# FORM 2A

# LISTING STATEMENT

This Listing Statement must be used for all initial applications for listing and for Issuers resulting from a fundamental change. The Exchange requires prospectus level disclosure in the Listing Statement (other than certain financial disclosure and interim Management's Discussion and Analysis) and can require that the Issuer include additional disclosure.

**General Instructions**

(a) Please prepare this Listing Statement using the format set out below. The sequence of questions must not be altered nor should questions be omitted or left unanswered. The answers to the following items must be in narrative form. When the answer to any item is negative or not applicable to the Issuer, state it in a sentence. The title to each item must precede the answer.

(b) In this form, the term “Issuer” includes the applicant Issuer and any of its subsidiaries.

(c) In determining the degree of detail required, a standard of materiality should be applied. Materiality is a matter of judgment in a particular circumstance, and should generally be determined in relation to an item's significance to investors, analysts and other users of the information. An item of information, or an aggregate of items, is considered material if it is probable that its omission or misstatement would influence or change an investment decision with respect to the Issuer's securities. In determining whether information is material, take into account both quantitative and qualitative factors. The potential significance of items should be considered individually rather than on a net basis, if the items have an offsetting effect. This concept of materiality is consistent with the financial reporting notion of materiality contained in the Handbook.

(d) Terms used and not defined in this form are defined or interpreted in Policy 1 – Interpretation.

(e) For Issuers that are re-qualifying for listing following a fundamental change, provide historic and current details on

(i) the Issuer

(ii) all other companies or businesses that are involved in the fundamental change (the “target”); and

(iii) the entity that will result from the fundamental change (the "New Issuer").

Information concerning the Issuer that was contained in the most recent Listing Statement may be incorporated by reference, but this statement must indicate if any of the information in the prior statement has changed (e.g. describing a business that will no longer be undertaken by the New Issuer). Information concerning assets or lines of business of the target that will not be part of the New Issuer's business should not be included.

(f) This Listing Statement provides prospectus-level disclosure. It will be amended from time to time to reflect any changes to the prospectus disclosure requirements. If changed, the new form is to be used for the next listing statement the Issuer is required to file. The Issuer does not have to amend a listing statement currently on file to reflect any new disclosure requirements.

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## 2. Corporate Structure

2.1 The full corporate name of the Issuer is Victory Nickel Inc. ("**Victory Nickel**" or the "**Issuer**"). The Issuer's head and registered office is located at 80 Richmond St. W., 18th Floor, Toronto, Ont., Canada, M5H 2A4.

2.2 The Issuer is incorporated February 1, 2007 under the laws of the province of Ontario. On September 12, 2014, the Issuer announced a consolidation of its common shares on a one-for-ten basis (the "**Share Consolidation**"). The common shares began trading on a consolidated basis on September 17, 2014. Any reference to the numbers of common shares, options and warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period referred to in this document, unless otherwise noted.

2.3 Victory Nickel has two subsidiaries, Victory Silica Ltd. ("**Victory Silica**") and BG Solutions Inc. ("**BG Solutions**").

(a) Victory Nickel owns 100% of the voting securities of both Victory Silica and BG Solutions.

(b) Victory Silica is incorporated pursuant to the OBCA; BG Solutions is incorporated pursuant to the Business Corporations Act (Alberta).

(c) There are no restricted shares.

2.4 The Issuer is not requalifying following a fundamental change, nor is it proposing an acquisition, amalgamation, merger, reorganization or arrangement.

2.5 This does not apply to the Issuer as the Issuer is incorporated in Canada.

## 3. General Development of the Business

3.1 Victory Nickel has historically been a Canadian exploration and development mineral resource company and has been primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada. However in 2012 Victory Nickel established a presence in the frac sand market with the formation of wholly-owned subsidiary Victory Silica Ltd. ("**Victory Silica**"). The reason for entering the frac sand production market is directly related to the results of a feasibility study completed in 2010 on the Issuer's Minago nickel project in central Manitoba which revealed the existence of a substantial frac sand resource.

As of the date hereof, the Issuer holds the following interests in material mineral properties:

- 100% interest in the Minago property (the "**Minago Project**") (sulphide nickel) located in the Thompson Nickel Belt in Manitoba;
- 100% interest in the Mel property (the "**Mel Project**") (sulphide nickel) located in the Thompson Nickel Belt in Manitoba;
- 100% interest in the Lac Rocher property (the "**Lac Rocher Project**") (sulphide nickel) located in northwestern Quebec;

Being an exploration company without producing mines, Victory Nickel previously had no sustainable revenue source, and had to rely on debt or equity financings or the sale of projects as its major source of funds for its activities; however, in 2012, Victory Silica was created by the Issuer to enter the frac sand production, distribution and sales market. The Issuer has since established itself as a frac sand provider by acquiring concentrated, unprocessed washed frac sand ("Concentrate") and processing it into finished frac sand product for sale initially in the Alberta, Saskatchewan, Manitoba and North Dakota markets.

**Three-Year History**
***November, 2012 - Loan Agreement***

In November 2012, the Issuer entered into a loan agreement with Nuinsco Resources Limited ("Nuinsco") for $1,000,000 (the "**Advance**"). The loan bears interest at 12% per annum, matures on January 31, 2015 and is secured by equipment and a general security agreement over the Issuer's assets. The loan was subject to prepayment, at the option of the lender, from the $1,000,000 Lynn Lake Project option payment that was due from Prophecy Platinum Corp. **("Prophecy")** on March 1, 2013. However, Prophecy did not make the payment and the option was terminated as of February 19, 2014.

***January, 2013 - Acquisition of Seven Persons Sand Recycling Facility***

On December 28, 2012, the Issuer entered into an asset purchase agreement with BG Solutions Ltd. (the "**7P Plant Agreement**") for the purchase of the Seven Persons sand recycling facility located in Seven Persons, Alta, 18km southwest of Medicine Hat, Alberta (the "**7P Plant**"), subject to certain conditions. The acquisition of the 7P Plant is part of the Issuer's initiative to enter the frac sand market.

The terms of the 7P Plant Agreement provided for payment in three stages: (1) an initial payment of $10,000 on signing the 7P Plant Agreement; (2) a second payment of $300,000 on receipt of approval from Alberta's Energy Resources Conservation Board ("**ERCB**") of a reclamation plan to convert the 7P Plant site to a frac sand processing facility; and (3) completion of the reclamation plan, estimated to cost $400,000.

***March, 2013 - Private Placement***

In March 2013, the Issuer completed a non-brokered private placement financing of 4,417,850 Common Shares at a subscription price of $0.50 per Common Share for gross proceeds of $2,208,925.

***March, 2013 - Amended and Restated Loan Agreement***

On March 25, 2013, the Issuer executed an amended and restated loan agreement with Nuinsco (the "**Loan Agreement**") in respect of the Advance. Pursuant to the Loan Agreement, the secured credit facility (the "**Facility**") was increased to $2,500,000 (including the Advance), subject to an increase to up to $3,000,000 if the Rights Offering (as defined below) was not fully subscribed.

As with the original loan, the Facility bears interest at 12% per annum, payable quarterly in arrears, and matures on January 31, 2015. Upon the earlier of June 1, 2014 or notification that the frac sand plant is at commercial production, Nuinsco has the right to convert the outstanding balance of the Facility into a participating interest (the "**Conversion**") whereby Nuinsco is entitled to receive a share of cash flows earned from the sale of frac sand from the Issuer's frac sand business. The Issuer's participation is based on a range of a maximum of $10,000,000, with a minimum of $7,500,000, and is subject to adjustment under certain circumstances which could increase or decrease this range. On Conversion, the Facility would be considered paid in full. Nuinsco opted to exercise the Conversion in April 2014. Nuinsco had also agreed to backstop an equity issue with cash or by converting a portion of the Facility into shares, at Nuinsco's option to an amount up to $1,500,000 under certain circumstances. The Issuer announced a rights offering on June 14, 2013.

Under the terms of the Facility, Nuinsco agreed to provide a standby commitment for any equity offering initiated by Victory Nickel. This commitment was triggered for the rights offering which closed on July 30, 2013. Under the agreement, Nuinsco subscribed for 5,031,601 units for cash of $1,207,584. Each Unit comprises one common share and one common share purchase warrant. This brings cumulative advances under the Facility to Victory Nickel to $2,207,584 and caps the Facility amount at $2,707,584 (from a maximum possible $3,000,000) with $500,000 remaining for draw down and to be used to develop the Issuer's frac sand business. The subscription under the standby commitment, among other things, is included in the calculation of Nuinsco's potential participation under the Conversion of the Facility.

The Issuer was to pay, with shares, an arrangement fee of up to $300,000 plus a commitment fee of 1.5% per annum on unutilized balances.

On February 4, 2014, both Nuinsco and Victory Nickel agreed to cancel the $500,000 amount remaining to be drawn down under the Facility. This fixed the commitment fee

to be paid in shares at $12,000 and also amended the range of Nuinsco's participation in the net cash flows earned from the sale of frac sand to a maximum of $10,222,831 with a minimum of $7,667,124 on the basis of a sharing percentage of 52.16%. This range could be decreased should Victory Nickel repay some or all of the $1,000,000 balance outstanding before Conversion.

***June, 2013 - Rights Offering***

On July 30, 2013, the Issuer completed an offering to shareholders of the Issuer of rights (each, a "**Right**") to subscribe for units of the Issuer (each, a "**Rights Offering Unit**") on the terms set forth in the rights offering circular of the Issuer dated June 14, 2013 (the "**Rights Offering**"). Each Rights Offering Unit was comprised of one Common Share and one Common Share purchase Warrant (each, a "**Rights Offering Warrant**"). Each Rights Offering Warrant issued entitles the holder thereof to acquire one Common Share at an exercise price of $0.35 per Common Share during the 12 month period beginning at 9:00 a.m. (Toronto time) on July 31, 2014 and ending at 4:00 p.m. (Toronto time) on July 31, 2015.

Pursuant to the Rights Offering, the Issuer issued 10,000,000 Rights Offering Units for gross proceeds of $2,400,000. Pursuant to the Facility, Nuinsco provided a standby commitment in connection with the Rights Offering (the "**Standby Commitment**") in the amount of $1,207,584 and subscribed for 5,031,601 Rights Offering Units.

***September, 2013 - Private Placement***

In September 2013, the Issuer completed a private placement financing of 1,250,000 units of securities at a subscription price of $0.24 per unit for gross proceeds of $300,000. Each unit was comprised of one Common Share and one Common Share purchase warrant. Each warrant entitled the holder to purchase one Common Share at an exercise price of $0.35 for a period of 24 months from the date of issuance.

***November, 2013 - Private Placement***

On November 11, 2013, the Issuer completed a private placement financing of a convertible unsecured promissory note (the "**Promissory Convertible Notes**") in the principal amount of US$2,000,000. A portion or all of the principal amount of the promissory note is convertible prior to November 11, 2015, the maturity date, into Common Shares at a conversion price equal to $1.00 Canadian converted into United States dollars at the applicable Bank of Canada noon rate on the prior business day to such time of conversion, subject to adjustment. The principal amount of the promissory note outstanding from time to time bears interest at the rate of 14.8% per annum. This private placement forms part of the aggregate US$6,000,000 in Promissory Convertible

Notes (defined below). On November 12, 2015, the Issuer announced it had not repaid the US$2,000,000 in principal due under this Promissory Convertible Note.

***May, 2014 – 7P Plant Reclamation Completed***

In May 2014, reclamation activities at the 7P Plant were completed, satisfying all conditions precedent for the acquisition by the Issuer of the 7P Plant.***May, 2014 – SPA Loan***

On May 15, 2014 (the "**Initial Closing Date**"), the Issuer announced that it had executed a securities purchase and senior secured line of credit agreement (the "**SPA Loan**") with City Hall Capital LLC ("**City Hall**" or the "**Secured Lender**") in the amount of US$4,000,000. The SPA Loan bears interest of 14.8% per annum and matures on July 30, 2015. City Hall previously purchased a convertible note in the amount of US$1,000,000 and this was extinguished and became part of the SPA Loan on the Initial Closing Date.

As part of the SPA Loan, the Issuer issued 2,000,000 common share purchase warrants. For each US$1,000,000 advanced under the SPA Loan, the lender is entitled to exercise 500,000 common share purchase warrants to acquire shares at $1.00 per share for a period of three years. The number of warrants is subject to an increase to 1,000,000 Warrants for each US$1,000,000 drawn under the SPA Loan if the loan is prepaid and the closing price of the Issuer's common shares is $2.00 or lower on the trading day preceding the date of such prepayment.

***July, 2014 – Private Placement***

At various times up to July 7, 2014, the Issuer completed additional private placements of unsecured Promissory Convertible Notes in the principal amount of approximately US$5,000,000 ($4,000,000 net of the $1,000,000 which formed part of the SPA Loan, as noted above). The Promissory Convertible Notes each have two-year terms from issue date, bear interest calculated and payable quarterly at 14.8% and are convertible at the option of the holder into the Issuer's shares at $1.00 per share. On July 1, 2015, the Issuer announced that it was not able to make the quarterly interest payment due June 30, 2015 on the Promissory Convertible Notes.

***August, 2014 – Completed the Commissioning of the 7P Plant***
On August 11, 2014, the Issuer announced that the 7P Plant had attained sufficient consistent throughput of frac sand that the commissioning stage was now complete.

***October, 2014 – Loan Facility***
On October 1, 2014, the Issuer completed an arrangement of short-term financing by way of a promissory note amounting up to US$2,000,000. The promissory note bears interest at 28%, calculated and settled monthly. This short-term loan was renewed on a

monthly basis upon payment of extension fees and penalties. The Issuer made repayments aggregating $1,000,000 during the first two months of 2015, and the remaining balance of $1,000,000 due on March 31, 2015 was extended until April 30, 2015 and subsequently further extended to May 31, 2015. On June 3, 2015, the Issuer announced it had entered into an amending agreement (the "**Amending Agreement**") with respect to the SPA loan. Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Issuer for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note and for working capital purposes. The aggregate amount of $5,150,000 under the amended loan was due on July 30, 2015. The interest rate under the Amending Agreement is 14.8% per annum. On July 1, 2015, the Issuer announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan. On July 30, 2015, the Issuer announced it had not repaid the principal amounts due under the SPA Loan.

On July 1, 2015, the Issuer announced that it was in discussion with its lenders and other potential financiers to restructure the Issuer's debt and recapitalize Victory Nickel.

***November, 2015 – SPA Loan Restructuring*** **("SPA Loan Restructuring")**
On November 26, 2015, the Issuer announced it had entered into a binding term sheet to restructure and extend the SPA Loan (the "**New SPA Loan**"). Under terms of the agreement the Secured Lender has agreed to extend the maturity date of the SPA Loan by 30 months to January 31, 2018. The facility amount under the New SPA Loan has been increased to US$5,500,000, to be used to repay the principal and interest owing under the US$5,150,000 SPA Loan. The interest rate on the New SPA Loan remains unchanged at 14.8% with interest payable in arrears. The New SPA Loan is due in full on the Maturity Date, subject to a cash sweep of 75 % of free cash flow ("**Free Cash Flow**") payable within 45 days following the end of each fiscal quarter. Free Cash Flow will be calculated based on the Issuer's quarterly unaudited and annual audited consolidated statements of cash flows, and be calculated as net cash from operating activities, plus net cash from investing activities, less interest and lease payments as shown in cash flows from financing activities. Allowable net cash from investing activities must be approved by the Secured Lender in advance. In addition, the New SPA Loan provides that the Issuer will not make payments without the Secured Lenders approval on existing unsecured debt until the New SPA Loan is repaid.

For each $1,000,000 advanced under the New SPA Loan, the Lender is entitled to receive warrants to purchase 500,000 Victory Nickel shares exercisable at CDN$0.25 per share for a period of two years from the closing date of the Transaction (the "**Warrants**"). Any warrants previously issued under the SPA Loan will be cancelled and replaced with Warrants.

As part of the SPA Loan Restructuring, the Issuer has also made the following restructuring proposals to unsecured creditors:

- **To the holders of the Promissory Convertible Notes:**

1) 50% of the amount of the Promissory Convertible Notes will be converted to common shares of Victory Nickel valued at a price of C$0.25 per share.

2) The remaining Promissory Convertible Notes will be replaced with new promissory convertible notes (the "**New Promissory Convertible Notes**") with the following terms:

(i) A maturity date of July 31, 2018.

1) (ii) An interest rate of 7% per annum, payable annually or at any time in cash or in shares valued at market at the option of the Issuer.

2) (iii) Convertible at C$0.25 per share.

3) (iv) Outstanding interest on the Promissory Convertible Notes will be settled in Victory Nickel shares valued at C$0.05 per share**.**

- **To the trade creditors:**

1) Approximately C$1.3 million of debt to trade creditors may be paid in shares at a price of $0.05 per share**.**

2) The remaining C$1.3 million of debt to trade creditors may be paid with New Promissory Convertible Notes as outlined above.

Completion of the SPA Loan Restructuring with the Secured Lender the unsecured lenders and trade creditors is subject to normal regulatory approvals and is being documented.

3.2 This item does not apply to the Issuer as there are no significant acquisitions or dispositions completed by the Issuer for which financial statements or pro-forma financial statements would be required under National Instrument 41-101 *General Prospectus Requirements* if this Listing Statement were a prospectus.

3.3 The recent downturn in the price of oil and gas has resulted in a drastic decrease in the oil and gas drilling activity which in turn results in a similar decrease in the demand for frac sand. As a result, the expected cash flow from the Issuer's frac sand business was curtailed and not sufficient to repay debt as it came due. The impact on the Issuer's balance sheet has and continues to bring pressure to the Issuer's market valuation. To remedy this, the Issuer has, with the co-operation of its Secured Lender, designed a debt restructuring plan which is now being implemented. The terms of this restructuring was described earlier. Once completed, the Issuer will review its positon to establish whether or not additional funding is required.

The near-term outlook in the frac sand market remains unclear due to the continuing downward pressure on the oil price and related impact on exploration and production ("**E&P**") and oilfield services companies. The strength of the US dollar is also impacting

demand for high-quality Wisconsin sand as the price for domestic sand has dropped and service companies appear satisfied with using lower quality domestic sand because of the price differential. This will continue to stress the Issuer's liquidity until such time as the market demand recovers and operations can resume on a consistent basis.

In the interim, the Issuer intends to sell its inventory to meet its outstanding obligations or any new obligations as they become due.

Development of the Issuer's current nickel mining projects to the production stage will require significant financing. Given the current economic climate and metal price environment, the ability to raise funds to develop the Issuer's nickel projects is unlikely.

There is no certainty, especially in the present environment, that the Issuer's initiatives to restructure its debt and improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Issuer's activities including debt servicing, project expenditures and corporate costs.

The resource industry, metal mining and oil and gas, is and has always been very cyclical. The current cycle has been more severe than ever seen and would suggest the need for a severe correction. The timing of the recovery is uncertain. In the interim, the Issuer has reduced costs and programs to a minimum and to a level which are sufficient to protect its assets.

# 4 Narrative Description of the Business

## 4.1 General

(1) Victory Nickel has three reporting segments, Corporate, Exploration and Development and Frac Sand.

***The Corporate Segment*** supports all of the Issuers activities.

***The Exploration and Development Segment***

The Exploration and Development segment was the base on which the Issuer was formed and includes activities on the Issuer's nickel projects.

The Issuer was formed on February 1, 2007 as an exploration and development mineral resource company and, until recently, was primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada. Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Corazon Mining Ltd. ("**Corazon**"), an Australian public company (ASX: CZN) refer below) and Mel projects in Manitoba and the Lac Rocher project in Québec.

The results of a feasibility study on the Minago Project ("**FS**") were announced in December 2009, the Environmental Impact Study ("**EIS**") was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Minago Environmental Act Licence ("**EAL**") was announced in August 2011. In April 2014 the Issuer announced the filing of an amendment to the EAL.

A preliminary economic assessment of Lac Rocher ("**PEA**") was announced in November 2008. Baseline environmental studies are ongoing at Mel in preparation for permit applications should the economics support development.

In November 2014, Corazon optioned Lynn Lake. Under the terms of the agreement, Corazon can acquire a 100% interest by issuing to Victory Nickel 40 million Corazon shares upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project. The Issuer received 40,000,000 shares of Corazon in April 2015. The Issuer does not consider Lynn Lake to be a material asset.

**History of the Issuer's Properties**

***Minago Project***

The Minago Project is located on the Thompson Nickel Belt in Manitoba, and is one of Canada's largest undeveloped sulphide nickel deposits with measured and indicated resources of 54.2 million tonnes grading 0.52% nickel, or 620 million pounds of in-situ nickel (0.25% nickel cut-off grade), comprised of an 11.1 million tonne measured resource grading 0.56% nickel and a 43.1 million tonne indicated resource grading 0.51% nickel. A further 14.6 million tonne inferred resource at 0.53% nickel contains an additional 170 million pounds of in-situ nickel. The Minago open pit as designed is overlain by an 11 million tonne frac sand resource.

In August 2011, the Issuer was granted an EAL by the Manitoba government for the construction, operation and subsequent decommissioning of a mine at the Minago Project.

On August 23, 2011, the Manitoba Government issued Victory Nickel's final EAL for the Minago project. The licence expires on August 22, 2014 unless the Issuer completes a certain amount of work to move the project forward. During 2013, the Issuer complied with the conditions of the EAL and, in December, filed an Environmental Act Proposal ("**EAP**") to amend the EAL to relocate the proposed tailings and waste rock management facility. The construction of drainage ditches installed to lower down the water table within the pit shell limits, the installation of Flow Gauging and Telemetry

systems and the implementation of a comprehensive environmental monitoring program are considered part of the site development necessary to maintain the EAL which would otherwise have expired in August, 2014. Approval of the EAP is expected imminently.

***Mel Project***

The Mel Project sulphide nickel deposit is located in the Thompson Nickel Belt, just north of Thompson Manitoba, and has a NI 43-101-compliant indicated resource of 4,300,000 tonnes grading 0.88% nickel (approximately 83,000,000 pounds in-situ nickel) and an additional inferred resource of 1.0 million tonnes grading 0.84% nickel (approximately 19,000,000 pounds in-situ nickel). This near-surface resource, along with a contractual obligation by Vale Canada Limited ("**Vale**") to mill ore mined from the Mel Project deposit at cost plus 5% (provided that the product meets Vale's specifications and that Vale has sufficient mill capacity), makes near-term nickel production from the Mel Project deposit a possibility that the Issuer is continuing to evaluate.

***Lac Rocher Project***

Lac Rocher is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cut-off, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per pound in the Lac Rocher PEA was US$9.74 with copper at US$3.65.

The Lac Rocher Project is subject to a discovery incentive plan (the "**DIP**") to reward certain individuals involved in the discovery of the Lac Rocher Project with a 2% net smelter royalty ("**NSR**") for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Issuer with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Issuer may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher Project is the only property subject to the DIP. As the Lac Rocher Project is not yet in production, no royalties are currently payable.

***Lynn Lake Project***

The Issuer hold a 100% interest in the Lynn Lake property (the "**Lynn Lake Project**") (sulphide nickel) located in the historic mining town of Lynn Lake in northern Manitoba. In November 2014, Corazon Mining Ltd. ("**Corazon**") optioned the Lynn Lake Project. The Issuer does not consider the Lynn Lake Project to be material.

***The Frac Sand Segment***

The Issuer's decision to enter the frac sand business was initially based on the need to highlight the value of the frac sand as a co-product at its Minago nickel project in Manitoba. Based on the FS, approximately 11 million tonnes of frac sand exist within the Minago FS pit footprint. The frac sand is a significant contributor to the economics of the Minago project and represents a by-product value of approximately US$2.90 per pound of nickel. On June 19, 2012, the Issuer announced the creation of Victory Silica, a wholly-owned subsidiary that has been established to manage the Issuer's entry into frac sand production and distribution.

Victory Nickel is now a Canadian producer of high-quality "Northern White" frac sand sourced from Wisconsin, USA, through its wholly-owned subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica"). Northern White occurs predominantly in the US Mid-West and generally exceeds American Petroleum Institute ("API") specifications. For this reason, it is a highly-desirable and preferred frac sand. Frac sand is used as a proppant to enhance the recovery from oil and gas wells. The Issuer's frac sand processing facilities are located in Seven Persons, Alberta and comprise a wet plant with capacity of approximately 120,000 tons per annum ("**tpa**") and a fully-operational dry plant with a nominal capacity of 500,000 tpa (the "**7P Plant**"). In April 2015 the Issuer announced the temporary suspension of production at its 7P Plant as demand for frac sand dropped off during the spring break-up season and due to the decrease in activity related to the sudden drop in the price of oil. In May 2015, spot sales of frac sand from the 7P Plant resumed and the 7P Plant operates on an as-needed basis only.

The Issuer has considered constructing a wet plant in Wisconsin or Minnesota and is also completing preliminary studies to build a second 1,000,000 tpa dry plant in or near Winnipeg, Manitoba. Market conditions necessitate the deferral of any such construction until more certainty returns to the oil and gas sector.

Crucial to the success of its frac sand operations is the Issuer's ability to build a solid customer base within an economic distance of its production facilities. The Issuer was able to establish itself as a preferred supplier in the areas around Medicine Hat, Alberta through spot-market sales and short-term contracts. The Issuer's 7P Plant is located in close proximity to oil and gas producing plays in Alberta, BC, Saskatchewan and North Dakota, allowing customers to purchase sand FOB the 7P Plant and use their own trucks to deliver to the wellhead or, alternatively, to have the Issuer deliver frac sand directly to the wellhead. A small portion of finished sand is delivered by rail.

Unprocessed frac sand is a naturally occurring mineral that is mined and processed and is one of the three primary types of proppant that are commonly used in the drilling and completion of oil and natural gas wells and specifically in the hydraulic fracturing process. Of the three primary types of proppant, processed frac sand is the most widely used due to its broad applicability in oil and natural gas wells and its cost advantage relative to other proppants.

Fracking or hydraulic fracturing is a process whereby a mixture of proppant (such as processed frac sand), additives and water is injected down oil and gas wells under pressure. This causes the rock layer to crack. The sand particles then enter the fissures to hold them open so that oil and natural gas can more freely flow up the well opening created by drilling.

Processed frac sand has specific properties, including: (1) a certain roundness and sphericity; (2) a certain crush resistance; and (3) it must be free of debris or clean. The highest quality sands are imported into Canada from the old, in geological age, deposits in the United States Midwest, such as deposits in Illinois and Wisconsin. However, at times, this premium-quality sand is only made available to service companies in the United States. The second highest quality is sand derived from sandstone deposits in Canada, such as the deposits at the Minago Project. The lowest quality sands are younger and more angular dune sands.

In 2012, through the creation of Victory Silica, Victory Nickel decided to establish itself in the frac sand business. Also in 2012, Ken Murdock was appointed as Chief Executive Officer of Victory Silica, with the objective of establishing Victory Silica as a supplier of premium processed frac sand in the Western Canadian and certain Northwestern United States markets. Mr. Murdock has many years of experience in the frac sand, oil and gas and aggregates industries.

Processing frac sand is a two-stage process: first, mining and washing the raw sand (the "**Wet Stage**") and, second, drying and sorting the finished sand (the "**Dry Stage**"). Currently, the frac sand business model focuses on purchasing mined and washed wet sand Concentrate from existing Wisconsin sand mines and then drying and screening the sand at the Issuer's 7P Plant (see business plan below).

The 7P Plant is located 18km southwest of Medicine Hat, Alberta in an area which is populated with fracking companies, potential customers of the Issuer, and is within only a few hours' trucking distance of major oil or gas play well sites. The Issuer's initial target markets are located in Alberta, British Columbia, Saskatchewan, Manitoba and North Dakota. In general, the Issuer's customers are expected to take delivery of the processed frac sand product by truck via the 7P Plant, at the expense of the customer.

On December 28, 2012, the Issuer entered into the 7P Plant Agreement for the purchase of the 7P Plant, subject to certain conditions.

To further the Issuer's efforts with respect to the frac sand initiative, in July 2013, the Issuer ordered key pieces of equipment, which were received in multiple shipments between November 2013 and January 2014. On September 16, 2013 the Issuer entered into an agreement with Seven Rivers InterModal Terminals, LLC for the transloading

from truck to rail of unprocessed frac sand concentrate produced in Wisconsin for transport to, and final processing at, the 7P Plant.

On September 20, 2013, Canadian Pacific approved the Issuer's application for a credit facility allowing the Issuer to rail freight from Wisconsin to Seven Persons, Alta.

On October 31, 2013, AMEC Environment & Infrastructure, a division of AMEC Americas Limited, finished the required closure report regarding site remediation at the 7P Plant, which was submitted to the AER. This paved the way for installation of the upgrades required to convert the 7P Plant to a 500,000 ton per annum frac sand production facility. The installation of the upgrades required to convert the 7P Plant was completed in January 2014.

On November 4, 2013, the Issuer made an application to convert the 7P Plant to a frac sand processing facility and on March 18, 2014, the Issuer received the required approval from the Alberta Energy Regulator (the successor to the ERCB) (the "**AER**").

On December 17, 2013, the Issuer entered into a rail car leasing agreement to provide rail cars for the shipment of sand concentrate from Winona, MN to Seven Persons, Alberta (the "Rail Car Lease"). Additional rail cars were leased in December of 2014.

On December 28, 2013, the Issuer finalized its supply contract with a Wisconsin-based sand supplier to provide washed sand Concentrate to be delivered for processing at the 7P Plant. The completion of the agreement ensures the availability of the highest quality Jordan formation sand from Wisconsin and also provides Victory Nickel with the opportunity to participate in a joint venture on several properties in Wisconsin and Minnesota guaranteeing it a long-term supply of premium-quality unprocessed frac sand from Wisconsin.

On January 23, 2014, the Issuer finalized a custom processing agreement which provides for the washing of sand to produce a 20/50 sand Concentrate.

In late January 2014, 900 tons of Concentrate was shipped from the transload terminal in Winona, WI for drying, screening into various grades and sale from the 7P Plant, and in early February 2014 the first nine-railcar shipment of Concentrate from Winona, MN had arrived, been unloaded and moved to the 7P Plant for initial plant commissioning. Two additional railcar lots arrived in February 2014.

In February 2014, commissioning of the 7P Plant commenced, which involved introducing washed premium-quality Jordan formation Concentrate from inventory stored at the 7P Plant into the newly-built drying and screening facility in order to perform the necessary tests and inspections to ensure that the 7P Plant is operating at specified

performance levels. Starting in March 2014, the Issuer commenced selling and delivering frac sand processed during commissioning on a spot basis.

In May 2014, reclamation activities at the 7P Plant were completed, satisfying all conditions precedent for the acquisition by the Issuer of the 7P Plant.

In August 2014, the Issuer completed commissioning of the 7P Plant.
In October 2014, the Issuer entered into an option to acquire a 100% interest in the Bear Coulee land package totalling over 300 acres in south western Wisconsin, USA. The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months with two equivalent extensions available under certain circumstances. Prior to production, a payment of US$40,000 per annum as advance royalties is on the initial 20,000 tons of sand production. Once the property is in production, a royalty of US$2.00 per ton of frac sand sold from the property is payable.

In January 2015 the Issuer contracted with a second Wisconsin, USA-based supplier of washed and concentrated Northern White frac sand and with a second transload facility located in St. Paul, Minnesota in order to provide additional flexibility in the Issuer's frac sand supply chain.

In February 2015 the Issuer announced the completion of a National Instrument 43-101 indicated resource estimate of 10.9 million tons of frac sand on the Bear Coulee Project. In March 2015, the Issuer announced that the sand resource exceeds the American Petroleum Institute ("**API**") frac sand specifications and that, on average, an exceptional 43% of the resource will report to the 20/40 size fraction.

The frac sand initiative business plan is a three-phased approach, managed and operated by Victory Silica employees, of which Phase 1 has already been completed:

- **Phase One** (*in operation*) ("**Phase One**"): The Issuer has begun processing sand imported from Wisconsin at the 7P Plant and selling the processed frac sand to customers on a spot basis. Phase One also envisions the sale of domestically-sourced frac sand, although no sales of this product have yet been made from the 7P Plant.

- **Phase Two** (*planned but deferred due to market conditions)* ("**Phase Two**"): The Issuer intends to take steps to reduce costs associated with Phase 1, including the construction of a concentrator in Wisconsin, and assure security of sand supply by acquiring control of a frac sand mine in Wisconsin.

- **Phase Three** (*planned but deferred due to market conditions - expected development period is projected to be two years following receipt of financing*) ("**Phase Three**"): The Issuer intends to construct a larger frac sand plant to process and distribute both imported and domestic sand, which may potentially, but not necessarily,

include sand mined as a co-product of development at the Minago Project. The Issuer has already identified a site in Winnipeg, Manitoba for this purpose.

The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014. In April 2015 the Issuer announced the temporary suspension of production at its 7P Plant as demand for frac sand dropped off during the spring break-up season and due to the decrease in activity related to the sudden drop in the price of oil that began in 2014. In May 2015, spot sales of frac sand from the 7P Plant resumed and the 7P Plant has operated only on an as-needed basis since that time.

To finance development of the 7P Plant, the Issuer has previously completed a rights offering and other equity issues and various debt transactions, both secured by the assets of the Issuer and unsecured, with a number of lenders as described earlier.

The SPA Loan is secured via a general security agreement over all the assets of the Issuer. The interest rate on the SPA Loan is 14.8% per annum, with interest payable quarterly, in arrears. The aggregate principal amount owing under the SPA Loan is US$5,150,000, which was due and payable on July 30, 2015; interest of approximately US$380,000 is also presently due and owing.

In addition to the SPA loan, the Issuer issued the Promissory Convertible Notes. One Promissory Convertible Note in the amount of US$2,000,000 was due in November 2015, three Convertible Promissory Notes aggregating US$750,000 are due in February 2016, and four Convertible Promissory Notes aggregating to C$265,000 are due at various times between January and March, 2016.

The Issuer’s forecasted cash flows for the 7P Plant were US$12,500,000 per annum based on market conditions in 2014. This would have been more than sufficient to repay all debt when due. Unfortunately the sudden and significant drop in the price of oil changed the Issuer’s expectation.

On July 1, 2015, the Issuer announced via news release that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and on the Promissory Convertible Notes, and that it was in discussion with its lenders and other potential financiers to restructure the Issuer’s debt and recapitalize the Issuer. On July 30, 2015, the Issuer announced via news release it had not repaid the amounts due under the SPA Loan. In addition, the Issuer has had to defer payments to suppliers to an amount of approximately US$3,000,000.

As at September 30, 2015, the Issuer had a working capital deficiency of US$10,630,000. The Issuer used net cash from operating activities of US$5,953,000 during the first nine months of 2015.

Major suppliers of frac sand indicate that the long-term fundamental trends for sand demand remain favourable and that the price discounts are temporary in the current market. In the interim, programs are being developed by management in an effort to make the Issuer's operations more competitive in the Canadian market.

In November, 2015, the Issuer announced the SPA Loan Restructuring, as described in detail in Section 3.1 above.

4.1 (1) (a) Over the course of the next 12 months, the Issuer expects to:

1. Rectify the working capital deficiency through the restructuring of secured and unsecured debt.

2. Continue to produce and sell frac sand from its 7P Plant in Alberta as required.

3. Fund segment activities through the sale of existing inventory and if necessary through additional production of frac sand at the Issuer's 7Person plant.

4. Implement a dry frac sand importation and sales program ("**Dry Sand Program**").

5. Implement a program to purchase raw domestic frac sand for finishing (washing, drying and sorting) at the 7P Plant for sale to customers operating in southern Alberta ("**Domestic Sand Program**").

6. Maintain the Issuers existing nickel projects in good standing.

(1) (b)

1. The SPA Loan Restructuring involves negotiating a restructured debt agreement with the Issuer's secured lender and finalizing revised terms with unsecured creditors (these steps have been completed), having unsecured creditors sign and return debt settlement agreements (this process is sufficiently complete to allow the Issuer to complete the agreements), issuing consideration (common shares and/or warrants and promissory notes) under the debt settlement agreement and providing revised documentation to secured and unsecured trade creditors and note holders (this will be completed upon closing which will occur immediately following completion of the listing of the common shares on the CSE).

2. The 7P Plant is up and running and no new capex is required to continue to produce and sell frac sand.

3. As at September 30, 2015 approximately 12,000 tons of finished frac sand inventory and 26,000 tons at various stages of processing exists at the 7P Plant. Concentrate can be processed as required should all existing finished inventory be sold and no new capex is required. Operating costs will be funded through sale of finished goods inventory.

4. Under the Dry Sand Program, the Issuer plans to ship high-quality finished Northern White frac sand from Wisconsin to a leased transload facility in Fort Saskatchewan, Alberta for sale to customers operating in Grande Prairie, Alberta and other areas in northern Alberta where significant frac sand demand continues. Costs for this program are entirely working capital. The plan is to have customers prepay prior to the Issuer buying finished frac sand from Wisconsin and moving it to Alberta. This reduces the margins but significantly reduces risk and capital required. The Issuer would in effect be a broker of finished product, Suppliers have been identified and negotiations with customers are ongoing and sales could occur at any time.

5. Supplying both domestic and imported frac sand was always a part of the Phase One plan, and the Domestic Sand Program is designed to take advantage of increased current demand for lower-cost domestic frac sand. As with the Dry Sand Program, costs for this program are almost entirely working capital. The extent of the working capital requirement will be dependent on the magnitude of the market and projected sales at the time. Sand will only be bought if a sale has been made. The capital costs to restart the existing wash plant are approximately $50,000 and would be funded through ongoing sales. This program will not be advanced until the spring of 2016 at the earliest.

6. Maintain existing properties by insuring the payment of property lease costs required during 2016. These total less than C$100,000.

(1) (c)

As at December 31, 2015, the most recent month end, the Issuer had an estimated working capital deficiency of $5.7 million. Under terms of the restructuring negotiated with the Issuer's Secured Lender, US$5.5 million has been reclassified to long term as the maturity date of the secured loan is extended to January 2018. As part of the restructured secured loan terms, maturity of unsecured debt will be extended to July of 2018. Upon completion of the restructuring, the Issuer's working capital position will improve to approximately US$2.3 million.

No additional funding is required to achieve the milestones set out in paragraphs (a) and (b). Funding will be generated from realization of working capital or prepayment by customers. Previously, the Issuer had negotiated a receivables factoring agreement with a major bank which included a working capital covenant. The Issuer was unable meet the working capital covenant and as a result did not complete this agreement. The main reason for not being able to meet the working capital covenant was because the amount of the debt which had now become current and decreased working capital. With the completion of the proposed restructuring and a return to a positive working capital position the

Issuer is now able to revisit this and other alternatives for working capital financing with the potential to further enhance the overall financial condition.

(1) (d)

As described in paragraphs (a) and (b) above, funds to achieve the milestones will be generated from operations. In addition the Issuer has the option of selling non-core assets if necessary.

(2)

(a) Frac sand is a bulk commodity that is shipped by both rail and road. The 7P Plant is located 18km southwest of Medicine Hat, Alberta in an area which is populated with fracking companies, potential customers of the Issuer, and is within only a few hours' trucking distance of major oil or gas play well sites. The Issuer's initial target markets are located in Alberta, British Columbia, Saskatchewan, Manitoba and North Dakota. In general, concentrated wet frac sand is shipped to a rail siding in Medicine Hat from Wisconsin by rail and from that rail siding to the 7P Plant by truck. Typically, the Issuer's customers take delivery of the processed frac sand product by truck FOB the 7P Plant, at the expense of the customer.

(b)

(i) This item is not applicable to the Issuer as there are no joint ventures for equity-accounted companies.

(ii) The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014. During fiscal 2014 and 2015, 100% of the Issuer's revenues were generated from the sale of various grades of frac sand.

(iii) This item is not applicable to the Issuer as there are no controlling shareholders.

(iv) This item is not applicable to the Issuer as no sales or transfers are made to investees.

(c) This item is not applicable to the Issuer as the 7P Plant completed commissioning in August 2014.

(3)

(a) Frac sand production is a two-stage process: the wet stage and the dry stage. The Issuer has historically contracted out the wet stage in Wisconsin prior to shipping the wet sand to the 7P Plant by rail, however a de-commissioned wet

plant exists at the 7P Plant site which can be placed back into production at a projected cost of approximately $50,000. The wet stage uses water to remove the fines and clays, allowing transport of only the coarser sand fractions. The dry stage, where the Concentrate is dried and separated by screening into finished product of several different sizes, is completed at the 7P Plant, which is a 500,000 tpa dry processing facility. Finished frac sand is typically sold FOB the 7P Plant where it is loaded into trucks operated or contracted by customers at their cost, however in certain instances the Issuer has arranged for delivery to customer sites by contracting third party transportation providers (truck and/or rail) at the customer's cost.

(b) The Issuer's lease MLL 890027 in the province of Alberta, covering the 7P Plant site, expired on November 20, 2014 (the "**7P Plant Lease**"). Before and subsequent to that time, the Issuer had the option to purchase the land covered by the 7P Plant Lease, however the purchase price proposed by the government of Alberta was unacceptable therefore the Issuer applied to renew the 7P Plant Lease. This renewal, for a period of 25 years, is in progress and requires the payment of rent owing totaling approximately $2,500 and a one-time security deposit of up to $50,000 and lease payments of approximately $900 per annum. The Issuer also has a lease agreement with Canadian Pacific Railway Company covering a rail siding (the "**Siding Lease**") for the transloading of frac sand in Seven Persons, Alberta. The Siding Lease was entered into on January 27, 2014, and continues in force from year-to-year as a yearly lease, provided the Issuer is not in default of any of the terms, covenants and conditions of the Siding Lease. The annual lease amount of C$5,150 is now due for payment. No related persons of the Issuer are either landlords or mortgagees.

(c) The Issuer prides itself on the amount of mining and exploration expertise it has in its management team, its group of regularly used consultants and its Board of Directors (the "**Board**"). This type of expertise is generally in short supply. The Issuer believes it has a competitive advantage in its ability to quickly assess exploration and mining opportunities. With respect to the frac sand initiative, the Issuer has hired individuals with the specialized skill and knowledge necessary to enter into, and compete in, the frac sand business, including Ken Murdock, the Chief Executive Officer of Victory Silica who has over 25 years of experience in the frac sand/aggregates/oil and gas industries.

(d) The Issuer's business plan calls for sourcing of raw material and finished frac sand from both Canadian and US sources; thus far the Issuer has sourced all of its products out of the US. The pricing of raw material and of finished frac sand fluctuates with demand and has decreased over the past year in concert with the decrease in oil and gas prices over the past 12 to 18 months and,

accordingly the availability of both domestic and imported frac sand has increased.

(e) This is not applicable to the Issuer as the Issuer has no identifiable intangible properties as described.

(f) The Exploration and Development Segment is cyclical, driven in large part by metal price cycles. The Issuer attempts to make judicious use of consultants to minimize overhead so it will be better able to weather low metal prices. Victory Nickel's mineral exploration, development and mining business is also seasonal, with much of its exploration expenditures occurring in the first quarter when winter conditions provide the best working conditions and property access. As the Issuer develops new projects, exploration expenditures may occur more evenly throughout the year. As Victory Nickel's mining and exploration business is in the development stage, no revenue is currently generated from the Exploration and Development Segment. With respect to the Frac Sand Segment, there is a certain amount of seasonality with regard to processed frac sand purchasing by end users. Spring break-up is a period generally commencing in March and ending in May during which road restrictions limit the ability of oil and gas companies to mobilize the equipment and supplies needed to drill wells; a slowdown in drilling activity typically results in decreased demand for frac sand. Spring break-up begins and ends at different times depending on weather patterns and geographical locations., In addition, the demand for frac sand is impacted by the global price of oil and gas which is a cyclical industry.

(g) This is not applicable to the Issuer as there no contracts or sub-contracts to be renegotiated or terminating during the upcoming 12 months.

(h) As noted above, the renewal of the 7P Plant Lease is in progress and requires the payment of a security deposit of up to $50,000 for site reclamation. As the frac sand business is not environmentally unfriendly there are no environmental protection requirements in the Frac Sand Segment.

With respect to the Exploration and Development Segment, as the Issuer does not have any producing mineral properties there are no ongoing environmental protection requirements. As noted above, the Issuer has received the EAL for its Minago property and it will continue to do what is required to maintain this licence. No significant financial and operational effects of environmental protection requirements on the capital expenditures, earnings and competitive position of the Issuer in the current financial year. The Issuer will meet all environmental requirements under its permits in the event any of its mineral properties enter production.

(i) As of the end of the Issuer's most recently-completed financial year it had eight (8) employees. With the 7P Plant in full production, the Issuer expects to have 35 employees.

(j) This is not applicable as the Issuer has no foreign operations.

(k) At the present time there is the Siding Lease and the 7P Plant Lease for the land on which the 7P Plant is situated. Other contracts which the Issuer has not renewed include the Rail Car Lease and a Concentrate supply contract which are not necessary at present. When necessary, the Issuer is confident that these contracts can be reinstated or renewed with previous or other suppliers.

(l) This is not applicable to the Issuer as there are no major contracts or sub-contracts expected to be renegotiated or terminated in the current financial year.

(4) The mining industry is intensely competitive and the Issuer must compete in all aspects of its exploration and development activities with a substantial number of other junior mining companies, some of which have greater technical and financial resources. The Issuer may be at a disadvantage with respect to some of its competitors in the acquisition and/or development of high potential mining properties throughout the principal markets and geographical areas in which the Issuer carries on its business activities, however the Issuer's exploration and development projects are located in Manitoba and Quebec, two of the more favourable jurisdictions for resource activities globally.

With respect to the Frac Sand Segment, the 7P Plant is strategically located in an area populated by fracking companies and is within only a few hours' trucking distance of major oil or gas play well sites, providing the Issuer with what the Issuer believes to be a competitive advantage in terms of geographic location. The Issuer is a new entrant into the rapidly-growing frac sand market, and as such must compete with other companies, some of which have greater technical and financial resources. The Issuer believes, however, that given its focus on the rapidly-growing Canadian market; its personnel that has significant experience in the frac sand industry; the high quality of its frac sand product and consistent availability to Canadian customers; its well-located 7P Plant that is financed, built and operating; its status as an early mover in the Canadian frac sand industry relative to potential Canadian competitors most of which are at an earlier stage of development than the Issuer; and its three-phased business plan that mitigates risk and offers multiple growth opportunities, it is well positioned to successfully compete in the frac sand industry.

(5) This is not applicable to the Issuer as it has no lending operations.

(6) This is not applicable to the Issuer as neither it nor any of its subsidiaries has undergone any bankruptcy, or any receivership or similar proceedings within the three most recently completed financial years or in the current financial year.

(7) The Issuer has had no restructuring transactions other than the SPA Loan Restructuring. Details of the SPA Loan Restructuring are discussed in detail in Section 3.1 above.

The Issuer has sent a debt settlement proposal to each of the holders of the unsecured Promissory Convertible Notes as well as to each of its trade creditors with amounts owing in excess of $5,000. As of the date hereof, of the 12 holders of unsecured Promissory Convertible Notes, 11 have agreed to the terms presented. As announced via news release on December 14, 2015, the Issuer received formal notice of default and demand for payment of principal and accrued interest from the holder of a US$3,000,000 unsecured Promissory Convertible Note. The Issuer is continuing in discussions with the holder of this unsecured Promissory Convertible Note and its legal counsel, and remains hopeful of a positive resolution.

Of the 45 trade creditors that received the debt settlement proposal, 23 have agreed to the terms including those that have returned their documentation and those that have indicated they are prepared to sign the agreement and are in the process of returning their documentation.

Management's intention is to close on at least a first tranche of the debt settlement proposal as soon as practicable following listing of its shares on the CSE.

(8) This is not applicable to the Issuer as it has not yet implemented a formal social or environmental policy but expects to have such a policy in place during the current financial year.

4.2 This section is not applicable to the Issuer as it has no asset-backed securities outstanding.

4.3 **Mineral Projects.**

As noted above, the Issuer's Exploration and Development Segment comprises four mineral projects, Minago, Mel, Lynn Lynne Lake and Lac Rocher, three of which (Minago, Mel and Lac Rocher) the Issuer considers material projects. Presented in this Section 4.3 are the executive summary sections which are reproduced from the following national Instrument 43-101 – *Standard of Disclosure for Mineral* Projects **("NI 43-101")** reports:

- the "Feasibility Study Minago Nickel Mine" (the "**Minago Feasibility Study**"), dated March 4, 2010;

- the "Technical Report on the Mel Deposit, Northern Manitoba" (the "**Mel Technical Report**"), dated March 9, 2007; and,
- the “Preliminary Economic Assessment Lac Rocher Nickel Project, Quebec” (the "**Lac Rocher Preliminary Economic Assessment**"), dated November 5, 2008.

Each of the Minago Feasibility Study, the Mel Technical Report and the Lac Rocher Preliminary Economic Assessment, prepared in accordance with NI 43-101, is filed under the Issuer’s profile at www.sedar.com and is attached as Schedule “A” to this document.

***Minago Project***

# EXECUTIVE SUMMARY

## PROJECT OVERVIEW

The Feasibility Study Report discusses the scope, design features, and economic viability of the Minago Project (the Project), owned by Victory Nickel Inc. (Victory Nickel). The Minago Property (Property) is located in Manitoba's Thompson Nickel Belt on Highway 6, approximately 225 km south of Thompson, Manitoba, Canada (Figure 1).

This report is structured as a series of volumes: Volume I, Executive Summary; Volumes II and III, the Minago Feasibility Study, Volume IV, Drawings; and Volumes V, VI and VII, Appendices. As an overview of the entire Minago Feasibility Study, Volume I is an outline of Sections 1.0 to Section 19.0. The intent is a Volume I, Executive Summary, which is a "stand-alone" document that can be read without reference to the body of the Minago Feasibility Study.

The deposit has potential as a large tonnage, low-grade nickel sulphide deposit (25.2 Mt at 0.43% nickel (Ni), 0.20% cut-off grade) and contains 14.8 Mt of marketable frac sand. The potential of the Property is supported by a recent metallurgical test program, where a very high grade nickel concentrate of 22.3% was produced. The excellent recoveries for the ore from the open pit mine are substantiated by historical and current metallurgical testing data.

Normally, the economic potential of a deposit would be adversely impacted by an overlay of 80 m of overburden, limestone, and sand, with a high open pit strip ratio. However, the 10 m sand layer just above the ultramafic ore bearing rock contains marketable hydraulic fracturing sand (frac sand) which will offset the cost of the stripping.

The financial analysis assumes that critical revenue streams will be developed from both the nickel and frac sand resources. Table 1 shows the proposed production schedule by year, for the waste, the nickel ore and the sand.

To conserve costs and create more favourable spoil areas, Wardrop chose a dredging option over the mechanical removal of the overburden. By co-depositing the potentially acid generating, metal leaching ultramafic rock and sealing these within the tailings, significant infrastructure and legacy costs will be eliminated. Finally, by shortening the production life of the frac sand plant to more nearly match that of the ore processing plant, general and administrative and surface facility costs will be minimized.

The mine life is estimated to be seven full years and two partial years, with concentrate production mirroring ore production. For six of the nine years the production is at full capacity, for one year there will be a slightly reduced capacity and for two years there will be a reduced capacity. The frac sand, which is to be mined and stockpiled at the start of mining, will be

processed throughout the life of the mine and beyond. The first partial year's ore production (2013) will be stockpiled pending commissioning of the ore processing plant in 2014.

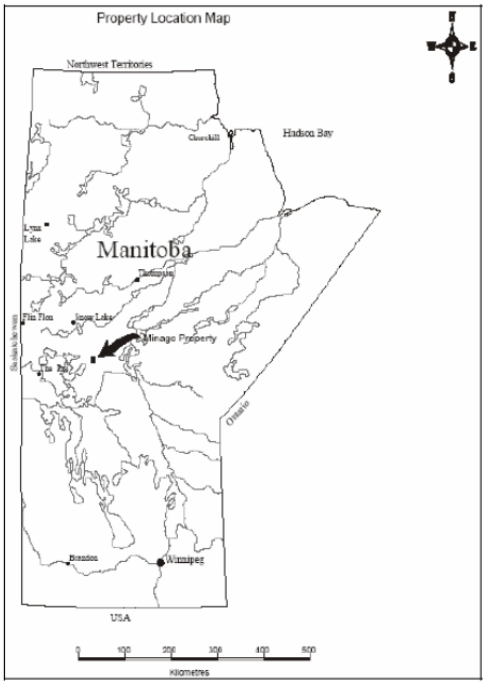
The Project includes an open pit bulk tonnage mining method, a 3.6 Mt/a nickel ore processing plant, and 1.5 Mt/a sand processing plant producing various sand products, including 20/40 and 40/70 frac sand, and other finer-sized sands. The Project will be built over a three year period at a capital cost of $596.3 million. The nickel ore processing plant is scheduled to come online in the spring of 2014, and the frac sand plant in the spring of 2013.

Based on a three year rolling average for nickel metal prices of US$11.19/lb, a frac sand FOB price of CDN$63.02/t, and a currency exchange rate of $1.00:$1.097 (US$/CDN$), the Project will have a pre-tax Internal Rate of Return (IRR) of 17.66% and a pre-tax Net Present Value (NPV) of $294 million at an 8% discount rate, with recovery of capital in four years after the first generation of nickel revenues.

**Table 1 Production Schedule by Year and Product**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dolomite (kt) | 42,655 | 43,179 | 15,183 | 10,015 | 0 | 0 | 0 | 0 | 0 | 0 | 111,032 |
| Granite (kt) | 0 | 1,744 | 20,890 | 20,440 | 35,711 | 24,459 | 9,784 | 4,944 | 3,832 | 199 | 122,005 |
| Ultramafic (kt) | 0 | 861 | 7,941 | 5,524 | 5,667 | 5,732 | 4,382 | 3,026 | 2,297 | 229 | 35,659 |
| Sand (kt) | 0 | 5,289 | 2,092 | 7,466 | 0 | 0 | 0 | 0 | 0 | 0 | 14,847 |
| Total Ore (kt) | 0 | 112 | 3,000 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | 453 | 25,166 |
| % Ni(S), Grade Ore | 0.000 | 0.374 | 0.419 | 0.429 | 0.430 | 0.413 | 0.436 | 0.431 | 0.447 | 0.468 | 0.430 |
| Total Tonnage (kt) | 42,655 | 51,186 | 49,105 | 47,045 | 44,979 | 33,792 | 17,766 | 11,570 | 9,728 | 881 | 308,706 |

**Figure 1 Property Location Map**



### Project Scope

As currently configured, the proposed Project will comprise an open pit mine, an ore concentrating plant, a frac sand plant, and supporting infrastructure.

The supporting infrastructure will be comprised of:

- a tailings and waste rock management facility (TWRMF) for the concurrent disposal of tailings and ultramafic waste rock
- rock dumps and overburden disposal repository
- an explosives plant and explosives storage
- water treatment facilities
- de-watering systems with associated pipelines and pumping stations
- roads and laydown areas
- staff accommodations and facilities
- open pit mining equipment, including trucks, shovels, loaders, and drills
- truck repair and maintenance facilities
- associated electrical and mechanical systems.

### Plant Location and Geography

The Project site is favorably located close to existing infrastructure, including Manitoba Provincial Highway 6, a 230 kV high voltage transmission line running directly beside Highway 6 on the east side of the road, the OmniTRAX Canada Railway Line, and the town of Grand Rapids.

The mine site is situated within a topographically low area of water-saturated peat and forest terrain. The area is almost entirely swampy muskeg with vegetation consisting of sparse black spruce and tamarack set in a topographic relief of less than 3 m. Although this low area extends for significant distances to the north and east, limestone outcrops exist to the south and west at a distance of 7 to 20 km from the site.

The site is located within the Nelson River sub-basin, which drains northeast into the southern end of the Hudson Bay. The basin has two more catchments in the Minago River and the Hargrave River, which enclose the project site. There are two more tributaries, the William River and the Oakley Creek present at the periphery of the project area. The catchments of these two tributaries are within the Lake Winnipeg basin and drain northward into the Nelson River sub-basin.

## *Site Arrangement*

The plant and infrastructure facilities shown in Figure 2 have been located as close to the open pit mine as possible on the limestone bluff to the west of the site. The escarpment will be cut back to a general level of 254 m to ensure clearance above the water table for the plant facilities. The crusher is located on the limestone bluff at a position where the elevation grade is most favourable. A more detailed sketch showing the plant and the camp facilities is provided in Figure 3.

The TWRMF has been located on the east side of the property where the geotechnical profile was interpreted to provide favourable foundation conditions. At this location, to the northeast of the mine, the overburden thickness was found to be between 3 to 6 m below the ground surface and comprised mainly competent clays. Typically, on the balance of the site within close proximity of the open pit mine, the overburden clays extended to depths of 10 to 12 m below the surface.

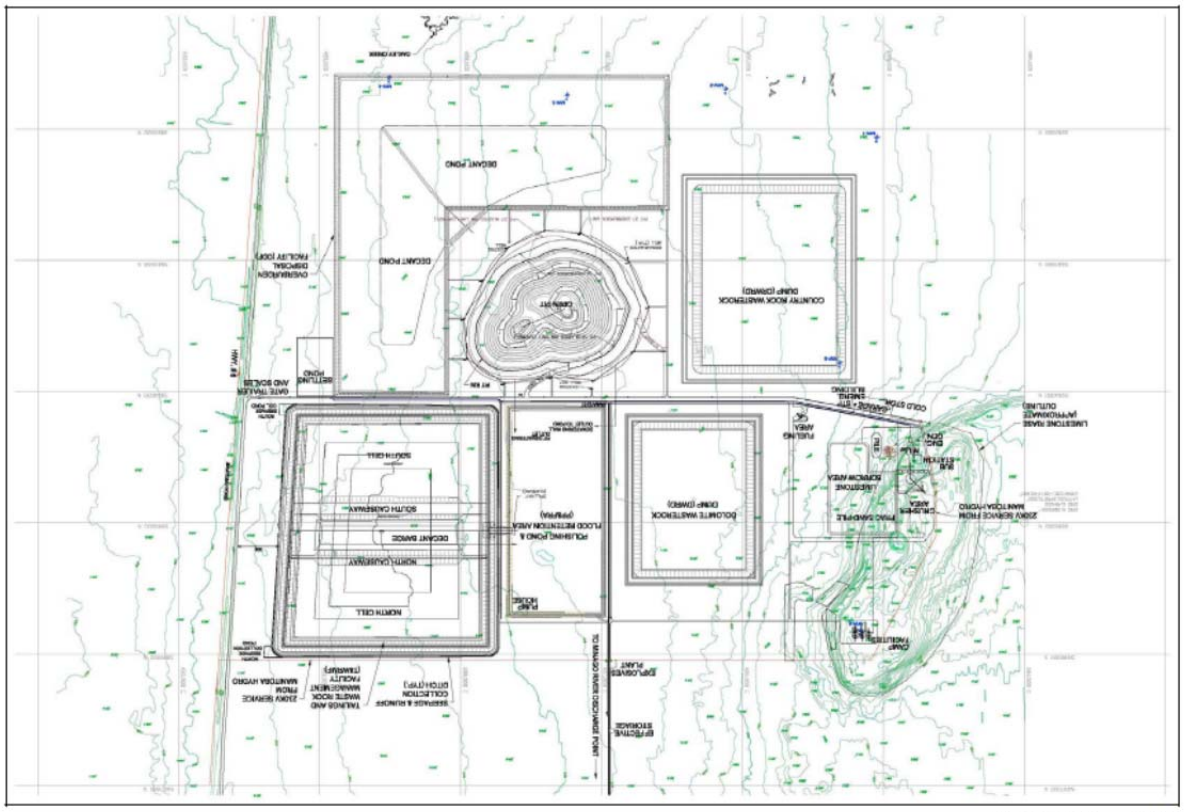


Figure 2 Overall Site Plan

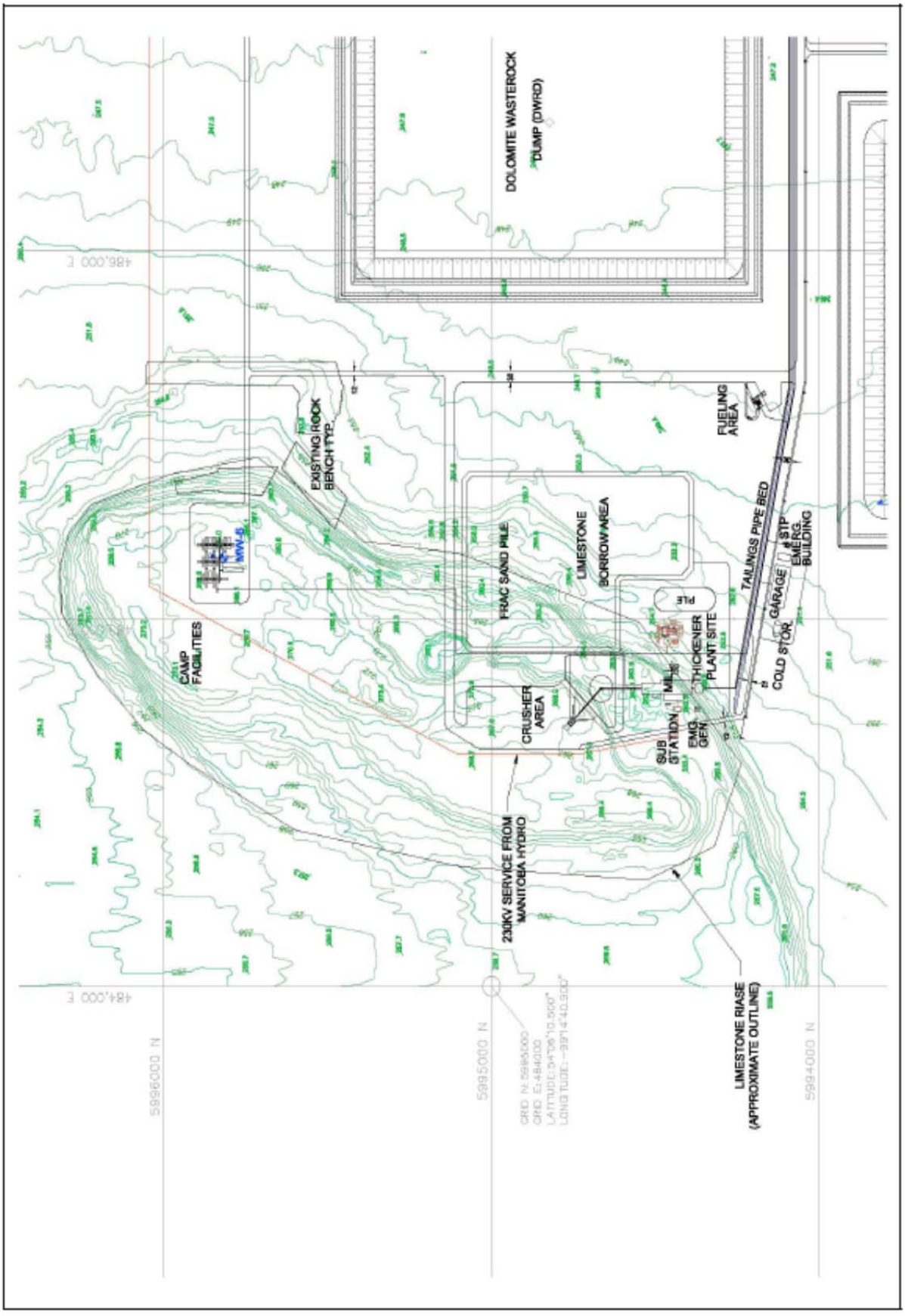



**Figure 3 Plant and Camp Facilities**

*History*

Geophysical Reservation 34 (GR 34), covering an area of 19.2 by 38.4 km, was granted to Amax Potash Ltd. (Amax) on November 1, 1966 for a period of two years, extended to April 30, 1969 in 1968. In March of 1969, Amax converted the most favourable prospective area of GR 34 to 844 contiguous claims and in April of 1969 an additional 18 claims were staked.

In 1973, the claims covering ground deemed to have the most potential for economically viable nickel mineralization were taken to lease status as Explored Area Lease 3 (North Block) and Explored Area Lease 4 (South Block). A subsequent agreement, dated December 12, 1973, granted Granges Exploration Aktiebolag (Granges) an option on the Explored Area Leases.

- On May 18, 1989 Black Hawk Mining Inc. (Black Hawk) purchased the Amax interest in the Explored Area Leases and on August 2, 1989 purchased the Granges interest and Net Smelter Return (NSR) royalty in the Explored Area Leases.
- On April 1, 1992 Explored Area Lease 3 and Explored Area Lease 4 were converted to Mineral Lease 002 and Mineral Lease 003 respectively.
- On March 18, 1994 a portion of Mineral Lease 002 was converted to mineral claims KON 1, KON 2, and KON 3.
- On March 18, 1994 portion of Mineral Lease 003 was converted to mineral claim KON 4.
- On November 3, 1999 Nuinsco Resources Limited (Nuinsco) purchased the Black Hawk interest, subject to a graduated NSR royalty based on nickel prices.
- On February 1, 2007, Victory Nickel Inc. Was formed through an arrangement with Nuinsco and was assigned the Minago Property along with several others.
- In October 2008, Victory Nickel acquired Independent Nickel Inc. which owned a Royalty on the Minago Property.

The Property is comprised of one contiguous group of claims and one mineral lease, augmented by an isolated claim and a second adjacent mineral lease. The contiguous block consists of one mineral lease and 40 unpatented mineral claims with a combined surface area of 7,298.23 ha. The other block comprises one mineral lease and one unpatented mineral claim that are contiguous with a combined surface area of 281.85 ha.

There are no instruments registered with the Mining Recorder at Manitoba Industry, Economic Development and Mines on any of the mineral dispositions with respect to liens, judgments, debentures, royalties, back-in rights, or other agreements.

There are no environmental liabilities attached to the Property.

The scope of the exploration work is summarized as follows:

### AMAX EXPLORATION WORK – 1966 TO 1972

Amax conducted a regional scale exploration program on the southern extension of the Thompson Nickel Belt.

### GRANGES EXPLORATION WORK – 1973 TO 1976

Granges focused their efforts on the Minago nickel deposit conducting resource estimates, mining, metallurgical, and milling studies. The work concluded that the Minago nickel deposit was sufficiently confirmed and that further delineation and exploration should be conducted from underground workings.

### BLACK HAWK EXPLORATION WORK – 1989 TO 1991

Black Hawk conducted a deep penetrating ground electromagnetic survey, resource estimates, mining, metallurgical, and milling studies. A helicopter borne electromagnetic and magnetic survey covering the Property was obtained from Falconbridge Limited and interpreted.

### NUINSCO WORK – JUNE 2006

In June 2006 Nuinsco, requested an independent review of the geology, exploration history, historical resource estimates, resource estimates, and the potential for discovery of additional nickel mineralization. A report summarized the results of exploration conducted during the period from 1966 to 1991 and the work conducted by Nuinsco from 2004 to October 31, 2006. An independent report was deemed necessary for material disclosure of new diamond drill data, mineral resource estimates, and technical studies.

## *REGIONAL GEOLOGY*

The regional geology comprises the eastern edge of the Phanerozoic sediments of the Western Canada Sedimentary Basin. The basin unconformably overlies Precambrian crystalline basement rocks, including the Thompson Nickel Belt. The basin tapers from a maximum thickness of about 6,000 m in Alberta to zero at the north and east, where it is bound by the Canadian Shield. The Property is located near the northeast corner of the basin, where it comprises approximately 53 m of Ordovician dolomitic limestone underlain by approximately 7.5 m of Ordovician sandstone.

The Precambrian basement rocks of the Thompson Nickel Belt form a northeast southwest trending 10 to 35 km wide belt of variably reworked Archean age basement gneisses and Early Proterozoic age cover rocks along the northwest margin of the Superior Province. Lithotectonically, the Thompson Nickel Belt is part of the Churchill Superior boundary zone.

The Archean age rocks to the southeast of the Thompson Nickel Belt include low to medium grade metamorphosed granite greenstone, and gneiss terranes and the high grade metamorphosed Pikwitonei Granulite Belt. The Pikwitonei Granulite Belt is interpreted to represent exposed portions of deeper level equivalents of the low to medium grade metamorphosed granite greenstone and gneiss terranes. The Superior Province Archean age rocks are cut by mafic to ultramafic dikes of the Molson swarm dated at 1883 mega annum

(Ma). Dikes of the Molson swarm occur in the Thompson Nickel Belt, but not to the northwest in the Kisseynew domain. The early Proterozoic rocks to the northwest of the Thompson Nickel Belt comprise the Kisseynew domain that is interpreted to represent the metamorphosed remnants of a back arc or inter arc basin.

The variably reworked Archean age basement gneisses constitute the dominant portion (volumetrically) of the Thompson Nickel Belt. The Early Proterozoic rocks that occur along the western margin of the Thompson Nickel Belt are a geologically distinguishable stratigraphic sequence of rocks known as the Opswagan Group.

### Climatic Conditions

The Project area is located at approximately 250 m above sea level (masl) in north-central Manitoba, approximately 100 km north of Grand Rapids, which is on the western shores of Lake Winnipeg. The region is characterized by warm, wet summers and cold, dry winters. Temperatures range from 23.5°C in July to -24.4°C in January. Annual precipitation is approximately 473.7 mm, of which 77% falls as rain. The majority of this rainfall occurs between June and September, with a smaller amount falling in early spring and late fall. Little rain is recorded for November to March when almost all precipitation falls as snow (Canadian Climate Normals 1971-2000, Grand Rapids Hydro Climate Station).

At Grand Rapids Hydro station from 2003 to 2007 the average mean monthly temperature for January was – 17.42°C and for July was 19.04°C. The average minimum temperature in January was -24°C, and the average maximum in July was 24.6°C.

The Project is located in a region historically exhibiting low seismicity and extensive evaluation extending beyond an examination of historic earthquakes is not considered necessary.

## Geology and Mineral Resources

Wardrop conducted a mineral resource estimate of the Precambrian nickel mineralization, and the Paleozoic Sandstone immediately above. The estimation was completed for total nickel, nickel in sulphide (Ni(S)) and frac sand using data from historic and recent drilling.

For total nickel, Wardrop estimates that the Minago deposit contains a Measured Resource of 11 Mt, grading 0.56% Ni, above a cut-off grade of 0.25% Ni. In addition, the deposit contains 43 Mt of Indicated Resource at 0.51% Ni above a 0.25% Ni cut-off grade. An Inferred Resource of 15 Mt at 0.53% Ni above a 0.25% Ni cut-off has also been estimated.

In order to better define the recovery potential on the nickel, Wardrop also estimated the nickel in sulphide resource within the total nickel resource, which being part of the total nickel resource is not an additional resource. Wardrop estimates that the Minago deposit contains a Measured Resource of 9.1 Mt, grading 0.47% Ni(S), above a cutoff grade of 0.2% Ni(S). In addition, the deposit contains an estimated 35 Mt of Indicated Resource at 0.42% Ni(S) above a 0.2% Ni(S) cut-off grade and an Inferred Resource of 12 Mt at 0.44% Ni(S) above a 0.2% Ni(S) cut-off.

An Indicated Resource of 15 Mt of frac sand within the Winnipeg Formation Sandstone has also been identified within the open pit shell. Of this, 13% of the frac sand will report to the 20/40 size fraction, while 71% will report to the 40/140 size fraction. The sandstone layer must be removed to facilitate access to the mineralized zones within the proposed open pit mine. In the design of the pit shell the extent of the frac sand recovery has been constrained to optimize the recovery of nickel. However, during the development of the mine the full potential for removing frac sand may be realized by extending mining beyond the limits set by modeling.

Prior to estimating the resource, Wardrop conducted an internal validation of the original drill hole logs against the drill hole database. Data verification was completed on collar co-ordinates, length of hole, down-the-hole survey measurements including azimuth and dip, from and to footage measurements of geology and assay sampling intervals, lithological units and nickel and nickel sulphide percentages as compiled from assay certificates merged into a database. Wardrop elected to assign density based on a lithology model, where densities were determined from the lithology of the nearest drill hole.

A wireframe model of the nickel resource was built based on a minimum grade of 0.2% Ni. All of the mineralized serpentinite was included in the solid regardless of the grade. The internal granite lenses could not be separated in the "serpentinite model" as there was not enough continuity of the lithology between drill sections. The wireframe was separated into east and west domains based on the shape of the deposit. Grades were assigned to the blocks in each side, based on variography specific to that side of the deposit.

Interpolation of the Minago deposit nickel resource estimate was completed using ordinary kriging (OK) with nearest neighbour (NN) and inverse distance squared ($ID^2$) check models. There was very little variation between the methods. The frac sand resource was estimated separately using a nearest neighbour method.

The Minago resource estimate was based on Ni(S), the recoverable part of the nickel present in the deposit. A total of 4,557 Ni(S) assays were available compared to 14,829 total Ni assays. Wardrop examined in detail the relationship between the individual Ni(S) and total Ni assays, and calculated the missing Ni(S) values. The population of calculated Ni(S) values was similar to the population of measured Ni(S) values.

Significant parts of the deposit below a depth of 400 m will require additional drilling to upgrade the resource class from Inferred to Indicated.

## Open Pit Mining

The open pit design was optimised using the Lerchs-Grossman pit method, which was refined to a detailed design with catch berms and haul roads. Subsequently, mine development and production schedules were developed, equipment items were selected, and the capital and operating costs were evaluated. Information pertaining to the 3D geological block model that was used in the optimization is provided in Section 2.0.

For this Study, Wardrop determined that the deposit was amenable to a conventional open pit mining method. The mine would provide mill feed of sulphide ore at a rate of 10,000 t/d for a total of 25.2 Mt of ore grading 0.43% over a period of approximately 8 years. Further drilling is proposed to reclassify some of the inferred into the measured and indicated categories.

In addition, the open pit will provide sand feed to a frac sand process facility at a rate of about 4,100 t/d of sand for a total of 14.8 Mt of frac sand over a period of about 10 years. Although the sand will be mined over a period of 3 years at the start of the mining period and stockpiled, the throughput of the sand plant will be set to roughly match the same operational period as the ore processing plant.

Previous work completed in December 2008 by Wardrop indicated that, at that time, the economic recovery of underground resource was not feasible due to insufficient diamond drilling density at depth. The current data indicates insufficient resources in the Measured and Indicated categories which are the categories necessary to qualify a resource for a Feasibility Study. For this reason, the pit optimization was based on an "open pit only" option without considering the effect of breakeven open pit and underground costs.

The overall waste-to-ore ratio (tonne per tonne, t/t) to mine both the nickel sulphide ore and frac sand is outlined in Table 2 below.

**Table 2 Open Pit Design 14 Stripping Ratios**

| Case | SR (t/t) (No Overburden) | SR (t/t) (With Overburden) |
|---|---|---|
| Frac Sand Only | 7.48 | 8.23 |
| Nickel Ore Only | 11.27 | 11.71 |
| Nickel Ore and Frac Sand | 6.72 | 7.00 |

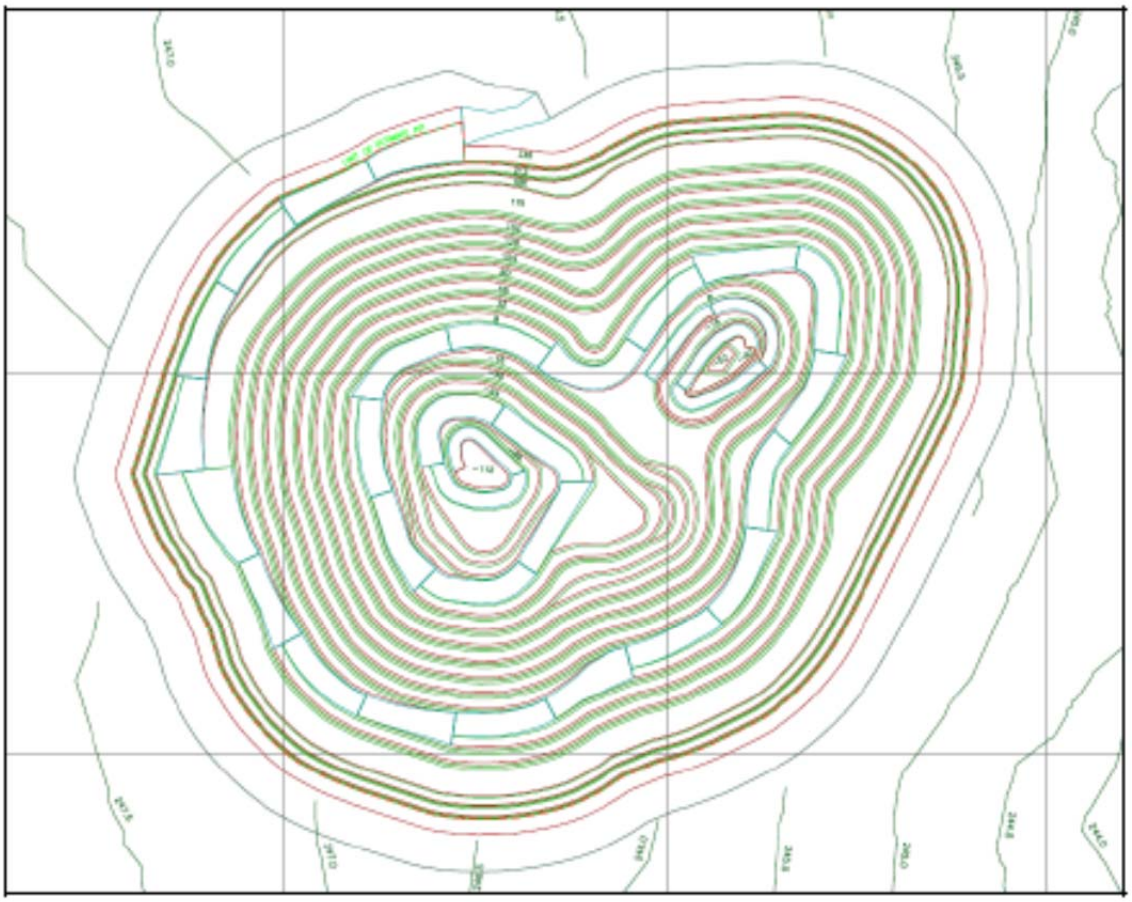
The overall mining sequence was developed in three phases: one initial pit phase and two pushback phases. Each phase corresponds to a designed open pit that is mined in sequence in accordance with the ore grade and stripping ratio. The mine development for the ore and the waste will progress using 12 m high benches.

After removal of trees and significant roots, mine development will commence with the removal of the overburden muskeg and clay overlying the dolomite. For this initial stage of the mining operation, the work would be done as part of capital expenditures using contractors to remove the overburden. Given the logistical challenges, schedule constraints, and cost associated with the mechanical removal of the overburden, a dredging method has been selected to remove the muskeg and clay.

The dredging operation is scheduled to commence in the spring of 2011, to prepare for dolomite removal to start at the beginning of 2012. The removal of the dolomite will take approximately 2 years; frac sand will be available for mining at the beginning of 2013, and nickel ore at the start of 2014.

The general arrangement mine complex is provided in Figure 2 and in Section 1.0. The general layout for the ultimate mine is provided in Figure 4.

**Figure 4 Ultimate Open Pit Mine**



Stability analyses of the open pit walls were undertaken to evaluate the geotechnical domains. These analyses were based upon geological information, field mapping programs, geotechnical logging of rock cores from a diamond drilling program, site visits, and previous studies. The development of these analyses with a brief summary of the results and conclusions presented in the following paragraphs and more detailed information provided in Section 3.0.

An additional geotechnical berm with a width of 35 m will be required at the base of the sandstone unit to catch sloughing material in dolomite above. The weaker sandstone material would promote toppling-type failures of the dolomite along critical jointing.

The bench height of 12 m for the open pit is a function of the working range of production operating equipment. The bench face angles were estimated from the available information on the geological structure or were assigned estimated values

The economic and operating parameters selected by Wardrop in the initial open pit optimization are given in Table 3. Although not exactly the same as the final selected parameters, these selected parameters are sufficiently close to provide a reliable optimization. The break-even plant feed cut-off head grade for the open pit optimization is calculated at 0.2% Ni(S).

**Table 3 Economic Parameters for Pit Optimization**

| Items | | Units | Value |
|---|---|---|---|
| Exchange Rate | | Cdn$:US$ | 1.122 |
| Discount Rate | | % | 8.00 |
| Metal Price (Market) | Nickel (7.40$US/lb) | Cdn$/lb | 8.30 |
| | Payable (95%) | Cdn $/lb | 7.89 |
| | Gain from Cu, PGMs | Cdn $/lb | 0.39 |
| Frac Sand Price | Sand product | Cdn $/tonne, FOB | 58.78 |
| Metal & Sand Recovery | Milling (Nickel Sulphide) | % | Varies see Sec. 3.4.5 |
| | Processing (Frac Sand) | % | 68.8 |
| | Concentrate Transit Loss | % | 0.3 |
| Concentrate Transportation | Landing Freight | Cdn $/wet tonne | 20.34 |
| | Landing Freight | Cdn $/lb FOB Mine | 0.036 |
| Smelter & Refinery Charge | Smelter charge | Cdn$/lb FOB Mine | 0.329 |
| | Refining Charge Nickel | Cdn$/lb FOB Mine | 0.424 |
| | Refining Charge Cu, PGMs | Cdn$/lb FOB Mine | 0.016 |
| | MgO and SiO Penalty | Cdn$/lb FOB Mine | 0.073 |
| Operating Cost | Mining (Ore or Waste) | Cdn$/t mined | 1.55 |
| | Stockpile Rehandle (Ore) | Cdn$/t mined | 0.55 |
| | Milling (Ore) | Cdn$/t milled | 10.03 |
| | Processing (Frac Sand) | Cdn$/t mined | 8.51 |
| | G&A + time cost | Cdn$/t milled | 1.18 |
| Inter-Ramp Overall Pit Slope Angle | Overburden | Degree | 8.9 |
| | Limestone | Degree | 50.2 |
| | Sandstone (with Regolith) | Degree | 16.6 |
| | Country Rock | Degree | Sector A: 46.0<br>Sector B: 45.0<br>Sector C: 42.0<br>Sector D: 50.2 |
| | Host Rock (Minerals) | Degree | 40.0 |

From the series of nested pit shells that were generated using these parameters, Pit Shell 14 was selected as having the highest present value. The mining reserve in Table 4 represents ore contained in the ultimate detailed pit design and included as dilution.

**Table 4 Selected Pit Mining Reserves**

| Classification | Tonnes (millions) | Grade (%Ni(S)) | Nickel (millions of pounds |
|---|---|---|---|
| Proven | 6.6 | 0.487 | 70.5 |
| Probable | 18.6 | 0.410 | 167.5 |
| Total Proven and Probable | 25.2 | 0.430 | 238.0 |

The values shown in Table 5 represent concentrator feed in terms of Nickel (Ni(S)) values will be subject to a 71.2% concentrator recovery at the 0.430% feed grade.

**Table 5 Selected Pit Frac Sand Reserves**

| Classification | Tonnes (millions) | Grade |
|---|---|---|
| Proven | 0.0 | n/a |
| Probable | 14.8 | n/a |
| Total Proven and Probable | 14.8 | n/a |

Wardrop designed three mineable phases, based on the Measured and Indicated mineral resources and the selected open pit shell. Table 6 which is taken from Table 1 shows the mined ore tonnage by grade and period with Table 7 showing the ultimate pit design results:

**Table 6 Mined Ore Tonnage by Grade by Period**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| Ore Tonnes (kt) | 112 | 3000 | 3600 | 3600 | 3600 | 3600 | 3600 | 3600 | 453 |
| Grade (% Ni(S)) | 0.37 | 0.42 | 0.43 | 0.43 | 0.41 | 0.44 | 0.43 | 0.45 | 0.47 |

**Table 7 Ultimate Pit Design Results**

| Item | Size |
|---|---|
| Pit Top Elevation | Approx. 247 m |
| Pit Bottom Elevation | -112 m |
| Pit Depth | . 359 m |
| Volume of Pit | 156.7 million $m^3$ |
| Area of Pit Top | 1.0 million $m^2$ |
| Perimeter at the Top of the Pit | 3.7 km |
| Length from East to West | 1.2 km |
| Length from North to South | 1.1 km |

Figure 5 summarizes the waste and ore mined by period, Figure 6 the ore tonnes by pit and by period and Figure 7 which shows the mined ore tonnage by grade and by period in Table 6 graphically.

**Figure 5 Summary of Waste and Ore Mined**

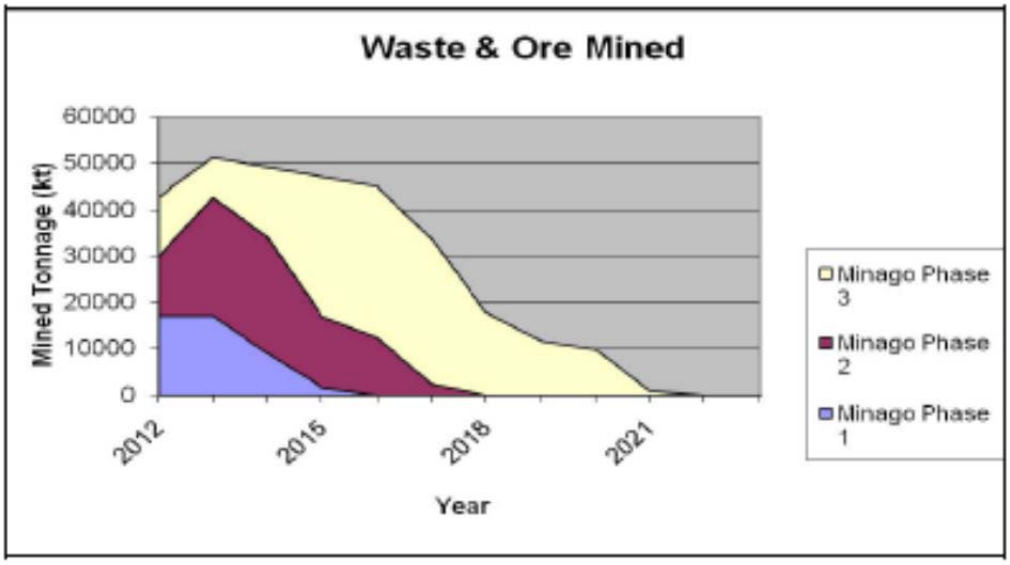



**Figure 6 Mined Ore Tonnage by Pit**

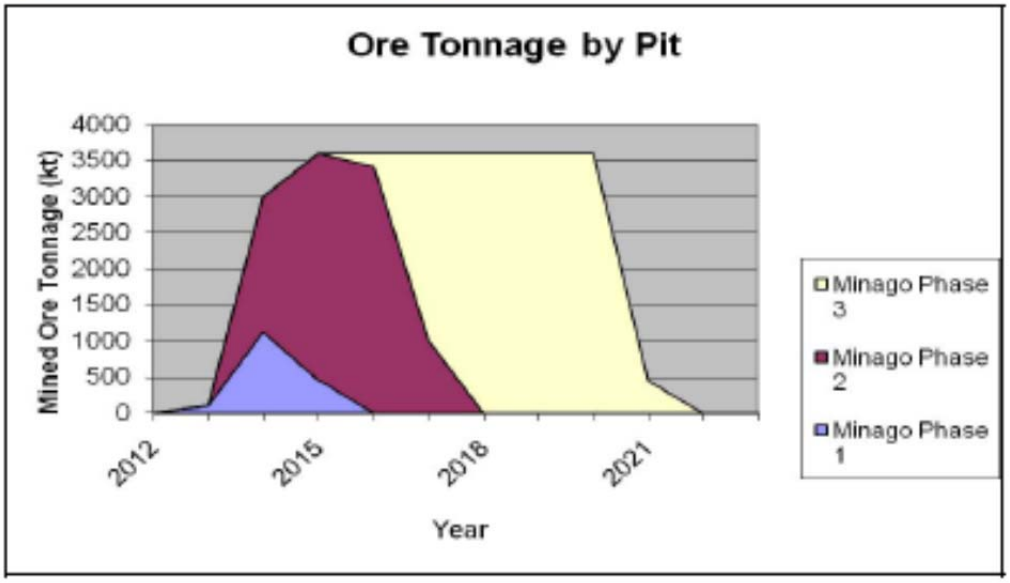
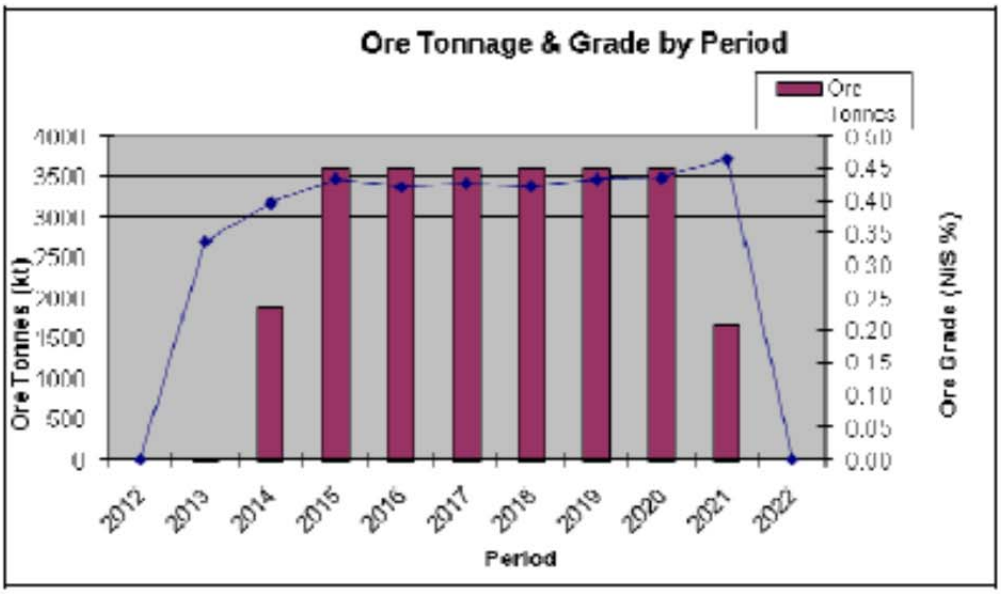


**Figure 7** **Mined Ore Tonnage & Grade by Period**




The rock quantities are summarized as follows:

1. A total of 11.2 Mt of overburden comprising peat and clay will be placed in a repository located southeast of the pit, over a one year period. This cell was considered the ideal location for this low-strength material because it is above an area with thick, low-strength clays.

2. Of the 111.0 Mt of dolomite/ limestone from the pit, a portion will be used for the construction of mine infrastructure in various locations, with the remainder going to the dolomite dump. This limestone would be used to building the TWRMF; the remaining roads and the crusher and ore stockpile pad (18.7 Mt).

3. The granite is considered non-acid generating and will be dumped onto the county rock dump. The ultramafic waste (35.7 Mt) which is potentially acid-generating will be co-disposed with the tailings.

The mine water will be managed as follows:

1. The progressive development of the open pit will result in increased water infiltration from precipitation and groundwater inflows. As the pit deepens and the footprint increases dewatering systems such as drainage ditches, sumps, pipelines and pumps will be implemented.

2. To minimize groundwater infiltration and surface run-off, a ring road with upstream clay lining and drainage ditches will be implemented to divert water away from the pit.

Although dewatering wells will be installed at the pit perimeter, a worst-case allowance of 20% of groundwater seepage has been assumed.

3. In the pit, dewatering sumps will be used to contain groundwater and storm water run-off will be pumped directly to the polishing pond. The in-pit pumping requirements will vary annually, increasing with the catchment area as successive pushbacks create the ultimate pit.

4. Storm water from the tailings pond, in-pit dewatering and dewatering wells would be channelled into the polishing pond. This water containment provision would ensure that quality standards are met prior to discharge.

## EQUIPMENT SELECTION

Wardrop performed an economic analysis to evaluate and determine the optimum size and configuration of the truck and shovel fleet. Various sizes and brands of haul trucks, shovels, loaders and electric drill were evaluated. Given the cheap supply of electric power, electric cable shovels were compared with diesel or electric-powered hydraulic shovels and electric drills were compared with diesel-powered drills.

Due to the relatively short mine life and the low capital cost of electric-hydraulic shovels a fleet consisting of 22 $m^3$ electric hydraulic shovels, 20 $m^3$ loaders and 218-t trucks was determined to be the most economic choice. Wardrop selected 270 mm (10 5/8") blast hole drills, supplemented by auxiliary equipment such as tracked dozers, rubber-tired dozers, graders and other minor support equipment.

The 218-t hauler was selected to match the 22 $m^3$ electric hydraulic shovels and 20 $m^3$ front end loaders in determining the number of trucks required for each operating year. Haul truck cycle times were based on predicted haulage profiles from pit sources by mining phase to destinations based on material types. Truck productivities were based on expected operating conditions, haulage profiles, production cycle times. Ramps were assigned a grade of 10% in the pit and dumps assuming a maximum speed of 40 km/h, reduced to 30 km/h on the main pit ramp.

To meet a production rate of 10 kt/d of ore, ten 218-t trucks, three 22 $m^3$ bucket shovels, and one 20 $m^3$ loader will initially be required. This requirement will increase to 19 trucks in 2016 assuming 15 will be owned and four will be rented as shown in Table 8 below.

**Table 8 Truck, Shovel, Loader Requirements by Year**

| Equipment | 2011 Contract Mining | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trucks** | | | | | | | | | | | |
| Physical Availability | | 95.00% | 92.04% | 89.19% | 86.44% | 83.78% | 81.23% | 78.76% | 76.39% | 75.00% | 75.00% |
| Utilization | | 82.2% | 79.3% | 76.4% | 73.7% | 71.0% | 68.5% | 66.0% | 63.6% | 62.2% | 62.2% |
| Productivity | | 606 | 528 | 460 | 440 | 397 | 364 | 333 | 311 | 289 | 267 |
| Number Required | | 10.0 | 15.0 | 17.0 | 17.0 | 19.0 | 16.0 | 10.0 | 7.0 | 7.0 | 1.0 |
| **Shovels** | | | | | | | | | | | |
| Physical Availability | | 92.00% | 92.00% | 89.00% | 86.00% | 83.00% | 80.00% | 77.00% | 74.00% | 74.00% | 74.00% |
| Utilization | | 71.6% | 71.6% | 68.7% | 65.8% | 62.9% | 60.0% | 57.1% | 54.1% | 54.1% | 54.1% |
| Productivity | | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 |
| Number Required | | 2.5 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 |
| **Loaders** | | | | | | | | | | | |
| Physical Availability | | 90.00% | 90.00% | 90.00% | 89.38% | 88.66% | 87.94% | 87.22% | 86.50% | 85.78% | 85.06% |
| Utilization | | 85.0% | 85.0% | 84.5% | 84.0% | 83.5% | 82.0% | 81.5% | 81.0% | 80.5% | 80.0% |
| Productivity | | 1,495 | 1,495 | 1,486 | 1,478 | 1,469 | 1,442 | 1,434 | 1,425 | 1,416 | 1,407 |
| Number Required | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## GEOTECHNICAL

The geotechnical engineering addresses the foundation conditions resulting from the soft clay overburden comprising a weak clay horizon and the shortage of natural construction material in the critical initial stages of the development of the mine. The layout of the major plant and geotechnical services and facilities is strongly influenced by the geotechnical profile. A number of engineering studies, analyses and optimizations were required to arrive at minimal CAPEX and OPEX within the requirements of a sound technical design.

An extensive geotechnical field investigation and a laboratory program was completed to obtain the necessary data for the feasibility study designs. The site has an initial cover of muskeg which overlies a variable thickness of competent and then weak clay, which in turn is underlain by dolomite bedrock. There is an exposure of limestone bedrock at the west site border, but the site is generally perennially flooded. The piezometric heads in the bedrock generally reached within the upper 1.5 m below the ground surface and in some areas, artesian conditions were encountered. This suggests a confined aquifer which is independent of groundwater conditions encountered within the overburden. Because of the high water level and the presence of artesian effects, construction of the major structures will be most practically achieved after the dewatering of the site.

In some areas, where the current boreholes are spaced far apart, additional geotechnical investigation will be required for detailed engineering design. The current level of information is adequate for feasibility level design interpretations. Further testing and analyses during detailed design and construction stages are expected to result in more optimal geotechnical designs. The geotechnical design development involved supplementary information inputs from hydro-geological and hydrological studies prepared by Golder Associates. Environmental input was obtained from the geochemical report prepared by URS. Geotechnical design aspects in relation to mine closure were developed in conjunction with the overall mine closure plan prepared by Victory Nickel.

The engineering solutions for major earth/rock fill structures are controlled by the deformation characteristics of the peat and clay. The presence of weak clays, found at depths generally in excess of 5 m, posed significant limitations on the designs of major geotechnical structures. These issues were resolved by adjusting the site layouts with the most sensitive structures situated in geotechnical locations with a reduced thickness of weak clays. The geotechnical designs included the benefits resulting from under drainage from open pit dewatering that will precede their construction.

Because of the presence of significant thicknesses of weak clays, the ultimate heights of the rock dumps are limited and these will be constructed in a number of stages in accordance with the waste rock production schedule. The location of the Tailings and Waste Rock Management Facility has been selected in an area where the weak clay thickness is estimated to be minimal, ranging from 3 m to 6 m. Staged construction relying on the pre-consolidation aided by the under drainage has greatly minimized the capital costs.

The heavy mine infrastructure buildings will be constructed on the limestone outcrop/subcrop to resolve the significant foundation excavation and dewatering issuesthat would otherwise be required in areas of significant clay overburden. For the smaller, lighter structures to be constructed on the clays flanking the limestone outcrop there are the options to pile or construct on a rock fill carpet taken down to the clay. At the detailed design stage the option to utilize mini-piles taken down to limestone would be examined against the requirement to minimize settlements and optimize costs.

In addition to the foundation problems the presence of perennially flooded peat and clay overburden with the open pit poses problems for its removal. Initially, Wardrop considered mechanical means for stripping the overburden using excavators and trucks contracted to a specialist earthworks company. This was to be contracted out because of delivery times in procurement of the mining equipment and because contracted equipment would be smaller and more suited to this work.

After further analysis, the option to dredge the muskeg and soft clays was reviewed for cost and schedule considerations. Based on Wardrop's assessment aided by preliminary inputs from a dredging contractor it followed that costs would be reduced and that the more compact schedule would be assured with the dredging option. However, the schedule for the dredging would be tied to a construction season starting with the 2011 spring thaw. Currently, overburden removal is schedule to begin in the spring of 2011 leaving 2010 and the first part of 2011 to prepare for the dredging.

A separate area close to the pit has been dedicated for the disposal of the peat and clay removed during the dredging operation. The dredged overburden material will be pumped to the Overburden Disposal Containment (ODC) area and spigotted in to create a beach around the perimeter of the area. During operations, this dredged clay material is considered in the construction of the low permeability zone on the upstream side of of the TWRMF dam.

Although the leachates from the dolomite and the country rock are not expected to raise environmental concerns in relation to on-land disposal, ultramafic units are considered as potentially acid generating and metal leaching. The TWRMF was conceived to mitigate the environmental issues by encapsulating the PAG waste rock within a single repository using a novel concurrent disposal concept. This TWRMF design consolidates components from known precedents will be supported by observational method during the construction and operation phases. The dolomite and country rock waste rock will be stored in separate dumps that will not require collection and treatment. This concept has resulted in capital and operational cost savings and will eliminate any long term legacy costs in treating effluent from the ultramafic rock.

Field trials and a well thought-out instrumentation and monitoring program, is indispensible for both the confirmation of design assumptions and possible design optimization. Other aspects of the project, such as water balance, deposition plans, construction details and material specifications, additional borrow material sources, closure and reclamation issues have been addressed.

## METALLURGY

Wardrop designed a comprehensive metallurgical testing program to generate data for the mill design and economic assessment for the Project. This program began in early 2007 and was completed in October of 2008 at SGS Lakefield. The major testing components in the metallurgical program included:

- grindability tests to collect data for grinding circuit design
- QEMSCAN analysis to characterize the mineralogy of the ores
- flotation testing to improve the nickel recovery as well as develop design criteria.
- flotation products settling and filtration tests to collect data for sizing tailings and concentrate thickeners and concentrate filtration equipment.
- variability flotation tests to gain a better understanding of the flotation performance of ore from different portions of the deposit which helps in the project risk assessment.

Five drill holes were designed to collect representative testing samples for the project. The open pit master composite 2 (OPMC2) used in developing the design criteria was generated based on the sulphidic nickel block model. It contains 0.54% total Ni and 0.36% sulphidic Ni. The major nickel bearing sulphides are pentlandite and millerite. The main gangue minerals in the composite are serpentine (34.7%), talc (30.2%) and phlogopite (11.2%).

The testing program accommodated an analytical task to determine the sulphidic Ni grade of all the intervals from the 2007 and 2008 drilling programs which contained higher than 0.2% total nickel. These results along with the historical sulphidic nickel assay results obtained by Amax Exploration were used to develop the geological sulphidic nickel block model for accurate accounting of the recoverable nickel. Mining and milling designs were based on this block model

The grindability testing samples have a median SPI of 27.4 minutes; a median RWI of 9.6 kWh/t and a median BWI of 14.9 kWh/t. Two independent simulation programs (JKSimMet and CEET) were used to design the grinding circuit.

Flotation work was completed on various samples to optimize flowsheet and reagent regime as well as to obtain reliable design data for the project. Tests were also performed to validate the viability of developing a head grade-recovery curve based on the sulphidic nickel assay. The mass balance of the mill design was based on the metallurgical projections from a locked cycle test on OPMC2. Variability flotation tests were carried out to investigate the difference in flotation response for samples from various locations of the deposit as well as with different mineralogy.

The sulphidic head grade-recovery formulas developed for pit optimization and economic assessment are shown in Table 9.

**Table 9 Head Grade-Recovery Formula for the Calculation of Nickel Sulphide Recovery at Different Sulphidic Ni Grades**

| Head Grade (Sulphidic Ni%) | Equations for Sulphidic Ni Recovery Calculation |
|---|---|
| G<0.1 | Recovery = 0% |
| 0.1≤G≤1.25 | Recovery = $(61.375X^3 - 198.87X^2 + 218.02X + 9.435)$% |
| G>1.25 | Recovery = 91.1% |

The metallurgical projections from a locked cycle test on the OPMC2 are tabulated in Table 10. The test condition for the locked cycle test were: Grind size, $P_{80}$ = 68 µm; 150 g/t PAX and 500 g/t Calgon in grinding; 250 g/t PAX in rougher flotation and 25 g/t PAX in 1st cleaner flotation; 700 g/t Dep. C in cleaner flotation; and 70 g/t MIBC in rougher flotation.

**Table 10 Metallurgical Projections for OPMC2 of Minago (based on LCT-6)**

| Product | Weight | Assays, % | | | | % Distribution | | | |
|---|---|---|---|---|---|---|---|---|---|
| | % | Ni | Sulphidic Ni | S | MgO | Ni | Sulphidic Ni | S | MgO |
| 5th Cl Conc | 1.26 | 22.27 | 15.31 | 24.36 | 10.43 | 52.28 | 57.89 | 69.15 | 0.39 |
| 1st Cl + Scav Tail | 18.31 | 0.29 | 0.17 | 0.16 | 34.85 | 9.85 | 9.19 | 6.70 | 19.00 |
| Ro Tail | 80.43 | 0.25 | 0.14 | 0.13 | 33.64 | 37.88 | 32.93 | 24.16 | 80.61 |
| Combined Tail | 98.74 | 0.26 | 0.14 | 0.14 | 33.87 | 47.72 | 42.11 | 30.85 | 99.61 |
| Head (calculated) | 100.00 | 0.53 | 0.33 | 0.44 | 32.97 | 100.00 | 100.00 | 100.00 | 100.00 |

The metallurgical projection indicates that a nickel concentrate containing 22.27% Ni and 10.43% MgO will be produced with an equivalent sulphidic nickel recovery of 77.2%.

A second locked cycle test on OPMC2 indicated that recycled water did not have a significant effect on the flotation performance of the composite.

Flotation tests on the variability sample representing the first two years of open pit production show that this composite floated better than OPMC2, which indicate that little difficulty is expected for the start-up and early operation of the plant in terms of the metallurgical performance of the ore.

The overall variability sample flotation results indicated that all the variability samples with a sulphidic nickel assay higher than 0.22% demonstrated floatability similar to those of the sulphidic nickel grade composites used in the generation of the sulphidic nickel head grade – recovery curve. In most of the flotation tests on the variability samples, lower MgO contents in concentrates were achieved as compared to the results of tests on the sulphidic nickel grade composites. Tests on three of the four variability samples containing less than 0.20% sulphidic Ni achieved very low nickel recovery. The variability testing results indicate that the risk of a "metallurgy underperformance" is low for the project if the mining cut off grade is higher or close to 0.20% sulphidic Ni. The risk will increase as the mining cut off grade decreases.

Dewatering tests on locked cycle flotation tails and concentrate indicated that a high rate thickener would work better for the thickening of the tails and a pressure filter could achieve moisture of 8.5% in the concentrate filter cake.

The Minago ore samples were historically tested by SGS Lakefield (formerly Lakefield Research), Process Research Associates (PRA) and Outokumpu Oy.

## NICKEL ORE PROCESSING PLANT

The mineral processing plant will process nickel ore at a nominal rate of 10,000 t/d beginning with the haulage of ore to the primary gyratory crusher and hydraulic rock breaker capable of crushing the ore to an optimal size for grinding (Figure 8).

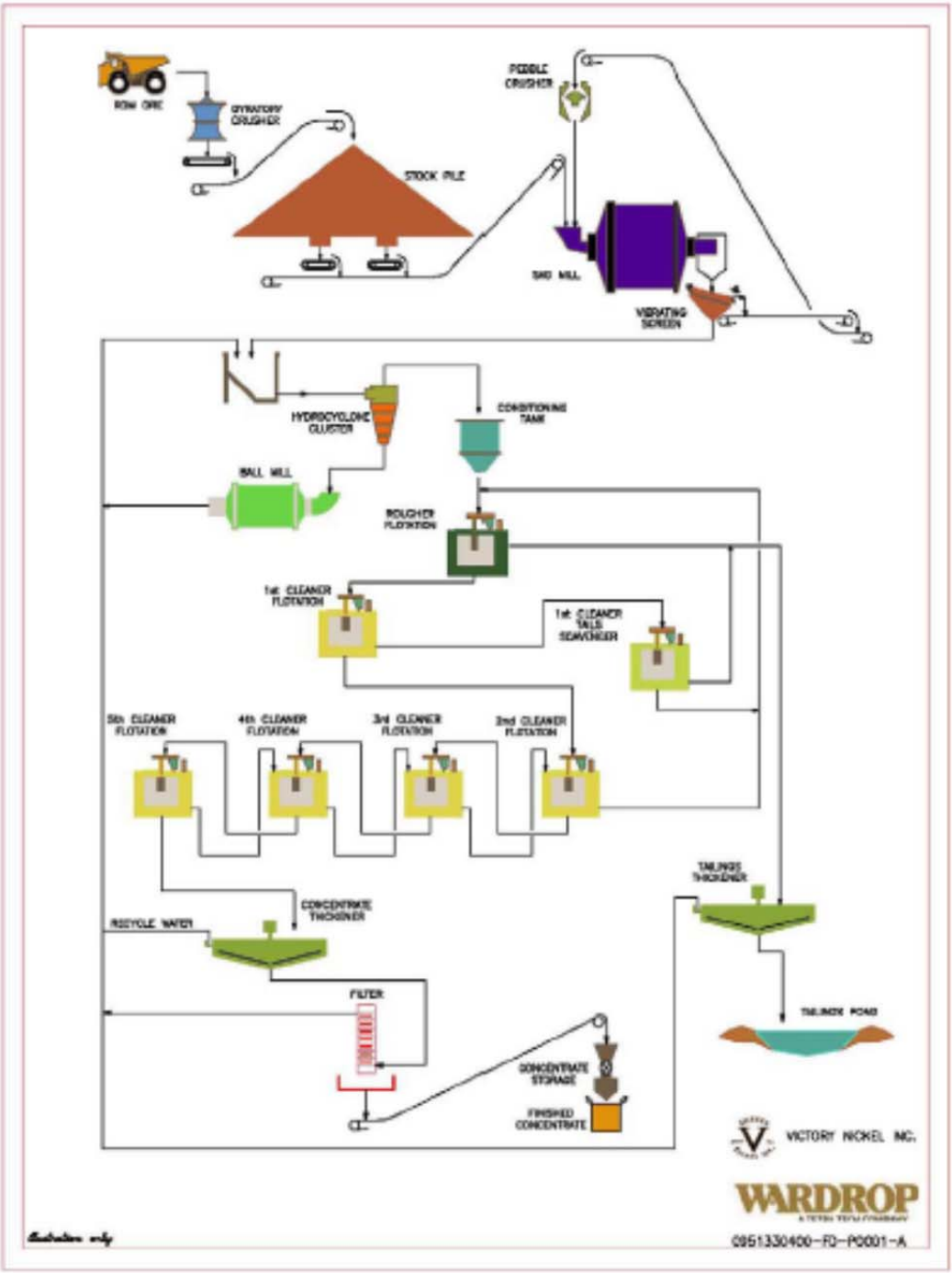
The grinding circuit, consisting of one semi-autogenous grinding (SAG) mill and one ball mill, will grind the ore prior to flotation. An intermediate crushing stage consisting of one pebble cone crusher will crush oversized product from the grinding circuit for recirculation to the SAG mill. A single vibrating screen will be utilized to classify the SAG mill discharge and the oversize that will be crushed. A hydrocyclone cluster will classify the ball mill discharge and the underflow of the vibrating screen. Underflow from the hydrocyclone cluster the oversize ball mill product will be recycled to the ball mill feed while the overflow the undersize product will gravity flow to the conditioning tank at the start of the flotation circuit.

The flotation circuit will consist of conventional rougher, scavenger and cleaner cells to produce a high-grade nickel concentrate and final tailings. One bank of rougher cells, one bank of scavenger cells, and five banks of cleaner cells will be utilized throughout the flotation circuit. The final flotation concentrate will be thickened in an indoor conventional concentrate thickener and stored in a stock tank. Concentrate from the stock tank will be dried for shipment in a horizontal plate filter press. The filter press will dewater the concentrate to an 8.6% moisture content. A bagging machine will bag the final concentrate in 2 t bags for shipping.

A high rate tailings thickener will clarify the final tailings from the flotation circuit and distribute the tailings underflow to the tailings management area. Flocculants will be used in each thickener to assist in settling and generating a precipitate from solution. Reagents including potassium amyl xanthate (PAX) and sodium hexametaphosphate (SHMP or Calgon) will be added to the ore in the grinding stage to enhance the flotation performance downstream. Methyl isobutyl carbinol (MIBC) and depramin C (CMC) will also be added to the cleaner flotation to aid in concentrate quality.

Flotation optimization will be provided by on-stream samplers, particle size analyzers and an on-line x-ray analyzer. The samplers and analyzers will be used to monitor performance of the flotation process to optimize concentrate grade and nickel recoveries. An assay and metallurgical laboratory will be incorporated into the mill building to perform laboratory tests.

**Figure 8 Simplified Flowsheet**



## FRAC SAND PROCESSING PLANT

The Preliminary Economic Assessment (PEA) identified a sandstone horizon averaging nine metres thick above the unconformity of the main nickel bearing serpentinite. This sandstone layer must be removed to access the mineralization within the proposed open pit mine reported in the PEA study. The sandstone unit which is comprised of small, round, uniformly sized silica sand particles is amenable for use as hydraulic fractionating sand or frac sand in the oil and gas industry.

The sandstone is not expected to require drilling and blasting to be removed, but will require additional backhoe cleanup due to the expected undulating contact at the top of the basement rocks. The backhoe will windrow the sand so that a front-end loader can easily load the material while minimizing the loss of sand due to the loaders large bucket size. The sand is then hauled to a stockpile location, separate from the waste dumps, prior to processing. The sand is released each time a mining stage passes through the bedrock contact in Years 1, 2 and 3 (Table 11). The insitu sand would be processed at a feed rate of 1.5 Mt/a, producing different grades of frac sand at a rate of 1.15 Mt of marketable sand annually.

**Table 11 Final Pit Sand Resource by Year**

| Phase | Sand (tonnes) | Year |
|---|---|---|
| Starter Pit | 5,288,864 | 1 |
| Phase I | 2,091,628 | 2 |
| Phase II | 7,466,065 | 3 |
| **Total** | **14,846,557** | |

### PROCESSING PLANT DESIGN

Initial studies determined the deposit was capable of producing three saleable products including two types of fracturing sand and a flux sand product. Based on Marketing study results for annual sales, Outotec designed the plant capable of producing 1.15 Mt/a of marketable sand. Approximately 0.615 Mt/a of the final product would be frac sand capable of meeting the API specifications, and 0.535 Mt/a of the final product would be non-API frac sands to be sold into other markets.

The design takes into account the seasonality of the frac sand market, the inclement winter weather of Manitoba, and the requirement to operate the full plant year-round. The wet and dry plants will operate in series, with a wet plant feed rate of 265 t/h.

A 16-month schedule for plant completion is estimated as the best-case scenario. This would include detailed design, procurement, construction and commissioning with consideration for starting construction in the spring.

## INFRASTRUCTURE FACILITIES

The site infrastructure will consist of several facilities including a maintenance building, fuelling facilities, emergency services building, cold storage, fresh and process water pump house, modular complex building, guardhouse and scale house, treatment plants, dewatering facilities, and tailings management facilities.

The maintenance building with truck shop will be used for vehicle repair, tire replacements, welding and general maintenance. This truck shop will comprise a wash bay, lube storage, hydraulic shop, electrical shop, instrumentation shop, storage warehouse and lunchroom. The fuelling faculties will provide diesel fuel storage for mining trucks and diesel generators.

The modular complex building will consist of mine staff dormitories, staff kitchen and cafeteria, mine dry, recreational facilities and office complex. The water and waste water treatment facilities include sewage treatment plant and potable water treatment plant. Dewatering facilities include groundwater pumps located around the perimeter of the pit as well as portable dewatering pumping stations within the open pit.

The tailings management area will be used to discharge tails and dump ultramafic waste. This area will be equipped with a floating barge system to properly discharge decant water to the polishing pond and flood retention area. The polishing pond pump house will discharge to the Minago water shed north of the Minago mine site.

## ELECTRICAL

Electrical power is required for the ore processing plant, the frac sand plant, the open pit mine, de-watering and general services. A main substation 230 kV/13.8 kV will be installed to transform the primary power at 230 kV to the secondary power at 13.8 kV. The secondary power distribution network would consist of 13.8 kV primary feeders and overhead transmission lines (ACSR). The secondary feeders would consist of 6.6 kV, 4.16 kV and 0.6 kV Teck cable. All operational loads would be calculated on a 24 hr basis for the various load centres.

The processing plant consist mainly of the grinding, flotation, concentrate thickener, process water plant and reagent areas which accounts for 29 Megavolt amperes (MVA) (58 %) of the load requirement. The open pit mine/remote locations consist mainly of the shovels, drills, dewatering pumps, administration buildings, sand plant and transfer pond pumps which accounts for 21 MVA (42 %) of the load. Total operational load for the Victory Nickel Minago mine is approximately 50 MVA.

## LOGISTICS AND TRANSPORTATION

The Minago property enjoys the advantage of being located directly adjacent to Manitoba Provincial Highway 6, a major north-south highway transportation route. Also, the property may be served by the OmniTRAX rail company with a railhead at Ponton 60 km away. Therefore both inbound and outbound goods from the Minago site can be transported by conventional

land transportation methods such as truck and rail. These transportation costs have been taken into consideration in both operational costs and capital costs.

## STAFFING AND PERSONNEL DEVELOPMENT

Well-trained, qualified personnel are an essential requirement to ensure the proper start-up and production targets that define a successful project. The correct staffing levels and the staffing requirements in each category define the basis for assessing labour operating costs. A comprehensive set of human resources policies and practices are required to define training and the human resources policies.

A work force schedule has been prepared to identify the staffing requirement by major facility and by area as summarized in Table 12.

**Table 12 Department Staffing (Including Contracted Services Personnel)**

| Department | Number of Personnel |
|---|---|
| Maintenance Department | 94 |
| Mining Department | 121 |
| Processing Department | 94 |
| Geology Department | 4 |
| Engineering Department | 5 |
| Human Resources Department | 14 |
| Environmental Department | 5 |
| Mine Controller Department | 14 |
| Contracted Services Personnel | 71 |
| Total | 422 |

The staffing levels have been assessed to take into account of vacations, training, and absence relief for the various categories. There will be a requirement to start-up the frac sand plant initially, followed by the open pit mine and ore processing plant.

In estimating labour requirements, allowances will need to be made for the various employee scheduling arrangements described in Section 12.0. For the three employment arrangements, different allowances called "K" factors will be applied to account for absences due to vacation, training, or sick leave.

## SOCIAL CONTEXT

As part of the Minago Feasibility Study, Victory Nickel conducted a Socioeconomic Assessment of the neighbouring communities. A series of meetings and interviews were held with a wide range of key stakeholders to identify their views and opinions with respect to the Minago Project. The stakeholders included Norway House Cree Nation (NHCN) and Norway House

Community (NHC); Grand Rapids Cree Nation (GRCN) and Grand Rapids Community (GRC); Cross Lake Band of Indians (CLBI) and Cross Lake Community (CLC); Moose Lake Cree Nation (MLCN) and Moose Lake Community (MLC); Snow Lake; Manitoba Métis Federation (MMF); Trapline Owners (TLO); Norway House Resource Management Board (NHRMB) and Government Agencies. Consultations, community engagements, and small group and open house meetings were held in the individual communities. Also, Victory Nickel has signed a Memorandum of Understanding (MoU) with Cross Lake, Moose Lake and Grand Rapids First Nations' Bands. The communities to the Minago Property include Grand Rapids (GR), Moose Lake (ML), Cross Lake (CL), Snow Lake (SL) and Norway House (NH). Each community has its own governing infrastructure usually collectively known as the First Nations in the Northern Region of Manitoba.

The objectives of the Socioeconomic Assessment (SEA) for the Minago Project were to:

- introduce the major components of the Minago Project to a wide range of key stakeholders
- inform communities and stakeholders of potential impacts and their relative magnitude on the communities' social and economic well-being
- provide an opportunity for the integration of diverse community values into the decision making process for the mine development
- understand the concerns of the communities and stakeholders to develop potential mitigative measures that are practical and cost effective
- provide information for addressing the potential impacts of the Minago Project on the socio-economic resources of the communities.

The various meetings with government agencies, public, First Nations and Métis consultation and community engagements on various aspects of the Minago Project occurred during the past three years (2007-2009). The issues raised by each of these groups during this process have been documented and are summarized in the Study.

### *Regulatory Agency Consultation and Engagement*

As part of the exploration and development process for the Project, meetings between Victory Nickel and provincial and federal regulatory agencies focused on environmental protection and wildlife, waste management, vegetation, fisheries, benthos, air and water quality, and permitting and regulatory requirements.

### *Technical Advisory Committee and Government Meetings*

Victory Nickel had technical sessions with the provincial and federal government representatives, including Provincial/Federal Technical Committee and consultants focused on:

- Environmental Baseline Studies including vegetation, soil, fisheries, sediments, wildlife and water quality assessments, hydrology and hydrogeology.

- a socioeconomic assessment,
- geochemical characterization and geotechnical aspects.
- mining, nickel milling and ore processing.
- water management, pit dewatering.
- frac sand mining and processing.
- tailings management, waste rock dumps.
- design basis and criteria.
- site reclamation.
- Métis and First Nations consultations and engagement, and permitting.

The issues and comments raised during these meetings were incorporated in the planning and design of the Minago Project and are summarized in the Study.

### *First Nations Consultation and Engagement*

As the Minago Project area falls within the Treaty 5 traditional territory and specifically the Norway House Resource Management Area, in 2007 in-depth community meetings were initiated to introduce the project. In 2008, additional community engagement meetings were initiated to discuss preliminary findings of the Environmental Baseline Studies (EBS) and some of the design basis and criteria for the frac sand plant, water management systems, pit dewatering systems, mine, mill, tailings storage facilities, waste rock dumps, and overall site infrastructure. In 2009, Victory Nickel concentrated on negotiating a Social Economic Participation Agreements with Cross Lake, Grand Rapids and Moose Lake First Nations.

Overwhelmingly, there were more positive impacts issues raised than negative ones as detailed in the previous sections. The concerns that the First Nations (NHCN, CLBI, MLCN and GRCN) and Métis had were in regard to impacts to wildlife, water, social issues and traditional land use.

### *Community Involvement*

Along with the meetings with Norway House Cree Nation, Misipawistik Cree Nation (Grand Rapids), Mosakahiken Cree Nation (Moose Lake), Cross Lake Band of Bands and the Métis Federation of Manitoba, a series of public open houses were held. These meetings were initiated to allow residents of Norway House, Cross Lake, Moose Lake, Grand Rapids, and Snow Lake to provide comment on the project's progress and proposed activities. The issues raised during these meetings concerned employment and business opportunities, including the issues identified in Table 13. Meetings with the members of the Métis Federation of Manitoba (MMF) were held in Grand Rapids on May 08, 2007, in Norway House on May 23, 2007, and in The Pas on October 08, 2008. Victory Nickel also participated in the 2008 MMF Annual General Meeting that was held in Brandon, Manitoba.

### Public Consultation

There is some overlap between the COI and the public as the majority of the local communities, notably Grand Rapids, Norway House, Moose Lake, and Cross Lake, are represented by members of the Cree Nations. In addition to respective community band councils, each community has its own local government. People from the local communities also attended scheduled meetings in Norway House, Cross Lake, Moose Lake, and Grand Rapids.

### Future Consultation and Community Engagement Meetings

As the project progresses, Victory Nickel will hold additional consultation and community engagement meetings with the First Nations, Metis, government, the public and other stakeholders to project related information. These meetings with the First Nations will take place in 2010.

## Environmental Considerations

### Introduction

In parallel with the preparation of the Minago Feasibility Study, Victory Nickel conducted base-line studies of the area surrounding the proposed mine site. These studies included surface water quality, monitoring, vegetation surveys, fisheries assessment, benthic community enumeration, wildlife surveys, sediment characterisation, soil assessment, socio-economic assessment, geo-chemical characterisation, hydrology and hydro-geology. The goal of this study is to determine the potential impacts of the Minago Project on those environs by comparing baseline indicators and operational data.

Details of the following aspects of the Environmental Considerations are given in Section 12.0 of this Study:

### Permitting

Victory Nickel plans to submit an Environmental Act application to the Manitoba government during the Second Quarter of 2010.

## Closure Plan

In keeping with high standards for environmental and social responsibility and the Manitoba Closure Regulation 67/99, Victory Nickel will implement an environmentally sound and technically feasible decommissioning and closure plan for the Minago Project. The closure planning and implementation will be undertaken with appropriate environmental care, to meet these Provincial and Federal laws and regulation, satisfy the interests of the public, and achieve the company's environmental standards. In so doing, Victory Nickel will exercise reasonable efforts to plan, design, construct and operate the facilities for closure, with a goal of achieving a walk-away scenario as described in the main body of the Study.

## ORE CONCENTRATE AND FRAC SAND MARKETING

The worldwide recession in 2008 led the price of base metals in general and nickel in particular to levels below marginal costs. After rising from US$4.00/lb in 2003, to a record high of US$24.58/lb in May 2007, the price of nickel returned to US$4.15/lb in November 2008.

Given the recent swings in commodity prices, a certain period of stability would be required before determining reliable commodity price trends. When the project was conceived in 2007, the price of nickel briefly reached over US$24.00/lb and for a time US$15.00/lb nickel seemed assured. However, for a brief period in early 2009, the price of nickel dropped below US$4.00/lb and currently ranges in the US$7.00 to US$8.50/lb range.

For the purposes of the Financial Model, metal prices and exchange rates have been established on the basis of a 3 year rolling average. This approach which is used by the Securities and Exchange Commission in the United States, considers the behaviour of the market in the previous three years. By using this approach, we have not included forecast pricing to establish forward looking pricing for our Financial Analysis.

The frac sand pricing from IM&M suggests that the prices for frac sand will remain at the current levels with pricing dependent on drilling activity in the oil shales.

## CAPITAL COSTS

The capital cost estimate (CAPEX) for the mine, process plant, load out facility and infrastructure for the Project has been prepared in accordance with standard industry practices. For feasibility-level studies the required intended range of accuracy for the given level of definition is assumed to be -10% to +20%.

The estimate includes for direct and overhead cost estimates, based on current pricing for common items. The Indirect Costs, Owner's Costs and Contingency Costs are considered as Overhead Costs in this Capital Cost Estimate. As of December 2009, the estimated CAPEX for the Project is CDN$596,268,000 subject to the qualifications, assumptions and exclusions detailed in this report.

The capital cost summary and distribution is shown in Table 13.

**Table 13 Summary Project Capital Costs**

| Category Number | Description | Total (CDN$) | Pre-Production (CDN$) | Sustaining (CDN$) |
|---|---|---|---|---|
| **Direct Costs** | | | | |
| 00000 | General | 5,883,000 | 5,883,000 | 0 |
| 10000 | Site Development | 37,205,500 | 37,205,500 | 0 |
| 20000 | Site Utilities | 47,616,600 | 45,616,600 | 2,000,000 |
| 30000 | Tailings Management Facilities | 16,481,400 | 15,231,400 | 1,250,000 |
| 40000 | Frac Sand Development | 26,639,000 | 26,639,000 | 0 |
| 50000 | Mine Infrastructure | 35,608,600 | 35,608,600 | 0 |
| 60000 | Mobile Equipment | 106,975,000 | 106,975,000 | 0 |
| 70000 | Ore Processing Facilities | 146,696,900 | 146,696,900 | 0 |
| 80000 | Non-Process Buildings | 19,118,900 | 19,118,900 | 0 |
| | Totals - Direct Costs | 442,224,900 | 438,974,900 | 3,250,000 |
| **Overhead Costs** | | | | |
| X0000 | Indirect Costs | 91,399,100 | 91,399,100 | 0 |
| Y0000 | Owner's Costs | 12,847,500 | 12,847,500 | 0 |
| Z0000 | Contingency | 49,796,500 | 49,796,500 | 0 |
| Overhead Cost Total | | 154,043,100 | 154,043,100 | 0 |
| **Grand Total** | | **596,268,000** | **593,018,000** | **3,250,000** |

The pricing for commodities or the design/supply of equipment is based on non-binding, budgetary quotations from vendors and contractors for major equipment and unit rates. "Budgetary quotations" generally means that indicative pricing has been provided for specified equipment, materials and productivity, but no commitment has been made to provide the equipment or materials at this price at a future date.

The PST is included in the Capital Cost Estimates and the GST is excluded with the costs associated with import duties and tariffs included the Owner's Costs.

As most equipment was priced towards the end of 2008, where costs are significant these have been re-priced to confirm that costs are still current. In other cases adjustments have been made to the rates to bring these into line with current expectations. Where possible costs are based on current market conditions without provision for future cost escalation.

The project capital cost estimates are expressed in Canadian Dollars with foreign currency exchange rates applied as set out in Table 14.

**Table 14 Foreign Exchange Rates**

| Base Currency | Foreign Currency |
|---|---|
| CDN$1.097 | US$1.00 |

The CAPEX is based on the assumption that Victory Nickel will follow the Project Implementation Plan described in this feasibility study. Any significant deviation from this Project Implementation Plan may have an impact on both the project schedule and costs. In particular, the various costs have been calculated assuming the timeframe developed in the Project Implementation Plan.

The quantities developed are based on general arrangement drawings, process design criteria, process flow diagrams, and preliminary P&IDs. Design allowances are applied to bulk materials based on discussions between the respective discipline and the estimator. Engineering, Procurement and Construction Management costs were provided by Wardrop based upon a percentage of the expected construction cost for the project.

The Labour rates comprise blended union and non-union rates and include payroll burdens and overtime shift premium rates. In addition to the labour rates, contractors will be paid a rate for their overhead which would include site management

Labour rates pertinent to the estimate are summarized in the Study from which an average labour rate of CDN$75 was evaluated.

The labour rate is based on a construction schedule of three week in and one week out, and a 70-hour work week. Scheduled site hours are 7 days per week at 10 hours per day, totaling 70 hours per week for which 40 hours would be paid at straight time and 30 hours at time and a half. The associated productivity factor for labour hours in the capital cost is estimated to be 1.15 to 1, or 87% efficiency.

A contingency percentage of the total Direct and Indirect Costs has been included to meet unanticipated costs within the scope of the estimate. The contingency was estimated on a discipline-by-discipline basis, taking into account items that have been quoted, estimated, or factored. Contingency is intended to make provision for cost escalation during construction and the costs associated with scope change costs and delays. The schedule delays and associated costs could be due to such factors as unexpected ground conditions, extraordinary climatic events or labour disputes.

## Operating Costs

On-site operating costs are estimated for five cost centres: General & Administrative, Surface Facilities, Frac Sand Processing, Nickel Ore Processing and Mining (Table 16). To provide a consistent framework for expressing costs within these cost centres cost, control categories have been developed for salaries and wages, maintenance, consumables, fuel, power and

service contracts. The details on each of these five cost centres and the six cost control categories can be found below.

The salary and wages costs were developed from the organizational chart and the Work Force Schedule, described in Section 11.0, Staffing and Personnel Development.

**Table 15 Operating Cost Summary**

| Cost Centres | Project Life | Annual | Daily |
|---|---|---|---|
| General & Administrative | 109,072 | 12,450 | 34.6 |
| Surface Facilities | 39,871 | 4,627 | 12.9 |
| Frac Sand Processing | 73,268 | 7,404 | 30.9 |
| Nickel Ore Processing | 249,252 | 37,568 | 104.4 |
| Mining | 388,242 | 59,071 | 164.1 |
| **Total** | **859,705** | **121,120** | **346.9** |

Notes:
Year 4 has been taken as the representative year.
Frac Sand daily cost is calculated based on 240 day annual operation.
Nickel Concentrate Processing is based on 360 day operations.
G&A and Surface Facility are credited against Ore Processing

A full breakdown of the costs associated with the various Cost Centres is provided in Section 16.0, Operating Costs. Similarly, details of the following Manitoba Hydro Rates and the diesel fuel costs have been summarized in Section 16.0 of this Study.

## PROJECT ECONOMIC ANALYSIS

An economic evaluation of the Minago Project was prepared by Wardrop based on a pre-tax financial model. Assuming a 7 year nickel mine life, 7 year mill life and a 10 year frac sand plant life, the following pre-tax financial indicators were calculated:

- An IRR of 17.66%
- A Payback of capital in the fourth year of nickel production
- A $596 million capital cost
- A $294 million NPV at 8% discount rate

As the Economic Analysis in this section has been based on the Capital Cost and Operating Cost Estimates in Sections 15.0 and 16.0, the same qualifications, assumptions and exclusions apply. Further, this economic analysis is subject to the same allowances for variation in currency exchange rates and escalation in prices as capital and operating costs.

The results of the Financial Analysis are presented as the Internal Rate of Return (IRR), the Payback Period and the Net Present Value (NPV) for a given discount rates. To understand the effect of the variables, parametric sensitivity analyses are performed to describe the influence of

capital cost, nickel price and operating costs. Specific graphs are prepared to illustrate the effects of key cost and pricing parameters on the IRR and NPV.

The Financial Analysis has been facilitated through a financial model that describes the economics of the Minago Project by providing a compact summary of the Business case for the project throughout the Life of the Mine. The financial model was calculated on a 100% equity basis. As required by Victory Nickel, Wardrop has not included any post tax financial modeling for the project in the financial model.

The financial model is based upon 3 year rolling average market prices for nickel and pay metals and exchange rates as shown in Table 16. Nickel Concentrate losses were estimated at 0.30% for handling from mine to smelter at an average Moisture Content of 6.00%.

**Table 16 Pricing and Exchange Rate Assumptions**

| Financial Inputs | Units | Base Case | |
|---|---|---|---|
| | | $US | CDN$ |
| Nickel | Lbs | 11.19 | 12.27 |
| Copper | Lbs | 2.91 | 3.19 |
| Palladium | Oz | 322.40 | 353.64 |
| Platinum | Oz | 1353.78 | 1,484.97 |
| Gold | Oz | 836.25 | 917.29 |
| Cobalt | Lbs | 27.73 | 30.42 |
| Silver | Oz | 14.25 | 15.63 |
| Rhodium | Oz | 2,254.56 | 2,473.04 |
| Frac Sand | Tonne | n/a | 63.02 |
| Exchange Rate | n/a | 1.097 | 1.00 |

Within Section 14.0, the report by "Reid Resource Consulting Pty Ltd" reviews the typical progress of pricing from the initial "indicative" to the "final" and reviews Price Participation and Penalty Schedules. The penalty schedule identified the negative impact of the zinc content and the MgO on the smelter pricing.

IM&M of Calgary prepared a report to evaluate the anticipated frac sand pricing in January 2009 based upon location and frac sand grading. On the assumption that transportation costs will follow any pricing increase, the value of the markets available less transportation costs has been assessed to be $72,019,885 per annum.

Sensitivity analyses were carried out to evaluate the effects of increases in Nickel price from US$6.00 to US$20.00/lb on NPV, IRR and Payback of Capital. The NPV were calculated at discount rates of 8%, 6% and 4% for the range of metal prices selected and the results presented in Table 17 below. The Payback Year is estimated from the beginning of the year in which first nickel ore production starts.

**Table 17 Summary of Pre-Tax NPV, IRR, and Payback Sensitivities**

| Nickel Price Scenario US$/lb | NPV at Selected Discount Rates (in Million$) | | | IRR (%) | Payback* (Years) |
|---|---|---|---|---|---|
| | 8% | 6% | 4% | | |
| $4.00 | -286.3 | -271.8 | -249.6 | -4.4% | n/a |
| $6.00 | -119.9 | -78.4 | -23.7 | 3.3% | 8 |
| $8.00 | 39.5 | 107.0 | 192.7 | 9.4% | 6 |
| $10.00 | 198.9 | 292.3 | 409.2 | 14.8% | 5 |
| $12.00 | 358.3 | 477.7 | 625.6 | 19.5% | 4 |
| $14.00 | 517.8 | 663.1 | 842.1 | 23.8% | 4 |
| $16.00 | 677.2 | 848.4 | 1,058.6 | 27.7% | 3 |
| $18.00 | 836.6 | 1,033.8 | 1,275.0 | 31.3% | 3 |
| $20.00 | 996.0 | 1,219.1 | 1,491.5 | 34.6% | 3 |

*stated in terms of years of nickel production

The average life of mine operating costs per pound of nickel before by product credits is estimated to be $6.95 and net of by product credits $2.12. In Table 18 below these costs are summarized by pound of nickel and by tonne of ore.

**Table 18 Total Nickel Cost Summary**

| | Operating Cost ($/lb) | Operating Cost ($/tonne) |
|---|---|---|
| General and Administrative | $0.69 | $4.33 |
| Surface Facilities | $0.25 | $1.58 |
| Ore Processing | $1.57 | $9.90 |
| Mining | $2.45 | $15.43 |
| Concentrate Transportation | $0.06 | $0.39 |
| Smelter and Refining Charges | $1.93 | $12.15 |
| **Cost Before By-product Credits** | **$6.95** | **$43.78** |
| Frac Sand Credit | $4.04 | $25.44 |
| Pay Metal Credit | $0.49 | $4.97 |
| **Cost Net By-product Credits** | **$2.12** | **$13.37** |

## PROJECT IMPLEMENTATION PLAN

The Project Implementation Plan (PIP) is intended to ensure the successful execution of engineering procurement, and construction phases, and the alignment with subsequent mine development phases. The PIP will ensure that necessary costs have been included in the cost estimates for the project detail design, procurement, and construction phases. The PIP will provide a better understanding of the overall risk profile and project risk mitigation strategies.

### Project Implementation Strategy

The first stage in establishing a Project Implementation Strategy will be for the Owner to define a strategy which best fits the needs of the project. Wardrop has assumed that the Owner will require full support during the detailed engineering, procurement, and construction phases of the project. The Owner's plans for the hiring and training of personnel and the operation of the plant have not yet been considered but will be considered with the PEP.

The full text of the main document describes the various traditional implementation strategies. The implementation strategy adopted by the Owner will reflect the depth of available skills within the Owner's team, and the degree of involvement the Owner wishes to take. The project management style should reflect the Owner's role in the management of the project and the Owner's risk philosophy.

For the Minago Mine the Implementation Strategy will need to address the schedule restraints posed by weather and the requirement for a flexible contracting strategy in a remote site location utilizing local labour.

- The problems associated with a flooded site dictate that initial winter construction when the ground is frozen is preferable.
- A flexible contracting strategy will be required to accommodate the timely procurement of long-lead items and construction.
- Being some 225 km from Thompson, Manitoba and 485 km from the major city of Winnipeg, Manitoba the site may be classified as having a remote location.
- Wherever possible, labour should be drawn from local labour pools in Norway House, Grand Rapids, Moose Lake, Cross Lake or Snow Lake.

### Contracting Strategy

The contracting considerations will include a review of the availability of contractors, a consideration of Union or Non-Union Contractors and the size of packages to attract tenders. Where possible, approved contract proformas will be utilized for construction and service contracts. Generally, construction contractors will be responsible for construction labour, construction equipment, transportation to site, contract surveying, quality control, safety, environmental safeguarding, and supplying permanent materials as required by contract. A summary of the Major Equipment Packages and Major Construction Contracts are outlined in Section 18.0, Project Implementation Plan.

### Project Schedule

The Project Implementation Schedule will address the primary activities required to engineer, procure, construct, performance testing, commissioning and operation of the Minago Project.

The schedule is based on the following:

- An assumed date for the start of Detail Design without a Basic Engineering Phase.
- Full funding required to meet the schedule.
- An EPCM contracting strategy.
- Permitting approvals won't compromise engineering, procurement & construction dates.

The Project Implementation Schedule is summarized in Section 18.0 with the full schedule included in the appendices. Given the requirement to commence the dredging early in 2011, the engineering and procurement for the substation, dewatering and dredging work would need to be advanced early this year.

## PROJECT RISKS AND OPPORTUNITIES

The Minago Project, like many large projects carries with it both risks and opportunities which may influence a successful outcome. Within this Feasibility Study we have attempted to identify the most likely risks and opportunities. Where we have identified a risk the mitigating circumstances which might ameliorate that risk have been identified.

Risks and opportunities range from location, financial, economic, social and political fields. Representative risks and opportunities include commodity issues, construction costs, environmental and regulatory issues, resource estimates, process design, financial risk, logistics, political, labour, social and aboriginal issues.

The most significant immediate factor affecting risk and opportunity is the current economic downturn which has led to a steep deflationary cycle. On the positive side, the economic downturn has stabilized prices, improved the availability of labour and has improved deliveries. The inherent risk is that the commodity prices may remain low for the foreseeable future or that financing may become difficult to obtain.

Wardrop has identified commodity issues as a risk given the recent precipitous drop in the price of nickel since the $24.00/lb peak. Although the frac sand pricing has been affected by the slowdown in the development of new wells, the pricing should improve when the gas prices start to rebound.

On the political front, the aboriginal issues remain to be resolved despite positive press comments from many aboriginal leaders. Although the benefits of the mine have been acknowledged, full agreement with all of the native bands has not been realized. However, by continuing to develop relationships with the local aboriginal bands, Victory Nickel is moving to mitigate this risk.

Until the Environmental Impact Statement, has been submitted and approved, specific environmental approvals may not be forthcoming. Nevertheless, environmental issues do not appear to be insurmountable and Victory Nickel has taken the necessary steps to understand the environmental issues.

Victory Nickel is planning to take advantage of Manitoba Hydro's current power rates which are the lowest in North America. To lock in these preferential rates to ensure that this power is available at current prices, steps should be taken to acquire the approval of Manitoba Hydro early in the process. In addition to determining rates, Victory Nickel needs to finalize the process for getting approval for the connection to the 230 kV Line.

On the upside, the possibility of reclassifying ore resource from inferred to indicated offers the greatest opportunity. The calculation of the inferred resource suggests that significant measured and inferred resources could be realized. In a similar vein, there is the possibility to develop resource in the north arm of the ore body. With mining and milling infrastructure costs carried within this project, the costs for developing these contiguous ore bodies would be reduced.

The annual feed rate for production of frac sand for the developing Canadian oil fields has been set at 1.5 Mt/a.. If advantageous market conditions prevail, additional capacity may be available the design of the Frac Sand Plant is amenable to increasing production.

During the detail design, significant opportunity exists to reduce the construction costs by minimizing excavation, structure, and concrete quantities, and more effective equipment selection. The possibility of utilizing more off-site pre-construction and modularized components such as pre-mounting and pre-wiring of valve skids complete with controls.

Capital costs may be reduced through the purchase of second-hand equipment which is becoming increasingly available due to the economic slowdown. In order to defer the immediate use of capital, Victory Nickel has explored the option of leasing equipment.

Within the site, the location of tailings dams, overburden dump and rock dumps will be optimized to select zones where the soft clays thicknesses are minimal.

As the present locations are close to the pit, these are optimal in terms of haul distance, the preferred option going forward would be to improve the load bearing capacity of the clay below the dumps. By staging construction to consolidate the clay, the dump heights may be increased and the area required minimized reducing the construction and operational costs.

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***Mel Project***

**1.0 SUMMARY**

Located in north central Manitoba, the Mel property is situated within the Nelson House Resource Management Area, approximately 25 kilometres (km) north of the city of Thompson and 764 km north of the provincial capital of Winnipeg, Manitoba, Canada.

The Mel property comprises one mineral lease (ML-007) and 37 unpatented mineral claims totalling an aggregate of 9,516.973 hectares (ha). Both the Mel lease and the Mel claims are held and 100% owned by Inco Limited (Inco), subject to an option/buy-back letter of agreement with Victory Nickel Incorporated (Victory) dated August 27, 1999, as well as subsequent agreements and amendments.

Victory has commissioned Wardrop Engineering Inc. (Wardrop) to carry out an independent resource estimation of the nickel development potential of the Mel deposit. The work entailed estimating mineral resources in conformance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Mineral Resource and Mineral Reserve definitions referred to in National Instrument 43-101 (NI 43-101) Standards and Disclosure for Mineral Projects.

Road access to the property is provided by Provincial Highway 391, which crosses the extreme southwest corner of the Mel claims. In the summer months, access to the property is possible by boat on the Odei River that meanders throughout the entire length of the Mel property. Access to most of the property is restricted primarily to the winter months when the ground is frozen due to much of the area being covered by muskeg. Access to the property is also possible via helicopter from the city of Thompson.

In the city of Thompson, Inco conducts nickel mining, milling, smelting and refining operations. The city of Thompson, known as a regional trade and service centre of Northern Manitoba, boasts an excellent transportation system of scheduled daily air service, overnight truck delivery, paved roads, and a railway system that connects Thompson with other communities throughout the province. It has all of the services and amenities that would be expected in a much larger, urban centre. There is no mining infrastructure on the Mel property.

The first record of exploration in the vicinity of the Mel property was in 1961, when the Canadian Nickel Company Ltd. (a wholly owned subsidiary of Inco) first discovered the Mel deposit on what is now mineral lease ML-007. Numerous companies were active in the area beginning in 1961; however, activity ceased in 1971 with the advent of exploration prohibitive legislation. The region remained dormant until 1999 when Inco staked the Mel claims. Until recently, Inco along with Victory, have actively explored the Mel property.

The Mel property is situated within the Thompson Nickel Belt; a northeast-southwest trending 10 to 35 km wide belt of Early Proterozoic sedimentary rocks interfolded with

Archean age basement gneisses. The nickel deposits are associated with ultramafic intrusions that occur within the Proterozoic rocks, which have been metamorphosed to schists and gneisses and have subsequently been folded into complex patterns. The Thompson Nickel Belt is fault bounded on both the eastern and western margins. To the east along the Superior Rift fault zone, Archean Superior Province rocks are in contact with the Thompson Nickel Belt (Peredery et al., 1982). To the west, the Thompson Nickel Belt is in direct contact with the Kisseynew domain, located within the Trans-Hudson Orogeny tectonic domains of the Churchill Province (Bleeker, 1990). The Kisseynew paragneisses have been interpreted to represent the metamorphosed remnants of a back-arc or inter-arc basin.

At the Mel deposit, nickel-bearing massive and stringer sulphides occur within and in contact with an ultramafic intrusion. The sulphides are dominantly pyrrhotite with lesser amounts of pentlandite and chalcopyrite. Mineralization strikes approximately 345 degrees (°) for a distance of 1500 metres (m), dips from 70° to 80° east and extends to a known depth of 825 m below surface. The deposit consists of folded, continuous to discontinuous higher-grade nickel bearing sulphide layers up to 15 m thick (horizontal) within a broader mineralized zone with horizontal thicknesses locally exceeding 30 m. Folding appears to have locally caused thickening of the mineralized layers.

Diamond drilling from 1961 to 1971 was AXT size core except for a few holes of AQ size core drilled at the end of the 1971 campaign. Core from that period has been preserved and is stored by Inco in Thompson as abbreviates only with generally one representative sample approximately 10 centimetre (cm) long collected approximately every three metres in the hole. Diamond drilling from 1999 to 2006 is NQ core size. The core is logged, sampled and stored by Inco in Thompson. Mineralized sections of the core are subdivided into sample intervals not exceeding 1.5 m of core length based on rock type, alteration, sulphide abundance and textural variations.

## 1.1 RESOURCE STATEMENT

Wardrop completed an estimation of the mineral resource on the Mel Deposit for Victory. This has resulted in an Indicated resource of 4,279,000 tons grading 0.875% nickel (Ni) plus an Inferred resource of 1,010,000 tons grading 0.839% Ni at a cut-off of 0.5% Ni.
Wardop carried out data verification on 5% of the drillhole database from drill logs and assay values. The database verification conducted by Wardrop found no discrepancies with the original information. Wardrop concludes that the database meets industry standards for resource estimation.

Estimation of the resource included the interpolation methods of nearest neighbour, inverse distance squared and ordinary kriging. The methods were validated by comparison of global mean grades, visual review of coded block grades and swath plots. No significant discrepancies exist between the methods. Ordinary kriging methodology was selected for grade estimation on the deposit.

## 1.2 RECOMMENDATIONS

Additional drilling is recommended on the Mel deposit in order to improve the resource classification and to increase confidence in grade continuity. Wardrop suggests performing infill drilling along strike as well as bracket holes at depth where the higher grade material is identified.

Wardrop recommends exploration on the Mel lease to extend the Mel deposit along strike thereby potentially increasing the tonnage estimates and drilling on Mel mineral claims to further explore the lower Pipe Formation.

This resource estimate only included nickel (Ni) values but the assay database includes values for copper (Cu) and cobalt (Co). Wardrop recommends that all samples be assayed for Ni, Cu, Co and Platinum Group Elements (PGE) as well as all potential payable and deleterious elements.

Additional bulk density determinations of the mineralized material should be carried out so that specific gravity data can be incorporated into resource block model for estimation.

Additional drilling is recommended so that samples can be collected for metallurgical testing and mineral processing at Mel deposit.

Wardrop believes that the current resource block model honours the high grade values well and that local grade variations are reasonably well represented. However, more work is required to improve the local grade estimation within the block model estimation, possibly multiple indicator kriging and unfolding to compare with the current estimation method. Globally, the Wardrop resource compares well with previous Inco estimates. For preliminary economic assessment or feasibility type study work, where selective mining methods or detailed engineering design work will be required, Wardrop recommends updating the current resource block model. This exercise will be beneficial once new drilling data becomes available.

## *Lac Rocher Project*



# 1. Summary

This report constitutes a Preliminary Economic Assessment (PEA) of the Lac Rocher Nickel Project. The project is based on developing a shallow underground mine (ramp access), extraction of the ore by a mining contractor, and transportation of the ore for custom milling in a processing facility in Chibougamau, Quebec. Metallurgical testing was performed on a low grade sample of material as part of the PEA, and the results used to define a process flowsheet and to estimate concentrate grades and recoveries.

The scenario retained involves the extraction, in two phases, of some 317,730 diluted tonnes of ore, at a grade of 1.57% nickel (Ni). 0.58% copper (Cu) and about 0.053% cobalt (Co), with expected recoveries of respectively 81% (Ni), 91% (Cu) and 95% (Co). This would result in the production of about 38,400 tonnes of a mixed nickel-copper-cobalt concentrate containing some 4,040 tonnes of nickel (8.9 million pounds), 1,680 tonnes of copper (3.7 million pounds), and some 160 tonnes of cobalt (0.35 million pounds).

A pre-tax, 100% equity based cash flow analysis, for base case prices of 8.00 $US/lb Ni, 3.00 $US/lb Cu and 25 $US/lb Co, indicates that the project is not economical at such metals prices, with a Net Present Value (NPV) of about – 13.9 M $

***Location and Access***

The Lac Rocher Property (the property) of Victory Nickel Inc. is located in the northwest quadrant of the Canton 115 area of north-western Quebec. It is 160 kilometres ENE of the town of Matagami. The claims lie 50 km east of Highway 109 (known as the James Bay Route), connecting Val-d'Or with the James Bay hydroelectric installations. The claims are centered on approximately 76°21'W, 50°35'N. To the authors' knowledge, the property has not been legally surveyed at the time this PEA was completed. Access is by all season logging roads extending to approximately 3 km of the property, and then through a winter road to be upgraded as part of the project.

The property is located within the James Bay Lowland, with maximum topographic relief of about 150 metres. At Lac Rocher, a maximum relief of 45 m is present, and overburden is relatively thin, in the order of several metres. The main discovery area lies within the Reservoir Quenonisca, a Hydro-Québec reserve district which could be flooded if a hydroelectric dam is constructed to create this reservoir.

The property is comprised of sixty nine (69) contiguous claim units covering a total area of 1,088 ha. Victory Nickel has obtained a 100% interest in the property. The 20 original claims, which comprise the deposit to be mined, are subject to a production royalty calculated at the rate of 0.50 $ (fifty cents) per ton on all ore mined and milled from the claims for the life of any mine developed.




***Deposit Type and Mineralization***

The property lies near the eastern termination of the 1,000 km long Opatica Subprovince of the Superior Province of the Canadian Shield.

The deposit type targeted at the Lac Rocher Property is a mafic-ultramafic-iron-nickel-copper sulphide association (magmatic hosted nickel sulphide mineralization). Mineralization occurs as disseminated sulphides and as massive sulphide lenses, within a mafic to ultramafic body and within fractures adjacent to its contacts. This type of mineralization is a common source of much of the world's nickel production.

The main geological feature hosted on the claims is a circular mafic intrusion, referred to as the Lac Rocher Pluton. This pluton is a multiphase intrusion composed of gabbro, pyroxenite and peridotite. Contacts of the intrusion with the host rock are relatively sharp, displaying little evidence of *in-situ*

hybridization. The intrusion is pervasively hydrated and displays no penetrative fabric. Pyroxenite and peridotite phases are relatively well defined, indicating that they may be petrogenetically related, and the product of fractional crystallization of a single parent.

The nickel-copper mineralization is associated with both gabbroic and lower pyroxenitic horizons. Disseminated sulphides occur as scattered blebs, generally in the millimetre to one centimetre size range, although rare clasts of massive sulphide up to 10 centimeter are present. In general, percent sulphide increases from 1-5% to 15-20%, and is locally massive at the base. The massive sulphides are especially nickel-rich and copper-poor.

***Exploration and Drilling***

Exploration in the immediate area dates back to 1959, with various companies conducting surveys and drilling on claims within a few kilometres from the property. The nickel-copper-bearing sulphides were first identified in 1994. The claims covering the deposit were acquired by Nuinsco Resources in 1998, and transferred to Victory Nickel inc. upon its creation, in February 2007.

Nuinsco conducted exploration work on the property in 1998, 1999, 2000, 2006 and Victory Nickel did in 2007. This work includes IP, Pulse EM, magnetometer, ground magnetic readings, MaxMin readings, gravity surveys, scan resistivity surveys, and drilling. Drilling was conducted in each of these campaigns.

A total of 97 diamond drill holes have been implemented on the property, for a total length of 19,458 m. A number of those holes were targeted at anomalies in the area and were not used to characterise the Lac Rocher Discovery intrusion. A total of 64 drill holes targeted the Discovery intrusion and were used to estimate the mineral resources in this study. All drill holes were surveyed for both their location and their deviation.

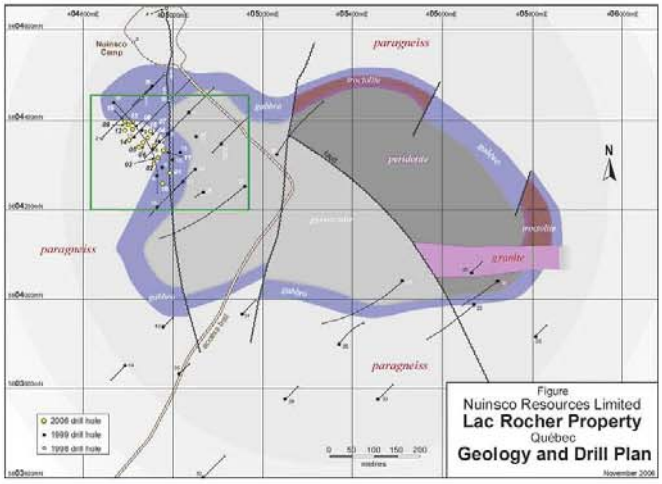
The drill hole database available for this study consists of:

- 64 diamond drill holes;
- 814 down hole survey records;
- 3,750 assay records (Ni, Cu), and 1,157 records for Co;
- 1,453 lithology records.

Drilling outlined a mafic to ultramafic intrusion which is compositionally zoned, roughly ovate in surface plan, and composed predominantly of pyroxenite and peridotite. It has the dimensions of approximately one kilometre along an east-west axis and 450 m in a north-south direction.

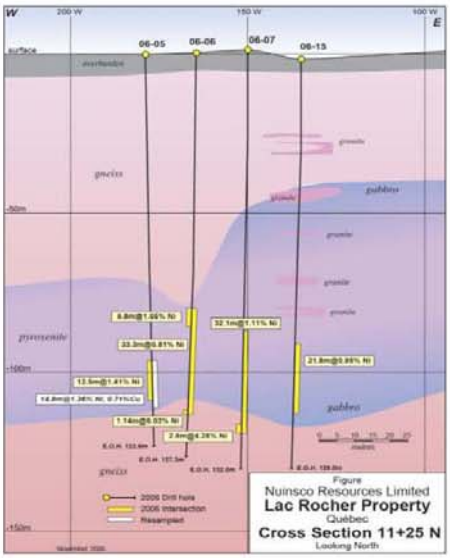
Sulphide mineralization of significance occurs as broad domains of disseminated and intercumulate aggregates of pyrrhotite, pentlandite, chalcopyrite and minor pyrite. Massive sulphide mineralisation has been intersected in 12 drill holes.

Higher concentrations of sulphide occur predominantly within pyroxenite, while gabbro hosts disseminated sulphide. In general, the sulphide content increases towards the footwall contact of the pyroxenite intrusion. Massive sulphides occur as lenses within the pyroxenite, at its footwall contact or within the paragneiss at close proximity with the pyroxenite contact. The massive sulphide intervals are composed of a fine grained pyrrhotite-rich groundmass enveloping coarse grained rosettes of pentlandite, irregular, small aggregates of chalcopyrite, and rare irregular pyrite aggregates.




Outside of the discovery intrusion, diamond drilling of airborne E.M., magnetic, Induced Polarisation and gravity anomalies failed to intersect any mineralization of any type. The representative cross-section illustrates the relationship between geology, drill-hole locations and mineralization.

***Sampling and Analyses***




Sampling focused on mineralised mafic to ultramafic units. Sample intervals ranged from less than 1 m to 1.5 m. Depending on the year, some of the core is split and other is sawed. The geologist logging the core marks it and places a sample tag in the core box. Tags are also made for blanks and standards to be placed in the sample stream (approximately 5% of the samples). Blanks were placed immediately after massive sulphide samples. The core is then cut and half of the core is placed into a bag with the tag. The samples would then be taken to a laboratory for assay. Standard control procedures have been followed, including a duplicate analysis every 12$^{th}$

sample. Blanks were introduced after massive sulphide samples, in order to reduce the potential for contamination.

***Data verification***

No data verification was performed as part of this Preliminary Assessment. This was described in a mineral resource Technical Report by Ted Goettel, geol., December 6, 2006.

***Metallurgical Testing***

A mineralogical study and flotation test work program was conducted by Corem on a composite of drill core sample representative of the lower grade part of Victory Nickel's Lac Rocher deposit. As part of the PEA project, engineers from Bumigeme Inc. were involved in the follow-up of Corem's testwork, and provided technical assistance.

The ~50 kg composite was prepared by Mr. Chris Wagg, a Qualified Person. The composite of uncrushed samples of diamond drill core intersections was prepared to represent the lower grade part of the Lac Rocher resource.

Independently of the PEA, a mineralogical investigation and metallurgical test work program was conducted by Xstrata Nickel on behalf of Victory Nickel. The program was conducted on a composite sample prepared from drill core intersections in the higher grade part of the Lac Rocher resource. Results obtained showed that the composite was readily amenable to the Xstrata flotation process.

The purpose of the test work on the lower grade sample was to generate the information required to develop the flowsheet of a flotation process permitting to recover the highest possible percentage of nickel and copper content of the resource into a mixed concentrate grading a minimum of 10% Ni and meeting all specifications generally set forth in nickel concentrates smelting contract specifications. This objective was met by conducting 14 grinding-flotation tests.

***Head Sample for Grinding-Flotation testing***

The material used for metallurgical testing was assayed at 1.36% Ni, 0.47% Cu and 0.04% Co. Its Bond Work Index was determined at 13.4 kWh/t.

***Mineralogical Investigation***

Pentlandite is the major nickel-bearing phase identified. It mainly occurs as contact grains as well as ex-solution flames within pyrrhotite. Chalcopyrite was the only copper-bearing phase observed. Other sulphides minerals present are mostly pyrrhotite, with some pyrite present. The liberation particle size for pentlandite has been estimated to be around 50-60 μm.

Major gangue minerals are silicates, mostly actinolite (amphibole), phlogopite and chlorite.

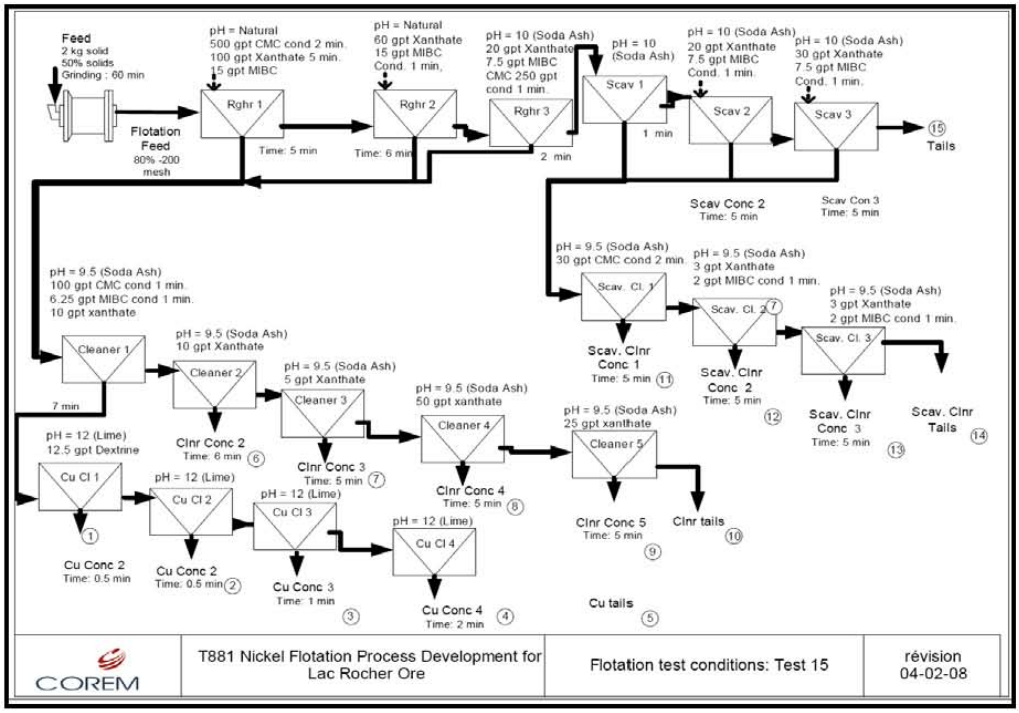
Magnetic testing indicated that the pyrrhotite has a very low magnetic susceptibility and that there is negligible nickel enrichment in the magnetic fraction. Therefore, magnetic separation cannot contribute to improve the overall efficiency of the flotation process.

***Flotation Testwork***

The primary objective of the flotation testwork was to develop the flowsheet of a process capable of recovering the highest possible percentage of the nickel in concentrate grading a minimum of 10% Ni. Preflotation and direct flotation tests were conducted on 2 kg samples. Some tests also verified the possibility of extracting a high-grade copper concentrate from the mixed Ni-Cu concentrate. With high copper grades but low recoveries, this option was deleted from the process.

Direct flotation was determined to be the best process approach, with a rougher-cleaner configuration producing a mixed concentrate respecting the testing objectives.

Final tests provided concentrates assaying between 10% Ni and 11.6% Ni, 3.9% Cu to 4.3% Cu, and 0.32% Co to 0.38% Co. Recoveries ranged from 77% and 83% for nickel, 91% to more than 94% for copper, and more than 95% for cobalt. The impurities present in the final concentrates were all below typical penalty levels in smelter specifications.



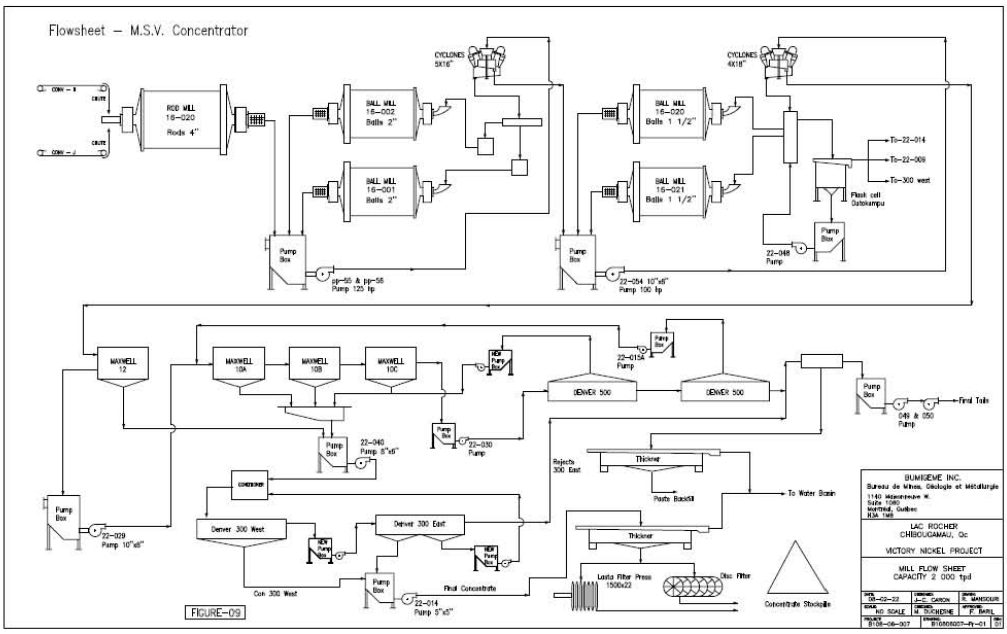
### *Mill Flowsheet*

The proposed flowsheet was developed on the basis of the results of the test work program as well as on the hypothesis that the Lac Rocher resource would be custom milled in the Copper Rand (MSV) concentrator, modified to meet the process requirements.

The proposed flowsheet includes modifications to the testwork flowsheet to: convert the fourth rougher stage into a scavenger stage and recirculation of the scavenger concentrate ahead of the rougher circuit; convert the fifth cleaner stage into a scavenger-cleaner stage and recirculation of its concentrate ahead of the cleaner circuit; and deleting the scavenger stages used during testing.

### *Process Criteria*

Required modifications to the Copper Rand processing plant in Chibougamau are not important. They include an exterior ore pad, two new steel bins (total capacity of 3,000 t) with ore feeders and a scale, two conditioners with pumps and associated piping, two reagent feeders, and modifications to the concentrate storage area for separate storage of the Lac Rocher concentrate.




Primary crushing of the ore will be performed at the mine site, to facilitate handling and transportation. The nominal feed rate to the processing circuit will be about to 2,200 t/d (91 t/h). The mill will process Lac Rocher ore on a seven days per month basis, for a total of 14,000 – 16,000 t/ month.

Crushing and grinding will be performed in existing circuits, with crushed ore stored in the two new ore silos. Grinding fineness will be 80% passing 74 μm.

Flotation will also use existing equipment. Reagents for flotation are potassium amyl xanthate (PAX) as collector, CMC as a gangue depressant, MIBC (frother) and some flocculent. Soda ash was used during metallurgical testing for pH control, when lime was found to have a slowing effect on flotation kinetics. Additional testing is recommended to assess the possibility of achieving the target grades and recoveries using lime, which is the current pH control reagent used in the Copper Rand mill.

Flotation tailings of the Lac Rocher ore will be acid-generating, with an average sulphur content of about 1.7%. Tailings will be disposed of in the same fashion as already practised at the Copper Rand facility, which is by rejecting in the downstream section of the existing tailings disposal facility, so they are submerged at all times.

Tailings tonnage produced by the processing of some 317,730 t of ore will be approximately 285,000 t, occupying about 190,000 $m^3$ after settling. Underwater spare storage capacity of the existing tailings disposal facility is estimated at 2.3 $Mm^3$ (end of December 2007). This is sufficient to accommodate the Lac Rocher tailings, in addition to the estimated 450,000 $m^3$ to be produced from processing the ore from the Copper Rand mine.

***Mill and Processing Costs***

The cost of modifications to the existing mill, including two new ore bins, is estimated at 864,000 $. Total processing costs are estimated at 24.18 $/t, including ore re-handling from the stockpiling area at the processing facility, concentrate loading and tailings disposal.

***Expected Metallurgical Performance***

The Lac Rocher flowsheet process was developed on the basis of the results obtained from open circuits. To the three rougher stages in the flowsheet of the last laboratory test, a $4^{th}$ stage is recommended, which will slightly pull a pentlandite scavenger concentrate recirculated to the rougher circuit. Similarly, the $5^{th}$ stage of the laboratory cleaning circuit will scavenge a concentrate recirculated to the head of the cleaning circuit.

Based on results obtained from the last two laboratory tests, Bumigeme Inc. (responsible for the metallurgical aspects in the PEA) concludes that:

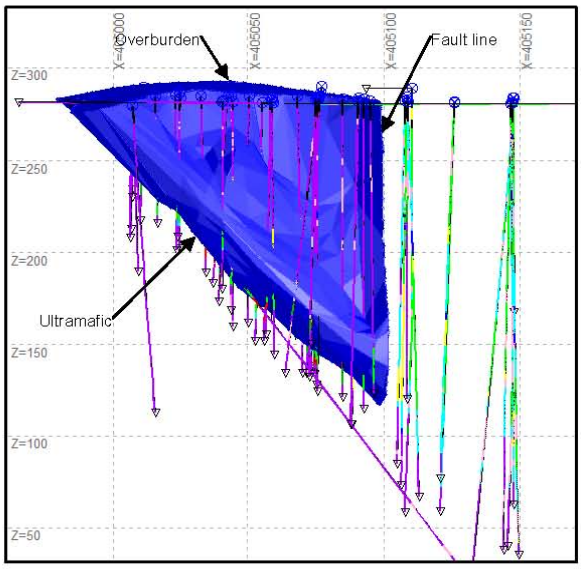
*"The milling of that part of the Lac Rocher resource having grade and mineralogical characteristics similar to those of the composite tested by Corem will recover a minimum of 81% of the nickel, 91% of the copper and 95% of the cobalt, in a concentrate grading 10.5% Ni, 3.9% Cu and 0.33% Co, and meeting the specifications set forth in the proposed Smelting Contract for being penalty free."*

The milling of higher grade sections of the resource at Lac Rocher is likely to result into a higher nickel recovery with similar grades of concentrate. This remains to be confirmed by actual processing of a bulk sample or additional testing. Some testing is recommended in the areas of grinding, stage addition of the gangue depressant, substitution of soda ash by lime, and laboratory testing using the existing Copper Rand flowsheet.

***Mineral Resources – Geological Interpretation***

Mineral resources were estimated for the first time in 2006 and were reported in the Technical Report, Goettel, 2006. Within the scope of this Preliminary Economic Assessment, it was decided to update the resource model previously made with the new 2007 drilling results, and incorporate copper and cobalt data in the model. It is important to note that there are no mineral reserves estimated within the scope of this study.

Using lithologic information from the drill hole logs, the contact between the gneiss host rocks and the ultramafics has been modeled in the form of a contact surface delineating the intrusion to the west. To the east, a major fault limits the extent of the mineralised envelope. These features form a sort of cone opening up toward the surface. The approximate volume of the mineralised envelope is 958,200 $m^3$.




Massive sulphide mineralization, very different from the bulk of the Ni-Cu mineralization in the ultramafic intrusion, has been identified. The massive sulphide lens lies directly on the contact between the gneiss and the ultramafic intrusion. It is relatively small in size. The volume of the massive sulphide lens is approximately 5,500 $m^3$.

The ultramafic intrusion is cut by several granitic dykes whose location and size are very erratic. The dykes are totally barren. The current geological interpretation of these dykes needs to be refined. They do not intersect the massive sulphide lens. The volume occupied by the interpreted granitic dykes is currently estimated at approximately 58,000 $m^3$.

### *Mineral Resources – Block Model Interpretation*

The mineral resources of Lac Rocher have been estimated using 3D block modelling with Inverse Distance interpolation. Composites 1.5m in length were created from the drill hole assay data, and separated by mineral type (massive sulphide and ultramafic intrusion) for estimation in 2 x 2 x 3 m blocks.

### *Classified Mineral Resources*

The mineral resources are derived from the accumulation of the resource model blocks, by category, above certain cut-off grades. The estimated mineral resources are categorised into the Measured, Indicated or Inferred categories, for a variety of Ni cut-off grades. This classification is based on the proximity of available drill holes and samples within given elliptical radii. Mineral resources related to cobalt have been classified separately from those related to nickel and copper. Cobalt mineral resources have been classified solely in the Inferred Category. Cobalt has been added to the scope of this study at the very end and no documentation or QA/QC was available. Cobalt mineral resources and related assumptions must be treated with caution.

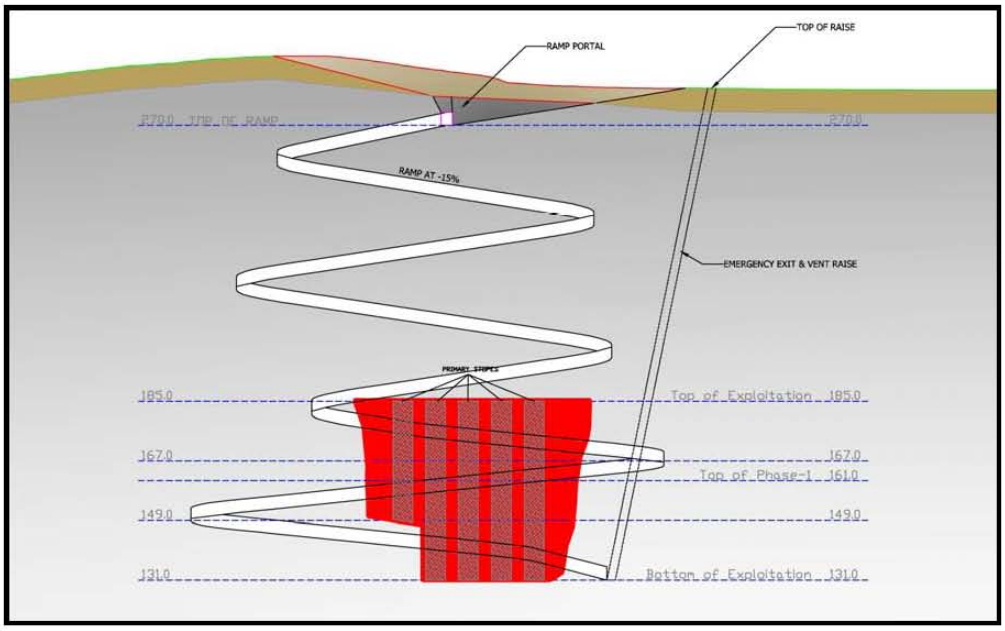
| | Measured | | | Indicated | | | Measured + Indicated | | | Inferred | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ni % cutoff | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % |
| 0.5 | 285,918 | 1.23 | 0.77 | 513,183 | 1.05 | 0.62 | 799,101 | 1.12 | 0.68 | 439,279 | 0.65 | 0.41 |
| 0.75 | 170,392 | 1.65 | 0.98 | 241,041 | 1.56 | 0.85 | 411,433 | 1.60 | 0.90 | 56,927 | 1.18 | 0.55 |
| 1 | 106,669 | 2.12 | 1.16 | 139,278 | 2.08 | 1.04 | 245,946 | 2.10 | 1.09 | 22,337 | 1.67 | 0.59 |
| 1.25 | 75,150 | 2.55 | 1.31 | 96,164 | 2.51 | 1.18 | 171,314 | 2.53 | 1.24 | 12,943 | 2.10 | 0.62 |
| 1.5 | 56,822 | 2.93 | 1.45 | 71,426 | 2.91 | 1.29 | 128,248 | 2.92 | 1.36 | 10,117 | 2.30 | 0.67 |
| 1.75 | 44,808 | 3.28 | 1.57 | 54,489 | 3.31 | 1.39 | 99,296 | 3.29 | 1.47 | 6,531 | 2.64 | 0.80 |
| 2 | 36,620 | 3.60 | 1.67 | 43,315 | 3.68 | 1.48 | 79,935 | 3.64 | 1.57 | 3,549 | 3.32 | 1.03 |
| 2.25 | 30,444 | 3.90 | 1.72 | 36,285 | 3.98 | 1.55 | 66,729 | 3.94 | 1.63 | 3,074 | 3.50 | 1.09 |
| 2.5 | 26,287 | 4.14 | 1.76 | 30,637 | 4.28 | 1.61 | 56,924 | 4.22 | 1.68 | 2,772 | 3.62 | 1.12 |
| 2.75 | 22,522 | 4.40 | 1.80 | 25,221 | 4.63 | 1.67 | 47,742 | 4.52 | 1.73 | 2,386 | 3.79 | 1.15 |
| 3 | 19,020 | 4.68 | 1.83 | 21,878 | 4.90 | 1.74 | 40,898 | 4.80 | 1.78 | 1,969 | 3.98 | 1.21 |
| 3.25 | 16,722 | 4.89 | 1.88 | 19,558 | 5.12 | 1.78 | 36,280 | 5.01 | 1.83 | 1,571 | 4.21 | 1.24 |
| 3.5 | 14,493 | 5.12 | 1.89 | 17,259 | 5.35 | 1.81 | 31,751 | 5.25 | 1.85 | 1,130 | 4.53 | 1.28 |
| 3.75 | 12,368 | 5.38 | 1.90 | 15,116 | 5.59 | 1.82 | 27,484 | 5.50 | 1.86 | 1,009 | 4.63 | 1.30 |
| 4 | 10,555 | 5.64 | 1.88 | 13,660 | 5.78 | 1.81 | 24,214 | 5.72 | 1.84 | 927 | 4.70 | 1.31 |
| 4.25 | 9,286 | 5.85 | 1.89 | 12,221 | 5.97 | 1.80 | 21,507 | 5.92 | 1.84 | 728 | 4.85 | 1.37 |
| 4.5 | 8,393 | 6.01 | 1.91 | 10,537 | 6.22 | 1.82 | 18,929 | 6.13 | 1.86 | 566 | 5.01 | 1.44 |
| 4.75 | 7,326 | 6.20 | 1.88 | 9,033 | 6.49 | 1.83 | 16,359 | 6.36 | 1.85 | 398 | 5.19 | 1.49 |
| 5 | 6,087 | 6.47 | 1.78 | 7,726 | 6.76 | 1.78 | 13,813 | 6.63 | 1.78 | 267 | 5.32 | 1.52 |
| 5.25 | 5,343 | 6.66 | 1.78 | 6,970 | 6.94 | 1.75 | 12,313 | 6.82 | 1.76 | 180 | 5.42 | 1.54 |
| 5.5 | 4,761 | 6.82 | 1.75 | 6,078 | 7.16 | 1.67 | 10,839 | 7.01 | 1.70 | 45 | 5.62 | 1.53 |
| 5.75 | 4,185 | 6.99 | 1.69 | 5,204 | 7.42 | 1.55 | 9,389 | 7.23 | 1.61 | | | |

| | Inferred | | |
|---|---|---|---|
| Ni % cutoff | Tonnage | Co ppm | Co Metal (lb) |
| 0.5 | 1,238,380 | 289 | 790,098 |
| 0.75 | 468,360 | 432 | 446,252 |
| 1 | 268,283 | 529 | 312,684 |
| 1.25 | 184,257 | 590 | 239,699 |
| 1.5 | 138,365 | 629 | 191,961 |
| 1.75 | 105,828 | 662 | 154,351 |
| 2 | 83,484 | 708 | 130,216 |
| 2.25 | 69,803 | 748 | 115,092 |
| 2.5 | 59,696 | 783 | 102,987 |
| 2.75 | 50,129 | 826 | 91,327 |
| 3 | 42,867 | 867 | 81,964 |
| 3.25 | 37,850 | 898 | 74,933 |
| 3.5 | 32,881 | 919 | 66,631 |
| 3.75 | 28,493 | 924 | 58,069 |
| 4 | 25,141 | 937 | 51,931 |
| 4.25 | 22,235 | 931 | 45,614 |
| 4.5 | 19,495 | 942 | 40,470 |
| 4.75 | 16,756 | 927 | 34,258 |
| 5 | 14,080 | 922 | 28,625 |
| 5.25 | 12,493 | 915 | 25,197 |
| 5.5 | 10,884 | 922 | 22,123 |
| 5.75 | 9,389 | 921 | 19,057 |

***Mining - Development***

The Lac Rocher deposit appears as a continuous concentration of nickel and copper sulphides calling for a mining method that will recover the maximum of ore and have a minimum of dilution. Core examination suggests very good rock qualities, with core recovery of almost 100% and very little visible alteration.

Most of the higher nickel values are sitting along a clean footwall contact with gneissic rocks, at an angle of ± 50º. Because of the rather low tonnage and the fact that the known bottom of the deposit is less than 150 m from surface, a ramp is the logic choice of access for exploitation. Sinking a shaft is not economically feasible in the current context. The portal of the ramp is located at elevation 270 m.




Based on the resources estimation, a number of mining scenarios has been examined. The retained scenario proposes to extract approximately 297,000 t of Measured and Indicated resources, at a grade of 1.60% Ni and 0.60% Cu, plus 21,000 t of Inferred resources at a grade of 1.07% Ni and 0.35% Cu. All cobalt resources, in the total 318,000 diluted tonnes, have been classified as Inferred, at a grade of 0.053% Co.

The addition of Inferred category resources in the mining scenario of this PEA is explained by the fact that the mining method proposed is based on a complete extraction of the resources inside the portion of mineralized deposit targeted for mining. Inferred resources represent 6% of the resources to be extracted.

The project would be realized in two phases. During Phase 1, a portal and a main ramp with cross-cuts would provide access to the lower levels of the mine, and allow for a definition drilling program that will better delineate the resources. Approximately 65,000 t would be mined out to confirm the process flowsheet and metal recoveries, the operating costs and the mining method. The remaining 253,000 t of ore would be extracted during Phase 2.

The proposed minus 15%, 1,100 m long, 5 m wide by 4 m high ramp will start at elevation 270 m and terminate at the elevation of the first mining lift, which is at the 131 m elevation. A 170 m long ventilation-escapeway raise (3 m x 3 m) will connect the bottom of the ramp to the surface. Secondary ramping accesses will be provided at every 6 meters.

### *Mining Method*

The selected mining method retained in this PEA study is mechanized cut and fill, with delayed rock fill. Development waste and sand/gravel material will be used as backfill, and cement will be added for consolidation when required.

Primary stopes (6 m wide by 6 m high) will be excavated starting from the bottom of the orebody. They will be backfilled with cemented fill after each lift. The 4-m wide pillars of left between the primary stopes will later be extracted and backfilled only on the top section to avoid dilution when mucking out the broken ore. Average ore production rate has been assumed to be 500 t per day during Phase 1 and 750 t per day during Phase 2.

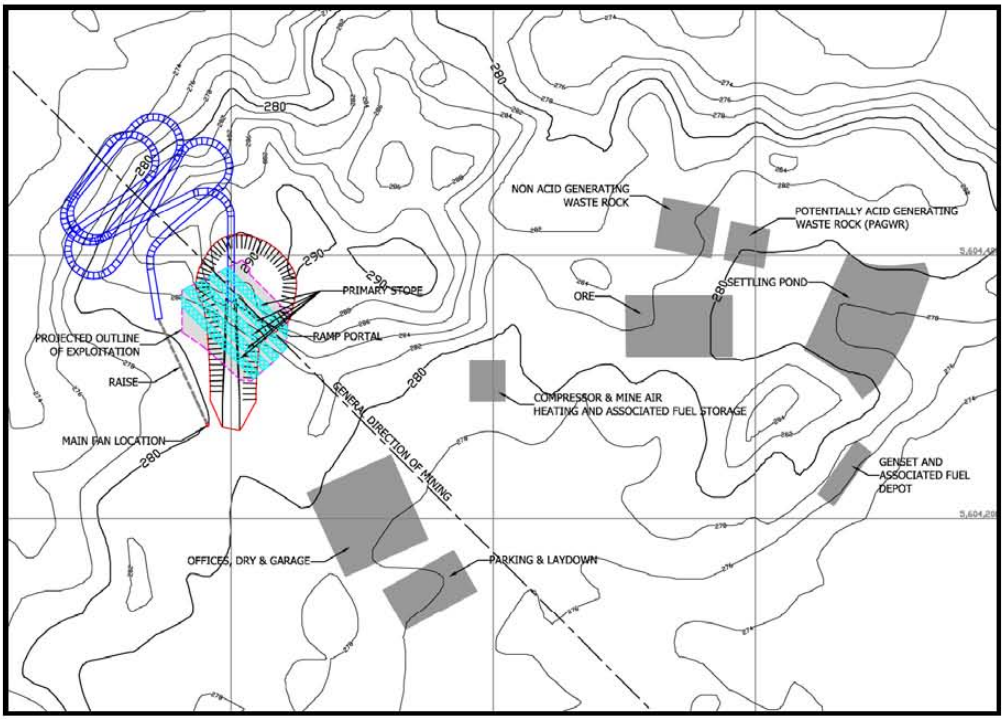
### *Infrastructure and Services*

The site around the proposed portal location is relatively flat, and permits a compact general arrangement of the mine facilities.

With no ore processing facility at the mine site and the short duration of the project, power will be produced on-site by diesel-powered generators, eliminating the need to build a power line and associated facilities. The availability of camp accommodations less than 40 km from Lac Rocher also eliminates the need to build such an installation at the mine site.

Site development will mostly consist in upgrading an existing winter access to the mine site, implementing some site roads, parkings and laydown areas. Temporary buildings will consist in an office accommodation for the owner's team (rented trailers), a mining contractor-supplied shop and dry complex, gensets, a fuel station, a compressor station and a mine air-heating installation.

Four stockpile pads will be provided, two each for ore and waste rock. A control basin will be installed downstream of the stockpiling area, to treat mine water and drainage from the stockpile.

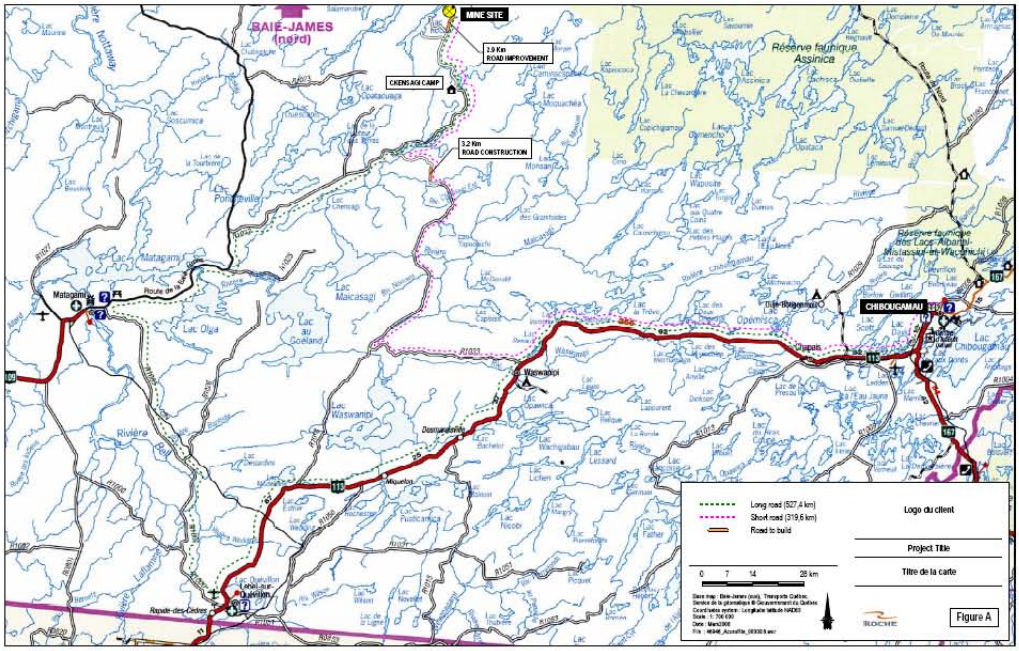



***Roads and Transportation***

The existing road to Matagami will be the main access for personnel and supplies. Its last 2.9 km portion (winter road) will be upgraded. Using this route to drive to Matagami and then on to Chibougamau to transport ore to the processing facility would represent a total distance of about 540 km.

Another shorter route will be used for the transportation of the ore to the Copper Rand mill in Chibougamau. It involves the building of a new 3.6 km segment and some upgrading to link with an existing logging road. This road leads south to the village of Waswanipi, to reach Route 113 extending to Chibougamau. Total distance is about 325 km. Transportation cost over this road option is estimated at 35 $ per ton of ore.

The nickel-copper concentrate produced at the Copper Rand mill in Chibougamau has been assumed to be sent to a nickel smelter in the Sudbury area, in Ontario. A quotation for rail transportation was obtained form CN. Including the fuel surcharge as of January 2008, the estimated cost per ton of concentrate is 60$.




***Ore and Waste Rock Storage***

Assays and leaching tests performed on ore (core) samples confirm that ore is to be considered as leaching under applicable rules in Quebec.

Favourable areas for storing waste rock and ore are available close to ramp and upstream of the proposed control pond.

Two areas have been designed for the temporary storage of ore. They would provide the option of separating different types of ore upon hauling from the mine, and the subsequent separate transportation of each type to the milling facility. Both areas have a capacity of some 20,000 t each.

Samples of waste rock from the future ramp area have a sulphide content lower than 0.3% and a ratio of neutralization potential/acidifying potential large enough to be considered as environmentally safe, i.e. not acid-generating.

A 9,000 t capacity storage area has been provided. Most of this type of waste rock should be used for site preparation (stockpile pads, site roads). It will also be needed to backfill stopes in the underground workings when mining begins, and none should be left at the end of Phase 1 of the project. All remaining waste rock would be used as backfill when mining proceeds to Phase 2.

Any waste rock from within the mineralised envelope would be acid-generating and would have to be treated with appropriate protection measures for storage and treatment of drainage. With the current

mining plan, any material extracted from the mineralised envelope will very likely have a high enough nickel content to be considered as ore. Little or no acid-generating waste rock should therefore have to be managed. A stockpiling area with a capacity of 5,000 t has been provided to temporarily store any acid-generating waste rock, until it is returned underground as rockfill.

***Site Water Management***

A 2,300 $m^3$ control pond will provide a 3.5 to 4-day retention time for the settling of suspended solids from mine water and runoff from the upstream area used for storage of ore and waste rock. A treatment facility will be available to control the quality of the pond's effluent to applicable criteria.

***Markets and Smelter***

The Lac Rocher project is a short-term one. As defined within this PEA, development of the mine and mining would extend over about 24 - 26 months, with first ore potentially extracted about mid-2009, and mining proceeding until the fall of 2010.

Based on current trends for prices for nickel and copper, Victory Nickel recommends that the cash flow analysis be conducted with prices of 8 $US/lb for nickel, 3 $US/lb for copper and 25 $US/lb for cobalt, for the duration of the project.

Victory Nickel had preliminary discussions with various nickel smelters. A final choice remains to be finalised upon negotiations when more project information and a final timeline have been developed.

The cash flow analysis has been conducted with smelting terms provided by Victory Nickel. The exact nature of the smelter's specifications and charges must remain confidential. For the sake of estimation, transportation of the mixed nickel-copper concentrate produced in Chibougamau has been assumed to be by train to the Sudbury area.

***Environmental Considerations***

An Environmental Baseline Study (EBS) of the Lac Rocher has been initiated in 2007. Its objective is to gather environmental data to be used to develop the Environmental and Social Impact Assessment (ESIA) on the basis of available information and field surveys. Field surveys were conducted within a study area of about 260 $km^2$ in order to obtain relevant information on environmental components.

The region is characterized by a continental sub-polar and sub-humid climate with a short plant-growing season (140 to 150 days). The site is in a region of low topographic relief with low-lying hills primarily covered with glacial deposits consisting of undifferentiated till. The Lac Rocher property is located within a Spruce-Moss forest bioclimatic domain, at the bottom of a small

valley covered primarily by peat bog, except for the mine site itself which is on slightly higher and dry ground.

There is no sensitive physical or biological component of the environment in the project area.

The project is located in a territory governed by the *James Bay and Northern Quebec Agreement* (JBNQA). The project area falls entirely within Category II lands, which belong to the province, but where Native governments share management for hunting, fishing and trapping, tourism development and forestry. Native people have exclusive hunting, fishing and trapping rights on these lands.

An Archaeological Potential Study was conducted and revealed no areas of interest in the proposed mining sector.

As it lies within Category II lands, any loss of area due to the Lac Rocher project will have to be financially compensated to the Native peoples.

Victory Nickel Inc. met with the tallymen supervising the Waswanipi Cree Community's trapline in the project area, to present the Lac Rocher Project and gather Native People concerns with respect to the project. A Memorandum of Understanding has already been established between Victory Nickel Inc. and the Waswanipi Cree First Nation.

***Permitting***

In accordance with the James Bay and Northern Quebec Agreement, signed by the Native peoples of the northern regions, Chapter II of the Environmental Quality Act contains specific provisions applicable to the authorization of projects in James Bay and Northern Quebec.

Mining exploitation projects are automatically subject to an environmental and social impact assessment (ESIA) and review procedure. An exemption may be requested for exploration projects. An application for such an exemption has been filed by Victory Nickel Inc. for Phase 1 of the project (bulk sampling and advanced exploration). The exemption was granted to Victory Nickel by MDDEP in March 2008.

The ESIA needs to be filed for authorization of Phase 2 of the project, involving the following activities:

- Submittal of a notice of intent along with preliminary information;
- Review of the preliminary information by an Evaluating Committee (COMEV) which defines the nature and extent of the impact (ESIA) study;
- Preparation of the impact study in accordance with the administrator's guidelines;

- Submittal of the ESIA to a review committee (COMEX). Native administrations and the public can make representations to the committee, which may also hold public hearings or any other type of consultation;
- COMEX recommends whether to reject or authorize the development project.

Regional authorizations are then required from MDDEP under various provisions of the Environmental Quality Act for a few project components, mainly basic mining installations, waste management, waterworks and sewage system and atmospheric emissions.

Federal government representatives are only involved in the environmental review of a project in a few instances. In the case of the Lac Rocher project, it very unlikely that water bodies would be directly affected by the mining activities. The federal environmental review procedures should therefore not apply.

***Economic Analysis***

The financial analysis of the Lac Rocher has been conducted on a pre-tax, 100% equity basis. All costs used in the analysis are also before any applicable tax. Costs include a royalty payable by Victory Nickel as per the terms of an Option Agreement applicable to the 20 original claims, which contain the resource to be mined. The agreement involves a 0.50 $/t royalty payable for all ore mined and milled for the life of any exploitation of the Lac Rocher deposit.

Costs have been regrouped in four separate categories:

- Expenses directly incurred by the owner (engineering, supervision, accounting, room and board);
- All charges eventually billed by a mining contractor; request for proposals were obtained from four mining contractors for the development and the operation of the mine under the supervision of Victory Nickel;
- Charges for ore transportation to the processing plant; and
- Costs for ore handling and ore treatment at the processing plant site.

The base case scenario is for mining a total of 317,730 t of ore (diluted) in two phases:

- An initial phase of 65,000 t at 1.75% Ni, 0.57% Cu and 0.062% Co, followed by;
- A second phase of 252,730 t at 1.52% Ni, 0.59% Cu and 0.051% Co;
- For a total project of 317,730 at 1.57% Ni, 0.58% Cu and 0.053% Co.

All ore is transported to the Copper Rand processing plant of Campbell Resources, in Chibougamau. Revenues (NSR values) were calculated on the basis of smelting terms provided by Victory Nickel for a mixed nickel-copper concentrate. Calculations were based on the following parameters:

- Concentrate grading 10.5% Ni, 3.9% Cu, and 0.33% Co;
- Nickel recovery of 81%;
- Copper recovery of 91%;
- Cobalt recovery of 95%;
- Prices of 8 $US/lb for nickel, 3 $US/lb for copper and 25 $US/lb for cobalt;
- An exchange rate of 1.00 $CDN : 0.95 $US;
- Transportation of the concentrate by train from Chibougamau to the Sudbury area, at a cost of 60 $CDN per tonne.

Phase 1 of advanced exploration entails a cost for development and extraction/milling of 27.2 M$ for the 65,000 t bulk sample. It would generate estimated revenues of 11.6 M$, for a net present value (NPV) of minus 15.7 M$. Expenses during the 9-month pre-production period are estimated at 18.1 M$. Extraction and processing of the bulk sample would cost an estimated 9.1 M$.

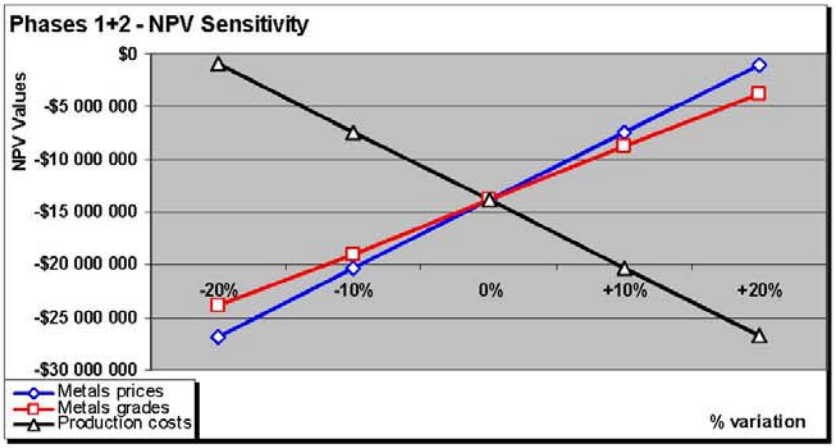
With greatly reduced development costs, production and general costs account for most of the 37.3 M$ expenses for mining the remaining 272,530 t. With estimated revenues of about 39.1 M$, Phase 2 would end up with a positive pre-tax cash flow of some 1.7 M$, for a NPV of 6.71 $/t of ore, equivalent to 0.25 $ per pound of recoverable nickel.

The combination of the two phases of mining, for a base case of 317,730 diluted tons, provides estimated revenues of 50.8 M$. Total costs, including demobilization, are about 64.7 M$, for a pre-tax cash flow of – 13.9 M$, for a NPV of - 43.64 $/t of ore, or - 1.56 $ per pound of recoverable nickel.

Maximum project sensitivity is for variations in metal prices and production costs, followed by changes in metals grades.

| NPV Values | | | |
|---|---|---|---|
| Variation | Metals prices | Metals grades | Production costs * |
| -20% | -$26 827 331 | -$23 901 037 | -$961 925 |
| -10% | -$20 285 270 | -$19 046 123 | -$7 414 524 |
| **0%** | **-$13 867 124** | **-$13 867 124** | **-$13 867 124** |
| +10% | -$7 452 155 | -$8 688 125 | -$20 319 723 |
| +20% | -$1 037 186 | -$3 833 210 | -$26 772 323 |

* Excluding royalties




Sensitivity to the prices of metals is mostly for nickel, with variations in copper or cobalt prices having much lower effects.




Break-even conditions are obtained at a NSR value of 203.58 $/t, corresponding to the following values when calculated for each of the variables in the sensitivity analysis:

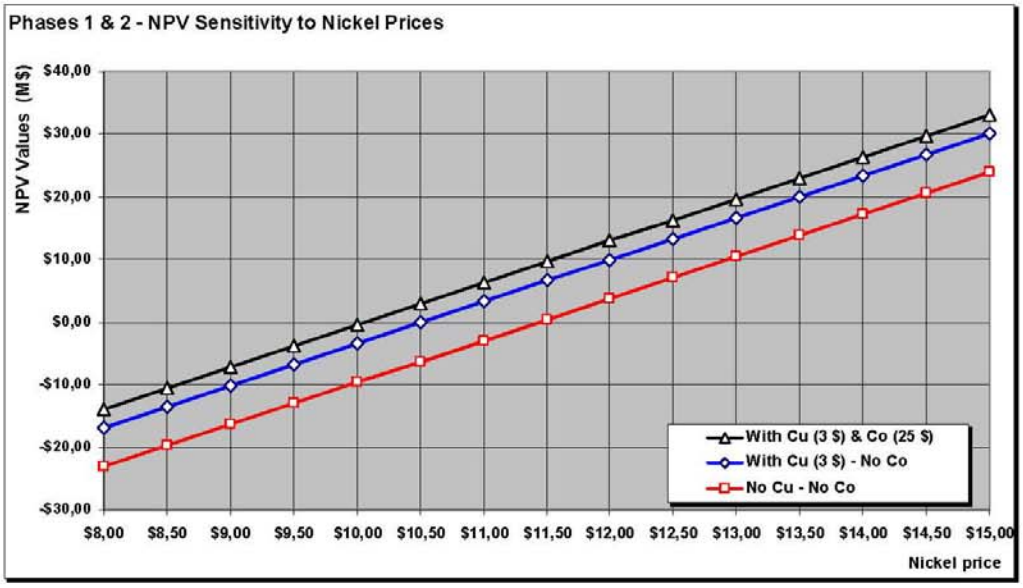
- Prices of metals: plus 21.7%, corresponding to 9.74 $ US/lb for nickel, 3.65 $ US/lb for copper and 30.43 $ US/lb for cobalt;
- Metal grades: plus 28%, corresponding to an ore grade of 2.00% Ni, 0.74% Cu and 0.068% Co;

- Production costs: minus 21.0%, corresponding to a decrease from 203.58 $/t to 159.94 $/t (- 43.64 $/t).

A further analysis of project sensitivity to nickel prices, in increments of 0.50 $US/lb, between 8.00 $ US/lb and 15.00 $ US/lb, indicates that:

- With revenues gained from copper, at a constant 3.00 $ US/lb, and cobalt, at a constant 25.00 $ US/lb, project breakeven is at a nickel price of 10.07 $ US/lb;
- With revenues gained from copper, at a constant 3.00 $ US/lb, but no revenues gained from cobalt, NPV is reduced by 3.0 M$, and project breakeven is at a nickel price of 10.51 $ US/lb;
- If no revenues from copper and cobalt are considered, NPV is reduced by a further 6.2 M$, and project breakeven is at a nickel price of 11.43 $ US/lb.

Each change of 0.50 $ US/lb in the price of nickel results in a NPV variation of 3.35 M$.




***Schedule***

First ore would be available by the end of Month-9, with Phase 1 of advanced exploration lasting till about the end of Month-14. With no delay for permitting or any other event between the two phases, additional mining of the remaining 252,730 t, at a rate of some 750 t/d, would require about 11 additional months. Unless additional reserves are identified as a result of any combination of

variables (new findings, lower production costs, higher metals prices, etc.), demobilization would take place during Month-26.

***Recommendations***

Given current the current context of nickel prices, which are below the break even point of this project, it is not recommended to proceed with the Lac Rocher Project at this time.

In a situation where nickel prices would firm up to a value of the order of 12 $ US/lb, the estimated NPV of the project would be of the order to 12 – 13 M $. In such a context, further negotiations or assessments are recommended to update or increase the precision of some estimates. The main ones are:

- **Geology and Resources**

Several barren granitic dykes cut across the mineralised envelope. Their spatial description is only preliminary. A more accurate interpretation of the dykes should be obtained for the purpose of mine design.

- **Mining and Infrastructure**

A detailed (topographical) site survey is recommended to assess conditions in the area designated for ore storage and the control basin. This will confirm the preliminary design of these facilities.

An assessment of rock surface profile and rock quality at the portal location is also recommended, this could be performed by a seismic profile in the portal axis, and trenching.

A local/regional inventory for sources of borrow materials is also suggested, to locate potential sources of rockfill material to complement waste rock uses for underground support.

A preliminary rock mechanics study is recommended to provide an evaluation of stopes stability and provide an input to the mine design (stope and pillars dimensions).

- **Metallurgy**

The flowsheet developed during testing on a low grade sample is fairly straightforward. It can easily be set up in the Copper Rand mill of Campbell Resources, in Chibougamau. Additional laboratory and/or in-plant testing during Phase 1 of advanced exploration could lead to an optimisation of metallurgical performance. Areas of recommended testing are:

  - Experimenting a coarser grind;
  - Testing CMC addition at multiple points;

- Replacing soda ash with lime;
- Determination of sedimentation and filtration characteristics;
- Assessing the performance of the current mill flowsheet on the Lac Roche ore.

Metallurgical testing was performed on a single blended sample, whose grade (1.30% Ni) is reasonably close to the average concentration of the ore to be extracted according to the proposed mining plan. This mining plan, however, indicates that actual grade, on a bench by bench basis, may fluctuate from about 0.9% Ni to 2.3% Ni. The effect of such variations on metallurgical performance and flowsheet conditions (reagents dosage, residence time) is not known, and could warrant some additional testing.

Gold and silver content of the concentrate was not assayed during metallurgical testing. Confirming the content of these precious metals is recommended to assess the potential for revenues.

- **Costs**

About three-quarters of the project costs are related to activities to be performed by contractors. These activities are: mine development, mining, ore transportation, ore processing. Mine development and mining alone account for almost half of estimated costs.

Roche recommends negotiations with mining and transportation contractors to firm up estimated prices and confirm availability of the required resources.

- **Ore transportation**

Project economics require that the hauling of the ore to Chibougamau can be done by using a road shortcut leading from Lac Rocher to the village of Waswanipi.

Having to use a longer route passing through Matagami would increase trucking distance by more than 200 km (one-way distance). The resulting cost would lower the project NPV by more than 6 M$, and would also require more equipment and drivers to maintain the appropriate trucking rate. This would seriously affect project profitability.

An authorisation will have to be negotiated with the Waswanipi Cree First Nation to use this road shortcut. This is a critical condition for project profitability.

4.4 This section is not applicable to the Issuer as it has no oil and gas operations.

## 5. Selected Consolidated Financial Information

5.1

| (US$000s, Except per share amounts) | Q3 2015 | Q2 2015 | Q1 2015 | 2014 | 2013 | 2012 |
|---|---|---|---|---|---|---|
| Total Revenues | 325 | 631 | 1,522 | 13,976 | Nil | Nil |
| Income (Loss) from Continuing Operations | (1,612) | (1,042) | 335 | (2,158) | (4,677) | (1,108) |
| Income (Loss) from Continuing Operations/share (basic) | (0.03) | (0.02) | 0.01 | (0.04) | (0.10) | (0.03) |
| Income (Loss) from Continuing Operations/share diluted | (0.03) | (0.02) | 0.00 | (0.04) | (0.10) | (0.03) |
| Net Income (Loss) | (1,599) | (906) | (271) | (4,416) | (4,890) | 193 |
| Net Income (Loss)/share (basic) | (0.03) | (0.02) | 0.00 | (0.04) | (0.10) | 0.00 |
| Net Income (Loss)/share (diluted) | (0.03) | (0.02) | 0.00 | (0.04) | (0.10) | 0.00 |
| Total Assets | 58,199 | 59,468 | 59,907 | 61,932 | 57,253 | 55,308 |
| Long-Term Liabilities | 2,405 | 5,457 | 4,780 | 7,597 | 7,812 | 2,494 |
| Cash Dividends | N/A | N/A | N/A | N/A | N/A | N/A |

As noted earlier, Victory Nickel has historically been a Canadian mineral resources exploration and development company, primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada.

Formed on February 1, 2007, Victory Nickel owns 100% of four advanced sulphide nickel projects: Minago, Lynn Lake and Mel in Manitoba and Lac Rocher in Québec. On June 19, 2012, the Issuer announced the creation of Victory Silica as an entry into the frac sand distribution and sales market prior to any frac sand and nickel production commencing at Minago. The Issuer's decision to enter the frac sand business was initially based on the need to highlight the value of the frac sand as a co-product at Minago. Based on the FS, approximately 11 million tonnes of frac sand will be produced from within the Minago pit footprint. The frac sand is a significant contributor to the economics of the Minago project. The Issuer has established itself as a frac sand producer by acquiring concentrated sand

in Wisconsin, US and processing it into four main categories of finished frac sand products at its 500,000 ton per annum rated 7P Plant which was constructed during 2012, 2013 and 2014. This strategy was designed to generate significant cash flow for Victory Nickel prior to development and sale of frac sand from its Minago project. The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014.

The Issuer began generating operating cash flow during the second half of 2014 but not at levels sufficient to wholly fund its activities. In the fourth quarter of 2014, due to factors beyond the Issuer's control, the market for frac sand began to soften as a result of the rapid drop in the price of oil. During the first quarter of 2015 demand for frac sand in the Issuer's primary markets came to a full stop as oil and gas companies cancelled or deferred capital programs. The drop in sales required a temporary suspension in frac sand production in 2015. While oil and gas drilling activity rebounded somewhat in 2015 and the 7P Plant has operated through much of 2015 and into 2016 on an as-needed basis in response to reduced demand for frac sand.

The near-term outlook in the frac sand market remains unclear due to the continuing downward pressure on the oil price and related impact on exploration and production and oilfield services companies. The strength of the US dollar is also impacting demand for high-quality Wisconsin sand as the price for domestic sand has dropped and service companies appear satisfied with using lower-quality domestic sand because of the price differential. This will continue to stress the Issuer's liquidity until such time as the market demand recovers and operations can resume.

Given the Issuer's transition during 2014 into an operating entity driven by prices in US$, effective October 1, 2014, the Issuer changed its functional and presentation currency to the US$. For comparative reporting purposes, historic financial statements were translated into the US$ reporting currency whereby assets and liabilities were translated at the closing rate in effect at the end of the comparative periods; revenues, expenses and cash flows were translated at the average rate in effect for the comparative periods and equity transactions were translated at historic rates.

5.2

| **(US$000s, Except per share amounts)** | **Q4 2014** | **Q3 2014** | **Q2 2014** | **Q1 2014** |
|---|---|---|---|---|
| Total Revenues | 7,203 | 5,463 | 1,310 | nil |
| Income (Loss) from Continuing Operations | 106 | (345) | (667) | (1,252) |
| Income (Loss) from Continuing Operations/share (basic) | (0.00) | (0.01) | (0.01) | (0.01) |
| Income (Loss) from Continuing Operations/share diluted | (0.00) | (0.01) | (0.01) | (0.01) |

| | | | | |
|---|---|---|---|---|
| Net Income (Loss) | 96 | (373) | (693) | (1,446) |
| Net Income (Loss)/share (basic) | (0.00) | (0.01) | (0.01) | (0.01) |
| Net Income (Loss)/share (diluted) | (0.00) | (0.01) | (0.01) | (0.01) |

| **(US$000s, Except per share amounts)** | **Q4 2013** | **Q3 2013** | **Q2 2013** | **Q1 2013** |
|---|---|---|---|---|
| Total Revenues | nil | nil | nil | nil |
| Income (Loss) from Continuing Operations | (3,557) | (482) | (359) | (289) |
| Income (Loss) from Continuing Operations/share (basic) | (0.07) | (0.01) | (0.01) | (0.01) |
| Income (Loss) from Continuing Operations/share diluted | (0.07) | (0.01) | (0.01) | (0.01) |
| Net Income (Loss) | (3,650) | (503) | (417) | (313) |
| Net Income (Loss)/share (basic) | (0.07) | (0.01) | (0.01) | (0.01) |
| Net Income (Loss)/share (diluted) | (0.07) | (0.01) | (0.01) | (0.01) |

5.3 The Issuer has not declared any dividends. There are no restrictions under the Issuers Articles of Incorporation preventing it from paying dividends. Under the SPA Loan agreement the Issuer is restricted from declaring dividends without the approval of the Secured Lender.

5.4 This section is not applicable to the Issuer as it is not subject to foreign GAAP rules.

## 6. Management's Discussion and Analysis

***Annual MD&A, Fiscal year ended December 31, 2014 (Dated March 31, 2015)***

**For the Years ended December 31, 2014 and 2013**

The following discussion of the results of operations, financial condition and cash flows of Victory Nickel Inc. (“Victory Nickel” or the “Company”) prepared as of March 31, 2015 consolidates management’s review of the factors that affected the Company’s financial and operating performance for the years ended December 31, 2014 and 2013, and factors reasonably expected to impact on future operations and results. This discussion is intended to supplement and complement the Company’s audited consolidated financial statements for the years ended December 31, 2014 and 2013 (“2014 Audited Consolidated Financial Statements”) and the notes thereto which were prepared in accordance with International Financial Reporting Standards (“IFRS” or “GAAP”).

Certain information and discussion included in this management's discussion and analysis ("MD&A") constitutes forward-looking information. Readers are encouraged to refer to the cautionary notes contained in the section Forward-Looking Statements at the end of this MD&A.

The 2014 Audited Consolidated Financial Statements are available at www.sedar.com and at the Company's website www.victorynickel.ca.

**Change in Functional and Presentation Currency**

Effective October 1, 2014, the Company changed its functional currency to the United States dollar ("US$" or "US dollar") from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) to the 2014 Audited Consolidated Financial Statements for additional information. All amounts disclosed are in United States dollars unless otherwise stated. All tabular amounts are in thousands of US dollars.

## COMPANY OVERVIEW

Victory Nickel is a Canadian producer of high-quality "Northern White" frac sand sourced from Wisconsin, US, through its wholly-owned subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica"). Northern White occurs predominantly in the US Mid-West and generally exceeds American Petroleum Institute ("API") specifications. For this reason, it is a highly-desirable and preferred frac sand. Frac sand is used as a proppant in the oil and gas industry which enhances the recovery from oil and gas wells. The Company's frac sand processing facilities are located in Seven Persons, Alberta and comprise a wet plant with capacity of approximately 120,000 tons per annum ("tpa") which requires minimal investment to become operational and a fully-operational dry plant with a nominal capacity of 500,000 tpa (the "7P Plant").

In addition to the significant sand resource at its Minago project in Manitoba, in October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months with two equivalent extensions available under certain circumstances. Prior to production the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin. In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit Envirosolutions Inc. ("Summit") on the Company's Bear Coulee Property and will be incorporated into a National Instrument 43-101 technical report.

The Company is now considering constructing a wet plant in Wisconsin or Minnesota and is also completing preliminary studies to build a second 1,000,000 tpa dry plant in Winnipeg, Manitoba.

Crucial to the success of its frac sand operations is the Company's ability to build a solid customer base within an economic distance of its production facilities. To date, the Company

has been able to establish itself as a preferred supplier in the areas around Medicine Hat, Alberta through spot-market sales and has completed a fixed term contract for approximately 2,000 tons per week. The Company's 7P Plant is located in close proximity to drilling activity in Alberta, BC, Saskatchewan and North Dakota, allowing customers to purchase sand FOB the 7P Plant and use their own trucks to deliver to the wellhead or, alternatively, to have the Company deliver sand directly to the wellhead. A small portion is delivered by rail.

The Company was formed on February 1, 2007 as exploration and development mineral resource company and, until recently, was primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada. Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Corazon Mining Ltd. ("Corazon") an Australian public company (ASX: CZN) refer below) and Mel projects in Manitoba and the Lac Rocher project in Québec. The results of a feasibility study on the Minago Project ("FS") were announced in December 2009, the Environmental Impact Study ("EIS") was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Environmental Act Licence ("EAL") was announced in August 2011. A preliminary economic assessment of Lac Rocher ("PEA") was announced in November 2008. Baseline environmental studies are ongoing at Mel in preparation for permit applications should the economics support development.

In November 2004, Corazon optioned Lynn Lake. Under the terms of the agreement, Corazon can acquire a 100% interest by issuing to Victory Nickel 40 million Corazon shares upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project.

The Company's decision to enter the frac sand business was initially based on the need to highlight the value of the frac sand as a co-product at its Minago nickel project in Manitoba. Based on the FS, approximately 11 million tonnes of frac sand will be produced from within the Minago pit footprint. The frac sand is a significant contributor to the economics of the Minago project. On June 19, 2012, the Company announced the creation of Victory Silica a wholly-owned subsidiary that has been established to manage the Company's entry into frac sand production and distribution. The Company has established itself as a frac sand producer by acquiring concentrated sand in Wisconsin, US and processing it into four main categories of finished frac sand products at the 7P Plant. This strategy is expected to generate significant cash flow for Victory Nickel prior to development and sale of frac sand from its Minago project. The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014.

During the first quarter of 2014, Convertible Notes aggregating $2,000,000 were issued. In the second quarter, a convertible note with principal of $1,000,000 was extinguished and replaced

with a SPA Note as part of the SPA Loan. The SPA Loan of $4,000,000 was entered into in the second quarter and was fully drawn in August, 2014 and is due on July 30, 2015.

An additional Convertible Note of $3,000,000 was also entered into during the third quarter of 2014.

A one month short-term facility of $2,000,000 to fund working capital was fully drawn down by October, 2014. The short-term facility has been renewed on a monthly basis and the $1,000,000 balance was due March 31, 2015. A further extension to April 30, 2015 was arranged on March 31, 2015.

**Going Concern**

The Company's 2014 Audited Condensed Consolidated Financial Statements have been prepared using the going concern assumption which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at December 31, 2014, the Company had a working capital deficiency of $3,316,000, (December 31, 2013 – working capital of $437,000). Working capital is defined as current assets (excluding any restricted cash) less current liabilities.

During the second quarter of 2014, the Company began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. The Company has generated operating cash flow during the second half of 2014 but not yet at levels sufficient to wholly fund its activities.

In late 2013 and the second half of 2014, the Company raised $5,000,000 through the issuance of Convertible Notes – refer to the Liquidity and Capital Resources section. The Company now has approximately $11 million of debt including the SPA Loan of $4,000,000 which is due in July, 2015; one convertible note in the amount of $2,000,000 is due in November 2015, and, along with a $2,000,000 short-term note for receivables financing these amounts are classified as current liabilities, due within one year. The lender has agreed to several monthly extensions of the short-term facility upon payment of extension fees and it is presently due by March 31, 2015. A further extension to April 30, 2015 was arranged on March 31, 2015 (Note 28 to the 2014 Audited Consolidated Financial Statements).

The Company recognizes the imminent cash requirement to repay debt and is actively considering restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully

complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds to finance nickel projects may prove difficult. Refer to the Risks and Uncertainties and Liquidity and Capital Resources sections for additional information.

None of the Company's nickel mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, and the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. The Company's 7P Plant completed commissioning in August, 2014. During the start-up period, the Company experienced various events which prevented it from reaching the designed capacity of 500,000 tpa at its 7P Plant. Although steps have been taken to reduce the impact of these events, there is no certainty that operations will not be affected by similar events in the future. The recent drop in the price of oil has caused confusion in the frac sand business and it is not known when business will return to normal. Although it is expected that future cash flow will be sufficient to meet operating requirements with the ultimate potential to advance the Company's mining interest, the timing of this is not certain.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to the financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

## HIGHLIGHTS

During and subsequent to the year ended December 31, 2014, the Company:

**Corporate**

- Announced the Conversion of the Amended Loan to a direct interest in net cash flows (the "Participating Interest").

• Completed a securities purchase and line of credit agreement (the "SPA Loan") for $4,000,000.
• Completed the issue of convertible notes in the aggregate of $5,000,000 (the "Convertible Notes").
• Completed a share consolidation on a one-for-ten basis (the "Share Consolidation").
• Completed a short-term financing by way of a promissory note amounting to $2,000,000 to fund accounts receivable.

**Frac Sand and Victory Silica**

• Completed the acquisition of the 7P Plant.
• Completed the upgrade and construction of the 500,000 tpa 7P Plant frac sand processing facility
• Completed the start-up and commissioning stage of the 7P Plant
• Completed all key agreements for: sand purchase, sand washing, transload in Winona, rail transport, rail siding, railcar leasing, Seven Persons trucking, mobile equipment leasing.
• Obtained approval from the Board of Directors to proceed with Phase Two, providing non-dilutive financing can be obtained.
• Produced 109,155 tons of frac sand at the 7P Plant during 2014.
• Sold 90,731 tons of frac sand at the 7P Plant during 2014.
• Optioned the Bear Coulee frac sand property at the end of 2014
• In early 2015, completed a 43-101 report outlining a frac sand resource of approximately 11 million tons of frac sand on the Bear Coulee property.
• Secured a second Wisconsin-based supplier of washed concentrated Northern White frac sand.
• Contracted with a second transload facility in St. Paul, Minnesota in early 2015.

**Minago**

• Applied for amendment to Minago Environmental Act Licence ("EAL") to relocate the tailings impoundment.

**Lynn Lake**

• Regained 100% ownership of the Lynn Lake project.
• Optioned the Lynn Lake project to Corazon in November, 2014.

**OUTLOOK**

The year 2014 was a great year for the frac sand industry and a decisive one for Victory Nickel. As a typical junior resource company with superior nickel projects but no access to the financial and capital markets necessary to move these projects forward, the Company had to find an alternative. Waiting for the resource markets to turn around was not considered to be an acceptable option. So in June 2012, the Company announced its intention to enter the frac sand business with a plan that was certainly considered very aggressive and a vision at best. With the efforts of the talented team that was put together under the leadership of Ken Murdock, CEO of

Victory Silica, that vision is now a reality. Victory Nickel, through its wholly-owned subsidiary Victory Silica, is now a producer and distributor of high-quality northern white frac sand for sale into the northern markets of Canada and the U.S. Victory Silica's product has received universal acceptance in the oil and gas service industry and the Company now boasts a customer list comprised of leading companies in the industry.

Choosing to enter the frac sand business was not without reason. The strong market fundamentals for frac sand suggested continuing growth of the industry and new public information and strong peer group valuations indicated the availability of near-term cash flow. Suddenly, towards the end of the year and apparently to everyone's surprise, the bottom fell out of the oil industry and the price of oil crashed from in excess of $100 per barrel to the mid $40's and has remained in a narrow range ever since. Requests to OPEC to cut production were met with resistance and, in fact, Saudi Arabia, in February 2015, produced more barrels of oil since it had in 2013. In the United States, production of 9.42 million barrels per day was the highest since 1983, presumably all due to fracking. One can only assume that the U.S. would rather provide their own oil than have to be dependent on other nations.

The sudden turn of events could not have come at a more crucial time in our development and entry into the frac sand industry.

Phase One of the Company's three-phase entry into the industry is now complete and the 7P Plant is capable of producing at levels sufficient to generate cash flow. Training of the fourth crew necessary to operate 24 hours per day, seven days a week, was near completion towards the end of the year. Bottlenecks in rail delivery were dealt with by adding a second transload facility in Minnesota to minimize the impact of traffic congestion at our first transload facility in Wisconsin. A second supplier of washed sand was contracted and washing sand during the winter season, something normally not possible, is being undertaken.

Having completed Phase One, the board of directors approved moving forward to Phase Two of the Company's three-phase business plan. With the recent decline caused by the drop in the price of oil, this project will be difficult to finance in a non-dilutive manner. However, this is a desirable next step which would not only make the Company more competitive but also provide significant flexibility to target certain markets which often require different grades of sand.

Phase Two of the Company's three-phase plan is to build a wash plant on a Wisconsin sand resource. Frac sand production is a two-stage process; the wet stage and the dry stage. The Company now contracts out the wet stage which is completed in Wisconsin prior to shipping the wet sand to the 7P Plant in Alberta. The wet stage removes the fines and clays, allowing transport of only the coarser fractions. The dry stage, where the sand is dried and separated into four main products of different sizes, is completed at the Company's 7P Plant, a 500,000 tpa dry processing facility. This is of great advantage in maintaining the high quality of the sand. By dry processing and finishing close to markets, where customers can ship directly to the wellhead by truck, Victory Nickel's finished product is only handled once rather than five or six times as is the

case with most Wisconsin sand. Every time finished product is handled, the quality deteriorates. Our customers have recognized the need to maintain the high quality which, importantly, makes quality one of Victory Nickel's key competitive advantages.

The three-phase approach to entry into the business was designed to minimize risk to Victory Nickel shareholders. The cost of entry with Phase One was approximately $6,000,000, or less than $12 per ton of annual production at capacity. This represents approximately 30% of the expected capital required to build a plant from scratch. The capital recovery period is generally in excess of two years. In Victory Nickel's case, this period is approximately six months at full production levels.

Phase Three of the business plan is to build a second dry processing facility in Winnipeg, Manitoba. Several sites have been identified. The Company is targeting a site which is serviced by multiple rail carriers. This gives the Company more flexibility in accessing only the highest quality sand from the Wisconsin/Minnesota region. The plan is to build a 1,000,000 tpa plant which would initially be fed with Northern White sand. However, the ultimate plan is to provide customers with a variety of qualities which would include domestic sand, possibly from the Company's Minago project in Manitoba which has been permitted and is ready for development when the price of nickel recovers. The Minago project is a nickel project overlain by overburden which includes sand meeting the frac sand specs. The Winnipeg formation sand is the highest-quality domestic sand and would be a welcome addition to the Company's mix of products. Not all of our customers' applications require the best quality sand.

The Minago FS completed in 2009 indicated that the frac sand component of the Minago open pit contributed approximately $2.90 per pound of nickel; a very significant co-product. The sand resource at Minago is not restricted to the footprint of the open pit but extends beyond the pit limit such that it is not unreasonable to expect that there is sufficient sand to last in excess of 100 years at the million ton per year rate of extraction; this would be a new industry for Manitoba

We cannot change the market. All we can do is work with it and within it. There are numerous articles outlining the significant reduction in rigs since the drop in the price of oil. However, statistics show that the number of uncompleted wells (not fracked) is increasing. This, in effect, is storing oil in the ground as oil doesn't flow until it is fracked. We read this as very positive. Eventually, these wells will be fracked regardless of the amount of drilling. Existing wells are being refracked. The amount of sand used per frack, that is, proppant intensity per well, is increasing as E&P companies realize that more sand means more oil.

E&P companies continue to squeeze oilfield services companies to reduce costs. Oilfield service companies in return push suppliers including frac sand suppliers to reduce costs. The uncertainty is causing panic selling in some cases. Conversely, there are indications that oilfield services companies are being opportunistic and stocking up on cheap sand. This is not sustainable.

The Company must now focus on managing liquidity until markets settle down and fear no longer impacts business decisions. The Company recognizes the imminent cash requirement to repay debt and is actively considering restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. The Company will only incur costs associated with buying and delivering sand to its 7P Plant when existing inventories get below working levels. We will manage the current downturn.

### Nickel Assets

The Company owns four advanced sulphide nickel projects; three in Manitoba and one in Quebec. A feasibility study of Minago, our main project, was completed in 2009 and permits for development were received in 2011. The Minago project is ready for development. An important part of the Minago deposit is the significant frac sand resource overlying the nickel deposit. Quantifying the value of the frac sand by getting into the business in advance of the Minago development should add certainty to the value of the frac sand co-product at Minago and make financing possible.

## RESULTS OF OPERATIONS

| Year ended December 31, 2014 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total | 2013 Total |
|---|---|---|---|---|---|---|
| **Revenues** | $ - | $ - | $ 13,976 | $ - | $ 13,976 | $ - |
| Cost of goods sold | - | - | (12,854) | - | (12,854) | - |
| **Gross margin** | - | - | 1,122 | - | 1,122 | - |
| **Operating expenses** | | | | | | |
| General and administrative | (1,914) | (26) | (496) | - | (2,436) | (1,582) |
| Share-based payments: | | | | | | |
| Options | (344) | - | - | - | (344) | (197) |
| Share Bonus plan | - | - | - | | - | (42) |
| Amortization of property, plant and equipment | (1) | (4) | (548) | - | (553) | (26) |
| Writedown of E and E projects | - | (60) | - | - | (60) | 383 |
| Pre-exploration costs | - | (4) | - | - | (4) | - |
| Net frac sand pre-operating costs | - | - | (194) | - | (194) | (585) |
| **Operating loss** | (2,259) | (94) | (116) | - | (2,469) | (2,049) |
| Finance income | 2,209 | - | 11 | (11) | 2,209 | 14 |
| Finance costs | (2,651) | - | (29) | 11 | (2,669) | (3,633) |
| **Net finance costs** | (442) | - | (18) | - | (460) | (3,619) |
| **Loss before income taxes** | (2,701) | (94) | (134) | - | (2,929) | (5,668) |
| Income tax recovery | 513 | - | - | - | 513 | 778 |
| **Net Loss for the Year** | $ (2,188) | $ (94) | $ (134) | $ - | $ (2,416) | $ (4,890) |

### Overall

For the year ended December 31, 2014, the Company had a net loss of $2,416,000, or a loss of $0.04 per share (December 31, 2013 - $4,890,000 or a loss of $0.10 per share (after giving retroactive effect to the Share Consolidation)). This narrative discusses the relevant operations of the Frac Sand and Exploration and Development segments first, and then addresses more general and corporate activities.

### Frac Sand

The Company's 7P Plant commissioning was completed during August 2014 and produced 109,155 tons of various grades of frac sand. During the commissioning and production periods, 88,891 tons of sand was sold which generated gross margin of $1,122,000. The first sand was produced in March 2014 consequently there was no Frac Sand Segment in 2013 other than pre-operating costs of $585,000 recorded for the Company as a whole compared with $194,000 during the pre-operating stage in 2014.

*Revenues*
The Company recognized revenue on frac sand sales from the second quarter onwards aggregating $13,976,000 or $157.23 per ton sold. During the commissioning and start-up stages, the 7P Plant operated at below capacity levels for various reasons – most of which have been addressed. However, a gross margin of $1,122,000 was realized for 2014. Inventories of finished sand are priced using normalized costs thus do not bear an inordinate proportion of costs.

*Cost of goods sold*
The cost of goods sold includes the cost of concentrated sand purchased in Wisconsin, the cost of delivery to the 7P Plant including handling and transloading costs and the operating cost to dry and screen the concentrated sand into four main dry products. Direct plant operating costs are inventoried and charged to cost of goods sold when title to the product passes to the customer. Costs are capitalized as a component of inventory on a normalized basis and are reflected in costs of goods sold when inventory is sold.

The cost of goods sold was $12,854,000, or $144.60 per ton of frac sand sold for the year ended December 31, 2014; this also includes transportation costs to the customer for a portion of sales. Included in the year was approximately five months of commissioning during which time the plant was not operating at its design level. The plant operated at below capacity while training of four crews continued throughout the year. The fourth and final crew was hired in October 2014. In addition, the 7P Plant experienced rail delivery issues, weather disruptions and equipment failures.

Costs per ton are stated as costs per dry ton unless otherwise stated.

Concentrated sand is purchased through long-term supply agreements with third parties at specified prices per ton. For the year ended December 31, 2014 the cost of washed, concentrated sand included as a component of inventory was $34.60 per ton. Transportation costs including freight charges and fuel surcharges when transporting our sand from Wisconsin to the 7P Plant, transload costs at the source and at the 7P Plant were $61.25 per ton for the year ended December 31, 2014. Other elements of cost of goods sold were $23.55 per ton during the year ended December 31, 2014 and were primarily comprised of railcar lease payments, operating expenditures at the plant and mobile equipment lease payments. This adds to a finished goods inventory cost of $119.40 per ton. The difference from that to the cost of goods sold per ton of $25.20 essentially represents a combination of transportation costs to the

customer's specified location (included in both sales and cost of goods sold) and costs due to start-up such as training of new hires.

All plant operating expenditures, local trucking and some mobile equipment lease payments included in cost of goods sold are denominated in C$ dollars, therefore average costs include a foreign exchange component.

*Gross margin*
The 7P Plant generated a gross margin of $1,122,000 for the year ended December 31, 2014 on sales revenue of $13,976,000. The gross margin of $12.62 per ton was lower than the expected $25.00 per ton as the Company worked through plant inefficiencies during the commissioning and start-up stages. During the fourth quarter, the gross margin was $13.03.

*General and administrative and other costs*
General and administrative ("G&A") costs for the segment amounted to $496,000 for the year ended December 31, 2014. These costs include Victory Silica administration, marketing and logistics management.

Amortization of property, plant and equipment of $548,000 was recorded in the year ended December 31, 2014 for items in use at the 7P Plant including owned and leased equipment. The 7P Plant assets came into use primarily in the second quarter of 2014, at which time amortization commenced. The 7P Plant was not in operation during 2013.

Net pre-operating costs amounted to $194,000 ($585,000 in 2013). This is disclosed net of sales which occurred in the pre-operating phase of $248,000.

*Net income*
All of the above items combine to produce net loss for the frac sand segment of $134,000 for the year ended December 31, 2014, after interest expense relating to equipment leases of $29,000, offset by a net foreign exchange gain of $11,000.

**Exploration and Development**
There were no write-downs necessary for impairment of projects in 2014 and 2013, however, expenditures of $60,000 on non-core projects were written off for the year ended December 31, 2014. In addition, there were pre-exploration expenditures of $4,000 incurred in the same period (2013 – $nil). In the year ended December 31, 2013, the Company received $391,000 in receipts under the Lynn Lake option; net of expenditures, $383,000 was recorded as recovery of exploration and evaluation project. The option was relinquished in early 2014 and the Lynn Lake project was returned to the Company. On November 4, 2014, the Company announced that it had optioned the Lynn Lake project to Corazon, an Australian listed public company with assets in the Lynn Lake area.

**Net Loss for the Year – Corporate and Total**

The net loss for the year ended December 31, 2014 for the Company was $2,416,000 compared with $4,890,000 for the same period of 2013, after operating expenses totalling $2,259,000 (2013 - $2,049,000), net finance costs of $460,000 (2013 - $3,619,000) and an income tax recovery of $513,000 (2013 - $778,000). In 2013, these costs were net of a $383,000 recovery with respect to the Lynn Lake property as a result of option amounts received in excess of the recorded value of the property; as explained above, the option was terminated in March 2014.

G&A expenses increased by $854,000 to $2,436,000 compared with $1,582,000 in the prior year. The main reason for the increase is directly attributable to the Company's new frac sand business with G&A of $496,000 along with indirect costs attributed to the frac sand business incurred at Corporate. In addition, the CEO became a full-time employee of the Company effective January 1, 2014 and 100% of his remuneration is charged directly to G&A rather than through cost allocations under Nuinsco Resources Limited's ("Nuinsco") Management Agreement as occurred in 2013.

Corporate costs include: general investor relations expenses, consulting, travel costs, health benefits and director costs mostly related to growing the frac sand business. Slightly offsetting the increase are costs under the Management Agreement with Nuinsco which have decreased marginally by $25,000 reflecting a slight change in activity.

As mentioned above, G&A expenses include costs charged by Nuinsco for administrative services, partly offset by costs charged to Nuinsco by Victory Nickel as described under Transactions with Related Parties and Management Agreement with Nuinsco below; these amounted to $661,000 and $nil (2013 - $684,000 and $16,000), respectively. The Management Agreement has been terminated by Victory Nickel but the Company expects to continue to share resources and costs with Nuinsco under a cost sharing arrangement.

The costs of public company compliance in 2014 for Victory Nickel were mitigated by sharing arrangements under the Management Agreement with Nuinsco but are still significant. For the year ended December 31, 2014 they are estimated to be $894,000 compared with $802,000 for 2013 on a comparable basis. The increase is due to higher investor relations support involved in educating stakeholders about the frac sand business as well as increased compliance costs as the Company engaged its auditors to perform a review on its interim financial statements effective with second quarter reporting.

The share-based payment expense for options for the year ended December 31, 2014 of $344,000 reflects the grant and partial vesting of 1,063,000 options (after giving retroactive effect to the Share Consolidation, refer to Note 19 to the 2014 Audited Consolidated Financial Statements) with a weighted average fair value at grant date of C$0.39. In 2013, the share-based payment expense for options reflects the grant and partial vesting of 9,370,000 options with a weighted average fair value at grant date of C$0.18 for an expense of $197,000. In addition, 181,417 shares were issued under the Share Bonus Plan with a closing price on grant date of between C$0.30 and C$0.45 in consideration for bonuses which were declared in 2013.

The value assigned to the stock options was calculated using the Black-Scholes option-pricing model as explained in Note 21 to the 2014 Audited Consolidated Financial Statements.

*Net finance costs*

| **Years ended December 31,** | **2014** | 2013 |
|---|---|---|
| Interest income on bank deposits | **$ 1** | $ 14 |
| Net change in fair value of financial liabilities at fair value through operations | **1,943** | - |
| Gain on adjustment of estimated cash flows | **225** | - |
| **Finance income** | **2,169** | 14 |
| Interest expense on loans | | |
| Cash settled | **1,274** | 160 |
| Amortization of loan fees | **770** | 130 |
| Amortization of embedded option derivatives | **339** | 11 |
| Commitment fee | **3** | 10 |
| Loss on adjustment of estimated cash flows | **-** | 3,100 |
| Net change in fair value of financial liabilities at fair value through operations | **-** | 165 |
| Net foreign exchange loss | **243** | 57 |
| **Finance costs** | **2,629** | 3,633 |
| **Net Finance Costs** | **$ (460)** | $ (3,619) |

For the year ended December 31, 2014, net finance costs were $460,000 (December 31, 2013 - $3,619,000). The Company considers financing activities, other than those related to equipment leased in the frac sand segment, to be part of the Corporate segment.

Finance income increased to $2,169,000 from $14,000 in the comparative period; primarily due to the reduction in the value of the embedded option derivatives related to the Company's convertible debt of $1,481,000 combined with a $462,000 reduction in the fair value of the warrants issued in connection with the SPA Loan which have a cashless exercise feature. Both of these instruments and their accounting are described below and most of the changes in the year occurred in the third quarter. In addition, the value of the estimated cash flows associated with the Participating Interest decreased by $225,000 in 2014 compared with an increase of $3,100,000 in 2013. The decrease is primarily a function of probability-weighted estimates and the expectation of the ceiling of funds applicable. Refer below.

Finance costs were $2,629,000 and reduced from the prior year by $1,004,000. The components were quite different year over year. Cash interest expense was $1,274,000 for the year ended December 31, 2014 (2013 - $160,000). The increase in interest expense during 2014 was primarily attributable to interest on the SPA Loan and the Convertible Notes issued to fund the construction and working capital for the frac sand business. (Trade accounts receivable and inventory attributable to the frac sand business amounted to an aggregate of $5,702,000 as at December 31, 2014.) As at December 31, 2013, the only debt related to the predecessor loan to the Participating Interest plus one convertible note for $2,000,000.

The change in finance costs above was affected by the change to a gain from a loss on estimated cash flows related to the Participating Interest of $225,000 which reduced the unamortized cost of the asset to $3,548,000 compared with an increase of $3,100,000 to $3,855,000 in 2013; other differences relate to changes in foreign exchange. The fair value of the Participating Interest will increase as it moves closer to the period when payments will begin due to the passage of time, ceteris paribus. However, changes in assumptions were made during the last quarter of 2014 relating to the expected production of the 7P Plant and the underlying cash flow model was changed accordingly. Note that although it was announced in February 2015 that the move to Phase Two of the frac sand business will be delayed, the Company still expects that it will enter that phase before the ceiling for Phase Two payments of C$7,677,124 (approximately $6,609,000) is reached. The Company applied probability weightings of 5%, 40% and 55% as risk factors to varying levels of expected cash flows. The probability weighted average cash flows has increased to 75% from 58% used in the model as at December 31, 2013. The percentage participation in net cash flows is 52.16%. As well, the Company incurred $243,000 in net foreign exchange loss on transactions and balances denominated in the Canadian dollar compared with $57,000 in the prior year.

The Company has issued several tranches of convertible notes. There are several elements of finance expense associated with these: cash-settled interest expense paid on a calendar quarter basis, non-cash amortization of loan fees, non-cash amortization of the embedded derivative related to the value of the convertibility feature at inception and the change in the value of that embedded derivative at the end of a reporting period. All amortizable elements are calculated using the effective interest rate method. Convertible notes were issued in 2013 and 2014 with similar terms and requiring similar accounting treatments. Collectively, these are termed the “Convertible Notes”. The aggregate outstanding principal value of the Convertible Notes as at December 31, 2014 is $5,979,000 (December 31, 2013 - $2,000,000).

Aggregate interest settled in cash for the year ended December 31, 2014 amounted to $1,274,000, of which $666,000 relates to Convertible Notes, $352,000 relates to the SPA Loan, and $178,000 relates to short-term loans. The balance of interest is on leased mobile equipment and other items. In the prior year, interest was $160,000 of which $115,000 related to the Amended Loan prior to its conversion to a Participating Interest and $41,000 related to the Convertible Note outstanding at that time. The balance of interest relates to leased mobile equipment.

Amortization of cash-settled loan fees in the year amounted to $770,000 with an additional $339,000 for amortization of a portion of the embedded option derivatives related to the Convertible Notes remaining of $1,003,000 calculated at inception ($160,000 of which was recorded in 2013). The value of the embedded option derivatives at December 31, 2014 decreased by $1,316,000 due to reductions in the value of the embedded option derivatives from their inception values and, accordingly, $1,481,000 was credited through operations as finance income during 2014.

The embedded option derivatives are calculated using the Black-Scholes option-pricing methodology and are a function of share price, the C$1.00 conversion price (after the retroactive effect of the Share Consolidation), risk-free interest rate, length of time to expiry and share price volatility as well as the US dollar exchange rate for loans denominated in US dollars but convertible using a Canadian price. All other things being equal, one would expect the value of the option to decline as time approaches the expiry date. However, because of the volatility of exchange rates and the Company's share price, this may not always be the case. Further, since one Convertible Note was exchanged into a portion of the SPA Loan in the second quarter of 2014, a portion of the embedded option derivative was de-recognized. The SPA Loan does not contain an embedded option derivative feature, however the warrants which were issued therewith may be exercised on a cashless basis. The value of the warrants is considered to be debt rather than equity and changes in the fair value of the warrants is also recorded through net finance income. For the year ended December 31, 2014, this amounted to $462,000 in finance income.

We remarked in the first quarter MD&A that whether any increases in values of financial instruments would continue was speculative. But what is certain is that it has caused a significant amount of variability in the finance income and finance costs in the statement of operations.

*Income tax recovery*

The Company does not allocate income taxes between segments. In the year ended December 31, 2014, the Company recorded an income tax recovery of $513,000 (2013 – income tax recovery of $778,000). This is primarily a function of higher taxable losses. Furthermore, because the losses are expected to be used to shelter frac sand income in a lower tax rate jurisdiction, the income tax rate in place is expected to be 25%; this was adjusted at the end of 2013.

*Other comprehensive income*

Other comprehensive income ("OCI") for the year ended December 31, 2014 relates to a decrease of $104,000 (2013 – decrease of $217,000) in the market value of the Company's financial assets at fair value through OCI along with an income tax recovery recorded through OCI of $12,000 (2013 – income tax recovery of $30,000). These changes are a result of net market value changes in the Company's marketable securities. There were no sales of securities during 2014; sales generated $57,000 of proceeds during 2013. Furthermore, foreign exchange loss in OCI of $2,338,000 was incurred compared with $3,390,000 in the comparative period due to the change in functional and presentation currency to the US$ from the C$, as described earlier.

*Other significant changes*

The changes in other balances not specifically addressed in other sections of this MD&A are described herein.

Cash and cash equivalents have decreased from $1,338,000 to $712,000 excluding restricted deposits of $271,000 which support several letters of credit provided to facilitate its frac sand business with certain vendors. The Liquidity and Capital Resources section describes the cash flows in the year in detail.

Receivables and prepaids as at December 31, 2014 increased from $358,000 to $3,367,000 and primarily include $2,725,000 trade accounts receivable from frac sand sales compared with $nil as at December 31, 2013. While some balances are in excess of 30-day terms, we do not expect to experience any losses given the quality of our customers. The Company has received payments to date for the majority of its trade accounts receivable outstanding as at December 31, 2014. Prepaids include $555,000 of deposits to sand suppliers as at December 31, 2014 (December 31, 2013 - $117,000).

Marketable securities as at December 31, 2014 decreased by $108,000 to $153,000 from the prior year as a result of declines in market prices of shares. The Company generated $57,000 in sales proceeds in the first quarter of 2013, no sales occurred during 2014.

Inventory of $2,977,000 comprises various grades of finished product and concentrated sand at various locations from the transload facilities in Wisconsin and Minnesota, in transit to Seven Persons and at the 7P Plant itself. Valuation of the inventory is based on normalized costs anticipated during normal production levels. Unit costs are approaching normalized levels since the plant was operating more steadily towards the end of 2014.

Property, plant and equipment increased to $6,179,000 from $4,963,000 as at December 31, 2014 primarily due to expenditures on the 7P Plant and related leased mobile equipment. The mobile equipment is in use and is being depreciated; amortization on the plant commenced in the second quarter given its availability for use in production. The first sand was processed through the 7P Plant in March, 2014 and commissioning occurred during the second quarter of 2014.

Project expenditures are described below in Mine Property and Development Activities and Exploration and Evaluation Activities.

The increase in trade and other payables of $1,512,000 to $3,032,000 relates primarily to an increase in trade payables of $1,294,000 for supplies, transportation and property, plant and equipment for the 7P Plant combined with an increase in accrued liabilities of $228,000 related to the frac sand business. This is due to the increased activity of the frac sand operation.

Victory Nickel has several loans and borrowings; current amounts due within one year amount to $7,493,000 and long-term loans aggregate $2,957,000; a total increase of $8,307,000 over the loans and borrowings as at December 31, 2013 of $2,143,000. Additional Convertible Notes aggregating $5,000,000 were entered into during 2014. In the second quarter, a Convertible Note with principal of $1,000,000 was extinguished and replaced with a SPA Note as part of the

SPA Loan. The SPA Loan of $4,000,000 was entered into in the second quarter and was fully drawn in August, 2014; the SPA Loan is due on July 30, 2015 and is accordingly now classified as a current liability due within one year. An additional Convertible Note of $3,000,000 was also entered into during the third quarter of 2014. Furthermore, a short-term facility of $2,000,000 was fully drawn down by October, 2014. The short-term facility originally had a term of one month. It has been successively renewed on a monthly basis upon payment of extension fees. Presently, the facility is due April 30, 2015 with a principal balance outstanding of $1,000,000. Changes in the embedded option derivatives described earlier, account for the remaining changes in loans and borrowings.

Note 15 to the 2014 Audited Consolidated Financial Statements includes an analysis of the loans and borrowings balances. Refer to the Liquidity and Capital Resources section for additional discussion.

The Company has entered into several finance leases to purchase mobile equipment with a total fair value of $666,000 at various acquisition dates; the long-term portion of the related obligation is $275,000 (December 31, 2013 - $384,000) and the short-term lease obligation of $137,000 (December 31, 2013 - $150,000) is included in *Trade and other payables*. Note 17 to the 2014 Audited Consolidated Financial Statements includes an analysis of the lease obligation.

The Participating Interest is a financial liability carried at amortized cost. The valuation thereof is determined by a model of estimated cash flows. As at December 31, 2014, the estimated value of the Participating Interest was $3,548,000 which decreased by $307,000 compared with $3,855,000 as at December 31, 2013, a result of changes in amortized loan fees combined with changes in the effect of foreign exchange. Refer to further analysis below.

The deferred tax liability balance amounts to $817,000 as at December 31, 2014 (December 31, 2013 - $1,430,000). The main components of the balance relate to the tax effects of E&E projects and the MP&D project, offset by the tax value of net operating tax losses carried forward. Due to changes in the expected future income tax rate because of the frac sand activity in Alberta, the deferred tax liability amount reflects a rate of 25%. The Company estimates that it has approximately $242,000 (December 31, 2013 - $172,000) in unrecognized deferred tax assets in relation to Victory Silica.

The share capital balance has increased to $52,570,000 as at December 31, 2014 (December 31, 2013 - $52,048,000). On September 12, 2014, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”); any reference to the numbers of common shares, options and warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period referred to in this MD&A.

The increase in share capital of $522,000 was primarily due to the exercise of 463,000 options (after giving retroactive effect to the Share Consolidation) in the first quarter of 2014 generating

cash of $201,000 and requiring a transfer from contributed surplus to share capital of $144,000. As well, 450,065 shares (after giving retroactive effect to the Share Consolidation) were issued during the third and fourth quarter upon the exercise of warrants issued as part of the rights offering completed in July 2013 generating cash of $144,000 and requiring a transfer from contributed surplus to share capital of $30,000. Furthermore, 18,268 common shares were issued to Nuinsco in settlement of commitment fees on the Amended Loan (see Note 16 to the 2014 Audited Consolidated Financial Statements).

Contributed surplus has increased to $5,644,000 from $5,431,000 primarily as a result of options vesting during the year of $344,000, partly offset by transfers to share capital as mentioned above for options and warrants exercised during the year.

***Year Ended December 31, 2013 Compared with Year Ended December 31, 2012***

For the year ended December 31, 2013, the Company had a net loss of $4,890,000, or $0.10 per share (after giving retroactive effect to the Share Consolidation), (2012 – net loss of $183,000, or $0.00 per share).

The results are mainly a function of general and administrative expenses of $1,582,000 (2012 - $1,320,000), aggregate share-based payment expenses of $239,000 (2012 - $263,000), net finance costs of $3,619,000 (2012 – $13,000) and pre-operating costs related to Victory Silica of $585,000 (2012 - $159,000); these costs were offset by a $383,000 recovery (2012 - $1,449,000) with respect to the Lynn Lake property as a result of option amounts received in excess of the recorded value of the property. Results in the year also include an income tax recovery of $778,000 (2012 – income tax recovery of $141,000).

General and administrative expenses increased by $262,000, to $1,582,000 from $1,320,000, for the years ended December 31, 2013 and 2012, respectively. The main reason for the increase is because of activity creating the frac sand business. Costs under the management agreement with Nuinsco alone have increased by approximately $100,000 due to that activity. There were finance consulting and due diligence fees of approximately $58,000 and increases in directors fees and meeting expenses because of a higher number of meetings, increases in investor relations expenses because of the new business as well as increased legal and insurance costs also for the new business. Costs include a bonus to senior officers which was partly paid in cash and partly in shares in July, 2013. In 2012, the Company incurred travel and legal costs associated with securing financing.

As mentioned above, general and administrative expenses include costs charged by Nuinsco for administrative services, partly offset by costs charged to Nuinsco by Victory Nickel as described under Transactions with Related Parties and Management Agreement with Nuinsco Resources Limited below; these amounted to $733,000 and $17,000 (2012 - $654,000 and $27,000 respectively). Costs allocated from Nuinsco pursuant to the management agreement are activity related; the increase in costs is primarily a result of increased people costs allocated under the agreement due to activity at Victory Silica and on the frac sand business. This arrangement with

Nuinsco allows the Company to have access to disciplines which would otherwise be cost-prohibitive to a junior company.

The costs of public company compliance for Victory Nickel for the year ended December 31, 2013 are estimated to be approximately $802,000, compared with $730,000 in the year ended December 31, 2012, calculated on a comparable basis. As described above, investor relations costs have increased because of the frac sand business.

The share-based payment expense for options in the year ended December 31, 2013 reflects the grant and partial vesting of 937,000 options (after taking retroactive effect of the Share Consolidation) with a weighted average fair value at grant date of C$0.18. In addition, 181,410 shares were issued under the Share Bonus Plan with a closing price on grant date of between C$0.30 to C$0.45 in consideration for bonuses which were declared in 2013. The expense in 2012 reflects the grant and partial vesting of 805,000 options with a weighted average fair value at grant date of C$0.35. The value assigned to the stock options was calculated using the Black-Scholes option-pricing model as explained in Note 19 to the Company's 2013 Audited Consolidated Financial Statements.

There were no write-downs necessary for impairment of projects in 2013 or 2012. Furthermore, there were no pre-exploration expenditures incurred in either year. In the year ended December 31, 2013, the Company received an aggregate of $391,000 in receipts under the Lynn Lake option; net of expenditures, $383,000 was recorded as recovery of exploration and evaluation project. The Company had agreed to schedule out the previously-agreed option payment, along with an additional amount of C$125,000. In 2012, the full option receipt of C$1,000,000 was received in the first quarter of that year and another C$450,000 was received in the third quarter. Also as described above, Wellgreen has relinquished the Lynn Lake option and no further option payments under this option agreement will be received.

In 2012, the Company announced the creation of Victory Silica as described earlier; VSL's executive and staff are responsible for managing the frac sand business. Pre-operating costs of $585,000 expensed in 2013 comprise start-up consulting fees and related expenses, overhead allocations, additional staff costs, and repairs and maintenance of the 7P Plant during the period. In 2012, pre-operating costs of $159,000 consist mainly of start-up consulting fees and related expenses only.

For the year ended December 31, 2013, net finance costs were $3,619,000 (for the year ended December 31, 2012 – $13,000). Finance costs increased to $3,633,000 from $16,000 in the years ended December 31, 2013 and 2012, respectively, mainly due to the interest expense on the loans and related items; in particular, given the potential conversion to a participating interest by Nuinsco at that time, the Company recorded an increase in the fair value of the loan of $3,100,000 effective December 31, 2013.

The accounting of the Conversion feature and the determination of estimated future cash flows is described above. Refer also to Note 16 to the 2014 Audited Consolidated Financial Statements. In the fourth quarter of 2013, the Company entered into a Convertible Note for $2,000,000. There are several elements of finance expense associated with this: cash-settled interest expense paid on a calendar quarter basis, non-cash amortization of loan fees, non-cash amortization of the embedded derivative related to the value of the convertibility feature at inception and the change in the value of that embedded derivative at the end of a reporting period. All amortizable elements are calculated using the effective interest rate method.

Aggregate interest settled in cash for the year ended December 31, 2013 amounted to $160,000. Approximately $117,000 was on account of the Participating Interest/Amended Loan ($9,000 was paid in 2013 relating to 2012) and $43,000 was on account of the Convertible Note. Amortization of loan fees in the year amounted to $130,000 and $11,000 represented amortization of a portion of the embedded derivative in the Convertible Note of $160,000 calculated at inception. The value of the embedded derivative increased to $325,000 as at December 31, 2013 and, accordingly, $165,000 was charged through operations.

In the year ended December 31, 2013, the Company recorded an income tax recovery of $778,000 (2012 – income tax recovery of $141,000). This is primarily a function of higher taxable losses partly offset by the tax effect of non-capital losses of $183,000 which expired in 2013. Furthermore, because of the frac sand business activity expected to be in place when the losses are utilized, the income tax rate in place is expected to be 25%; this reduced the required future income tax liability by $284,000 which is recorded in the income tax recovery. The Company has estimated it has $183,000 in unrecognized deferred tax assets in relation to Victory Silica; given this is a new venture which has not yet started operation, it is not currently assessed as more-likely-than-not that losses and costs incurred in Victory Silica will be realized prior to their expiry.

Other comprehensive income (“OCI”) in the year ended December 31, 2013 relates to a decrease of $217,000 (December 31, 2012 – $655,000) in the market value of the Company’s financial assets at fair value through OCI along with income tax recoveries recorded through OCI of $30,000 (December 31, 2012 – income tax recoveries of $88,000). In addition, the Company recorded $3,390,000 as the effect of foreign currency conversion for the year ended December 31, 2013 pursuant to the Company’s decision to change the functional and presentation currency to the US Dollar.

The changes in other balances not specifically addressed in other sections of this MD&A are as follows:

Receivables and prepaids as at December 31, 2013 include $110,000 in sand purchases prepaid in accordance with the purchase contract signed late December. Sand commenced being delivered to the 7P Plant in February, 2014.

Marketable securities as at December 31, 2013 consist of the Company's financial assets at fair value through OCI; the Company's investment in shares is at fair value through OCI; the Company no longer has any investment in warrants at fair value through operations. Marketable securities decreased by $299,000 from December 31, 2012 as a result of sales and declines in market prices of shares. The Company generated $57,000 in sales proceeds in the first quarter of 2013; there were no sales in the balance of 2013.

Property and equipment increased to $4,963,000 from $1,431,000 as at December 31, 2012. The primary reason for the increase relates to expenditures on the 7P Plant and leased mobile equipment related thereto. The costs include acquisition costs as well as plant improvements. The mobile equipment is in use and is being depreciated; since the plant had not yet been commissioned as at December 31, 2013, it was not depreciated during 2013.

Project expenditures are described below in Mine Property and Development Activities and Exploration and Evaluation Activities.

The increase in trade and other payables of $966,000 relates primarily to an increase in trade payables of $448,000 and accrued liabilities of $312,000 pertaining to property and equipment at the 7P Plant as well as $151,000 increase in the current portion of lease obligations for mobile equipment because of the ramp up of activity. Such increases are partly offset by the settlement of 2012 balances being: deferred directors' fees of $121,000 and settlement of $115,000 of accounts payable in shares in the first quarter of 2013.

Victory Nickel entered into a loan agreement and C$1,000,000 was advanced prior to December 31, 2012. At the option of the Lender (Nuinsco), and under certain circumstances, the Lender could elect to receive prepayment of the loan from up to $1,000,000 of the proceeds of the Lynn Lake option payments. Accordingly, under the option agreement in effect at December 31, 2012, C$1,000,000 of the loan was classified as a current liability since this matched the Lynn Lake option payments which were available to be diverted to the Lender at their option under agreements in place as at December 31, 2012. The option has been relinquished by Wellgreen and no further option payments are due.

Due to the Conversion of the loan in early 2014, it became the Participating Interest and includes a loss on adjustment of estimated cash flows of $3,100,000 calculated as described above. Note 16 to the 2014 Audited Consolidated Financial Statements includes an analysis of the loan balance.

Refer to the Liquidity and Capital Resources section for additional discussion of the Amended Loan and the impact of the rights offering on its terms and its conversion.

On November 11, 2013, the Company entered into a Convertible Note for $2,000,000. This has a two-year term and is convertible into the Company's shares at a conversion price of C$1.00 (after taking retroactive effect of the Share Consolidation) at the holder's option in part or in

whole at any time prior to due date. When shown net of unamortized fees and including the value of the embedded option derivative as described above, the value of this financial liability is $2,143,000 as at December 31, 2013.

In the latter half of 2013, the Company entered into several finance leases to purchase mobile equipment with a total fair value of $595,000 at acquisition date; the long-term portion is $384,000 and the short-term lease obligation of $150,000 is included in *Trade and other payables* as described above. Note 17 to the 2014 Audited Consolidated Financial Statements includes an analysis of the lease obligation.

The deferred tax liability balance amounts to $1,430,000 as at December 31, 2013, compared with $2,486,000 as at December 31, 2012. The main components of the balance relate to the tax effects of E&E projects and the MP&D project, partly offset by the tax value of net operating tax losses carried forward. In 2013, $183,000 of available operating losses expired and $50,000, the tax effect of that amount, reduced the income tax recovery in the year. Due to changes in the expected future income tax rate, the deferred tax liability amount was reduced by $284,000 in the year ended December 31, 2013. The Company estimates that it has approximately $172,000 (2012 - $42,000) in unrecognized deferred tax assets in relation to Victory Silica.

The share capital balance has increased significantly year over year by $4,122,000. Note 19 to the 2014 Audited Consolidated Financial Statements includes a detailed analysis of the account and the Liquidity and Capital Resources section describes the transactions more fully. The most significant transactions were as follows: $2,449,000 in gross proceeds were generated from private placements and $2,332,000 in gross proceeds were raised in the rights offering; share issue costs are applied against these balances and an apportionment of proceeds was also attributed to the warrants and recorded in *Contributed surplus* at an aggregate of $816,000 which, combined with the issuance of options, accounts for the increase in that account of $1,011,000.

## SUMMARY OF QUARTERLY RESULTS

Selected financial information for each of the last eight quarters ended December 31, 2014 is as follows:

| Fiscal year 2014 | 4th Quarter | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|
| Revenue | $ 7,203 (1) | $ 5,463 (1) | $ 1,310 (1) | $ - |
| Gross margin (loss) | $ 670 (2) | $ 689 (2) | $ (146) (2) | $ - |
| Net finance income (costs) | $ 714 (3) | $ (255) (5) | $ (47) (7) | $ (872) (9) |
| Net income (loss) | $ 96 (4) | $ (373) (6) | $ (693) (8) | $ (1,446) (10) |
| Total comprehensive loss | $ (2,287) | $ (464) | $ (724) | $ (1,371) |
| Earnings (loss) per share - basic and diluted (14) | $ 0.00 | $ (0.01) | $ (0.01) | $ (0.02) |

| Fiscal year 2013 | 4th Quarter | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|
| Net finance costs | $ (3,443) (11) | $ (66) | $ (73) | $ (37) |
| Net loss | $ (3,656) (12) | $ (503) | $ (417) | $ (313) |
| Total comprehensive loss | $ (3,628) (13) | $ (518) | $ (493) | $ (436) |
| Loss per share - basic and diluted (14) | $ (0.07) | $ (0.01) | $ (0.01) | $ (0.01) |

(1) Revenue represents sales of frac sand (first sales were recognized in the second quarter).
(2) Gross margin (loss) includes cost of goods sold which include operating costs for a full period despite production being at less-than-full capacity.
(3) Net finance costs include $708,000 change in the fair value of the embedded option derivatives related to the Convertible Notes partly offset by $493,000 gain on adjustment of estimated cash flows for the Participating Interest.
(4) Includes the effects noted above.
(5) Net finance costs include $827,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $20,000 loss on adjustment of estimated cash flows for the Participating Interest.
(6) Includes the effects noted in (1), (2), and (5).
(7) Net finance costs include $450,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $135,000 loss on adjustment of estimated cash flows for the Participating Interest.
(8) Includes the effects noted in (1), (2), and (7).
(9) Net finance costs include $505,000 change in the fair value of the embedded derivatives related to the Convertible Notes as well as $97,000 loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco.
(10) Includes the effects noted above combined with increased costs relating to the frac sand business and net frac sand pre-operating costs of $194,000.
(11) Net finance costs for the period includes $3,133,000 for the loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco and $154,000 for the increase in value of the embedded derivative related to the convertible promissory note.
(12) Net loss for the period includes $229,000 for costs charged under the management agreement with Nuinsco and reflects increased activity on the frac sand business and an income tax recovery of $532,000.
(13) Total comprehensive loss for the period includes the effects noted above.
(14) After the retroactive effect of the Share Consolidation.

## LIQUIDITY AND CAPITAL RESOURCES

As at December 31, 2014, the Company had a working capital deficiency of $3,316,000, including cash and cash equivalents (but not restricted cash), receivables and prepaids, marketable securities, inventory, accounts payable, and current portion of long-term borrowings. As at December 31, 2013, the Company had working capital of $437,000.

Working capital deteriorated from the prior year despite the fact that the frac sand operation is generating revenue. This is largely because the SPA Loan amounting to $3,585,000 has been classified as current as at December 31, 2014 as it is due July 30, 2015. As well, a Convertible Note of $1,908,000 issued under the Company's program is due on November 10, 2015. Furthermore, the Company completed the arrangement of short-term financing on October 1, 2014 by way of a promissory note amounting to $2,000,000. The lender has agreed several

monthly extensions upon payment of extension fees. On January 31, 2015, February 6, 2015, and February 27, 2015 the Company repaid $500,000, $250,000, $250,000 respectively. A fourth amendment extended the short-term loan to March 31, 2015 under similar terms; the balance presently outstanding is $1,000,000. On March 31, 2015, the Company agreed an additional extension of the short-term loan with the lender. The balance outstanding is $1,000,000 and is now due on or before April 30, 2015 under similar terms. On March 31, 2015, the Company paid an extension fee of $10,000 along with a penalty for not repaying the amount originally due on March 31, 2015 of $15,000.

In 2014, the Company's Convertible Note program raised gross aggregate funds of $5,000,000 in principal; $4,000,000 net of the conversion to the SPA Loan referred to above (2013 - $2,000,000).

These financings were used to fund the construction and upgrading of the 7P Plant as well as to fund the working capital for the frac sand business comprised of receivables from sales of frac sand, prepaids on deposits for sand, inventory, and trade payables on supplies, transportation, and property, plant and equipment.

The 500,000 tpa frac sand plant cost $4,774,000 and mobile equipment related thereto acquired mostly under leases cost $666,000. Inventory and trade accounts receivable related to the frac sand business amounted to $2,977,000 and $2,725,000, respectively, as at December 31, 2014.

The main financings occurring during the year and related events are described in the following sections.

Loan and Amended Loan with Nuinsco of up to $3,000,000 which, upon Conversion, became the Participating Interest was entered into in 2012 and was amended in March 2013. Under the loan agreement with Nuinsco, C$1,000,000 was advanced prior to December 31, 2012; the Amended Loan provided additional funds of up to C$2,000,000 by way of loan or backstop for a unit issue. Pursuant to the results of the rights offering, this amount was capped at C$1,707,584. Nuinsco's backstop to the rights offering was C$1,207,584. By providing the backstop and participating in the rights offering to the extent of its existing share position, Nuinsco increased its ownership in the Company to approximately 12.24% as at July 30, 2013 on a non-diluted basis and made Nuinsco a related party of the Company.

Prior to June 1, 2014, Nuinsco, had the right to convert the outstanding balance of the Amended Loan into a participating interest (the "Conversion") whereby Nuinsco is entitled to receive a share of net cash flows, calculated after recoupment of Phase One capital and pre-operating costs, earned from the sale of frac sand from the 7P Plant. Nuinsco's participation is capped at C$10,222,831, with a minimum of C$7,667,124, or approximately $8,812,000 and $6,609,000, respectively, should the Company enter Phase Two operations.

On April 22, 2014, Nuinsco exercised its conversion option and converted its loan to the Participating Interest, at the same time, it relinquished its security over the assets of the Company since the Conversion constituted payment of the loan in full. This obligation will be settled through a 52.16% participation in net operating cash flows from the frac sand business after recoupment of capital costs for Phase One and pre-operating expenses.

Cash payments of $46,000 for interest expense were made during the year ended December 31, 2014 (2013 - $115,000); interest was due in cash at the end of each calendar quarter. Non-cash amortization of loan fees is also included in interest expense on the loan with Nuinsco.

As at December 31, 2013, the carrying value of the Amended Loan was revalued to take into account future expected cash flows. The amortized cost at that time was estimated to be $3,855,000. The Company has reviewed the expected future cash flows along with assumptions and has revalued the obligation at $3,548,000 as at December 31, 2014. The change in value of $225,000 in 2014 has been recorded through *Finance Costs* in the statement of operations.

These amounts were determined as described earlier and will be subject to the ongoing revaluation as the frac sand business develops and cash flow amounts become more certain. Under present assumptions and business expectations, contractual payments to Nuinsco would not commence until approximately fourth quarter of 2016 when Phase One capital costs and pre-operating expenditures are expected to have been recovered. The Company significantly increased the probability-weighted estimates applied to varying cash flows to approximately 73% in the year from 55%. The Company retained the cash flow ceiling of $6,609,000 despite the announcement in February 2015 that entry into Phase Two of the frac sand business plan has been delayed. The net effect of these assumption changes required a decrease in the Participating Interest year over year.

The Company created a model reflecting the pre-operating and Phase One capital costs to be recouped along with its sales, production and cost forecasts to derive the probability-weighted estimates of zero, 50% and 100% of the applicable cash flow ceiling.

The Company will continue to reassess the carrying value of the Participating Interest as circumstances warrant.

**Convertible Notes** – a convertible promissory note for $2,000,000 was issued on November 11, 2013. Additional Convertible Notes were issued in 2014 of $4,750,000 and C$265,000 under similar terms; $1,000,000 of that amount was extinguished and reissued as a SPA Note. The aggregate principal amount outstanding as at December 31, 2014 is $5,979,000. The accounting complexities of these financial liabilities have been described earlier. The Convertible Notes have terms of two years, bear interest at 14.8% calculated on a monthly basis and settled quarterly and may be converted in whole or in part, at any time, at the option of the holders into Victory Nickel shares at a conversion price of C$1.00 per share (after giving retroactive effect to the Share Consolidation).

**SPA Loan** - on May 15, 2014, the Company announced that it had executed a securities purchase and senior secured line of credit agreement in the amount of $4,000,000. The SPA Loan bears interest of 14.8% per annum and matures on July 30, 2015; accordingly, the SPA Loan is classified as a current liability due within one year. The lender previously purchased a convertible note in the amount of $1,000,000 and this was extinguished and became a SPA Note on the initial closing date of May 15, 2014 (the "Initial Closing Date").

As part of the SPA Loan, the Company issued 2,000,000 common share purchase warrants (after giving retroactive effect to the Share Consolidation). For each $1,000,000 advanced under the SPA Loan, the lender is entitled to exercise 500,000 common share purchase warrants (after giving retroactive effect to the Share Consolidation) to acquire shares at C$1.00 per share (after giving retroactive effect to the Share Consolidation) for a period of three years. The number of warrants is subject to an increase to 1,000,000 Warrants (after giving retroactive effect to the Share Consolidation) for each $1,000,000 drawn under the SPA Loan if the loan is prepaid and the closing price of the Company's common shares is C$2.00 or lower (after giving retroactive effect to the Share Consolidation) on the trading day preceding the date of such prepayment. The Company has valued the prepayment right at $nil given that there is a cost to issue additional warrants upon prepayment of any of the SPA Loan.

The terms of the SPA warrants contain a cashless exercise feature which requires the warrants to be recognized as a liability rather than as equity within contributed surplus. Accordingly, the fair value of the warrants at inception of $583,000 is recorded as a liability with the balance of the SPA Loan. Any change in the fair value of the warrants is also recorded as a component of the SPA Loan and charged to finance income or costs in the statement of operations. The fair value change amounted to a decrease of $462,000 during 2014 since inception bringing the fair value of the cashless warrants to $121,000 as at December 31, 2014.

In the year ended December 31, 2014, the Company paid $370,000 in cash for interest and amortized $450,000 in loan fees into interest expense.

Loan Facility – on October 1, 2014, the Company completed an arrangement of short-term financing by way of a promissory note amounting to $2,000,000. The promissory note bears interest at 28%, calculated and settled monthly. This short-term loan has been renewed on a monthly basis upon payment of extension fees and penalties. The Company has made repayments aggregating $1,000,000 during the first two months of 2015. The remaining balance is $1,000,000. On March 31, 2015, the Company agreed an additional extension of the short-term loan with the lender. The balance outstanding of $1,000,000 is now due on or before April 30, 2015 under similar terms. On March 31, 2015, the Company paid an extension fee of $10,000 along with a penalty for not repaying the amount originally due on March 31, 2015 of $15,000.

**Cash flows in 2014** - Cash and cash equivalents as at December 31, 2014 and 2013 were held with major Canadian banks. The Company has a policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board. Marketable securities are available to be sold for liquidity purposes, as the Company requires; this source is limited.

For the year ended December 31, 2014, the Company used cash in operating activities of $6,261,000 (2013 - $2,296,000). As the Company is in the exploration, evaluation and development stage and continues to ramp up to produce commercial quantities of frac sand at the 7P Plant, there are limited revenues to recover expenses and the operating activities represent the corporate and administrative costs incurred to maintain a public company and to set up the frac sand operations, including building inventory and paying in advance for sand purchases.

The Company estimates that public company costs for the year ended December 31, 2014 amounted to $894,000. Many of these costs are incurred in the early part of the year. In the same period of 2013, such costs were approximately $802,000, calculated on a comparable basis. Consequently, the Company's liquidity is reduced unless and until there are significant increases in revenues, financing activities or sales of assets to provide funds. Note that the costs cited above do not include the costs of financing arrangements which are deducted directly from equity – these can be significant.

Costs incurred to advance the Company's exploration, evaluation and development projects are capitalized, as summarized below under the discussion of investing activities. Costs to set up the Company's frac sand operations and operating costs were recorded as part of pre-operating expenditures net of sales revenue for the first three months and thereafter are part of cost of goods sold or other expense lines. For the year ended December 31, 2014, $12,854,000 was charged to cost of goods sold and $194,000 to pre-operating expenses, compared with $585,000 net pre-operating expenses in the prior year (with no offsetting revenue). Revenue in 2014 amounted to $13,976,000.

The adjustment for net finance costs of $551,000 primarily relates to the net effects of the non-cash changes in the carrying value of the Participating Interest and the embedded option derivatives on the Convertible Notes as described above. While the adjustment on the Participating Interest is similar to a fair value adjustment it is an estimation of future cash flows to be paid under the Participating Interest created on Conversion which occurred in April, 2014. Distributions under the Participating Interest terms are calculated based on operating cash flow after recovery of capital and pre-operating costs and take into account working capital. It is presently anticipated that the first payment under the Participating Interest could occur in the fourth quarter of 2016.

As operating activity has begun to ramp up, receivables, inventory and trade and other payables have also grown. Receivables – mostly trade accounts receivable from frac sand sales – used

$3,009,000 in working capital and the build-up of inventory used $2,977,000. The Company is looking to find cost-effective ways to manage this growth rather than relying on trade and other payables which provided a source of funds of $2,248,000 in the year.

For the year ended December 31, 2014, net cash used by investing activities was $2,990,000, compared with cash used of $2,743,000 in 2013. Aggregate amounts of $396,000 and $160,000 were used to advance the MP&D project and E&E projects, respectively, during the year (2013 - $945,000 and $134,000). In 2014, $2,334,000 was used for expenditures on the 7P Plant acquisition, equipment and improvements (2013 – $1,962,000).

During 2013, the Company sold shares for aggregate proceeds of $57,000. Funds of $391,000 were received with respect to the option agreement with Wellgreen for the Lynn Lake property in 2013; as described above, the option agreement has been terminated and no additional funds are forthcoming. Deposits on transformers of $100,000 were made in 2014, compared with $150,000 in 2013.

The Company generated $8,625,000 in financing activities for the year ended December 31, 2014 compared with $6,120,000 in 2013. In 2014, the main source of funds, $9,978,000, was from the Convertible Notes, the SPA Loan, and the short-term loan. In 2013, debt financing represented $2,000,000 from a Convertible Note and aggregate equity financing was $4,382,000, net of fees; $2,449,000 was raised in equity pursuant to private placements and another $2,332,000 was raised through a rights offering (all before fees). Loan interest of $1,274,000 was paid during 2014; $168,000 in 2013, of which $9,000 related to interest accrued in 2012. Aggregate payments under leases for deposits and other principal payments totalled $146,000 for mobile equipment used in the frac sand business compared with payments of $94,000 in 2013. The Company also deposited $271,000 of funds to support letters of credit issued to facilitate the Company's frac sand business.

There were no equity financings completed during 2014 other than $201,000 received through the exercise of options and $144,000 received through the exercise of warrants issued as part of the rights offering in July 2013; aggregate share issue expenses were $7,000.

The Company's activities for the year ended December 31, 2014 used cash and cash equivalents of $626,000, compared with a net increase in cash of $1,081,000 in 2013.

**Table of Contractual Commitments**

| | Due Date | Currency | December 31, 2014 | December 31, 2013 |
|---|---|---|---|---|
| Transformer and electrical equipment | On shipping | US Dollar | $ 1,296 | $ 1,396 |
| Loans and borrowings (including unpaid accrued interest) | | | | |
| Amended Loan | January 31, 2015 | Canadian Dollar | $ - | $ 1,000 |
| Participating Interest | Refer to note below | Canadian Dollar | $ - | $ - |
| Convertible Notes | November 11, 2015 to July 7, 2016 | US Dollar | $ 5,750 | $ 2,000 |
| Convertible Notes | January 30, 2016 to March 13, 2016 | Canadian Dollar | $ 265 | $ - |
| SPA Loan | July 30, 2015 | US Dollar | $ 4,000 | $ - |
| Promissory Note [(1)] | January 31, 2015 | US Dollar | $ 2,000 | $ - |
| Purchase of 7P Plant | Refer to note below | Canadian Dollar | $ - | $ - |
| Leased mobile equipment | Within one year | Canadian Dollar | $ 179 | $ 190 |
| | One to five years | Canadian Dollar | $ 328 | $ 447 |

(1) The short-term note in place as at December 31, 2014 was due by January 31, 2015. The note has been renewed on a monthly basis upon payment of extension fees and penalties. As at March 31, 2015, the amount outstanding is $1,000,000 and is due April 30, 2015.

Note that the final acquisition of the 7P assets was subject to conditions precedent, including the transfer of leases which continues to require regulatory approval. Effective May 20, 2014, through the acquisition of 100% of BG Solutions, the company which owned the leases, the Company completed the purchase of the 7P assets including the land lease. The Asset Purchase Agreement was cancelled. Further note that the Amended Loan was contractually payable on January 31, 2015 but, in April 2014, was converted to the Participating Interest. The Participating Interest has no specific payment dates and is dependent upon cash flows from the frac sand business after having recouped the capital cost of the 7P Plant and the pre-operating expenses. The Convertible Notes may also be settled in part or in whole through the issuance of the Company's shares at a price of C$1.00 per share (after giving retroactive effect to the Share Consolidation) at the holders' option at any time prior to repayment.

During the first quarter of 2014, 463,000 stock options were exercised (after giving retroactive effect to the Share Consolidation) which generated $201,000 in cash for the Company. Also, note that all 12,356,864 of the Company's outstanding warrants (after giving retroactive effect to the Share Consolidation) are exercisable. The 10,000,000 warrants (after giving retroactive effect to the Share Consolidation) issued pursuant to the rights offering in 2013 became exercisable on July 31, 2014, 1,250,000 warrants (after giving retroactive effect to the Share Consolidation) issued pursuant to a private placement wee exercisable on issue. The 2,000,000 warrants (after giving retroactive effect to the Share Consolidation) issued in 2014 under the SPA Loan are three year warrants exercisable at C$1.00 (after giving retroactive effect to the Share Consolidation); furthermore, these warrants have a cashless exercise feature which, if selected, would cause shares to be issued but without a cash infusion to the Company. Typically, warrants tend not to be exercised until close to their expiry. All except the 2,000,000 warrants issued pursuant to the SPA loan are exercisable at C$0.35 (after giving retroactive effect to the

Share Consolidation). In 2014, 893,136 warrants (after giving retroactive effect to the Share Consolidation) were exercised which generated $144,000 in cash.

The Company will continue to balance its financing choices as a function of availability and market activity. Managing in challenging times takes as much, if not more, senior management effort. More recently, the Company has issued Convertible Notes. The SPA Loan, executed in May, 2014, provided a facility of $4,000,000 to be used to fund working capital related to the frac sand initiative. This was supplemented on October 1, 2014 by the completion of a short-term financing by way of a promissory note aggregating $2,000,000. This was a preliminary step towards the objective of securing receivables financing through factoring or similar activities. The Company is in the process of documenting a bank facility to factor certain of its receivables.

Commissioning of the 7P Plant commenced in March until early August. Approximately 99% of sales in 2014 were collected from customers to the date of this report and inventories valued at $2,977,000 as at December 31, 2014 were built which includes $1,445,000 of finished product.

Using March 30 2015 prices, the aggregate market value of the Company's marketable securities held in public company shares is approximately $279,000.

As at March 31, 2015, the Company had options outstanding which could bring in additional funds of approximately C$1,731,000. Most of those instruments are not "in-the-money" and the receipt of such funds cannot be relied upon. Furthermore, the remaining warrants issued under the rights offering and private placement could generate additional cash of C$3,780,000. Approximately C$158,000 of warrants from the rights offering have been exercised as of the date of this report; the figures exclude potential proceeds from the warrants issued with the SPA Loan which are subject to a cashless exercise feature.

The Company has good title to its projects and will continue to maintain the projects in good standing.

The Company recognizes the imminent cash requirement to repay debt and is actively considering restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

Development of the Minago mine will require considerable financial resources. The Company recognizes that the state of the financial markets and the apparent lack of support for mining projects will make financing this project difficult. However, validating the frac sand portion of the project should provide leverage to get potential partners interested in the nickel portion of the project.

The Company continues to hold discussions with local and overseas financiers and potential business partners with respect to the nickel and frac sand opportunities.

## BUSINESS UPDATE

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company also now produces frac sand for the oil and gas industry in Canada and the northern US. Accordingly, the Company has commenced reporting on a segmented basis in 2014. The Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand.

The Corporate segment supports all of the Company's activities.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 24 in the 2014 Audited Consolidated Financial Statements). The segment is located in Canada although sand as raw material is imported from the US.

The following table provides information on the Company's segmented assets. The segmented Statement of Operations for 2014 has been presented earlier in the MD&A in the discussion of operating results for 2014 and 2013.

| | **December 31, 2014** | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| **Canada** | | | |
| Corporate | **$ 1,860** | $ 2,290 | $ 2,404 |
| Exploration and Development | **49,734** | 51,764 | 52,904 |
| Frac Sand | **11,300** | 3,654 | - |
| Intersegment elimination | **(962)** | (455) | - |
| **Total Assets** | **$ 61,932** | $ 57,253 | $ 55,308 |

## EXPLORATION AND DEVELOPMENT ACTIVITIES

Paul Jones, Vice-President, Exploration, is a "qualified person" as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Company described herein.

## MINE PROPERTY AND DEVELOPMENT ACTIVITIES

### NICKEL

### Minago Project

During the year ended December 31, 2014, expenditures of $372,000 (December 31, 2013 - $819,000 (before receipt of a government grant of $70,000)) was incurred on the Minago project.

The Company's 100%-owned Minago project is a permitted project ready for development. It is located on the unexposed southern part of the Thompson Nickel Belt in Manitoba, and is one of Canada's largest undeveloped sulphide nickel deposits. Minago has been shown to be capable of producing a nickel concentrate grading from 22.3% up to 35.0%, making it reportedly the world's highest grade nickel concentrate. In addition to metal by-products such as copper, cobalt, gold, platinum, palladium, silver and rhodium, a layer of silica sand averaging approximately nine metres thick overlies the nickel mineralization within the open pit. Approximately 84% of the sand is marketable as frac sand. The frac sand forms part of the overburden that must be removed prior to mining the nickel ore. According to the FS, production of frac sand could begin 20 months after the start of mine development.

The analytical data and geological interpretations obtained from a work program in 2010 were incorporated into an updated geological model and resource estimate. The updated resource incorporates a 24% increase (over the previous resource estimate) in the NI-43-101-compliant measured and indicated, pit-constrained, sulphide nickel resource used in the Minago FS. The FS is posted at www.sedar.com. Note that all resources are contained in the Nose Deposit and the update below does not include the results of the 2011 drilling program.

| | **April 2011 Pit-Constrained Resource[1]** | | | **March 2010 In-Pit Resource[2]** | | | **Increase (Decrease) in Contained Metal** | |
|---|---|---|---|---|---|---|---|---|
| | **Tonnes** | **Grade** | **Ni Content** | Tonnes | Grade | Ni Content | **Ni Content** | **Change** |
| **Category** | **Millions** | **%NiS[3]** | **M Lb** | Millions | %NiS[3] | M Lb | **M Lb** | **%** |
| **Measured** | **8.2** | **0.473** | **85.0** | 6.6 | 0.488 | 71.4 | **13.7** | **19.2** |
| **Indicated** | **22.8** | **0.432** | **217.2** | 19.1 | 0.410 | 172.6 | **44.6** | **25.9** |
| **M&I** | **31.0** | **0.443** | **302.2** | 25.7 | 0.430 | 243.9 | **58.3** | **23.9** |
| **Inferred** | **0.2** | **0.380** | **1.4** | 1.4 | 0.402 | 12.2 | **(10.8)** | **(88.4)** |

[1] Lerch-Grossman pit optimization shell [2] Whittle pit optimization shell [3] Nickel in sulphide form

A winter work program was conducted at Minago in 2011. The program comprised 8,793m of diamond drilling in 20 drill holes with associated ground and borehole electromagnetic geophysics. The program was intended to evaluate parts of the project that have seen little work to date as well as to build upon the existing data-set of the Nose Deposit nickel mineralization. The entire pit-constrained resource is located within the Nose Deposit. A total of 15 holes were collared to intersect the "North Limb", a domain of nickel-bearing ultramafic rock extending at least 1.5km north from the Nose Deposit. A single deep hole was collared on the Nose Deposit to evaluate the depth extension of the ultramafic host rock and nickel mineralization. The hole was drilled to a total length of 1,527m and intersected approximately 160m of ultramafic rock near the bottom of the hole – confirming the extension of the host rock to depths several hundred metres below that previously tested. A single drill hole was collared in the western part of the property in order to test the thickness of the Winnipeg Formation sand horizon. As anticipated, the hole successfully intersected the Winnipeg Formation sandstone layer (frac sand horizon) immediately above the unconformity with the Thompson Nickel Belt rocks.

A 3,500m winter work program was conducted in early 2012. The program tested a number of targets around the property that have been identified in previous work programs as well as areas that are scheduled for Minago mine infrastructure development. In part, the drilling evaluated the nickel-bearing Ospwagan Group/Pipe Formation rocks in the vicinity of the Minago Nose Deposit. Given the widespread nature of nickel mineralization on the Minago property and the number of targets identified, the possibility of intersecting completely new nickel mineralization was considered good. The drilling intersected magnetite-bearing amphibolite domains, pyrite-pyrrhotite intervals and minor serpentinite.

Importantly, two holes of the 2012 program tested known nickel-bearing serpentinite that underlies mining lease ML-003 approximately 5km south of the Nose Deposit. Thirteen historic drill holes are known to have been drilled by previous operators in the area between 1968 and 1971. Ten of the thirteen holes intersected serpentinized ultramafic rock, while seven of these holes obtained significant intersections of nickel-mineralized serpentinite from within a body interpreted to be >2 km long. The most extensive intersection, in MXB-70-60, was 605m grading 0.3% Ni from 154m down hole. DDHs V-12-07 and V-12-09 completed in the winter of 2012 both intersected significant widths of serpentinite and obtained analytical results consistent with historic results.

No exploration or development programs have been conducted on the project subsequent to the winter 2012 work program; current work is related to reporting and evaluation of existing results as well as gathering additional geochemical information from existing drill core. An application to renew the Minago mining leases ML-002 and ML-003 was successful and both leases have been renewed for a 21-year term.

On August 23, 2011, the Manitoba Government issued Victory Nickel's final EAL for the Minago project. The licence expires on August 22, 2014 unless the Company completes a certain amount of work to move the project forward. During 2013, the Company has complied with the conditions of the EAL and, in December, filed an Environmental Act Proposal ("EAP") to amend the EAL to relocate the proposed tailings and waste rock management facility. The construction of drainage ditches installed to lower the water table within the pit shell limits, the installation of Flow Gauging and Telemetry systems and the implementation of a comprehensive environmental monitoring program are considered part of the site development necessary to maintain the EAL which would have otherwise expired in August, 2014.

*Minago Frac Sand*

An indicated resource of 15 million tonnes of sandstone has been estimated to occur within the current Minago pit shell. The frac sand component of this resource of approximately 11 million tonnes is a significant contributor to the positive economics at Minago. As part of the FS, Outotec produced a feasibility-level design for a frac sand plant complete with capital and operating costs to produce 1,140,000 tonnes of frac sand annually for a ten-year period. Considerable potential exists to expand the resource beyond the limits of the current pit.

## EXPLORATION AND EVALUATION ACTIVITIES

For the year ended December 31, 2014, the Company incurred exploration expenditures on its E&E projects of $160,000 (December 31, 2013 - $131,000). Expenditures have been minimal due to the tight equity markets and management's focus on Victory Silica and the frac sand business. The 2013 expenditures are shown before the transfer of $383,000 through operations with respect to the Lynn Lake option receipts in excess of carrying value.

## FRAC SAND

### Bear Coulee Property

In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment of $10,000 on signing of the agreement (and paid in 2014), a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit on the Bear Coulee Property and will be incorporated into a National Instrument 43-101 technical report. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin.

## NICKEL

### Lac Rocher

Lac Rocher is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cutoff, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per lb in the Lac Rocher PEA was $9.74 with copper at $3.65.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% net smelter royalty ("NSR") for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

Year round access is now available to the site. In December 2009, diamond drilling was conducted to provide geotechnical data deemed necessary for future portal and ramp development. An InfiniTem ground electromagnetic survey was conducted over a portion of the property to test for deeper extensions to the nickel mineralization. At the same time, evaluation of the availability of borrow material was also conducted in the local region. No work was conducted at the site in 2014.

**Mel Project**

The Mel project is located on the Thompson Nickel Belt, just north of Thompson, Manitoba. It is a large property, approximately 25km east-west by about 6km north-south, and remains underexplored.

Mel has an indicated resource of 4.3 million tonnes grading 0.88% nickel (approximately 83 million pounds in-situ nickel) and an additional inferred resource of one million tonnes grading 0.84% nickel (approximately 19 million pounds in-situ nickel) and offers significant exploration upside as well as near-term production potential.

The Company had earned a 100% ownership of Mel subject to a 51% Vale back-in right. During the third quarter of 2010, the Company announced that Vale had determined that it would not exercise its back-in right. Title to the property has been transferred. Accordingly, the Company is in a position to determine future programs at Mel in its sole discretion.

Ten drill holes, totalling 3,459m, comprised the 2011 winter work program on the Mel Property, the first managed by the Company. Two drill holes, totalling 739m, were collared to test a UTEM geophysical anomaly approximately 700m north of the Mel deposit associated with earlier prospective nickel results; no sulphide mineralization was encountered. Eight drill holes, totalling 2,720m, were collared to test the down-dip extension of the Mel resource shell; all holes intersected nickel mineralization of grade and width comparable to that obtained in holes that comprise the existing resource.

A re-evaluation of the Mel dataset has been completed for both the drill hole data on the Mel deposit and the considerable drilling (111 drill holes) conducted of the claims portion of the property. The study has included reinterpretation of the geological context in order to evaluate new or under-tested target areas, particularly on the portion of the property comprised of claims, for future work and that can be incorporated into further, more refined, modelling of the Mel resource. No fieldwork was conducted during 2014. An application to renew Mel mining lease ML-007 was successful and the lease has been renewed for a 21-year term.

Under the terms of the option agreement, Vale must mill ore from the Mel project at cash costs plus 5% subject to capacity availability and metallurgy – this is unaffected by Vale's decision not to exercise its back-in right. Furthermore, in accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before

federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

**Lynn Lake**

The Lynn Lake property is located in the historic mining town of Lynn Lake in northern Manitoba, about 320km by road northwest of the Thompson mining camp. The property is the former Sherritt Gordon Mines Limited ("Sherritt") mine site known as the Lynn Lake A Mine and Farley Mine, comprised of 13 mining claims, 14 mining claim leases and 2 mineral leases covering an area of 2,170.26 hectares. The property was operated by Sherritt from 1953 to 1976 with reported production of 22.2 million tons at an average grade of 1.023% nickel and 0.535% copper.

As discussed earlier and described in Note 12 to the 2013 Audited Consolidated Financial Statements, the Company had optioned Lynn Lake to Prophecy Coal with subsequent assignment to Wellgreen. In March, 2014, Wellgreen relinquished the option on the property and it has reverted to the Company. On November 4, 2014, the Company announced that it had optioned the Lynn Lake project to Corazon, an Australian listed public company with assets in the Lynn Lake area. Under the terms of the agreement, Corazon can acquire a 100% interest in Lynn Lake by issuing 40 million Corazon shares to the Company upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project.

**FRAC SAND SEGMENT**

As explained above, the Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 24 in the 2014 Audited Consolidated Financial Statements). The segment is located in Canada although sand as raw material is currently imported from the US. The plan is to eventually produce both domestic and imported sand.

On June 19, 2012, the Company announced this initiative through the creation of Victory Silica. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project at the same time as generating cash flow. On January 9, 2013, the Company announced that it had completed an asset purchase agreement for the purchase of the 7P Plant assets.

The Company then proceeded to implement Phase One of its three phase business plan. Phase One provided for the refurbishment and upgrading of the 7P Plant to a capacity of 500,000 tpa of high-quality frac sand.

The 7P Plant was completed in March 2014 followed by commissioning until early August. During commissioning and to December 31, 2014, the 7P Plant produced 109,155 tons of frac sand and, to the end of December 2014, 90,731 tons of this sand was sold. In addition, 16,830 tons of finished goods inventory was built up. Production tonnage includes approximately 90 tons of sand which have been included in raw materials inventory. The balance of 1,504 tons represents losses. The cost to purchase and complete the 7P Plant upgrade was approximately $4,774,000; $5,440,000 including the cost of leased equipment (and before amortization). The 7P Plant reached full staff complement early in the fourth quarter with the addition of the fourth crew. Unfortunately, start-up issues described earlier prevented the 7P Plant from operating at full capacity. This, compounded by the impact of the recent unprecedented decline in the price of oil has left a confused environment resulting in price decreases which we believe are not sustainable. This, combined with the typically slow season during spring breakup has necessitated the reduction of three crews until demand returns. In the interim, the Company has built up significant finished frac sand inventory that is ready for sale and concentrated sand inventory ready to be processed and the 7P Plant is prepared to increase production as required.

Successful completion of Phase One was expected to lead to Phase Two which provides for the building of a wash plant in Wisconsin, US followed by Phase Three which provides for the construction of a second dry processing facility in Manitoba with a capacity of approximately 1,000,000 tpa. With the completion of Phase One, the Board of Directors has approved proceeding with Phase Two provided non-dilutive financing can be arranged. The uncertainty caused by the drop in the price of oil will make financing Phase Two more challenging.

**IMPAIRMENT ANALYSIS**

There has been no marked recovery in the metals markets and more general economic indicators except for a strengthening US dollar, a small increase in the nickel price and a reduction in the oil and gas prices. The Company performed a detailed impairment analysis on each of its E&E projects and the MP&D project as at December 31, 2014. The Company does not believe that there have been any material changes to date which would adversely affect this analysis. Furthermore there has been no change in management's plans for the projects which would cause a reassessment.

The challenge facing all junior mining companies remains to find financing for development of projects. This difficulty is not a reflection of the quality of the Company's projects but is indicative of a continued general malaise affecting the junior resources sector in general. The Company performed a detailed impairment analysis at the project level.

An initial indicator of impairment considers the market capitalization of a company compared with its net book value. At and around the end of December 2014, the Company's market capitalization was below its net book value – being approximately 20% of net book value which remained consistent from December 31, 2013. A 100% ratio would require a share price of approximately $0.09 (after retroactive effect of the Share Consolidation) which was most recently achieved in late 2011. However, many resource companies continue to experience similar

circumstances in present markets despite having good projects. In particular, the Company continues to note situations where a company's cash balances may exceed its market capitalization. An analysis was performed on each of the Company's E&E projects and the MP&D project.

The impairment analysis reviewed historic expenditures recorded on each project along with any purchase price allocations from acquisitions, reflected the existence of previous writedowns or reversals of impairment and also considered the existence of any economic studies which had been performed. The assumptions used in such studies were reviewed for such factors as: forecast metals prices, foreign exchange rates, changes in resource and/or cost estimates, changes in royalty arrangements, the existence of significant by-products and other matters as necessary. In addition, any third-party arrangements, such as the Lynn Lake option, were also taken into consideration.

Forecast metals prices were estimated from third-party sources such as analyst consensus reports and other available documentation which were considered to be reasonable by management. In particular, for the FS base case, long-term annual forecast nickel prices averaging $11.19 and an exchange rate of US$0.9116 : C$1.00 were used. Since the FS was performed, metals prices and exchange rates have changed. The Company continues to work on updating the FS for improved economics and announced updated resource estimates in 2011 as a result of the drilling performed in 2010.

For the purposes of impairment testing, the economic model in the FS was used as a base. The business model used in the FS and the intention of management is to develop and produce the nickel and frac sand co-product simultaneously. For the purposes of assessing the impairment of Minago, frac sand is treated as a raw material for sale into the market and is not processed to a finished product. This required elimination from the FS economic model of the following: processing plant capital, processing operating costs, transportation costs and the finished goods margin. This does not reflect how management intends to develop Minago, nor, in management's opinion, does it reflect how any other organization would develop the project.

In addition, adjustments were made for prices derived from the forecasted average of $9.29 for nickel and an exchange rate of US$0.80:C$1.00. A discount rate of 11% was used in the analysis and includes estimates for income taxes.

Capital and operating cost estimates generally were reduced from those used in historic studies if documentary evidence supporting such reductions had recently been obtained as part of the review work which had been undertaken for the Minago FS. For the Minago project in particular, the transformer commitment has been made at a much-reduced cost than was used in the FS. Used equipment prices cannot be typically reflected in a FS, as the market is unpredictable, except where firm pricing has been negotiated. Often cost estimates used in previous studies had been derived when such were universally recognized to be at historic highs. We have continued to see evidence of engineering firms broadly announcing price freezes. Experience

with equipment strategies at the 7P Plant has proved that good quality used equipment can be sourced and equipment financing is available. This represents an additional cost-saving opportunity which has not been quantified in the impairment analysis.

These factors resulted in a recoverable amount in excess of the book value of Minago. Accordingly, no impairment exists on the Minago project.

The impairment model is sensitive to several of the model key input variables. The following table indicates the estimated impact on the recoverable amount:

| Change in Model Key Input | Change in Recoverable Amount of Minago |
|---|---|
| Effect of: | |
| Increase discount rate by 1% | (55%) |
| Increase exchange rate by 0.05 | (65%) |
| Increase frac sand and nickel prices by 1% | 14% |
| Increase operating costs by 5% | (30%) |

Furthermore, management's intentions with respect to future expenditures and plans for the projects were considered. With the exception of some small projects, all projects have had recent expenditures and are considered to be active. All of the Company's projects were tested for impairment as at the balance sheet dates.

Management concluded that no impairment existed in each of its projects effective December 31, 2014 and that costs incurred to date are recoverable. The Company will continue to monitor developments as they occur in the metals markets and the economy and will update its impairment analysis to take account of any such changes, as appropriate.

## CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

Critical accounting estimates and judgements used in the preparation of the consolidated financial statements include determining the carrying value of investments, MP&D and E&E projects, assessing the impairment and classification of long-lived assets, determining the recoverability of deferred income tax assets, the valuation of the Participating Interest and the convertibility feature of the promissory notes, the valuation of share-based payments and the disclosure of contingencies and going concern matters. These estimates involve considerable judgement and are, or could be, affected by significant factors that are out of the Company's control.

For a complete list of the significant accounting policies as well as information concerning the use of estimates, judgements and measurement uncertainty, reference should be made to Note 3 to the Company's 2014 Audited Consolidated Financial Statements. The Company's financial statements have been prepared using the going concern assumption; reference should be made to Note 1 to the Company's 2014 Audited Consolidated Financial Statements.

The recorded value of the Company's E&E projects and the MP&D project is based on historic costs that are expected to be recovered in the future. The Company's recoverability evaluation is based on market conditions for minerals, underlying mineral resources associated with the properties and future costs that may be required for ultimate realization through mining operations or by sale. The Company is in an industry that is exposed to a number of risks and there is always the potential for a material adjustment to the value assigned to these assets. Such risks also extend to the evaluation of fair values of net assets upon acquisition.

The value of the Participating Interest is a significant estimate which uses a model of estimated cash flows and applies probability-weighted estimates to the model. Assumptions are made about the phase at which the frac sand business will be when payments are being made as well as production costs and volumes and sales prices and volumes.

The fair value of the stock options and warrants, as well as the embedded option derivative in the promissory note, is calculated using the Black-Scholes option-pricing model that takes into account the exercise price, expected life of the option/warrant, expected volatility of the underlying shares, expected dividend yield, and the risk-free interest rate for the term of the option/warrant or embedded option derivative.

The Company has determined that it is highly probable that Victory Nickel will generate returns sufficient to utilize its taxable losses prior to their expiry. This is a significant judgement that, dependent upon future events, may turn out to be incorrect. Presently, since Victory Silica is not revenue-generating, a full valuation allowance has been recorded against losses incurred in that subsidiary. The Company will monitor any changes in circumstances which could require a reversal of the valuation allowance.

## NEW ACCOUNTING POLICIES

IFRS issued by the International Accounting Standards Board ("IASB") have been adopted in the Company's 2014 Audited Consolidated Financial Statements. Note 3 to those statements include the accounting policies that have been applied.

## FUTURE ACCOUNTING CHANGES

### New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued no new and revised standard and interpretations which are applicable to the Company or which have caused changes to its accounting policies. Refer to Note 3 to those statements.

## CORPORATE GOVERNANCE

The Company's Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of directors, none of whom are employees or officers of the Company, meets with management to review the

2014 Audited Consolidated Financial Statements to satisfy itself that management is properly discharging its responsibilities to the directors who approve the financial statements. The Board of Directors has also appointed compensation and corporate governance and nominating committees composed of non-executive directors.

**Evaluation of Disclosure Controls and Procedures**

The Company's Chief Executive Officer and Chief Financial Officer, (collectively, the "Certifying Officers"), are responsible for designing a system of disclosure controls and procedures, or causing them to be designed under their supervision, to provide reasonable assurance that information required to be disclosed in reports filed with or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities laws and that material information relating to the Company is made known to them with respect to financial and operational conditions to allow timely decisions regarding required disclosure. For the fiscal year ended December 31, 2014, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's disclosure controls and procedures as defined under the rules adopted by the Canadian securities regulatory authorities. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's disclosure controls and procedures were effective as at December 31, 2014. Such controls are facilitated by the small size of the Company's senior management team and their access to material information.

There were no changes to the Company's disclosure controls and procedures that occurred during the year ended December 31, 2014 that materially affected, or are reasonably likely to affect, the Company's disclosure controls and procedures.

**Evaluation of Internal Control over Financial Reporting**

The Company's Certifying Officers are responsible for designing a system of internal controls over financial reporting, or causing them to be designed under their supervision, to provide reasonable assurance regarding the reliability of financial reporting and preparation of consolidated financial statements for external purposes in accordance with Canadian GAAP. The Company used the COSO (1992) control framework and is in the process of updating its methodology to incorporate the COSO (2013) framework into its analyses for the future. The COSO Board has made the COSO (1992) framework available for use until an unspecified date at which point it is expected to be considered superseded. For the fiscal year ended December 31, 2014, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's internal control over financial reporting. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's internal controls over financial reporting and procedures were effective as at December 31, 2014.

During the year, the Company made improvements to the controls over financial reporting as part of its continuous improvement process and as part of its frac sand initiative. As may reasonably be expected, the entry into a new business requires new processes and controls which evolve as the business matures. As the frac sand business is still in the very early stages of the project initiative, changes in day-to-day operations are being experienced and therefore, the processes and controls required are still evolving. Controls around processes that have material impact to the financial statements such as Sales and Inventory are not operating in accordance to the design of the Company's internal control. As a result, mitigating controls for these processes were implemented and reliance was placed on these mitigating controls by management and will continue to be until the frac sand business matures.

In particular, certain inventory components were not measured adequately at the December 31, 2014 inventory count. In order to address this, a second inventory count including all the appropriate measurements was performed in the first quarter of 2015 and was rolled back to December 31, 2014 to support the quantities of all inventory components at that date. Apart from inconvenience and a relatively small extra cost, there was no loss to the Company as a result of this. The failure in the designed internal control was identified by management and was fully remediated through implementation of a mitigating control. This is not expected to be a recurring situation.

The management of the Company was required to apply its judgement in evaluating the cost-benefit relationship of possible controls and procedures. The result of the inherent limitations in all control systems means no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected.

There were no changes to the Company's internal controls over financial reporting that occurred during the quarter ended December 31, 2014 that materially affected, or are reasonably likely to affect, the Company's internal controls over financial reporting. However, reliance was placed on mitigating controls around processes that are currently still evolving to reduce risk of material misstatement on the financial statements to an acceptable level.

## TRANSACTIONS WITH RELATED PARTIES AND MANAGEMENT AGREEMENT WITH NUINSCO RESOURCES LIMITED

### Related Party Balances and Transactions for Services

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 19 and 21 to the 2014 Audited Consolidated Financial Statements). Payables to key management personnel generally relate to directors' fees, consulting fees, and expense reimbursements.

Balances and transactions with related parties as at and for the year ended December 31, 2014 and 2013 are shown in the following tables:

| As at December 31, | | 2014 | | 2013 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **251** | $ | 112 |

Key management personnel compensation comprises:

| Years ended December 31, | | 2014 | | 2013 |
|---|---|---|---|---|
| Short-term employee benefits | **$** | **891** | $ | 924 |
| Share-based payments - options | | **233** | | 115 |
| Share-based payments - Share Bonus Plan | | **-** | | 64 |
| | **$** | **1,124** | $ | 1,103 |

## Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director, being Mr. René Galipeau. As described earlier in Note 16 to the 2014 Audited Consolidated Financial Statements, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the management agreement will cease around the end of February 2015. The Company expects to continue to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at and for the years ended December 31, 2014 and 2013 are shown in the following tables:

| | | December 31, 2014 | | December 31, 2013 | | January 1, 2013 |
|---|---|---|---|---|---|---|
| **Balances Outstanding under the Management Agreement** | | | | | | |
| Payable to Nuinsco Resources Limited | **$** | **45** | $ | 53 | $ | - |
| Receivable from Nuinsco Resources Limited | **$** | **-** | $ | - | $ | 37 |

| Years ended December 31, | | 2014 | | 2013 |
|---|---|---|---|---|
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **671** | $ | 733 |
| Overhead charges to Nuinsco Resources Limited | **$** | **-** | $ | 17 |
| Project costs charged to Nuinsco Resources Limited | **$** | **21** | $ | 36 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **70** | $ | 29 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis.

**Balances and Transactions with Nuinsco under the Amended Loan/Participating Interest**

The terms of the Participating Interest are described in Note 16 to the 2014 Audited Consolidated Financial Statements as well as in the Liquidity and Capital Resources section of this MD&A. A summary of the balances and transactions related thereto is included in the table and accompanying note below:

| **Participating Interest** | **December 31, 2014** | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Advance for working capital | **$ 940** | $ 940 | $ 1,005 |
| Advance under Amended Loan for standby commitment | **1,135** | 1,135 | - |
| Accrued interest payable | **-** | - | 8 |
| Aggregate advances | **2,075** | 2,075 | 1,013 |
| Less: settled in Units of Victory Nickel | **(1,135)** | (1,135) | - |
| Less: unamortized loan fees | **(51)** | (185) | - |
| | **889** | 755 | 1,013 |
| Change in fair value | **2,875** | 3,100 | - |
| Effect of foreign exchange | **(216)** | - | - |
| **Participating Interest** | **$ 3,548** | $ 3,855 | $ 1,013 |
| Current portion - due within one year [1] | **$ -** | $ - | $ 1,005 |
| Long-term portion [2] | **3,548** | 3,855 | 8 |
| **Participating Interest** | **$ 3,548** | $ 3,855 | $ 1,013 |

The Company accrued $11,000 commitment fees payable in shares to Nuinsco upon the final advance under the Amended Loan and these are included in *Finance costs*. In December 2014, the Company issued 18,268 common shares to settle the commitment fees owed to Nuinsco. Victory Nickel paid interest of $46,000 for the year ended December 31, 2014 (December 31, 2013 - $115,000 of which $9,000 related to 2012 was paid in the first quarter of 2013).

## OUTSTANDING SHARE DATA

As at March 31, 2015, the Company had 57,634,578 common shares issued and outstanding. In addition, there were 3,036,000 stock options and 10,799,935 warrants outstanding which, if exercised and issued, would bring the fully diluted issued common shares to a total of 71,470,513 and would generate cash of approximately C$5,510,000. However, none of the options are “in the money”, all the warrants are exercisable.

## RECENT DEVELOPMENTS

On October 1, 2014, the Company completed the arrangement of short-term financing by way of a promissory note amounting to $2,000,000. The promissory note has been fully drawn down.

The promissory note bears interest at an annual rate of 28% and was originally due on December 1, 2014. The lender has agreed to several monthly extensions upon payment of extension fees and penalties. On January 31, 2015, February 6, 2015, and February 27, 2015 the Company repaid $500,000, $250,000 and $250,000 respectively. A fourth amendment extended the short-term loan to March 31, 2015 under similar terms. The balance owing is $1,000,000.

On March 31, 2015, the Company agreed an additional extension of the short-term loan with the lender. The balance outstanding is $1,000,000 and is now due on or before April 30, 2015 under similar terms. On March 31, 2015, the Company paid an extension fee of $10,000 along with a penalty for not repaying the amount originally due on March 31, 2015 of $15,000.

## RISKS AND UNCERTAINTIES

The exploration and development of natural resources are speculative activities that involve a high degree of financial risk. Additionally, there are specific risks related to the Company's presence in the frac sand market. The risk factors which should be taken into account in assessing Victory Nickel's activities and an investment in its securities include, but are not necessarily limited to, those set out in detail below.

The relative significance of each risk described below will vary as a function of several factors including, but not limited to, the state of the economy, the stage of Victory Nickel's projects, the availability of financing on acceptable terms and other matters.

Any one or more of these risks could have a material adverse effect on the value of any investment in Victory Nickel and the business, financial condition, operating results or prospects of Victory Nickel and should be taken into account in assessing Victory Nickel's activities.

### Financial and Investment Risks

#### *Going Concern*

None of the Company's mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, and the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. The Company's 7P Plant completed commissioning during the third quarter 2014 and is capable of producing at a commercial level. However, the recent decrease in drilling activity due to the decrease in the price of oil, may delay the Company's ability to generate sufficient cash flow to meet operating requirements.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of

resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to the financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

***Substantial Capital Requirements***

Victory Nickel will have to make substantial capital expenditures for the development of, and to achieve production from, its nickel projects. Production will only be reached a number of years following the start of development. Until that time, the Company is reliant on cash flows generated by its nascent frac sand business, on the equity markets and asset sales to generate cash for ongoing operations and programs. There can be no assurance that any debt or equity financing or cash generated by operations or asset sales will be available or sufficient to meet these requirements or for other corporate purposes or, if debt or equity financing is available, that it will be on terms acceptable to Victory Nickel. Moreover, future activities may require Victory Nickel to alter its capitalization significantly. The inability of Victory Nickel to access sufficient capital for its operations could have a material adverse effect on its financial condition, results of operations or prospects. Flow-through financing cannot be used to fund the Company's corporate costs.

The 7P Plant has been substantially completed. Future capital requirements for the 7P Plant are not expected to be significant. However, future phases will require additional capital; these phases are independent of the 7P Plant. This capital requirement may be in excess of the net funds generated by the business. The frac sand operations have ongoing requirements for working capital financing. There is a risk that sufficient working capital financing may not be available at suitable prices.

The Company recognizes the imminent cash requirement to repay debt and is actively considering restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

***Market Perception***

Market perception of junior exploration, development and mining companies may continue to shift such that these companies are viewed even less favourably. This factor could impact the

value of investors' holdings and Victory Nickel's ability to raise further funds by issue of additional securities or debt.

By entering the frac sand market and becoming an operating company with operating cash flows, Victory Nickel is attempting to distinguish itself from other juniors. This represents a risk in itself.

***Metal and Frac Sand Prices***

There is no assurance that, even if commercial quantities of mineral resources are developed, a profitable market will exist for the sale of such product. Nickel and by-product prices fluctuate on a daily basis and are affected by numerous factors beyond Victory Nickel's control – including factors which are influenced by worldwide circumstances. The level of interest rates, the rate of inflation, world supply and demand for commodities and stability of exchange rates can all cause significant fluctuations in commodity prices. Such external economic factors are in turn influenced by changes in international investment patterns and monetary systems and political developments. The prices of nickel and by-products have historically fluctuated widely and future price declines could cause commercial production to be uneconomical and such fluctuations could have a material adverse effect on Victory Nickel's business, financial condition and prospects. As Victory Nickel has historically been in the exploration and development stage, the above factors have had no material impact on present operations but were considered in evaluating the impairment of long-lived assets. However, these factors are of significant importance for the FS and decisions related thereto as well as being important to the developing frac sand business.

The business case developed to support the Company's entry into the frac sand business made significant assumptions on pricing of frac sand as well as for important cost elements of production and transportation. While many of the important costs have been fixed contractually, the price for frac sand sales is subject to market forces beyond the Company's control. The impact of the oil and gas pricing cycle is uncertain.

***Areas of Investment Risk***

The common shares of Victory Nickel are listed on the TSX. The share prices of publicly-traded companies can be volatile as the price of shares is dependent upon a number of factors, some of which are general or market or sector specific and others that are specific to Victory Nickel.

The market for shares in small public companies is less liquid than for large public companies. Investors should be aware that the value of the Company's common shares may be volatile and may go down as well as up and investors may therefore not recover their original investment.

The market price of the Company's common shares may not reflect the underlying value of Victory Nickel's net assets or its ongoing operations. The price at which investors may dispose of their securities may be influenced by a number of factors, some of which may pertain to Victory Nickel and others of which are extraneous. On any disposal of their common shares, investors may realize less than the original amount invested.

## Industry Risks

### *Speculative Nature of Mineral Exploration*

Mineral exploration is highly speculative in nature, involves many risks and frequently is non-productive. There is no assurance that Victory Nickel's exploration efforts will be successful. Few properties that are explored are ultimately developed into economically-viable operating mines. Success in establishing reserves is a result of a number of factors, including the quality of Victory Nickel's management, level of geological and technical expertise, the quality of land available for exploration and other factors. Once mineralization is discovered, it may take several years in the initial phases of drilling until production is possible, during which time the economic feasibility of production may change. Substantial expenditures are required to establish proven and probable reserves through drilling to determine the optimal extraction method for the ore and the metallurgical process to extract the metals from the ore and, in the case of new properties, to construct mining and processing facilities. It is possible that even preliminary due diligence will show adverse results, leading to the abandonment of projects. It is impossible to ensure that preliminary feasibility studies or full feasibility studies, such as has been released with respect to Minago, on Victory Nickel's projects or the current or proposed exploration programs on any of the properties in which Victory Nickel has exploration rights will result in a profitable commercial mining operation. As a result of these uncertainties, no assurance can be given that Victory Nickel's exploration programs will result in the establishment or expansion of resources or reserves.

### *Evaluation and Development Projects*

In general, evaluation and development projects have no operating history upon which to base estimates of future cash operating costs. For evaluation and development projects such as the mineral resource properties owned by Victory Nickel, estimates of proven and probable reserves are, to a large extent, based upon the interpretation of geological data obtained from drill holes and other sampling techniques and feasibility studies. This information is used to calculate estimates of the capital cost, cash operating costs based upon anticipated tonnage and grades of ore to be mined and processed, the configuration of the ore body, expected recovery rates, comparable facility and equipment operating costs, anticipated climatic conditions and other factors. In addition, there remains to be undertaken certain feasibility and/or development preparation work on the projects that could adversely impact estimates of capital and operating costs required for the development of the projects. Costs necessary to develop the projects could be significant and will have a direct impact on the economic evaluation of the projects. As a result, it is possible that the actual capital cost, cash operating costs and economic returns of the projects may differ from those currently estimated. The costs estimated under the FS for Minago differed from the PEA and may differ again upon actual development.

### *Frac Sand Industry*

Frac sand processing is a new business for Victory Nickel. The industry is closely linked to the oil and gas industry and is therefore affected by economic factors impacting that industry,

including the effect of future cycles based on historic experience. Demand for frac sand is influenced by many factors, including: global and regional economic and political events and conditions, fluctuations in pricing and availability of oil and gas and other energy sources, demand for oil and gas products, demand for cars and other vehicles, technological innovation impacting alternative energy sources, changes in the regulatory framework for mining and processing frac sand and the hydraulic fracturing industry. The oil and gas industry can be prone to sudden, unexpected production slowdowns which may impact exploration, development, production and well completion activities. These factors, such as the recent unprecedented drop in the price of oil, cannot readily be predicted or controlled. Negative developments could cause the demand for frac sand products to decline which could have adverse effects on business, financial condition, results of operations, cash flows and prospects.

With respect to the frac sand industry itself, risks include: changes in transportation availability and pricing, inclement or hazardous weather conditions from flooding or climate change, environmental hazards, industrial accidents, changes in the regulatory framework impacting mining, processing and the fracking industries in both Canada and the US, inability to procure sand in the required quantities or qualities, inability to obtain replacement parts or equipment on a timely basis, reduction in the availability of water for processing, inability to hire, train and retain qualified staff at acceptable rates; and other technical difficulties or failures. Any prolonged downtime could impact deliveries and reputation.

The fracking industry has been hailed as significantly contributing to North America's energy self-sufficiency. A combination of techniques is used, any changes impacting the use of frac sand as a proppant through regulation or technological innovation may negatively impact the frac sand industry. In addition, heightened political, regulatory and public scrutiny of hydraulic fracturing practices could potentially expose the Company or its customers to increased legal and regulatory proceedings, and any such proceedings could be time-consuming, costly or result in substantial legal liability or significant reputational harm.

***Competition***

The mineral exploration business is highly competitive in all of its phases. Victory Nickel competes with numerous other companies and individuals, including competitors with greater financial, technical and other resources than Victory Nickel, in the search for and acquisition of exploration and development rights on attractive mineral properties. Victory Nickel's ability to acquire exploration and development rights in the future will depend not only on its ability to develop the properties on which it currently has exploration and development rights, but also on its ability to select and acquire exploration and development rights on other suitable properties. There is no assurance that Victory Nickel will compete successfully in acquiring exploration and development rights on such other properties or in securing customers, sand supplies or other resources such as transportation.

Victory Nickel also faces competition in the frac sand market with respect to its frac sand business and there is no assurance that Victory Nickel will compete successfully processing and

selling frac sand in such market. Frac sand is a proppant used in the completion and re-completion of oil and natural gas wells to stimulate and maintain oil and natural gas production through the process of hydraulic fracturing. Frac sand is the most commonly used proppant and is less expensive than other proppants, such as resin-coated sand and manufactured ceramics. A significant shift in demand from frac sand to other proppants, or the development of new processes to replace hydraulic fracturing altogether, could cause a decline in the demand for the frac sand the Company processes and result in a material adverse effect on the Company's financial condition and results of operations. If significant new reserves of raw frac sand are discovered and developed, and those frac sands have similar characteristics to the raw frac sand processed by the Company, the Company's ability to maintain or acquire contracts may be negatively impacted which could have a material adverse effect on the Company's results of operations and cash flows over the long term. Additionally, quality sand supply is a limited resource and the presently-identified sources are a significant distance away from the 7P Plant which provides logistical challenges in securing timely railcar and other transportation at acceptable prices.

**Operational Risks**

***Limited History of Operations***

Victory Nickel has no history of earnings and limited financial resources. Victory Nickel currently has no operating mines and its ultimate success may depend on the ability of active mining operations to generate cash flow in the future, as well as its ability to access capital markets for its development requirements. There is no assurance that Victory Nickel will earn profits in the future. Significant capital investment will be required to achieve commercial production at Victory Nickel's existing nickel projects. There is no assurance that Victory Nickel will be able to raise the required funds to continue these activities.

In particular, frac sand processing represents a new initiative for Victory Nickel which is expected to generate significant cash flow for the Company, if successful. While the Company believes it has mitigated the risks of entering a new market through the hiring of experienced personnel, there is no assurance that this initiative will be successful.

***Frac Sand Processing Operations***

The 7P Plant is freshly-built. Production risks might be expected to be higher for a new operation than one which has been in operation routinely. However, a new plant may have a reduced risk profile as far as reliability is concerned. Refurbishment of equipment may be more risky than acquiring new plant. Despite hiring experienced management, many new operators have been hired, while risks have been mitigated by training, it is possible that early production may experience excessive downtime. The availability of suitably-qualified staff at acceptable prices also represents a risk.

The procurement, production and delivery of frac sand can be logistically complex – transportation costs represent a significant portion of frac sand costs. Unavailability of appropriate transportation and rail cars or lines on a timely basis may impact turnaround and

cause delays in deliveries. Changes in respective transportation costs or decreases in dependability may also impair the Company's ability to receive and/or deliver product with adverse effects on costs, revenues and reputation. Further, changes to logistics to reflect changed demand may not be able to occur on a timely basis, resulting in adverse effects on the cost profile.

Processing frac sand includes substantial costs for energy – electricity and gas – as well as water. Problems in securing sufficient energy supply at appropriate prices would have impact on operating costs and the ability to recover those increased costs may be impaired.

The specifications for frac sand are detailed; maintaining a robust quality control process is key to producing a high-quality product. Failure to do so could cause lost revenues and lost reputation.

***Development Targets, Permitting and Operational Delays***

There can be no assurance that Victory Nickel will be able to complete the planned development of its projects on time or on budget due to, among other things, delays in receiving required consents, permits and registrations, the delivery and installation of plant and equipment and cost overruns, or that the current personnel, systems, procedures and controls will be adequate to support Victory Nickel's operations. Any failure to meet development targets or other operational delays or inadequacies could have a material adverse effect. In particular, the Minago EAL was granted for a three-year period and expired on August 22, 2014. There is no guarantee that development work will commence on or before that date or that an extension will be granted. The Company believes that it has mitigated this risk through work performed on relocating tailings impoundments and the regulatory filings related thereto should either represent development or should extend the expiry.

The Company's frac sand business in its present phase, is reliant upon a third-party supplier of sand; any difficulties the supplier experiences with respect to securing, maintaining or extending permits for its properties and operations including appropriate water rights, may have adverse effects on the supply of sand.

***Resources and Reserves***

The figures for mineral resources and mineral reserves are estimates and no assurance can be given that the anticipated level of recovery and/or grades of mineral reserves or mineral resources will be realized. Moreover, short-term operating factors relating to ore reserves and resources, such as the need for orderly development of an ore body or the processing of new or different ore grades, may cause a mining operation to be unprofitable in any particular accounting period.

The Company's frac sand business in its present phase is reliant upon a handful of suppliers for its product. The Company has no resources or reserves of its own that can presently be exploited; although it recently announced reserves on the Bear Coulee option in Wisconsin.

Permitting this property for production is expected to take one to two years. The frac sand resource at Minago is not contemplated to be developed until either Phase Three of the frac sand initiative or as part of the Minago FS which requires significant financing to be developed.

***Title Risks***

Victory Nickel's ability to hold various mineral rights require licences, permits and authorizations and, in some cases, renewals of existing licences, permits and authorizations from various governmental and quasi-governmental authorities. Management believes that Victory Nickel currently holds or has applied for all necessary licences, permits and authorizations to carry on the activities which Victory Nickel is currently conducting and to hold the mineral rights Victory Nickel currently holds under applicable laws and regulations in effect at the present time. Management also believes that Victory Nickel is complying in all material respects with the terms of such licences, permits and authorizations. However, Victory Nickel's ability to obtain, sustain or renew such licences, permits and authorizations on acceptable terms is subject to changes in regulations and policies and to the discretion of the applicable governmental and quasi-governmental bodies.

***Insurance Risk***

Victory Nickel faces all of the hazards and risks normally incidental to the exploration and development of base metals, any of which could result in damage to life or property, environmental damage and possible legal liability for any or all such damage caused. Victory Nickel's activities may be subject to prolonged disruptions due to weather conditions depending on the location of operations in which Victory Nickel has interests; not all such risks are insurable.

Similarly, the frac sand processing plant faces many hazards and risks arising from the transportation and processing of frac sand materials, any of which could result in the matters described above. Again, not all such risks are insurable.

**Regulatory Risks**

***Government Regulation***

Existing and possible future environmental and social impact legislation, regulations and actions, including the regulation of air and water quality, mining reclamation, solid and hazardous waste handling and disposal, the promotion of occupational health and safety, the protection of wildlife and ecological systems and the protection of the societies and communities of indigenous peoples, could cause significant expense, capital expenditures, restrictions and delays in activities, the extent of which cannot be predicted and which may well be beyond Victory Nickel's capacity to fund. Environmental laws are becoming more stringent and actively enforced. Environmental and social impact studies may be required for some operations and significant fines and clean-up responsibilities may be assessed for companies causing damage to the environment in the course of their activities.

### *Economic, Political, Judicial, Administrative, Taxation or Other Regulatory Factors*

Victory Nickel may be adversely affected by changes in economic, political, judicial, administrative, taxation or other regulatory factors in the areas in which Victory Nickel does or will operate and holds its interests, as well as unforeseen matters. In particular, the fracking industry is often at the forefront of public attention whether or not deserved. Nonetheless, this provokes attention and scrutiny.

## Other Risks

### *Environmental and Health Risks*

The Company has no significant exposure to environmental or health risks from its exploration and development activities, although this will change as the Company's projects approach production (a normal characteristic of mineral industry projects). Lynn Lake, acquired pursuant to a takeover bid and recently subject to option with Corazon, is a former operating mine; however indemnifications exist from the Manitoba Government with respect to any pre-existing environmental concerns at that property.

The frac sand operation involves processing silica sand. In addition to environmental regulation, the Company is subject to laws and regulations relating to human exposure to crystalline silica under the *Occupational Health and Safety Act*. Workplace exposure to crystalline silica is monitored; the occupational exposure limits in Alberta for respirable crystalline silica are among the lowest in Canada and the US.

### *Key Personnel*

Victory Nickel relies on a limited number of key consultants and senior management and there is no assurance that Victory Nickel will be able to retain such key consultants or other senior management. The loss of one or more such key consultants or members of senior management, if not replaced, could have a material adverse effect on Victory Nickel's business, financial condition and prospects. Directors and management had previously accepted deferrals of remuneration in order to assist the Company through the economic turmoil; however, this potentially adds to the risk of losing experienced personnel.

### *Conflicts of Interest*

Certain of the Company's directors and officers are also directors and officers of other natural resource companies. Consequently, there exists the possibility for such directors and officers to be in a position of conflict. Any decision made by any of such directors and officers relating to Victory Nickel will be made in accordance with their duties and obligations to deal fairly and in good faith with Victory Nickel and such other companies.

### *Investments and Other Agreements with Resource Companies*

In addition, Victory Nickel makes, from time to time, investments in the common shares of publicly-traded companies in the junior natural resources sector or may enter into option or other agreements therewith. These companies are subject to similar risks and uncertainties as is Victory Nickel, and Victory Nickel's investments in and agreements with these companies are

subject to similar areas of risk as noted above. Victory Nickel seeks to manage its exposure by ensuring that appropriate recourse is included in such agreements upon the counterparty's or assignee's failure to meet contractual obligations.

**Summary**

The future success of the Company is subject to a number of risk factors that are common to the junior natural resources sector and is now exposed to risks associated with frac sand production. These include the extent to which it can outline natural resources on its properties and establish the economic viability of developing those properties and the political, economic and legislative stability of the territories in which the Company's interests are located. Another significant factor is the ability of the Company to obtain necessary financing or to find strategic partners to fund expenditure commitments as they fall due, as the Company currently has limited funds. Furthermore, the development of any nickel resource interest may take years to complete and the resulting income, if any, from the sale of any nickel or by- or co-products produced by the Company is largely dependent upon factors that are beyond its control, such as costs of development, operating costs and the market value of the end product.

The Company has attempted to mitigate some of the risks associated with securing financing through its entry into the frac sand processing business. This is expected to generate significant cash flows to the Company and should enable it to become financially stable. In turn, this could be leveraged to assist in securing funds to ultimately develop Minago. However, the frac sand business also has its own set of risks as indicated earlier, and of which investors should be aware.

## FORWARD-LOOKING STATEMENTS

**Forward-Looking Information:** This MD&A contains forward-looking information. All statements, other than statements of historic fact, that address activities, events or developments that the Company believes, expects or anticipates will or may occur in the future (including, without limitation, statements regarding estimates and/or assumptions in respect of production, revenue, cash flow, costs, economic return, net present value, mine life and financial models, mineral resource estimates, potential mineralization, potential mineral resources, timing of possible production and the Company's development plans and objectives) constitute forward-looking information. This forward-looking information reflects the current expectations or beliefs of the Company based on information currently available to the Company. Forward-looking information is subject to a number of risks and uncertainties that may cause the actual results of the Company to differ materially from those discussed in the forward-looking information, and even if such actual results are realized or substantially realized, there can be no assurance that they will have the expected consequences to, or effects on the Company.

Factors that could cause actual results or events to differ materially from current expectations include, among other things: uncertainty of estimates of capital and operating costs, production estimates and estimated economic return; the possibility that actual circumstances will differ from estimates and assumptions; uncertainties relating to the availability and costs of financing

needed in the future; failure to establish estimated mineral resources; fluctuations in commodity prices and currency exchange rates; inflation; recoveries being less than those indicated by the testwork carried out to date (there can be no assurance that recoveries in small scale laboratory tests will be duplicated in large tests under on-site conditions or during production); changes in equity markets; operating performance of facilities; environmental and safety risks; delays in obtaining or failure to obtain necessary permits and approvals from government authorities; unavailability of plant, equipment or labour; inability to retain key management and personnel; changes to regulations or policies affecting the Company's activities in exploration and development and the frac sand processing business; the uncertainties involved in interpreting geological data; and the other risks disclosed under the heading "Risks and Uncertainties" and elsewhere. Any forward-looking statement speaks only as of the date on which it is made and, except as may be required by applicable securities laws, the Company disclaims any intent or obligation to update any forward-looking information, whether as a result of new information, future events or results or otherwise. Although the Company believes that the assumptions inherent in the forward-looking information are reasonable, forward-looking information is not a guarantee of future performance and accordingly undue reliance should not be put on such information due to the inherent uncertainty therein.

**Annual MD&A, Fiscal year ended December 31, 2013 (Dated March 31, 2014)**
**For the Years ended December 31, 2013 and 2012**

The following discussion of the results of operations, financial condition and cash flows of Victory Nickel Inc. (“Victory Nickel” or the “Company”) prepared as of March 31, 2014 consolidates management’s review of the factors that affected the Company’s financial and operating performance for the years ended December 31, 2013 and 2012, and factors reasonably expected to impact on future operations and results. This discussion is intended to supplement and complement the Company’s audited consolidated financial statements for the years ended December 31, 2013 and 2012 (“2013 Audited Consolidated Financial Statements”) and the notes thereto which were prepared in accordance with International Financial Reporting Standards (“IFRS” or “GAAP”).

Certain information and discussion included in this management’s discussion and analysis (“MD&A”) constitutes forward-looking information. Readers are encouraged to refer to the cautionary notes contained in the section Forward-Looking Statements at the end of this MD&A.

The 2013 Audited Consolidated Financial Statements are available at www.sedar.com and at the Company’s website www.victorynickel.ca. All amounts disclosed are in Canadian dollars unless otherwise stated. All tabular amounts are in thousands of Canadian dollars.

## COMPANY OVERVIEW

Victory Nickel is a Canadian exploration and development mineral resource company and is primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada and is preparing to enter the oilfield services market via the sale of frac sand.

Formed on February 1, 2007, Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Wellgreen Platinum Ltd. ("Wellgreen" – formerly Prophecy Platinum Corp. "Prophecy Platinum") and Mel projects in Manitoba and the Lac Rocher project in Québec. The results of a feasibility study on the Minago Project ("FS") were announced in December 2009, the Environmental Impact Study ("EIS") was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Environmental Act Licence ("EAL") was announced in August 2011. A preliminary economic assessment of Lac Rocher ("PEA") was announced in November 2008. At the Mel project, now 100%-owned, ongoing updating of data is being conducted; when completed, additional modelling of the resource will be continued.

A significant product of the Minago project is frac sand. Frac sand is a silica sand meeting certain specifications and is used in drilling for oil and gas. On June 19, 2012, the Company announced the creation of Victory Silica Ltd. ("VSL" or "Victory Silica") a wholly-owned subsidiary that has been established to manage the Company's entry into and future operation of the frac sand distribution and sales market. The Company expects to establish itself as a frac sand provider by acquiring concentrated sand in Wisconsin, US and processing it into finished frac sand product at its 500,000 ton per annum ("tpa") frac sand processing plant at Seven Persons near Medicine Hat, Alberta (the "7P Plant"), for sale initially in the Alberta, Saskatchewan, Manitoba and North Dakota markets. If successful, this strategy is expected to generate significant cash flow for Victory Nickel prior to development and sale of frac sand from its Minago project. The 7P Plant processed its first sand for delivery during the week commencing March, 24, 2014.

**Option of Lynn Lake Property**

On October 21, 2009, the Company announced that it had optioned its Lynn Lake property ("Lynn Lake") to Prophecy Coal Corp. In 2011, the agreement, with the consent of Victory Nickel, was assigned to Prophecy Platinum pursuant to a corporate transaction between Prophecy Coal and Prophecy Platinum. As at December 31, 2012, the sole remaining term of the original agreement wherein Prophecy Platinum, now Wellgreen, could acquire a 100% interest in Lynn Lake was the payment of $1,000,000 due on or before March 1, 2013.

On March 1, 2013, the Company agreed to an additional amendment to the option agreement which allows Wellgreen to make a series of payments through 2013 and 2014 aggregating $1,125,000 in satisfaction of the remaining option conditions (the "Amended Option"). On March 1, 2013, the Company received the first payment of $125,000; a further $125,000 was received in May, $150,000 in September and $175,000 remained due by the end of 2013 with an additional $550,000 being payable by August 29, 2014. On March 18, 2014, Wellgreen formally confirmed it had terminated the option agreement and has vacated the Lynn Lake property. It is in the process of returning exploration data and various associated materials to the Company.

Prior to that time, because of the stage of the option agreement, the Company had ceased to consider Lynn Lake to be a material project.

On June 14, 2013, the Company announced the terms of a rights offering to existing shareholders to raise gross proceeds of up to approximately $2,700,000. The rights offering closed on July 30, 2013 and raised gross proceeds of $2,400,000 (excluding any potential proceeds from the exercise of the warrants). Accordingly, the Company issued 100,000,000 shares and 100,000,000 share purchase warrants. Each warrant entitles the holder to purchase one common share at a price of $0.035 during the 12-month period beginning July 31, 2014.

The proceeds of the rights offering included the exercise of the backstop contemplated in the Amended Loan described below. Upon exercise of the backstop and exercise of existing rights, Nuinsco Resources Limited ("Nuinsco" or the "Lender") increased its shareholding in the Company to approximately 12.24%, thereby becoming a related party of the Company. In September, 2013, the Company closed a private placement which raised gross proceeds of $300,000 through the issuance of 12,500,000 common shares and 12,500,000 share purchase warrants which entitle the holder to purchase one common share at a price of $0.035 for a two-year period.

On November 11, 2013, the Company issued an unsecured convertible promissory note for US$2,000,000 (the "Convertible Note"). The Convertible Note has a term of two years, bears interest at 14.8% calculated on a monthly basis and settled quarterly and may be converted in whole or in part, at any time, at the option of the holder into Victory Nickel shares at a conversion price of $0.10 per share.

**Going Concern**

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Advancing the Company's projects through exploration and development to the production stage will require significant financing. Refer to the Risks and Uncertainties and Liquidity and Capital Resources sections for additional information.

None of the Company's exploration and development projects has commenced commercial production and, accordingly, the Company is presently dependent upon debt and/or equity financings and the optioning and/or sale of resource or resource-related assets for its funding. The recoverability of the carrying value of the Company's mine property and development project and exploration and evaluation projects, and ultimately the Company's ability to continue as a going concern, is dependent upon factors including exploration results which indicate the potential for the discovery of economically recoverable reserves and resources, the Company's ability to finance exploration and development of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for

its funding. As at the date of this report, the Company has begun commissioning the 7P Plant and anticipates generating cash flow from the Frac Sand segment in 2014. The Company is at the cusp of having an operating activity being the Frac Sand segment which is expected to generate significant cash flows for the Company.

The Company's 2013 Audited Consolidated Financial Statements have been prepared using the going concern assumption which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at December 31, 2013, the Company had working capital of $465,000, (December 31, 2012 – working capital deficiency of $583,000; this included approximately $176,000 of agreed-upon deferrals owing to directors and senior management and accounts payable of $118,000 subsequently settled in the Company's common shares post year-end). Working capital is defined as current assets less current liabilities. Effective December 31, 2012, GAAP required the Company to treat $1,000,000 of the long-term loan due January 31, 2015 as current since the Lender had the right to require prepayment from the Lynn Lake option receipts to be received in the future. Given the termination of the option agreement, this reclassification is no longer applicable. The Company considers that working capital, combined with funds remaining from the convertible promissory notes entered into in 2014 to date and other financing initiatives underway should be sufficient to fund the Company's activities. However, should the Company not be able to continue to obtain the necessary financing, achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

**HIGHLIGHTS**

During and subsequent to the year ended December 31, 2013, the Company:

**Corporate**

- Completed:
  - a loan agreement for $1,000,000 (the "Facility") with Nuinsco which was subsequently increased by up to $2,000,000 (the "Amended Loan") to be used for capital expenditures related to the 7P Plant.
  - private placement financings aggregating approximately $2,509,000.
  - a rights offering to existing shareholders which closed on July 30, 2013 and raised gross proceeds of $2,400,000.
  - the Convertible Note for US$$2,000,000 – part of an umbrella $5 million approval; and.
  - additional financing under the umbrella of $2,190,000.
- Announced the retirement of Mr. Howard Stockford from the Board of Directors.

**Frac Sand and Victory Silica**

- Completed an asset purchase agreement to acquire the 7P Plant, subject to certain conditions and made the initial payment of $300,000.
- Filed a reclamation plan with the Alberta Energy Regulator (the "AER", the successor to Energy Resources Conservation Board) to convert the 7P Plant site to a frac sand plant from a sand recycling facility; such plan was approved on July 11, 2013.
- Completed the restoration work and filed the final remediation report with the AER on November 2, 2013.
- Filled three senior management positions – the General Manager, the VP Marketing and the Plant Manager.
- Commenced conversion of the 7P Plant to a 400,000 tpa frac sand plant.
- Achieved numerous milestones, including:
  - Completed key agreements for: sand purchase, sand washing, transload in Winona, rail transport, rail siding, railcar leasing, Seven Persons trucking, mobile equipment leasing.
  - Upgraded the design and build of the 7P Plant to accommodate 500,000 tpa.
  - Completed plant construction.
  - Received final clearance from the AER on the recycling plant remediation.
  - Commenced sand shipments to 7P Plant.
  - Began 7P Plant commissioning.

**Minago and Mel**

- Extended the Minago and Mel mining leases for 21 years.
- Received a permit from the Manitoba government to drill 12 water wells to be used for the dewatering of the Minago open pit.
- Advanced the compilation of exploration information that is required to submit an environmental impact statement for the Mel project.
- Completed a study to relocate the tailings impoundment area at Minago.

## OUTLOOK

Victory Nickel is a development stage nickel company with four sulphide nickel projects in Canada; three in Manitoba and one in Québec. The Minago Project, the most significant and advanced of the four projects has shown its value on completion of a FS in late 2009 and then was permitted for production in 2011, at a time when the price of nickel was in the US$11-US$13 per pound range and projections were for long term pricing of US$10-US$12 per pound. With a FS projected IRR exceeding 22%, the Company set off to finance the development of the Minago Project. A significant part of the value of the Minago Project is frac sand. The frac sand overlies the nickel deposit and will be removed as overburden during the first three years of development and production. The FS assumed that the frac sand will only be sold over a ten-year period at a rate of approximately 1 million tonnes per year. The recent growth in the frac sand market suggests that this assumption is very conservative.

Initially frac sand was considered a by-product but it is actually a co-product if we consider the value. The cost to produce a pound of nickel is reduced by US$2.90 per pound of nickel for the value of frac sand and brings the cost to produce a pound of nickel down to US$2.20 per pound making Minago one of the lowest cost producers in the world. However, the frac sand industry is fairly young and not yet well understood and it has been difficult to demonstrate its value to the Minago Project. Until early 2012, the industry was entirely privately held and very little public information was available.

This all changed starting in early 2012 when public transactions were announced which gave support to the valuation for frac sand reflected in the Minago FS. Preferred Sands LLC purchased the assets of Winn Bay Sand, including its Hanson Lake frac sand mine in Saskatchewan, for $200,000,000. Winn Bay is on the same geological structure as Minago, just a bit farther north and west. US Silica Holdings Inc. took its frac sand business public in February 2012 by completing an initial public offering (“IPO”) raising US$200,000,000. Later in the year, Hi-Crush Partners LP completed an IPO and raised US$225,000,000. More recently, in 2013, Emerge Energy Services LP completed an IPO and raised US$140,000,000. The total market capitalization of these three companies is in excess of US$2,000,000,000. To Victory Nickel, these transactions are an indication of the attractiveness and value of its Minago sand deposit and its potential in the frac sand business.

Before going any further in this discussion, we should understand frac sand.

*What is Fracking?*

Fracking or hydraulic fracturing is a process whereby a mixture of proppant (such as frac sand), additives and water is injected down oil and gas wells under pressure. This causes the rock layer to crack. The sand particles then enter the fissures to hold them open so that oil and natural gas can more freely flow up the well opening created by drilling.

The development of horizontal drilling has resulted in the tremendous growth of the fracking process over the last few years. According to market researcher the Freedonia Group, the quantity of sand used in North America for fracking has increased from 12.3 billion pounds in 1997 to 53.6 billion pounds in 2012. The forecast is for consumption to grow to 93.9 billion pounds by 2017. The highest annual growth rate will be in Canada at 16.3% per year.

*How significant is Fracking?*
According to recent news articles, fracking of shale oil and natural gas have allowed the US to rise to become the number one energy producer with the ability to be self-sufficient for the first time in history and is on the verge of energy independence. Other articles claim that last year, hydraulic fracking has been the biggest driver of employment in the US and it has lowered utility bills. Others suggest that, by lowering the cost of energy, fracking is creating a manufacturing renaissance in the US and attracting manufacturing back to that country.

*Why is Victory Nickel so interested in frac sand?*
In Canada, there are basically three qualities of sand available which meet the specifications for frac sand. Specs include: roundness and sphericity, crush resistance and sands must be free of debris or clean.
The highest quality sands are imported into Canada from the old, in geological age, deposits around the US great lakes, and more specifically from sands in Wisconsin. At times, this sand is only available to service companies in the US. The second highest quality is domestic sand derived from sandstone deposits which is our Minago sand. The lowest quality sands are younger and more angular dune sands.

Victory Nickel's Minago Project in central Manitoba has sufficient sand from the footprint of the open pit alone to produce 11 million tonnes of frac sand and, at the same time, produce nickel for nine years or more as described in the FS. On the surrounding property, there is potentially enough of a deposit to supply frac sand for many years to come.

In June 2012, while waiting for the general market malaise to improve, including the price of nickel, the Company made the decision to be pro-active and established a three-phase plan to enter into the frac sand business prior to development of the Minago Project. The objectives were not only to generate cash flow but at the same time enhance the profile of Minago within the frac sand industry.

To this end, Ken Murdock joined the Company as Chief Executive Officer of Victory Silica, a wholly-owned subsidiary created for this purpose. We first met Ken when he was hired by Wardrop Engineering to complete the frac sand portion of the Minago FS. The business plan is a three-phase approach with the first phase being the acquisition or construction of a plant in Canada to process wet sand concentrate purchased from Wisconsin. This sand will be initially sold into the Alberta, Saskatchewan, Manitoba and North Dakota markets.

Phase 1 of the three-phase plan has been implemented. Phase 1 was achieved by acquiring the sand recycling facility in Seven Persons, 18km south of Medicine Hat, Alberta. The plant required reclamation, upgrading and conversion from a sand recycling facility to a sand processing facility capable of producing various grades of frac sand at the rate of 500,000 tons per annum. The 7P Plant is completed and being commissioned; concentrated washed sand has been received from Wisconsin for final processing; high quality frac sand is being produced and sales of finished sand have been made.

To start production at the new 7P Plant, the Company is purchasing high quality washed concentrated sand from a producer in Wisconsin. As part of the sand purchase agreement, the Company has the ability to enter into a joint venture with the supplier. The joint venture would be created by Victory Silica constructing a sand wash plant at the mine site as its contribution to the joint venture. The partner would contribute its sand properties. This would not only generate additional cash flow but it would give Victory Silica a guaranteed supply of high quality sand. Due diligence has started on the sand deposits. Building the wash plant in Wisconsin is Phase 2 of the three-phase business plan.

Phase 3 is to build a second facility in Winnipeg, Manitoba to produce an additional 1 million tons of frac sand per annum. This facility will be used to accommodate sand delivered from Minago once the mine is developed. In the interim, concentrated sand will be purchased in Wisconsin for final processing in Winnipeg. Construction of the Winnipeg plant will take approximately 18 months from commencement.

It has been almost two years since we announced that we planned to enter the frac sand business. Since then a lot has happened:

- Initial financing had to be obtained;
- Senior management positions had to be filled with individuals knowledgeable about the production and sale of frac sand;
- Supply contracts had to be negotiated - including:
    - Sand Purchase Agreement,
    - Sand Washing Agreement,
    - Transload Agreement,
    - Rail Shipping Agreement,
    - Rail Siding Agreement,
    - Rail Car Lease Agreement and
    - Equipment Leasing Agreements.

With these agreements in place, approximately 90% of the costs are fixed.

- The restoration of the original Seven Persons recycling plant site had to be completed with final closure approval necessary to begin production;
- Plant commissioning had to be completed; and
- A work force had to be hired.

This is now behind us as we enter the final stage to become a producer of 500,000 tons of frac sand annually.

The next step is to grow and maximize our presence in the frac sand industry.

Since we began our phased entry into the frac sand business, there have been numerous reorganizations and acquisitions of frac sand deposits in Canada and the US. This is another indication that the frac sand business is booming. Everybody wants in. We are already in.

The Company's plan for a three-phase entry into the frac sand business is a pivotal event and deserves a summary once again. Initially, wet sand concentrate will be purchased to feed the 7P Plant which will produce high-grade finished product of various grades. As Victory Silica's presence becomes established, phase 2 will be to partially replace purchased sand with sand from a mine in Wisconsin operated by Victory Silica. Phase 3 provides for building a second dry plant in Winnipeg to process both sand from Wisconsin and Minago. The plan is to eventually produce approximately 1.5 million tons of imported (from Wisconsin) and domestic (from Minago) frac sand annually.

The 500,000 tpa 7P Plant is expected to generate profit margins of $25 per ton or in excess of $12,000,000 per year. Phases 2 and 3, will bring the eventual production target to 1.5 million tons of frac sand per annum and are expected to improve these margins. At full production, expected cash flow is expected to exceed $40,000,000 per annum.

**General:**
On August 23, 2011, the Manitoba Government issued Victory Nickel's final EAL for the Minago project. The licence expires on August 22, 2014 unless the Company completes a certain amount of work to move the project forward. During 2013, the Company has complied with the conditions of the EAL and, in December, filed an Environmental Act Proposal ("EAP") to amend the EAL to relocate the proposed tailings and waste rock management facility. The construction of drainage ditches installed to lower down the water table within the pit shell limits, the installation of Flow Gauging and Telemetry systems and the implementation of a comprehensive environmental monitoring program are considered part of the site development necessary to maintain the EAL which would otherwise expire in August, 2014.

Signs of improvement in the nickel market are appearing as the price of nickel recently moved up to US$7.30 per pound from the low US$6.00 range. In addition, the Canada/US exchange rate makes the price in Canadian dollars even more attractive. Tsingshan Holding Group is currently constructing the world's first integrated nickel pig iron plant to use nickel sulphide concentrate as part of the stainless steel production process. Minago's nickel concentrate is one of the highest grade nickel concentrates in the world and could be suitable for this process.

Management recognizes that liquidity is a luxury due to the lack of other cash available from the equity markets. This situation is not unique to Victory Nickel, as valuations and trading volumes of junior exploration and development companies are generally low at the present time.

The expected cash flow from the entry into the frac sand business is a game changer. Victory Nickel will now be positioned to advance and grow its businesses and generate significant valuations for its shareholders. Victory Nickel will soon be a cash flowing company with a very significant warrant on nickel.

## SELECTED CONSOLIDATED FINANCIAL INFORMATION

| **As at and for the years ended December 31,** (in thousands of Canadian dollars, except per share amounts) | **2013** | 2012 | 2011 |
|---|---|---|---|
| **Summary Operating Results Data** | | | |
| General and administrative expenses | **$ 1,631** | $ 1,321 | $ 1,575 |
| Share-based payments | **248** | 263 | 366 |
| Recovery of exploration and evaluation projects | **392** | 1,450 | 597 |
| Frac sand pre-operating costs | **605** | 159 | - |
| Net finance costs | **3,795** | 13 | 121 |
| Income tax recovery | **810** | 141 | 340 |
| Net loss | **5,104** | 183 | 1,137 |
| Total comprehensive loss | **5,294** | 750 | 2,834 |
| Loss per share | **(0.01)** | (0.00) | (0.00) |
| **Summary Balance Sheet Data** | | | |
| Cash and cash equivalents | **$ 1,423** | $ 256 | $ 517 |
| Marketable securities | **278** | 557 | 2,383 |
| Other current assets | **381** | 155 | 129 |
| Property, plant and equipment | **5,279** | 1,424 | 1,277 |
| Exploration and evaluation projects | **14,865** | 14,738 | 14,577 |
| Mine property and development project | **38,668** | 37,897 | 35,571 |
| Total assets | **60,894** | 55,027 | 54,454 |
| Trade and other payables | **1,617** | 551 | 322 |
| Loans and borrowings | **6,787** | 1,008 | - |
| Deferred tax liability | **1,521** | 2,473 | 2,702 |
| Total shareholders' equity | **50,969** | 50,995 | 51,430 |

## RESULTS OF OPERATIONS

### *Year Ended December 31, 2013 Compared with Year Ended December 31, 2012*

For the year ended December 31, 2013, the Company had a net loss of $5,104,000, or $0.01 per share, (December 31, 2012 – net loss of $183,000, or $0.00 per share).

The results are mainly a function of general and administrative expenses of $1,631,000 (2012 - $1,321,000), aggregate share-based payment expenses of $248,000 (2012 - $263,000), net finance costs of $3,795,000 (2012 – $13,000) and pre-operating costs related to Victory Silica of $605,000 (2012 - $159,000); these costs were offset by a $392,000 recovery (2012 - $1,450,000) with respect to the Lynn Lake property as a result of option amounts received in excess of the recorded value of the property. Results in the year also include an income tax recovery of $810,000 (2012 – income tax recovery of $141,000).

General and administrative expenses increased by $310,000, to $1,631,000 from $1,321,000, for the years ended December 31, 2013 and 2012, respectively. The main reason for the increase is because of activity creating the frac sand business. Costs under the management agreement with Nuinsco alone have increased by approximately $100,000 due to that activity. There were finance consulting and due diligence fees of approximately $60,000 and increases in directors fees and meeting expenses because of a higher number of meetings, increases in investor relations expenses because of the new business as well as increased legal and insurance costs also for the new business.
Costs include a bonus to senior officers which was partly paid in cash and partly in shares in July, 2013. In 2012, the Company incurred travel and legal costs associated with securing financing.

As mentioned above, general and administrative expenses include costs charged by Nuinsco for administrative services, partly offset by costs charged to Nuinsco by Victory Nickel as described under Transactions with Related Parties and Management Agreement with Nuinsco Resources Limited below; these amounted to $755,000 and $18,000 (2012 - $654,000 and $27,000 respectively). Costs allocated from Nuinsco pursuant to the management agreement are activity related; the increase in costs is primarily a result of increased people costs allocated under the agreement due to activity at Victory Silica and on the frac sand business. This arrangement with Nuinsco allows the Company to have access to disciplines which would otherwise be cost-prohibitive to a junior company.

The costs of public company compliance for Victory Nickel for the year ended December 31, 2013 are estimated to be approximately $848,000, compared with $730,000 in the year ended December 31, 2012, calculated on a comparable basis. As described above, investor relations costs have increased because of the frac sand business.

The share-based payment expense for options in the year ended December 31, 2013 reflects the grant and partial vesting of 9,370,000 options with a weighted average fair value at grant date of $0.018. In addition, 1,814,166 shares were issued under the Share Bonus Plan with a closing price on grant date of between $0.03 to $0.045 in consideration for bonuses which were declared in 2013. The expense in 2012 reflects the grant and partial vesting of 8,050,000 options with a weighted average fair value at grant date of $0.035. The value assigned to the stock options was calculated using the Black-Scholes option-pricing model as explained in Note 19 to the Company’s 2013 Audited Consolidated Financial Statements.

There were no write-downs necessary for impairment of projects in 2013 or 2012. Furthermore, there were no pre-exploration expenditures incurred in either period. In the year ended December 31, 2013, the Company received an aggregate of $400,000 in receipts under the Lynn Lake option; net of expenditures, $392,000 was recorded as recovery of exploration and evaluation project. As described earlier, the Company agreed to schedule out the previously-agreed option payment, along with an additional amount of $125,000. In 2012, the full option receipt of $1,000,000 was received in the first quarter of that year and another $450,000 was received in the third quarter. Also as described above, Wellgreen has relinquished the Lynn Lake option and no further option payments will be received.

In 2012, the Company announced the creation of Victory Silica as described earlier; VSL's executive and staff are responsible for managing the frac sand business. Pre-operating costs of $605,000 expensed in 2013 comprise start-up consulting fees and related expenses, overhead allocations, additional staff costs, and repairs and maintenance of the 7P Plant during the period. In 2012, pre-operating costs of $159,000 consists mainly of start-up consulting fees and related expenses only. The 7P Plant commenced operations in March, 2014 at which point expenses will be classified in accordance with their nature and amortization of plant assets will commence.

For the year ended December 31, 2013, net finance costs were $3,795,000 (for the year ended December 31, 2012 – $13,000). Finance costs increased to $3,808,000 from $16,000 in the years ended December 31, 2013 and 2012, respectively, mainly due to the interest expense on the loans and related items; in particular, given the potential conversion to a participating interest by Nuinsco, the Company recorded an increase in the fair value of the loan of $3,289,000 effective December 31, 2013.

The Conversion feature requires the classification of the loan as a financial liability at fair value through operations. From recognition until the fourth quarter of 2013, the Company considered that there were no changes in estimated cash flows since Nuinsco has not converted its loan and the 7P Plant was not built and there were other significant uncertainties. During the fourth quarter, the plant construction was well underway and the probability of Conversion has increased substantially. Accordingly, the Company has revised the estimated future cash flows and discounted these cash flows at the loan's original effective interest rate of 22%. The estimated future cash flows were determined using a probability-weighted estimation of future expected cash flow scenarios from the frac sand business based on current expectations of business results, capital costs and pre-operating expenditures. These cash flows were on the basis of Phase 1 completion only. The Company also included probability weightings of 34%, 16% and 50% as risk factors applied to varying levels of expected cash flows – being zero, 50% and 100% of the ceiling maximum of $10,222,831.

As described earlier, the percentage participation in net cash flows is 52.16% and the applicable ceiling for Phase 1 is $10,222,831. Based on the estimated cash flows described above, payments could commence as early as mid-2015. These assumptions resulted in revised amortized cost carrying amount of the loan of $4,100,000 and, accordingly $3,289,000 was recorded as a *loss on adjustment of estimated cash flows* through the statement of operations. This is a Level 3 methodology and is subject to the highest level of uncertainty. The Company will review and revise its estimates of expected future cash flows as the expectations of payments of the participating interest change. Changes in that estimate will be recorded through operations with appropriate adjustment for actual cash flows paid.

In the fourth quarter of 2013, the Company entered into the Convertible Note. There are several elements of finance expense associated with this: cash-settled interest expense paid on a calendar quarter basis, non-cash amortization of loan fees, non-cash amortization of the embedded derivative related to the value of the convertibility feature at inception and the change in the value of that embedded derivative at the end of a reporting period. All amortizable elements are calculated using the effective interest rate method.

Aggregate interest settled in cash for the year ended December 31, 2013 amounted to $173,000, approximately $120,000 was on account of the Amended Loan ($9,000 was paid in 2013 relating to 2012) and $44,000 was on account of the Convertible Note. Amortization of loan fees in the period amounted to $134,000 and $12,000 represented amortization of a portion of the embedded derivative in the Convertible Note of $168,000 calculated at inception. The value of the embedded derivative increased to $341,000 as at December 31, 2013 and, accordingly, $173,000 was charged through operations.

The embedded derivative is calculated using the Black-Scholes option-pricing methodology and is a function of share price, the $0.10 conversion price, risk-free interest rate, length of time to expiry and share price volatility as well as the US dollar exchange rate since the loan is denominated in US dollars but convertible using a Canadian price. Ceteris paribus, one would expect the value of the option to decline as time approaches the expiry date. However, because of the volatility of exchange rates and the Company's share price, the value increased from inception mid-November to December 31, 2013. Whether this will continue is speculative, but what is certain is that it can cause a significant amount of variability in the finance income and finance costs in the statement of operations.

In the year ended December 31, 2013, the Company recorded an income tax recovery of $810,000 (2012 – income tax recovery of $141,000). This is primarily a function of higher taxable losses partly offset by the tax effect of non-capital losses of $195,000 which expired in 2013. Furthermore, because of the frac sand business activity expected to be in place when the losses are utilized, the income tax rate in place is expected to be 25%; this reduced the required future income tax liability by $302,000 which is recorded in the income tax recovery. The Company has estimated it has $183,000 in unrecognized deferred tax assets in relation to Victory Silica; given this is a new venture which has not yet started operation, it is not currently assessed as more-likely-than-not that losses and costs incurred in Victory Silica will be realized prior to their expiry.

Other comprehensive income ("OCI") in the year ended December 31, 2013 relates to a decrease of $220,000 (December 31, 2012 – $655,000) in the market value of the Company's financial assets at fair value through OCI along with income tax recoveries recorded through OCI of $30,000 (December 31, 2012 – income tax recoveries of $88,000). These changes are a result of net market value changes in the Company's marketable securities.

The changes in other balances not specifically addressed in other sections of this MD&A are as follows:

Receivables and prepaids as at December 31, 2013 include US$110,000 in sand purchases prepaid in accordance with the purchase contract signed late December. Sand commenced being delivered to the 7P Plant in February, 2014.

Marketable securities as at December 31, 2013 consist of the Company's financial assets at fair value through OCI; the Company's investment in shares is at fair value through OCI; the Company no longer has any investment in warrants at fair value through operations. The Company's interest in warrants had a value of $nil at the end of December 31, 2012 and the warrants expired unexercised in April 2013. Any volatility in the market value of shares will be recorded through OCI whether generated from sales or unrealized market changes. Marketable securities decreased by $279,000 from December 31, 2012 as a result of sales and declines in market prices of shares. The Company generated $59,000 in sales proceeds in the first quarter of 2013; there were no sales in the balance of 2013 (year ended December 31, 2012 - $1,168,000).

Property and equipment increased to $5,279,000 from $1,424,000 as at December 31, 2012. The primary reason for the increase relates to expenditures on the 7P Plant and leased mobile equipment related thereto. The costs include acquisition costs as well as plant improvements. The mobile equipment is in use and is being depreciated; since the plant had not yet been commissioned as at December 31, 2013, it has not been depreciated. The first sand was processed through the 7P Plant in March, 2014.

Project expenditures are described below in Mine Property and Development Activities ("MP&D") and Exploration and Evaluation Activities ("E&E").

The increase in trade and other payables of $1,066,000 relates primarily to an increase in trade payables of $742,000 and accrued liabilities of $325,000 pertaining to property and equipment at the frac sand business as well as $160,000 increase in the current portion of lease obligations for mobile equipment because of the ramp up of activity at the 7P Plant. Such increases are partly offset by the settlement of 2012 balances being: deferred directors' fees of $121,000 and settlement of $118,000 of accounts payable in shares in the first quarter of 2013.

Victory Nickel entered into a loan agreement and $1,000,000 was advanced prior to December 31, 2012. At the option of the Lender (Nuinsco), and under certain circumstances, the Lender can elect to receive prepayment of the loan from up to $1,000,000 of the proceeds of the Lynn Lake option payments.

Accordingly, under the option agreement in effect at December 31, 2012, $1,000,000 of the loan was classified as a current liability since this matched the Lynn Lake option payments which were available to be diverted to the Lender at their option under agreements in place as at December 31, 2012. As described in Note 14 to the 2013 Audited Consolidated Financial Statements, the option has been relinquished by Wellgreen and no further option payments are due.

Therefore the loan is disclosed as a long-term liability and is shown net of unamortized loan costs which are accounted for under the effective interest rate method and also includes a loss on adjustment of estimated cash flows of $3,289,000 calculated as described above. Note 14 to the 2013 Audited Consolidated Financial Statements includes an analysis of the loan balance.

The loan was amended and extended in the first quarter of 2013 to up to $3,000,000 pursuant to certain conditions and is subject to conversion to a net profits interest in the frac sand business or repayment by January 31, 2015. With the closing of the rights offering on July 30, 2013, the Amended Loan was capped at $2,707,584 with a remaining amount available to be advanced at that time of $500,000. Refer to the Liquidity and Capital Resources section for additional discussion of the Amended Loan and the impact of the rights offering on its terms and its conversion.

On November 11, 2013, the Company entered into the Convertible Note for US$2,000,000. This has a two-year term and is convertible into the Company's shares at a conversion price of $0.10 at the holder's option in part or in whole at any time prior to due date. When converted to Canadian dollars, shown net of unamortized fees and including the value of the embedded option derivative as described above, the value of this financial liability is $2,279,000 and comprises the lion's share of the long-term liability.

In the latter half of 2013, the Company entered into several finance leases to purchase mobile equipment with a total fair value of $636,000 at acquisition date; the long-term portion is $408,000 and the short-term lease obligation of $160,000 is included in *Trade and other payables* as described above. Note 15 to the 2013 Audited Consolidated Financial Statements includes an analysis of the lease obligation.

The deferred tax liability balance amounts to $1,521,000 as at December 31, 2013, compared with $2,473,000 as at December 31, 2012. The main components of the balance relate to the tax effects of E&E projects and the MP&D project, partly offset by the tax value of net operating tax losses carried forward. In 2013, $195,000 of available operating losses expired and $53,000, the tax effect of that amount, reduced the income tax recovery in the year. Due to changes in the expected future income tax rate, the deferred tax liability amount was reduced by $302,000 in the year ended December 31, 2013. The Company estimates that it has approximately $183,000 (2012 - $42,000) in unrecognized deferred tax assets in relation to Victory Silica.

The share capital balance has increased significantly year over year by $4,224,000. Note 17 to the 2013 Audited Consolidated Financial Statements includes a detailed analysis of the account and the Liquidity and Capital Resources section describes the transactions more fully. The most significant transactions were as follows: $2,509,000 in gross proceeds were generated from private placements and $2,400,000 in gross proceeds were raised in the rights offering; share issue costs are applied against these balances and an apportionment of proceeds was also attributed to the warrants and recorded in *Contributed surplus* at an aggregate of $839,000 which, combined with the issuance of options, accounts for the increase in that account of $1,044,000.

***Year Ended December 31, 2012 Compared with Year Ended December 31, 2011***

For the year ended December 31, 2012, the Company had a net loss of $183,000, or $0.00 per share, (December 31, 2011 – net loss of $1,137,000, or $0.00 per share).

The results are mainly a function of general and administrative expenses of $1,321,000 (December 31, 2011 - $1,575,000), share-based payment expenses of $263,000 (December 31, 2011 - $366,000), net finance costs of $13,000 (December 31, 2011 – net finance costs of $121,000) and pre-operating costs related to Victory Silica of $159,000 (December 31, 2011 - $nil); these costs were offset by a $1,450,000 recovery (December 31, 2011 - $597,000) with respect to the Lynn Lake property as a result of option amounts received in excess of the recorded value of the property. Results in the year ended December 31, 2012 also include an income tax recovery of $141,000 (December 31, 2011 – a recovery of $340,000).

General and administrative expenses decreased by $254,000, to $1,321,000 from $1,575,000, for the years ended December 31, 2012 and 2011, respectively.

Expenses that decreased in 2012 from 2011 include discretionary investor and public relations costs and allocated charges by Nuinsco as described below; these expense decreases were partially offset by increased staff costs, and legal fees and management travel expenses related to investigating financing opportunities. Furthermore, in 2011, bonuses were given to senior management to recognize the significant effort and accomplishment of successfully obtaining the Minago EAL and a refund for Part XII.6 tax was received in relation to flow-through financing completed during 2008; no such bonuses or refund occurred in 2012. Effective August 1, 2012, senior management of Victory Nickel had accepted salary deferrals until better economic times prevail; Nuinsco has accepted deferral of payment by Victory Nickel for a portion of allocations of executive salaries charged under the management agreement, consistent with deferrals accepted by the Company's executive employees. These deferrals were settled in 2013.

General and administrative expenses include $654,000 in costs charged by Nuinsco for administrative services, partly offset by $27,000 charged to Nuinsco by Victory as described under Transactions with Related Parties and Management Agreement below (December 31, 2011 - $829,000 and $nil, respectively).

Costs allocated from Nuinsco pursuant to the management agreement are activity related; the decrease in costs is primarily a result of decreased people costs allocated under the agreement along with the effects of a reduced proportion of fixed costs since Nuinsco entered into a further management agreement with a third party. This arrangement allows the Company to have access to disciplines which would otherwise be cost-prohibitive to a junior company.

The costs of public company compliance for Victory Nickel for the year ended December 31, 2012 are estimated to be approximately $636,000, compared with $815,000 in the year ended December 31, 2011 calculated on a comparable basis. The decrease is mainly due to lower costs allocated from Nuinsco and lower investor and public relations costs, partly offset by increases in legal fees. These costs are estimated; in 2013, a slightly different methodology was adopted which calculated the costs to be $730,000 for 2012. The main difference in methodology related to the treatment of directors' fees.

The share-based payment expense of $263,000 in the year ended December 31, 2012 mainly reflects the grant and partial vesting of 2,225,000 options and the grant and immediate vesting of 5,825,000 options with a fair value of $0.035. The expense in 2011 reflected the grant and partial vesting of 742,500 options and the grant and immediate vesting of 1,692,500 options with a fair value of $0.077, the grant and immediate vesting of 1,900,000 options with a fair value of $0.07 and a modification expense relating to certain options issued to a retiring director that were approved by the Board to retain their original terms or would otherwise have expired.

The value assigned to the stock options was calculated using the Black-Scholes option-pricing model as explained in Note 18 to the Company's 2012 Audited Consolidated Financial Statements.

In the year ended December 31, 2012, the Company received additional consideration from the Lynn Lake option with Wellgreen (formerly Prophecy Platinum) for an aggregate total of $1,450,000 in cash (December 31, 2011 - $600,000 in cash). Accordingly, the Company recorded a net recovery of $1,450,000 through operations in the year ended December 31, 2012 (December 31, 2011 - $597,000; net of expenditures of $3,000).

There were no writedowns necessary for impairment of projects in 2012. The factors used in arriving at this conclusion are summarized under Impairment Analysis below.

In 2012, the Company announced the creation of Victory Silica as described earlier. Victory Silica pre-operating costs of $159,000 expensed in 2012 comprise start-up consulting fees and related expenses incurred on the frac sand project to date; no such costs were incurred in 2011. As announced on January 9, 2013, the Company completed an asset purchase agreement for the 7P Plant.

For the year ended December 31, 2012, net finance costs were $13,000 (December 31, 2011 – net finance costs were $121,000). The decrease in finance income to $3,000 in 2012 from $96,000 in 2011 was mainly due to the reduction in the flow-through premium liability of $87,000 that was amortized through finance income in 2011. There were no flow-through premium liabilities amortized or outstanding during 2012. See Liquidity and Capital Resources below for more details on flow-through financings. Finance costs decreased to $16,000 from $217,000 in the years ended December 31, 2012 and 2011, respectively, mainly due to the significant decline in the fair value of warrants of $213,000 during 2011. The assumptions used in determining the fair value of the warrants as at December 31, 2012 are included in Note 9 to the 2012 Audited Consolidated Financial Statements.

The Company continues to believe that it is more-likely-than-not that the benefit associated with certain of the losses and costs creating future income tax assets will be realized prior to their expiry. Accordingly, the Company may record periodic future income tax recoveries. Note that the Company has not recognized any income tax recovery for its subsidiary company Victory Silica since it has not yet commenced operations.

In the year ended December 31, 2012, the Company recorded an income tax recovery of $141,000 (December 31, 2011 – a recovery of $340,000). The change in the income tax recovery is a function of decreased operating loss combined with a reduction in the availability of investment tax credits. Furthermore, the Company has estimated it has $42,000 in unrecognized deferred tax assets in relation to the frac sand business contained in Victory Silica; given this is a new venture which had not yet started operation, it was not currently assessed as more-likely-than-not that losses and costs incurred in Victory Silica will be realized prior to their expiry.

OCI in the year ended December 31, 2012 relates to a decrease of $655,000 (December 31, 2011 – $1,962,000) in the market value of the Company's financial assets at fair value through OCI along with income tax recoveries recorded through OCI of $88,000 (December 31, 2011 – $265,000). These changes are a result of net market value decreases in marketable securities.

The changes in other balances not specifically addressed in other sections of this MD&A are as follows:

Marketable securities as at December 31, 2012 consist of the Company's financial assets at fair value through OCI and operations; the Company's investment in shares is at fair value through OCI and the investment in warrants is at fair value through operations. Accordingly, any volatility in the market price of warrants will impact the statement of operations but changes in the market value of shares will be recorded through OCI whether generated from sales or unrealized market changes. Marketable securities decreased by $1,826,000 from December 31, 2011 as a result of sales and declines in market prices and value of warrants. The Company generated $1,168,000 in sales proceeds in 2012 from sales of marketable securities (2011 - $6,112,000).

Property and equipment increased from December 31, 2011 mainly as a result of deposits of $200,000 made during the year ended December 31, 2012 relating to the purchase of transformers and other electrical equipment for the Minago project partly offset by some furniture sales.

The changes in trade and other payables relate primarily to the timing of project-related expenditures. The balance increased by $229,000 when compared with December 31, 2011 and includes approximately $176,000 of agreed-upon deferrals, mostly directors' fees and deferred salaries. Subsequent to December 31, 2012, $118,000 in accounts payable were settled through the issuance of 4,720,000 of the Company's shares.

Victory Nickel entered into a loan agreement and $1,000,000 was advanced prior to December 31, 2012. The loan bears interest at 12% per annum and matures on January 31, 2015. At the option of the lender (Nuinsco), and under certain circumstances, the lender can elect to receive prepayment of the loan from up to $1,000,000 of the proceeds of the Lynn Lake option payments. Accordingly, under the option agreement in effect at December 31, 2012, $1,000,000 of the loan has been classified as a current liability due within one year since this matches the Lynn Lake option payments which were available to be diverted to the lender at their option under agreements in place as at December 31, 2012.

The deferred tax liability balance amounts to $2,473,000 as at December 31, 2012 compared with $2,702,000 as at December 31, 2011. The main components of the balance relate to the tax effects of E&E projects and the MP&D project, partly offset by the tax value of net operating tax losses carried forward.

## SUMMARY OF QUARTERLY RESULTS

Selected financial information for each of the last eight quarters ended December 31, 2013 is as follows:

| Fiscal year 2013 | 4th Quarter | | 3rd Quarter | | 2nd Quarter | | 1st Quarter | |
|---|---|---|---|---|---|---|---|---|
| Net finance costs | $ (3,614) | (1) | $ (69) | | $ (75) | | $ (37) | |
| Net loss | $ (3,839) | (2) | $ (521) | | $ (429) | | $ (315) | |
| Total comprehensive loss | $ (3,810) | (3) | $ (537) | | $ (507) | | $ (440) | |
| Loss per share - basic and diluted | $ (0.01) | | $ (0.00) | | $ (0.00) | | $ (0.00) | |

| Fiscal year 2012 | 4th Quarter | | 3rd Quarter | | 2nd Quarter | | 1st Quarter | |
|---|---|---|---|---|---|---|---|---|
| Net finance (costs) income | $ (9) | | $ (2) | | $ 2 | | $ (4) | |
| Net (loss) income | $ (139) | | $ 60 | (5) | $ (571) | (6) | $ 467 | (8) |
| Total comprehensive (loss) income | $ (193) | (4) | $ 6 | | $ (1,252) | (7) | $ 689 | (9) |
| (Loss) earnings per share - basic and diluted | $ (0.00) | | $ 0.00 | | $ (0.00) | | $ 0.00 | |

(1) Net finance costs for the period includes $3,289,000 for the loss on adjustment of estimated cash flows for the Amended Loan and $173,000 for the increase in value of the embedded derivative related to the convertible promissory note.
(2) Net loss for the period includes $240,000 for costs charged under the management agreement with Nuinsco and reflects increased activity on the frac sand business and an income tax recovery of $558,000.
(3) Total comprehensive loss for the period includes the effects noted above.
(4) Total comprehensive loss for the period includes $49,000 net after-tax decline in the market value of securities.
(5) Net income for the period includes $450,000 recovery on the Lynn Lake option with Prophecy Platinum.
(6) Includes an increase in income taxes of approximately $150,000 which was reversed in the fourth quarter as it was not necessary.
(7) Total comprehensive loss for the period includes $681,000 net after-tax decline in the market value of securities.
(8) Net income for the period includes $1,000,000 recovery on the Lynn Lake option with Prophecy Platinum.
(9) Total comprehensive income for the period includes the recovery noted above as well as $222,000 net after-tax improvement in the market value of securities.

## LIQUIDITY AND CAPITAL RESOURCES

As at December 31, 2013, the Company had working capital of $465,000, including cash and cash equivalents and marketable securities. As at December 31, 2012, the Company had a working capital deficiency of $583,000 which included approximately $176,000 of agreed-upon deferrals owing to directors and senior management as well as accounts payable of $118,000 subsequently settled in shares of the Company.

Working capital as improved from the prior year but financing remains challenging although the Company has closed many successful financings during the year. As the 7P Plant completion approached and the prospect of revenues became more real, the opportunities for financing have improved and the Company has been able to consummate even more financings.

The 7P Plant has been designed to be able to process 500,000 tpa rather than the initial 400,000 tpa originally planned. This occurred because of some necessary engineering changes which were not originally contemplated but were then leveraged to build a plant with increased capacity. This caused the cost of the 7P Plant to be in excess of its original plan and put significant pressure on working capital. This will be a future benefit as capacity has increased by 25%.

The main financings occurring during the year are described in the following sections.

**Loan and Amended Loan with Nuinsco of up to $3,000,000** was entered into in 2012 and was amended in March 2013. Recognizing the challenging financing markets, the Company entered into the loan agreement with Nuinsco, $1,000,000 of which was advanced prior to December 31, 2012 and was used for working capital purposes; the Amended Loan provided additional funds of up to $2,000,000 under certain circumstances which were capped as described under the Rights offering narrative below at $1,707,584, $1,207,584 of which was advanced as backstop under the rights offering.
As described earlier, as at December 31, 2012, despite the loan having a contractual repayment term of January 31, 2015, the ability of the Lender to divert payments under the Lynn Lake option agreement required the Company to classify the whole principal balance as being due within one year. On March 1, 2013, the Lynn Lake option agreement was amended to include $125,000 due March 1, 2013 which was received and retained by Victory Nickel. Other payments of $125,000 and $150,000 were received in May and September (and also retained by the Company) and the remaining $175,000 was due by the end of 2013 with an additional $550,000 due by August 29, 2014. However, as described earlier, Wellgreen has relinquished the option agreement and no further option receipts are due.

On March 25, 2013, the Company amended and extended the loan agreement to up to $3,000,000 under certain circumstances – and which was capped at $2,707,584. The Amended Loan bears interest at 12% per annum, payable quarterly, and matures on January 31, 2015. Prior to June 1, 2014, the Lender, Nuinsco, has the right to convert the outstanding balance of the Amended Loan into a participating interest (the “Conversion”) whereby the Lender is entitled to receive a share of net cash flows earned from the sale of frac sand from the 7P Plant. Nuinsco’s participation is capped at $10,000,000, with a minimum of $7,500,000, and is subject to adjustment under certain circumstances – refer below. On Conversion, the Amended Loan would be considered paid in full.

Nuinsco had also agreed to backstop an equity issue, if any was announced, with cash or by converting a portion of the Amended Loan into shares, at the Lender's option to an amount up to $1,500,000 under certain circumstances. On June 14, 2013, the Company announced a rights offering as described more fully below with maximum gross proceeds of approximately $2,700,000. Under the backstop provision, Nuinsco subscribed for units of the rights offering for cash in the amount of $1,207,584 which, along with exercise of other rights and its pre-existing shares, resulted in Nuinsco increasing its share ownership in the Company to approximately 12.24% as at July 30, 2013 and made Nuinsco a related party of the Company.

The Company agreed to pay, with shares, an arrangement fee of up to $300,000 plus a commitment fee of 1.5% per annum on unutilized balances. Effective July 2013, the cumulative arrangement fee was capped at $270,758 and was settled with shares. Such fees are amortized into interest expense using the effective interest rate method.
An aggregate of $120,000 in interest expense was paid in cash for interest accrued for the year ended December 31, 2013; interest is due in cash at the end of each calendar quarter. Non-cash amortization of loan fees brings interest expense on the loan to $254,000 for the year. The commitment fee will be settled in shares and amounts to $11,000 as at December 31, 2013.

On February 4, 2014, both Nuinsco and Victory Nickel agreed to cancel the amount that remained available to be drawn down under the Amended Loan. This fixed the commitment fee to be paid in shares at $12,000 and also amended the range of the Company's participation in the net cash flows earned from the sale of frac sand to a maximum of $10,222,831 with a minimum of $7,667,124. This range could be decreased should Victory Nickel repay some or all of the $1,000,000 balance outstanding before Conversion.

Because the 7P Plant is being commissioned and the frac sand business is commencing, the Company expects that the Conversion right will be exercised by Nuinsco. While this will eliminate the loan payable, it will be replaced by a future outgoing cash flow stream. Accordingly, the Company has recorded the loan at an amortized cost of $4,100,000. This amount was determined as described earlier and will be subject to ongoing revaluation as the frac sand business develops and cash flow amounts become more certain. Under present assumptions and business expectations, contractual payments to Nuinsco would not commence until approximately mid-2015 when Phase 1 capital costs and pre-operating expenditures have been recovered.

The Company will reassess the carrying value of the loan as circumstances warrant.

**Private placement of $2,209,000** was entered into with a key investor. On March 22, 2013, the Company issued 44,178,500 common shares under the private placement with a key investor at $0.05 per share, generating gross proceeds of approximately $2,209,000. This, along with the Amended Loan, significantly improved available working capital in early 2013.

**Rights offering of $2,400,000** was completed on July 30, 2013 which generated gross proceeds of $2,400,000 through issuing 100,000,000 units, each unit comprising one common share and one common share purchase warrant. Each warrant enables the holder to buy an additional common share of the Company for $0.035 per share for a 12-month period commencing July 31, 2014. The proceeds included provisions under the Amended Loan for a backstop and top-up which aggregated $1,207,584 and effectively capped the Amended Loan at $2,707,584 with then future available advances to the Company being $500,000. As noted above, both the Company and Nuinsco have cancelled the available amount outstanding effective February 4, 2014.

**Private placement of $300,000** was closed on September 19, 2013 generating gross proceeds of $300,000 through issuing 12,500,000 units, each unit also comprising one common share and one common share purchase warrant. Each warrant enables the holder to buy an additional common share of the Company for $0.035 per share for two years from the closing date of September 19, 2013.

**Convertible Note for US$2,000,000** was entered into on November 11, 2013. The accounting complexities have been described earlier. The Convertible Note has a term of two years, bears interest at 14.8% calculated on a monthly basis and settled quarterly and may be converted in whole or in part, at any time, at the option of the holder into Victory Nickel shares at a conversion price of $0.10 per share. This is part of an umbrella package of convertible financing approved by regulatory authorities to a maximum of $5,000,000. The financing has been completed in tranches and has similar terms to the Convertible Note. Subsequent to December 31, 2013, the Company has closed an aggregate of US$1,750,000 and $265,000 under the umbrella package.

Discussions are also underway to source additional working capital financing for the frac sand business.

Other asset sales, as well as the sale of royalties on certain properties, are possibilities which would provide liquidity during this difficult period. With lower trading volumes, marketable securities are not as saleable as they have been in the past. Consequently, management is looking to realize on the sale of other assets as a mechanism to improve liquidity. The Company is also investigating the possibility of generating cash through the sale of new royalty arrangements on its properties.

**Cash flows in 2013** - Cash and cash equivalents as at December 31, 2013 and 2012 were held with major Canadian banks. The Company has a corporate policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board. Marketable securities are available to be sold for liquidity purposes, as the Company requires, providing funds for its operations and activities.

For the year ended December 31, 2013, the Company used cash in operating activities of $2,374,000 (December 31, 2012 - $1,295,000). As the Company is in the exploration, evaluation and development stage and has yet to produce frac sand at the 7P Plant, there are no revenues to recover expenses and the operating activities represent the corporate and administrative costs incurred mostly to maintain a public company and to set up the frac sand operations. The Company estimates that public company costs in the year ended December 31, 2013 amounted to $848,000. Many of these costs are incurred in the early part of the year.

In the same period of 2012, such costs were approximately $730,000, calculated on a comparable basis. Consequently, the Company's liquidity is reduced unless and until there are revenues, financing activities or sales of assets to provide funds. Note that the costs cited above do not include the costs of financing arrangements which are deducted directly from equity – these can be significant. Costs incurred to advance the Company's exploration, evaluation and development projects are capitalized, as summarized below under the discussion of investing activities. Costs to set up the Company's frac sand operations are expensed as part of pre-operating expenditures, in 2013, $605,000 was spent on frac sand activities, compared with $159,000 in 2012.

The adjustment for net finance costs of $3,781,000 primarily relates to the non-cash change in the carrying value of the loan with Nuinsco as described above. While this is a fair value adjustment it is an estimation of future outgoing cash flows under the participating interest should Nuinsco opt for Conversion. Nuinsco has not yet announced its intention.

During the year ended December 31, 2013, net cash used by investing activities was $2,798,000, compared with cash generated of $34,000 in the prior comparable period. Aggregate amounts of $973,000 and $138,000 were used to advance the MP&D project and E&E projects, respectively, during the year ended 2013 (2012 - $2,201,000 and $183,000). In 2013, $2,021,000 was used for expenditures on the 7P Plant acquisition and improvements (2012 – $nil).

During the early part of the year, the Company sold shares for aggregate proceeds of $59,000 (2012 – $1,168,000); the Company will continue to sell marketable securities for liquidity purposes when pricing is acceptable although present valuations would not generate significant cash flows. Aggregate funds of $400,000 were received with respect to the option agreement with Wellgreen for the Lynn Lake property in 2013 compared with $1,450,000 received in 2012.

The Company made payments of $152,000 in the year ended December 31, 2013 relating to the transformer equipment (2012 - $200,000) under the agreement to purchase transformers and other electrical equipment at an aggregate cost of US$2,840,000. The balance is due prior to shipping.

The Company generated $6,319,000 in financing activities during the year compared with $1,000,000 in 2012. In 2013, this comprised net cash of $4,496,000 from the issuance of shares and warrants; being $2,197,000 pursuant to a private placement with a key investor in the first quarter of 2013, net proceeds of $2,025,000 from the rights offering that closed on July 30 2013 and net proceeds of $279,000 from the private placement completed on September 19, 2013 ($5,000 in share issue costs were incurred on a non-cash item). Loan interest of $173,000 was paid during 2013; $9,000 of that relates to interest accrued in 2012. Aggregate payments under leases for deposits and other principal payments totalled $100,000; there were no such payments in 2012. The Convertible Note generated net funds of $2,096,000 in 2013 compared with funds of $1,000,000 under the Facility with Nuinsco in 2012 as amended in 2013.

There were no equity financings completed during the year ended December 31, 2012, although the Company received $1,000,000 under the Facility. The Company's operations in 2012 were financed through sales of marketable securities, option payments and the loan advance noted above.

The Company's activities during the year ended December 31, 2013 provided cash and cash equivalents of $1,147,000, compared with a net decrease in cash of $261,000 during 2012. In 2013, there was an unrealized foreign exchange gain of $20,000 on cash and cash equivalents.

The Company's remaining portfolio of marketable securities had a market value of $278,000 as at December 31, 2013. Effective February 4, 2014, there are no amounts available under the Amended Loan.

## Table of Contractual Commitments

| | Due Date | Currency | March 31, 2014 | December 31, 2013 | December 31, 2012 |
|---|---|---|---|---|---|
| Transformer and electrical equipment | On shipping | US Dollar | $ 1,396 | $ 1,396 | $ 1,546 |
| Flowthrough expenditures outstanding | Not applicable | Canadian Dollar | $ - | $ - | $ - |
| Loans and borrowings (including unpaid accrued interest) | | | | | |
| Amended Loan | January 31, 2015 | Canadian Dollar | $ 1,000 | $ 1,000 | $ 1,009 |
| Convertible Note | November 11, 2015 | US Dollar | $ 2,000 | $ 2,000 | $ - |
| Purchase of 7P Plant | Refer to note below | Canadian Dollar | $ - | $ - | $ - |
| Leased mobile equipment | Within one year | Canadian Dollar | $ 166 | $ 190 | $ - |
| | One to five years | Canadian Dollar | $ 423 | $ 447 | $ - |

Note that the final acquisition of the 7P Plant is subject to conditions precedent, including the transfer of leases which requires regulatory approval. The Company has fulfilled all of the reporting obligations required to secure the approval and received signoff by the AER on March 18, 2014. Further note that the Amended Loan (unless converted to a participating interest by Nuinsco) is contractually payable on January 31, 2015. The Convertible Note may also be settled in part or in whole through the issuance of the Company's shares.

As described above, exploration, evaluation and development companies such as Victory Nickel have historically been heavily reliant upon the equity markets to fund their activities as they have no short-term sources of revenue other than through monetization of assets. Opportunities available to Victory Nickel for financing would normally be through private placements in the equity markets. Today's equity markets continue to make this alternative difficult if not impossible without incurring significant dilution to existing shareholders. For this reason, the Company had chosen to liquidate portions of its securities holdings rather than raise equity financing. However, the results of this are also dependent upon market conditions which are outside the control of the Company, and market circumstances have also impacted the Company's investees and their market values impacting the funds which could be generated from sales.

In the first quarter of 2013, an opportunity was identified to enter into a private placement with an investor at an appropriate price. On March 22, 2013, the Company completed a private placement of 44,178,500 shares which generated approximately $2,209,000 in cash. While this is dilutive to existing shareholders, alternative financing sources, if any, take considerable time and resources to complete – as was the case with the rights offering.

The rights offering to existing shareholders announced mid-June raised $2,400,000 in gross proceeds effective July 30, 2013; all shareholders at the record date had the opportunity to participate in this potentially non-dilutive financing. The warrants issued under the rights offering have the ability to generate an additional $3,500,000 in funding between one and two years from closing – that is from July 31, 2014 onwards. The warrants are exercisable at $0.035; Victory Nickel shares have consistently traded in excess of that price since mid-December. Because the standby facility was utilized in the rights offering, the funds available under the Amended Loan with Nuinsco as at December 31, 2013 were $500,000; as described above, this amount has been cancelled and is no longer available to Victory Nickel.

Note that, through the backstop, Nuinsco owns shares of Victory Nickel rather than having advanced funds which would need to be repaid by Victory Nickel at a future date. Further note that advances under the backstop are considered in the same fashion as loan advances and form part of the calculation of cash flows under the convertibility feature of the Amended Loan.

Another private placement was completed mid-September 2013 generating gross proceeds of $300,000. The warrants issued under this private placement (issued on the same terms as the rights offering but exercisable at any time) have the potential to generate additional cash of approximately $438,000 until September 19, 2015.

The Company will continue to balance its financing choices as a function of availability and market activity. Managing in challenging times takes as much, if not more, senior management effort. However, senior management of both the Company and Nuinsco have periodically agreed to accept salary deferrals. Although all deferrals have now been settled, this is a mechanism that the Company has been able to utilize on a number of occasions. Directors have also periodically accepted deferrals of fees. More recently, the Company has issued convertible notes. Regulatory approval has been received to issue up to $5 million in aggregate. On November 11, 2013, the Convertible Note in the amount of US$2,000,000 was issued and several tranches of similar notes have been issued to date on similar terms aggregating $265,000 and US$1,750,000.

The Company will continue to consider all financing alternatives given acceptable pricing and other market conditions to advance its projects, put the frac sand plant into production and maintain liquidity. The optioning of the Lynn Lake property is one example of a corporate transaction that can generate cash and add value for shareholders while maintaining participation in the upside in the subject property.
The loan advance of $1,000,000 in 2012 was the first stage of an expanded loan agreement announced by the Company in March 2013. The initial advance was for working capital purposes and other amounts under the Amended Loan were advanced by way of the standby facility under the rights offering. The Amended Loan is subject to the Conversion right by the Lender which would allow the Lender to convert its debt (including funds advanced under the backstop of the rights offering) into a net cash flow participation in funds expected to be generated by the frac sand initiative.

In addition to generating cash flow, the frac sand initiative is intended to establish the Company's presence in the frac sand market. However, this initiative, while relatively near-term compared with mine-building, is not expected to begin generating cash flow from sales until early 2014. As reported already, the Company has announced the acquisition of the 7P Plant which continues to be subject to certain conditions precedent, including the transfer of leases. On July 11, 2013, the Company received approval from the AER, which allowed for restoration and development of the 7P Plant. Site restoration has been completed and the closure report has been filed; follow-up questions have been received and responded to and final clearance was received in March, 2014.

The Company expects that the Lender will convert its loan payable to a participating interest in future cash flows from the frac sand business; similarly, the Company expects that the share price will improve as the frac sand business develops and that the holder of the Convertible Note will convert it into equity. Conversion of any amounts will also reduce the future interest burden. With the expected extinguishment of those gross contractual liabilities of $1,000,000 and US$2,000,000, the cash resources available of $1,423,000, combined with the advances available under the convertible notes entered into to date of approximately $2,190,000, the Company is positioning itself to be able to fund the remaining refurbishment costs of the 7P Plant and commence generating positive cash flows from the frac sand business. Note that cash flows under the participating interest do not commence until the company has recovered its Phase 1 capital costs as well as its pre-operating expenditures. The Company is also undertaking advanced discussions to secure a working capital facility to fund the future frac sand inventory and receivables activity.

In January, 2014, employees, consultants, officers and directors exercised options which generated cash of $220,000 to the Company.

As at March 31, 2014, the aggregate market value of the Company's marketable securities held in public company shares is approximately $374,000, using closing March 28, 2014 prices. The market value of such shares may go up or down. Trading volumes have experienced declines and it is generally acknowledged that equities are being undervalued.

As at March 31, 2014, the Company had options outstanding which could bring in additional cash funds of approximately $1,973,000. Most of those instruments are presently not "in-the-money" and the receipt of such funds cannot be relied upon. However, the exercisable options at $0.055 cents or below could generate $633,000. Furthermore, the warrants issued under the rights offering and private placement could generate additional cash of $3,500,000 from July 31, 2014 and $438,000 from now. These warrants are "in-the-money".

As described above, the equity markets continue to be volatile and it is uncertain how future financing initiatives will be received, what the future market value of securities will be and how successful liquidity efforts will be in generating cash to finance activities. In particular, the financing required for the development of the Minago project is considerable.

The Company has good title to its projects and will continue to maintain the projects in good standing. The Lynn Lake property has been returned to the Company and could be subject to a further option.

Monthly average administrative costs for 2013 are budgeted at $119,000 – or approximately $1,400,000 on an annual basis, most of which are incurred to meet statutory requirements; actual annual cash-based costs for 2013 were $1,631,000 before frac sand pre-operating costs. These figures exclude salary amounts capitalized as part of project expenditures which need to be considered as part of annual cash requirements. Annual capitalized salaries in 2012 (including some part-time workers) amounted to $487,000; for 2013 these are budgeted at approximately $373,000 and actual salaries capitalized to projects amounted to $378,000.

The Company's budgeted cash operating requirements for 2013 were approximately $1,800,000 before project expenditures or $150,000 monthly average. Calculated on the same basis, average monthly cash costs in the year ended December 31, 2013 were approximately $180,000 which is higher than budget; such costs are weighted towards the beginning of a year because of statutory requirements such as audit and include the effect of the frac sand operations in its pre-operating phase.

Budgeted corporate cash operating requirements for 2014 (excluding frac sand operations) are approximately $2,056,000 before project expenditures or $171,000 monthly. Additional budgeted salary amounts capitalized to exploration and development projects amount to $395,000.

Controls on minimizing discretionary expenditures are in place and non-essential services have been cancelled. The Company continues to control operating costs; Victory Nickel and Nuinsco did not implement an across-the-board salary increase for 2012 and there were no general salary increases in 2013 in either company.

The Company continues to have amounts owing to fulfil the electrical equipment purchases initiated during 2010.

Through the combination of sales of marketable securities, the expected extinguishment of the gross liabilities under the Amended Loan of $1,000,000 (into a net participating interest) and the Convertible Note of US$2,000,000 (into equity), the cash resources available of $1,423,000 combined with the additional tranches of convertible notes of $2,190,000 to date, the Company expects to be able to meet its annual operating obligations and finance the acquisition of, and capital expenditures at, the 7P Plant. Additional working capital funding to support the operations of the frac sand business continues to be sought and advanced discussions are underway.

Development of the Minago mine will require considerable financial resources. The Company has put together a financing strategy which includes several components; the relative proportion of each will be dependent upon the market conditions at the time the strategy is executed. Components include: securing a joint venture partner for nickel and/or frac sand, off-take agreements for both nickel concentrate and frac sand, plant and equipment leasing for the mine and frac sand plant, bank borrowing and/or equity issues.

The Company continues to hold discussions with local and overseas financiers and potential business partners with respect to the nickel and frac sand opportunities.

## BUSINESS UPDATE

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company is about to enter the frac sand market and will have formal operating segments in 2014 when it expects to have operating revenues, products, processes and customers. Accordingly, the Company will commence reporting on a segmented basis in 2014. The Company expects to have three reporting segments: Corporate, Exploration and Development, and Frac Sand.

The Corporate segment will operate to support the Company's activities, including exploration and development projects and the frac sand business. The Company will continue to receive administrative support from Nuinsco (Note 23 in the 2013 Audited Consolidated Financial Statements) to do so.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada. Any applicable amounts relating to such projects will continue to be capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 24 in the 2013 Audited Consolidated Financial Statements). The segment is located in Canada although sand purchases are expected to be sourced from the US.

In order to assist in understanding the Company's transition, the following tables provide information on the Company's segments in accordance with expected reporting for 2014 onwards.

| **As at December 31,** | | **2013** |
|---|---|---|
| **Canada** | | |
| Corporate | **$** | **1,952** |
| Exploration and Development | | **55,056** |
| Frac Sand | | **3,886** |
| **Total Assets** | **$** | **60,894** |

| Year ended December 31, | | 2013 |
|---|---|---|
| **Canada** | | |
| Corporate | **$** | **324** |
| Exploration and Development | | **-** |
| Frac Sand | | **-** |
| Inter segment elimination | | **(324)** |
| **Total Revenues** | **$** | **-** |

## EXPLORATION AND DEVELOPMENT ACTIVITIES

Paul Jones, Vice-President, Exploration, is a "qualified person" as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Company described herein.

## MINE PROPERTY AND DEVELOPMENT ACTIVITIES

During the year ended December 31, 2013, $843,000 (before receipt of a government grant of $72,000) was incurred on the Minago project (December 31, 2012 - $2,376,000 before receipt of a government grant of $50,000).

### Minago Project

The Company's 100%-owned Minago project is a permitted project ready for development. It is located on the unexposed southern part of the Thompson Nickel Belt in Manitoba, and is one of Canada's largest undeveloped sulphide nickel deposits. Minago has been shown to be capable of producing a nickel concentrate grading from 22.3% up to 35.0%, making it reportedly the world's highest grade nickel concentrate. In addition to metal by-products such as copper, cobalt, gold, platinum, palladium, silver and rhodium, a layer of silica sand averaging approximately nine metres thick overlies the nickel mineralization within the open pit.

Approximately 84% of the sand is marketable as hydraulic fracturing "frac" sand, which is used to improve well recoveries in the oil and gas industry. The frac sand forms part of the overburden that must be removed prior to mining the nickel ore. According to the FS, production of frac sand could begin 20 months after the start of mine development.

The analytical data and geological interpretations obtained from a work program in 2010 were incorporated into an updated geological model and resource estimate. The updated resource incorporates a 24% increase (over the previous resource estimate) in the NI-43-101-compliant measured and indicated, pit-constrained, sulphide nickel resource used in the Minago FS. The FS is posted at www.sedar.com. Note that all resources are contained in the Nose Deposit and the update below does not include the results of the 2011 drilling program.

| | **April 2011 Pit-Constrained Resource[1]** | | | **March 2010 In-Pit Resource[2]** | | | **Increase (Decrease) in Contained Metal** | |
|---|---|---|---|---|---|---|---|---|
| | **Tonnes** | **Grade** | **Ni Content** | Tonnes | Grade | Ni Content | **Ni Content** | **Change** |
| **Category** | **Millions** | **%NiS[3]** | **M Lb** | Millions | %NiS[3] | M Lb | **M Lb** | **%** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Measured** | **8.2** | **0.473** | **85.0** | 6.6 | 0.488 | 71.4 | **13.7** | **19.2** |
| **Indicated** | **22.8** | **0.432** | **217.2** | 19.1 | 0.410 | 172.6 | **44.6** | **25.9** |
| **M&I** | **31.0** | **0.443** | **302.2** | 25.7 | 0.430 | 243.9 | **58.3** | **23.9** |
| **Inferred** | **0.2** | **0.380** | **1.4** | 1.4 | 0.402 | 12.2 | **(10.8)** | **(88.4)** |

[1] Lerch-Grossman pit optimization shell [2] Whittle pit optimization shell [3] Nickel in sulphide form

A winter work program was conducted at Minago in 2011. The program comprised 8,793m of diamond drilling in 20 drill holes with associated ground and borehole electromagnetic geophysics. The program was intended to evaluate parts of the project that have seen little work to date as well as to build upon the existing data-set of the Nose Deposit nickel mineralization. The entire pit-constrained resource is located within the Nose Deposit. A total of 15 holes were collared to intersect the “North Limb”, a domain of nickel-bearing ultramafic rock extending at least 1.5km north from the Nose Deposit. A single deep hole was collared on the Nose Deposit to evaluate the depth extension of the ultramafic host rock and nickel mineralization. The hole was drilled to a total length of 1,527m and intersected approximately 160m of ultramafic rock near the bottom of the hole – confirming the extension of the host rock to depths several hundred metres below that previously tested.

A single drill hole was collared in the western part of the property in order to test the thickness of the Winnipeg Formation sand horizon. As anticipated, the hole successfully intersected the Winnipeg Formation sandstone layer (frac sand horizon) immediately above the unconformity with the Thompson Nickel Belt rocks.

A 3,500m winter work program was conducted in early 2012. The program tested a number of targets around the property that have been identified in previous work programs as well as areas that are scheduled for Minago mine infrastructure development. In part, the drilling evaluated the nickel-bearing Ospwagan Group/Pipe Formation rocks in the vicinity of the Minago Nose Deposit. Given the widespread nature of nickel mineralization on the Minago property and the number of targets identified, the possibility of intersecting completely new nickel mineralization was considered good. The drilling intersected magnetite-bearing amphibolite domains, pyrite-pyrrhotite intervals and minor serpentinite.

Importantly, two holes of the 2012 program tested known nickel-bearing serpentinite that underlies mining lease ML-003 approximately 5km south of the Nose Deposit. Thirteen historic drill holes are known to have been drilled by previous operators in the area between 1968 and 1971. Ten of the thirteen holes intersected serpentinized ultramafic rock, while seven of these holes obtained significant intersections of nickel-mineralized serpentinite from within a body interpreted to be >2 km long. The most extensive intersection, in MXB-70-60, was 605m grading 0.3% Ni from 154m down hole. DDHs V-12-07 and V-12-09 completed in the winter of 2012 both intersected significant widths of serpentinite and obtained analytical results consistent with historic results.

No fieldwork has been conducted on the project subsequent to the winter 2012 work program; current work is related to reporting and evaluation of existing results as well as gathering additional geochemical information from existing drill core. An application to renew the Minago mining leases ML-002 and ML-003 was successful and both leases have been renewed for a 21-year term.

*Frac Sand*
An indicated resource of 15 million tonnes of sandstone has been estimated to occur within the current Minago pit shell. The frac sand component of this resource of approximately 11 million tonnes is a significant contributor to the positive economics at Minago. As part of the FS, Outotec produced a feasibility-level design for a frac sand plant complete with capital and operating costs to produce 1,140,000 tonnes of frac sand annually for a ten-year period. Considerable potential exists to expand the resource beyond the limits of the current pit. The Company has also announced the creation of Victory Silica to advance a plan which will allow the Company to exploit this long-term sand resource. Refer to Discussion on Frac Sand segment activities

## EXPLORATION AND EVALUATION ACTIVITIES

For the year ended December 31, 2013, the Company incurred exploration expenditures on its E&E projects of $135,000 (December 31, 2012 - $161,000). Expenditures have been minimal due to the tight equity markets and management's focus on Victory Silica and the frac sand business. The 2013 expenditures are shown before the transfer of $392,000 through operations (December 31, 2012 - $1,450,000) with respect to the Lynn Lake option receipts in excess of carrying value.

### Lac Rocher

Lac Rocher is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cutoff, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per lb in the Lac Rocher PEA was US$9.74 with copper at US$3.65.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% net smelter royalty ("NSR") for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

Year round access is now available to the site. In December 2009, diamond drilling was conducted to provide geotechnical data deemed necessary for future portal and ramp development. An InfiniTem ground electromagnetic survey was conducted over a portion of the property to test for deeper extensions to the nickel mineralization. At the same time, evaluation of the availability of borrow material was also conducted in the local region. In 2013, a program to retrieve all accessible drill core from the site was conducted. This core will be securely stored in Chibougamau at the Copper Rand mine site before being moved to permanent storage.

**Mel Project**

The Mel project is located on the Thompson Nickel Belt, just north of Thompson, Manitoba. It is a large property, approximately 25km east-west by about 6km north-south, and remains underexplored.

Mel has an indicated resource of 4.3 million tonnes grading 0.88% nickel (approximately 83 million pounds in-situ nickel) and an additional inferred resource of one million tonnes grading 0.84% nickel (approximately 19 million pounds in-situ nickel) and offers significant exploration upside as well as near-term production potential.

The Company had earned a 100% ownership of Mel subject to a 51% Vale back-in right. During the third quarter of 2010, the Company announced that Vale had determined that it would not exercise its back-in right. Title to the property has been transferred. Accordingly, the Company is in a position to determine future programs at Mel in its sole discretion.

Ten drill holes, totalling 3,459m, comprised the 2011 winter work program on the Mel Property, the first managed by the Company. Two drill holes, totalling 739m, were collared to test a UTEM geophysical anomaly approximately 700m north of the Mel deposit associated with earlier prospective nickel results; no sulphide mineralization was encountered. Eight drill holes, totalling 2,720m, were collared to test the down-dip extension of the Mel resource shell; all holes intersected nickel mineralization of grade and width comparable to that obtained in holes that comprise the existing resource.

The re-evaluation of the Mel dataset is continuing for both the drill hole data on the Mel deposit and the considerable drilling (111 drill holes) conducted of the claims portion of the property. The study has included reinterpretation of the geological context in order to evaluate new or under-tested target areas for future work and that can be incorporated into further, more refined, modelling of the Mel resource. No fieldwork was conducted during 2012 or in 2013 to date. An application to renew Mel mining lease ML-007 was successful and the lease has been renewed for a 21-year term.

Under the terms of the option agreement, Vale must mill ore from the Mel project at cash costs plus 5% subject to capacity availability and metallurgy – this is unaffected by Vale's decision not to exercise its back-in right. Furthermore, in accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

**Lynn Lake**

The Lynn Lake property is located in the historic mining town of Lynn Lake in northern Manitoba, about 320km by road northwest of the Thompson mining camp.

As discussed earlier and described in Note 12 to the 2013 Audited Consolidated Financial Statements, the Company had optioned Lynn Lake to Prophecy Coal with subsequent assignment to Wellgreen. In March, 2014, Wellgreen relinquished the option on the property and it has reverted to the Company. Given the stage of the option agreement, the Company had not considered Lynn Lake to be a material mineral project of the Company. The Company will review the exploration material and data once Wellgreen fulfils its obligation to provide this and will determine next steps accordingly.

**FRAC SAND SEGMENT**

As explained above, the Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 24 in the 2013 Audited Consolidated Financial Statements). The segment is located in Canada although sand purchases are expected to be sourced from both Canada and the US.

On June 19, 2012, the Company announced this initiative through the creation of Victory Silica and the hiring of Ken Murdock as its CEO. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project at the same time as generating significant cash flow. On January 9, 2013, the Company announced that it had completed an asset purchase agreement for the purchase of the 7P Plant located near Medicine Hat, Alberta.

Expenditures on non-capital items are presently classified as pre-operating expenditures and are charged through operations. Plant acquisition costs and plant improvement costs are capitalized as 7P Plant within Property and Equipment on the consolidated balance sheet without amortization since the plant is not available for use as at December 31, 2013. Certain mobile equipment used in the plant improvements are being depreciated.

Site reclamation work has been completed and the final closure report has been filed with the AER and was cleared on March 18, 2014. Major equipment has been received and the 7P Plant is in the process of being commissioned. All supply and service contracts have been completed, including agreements on the terms for purchase of, and for the washing and concentrating of, Jordan Formation frac sand in Wisconsin. A rail contract and credit facility has been approved by Canadian Pacific ("CP") for the shipping of concentrated sand from Wisconsin for finishing at the 7P Plant, as has a siding agreement to provide access for private cars on the CP rail line. Rail car leasing and transload agreements have also been completed.

Several deliveries of sand have been made to the 7P Plant and are warehoused ready for processing. Processing of sand as part of commissioning occurred in March 2014.

**IMPAIRMENT ANALYSIS**

While the metals markets and other general economic factors continue to be relatively stable, there has been no marked recovery except for a strengthening US dollar. The Company performed a detailed impairment analysis on each of its E&E projects and the MP&D project as at December 31, 2013. The Company does not believe that there have been any material changes to date which would adversely affect this analysis. Furthermore there has been no change in management's plans for the projects which would cause a reassessment.

The challenge remains to find financing for development of projects. This difficulty is not a reflection of the quality of the Company's projects but is indicative of a continued general malaise affecting the junior resources sector in general. The Company performed a detailed impairment analysis at the project level.

An initial indicator of impairment considers the market capitalization of a company compared with its net book value. At and around the end of December 31, 2013, the Company's market capitalization was below its net book value – being approximately 50% of net book value which represents an improvement from December 31, 2012. A 100% ratio would require a share price of approximately $0.09 which was most recently achieved in late 2011. However, many resource companies continue to experience similar circumstances in present markets despite having good projects. In particular, the Company continues to note situations where a company's cash balances may exceed its market capitalization. An analysis was performed on each of the Company's E&E projects and the MP&D project.

The analysis reviewed historic expenditures recorded on each project along with any purchase price allocations from acquisitions, reflected the existence of previous writedowns or reversals of impairment and also considered the existence of any economic studies which had been performed. The assumptions used in such studies were reviewed for such factors as: forecast metals prices, foreign exchange rates, changes in resource and/or cost estimates, changes in royalty arrangements, the existence of significant by-products and other matters as necessary. In addition, any third-party arrangements, such as the Lynn Lake option, were also taken into consideration.

Forecast metals prices were estimated from third-party sources such as analyst consensus reports and other available documentation which were considered to be reasonable by management. In particular, for the FS base case, long-term annual forecasted nickel prices with an average of US$11.19 and an exchange rate of US$0.9116 : C$1.00 were used. Since the FS was performed, metals prices have changed. The Company continues to work on updating the FS for improved economics and announced updated resource estimates in 2011 as a result of the drilling performed in 2010. For the purposes of impairment testing, the FS was re-run using prices derived from forecasts using a range of US$7.18 to US$8.75 for nickel and an exchange rate of US$0.8978: C$1.00. Market consensus appears to be that the US dollar will continue to strengthen and that has a positive impact on the FS economics. In 2012, the Company identified cost savings of approximately $5.6 million with respect to removing the overburden on the Minago pit footprint and, as yet unquantified, savings from the relocation of the tailings pond. A discount rate of 12% was used in the analysis. Considering these factors has produced a positive NPV in excess of the book value of the project. In addition, the Minago project contains significant frac sand and only that portion removed as part of the open pit shell has been included in project economics. Accordingly, no impairment exists on the Minago project.

Capital and operating cost estimates generally were reduced from those used in historic studies if documentary evidence had recently been obtained as part of the review work which had been undertaken for the Minago FS.

For the Minago project in particular, the transformer commitment has been made at a much-reduced cost than was used in the FS. Used equipment prices cannot be typically reflected in a FS, as the market is unpredictable, except where firm pricing has been negotiated. Often cost estimates used in previous studies had been derived when such were universally recognized to be at historic highs. We have seen evidence of engineering firms broadly announcing price freezes. Experience with equipment strategies at the 7P Plant has proved that good quality used equipment can be sourced and equipment financing is available. This represents an additional cost-saving opportunity which has not been quantified in the impairment analysis.

Furthermore, management’s intentions with respect to future expenditures and plans for the projects were considered. With the exception of some small projects, all projects have had recent expenditures and are considered to be active. All of the Company’s projects were tested for impairment as at the balance sheet dates.

Management concluded that no impairment existed in each of its projects effective December 31, 2013 and that costs incurred to date are recoverable. The Company will continue to monitor developments as they occur in the metals markets and the economy and will update its impairment analysis to take account of any such changes, as appropriate.

## CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

Critical accounting estimates and judgements used in the preparation of the consolidated financial statements include determining the carrying value of investments, MP&D and E&E projects, assessing the impairment and classification of long-lived assets, determining the recoverability of deferred income tax assets, the valuation of the convertibility feature of the loans and promissory notes, the valuation of share-based payments and the disclosure of contingencies and going concern matters. These estimates involve considerable judgement and are, or could be, affected by significant factors that are out of the Company's control.

For a complete list of the significant accounting policies as well as information concerning the use of estimates, judgements and measurement uncertainty, reference should be made to Note 3 to the Company's 2013 Audited Consolidated Financial Statements. The Company's financial statements have been prepared using the going concern assumption; reference should be made to Note 1 to the Company's 2013 Audited Consolidated Financial Statements.

The recorded value of the Company's E&E projects and the MP&D project is based on historic costs that are expected to be recovered in the future. The Company's recoverability evaluation is based on market conditions for minerals, underlying mineral resources associated with the properties and future costs that may be required for ultimate realization through mining operations or by sale. The Company is in an industry that is exposed to a number of risks and there is always the potential for a material adjustment to the value assigned to these assets. Such risks also extend to the evaluation of fair values of net assets upon acquisition.
The fair value of the stock options and warrants, as well as the embedded option derivative in the promissory note, is calculated using the Black-Scholes option-pricing model that takes into account the exercise price, expected life of the option/warrant, expected volatility of the underlying shares, expected dividend yield, and the risk-free interest rate for the term of the option/warrant or embedded option derivative.

The Company has determined that it is highly probable that Victory Nickel will generate returns sufficient to utilize its taxable losses prior to their expiry. This is a significant judgement that, dependent upon future events, may turn out to be incorrect. Presently, since Victory Silica is in its pre-operating phase, a full valuation allowance has been recorded against losses incurred in that subsidiary. Given that operations at the 7P Plant commenced in March, 2014, the Company expects that it will be able to reverse the valuation allowance in 2014.

## NEW ACCOUNTING POLICIES

IFRS issued by the International Accounting Standards Board ("IASB") have been adopted in the Company's 2013 Audited Consolidated Financial Statements. Note 3 to those statements include the accounting policies that have been applied.

## FUTURE ACCOUNTING CHANGES

### New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2013 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued no new and revised standard and interpretations which are applicable to the Company or which have caused changes to its accounting policies. Refer to Note 3 to those statements.

## CORPORATE GOVERNANCE

The Company's Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of directors, none of whom are employees or officers of the Company, meets with management to review the 2013 Audited Consolidated Financial Statements to satisfy itself that management is properly discharging its responsibilities to the directors who approve the financial statements. The Board of Directors has also appointed compensation and corporate governance and nominating committees composed of non-executive directors.

### Evaluation of Disclosure Controls and Procedures

The Company's Chief Executive Officer and Chief Financial Officer, (collectively, the "Certifying Officers"), are responsible for designing a system of disclosure controls and procedures, or causing them to be designed under their supervision, to provide reasonable assurance that information required to be disclosed in reports filed with or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities laws and that material information relating to the Company is made known to them with respect to financial and operational conditions to allow timely decisions regarding required disclosure. For the fiscal year ended December 31, 2013, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's disclosure controls and procedures as defined under the rules adopted by the Canadian securities regulatory authorities. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's disclosure controls and procedures were effective as at December 31, 2013. Such controls are facilitated by the small size of the Company's senior management team and their access to material information.

There were no changes to the Company's disclosure controls and procedures that occurred during the year ended December 31, 2013 that materially affected, or are reasonably likely to affect, the Company's disclosure controls and procedures.

### Evaluation of Internal Control over Financial Reporting

The Company's Certifying Officers are responsible for designing a system of internal controls over financial reporting, or causing them to be designed under their supervision, to provide reasonable assurance regarding the reliability of financial reporting and preparation of consolidated financial statements for external purposes in accordance with Canadian GAAP. The Company used the COSO (1992) control framework and is in the process of updating its methodology to incorporate the COSO (2013) framework into its analyses for 2014. The COSO Board has made the COSO (1992) framework available for use until December 15, 2014 at which date it will be considered superseded. For the fiscal year ended December 31, 2013, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's internal control over financial reporting. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's internal controls over financial reporting and procedures were effective as at December 31, 2013. During the year, the Company made improvements to the controls over financial reporting as part of its continuous improvement process.

The management of the Company was required to apply its judgement in evaluating the cost-benefit relationship of possible controls and procedures. The result of the inherent limitations in all control systems means no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected.

There were no changes to the Company's internal controls over financial reporting that occurred during the year ended December 31, 2013 that materially affected, or are reasonably likely to affect, the Company's internal controls over financial reporting.

## TRANSACTIONS WITH RELATED PARTIES AND MANAGEMENT AGREEMENT WITH NUINSCO RESOURCES LIMITED

### Related Party Balances and Transactions for Services

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19 to the 2013 Audited Consolidated Financial Statements). Payables to key management personnel generally relate to directors' fees, consulting fees, and expense reimbursements.

Balances and transactions with related parties as at and for the years ended December 31, 2013 and 2012 are shown in the following tables:

| **As at December 31,** | | **2013** | | 2012 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **119** | $ | 157 |

Key management personnel compensation comprises:

| Years ended December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| Short-term employee benefits | **$** | **952** | $ | 807 |
| Share-based payments - options | | **118** | | 217 |
| Share-based payments - Share Bonus Plan | | **66** | | - |
| | **$** | **1,136** | $ | 1,024 |

## Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director, being Mr. René Galipeau. As described earlier, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice.

Balances and transactions with Nuinsco under the management agreement as at and for the years ended December 31, 2013 and 2012 are shown in the following tables:

| As at December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| **Balances Outstanding under the Management Agreement** | | | | |
| Payable to Nuinsco Resources Limited | **$** | **56** | $ | - |
| Receivable from Nuinsco Resources Limited | **$** | **-** | $ | 37 |

| Years ended December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **755** | $ | 654 |
| Overhead charges to Nuinsco Resources Limited | **$** | **18** | $ | 27 |
| Project costs charged to Nuinsco Resources Limited | **$** | **37** | $ | 22 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **30** | $ | 31 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis.

## Balances and Transactions with Nuinsco under the Amended Loan

The terms of the Amended Loan are described in Note 14 to the 2013 Audited Consolidated Financial Statements as well as in the Liquidity and Capital Resources section of this MD&A. A summary of the balances and transactions of the Amended Loan is included in the table and accompanying note below:

| Loan payable to Nuinsco Resources Limited | December 31, 2013 | December 31, 2012 |
|---|---|---|
| Advance for working capital | **$ 1,000** | $ 1,000 |
| Advance under Amended Loan for standby commitment | **1,207** | - |
| Aggregate advances | **2,207** | 1,000 |
| Accrued interest payable | **-** | 9 |
| | **2,207** | 1,009 |
| Less: settled in Units of Victory Nickel | **(1,207)** | - |
| Less: unamortized loan fees | **(189)** | (1) |
| | **811** | 1,008 |
| Less: loans and borrowings - current portion | **-** | (1,000) |
| Change in fair value of loan | **3,289** | - |
| **Loans and borrowings - long-term portion** | **$ 4,100** | $ 8 |

The Company has accrued $11,000 for commitment fees payable in shares to Nuinsco upon the final advance under the Amended Loan and these are included in *Finance costs* for the year ended December 31, 2013. Victory Nickel incurred interest of $120,000 for the year ended December 31, 2013 which was paid in cash at the end of each respective quarter; $9,000 related to 2012 was paid in the first quarter of 2013.

## OUTSTANDING SHARE DATA

As at March 31, 2014, the Company had 571,660,820 common shares issued and outstanding. In addition, there were 28,187,500 stock options and 112,500,000 warrants outstanding which, if exercised and issued, would bring the fully diluted issued common shares to a total of 712,348,320 and would generate cash of approximately $5,911,000. However, many of the options are not “in the money” and most of the warrants cannot be exercised until July 31, 2014.

## RECENT DEVELOPMENTS

### Private Placements

In January and March, 2014, the Company issued promissory notes under private placements, generating gross proceeds of approximately $265,000. The promissory notes bear interest at a rate of 14.8% payable quarterly, have terms of two years and are convertible into the Company’s common shares at the holder’s option at $0.10 per share.

In February and March, 2014, the Company issued promissory notes under private placements, generating gross proceeds of approximately US$1,750,000. The promissory notes bear interest at a rate of 14.8% payable quarterly, have terms of two years and are convertible into the Company’s common shares at the holder’s option at $0.10 per share.

The Company has reserved 66,666,666 common shares for the convertible notes issued under the umbrella approval by the TSX of $5,000,000.

**Stock Options**
In January and February 2014, 4,630,000 options were exercised generating aggregate gross proceeds of $220,000.

On February 4, 2014, the Company granted 2,630,000 options to officers, employees and consultants at an exercise price of $0.055. Of these options, 1,465,000 vest immediately and 1,165,000 vest over one year.

**Other**
There have been no other additional developments not already discussed elsewhere in this MD&A.

## RISKS AND UNCERTAINTIES
In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

## FORWARD-LOOKING STATEMENTS
In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

**Annual MD&A, Fiscal year ended December 31, 2012 (Dated March 25, 2013)**
**For the Years ended December 31, 2012 and 2011**

The following discussion of the results of operations, financial condition and cash flows of Victory Nickel Inc. ("Victory Nickel" or the "Company") prepared as of March 25, 2013 consolidates management's review of the factors that affected the Company's financial and operating performance for the years ended December 31, 2012 and 2011, and factors reasonably expected to impact on future operations and results. This discussion is intended to supplement and complement the Company's audited consolidated financial statements for the years ended December 31, 2012 and 2011 ("2012 Audited Consolidated Financial Statements") and the notes thereto.

Certain information and discussion included in this management's discussion and analysis ("MD&A") constitutes forward-looking information. Readers are encouraged to refer to the cautionary notes contained in the section Forward-Looking Statements at the end of this MD&A.

The 2012 Audited Consolidated Financial Statements are available at www.sedar.com and at the Company's website www.victorynickel.ca. All amounts disclosed are in Canadian dollars unless otherwise stated. All tabular amounts are in thousands of Canadian dollars.

**COMPANY OVERVIEW**

Victory Nickel is a Canadian exploration and development mineral resource company and is primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada.

Formed on February 1, 2007, Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Prophecy Coal Corp. ("Prophecy Coal" – formerly Prophecy Resource Corp.) and as transferred to Prophecy Platinum Corp. ("Prophecy Platinum") as described below) and Mel projects in Manitoba and the Lac Rocher project in Québec. The results of a feasibility study on the Minago Project ("FS") were announced in December 2009, the Environmental Impact Study ("EIS") was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Environmental Act Licence ("EAL") was announced in August 2011. A preliminary economic assessment of Lac Rocher ("PEA") was announced in November 2008 indicating that a nickel price in excess of US$10 per pound is necessary to make the project economic, absent other changes. At the Mel project, now 100%-owned, ongoing updating of data is being conducted; when completed, additional modelling of the resource will be continued.

A significant by-product of the Minago project is frac sand. Frac sand is a particular sand meeting certain specifications and is used in the drilling for oil and gas. On June 19, 2012, the Company announced the creation of Victory Silica Ltd. ("VSL" or "Victory Silica") a wholly-owned subsidiary that has been established to enter the frac sand distribution and sales market. VSL expects to establish itself as a frac sand provider by acquiring raw sand and processing it into finished product, initially for sale in the Saskatchewan, Manitoba and North Dakota markets. If successful, this strategy is expected to generate cash flow for Victory Nickel and establish a presence in the frac sand market in preparation for development and sale of frac sand from its Minago project.

**Option of Lynn Lake Property**

On October 21, 2009, the Company announced that it had optioned its Lynn Lake property ("Lynn Lake") to Prophecy Coal. In 2011, the agreement, with the consent of Victory Nickel, was assigned to Prophecy Platinum pursuant to a corporate transaction between Prophecy Coal and Prophecy Platinum. The sole remaining term of the original agreement wherein Prophecy Platinum can acquire a 100% interest in Lynn Lake was the payment of $1,000,000 due on or before March 1, 2013.

On March 1, 2013, the Company agreed to an additional amendment to the option agreement which allows Prophecy Platinum to make a series of payments through 2013 and 2014 aggregating $1,125,000 in satisfaction of the remaining option conditions. On March 1, 2013, the Company received the first payment of $125,000; $450,000 remains due across 2013 and a total of $550,000 is payable by August 29, 2014. Upon receipt of the final option payment in 2014, the Company will transfer ownership of Lynn Lake to Prophecy Platinum.

In accordance with the contract, the Company received its scheduled amount of $1,000,000 due by March 1, 2012. On August 8, 2012, the Company received $450,000 from Prophecy Platinum in consideration for removal of the exploration expenditure condition from the Lynn Lake option agreement. Failure on the part of Prophecy Platinum to meet any of the terms, as recently amended, and failure of Prophecy Coal to remedy any such deficiency will result in cancellation of the option and Lynn Lake will revert to the Company.
The Company has no reason to believe that Prophecy Platinum will not make its final payments and accordingly expects the property to be transferred at that time.

Because of the stage of the option agreement, the Company no longer considers Lynn Lake to be a material project of the Company.

**Going Concern**

The Company is subject to the risks and challenges experienced by other companies at a comparable stage.

These risks include, but are not limited to, continuing losses, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Advancing the Company's projects through exploration and development to the production stage will require significant financing. Refer to the Risks and Uncertainties and Liquidity and Capital Resources sections for additional information.

None of the Company's projects has commenced commercial production and, accordingly, the Company is dependent upon debt and/or equity financings and the optioning and/or sale of resource or resource-related assets for its funding. The recoverability of the carrying value of the Company's mine property and development project and exploration and evaluation projects, and ultimately the Company's ability to continue as a going concern, is dependent upon factors including exploration results which indicate the potential for the discovery of economically recoverable reserves and resources, the Company's ability to finance exploration and development of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding.

The Company's 2012 Audited Consolidated Financial Statements have been prepared using the going concern assumption which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. If the going concern assumption were not appropriate, then adjustments to the carrying values of assets and liabilities, reported expenses and balance sheet classifications may be necessary. These adjustments could be material. As at December 31, 2012, the Company had a working capital deficiency of $583,000; this includes approximately $176,000 of agreed-upon deferrals owing to directors and senior management and accounts payable of $118,000 settled in the Company's common shares post year-end, (December 31, 2011 – working capital of $2,707,000). Working capital is defined as current assets less current liabilities.

The Company has initiatives underway to improve working capital including the amendment of the loan agreement and private placement described later in this MD&A as well as others which are expected to be announced shortly. As mentioned in the Company's prior MD&As, it has recently relied upon the sale of a portion of its marketable securities to fund its ongoing operations. Market conditions have deteriorated making it challenging to generate cash so the Company is continuing to research other sources of liquidity. There is no certainty in the present environment that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs.

## HIGHLIGHTS

During and subsequent to the year ended December 31, 2012, the Company:

### Corporate

- Completed road show meetings with domestic and offshore financiers and investors regarding developing the Minago mine.
- Announced a loan agreement for $1,000,000 with subsequent agreement to increase the facility up to $3,000,000 (the “Amended Loan”).
- Completed a private placement financing for approximately $2,209,000 with a key investor.

### Victory Silica

- Created Victory Silica and appointed Ken Murdock, a frac sand industry veteran, as CEO. VSL’s objective is to establish Victory Nickel’s presence in the frac sand market, prior to commencing production at Minago.
- Conducted advanced discussions with frac sand suppliers and customers for VSL.
- Entered into an asset purchase agreement to acquire a frac sand processing plant, the Seven Persons sand recycling facility (the “7P Plant”).
- Filed a restoration plan with ECRB to convert the operating licence from a reprocessing facility to a frac sand processing facility.
- Received proposals for wet concentrated sand supply.

### Minago

- Completed 3,500m of diamond drilling at Minago including drilling on a nickel-bearing area south of Minago sulphide nickel deposit.
- Received a blanket one-year work permit which will eliminate delays in the receipt of individual permits.
- Initiated a new metallurgical study to improve concentrate grade and quality.
- Evaluated relocation of certain infrastructure components at the Minago site in an effort to enhance accessibility and reduce capital costs.
- Identified additional potential savings on overburden removal and constructed a 2.3km test drainage ditch which is performing better than expected.

## OUTLOOK

Victory Nickel has achieved many major milestones since it was created in February 2007. After Nuinsco Resources Limited (“Nuinsco”) completed a PEA on its Minago project (“Minago PEA”) in November 2006, the Company was created and distributed to Nuinsco shareholders. The economic results of the Minago PEA prepared by Nuinsco were sufficiently robust to justify the preparation of a FS. Although the Minago PEA was prepared based on the mining of resources not only from an open pit but also from underground, under the rules for preparation of feasibility studies only measured and indicated resources can be included and, as such, the FS could only be based on the open pit portion of the resource.

The decision was made to proceed with the FS without the underground portion as it would have been too costly and time consuming to complete the drilling required to upgrade the inferred resource at depth into the measured and indicated categories for use in the FS. As it turns out, this was the right decision as the open pit portion has proven to be adequate to produce a positive FS. The underground portion is there for the future and will add to the mine life at Minago. The North Limb is also turning out to be very promising for extending the mine life.

In December 2009, another milestone was achieved. The FS was completed showing very positive results indicating that the Minago project should be advanced. The next major step on the road to development was the preparation of the EIS. The preparation of this major study was a significant effort and in May 2010, the EIS was filed - another major milestone.

The Company took the concerns of all stakeholders into consideration when preparing the EIS. Numerous meetings with the federal and provincial governments and agencies, the First Nations and the Métis communities took place and on August 3, 2011, the Manitoba Government issued Victory Nickel's final EAL for the Minago project. Receiving the EAL is the most significant milestone achieved so far. It means that Victory Nickel is one of the few companies to have successfully permitted a green-fields hard-rock mining project in Canada in many years. This licence allows us to move ahead with the development of this outstanding project.

With the EAL in hand, in September, 2011, the board of directors approved Minago development and has charged management with the challenge of financing the project to development and production. One of the conditions is that the financing structure keeps shareholder dilution to a minimum.

The pre-production cost to bring the Minago mine to production is in the range of $550-600 million over a three to four year period. The first year's initial requirement in the Base Case scenario FS is in the range of $75-100 million excluding any cost associated with ordering long lead time equipment. This amount will provide the funds necessary to remove the surface water, install pumps, prepare the camp, bring Manitoba Hydro electricity to the site, remove the top layer of overburden comprising 11 million tonnes of muskeg and clay and begin detailed engineering. Electricity from Manitoba Hydro is approximately one sixth the cost of diesel generated power so it is important to bring it in as early as possible. Discussions with equipment providers to structure a lease or other financing arrangements have been successful and, at the necessary time, management is confident that a leasing arrangement can be completed which will fund approximately $100 million of mobile equipment.

The objective was to get the first year's requirement funded in time to start removal of the overburden during the 2011/2012 winter. Unfortunately, due to market conditions, the Company has not yet been able to obtain the necessary funding. This is not to say that progress has not been made over the last year. Management has received, and continues to receive, serious expressions of interest but the uncertainty in the financial and equity markets is continuing to delay decisions by potential investors and joint venture partners.

This is a lot to take on for a junior company such as ours, especially in the current confused market environment.

However, management has always believed that the key to kick-starting the process is to bring in a joint venture partner such as Duluth Metals Limited did with Antofagasta plc and as Aur Resources Inc. did when Teck Cominco Ltd. stepped up to act as guarantor for bank financing for developing its share of the Louvicourt deposit back in the early '90s. Aur went on to become a significant mining company after receiving this kick-start. These are only two of many such examples.

**Frac Sand**

We shouldn't forget the very significant contribution of frac sand to the Minago economics. Although the frac sand will be mined during the first three years, the FS assumed that it will only be sold over a ten-year period. The recent growth in the frac sand market suggests that this assumption is very conservative. This market continues to expand and indications are that, if Minago was in production, Victory Nickel would sell all the frac sand it could produce. In transactions completed during 2012, Preferred Sands purchased the assets of Winn Bay Sand, including its Hanson Lake frac sand mine in Saskatchewan, for $200 million. Winn Bay is on the same geological structure as Minago, just a bit farther north and west. US Silica took its frac sand business public in February 2012 by completing an initial public offering ("IPO") aggregating US$200 million through 11,764,705 shares at US$17. Further, Hi-Crush Partners LP has filed documents with US regulators to raise in excess of US$200 million through an IPO. To Victory Nickel, these transactions are an indication of the attractiveness and value of its Minago sand deposit.

For these reasons, and to enhance the profile of Minago within the frac sand industry, Victory has decided to immediately establish itself in the frac sand business. To this end, Ken Murdock has joined the Company as Chief Executive Officer of Victory Silica, a wholly-owned subsidiary created for this purpose. The business plan is a three phase approach with the first phase being the acquisition of a plant in Canada to process wet sand concentrate purchased from Wisconsin. This sand will be initially sold into the Saskatchewan, Manitoba and North Dakota markets.

Initial production is planned at the 7P Plant in Medicine Hat, Alberta at the annual rate of 400,000 tons with a second facility to be built in Winnipeg to produce an additional 1,000,000 tons. This facility will be used to accommodate sand delivered from Minago once the mine is developed.

Over the last quarter we have had numerous discussions with suppliers of both raw sand and concentrated sand to be processed at Victory Silica's 7P Plant. The asset purchase agreement for the 7P Plant has been completed and ownership will transfer upon completion of certain conditions, expected to be met during the second quarter of 2013. The 7P Plant is well located in the centre of oil and gas drilling activity. We should be processing sand by the third quarter of 2013. We have received several proposals for the supply of sand and will make a decision as soon as the plant acquisition is complete.

The Company is planning a three phase entry into the frac sand business. Initially, wet sand concentrate will be purchased to feed Victory Silica's dry plant facility which will produce high grade finished product of various grades. As Victory Silica becomes established, phase 2 will be to partially replace purchased sand with sand from a mine in Wisconsin operated by Victory Silica. The phase 3 plan is to build a second dry plant in Winnipeg to process both sand from Wisconsin and Minago. The plan is to eventually produce approximately 1.5 million tonnes of imported (from Wisconsin) and domestic (from Minago) frac sand annually.

**General**

Economic and political unrest continue to cause a lack of confidence in the investment community. The impact of the recent presidential election in the United States will hopefully bring a bit more confidence and certainty in the financial markets.

As we wait for greater certainty and investor confidence to firm up, management intends to continue to pursue a partner in its efforts to finance the Minago mine to production. Investors are only looking to investments that are generating cash or will be generating cash in the very near term. Victory Nickel is quickly advancing to fill this investor requirement by getting into the frac sand business. Successful entry into the frac sand business by Victory Silica is expected to make a significant positive contribution by generating significant cash flow in the near term. On March 22, 2013, the Company issued 44,178,500 common shares for approximately $2,209,000 under a private placement from a key investor giving them an interest in Victory Nickel of approximately 9.9%. Furthermore, on March 25, 2013, the Company extended its loan arrangement with its lender to up to $3 million under certain circumstances. The Amended Loan is convertible to a participating interest in Victory Silica's net cash flows no later than June 30, 2014.

Notwithstanding the funds available from the private placement and the Amended Loan, the Company recognizes that any liquidity is a restricted resource due to the lack of other cash available from the equity markets. This situation is not unique to Victory Nickel, as valuations and trading volumes of junior exploration and development companies are generally low at the present time. We have implemented a program to ensure that expenditures are only made on a "need to" basis. Unless immediate return can be measured, the expenditure is not made.

## SELECTED CONSOLIDATED FINANCIAL INFORMATION

| **As at and for the years ended December 31,** (in thousands of Canadian dollars, except per share amounts) | **2012** | 2011 | 2010 |
|---|---|---|---|
| **Summary Operating Results Data** | | | |
| General and administrative expenses | **$ 1,321** | $ 1,575 | $ 1,393 |
| Share-based payments | **263** | 366 | 822 |
| Recovery of exploration and evaluation projects | **1,450** | 597 | 677 |
| Victory Silica pre-operating costs | **159** | - | - |
| Net finance (costs) income | **(13)** | (121) | 1,889 |
| Income tax recovery (expense) | **141** | 340 | (87) |
| Net (loss) income | **(183)** | (1,137) | 254 |
| Total comprehensive (loss) income | **(750)** | (2,834) | 3,375 |
| (Loss) earnings per share | **(0.00)** | (0.00) | 0.00 |
| **Summary Balance Sheet Data** | | | |
| Cash and cash equivalents | **$ 256** | $ 517 | $ 170 |
| Marketable securities | **557** | 2,383 | 10,556 |
| Other current assets | **155** | 129 | 96 |
| Exploration and evaluation projects | **14,738** | 14,577 | 44,703 |
| Mine property and development project | **37,897** | 35,571 | n/a |
| Total assets | **55,027** | 54,454 | 56,240 |
| Trade and other payables | **551** | 322 | 592 |
| Loans and borrowings | **1,008** | - | - |
| Deferred tax liability | **2,473** | 2,702 | 3,314 |
| Total shareholders' equity | **50,995** | 51,430 | 52,334 |

## RESULTS OF OPERATIONS

### *Year Ended December 31, 2012 Compared with Year Ended December 31, 2011*

For the year ended December 31, 2012, the Company had a net loss of $183,000, or $0.00 per share, (December 31, 2011 – net loss of $1,137,000, or $0.00 per share).

The results are mainly a function of general and administrative expenses of $1,321,000 (December 31, 2011 - $1,575,000), share-based payment expenses of $263,000 (December 31, 2011 - $366,000), net finance costs of $13,000 (December 31, 2011 – net finance costs of $121,000) and pre-operating costs related to Victory Silica of $159,000 (December 31, 2011 - $nil); these costs were offset by a $1,450,000 recovery (December 31, 2011 - $597,000) with respect to the Lynn Lake property as a result of option amounts received in excess of the recorded value of the property. Results in the year ended December 31, 2012 also include an income tax recovery of $141,000 (December 31, 2011 – a recovery of $340,000).

General and administrative expenses decreased by $254,000, to $1,321,000 from $1,575,000, for the years ended December 31, 2012 and 2011, respectively. Expenses that decreased in 2012 from 2011 include discretionary investor and public relations costs and allocated charges by Nuinsco as described below; these expense decreases were partially offset by increased staff costs, and legal fees and management travel expenses related to investigating financing opportunities.

Furthermore, in 2011, bonuses were given to senior management to recognize the significant effort and accomplishment of successfully obtaining the Minago EAL and a refund for Part XII tax was received in relation to flow-through financing completed during 2008; no such bonuses or refund occurred in 2012. Effective August 1, 2012, senior management of Victory Nickel have accepted salary deferrals until better economic times prevail; Nuinsco has accepted deferral of payment by Victory Nickel for a portion of allocations of executive salaries charged under the management agreement, consistent with deferrals accepted by the Company's executive employees.

General and administrative expenses include $654,000 in costs charged by Nuinsco for administrative services, partly offset by $27,000 charged to Nuinsco by Victory as described under Transactions with Related Parties and Management Agreement below (December 31, 2011 - $829,000 and $nil, respectively). Costs allocated from Nuinsco pursuant to the management agreement are activity related; the decrease in costs is primarily a result of decreased people costs allocated under the agreement along with the effects of a reduced proportion of fixed costs since Nuinsco entered into a further management agreement with a third party. This arrangement allows the Company to have access to disciplines which would otherwise be cost-prohibitive to a junior company.

The costs of public company compliance for Victory Nickel for the year ended December 31, 2012 are estimated to be approximately $636,000, compared with $815,000 in the year ended December 31, 2011. The decrease is mainly due to lower costs allocated from Nuinsco and lower investor and public relations costs, partly offset by increases in legal fees.

The share-based payment expense of $263,000 in the year ended December 31, 2012 mainly reflects the grant and partial vesting of 2,225,000 options and the grant and immediate vesting of 5,825,000 options with a fair value of $0.035. The expense in 2011 reflected the grant and partial vesting of 742,500 options and the grant and immediate vesting of 1,692,500 options with a fair value of $0.077, the grant and immediate vesting of 1,900,000 options with a fair value of $0.07 and a modification expense relating to certain options issued to a retiring director that were approved by the Board to retain their original terms or would otherwise have expired. The value assigned to the stock options was calculated using the Black-Scholes option-pricing model as explained in Note 18 to the Company's 2012 Audited Consolidated Financial Statements.

In the year ended December 31, 2012, the Company received additional consideration from the Lynn Lake option with Prophecy Platinum for an aggregate total of $1,450,000 in cash (December 31, 2011 - $600,000 in cash). Accordingly, the Company recorded a net recovery of $1,450,000 through operations in the year ended December 31, 2012 (December 31, 2011 - $597,000; net of expenditures of $3,000).

There were no writedowns necessary for impairment of projects in 2012. The factors used in arriving at this conclusion are summarized under Impairment Analysis below.

In 2012, the Company announced the creation of Victory Silica as described earlier. Victory Silica pre-operating costs of $159,000 expensed in 2012 comprise start-up consulting fees and related expenses incurred on the frac sand project to date; no such costs were incurred in 2011. As announced on January 9, 2013, the Company has completed an asset purchase agreement for a sand recycling facility, in Seven Persons, near Medicine Hat, Alberta.

For the year ended December 31, 2012, net finance costs were $13,000 (December 31, 2011 – net finance costs were $121,000). The decrease in finance income to $3,000 in 2012 from $96,000 in 2011 was mainly due to the reduction in the flow-through premium liability of $87,000 that was amortized through finance income in 2011. There were no flow-through premium liabilities amortized or outstanding during 2012. See Liquidity and Capital Resources below for more details on flow-through financings. Finance costs decreased to $16,000 from $217,000 in the years ended December 31, 2012 and 2011, respectively, mainly due to the significant decline in the fair value of warrants of $213,000 during 2011. The assumptions used in determining the fair value of the warrants as at December 31, 2012 are included in Note 9 to the 2012 Audited Consolidated Financial Statements.

The Company continues to believe that it is more-likely-than-not that the benefit associated with certain of the losses and costs creating future income tax assets will be realized prior to their expiry. Accordingly, the Company may record periodic future income tax recoveries. Note that the Company has not recognized any income tax recovery for its subsidiary company Victory Silica since it has not yet commenced operations.

In the year ended December 31, 2012, the Company recorded an income tax recovery of $141,000 (December 31, 2011 – a recovery of $340,000). The change in the income tax recovery is a function of decreased operating loss combined with a reduction in the availability of investment tax credits. Furthermore, the Company has estimated it has $42,000 in unrecognized deferred tax assets in relation to the Victory Silica business; given this is a new venture which has not yet started operation, it is not currently assessed as more-likely-than-not that losses and costs incurred in Victory Silica will be realized prior to their expiry.

Other comprehensive income ("OCI") in the year ended December 31, 2012 relates to a decrease of $655,000 (December 31, 2011 – $1,962,000) in the market value of the Company's financial assets at fair value through OCI along with income tax recoveries recorded through OCI of $88,000 (December 31, 2011 – $265,000). These changes are a result of net market value decreases in marketable securities.

The changes in other balances not specifically addressed in other sections of this MD&A are as follows:

Marketable securities as at December 31, 2012 consist of the Company's financial assets at fair value through OCI and operations; the Company's investment in shares is at fair value through OCI and the investment in warrants is at fair value through operations. Accordingly, any volatility in the market price of warrants will impact the statement of operations but changes in the market value of shares will be recorded through OCI whether generated from sales or unrealized market changes. Marketable securities decreased by $1,826,000 from December 31, 2011 as a result of sales and declines in market prices and value of warrants. The Company generated $1,168,000 in sales proceeds in 2012 from sales of marketable securities (2011 - $6,112,000).

Property and equipment increased from December 31, 2011 mainly as a result of deposits of $200,000 made during the year ended December 31, 2012 relating to the purchase of transformers and other electrical equipment for the Minago project partly offset by some furniture sales. The total price is US$2,840,000 with the remaining balance due prior to shipping. The Company has paid an aggregate of $1,334,000 since 2010.

Project expenditures are described below in Mine Property and Development Activities and Exploration and Evaluation Activities.

The changes in trade and other payables relate primarily to the timing of project-related expenditures. The balance increased by $229,000 when compared with December 31, 2011 and includes approximately $176,000 of agreed-upon deferrals, mostly directors' fees and deferred salaries. Subsequent to the year-end, $118,000 in accounts payable were settled through the issuance of 4,720,000 of the Company's shares.

Victory Nickel entered into a loan agreement and $1,000,000 was advanced prior to December 31, 2012. The loan bears interest at 12% per annum and matures on January 31, 2015. At the option of the lender, and under certain circumstances, the lender can elect to receive prepayment of the loan from up to $1,000,000 of the proceeds of the Lynn Lake option payments. Accordingly, under the option agreement in effect at December 31, 2012, $1,000,000 of the loan has been classified as a current liability due within one year since this matches the Lynn Lake option payments which were available to be diverted to the lender at their option under agreements in place as at December 31, 2012.

As described in Note 12 to the 2012 Audited Consolidated Financial Statements, the option agreement was amended March 1, 2013 and the future classification of the loan payable as current or long-term will be based upon the ability of the lender to divert payments based on the amended schedule which includes $450,000 due in 2013 and $550,000 due in 2014; $125,000 was paid to Victory Nickel on March 1, 2013 and was not diverted to the lender.

The loan has been subsequently amended and extended to up to $3,000,000 pursuant to certain conditions and is subject to conversion to a net profits interest in the Victory Silica business or repayment by January 31, 2015. Refer to the Liquidity and Capital Resources section for additional discussion of the Amended Loan.

The deferred tax liability balance amounts to $2,473,000 as at December 31, 2012 compared with $2,702,000 as at December 31, 2011. The main components of the balance relate to the tax effects of Exploration and Evaluation ("E&E") projects and the Mine Property and Development Project ("MP&D"), partly offset by the tax value of net operating tax losses carried forward.

***Year Ended December 31, 2011 Compared with Year Ended December 31, 2010***

For the year ended December 31, 2011, the Company had a net loss of $1,137,000, or $0.00 per share (2010 – net income of $254,000, or $0.00 per share).

The results are mainly a function of general and administrative expenses of $1,575,000 (2010 - $1,393,000), share-based payments from options of $342,000 (2010 – $657,000), share-based payments from bonus shares of $24,000 (2010 - $165,000), a $597,000 recovery (2010 - $677,000) with respect to the Lynn Lake property as a result of option amounts received in excess of the recorded value of the property and net finance costs of $121,000 (2010 – net finance income of $1,889,000). Results in 2011 also reflect a recovery of income taxes of $340,000 (2010 – expense of $87,000).

General and administrative expenses include $829,000 in costs charged by Nuinsco as described under Related Party Transactions and Management Agreement below (2010 - $719,000). Costs allocated from Nuinsco pursuant to the management agreement are activity related; the increase in costs is primarily a result of salary increases at Nuinsco.

General and administrative expenses increased by $182,000, to $1,575,000 from $1,393,000 for the years ended December 31, 2011 and 2010, respectively. Expenses that increased from 2010 to 2011 included investor and public relations expenses and costs charged by Nuinsco as described under Related Party Transactions and Management Agreement below; these expenses were partially offset by decreased travel and entertainment expenses and insurance costs. In 2011, bonuses were also recorded for senior management to recognize the significant effort and accomplishment of successfully obtaining the Minago EAL; there were no bonuses in 2010.

The costs of public company compliance for Victory Nickel for the year ended December 31, 2011 are approximately $815,000, compared with $698,000 in 2010. Such costs are non-discretionary and are generally weighted to the beginning of a financial year because of audit and other compliance requirements. The increase to 2011 from 2010 is mainly due to higher investor relation expenses along with increased management agreement charges as described above.

Share-based payments from options decreased by $315,000 to $342,000 in 2011 which is a result of lower fair value of options in 2011 compared with 2010 combined with a lower number of options issued in 2011, partly offset by the cost to modify the terms of a retiring director's options that would otherwise have expired and were approved by the Board to retain their original terms.

Share-based payments from bonus shares relates to common shares issued to employees and/or consultants as discretionary bonuses pursuant to the Company's Share Bonus Plan. The expense of $24,000 in 2011 is net of $31,000 that was capitalized to the MP&D project. The Company issued 648,235 and 1,571,100 bonus shares in 2011 and 2010, respectively.

In the year ended December 31, 2011, the Company received additional consideration from the Lynn Lake option with Prophecy Coal in the form of $600,000 cash (2010 - $1,100,000 cash and 2,419,548 shares of Prophecy Coal with a fair value of $968,000). In accordance with GAAP, the fair value of such consideration is deducted from the value of the property until it reaches $nil. Any excess of consideration over the recorded value is treated as a recovery of exploration and evaluation projects and recorded through operations. Accordingly, the Company recorded a net recovery of $597,000 through operations in 2011 (2010 - $677,000).

Management determined that no significant events had been experienced during 2011 that would prompt impairment of its E&E projects; in accordance with GAAP, the Minago project was reviewed for impairment prior to its transfer to MP&D project on the balance sheet upon Board approval to develop the mine and proceed with financing discussions. Metals prices and other market factors continued to improve or remain stable. The Company received a favourable FS on its Minago project and is presently reviewing alternative financing opportunities to advance development of the project as well as opportunities to optimize the FS itself. Drilling to upgrade and increase resources was completed in the first quarter of 2011 and the Company received its EAL during the year, which is the key step towards developing Minago.

For the year ended December 31, 2011, net finance costs were $121,000 (2010 – net finance income of $1,889,000). Finance income of $96,000 in 2011 primarily comprises the recognition of premium on flow-through spending of $87,000 related to the flow-through financing in May 2011. In 2010, the Company recorded $1,922,000 in finance income; $631,000 represents recognition of premium on flow-through financings completed in February and April, 2010, and $1,281,000 represents gains associated with the initial fair value of warrants and changes in the fair value thereafter as described below; in 2011 this was a loss of $213,000.

The Company completed its obligations under flow-through financings from February and April 2010 by the third quarter of 2010, and obligations under flow-through financings from May 2011 by the fourth quarter of 2011; accordingly, the entire flow-through premium was reflected through operations by the end of those respective years. Note 13 to the Company's 2012 Audited Consolidated Financial Statements includes an analysis of the flow-through premium liability.

The combined effect of the Prophecy Coal transactions in 2010 resulted in a change in fair value of warrants of $1,281,000; $388,000 is as a result of the recognition of the initial fair value of warrants adjusted for cumulative fair value changes to December 31, 2010 and $893,000 is from the fair value of shares acquired being in excess of the amounts paid. The specific transactions giving rise to the excess are as follows:

As part of the option agreement with Prophecy Coal, the Company was entitled to maintain its 10% interest in Prophecy Coal by participating in financings of that company. In January, 2010, the Company acquired 570,270 units comprising one share and one-half of a share purchase warrant in Prophecy Coal at a cash cost of $0.30 per unit. At that time, the fair value of each share was $0.41.

In April, 2010, the Company subscribed for 675,500 units in Prophecy Coal at $0.59 per unit pursuant to a private placement. Each unit consisted of one common share and one-half of one common share purchase warrant. Each whole warrant is exercisable at $0.80 for a two-year period, subject to reduction. If the closing price of the Prophecy Coal shares is at least $1.10 for 20 consecutive trading days at any time following four months from closing, Prophecy Coal may provide notice to reduce the remaining exercise period of the warrants to not less than 30 days from the date of such notice. At the time of issue, the fair value of each share was $0.99.

Under a reciprocal placement which took place at the end of May, 2010, the Company subscribed for 7,000,000 common shares of Prophecy Coal for $0.544 per share. At the time of issue, the fair value of each share was $0.62.

The Prophecy Coal warrants acquired during the first quarter of 2010 contained an acceleration clause that was invoked by Prophecy Coal in early 2011. Accordingly, the Company exercised all of these warrants in February, 2011, thereby acquiring 285,135 Prophecy Coal shares at a cash cost of approximately $114,000, or $0.40 per share. At the time of exercise of the warrants, the related shares had a market value of $1.00 per share which coincided with the cash cost plus carrying value of the warrants.

Finance costs in the year ended December 31, 2011 amounted to $217,000 compared with $33,000 in the previous year. The main reason for the change was a decline of $213,000 in the fair value of warrants. During June, 2011, Prophecy Coal completed a corporate transaction whereby its non-coal assets, including the Lynn Lake option, were spun off in exchange for shares in Prophecy Platinum. Shareholders of record in Prophecy Coal became shareholders in Prophecy Platinum on the basis of 0.094758 shares (post-consolidation) of each share held on June 13, 2011. Victory Nickel received approximately 596,000 shares of Prophecy Platinum at a then-market value of $0.80 per share. Pursuant to that corporate transaction, the warrants were similarly amended to entitle the Company to 0.094758 of a share of Prophecy Platinum, as well as a share of Prophecy Coal.

Accordingly, the parameters for the shares of both companies have been considered in arriving at the estimated fair value of the warrant. The assumptions used in determining the fair value of the warrants at December 31, 2011 are included in Note 9 to the 2012 Audited Consolidated Financial Statements; the expiry of the warrants was extended for a one-year period during 2012.

The fair value of the warrants acquired during the second quarter of 2010, and upgraded as described above, was updated using the Black-Scholes option-pricing model at December 31, 2011 and the fair value was calculated at $0.009; the resultant aggregate decrease in fair value during the year ended December 31, 2011 was $213,000.

In 2010, Finance costs of $33,000 related to fee and interest expense charged by Nuinsco for an advance prepayment for the exercise of warrants. The warrants were exercised by Nuinsco in September 2010.

The Company believes that it is more-likely-than-not that the benefit associated with certain of the losses and costs creating future income tax assets will be realized prior to their expiry. Accordingly, the Company may record periodic future income tax recoveries. In 2011, the Company recorded an income tax recovery of $340,000 (2010 – expense of $87,000).

OCI in 2011 of a net loss of $1,697,000 (2010 – a net income of $3,121,000) relates to a decrease of $1,962,000 (2010 – increase of $3,739,000) in the market value of the Company's financial assets at fair value through OCI net of income tax recovery recorded through OCI of $265,000 (2010 – expense of $618,000). These changes are a result of market value decreases which occurred during 2011. In 2010, the market value of securities increased.

Significant changes in other balances not specifically addressed in other sections of this MD&A are as follows:

Receivables increased by $33,000 from December 31, 2010, primarily due to an increase in the sales tax receivable as a result of expenditures on programs at the Minago and Mel projects during the year ended December 31, 2011. The amount outstanding was received in February 2012.

Marketable securities as at December 31, 2011 consist of the Company's financial assets at fair value through OCI and operations; the Company's investment in shares is at fair value through OCI and the investment in warrants is at fair value through operations. Accordingly, any volatility in the market price of warrants will impact the statement of operations but changes in the market value of shares will be recorded through OCI whether generated from sales or unrealized market changes. Marketable securities decreased by $8,173,000 from December 31, 2010 through a combination of market value declines and sales partly offset by the two warrants transactions as described.

In February, 2011, the Company exercised warrants at a cash cost of $114,000 which changed the nature of part of the Company's portfolio from financial assets at fair value through operations to financial assets at fair value through OCI. In addition, in the third quarter of 2011, the Company's special warrants received in May 2010 were converted into shares at no cost to the Company. The market value at the time of conversion was $0.30 or $2,000 and this amount was recorded through OCI since the warrants had previously been recorded at $nil.

Property and equipment increased over December 31, 2010 mainly as a result of deposits of $526,000 made during 2011, relating to the purchase of transformers and other electrical equipment for the Minago project. The Company has paid an aggregate of $1,134,000 in 2010 and 2011.

In 2011, the Minago project was transferred from *Exploration and evaluation projects* to *Mine property and development project* on the balance sheet upon the Board's approval to develop the mine and proceed with financing discussions. The Minago project is described in Mine Property and Development Activities below.

Trade and other payables consist primarily of project-related expenditures. The balance decreased by $270,000 when compared with December 31, 2010 primarily due to the timing of project-related expenditures – there was significant project activity around the end of 2010. Project expenditures are described in Mine Property and Development Activities and Exploration and Evaluation Activities below.

The deferred tax liability balance amounts to $2,702,000 as at December 31, 2011 compared with $3,314,000 as at December 31, 2010. The main components of the balance relate to the tax effects of E&E projects and the MP&D project, partly offset by the tax value of net operating tax losses carried forward.

Share capital has increased by $1,517,000 over December 31, 2010 primarily as a result of shares issued pursuant to two private placements as well as the exercise of warrants and options that generated aggregate gross proceeds of $1,500,000, $136,000 and $15,000, respectively, and shares issued to employees and consultants under the Share Bonus Plan as described earlier. Financings are discussed more fully under Liquidity and Capital Resources below. Note 16 to the 2012 Audited Consolidated Financial Statements contains an analysis of the share capital movements.

## SUMMARY OF QUARTERLY RESULTS

Selected financial information for each of the last eight quarters ended December 31, 2012 is as follows:

| Fiscal year 2012 | 4th Quarter | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|
| Net finance (costs) income | $ (9) | $ (2) | $ 2 | $ (4) |
| Net (loss) income | $ (139) | $ 60 (2) | $ (571) (3) | $ 467 (5) |
| Total comprehensive (loss) income | $ (193) (1) | $ 6 | $ (1,252) (4) | $ 689 (6) |
| (Loss) earnings per share - basic and diluted | $ (0.00) | $ 0.00 | $ (0.00) | $ 0.00 |

| Fiscal year 2011 | 4th Quarter | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|
| Net finance (costs) income | $ (46) | $ 82 | $ (62) | $ (95) |
| Net (loss) income | $ (328) | $ (605) (7) | $ (505) (9) | $ 301 |
| Total comprehensive (loss) income | $ (652) | $ 307 (8) | $ (2,795) (10) | $ 306 |
| (Loss) earnings per share - basic and diluted | $ (0.00) | $ (0.00) | $ (0.00) | $ 0.00 |

(1) Total comprehensive loss for the period includes $49,000 net after-tax decline in the market value of securities.
(2) Net income includes $450,000 recovery on the Lynn Lake option with Prophecy Platinum.
(3) Includes an increase in income taxes of approximately $150,000 which was reversed in the fourth quarter as it was not necessary.
(4) Total comprehensive loss for the period includes $681,000 net after-tax decline in the market value of securities.
(5) Net income for the period includes $1,000,000 recovery on the Lynn Lake option with Prophecy Platinum.
(6) Total comprehensive income for the period includes the recovery noted above as well as $222,000 net after-tax improvement in the market value of securities.
(7) Net loss for the period includes $186,000 for share-based payments and $97,000 for bonus expense.
(8) Total comprehensive income for the period includes $1,054,000 improvement in the market value of the Company's securities, partly offset by income taxes of $142,000.
(9) Net income for the period includes share-based payments of $140,000 for options granted and vesting in the period.
(10) Total comprehensive loss for the period includes $2,648,000 decline in market value of the Company's securities, partly offset by income taxes of $358,000.

## LIQUIDITY AND CAPITAL RESOURCES

As at December 31, 2012, the Company had a working capital deficiency, including cash and cash equivalents and marketable securities, of $583,000, working capital includes approximately $176,000 of agreed-upon deferrals owing to directors and senior management as well as accounts payable of $118,000 subsequently settled in shares of the Company, (December 31, 2011 – working capital of $2,707,000). The main reason for the decline is a result of the overall market conditions being experienced. The Company has recently relied upon its portfolio of marketable securities for the funding of its operations and programs. As the markets have declined, access to equity and debt financing has become more difficult for all companies and Victory Nickel has had to extend its regular payment periods.

Recognizing this sea-change, the Company has entered into a loan agreement with a third party, $1,000,000 of which was advanced prior to December 31, 2012 and was used for working capital purposes. As described earlier, despite the loan having a contractual repayment term of January 31, 2015, the ability of the lender to divert payments under the Lynn Lake option agreement required the Company to classify the whole principal balance as being due within one year. On March 1, 2013, the Lynn Lake option agreement was amended to include $125,000 due March 1, 2013 which was received and retained by Victory Nickel, and $450,000 due over 2013 with $550,000 due by August 29, 2014. Accordingly, future assessments of the loan as being current or long-term will be driven by the updated option agreement.

On March 25, 2013, the Company amended and extended the loan agreement to up to $3,000,000 under certain circumstances. The Amended Loan bears interest at 12% per annum, payable quarterly, and matures on January 31, 2015. Prior to June 1, 2014, the Lender has the right to convert the outstanding balance of the Amended Loan into a participating interest (the “Conversion”) whereby the Lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender’s participation is capped at $10 million, with a minimum of $7.5 million, and is subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. The Lender has also agreed to backstop an equity issue, if any is announced, with cash or by converting a portion of the Amended Loan into shares, at the Lender’s option to an amount up to $1,500,000 under certain circumstances.

The Company will pay, with shares, an arrangement fee of up to $300,000 plus a commitment fee of 1.5% per annum on unutilized balances.

On March 22, 2013, the Company issued 44,178,500 common shares under a private placement at $0.05 per share, generating gross proceeds of approximately $2,209,000. This, along with the Amended Loan, has significantly improved available working capital.

Other asset sales, as well as the sale of royalties on certain properties, are possibilities which would provide liquidity during this period. With lower trading volumes, marketable securities are not as saleable as they have been in the past. Consequently, management is looking to realize on the sale of other assets as a mechanism to improve liquidity. The Company is also investigating the possibility of generating cash through the sale of new royalty arrangements on its properties. There is no certainty in the present economic environment that the Company's working capital, even after considering the Amended Loan and the private placement, will be sufficient to fund the Company's activities including other project expenditures and corporate costs.

Cash equivalents as at December 31, 2012 and December 31, 2011 were held with major Canadian banks. The Company has a corporate policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board. Marketable securities are available to be sold for liquidity purposes, as the Company requires, providing funds for its operations and exploration, evaluation and development activities.

For the year ended December 31, 2012, the Company used cash in operating activities of $1,295,000 (December 31, 2011 - $1,654,000). As the Company is in the exploration, evaluation and development stage, there are no revenues to recover expenses and the operating activities represent the corporate and administrative costs incurred mostly to maintain a public company. The Company estimates that such costs in the year ended December 31, 2012 amounted to $636,000. Many of these costs are incurred in the early part of the year. In 2011, such costs were approximately $815,000 for the year, calculated on a comparable basis. Consequently, the Company's liquidity is reduced unless and until there are financing activities or sales of assets to provide funds. Note that the costs cited above do not include the costs of financing arrangements which are deducted directly from equity. Costs incurred to advance the Company's projects are capitalized, as summarized below under the discussion of investing activities.

During the year ended December 31, 2012, net cash generated from investing activities was $34,000, compared with cash generated of $374,000 in the prior comparable period. Aggregate amounts of $183,000 and $2,201,000 were used to advance E&E projects and the MP&D project, respectively, during the year ended December 31, 2012 (December 31, 2011 - $5,056,000 and $594,000). Effective September, 2011, the Board of Directors approved the development of the Minago mine and, accordingly, the Company transferred its Minago project from E&E to MP&D assets.

In February, 2011, the Company exercised certain warrants for cash of $114,000, thereby reclassifying the amount previously in financial assets at fair value through operations to OCI. During the year ended December 31, 2012, the Company sold shares for aggregate proceeds of $1,168,000 (December 31, 2011 – $6,112,000); the Company continues to sell marketable securities for liquidity purposes. Aggregate funds of $1,450,000 were received with respect to the option agreement with Prophecy Platinum for the Lynn Lake property (December 31, 2011 - $600,000) as described earlier.

The Company made deposits of $200,000 in the year ended December 31, 2012 (December 31, 2011 - $526,000) under an agreement to purchase transformers and other electrical equipment at an aggregate cost of US$2,840,000. The balance is due prior to shipping.

There were no financing activities from equity issuances during the year ended December 31, 2012; as stated above, the Company received an advance of $1,000,000 pursuant to its loan agreement for working capital purposes. Financing activities during the year ended December 31, 2011, and described below, generated net proceeds of $1,627,000, after cash-settled share issue costs of approximately $24,000.

In January, 2011, the Company issued 5,000,000 units at a price of $0.10 per unit generating gross proceeds of $500,000. Each unit comprised one common share and one-half common share purchase warrant. Each whole warrant entitled the holder to purchase one common share at an exercise price of $0.14 for a period of 12 months from closing. These warrants expired unexercised in January 2012. On May 25, 2011, the Company issued 8,695,652 flow-through common shares at a price of $0.115 per unit generating gross proceeds of $1,000,000. Each unit comprised one common share and one-half common share purchase warrant. Each whole warrant entitled the holder to purchase one common share at an exercise price of $0.15 for a period of 18 months from closing. Upon closing, the Company issued 456,960 finder’s warrants that entitled the holder to purchase one finder’s unit at an exercise price of $0.15 for a period of 18 months from issuance. Each finder’s unit entitled the holder to acquire one common share and one-half of one finder’s unit warrant. Each whole finder’s unit warrant entitled the holder to purchase one common share at an exercise price of $0.15 for a period of 18 months from the issuance of the finder’s unit warrant. The finder’s warrants and the finder’s unit warrants expired in 2012.

During the year ended December 31, 2011, 1,137,627 warrants were exercised that were issued pursuant to the rights offering in August 2009 at an exercise price of $0.12 per share for aggregate consideration of approximately $136,000. In July 2011, 300,000 options were exercised at a price of $0.05 per share for an aggregate consideration of $15,000.

There were no financings completed during the year ended December 31, 2012. The significant cost to maintain and comply with regulatory requirements for the Company's public listing cannot be financed with flow-through shares. Proceeds from the Company's warrants and non-flow-through financings are "hard" dollars and can be utilized without restriction. However, no such financings have occurred in 2012 and the Company's operations have been financed through sales of marketable securities, option payments and the loan advance. The Company's remaining portfolio of marketable securities had a market value of $557,000 as at December 31, 2012, the option payment remaining of $1,000,000 has been significantly extended with $125,000 received on March 1, 2013, another $450,000 due in 2013 with the remainder due by August 29, 2014 and the amount available under the loan is finite.

The Company's activities required cash and cash equivalents of $261,000 during the year ended December 31, 2012, compared with cash generated of $347,000 during the year ended December 31, 2011.

As at December 31, 2011, the Company had fulfilled its flow-through commitment that would have been required to be satisfied by December 31, 2012. Since there were no flow-through financings completed during 2012, there is no flow-through commitment outstanding for Victory Nickel as at December 31, 2012.

**Table of Contractual Commitments**

| | Due Date | Currency | March 25, 2013 | December 31, 2012 | December 31, 2011 |
|---|---|---|---|---|---|
| Transformer and electrical equipment | On shipping | US Dollar | $ 1,546 | $ 1,546 | $ 1,746 |
| Flowthrough expenditures outstanding | Not applicable | Canadian Dollar | $ - | $ - | $ - |
| Loans and borrowings | January 31, 2015 | Canadian Dollar | $ 1,037 | $ 1,009 | $ - |
| Purchase of 7P Plant | Refer to note below | Canadian Dollar | $ 700 | $ - | $ - |

Note that the payment of $700,000 for the 7P Plant is subject to conditions precedent, including the transfer of leases which requires regulatory approval. (Note 25 to the Company's 2012 Audited Consolidated Financial Statements). Further note that the long-term loan is contractually payable on January 31, 2015, however, because up to $1,000,000 of option payments may be diverted to the lender as prepayments under agreements in force December 31, 2012, that amount is classified as a current liability on the Consolidated Balance Sheet.

As described above, exploration, evaluation and development companies such as Victory Nickel have historically been heavily reliant upon the equity markets to fund their activities as they have no short-term sources of revenue other than through monetization of assets. Opportunities available to Victory Nickel for financing would normally be through private placements in the equity markets.

Despite experiencing some improvements during 2011, circumstances have toughened during 2012 and today's equity markets continue to make this alternative difficult if not impossible without incurring significant dilution to existing shareholders. For this reason, the Company has recently chosen to liquidate portions of its securities holdings rather than raise equity financing. However, the results of this are also dependent upon market conditions which are outside the control of the Company, and market circumstances have also impacted the Company's investees and their market values.

The Company will continue to balance its financing choices as a function of availability and market activity. During 2011, the Company took advantage of market activity to dispose of marketable securities at opportune pricing. Such opportunities have all but disappeared; however, the Company has had no choice but to liquidate securities to maintain liquidity at prices that were less favourable. The value of the Company's portfolio of securities is approximately two-thirds of the same portfolio valued at 2011 prices.

That said, on March 22, 2013, the Company completed a private placement of 44,178,500 shares which generated approximately $2,209,000 in cash. While this is dilutive to existing shareholders, alternative financing sources, if any, take considerable time to complete. This equity issue was completed with a key investor with a view to finding the funding required to develop the frac sand business and ultimately Minago.

Managing in challenging times takes as much, if not more, senior management effort. However, senior management of both the Company and Nuinsco agreed, effective August 1, 2012, to accept salary deferrals averaging 25% until better economic times prevail. Although Nuinsco has now been able to pay its deferrals, Nuinsco has continued to defer payment of the respective amounts by Victory Nickel. This has reduced current cash requirements. Similar measures were taken in 2009. Directors have also accepted deferrals of fees.

As at December 31, 2012, trade and other payables included approximately $120,000 in deferred directors' fees, $20,000 in deferred salaries for Victory Nickel employees and $36,000 in deferred salaries charged by Nuinsco under the management agreement. As noted above, deferrals are expected to continue until better economic times prevail. In addition, during the fourth quarter of 2012, approximately $38,000 of accounts payable was settled in shares and an additional $118,000 of accounts payable outstanding as at December 31, 2012, was settled through issuing shares in 2013.

The Company will continue to consider all financing alternatives given acceptable pricing and other market conditions to advance its projects and maintain liquidity. The optioning of the Lynn Lake property is one example of a corporate transaction that can generate cash and add value for shareholders while maintaining participation in the upside in the subject property.

The Company received its scheduled amount of $1,000,000 that was due by March 1, 2012, as well as $450,000 in satisfaction of removing an expenditure condition. Unfortunately, economic circumstances affecting the option holder caused a renegotiation of the remaining option amount of $1,000,000 originally due by March 1, 2013. As described earlier, the Company has agreed to an additional amendment to the option agreement which allows Prophecy Platinum to make a series of payments through 2013 and 2014 aggregating $1,125,000 in satisfaction of the remaining option conditions. On March 1, 2013, the Company received the first payment of $125,000; $450,000 remains due across 2013 and $550,000 is payable by August 29, 2014.

The loan advance of $1,000,000 in 2012 was the first stage of an expanded loan agreement announced by the Company in March 2013. The initial advance was for working capital purposes and the remaining amount under the Amended Loan of $1,500,000 ($2,000,000 under certain circumstances) is available to fund capital requirements for the Victory Silica initiative as described below and/or to support any financing initiative announced by the Company. The Amended Loan is also subject to a conversion right by the lender which would allow the lender to convert its debt into a cash flow participation in funds expected to be generated by the Victory Silica frac sand initiative.

In addition to generating cash flow, the Victory Silica initiative is intended to generate cash flow for the Company as well as to enhance the Company's credibility in the frac sand market.
However, this initiative, while relatively near-term compared with mine-building, is not expected to begin generating cash flow until later in 2013. As reported already, the Company has announced the acquisition of the 7P Plant which is subject to certain conditions precedent, including the transfer of leases.

As at March 25, 2013, the aggregate market value of the Company's marketable securities held in public company shares is approximately $392,000. The market value of such shares may go up or down. Trading volumes have experienced declines and it is generally acknowledged that equities are being undervalued.

As at December 31, 2012, the Company had options outstanding which could bring in additional cash funds of approximately $3,725,000. Most of those instruments are presently not "in-the-money" however and the receipt of such funds cannot be relied upon.

As described above, the equity markets continue to be volatile and it is uncertain how future financing initiatives will be received, what the future market value of securities will be and how successful liquidity efforts will be in generating cash to finance activities. In particular, the financing required for the development of the Minago project is considerable.

The Company has good title to its projects and will continue to maintain the projects in good standing. Prophecy Platinum had expenditure commitments to meet on the Lynn Lake project as described earlier which maintained ongoing investment in the property. The Company expects the remaining amended option terms to be fulfilled and for the ownership of Lynn Lake to be transferred to Prophecy Platinum in August 2014.

Monthly average administrative costs for 2013 are budgeted at $119,000 – or approximately $1.4 million on an annual basis, most of which are incurred to meet statutory requirements; actual monthly cash-based costs for 2012 are $123,000. These figures include amounts which have been agreed to be deferred but exclude salary amounts capitalized as part of project expenditures which need to be considered as part of annual cash requirements. Annual capitalized salaries in 2012 (including some part-time workers) amounted to $487,000; for 2013 these are budgeted at approximately $370,000. As discussed before, agreed-upon deferrals for 2012 amounted to $176,000; for 2013 these are budgeted at $262,000 for the full year. Therefore, the Company's cash operating requirements for 2013 are approximately $1,538,000 before project expenditures.

As described above, the agreed-upon salary and directors' fee deferrals by Victory Nickel will reduce the pressure on cash; other controls on minimizing discretionary expenditures are in place and non-essential services have been cancelled.
The Company continues to control operating costs; Victory Nickel and Nuinsco did not implement an across-the-board salary increase for 2012 and no salary increases occurred in 2013 in either company; executive salaries for both companies have remained at 2011 levels and, as noted earlier, average 25% salary deferrals have been agreed to by executive employees of Victory Nickel.

The Company continues to have amounts owing to fulfil the electrical equipment purchases initiated during 2010.

Through the combination of sales of marketable securities, the private placement completed in March 2013, the amended option receipt from Prophecy Platinum and the funds under the Amended Loan and any future financing, the Company expects to be able to meet its annual operating obligations and finance the acquisition of the 7P Plant as a minimum. Successful completion of any financing will largely determine the extent to which the frac sand initiative moves ahead to generate near-term cash for the Company.

Development of the Minago mine will require considerable financial resources. Management is monitoring the outcome of various financing initiatives being undertaken in the marketplace.

The Company has put together a financing strategy which includes several components; the relative proportion of each will be dependent upon the market conditions at the time the strategy is executed. Components include: securing a joint venture partner for nickel and/or frac sand, off-take agreements for both nickel concentrate and frac sand, plant and equipment leasing for the mine and frac sand processing plant, bank borrowing and/or equity issues (which may include one or more of: rights offering, private placement or a fully-marketed prospectus issue).

The Company continues to hold discussions with local and overseas financiers and potential business partners with respect to the nickel and frac sand opportunities. The completion of the private placement in March 2013 with a key partner represents the culmination of some of those discussions.

Paul Jones, Vice-President, Exploration, is a “qualified person” as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Company described herein.

**MINE PROPERTY AND DEVELOPMENT ACTIVITIES**

Pursuant to the Board approval to develop and finance the Minago mine, expenditures of $34,807,000 at the approval date were transferred from *Exploration and evaluation projects* into *Mine property and development project* on the consolidated balance sheet effective September 2011. During the year ended December 31, 2012, $2,376,000 (before receipt of a government grant of $50,000) was incurred on the project. Note that from the date of transfer to MP&D to December 31, 2011, $764,000 was incurred on the Minago project for an aggregate total spending of $4,512,000 in 2011. (For greater clarity, $3,748,000 of the 2011 spending is included in the total transfer to MP&D of $34,807,000.)

**Minago Project**

The Company’s 100%-owned Minago project is a permitted project ready for development. It is located on the unexposed southern part of the Thompson Nickel Belt in Manitoba, and is one of Canada’s largest undeveloped sulphide nickel deposits. Minago has been shown to be capable of producing a nickel concentrate grading from 22.3% up to 35.0%, making it reportedly the world’s highest grade nickel concentrate. In addition to metal by-products such as copper, cobalt, gold, platinum, palladium, silver and rhodium, a layer of silica sand averaging approximately nine metres thick overlies the nickel mineralization within the open pit. Approximately 84% of the sand is marketable as hydraulic fracturing “frac” sand, which is used to improve well recoveries in the oil and gas industry. The frac sand forms part of the overburden that must be removed prior to mining the nickel ore. According to the FS, production of frac sand could begin 20 months after the start of mine development.

The analytical data and geological interpretations obtained from a work program in 2010 were incorporated into an updated geological model and resource estimate. The updated resource incorporates a 24% increase (over the previous resource estimate) in the NI 43-101-compliant measured and indicated, pit-constrained, sulphide nickel resource used in the Minago FS. The FS is posted at www.sedar.com. Note that all resources are contained in the Nose Deposit and the update below does not include the results of the 2011 drilling program.

| | **April 2011 Pit-Constrained Resource[1]** | | | **March 2010 In-Pit Resource[2]** | | | **Increase (Decrease) in Contained Metal** | |
|---|---|---|---|---|---|---|---|---|
| | **Tonnes** | **Grade** | **Ni Content** | Tonnes | Grade | Ni Content | **Ni Content** | **Change** |
| **Category** | **Millions** | **%NiS[3]** | **M Lb** | Millions | %NiS[3] | M Lb | **M Lb** | **%** |
| **Measured** | **8.2** | **0.473** | **85.0** | 6.6 | 0.488 | 71.4 | **13.7** | **19.2** |
| **Indicated** | **22.8** | **0.432** | **217.2** | 19.1 | 0.410 | 172.6 | **44.6** | **25.9** |
| **M&I** | **31.0** | **0.443** | **302.2** | 25.7 | 0.430 | 243.9 | **58.3** | **23.9** |
| **Inferred** | **0.2** | **0.380** | **1.4** | 1.4 | 0.402 | 12.2 | **(10.8)** | **(88.4)** |

[1] Lerch-Grossman pit optimization shell [2] Whittle pit optimization shell [3] Nickel in sulphide form

A winter work program was conducted at Minago in 2011. The program comprised 8,793m of diamond drilling in 20 drill holes with associated ground and borehole electromagnetic geophysics. The program was intended to evaluate parts of the project that have seen little work to date as well as to build upon the existing data-set of the Nose Deposit nickel mineralization. The entire pit-constrained resource is located within the Nose Deposit. A total of 15 holes were collared to intersect the “North Limb”, a domain of nickel-bearing ultramafic rock extending at least 1.5km north from the Nose Deposit. A single deep hole was collared on the Nose Deposit to evaluate the depth extension of the ultramafic host rock and nickel mineralization. The hole was drilled to a total length of 1,527m and intersected approximately 160m of ultramafic rock near the bottom of the hole – confirming the extension of the host rock to depths several hundred metres below that previously tested.

A single drill hole was collared in the western part of the property in order to test the thickness of the Winnipeg Formation sand horizon. As anticipated, the hole successfully intersected the Winnipeg Formation sandstone layer (frac sand horizon) immediately above the unconformity with the Thompson Nickel Belt rocks.

A 3,500m winter work program was conducted in early 2012. The program tested a number of targets around the property that have been identified in previous work programs as well as areas that are scheduled for Minago mine infrastructure development. In part, the drilling evaluated the nickel-bearing Ospwagan Group/Pipe Formation rocks in the vicinity of the Minago Nose Deposit. Given the widespread nature of nickel mineralization on the Minago property and the number of targets identified, the possibility of intersecting completely new nickel mineralization was considered good. The drilling intersected magnetite bearing amphibolite domains, pyrite-pyrrhotite intervals and minor serpentinite.

Importantly, two holes of the 2012 program tested known nickel-bearing serpentinite that underlies mining lease ML-003 approximately 5km south of the Nose Deposit. Thirteen historic drill holes are known to have been drilled by previous operators in the area between 1968 and 1971. Ten of the thirteen holes intersected serpentinized ultramafic rock, while seven of these holes obtained significant intersections of nickel-mineralized serpentinite from within a body interpreted to be >2 km long. The most extensive intersection, in MXB-70-60, was 605m grading 0.3% Ni from 154m down hole. DDHs V-12-07 and V-12-09 completed this past winter both intersected significant widths of serpentinite and obtained analytical results consistent with historic results.

No fieldwork was conducted on the project subsequent to the Winter 2012 work program; all current work is related to reporting and evaluation of existing results.

*Frac Sand*

An indicated resource of 15 million tonnes of sandstone has been estimated to occur within the current Minago pit shell. The frac sand component of this resource is a significant contributor to the positive economics at Minago. As part of the FS, Outotec produced a feasibility-level design for a frac sand plant complete with capital and operating costs to produce 1,140,000 tonnes of frac sand annually for a ten-year period. Considerable potential exists to expand the resource beyond the limits of the current pit. The Company has also announced the creation of Victory Silica.

**Victory Silica**

On June 19, 2012, the Company announced a new initiative through the creation of Victory Silica and the hiring of Ken Murdock as its CEO. The objective is to generate cash flow while establishing VSL as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Expenditures are presently classified as pre-operating expenditures and are charged through operations. On January 9, 2013, the Company announced that it had completed an asset purchase agreement for the purchase of the 7P Plant located near Medicine Hat, Alberta.

## EXPLORATION AND EVALUATION ACTIVITIES

For the year ended December 31, 2012, the Company incurred exploration expenditures on its E&E projects of $161,000 (December 31, 2011 - $4,692,000). This includes $98,000 on the Mel project, $nil on Lynn Lake (before $1,450,000 option payments received from Prophecy Platinum), and $63,000 at the Lac Rocher project (December 31, 2011 - $3,748,000 on Minago, prior to its transfer to MP&D project, $705,000 on Mel; $3,000 on Lynn Lake (before $600,000 option payment received from Prophecy Coal) and $236,000 on Lac Rocher). The 2012 expenditures are shown before the transfer of $1,450,000 through operations (December 31, 2011 - $597,000) with respect to the Lynn Lake option receipts in excess of carrying value.

**Mel Project**

The Mel project is located on the Thompson Nickel Belt, just north of Thompson, Manitoba. It is a large property, approximately 25km east-west by about 6km north-south, and remains underexplored.

Mel has an indicated resource of 4.3 million tonnes grading 0.88% nickel (approximately 83 million pounds in-situ nickel) and an additional inferred resource of one million tonnes grading 0.84% nickel (approximately 19 million pounds in-situ nickel) and offers significant exploration upside as well as near-term production potential.

The Company had earned a 100% ownership of Mel subject to a 51% Vale back-in right. During the third quarter of 2010, the Company announced that Vale had determined that it would not exercise its back-in right. Title to the property has been transferred. Accordingly, the Company is in a position to determine future programs at Mel in its sole discretion.

Ten drill holes, totalling 3,459m, comprised the 2011 winter work program on the Mel Property, the first managed by the Company. Two drill holes, totalling 739m, were collared to test a UTEM geophysical anomaly approximately 700m north of the Mel deposit associated with earlier prospective nickel results; no sulphide mineralization was encountered. Eight drill holes, totalling 2,720m, were collared to test the down-dip extension of the Mel resource shell; all holes intersected nickel mineralization of grade and width comparable to that obtained in holes that comprise the existing resource.

The Mel dataset is currently being vetted and updated – this work will apply to both the drilling data on the Mel deposit as well as the considerable drilling (111 drill holes) conducted of the claims portion of the property. Following completion of this work, additional modelling of the resource is contemplated. No fieldwork has been conducted during 2012.

Under the terms of the option agreement, Vale must mill ore from the Mel project at cash costs plus 5% subject to capacity availability and metallurgy – this is unaffected by Vale's decision not to exercise its back-in right.
Furthermore, in accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

**Lac Rocher**

Lac Rocher is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cutoff, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per lb in the Lac Rocher PEA was US$9.74 with copper at US$3.65.

The Lac Rocher property is subject to a discovery incentive plan (the “DIP”) to reward certain individuals involved in the discovery of Lac Rocher with a 2% net smelter royalty (”NSR”) for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

Year round access is now available to the site. In December 2009, diamond drilling was conducted to provide geotechnical data deemed necessary for future portal and ramp development. An InfiniTem ground electromagnetic survey was conducted over a portion of the property to test for deeper extensions to the nickel mineralization. At the same time, evaluation of the availability of borrow material was also conducted in the local region. No fieldwork other than a brief examination of site conditions and drill core storage was conducted on the site during 2011 or 2012.

**Lynn Lake**

The Lynn Lake property is located in the historic mining town of Lynn Lake in northern Manitoba, about 320km by road northwest of the Thompson mining camp.

As discussed earlier and described in Note 12 to the 2012 Audited Consolidated Financial Statements, the Company has optioned Lynn Lake to Prophecy Coal with subsequent assignment to Prophecy Platinum. Failure on the part of Prophecy Platinum to meet any of the terms (or Prophecy Coal’s rectification of Prophecy Platinum’s deficiencies) will result in cancellation of the option on the property and it will revert to the Company. Among other things, the option included a commitment to make $3,000,000 in expenditures on the property.
As discussed earlier, on August 8, 2012, the Company received $450,000 from Prophecy Platinum in consideration for waiving the remaining expenditure commitment. On March 1, 2013 the option agreement was amended to schedule out an aggregate of $1,125,000 over the period to August 29, 2014; $125,000 was received on March 1, 2013. There is no reason to believe that Prophecy Platinum will not meet its remaining option payments to acquire the property and it will transfer to Prophecy Platinum at that point in 2014. Given the stage of the option agreement, the Company no longer considers Lynn Lake to be a material mineral project of the Company; it is included here for completeness.

## IMPAIRMENT ANALYSIS

While the metals markets and other general economic factors continue to be relatively stable, there has been no marked recovery. The Company performed a detailed impairment analysis on each of its E&E projects and the MP&D project as at December 31, 2012. The Company does not believe that there have been any material changes to date which would adversely affect this analysis. Furthermore there has been no change in management's plans for the projects which would cause a reassessment.

While the metals markets and other general economic factors have continued to stabilize over the prior year, there has been no marked improvement and the challenge remains to find financing for development of projects. This difficulty is not a reflection of the quality of the Company's projects but is indicative of a general malaise affecting the junior resources sector in general. The Company performed a detailed impairment analysis at the project level.

An initial indicator of impairment considers the market capitalization of a company compared with its net book value. At and around the end of December 31, 2012, the Company's market capitalization was below its net book value – being approximately 19% of net book value. A 100% ratio would require a share price of approximately $0.13 which was more recently achieved in early 2011. However, many resource companies continue to experience similar circumstances in present markets despite having good projects. In particular, we continue to note situations where a company's cash balances may exceed its market capitalization. An analysis was performed on each of the Company's E&E projects and the MP&D project.

The analysis reviewed historic expenditures recorded on each project along with any purchase price allocations from acquisitions, reflected the existence of previous writedowns or reversals of impairment and also considered the existence of any economic studies which had been performed. The assumptions used in such studies were reviewed for such factors as: forecast metals prices, foreign exchange rates, changes in resource and/or cost estimates, changes in royalty arrangements, the existence of significant by-products and other matters as necessary. In addition, any third-party arrangements, such as the Lynn Lake option, were also taken into consideration.

Forecast metals prices were estimated from third-party sources such as analyst consensus reports and other available documentation which were considered to be reasonable by management. In particular, for the FS base case, a three-year historic average nickel price of US$11.19 and an exchange rate of US$0.9116 : C$1.00 were used. Since the FS was performed, metals prices have changed. The Company continues to work on updating the FS for improved economics and announced updated resource estimates in 2011 as a result of the drilling performed in 2010. The FS was re-run using prices derived from forecasts of US$8.65 for nickel and an exchange rate of US$1.005: C$1.00. In 2012, the Company identified cost savings of approximately $5.6 million with respect to removing the overburden on the Minago pit footprint. Considering these factors produced a positive NPV in excess of the book value of the project. Accordingly, no impairment exists on the Minago project.

Capital and operating cost estimates generally were reduced from those used in historic studies if documentary evidence had recently been obtained as part of the review work which had been undertaken for the Minago FS. For the Minago project in particular, the transformer commitment has been made at a much-reduced cost than was used in the FS. Used equipment prices cannot be typically reflected in a FS, as the market is unpredictable, except where firm pricing has been negotiated. Often cost estimates used in previous studies had been derived when such were universally recognized to be at historic highs.

Furthermore, management's intentions with respect to future expenditures and plans for the projects were considered. With the exception of some small projects acquired as part of the Independent acquisition in 2008 and which were valued at $nil as part of the purchase accounting, all projects have had recent expenditures and are considered to be active. All of the Company's projects were tested for impairment as at the balance sheet dates.

Management concluded that no impairment existed in each of its projects effective December 31, 2012 and that costs incurred to date are recoverable. The Company will continue to monitor developments as they occur in the metals markets and the economy and will update its impairment analysis to take account of any such changes, as appropriate.

**CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS**

Critical accounting estimates and judgements used in the preparation of the consolidated financial statements include determining the carrying value of investments, mine property and development project and exploration and evaluation projects, assessing the impairment and classification of long-lived assets, determining the recoverability of deferred income tax assets, the valuation of share-based payments and the disclosure of contingencies and going concern matters. These estimates involve considerable judgement and are, or could be, affected by significant factors that are out of the Company's control.

For a complete list of the significant accounting policies as well as information concerning the use of estimates, judgements and measurement uncertainty, reference should be made to Note 3 to the Company's 2012 Audited Consolidated Financial Statements. The Company's consolidated financial statements have been prepared using the going concern assumption; reference should be made to Note 1 to the Company's 2012 Audited Consolidated Financial Statements.

The recorded value of the Company's E&E projects and the MP&D project is based on historic costs that are expected to be recovered in the future. The Company's recoverability evaluation is based on market conditions for minerals, underlying mineral resources associated with the properties and future costs that may be required for ultimate realization through mining operations or by sale. The Company is in an industry that is exposed to a number of risks and there is always the potential for a material adjustment to the value assigned to these assets. Such risks also extend to the evaluation of fair values of net assets upon acquisition.

The fair value of the stock options and warrants is calculated using the Black-Scholes option-pricing model that takes into account the exercise price, expected life of the option/warrant, expected volatility of the underlying shares, expected dividend yield, and the risk-free interest rate for the term of the option/warrant.

The Company has determined that it is highly probable that Victory Nickel will generate returns sufficient to utilize its taxable losses prior to their expiry. This is a significant judgement that, dependent upon future events, may turn out to be incorrect. Presently, since Victory Silica is in its pre-operating phase, a full valuation allowance has been recorded against losses incurred in that subsidiary.

## NEW ACCOUNTING POLICIES

IFRS issued by the International Accounting Standards Board ("IASB") have been adopted in the Company's 2012 Audited Consolidated Financial Statements. Note 3 to those statements include the accounting policies that have been applied and includes any new accounting policies – there have been none implemented to date except that the financial statements are now prepared on the consolidated basis in accordance with early-adoption of IFRS 10 and 12 due to the incorporation of a new subsidiary company, Victory Silica.

### Basis of Consolidation

#### *Subsidiary*

A subsidiary is an entity controlled by Victory Nickel. Control exists when Victory Nickel has the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities. In assessing control, potential voting rights that currently are exercisable are taken into account. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases. The accounting policies of Victory Silica align with the policies adopted by Victory Nickel. Significant Company entities are listed in Note 23 to the 2012 Audited Consolidated Financial Statements.

## FUTURE ACCOUNTING CHANGES

### New Standards and Interpretations Not Yet Adopted

The IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued the following new and revised standard and interpretations which are applicable to the Company but which are not yet effective for the year ended December 31, 2012.

#### *IFRS 10 - Consolidated Financial Statements*

Effective for annual periods beginning on or after January 1, 2013, with early adoption permitted, IFRS 10 establishes principles for the presentation and preparation of consolidated financial statements when an entity controls one or more other entities. The IFRS defines the principle of control and establishes control as the basis for determining which entities are consolidated in the consolidated financial statements.

***IFRS 12 – Disclosure of Interests in Other Entities***
Effective for annual periods beginning on or after January 1, 2013, with early adoption permitted, IFRS 12 requires the disclosure of information that enables users of financial statements to evaluate the nature of, and risks associated with, its interest in other entities and the effects of those interests on its financial position, financial performance and cash flows.

Early adoption of these standards is only permitted if IFRS 10, IFRS 11, IFRS 12 and the consequential amendments to IAS 17 and IAS 18 are adopted at the same time, with the exception of early adopting only the disclosure provisions for IFRS 12 without the other new standards.

The Company has early-adopted these standards when consolidating its subsidiary Victory Silica.

***IFRS 13 – Fair Value Measurement***
Effective for annual periods beginning on or after January 1, 2013, with early adoption permitted, IFRS 13 provides a definition of fair value, a single framework for measuring fair value and disclosure requirements about fair value measurements.

***Amendments to IAS 1 – Presentation of Financial Statements***
Effective for annual periods beginning on or after July 1, 2012, the amendments to IAS 1 require companies preparing financial statements in accordance with IFRS to group together items within OCI that may be reclassified to the income or loss section of the statement of operations.

IFRS 13 and Amendments to IAS 1 have not been early-adopted by the Company. However, the Company does not believe that the application of these pronouncements will have a material impact on the consolidated financial statements of the Company.

## CORPORATE GOVERNANCE

The Company's Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of directors, none of whom are employees or officers of the Company, meets with management to review the 2012 Audited Consolidated Financial Statements to satisfy itself that management is properly discharging its responsibilities to the directors who approve the financial statements. The Board of Directors has also appointed compensation and corporate governance and nominating committees composed of non-executive directors.

**Evaluation of Disclosure Controls and Procedures**

The Company's Chief Executive Officer and Chief Financial Officer, (collectively, the "Certifying Officers"), are responsible for designing a system of disclosure controls and procedures, or causing them to be designed under their supervision, to provide reasonable assurance that information required to be disclosed in reports filed with or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities laws and that material information relating to the Company is made known to them with respect to financial and operational conditions to allow timely decisions regarding required disclosure. For the fiscal year ended December 31, 2012, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's disclosure controls and procedures as defined under the rules adopted by the Canadian securities regulatory authorities. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's disclosure controls and procedures were effective as at December 31, 2012. Such controls are facilitated by the small size of the Company's senior management team and their access to material information.

There were no changes to the Company's disclosure controls and procedures that occurred the year ended December 31, 2012 that materially affected, or are reasonably likely to affect, the Company's disclosure controls and procedures.

**Evaluation of Internal Control over Financial Reporting**

The Company's Certifying Officers are responsible for designing a system of internal controls over financial reporting, or causing them to be designed under their supervision, to provide reasonable assurance regarding the reliability of financial reporting and preparation of consolidated financial statements for external purposes in accordance with Canadian GAAP. The Company used the COSO control framework. For the fiscal year ended December 31, 2012, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's internal control over financial reporting. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's internal controls over financial reporting and procedures were effective as at December 31, 2012. During the year, the Company made improvements to the internal controls over financial reporting as part of its continuous improvement process.

The management of the Company was required to apply its judgement in evaluating the cost-benefit relationship of possible controls and procedures. The result of the inherent limitations in all control systems means no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected.

There were no changes to the Company's internal controls over financial reporting that occurred during the year ended December 31, 2012 that materially affected, or are reasonably likely to affect, the Company's internal controls over financial reporting.

## TRANSACTIONS WITH RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, deferred directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 16 and 18 to the 2012 Audited Consolidated Financial Statements).

Balances and transactions with related parties as at and for the years ended December 31, 2012 and 2011 are shown in the following tables:

| **As at December 31,** | | **2012** | | 2011 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **157** | $ | 47 |

Key management personnel compensation comprises:

| **Years ended December 31,** | | **2012** | | 2011 |
|---|---|---|---|---|
| Short-term employee benefits | **$** | **807** | $ | 1,028 |
| Share-based payments - options | | **217** | | 320 |
| Share-based payments - Share Bonus Plan | | **-** | | 50 |
| | **$** | **1,024** | $ | 1,398 |

### Balances and Transactions with Nuinsco under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice.

Balances and transactions with Nuinsco under the management agreement as at and for the years ended December 31, 2012 and 2011 are shown in the following tables:

| **As at December 31,** | | **2012** | | 2011 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Receivable from Nuinsco Resources Limited under the management agreement | **$** | **37** | $ | 20 |

| Years ended December 31, | | 2012 | | 2011 |
|---|---|---|---|---|
| **Transaction Values** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **654** | $ | 829 |
| Overhead charges to Nuinsco Resources Limited | **$** | **27** | $ | - |
| Project costs charged to Nuinsco Resources Limited | **$** | **22** | $ | 39 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **31** | $ | 67 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis; Nuinsco has agreed to defer the payment of $36,000 of its charges related to management salaries consistent with deferrals accepted by the Company's executive employees. Payables to key management personnel generally relate to deferred directors' fees, consulting fees, deferred salaries and expense reimbursements.

## OUTSTANDING SHARE DATA

As at March 25, 2013, the Company had 446,245,542 common shares issued and outstanding. In addition, there were 25,862,500 stock options outstanding which, if exercised and issued, would bring the fully diluted issued common shares to a total of 472,108,042 and would generate cash of approximately $2,845,000. However, most of the options are not "in the money".

## RECENT DEVELOPMENTS

### Acquisition of Sand Recycling Plant

On January 9, 2013, the Company announced that it had completed an asset purchase agreement for the purchase of the Seven Persons sand recycling facility for $710,000. The 7P Plant is located near Medicine Hat, Alberta and its acquisition presents Victory Silica with an avenue to generate cash flow from frac sand production and sales in the near-term.

### Shares Issued to Satisfy Accounts Payable

On January 16, 2013, the company issued 4,720,000 shares to satisfy $118,000 in accounts payable owing.

### Private Placement

On March 22, 2013, the Company issued 44,178,500 common shares under a private placement at $0.05 per share, generating gross proceeds of approximately $2,209,000.

### Amendment and Extension of Loan Agreement

On March 25, 2013, the Company announced that it had amended and restated the loan agreement to increase the secured loan facility to up to $3,000,000 under certain circumstances. As with the original loan, the Amended Loan bears interest at 12% per annum, payable quarterly in arrears, and matures on January 31, 2015 and can be used to fund capital expenditures relating to the 7P Plant. The lender continues to have the right to elect to receive prepayment of $1,000,000 of the Amended Loan from the proceeds of the Lynn Lake option payment due and payable in periodic instalments through August 2014.

Prior to June 1, 2014, the lender has the right to convert the outstanding balance of the Amended Loan into a participating interest whereby the lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender's participation is capped at $10,000,000, with a minimum of $7,500,000, and is subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. The lender has also agreed to backstop an equity issue, if any is announced, with cash or by converting a portion of the Amended Loan into shares, at the lender's option to an amount up to $1,500,000 under certain circumstances.

The Company will pay, with shares, an arrangement fee of up to $300,000 plus a commitment fee of 1.5% per annum on unutilized balances.

There have been no other additional developments not already discussed elsewhere in this MD&A.

**RISKS AND UNCERTAINTIES**

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

**FORWARD-LOOKING STATEMENTS**

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

**Interim MD&A, for the Three and Nine Months Ended September 30, 2015 (Dated November 12, 2015)**

The following discussion of the results of operations, financial condition and cash flows of Victory Nickel Inc. ("Victory Nickel" or the "Company") prepared as of November 12, 2015 consolidates management's review of the factors that affected the Company's financial and operating performance for the three and nine months ended September 30, 2015, and factors reasonably expected to impact on future operations and results. This discussion is intended to supplement and complement the Company's unaudited condensed consolidated financial statements for the three and nine months ended September 30, 2015 ("Unaudited Condensed Consolidated Financial Statements") and the notes thereto.

Certain information and discussion included in this management's discussion and analysis ("MD&A") constitutes forward-looking information. Readers are encouraged to refer to the cautionary notes contained in the section *Forward-Looking Statements* at the end of this MD&A.

Readers are also encouraged to consult the audited consolidated financial statements for the year ended December 31, 2014 ("2014 Audited Consolidated Financial Statements") which were prepared in accordance with International Financial Reporting Standards ("IFRS" or "GAAP"). The Unaudited Condensed Consolidated Financial Statements and the 2014 Audited Consolidated Financial Statements are available at www.sedar.com and at the Company's website www.victorynickel.ca. All amounts disclosed are in United States dollars ("US$" or "US dollars") unless otherwise stated. All tabular amounts are in thousands of US dollars.

Shares of the Company trade on the Toronto Stock Exchange ("TSX") under the symbol NI. On August 4, 2015, the Company received a letter from the TSX advising that its eligibility for continued listing on the TSX is under review. Under the TSX's Remedial Review Process, the Company has been granted 60 days from that date to comply with all requirements for continued listing. On October 2, 2015, the Company announced that the TSX's Continued Listing Committee had granted an extension of its delisting review, deferring its delisting decision until no later than December 4, 2015. By that date the Company is required to comply with all requirements for continued listing. It is the intent of the Company to maintain a public listing for the Company's shares. In addition to working with the TSX during this period, management will evaluate alternative listing options. There can be no assurance that either the Company will be able to achieve compliance with the TSX's listing requirements within the required time frame or will secure an alternative listing.

**Change in Functional and Presentation Currency**
Effective October 1, 2014, the Company changed its functional currency to the US dollar from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) to the 2014 Audited Consolidated Financial Statements for additional information.

## COMPANY OVERVIEW

Victory Nickel is a Canadian producer of high-quality "Northern White" frac sand sourced from Wisconsin, USA, through its wholly-owned subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica"). Northern White occurs predominantly in the US Mid-West and generally exceeds American Petroleum Institute ("API") specifications. For this reason, it is a highly-desirable and preferred frac sand. Frac sand is used as a proppant to enhance the recovery from oil and gas wells. The Company's frac sand processing facilities are located in Seven Persons, Alberta and comprise a wet plant with capacity of approximately 120,000 tons per annum ("tpa") and a fully-operational dry plant with a nominal capacity of 500,000 tpa (the "7P Plant"). In April 2015 the Company announced the temporary suspension of production at its 7P Plant as demand for frac sand dropped off during the spring break-up season and due to the decrease in activity related to the sudden drop in the price of oil. In May 2015, spot sales of frac sand from the 7P Plant resumed and the 7P Plant operates on an as-needed basis only.

In addition to the significant frac sand resource at its Minago project in Manitoba, in October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months from receipt of permits with two equivalent extensions available under certain circumstances. Prior to production the Company will be required to pay $40,000 per annum an as advance royalty on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin. In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit Envirosolutions Inc. ("Summit") on the Bear Coulee Property and was incorporated into a National Instrument 43-101 technical report.

The Company has considered constructing a wet plant in Wisconsin or Minnesota and is also completing preliminary studies to build a second 1,000,000 tpa dry plant in or near Winnipeg, Manitoba. Market conditions necessitate the deferral of any such construction until more certainty returns to the oil and gas sector.

Crucial to the success of its frac sand operations is the Company's ability to build a solid customer base within an economic distance of its production facilities. The Company was able to establish itself as a preferred supplier in the areas around Medicine Hat, Alberta through spot-market sales and short-term contracts. The Company's 7P Plant is located in close proximity to oil and gas producing plays in Alberta, BC, Saskatchewan and North Dakota, allowing customers to purchase sand FOB the 7P Plant and use their own trucks to deliver to the wellhead or, alternatively, to have the Company deliver frac sand directly to the wellhead. A small portion of finished sand is delivered by rail.

The Company was formed on February 1, 2007 as exploration and development mineral resource company and, until recently, was primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada. Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Corazon Mining Ltd. ("Corazon"), an Australian public company (ASX: CZN) refer below) and Mel projects in Manitoba and the Lac Rocher project in Québec. The results of a feasibility study on the Minago Project ("FS") were announced in December 2009, the Environmental Impact Study ("EIS") was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Environmental Act Licence ("EAL") was announced in August 2011. In April 2014 the Company announced the filing of an amendment to the EAL. A preliminary economic assessment of Lac Rocher ("PEA") was announced in November 2008. Baseline environmental studies are ongoing at Mel in preparation for permit applications should the economics support development.

In November 2014, Corazon optioned Lynn Lake. Under the terms of the agreement, Corazon can acquire a 100% interest by issuing to Victory Nickel 40 million Corazon shares upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project. The Company received 40,000,000 shares of Corazon in April 2015.

The Company's decision to enter the frac sand business was initially based on the need to highlight the value of the frac sand as a co-product at its Minago nickel project in Manitoba. Based on the FS, approximately 11 million tonnes of frac sand exist within the Minago pit footprint. The frac sand is a significant contributor to the economics of the Minago project. On June 19, 2012, the Company announced the creation of Victory Silica, a wholly-owned subsidiary that has been established to manage the Company's entry into frac sand production and distribution. The Company has established itself as a frac sand producer by acquiring concentrated sand in Wisconsin, USA and processing it into four main categories of finished frac sand products at the 7P Plant.

The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014. Due to the sudden drop in the price of oil during late 2014, drilling activities by E&P companies has decreased and sales of frac sand have been significantly affected in 2015. The drop in sales required a temporary suspension in production in 2015.

**Going Concern**

These condensed consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at September 30, 2015, the Company had a working capital deficiency of $10,657,000. The Company generated net cash from operating activities of $895,000 during nine months ended September 30, 2015 but this is not yet at levels sufficient to wholly fund its activities.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the securities purchase and line of credit agreement (the "SPA Loan") and on the unsecured promissory convertible notes (the "Promissory Convertible Notes") outlined below, and that it was in discussion with its lenders and other potential financiers to restructure the Company's debt and recapitalize the Company. On July 30, 2015, the Company announced it had not repaid the principal amounts due under the SPA Loan. On September 30, 2015 the Company was unable to make the quarterly interest payments on the SPA Loan and the Promissory Convertible Notes due then. On November 12, 2015, the Company announced it had not repaid $2,000,000 in principal due under the Promissory Convertible Notes. The Company is continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due. There can be no assurance that the Company will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the lenders may take in light of these defaults.

On May 15, 2014, the Company announced that it had executed the SPA Loan to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a "SPA Note").

In October 2014, the Company obtained a short-term facility of $2,000,000 through the issuance of a promissory note. This facility was paid down to $1,000,000 and the due date extended on a monthly basis by the lender to May 31, 2015 (Note 14).

On June 3, 2015, the Company announced it had entered into an amending agreement (the "Amending Agreement") with respect to the SPA loan. Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note and for working capital purposes. The aggregate amount of $5,150,000 under the amended loan is due on July 30, 2015. The interest rate on the Amended Loan is 14.8% per annum. As noted earlier, the Company was unable to repay the amounts due under the SPA Loan on July 30, 2015.

In addition to the SPA loan, the Company issued two year unsecured promissory convertible notes aggregating approximately $6,000,000 (the "Promissory Convertible Notes"). One Promissory Convertible Note in the amount of $2,000,000 is in default as it was due November 11, 2015, three Promissory Convertible Notes aggregating $750,000 are due in February 2016, four Promissory Convertible Notes aggregating to C$265,000 are due at various times between January and March, 2016 and one Promissory Convertible Note in the amount of $3,000,000 is due in July, 2016, accordingly, they are classified as current liabilities, due within one year. Interest due on the Promissory Convertible Notes is due quarterly in arrears. As noted earlier, the Company was not able to make the interest payment due on June 30, 2015 and September 30, 2015.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. During the second quarter of 2014, the Company was in the start-up and commissioning stage and began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. On April 14, 2015, the Company announced that operations at the 7P Plant were temporarily suspended until the demand for frac sand improves; this temporary suspension was due to the dramatic decrease in energy pricing that began in 2014. On June 23, 2015, the Company announced that there were no sales made during the period from March 14 to May 12, 2015 at which time frac sand sales activity resumed. Sales activity has not resumed at the rates achieved during 2014 and the 7P Plant operates temporarily on an as-needed basis in order to fulfil customer needs.

Despite these sales, the near-term outlook in the frac sand market remains unclear due to the continuing downward pressure on the oil price and related impact on exploration and production on oilfield services companies. The strength of the US dollar is also impacting demand for high-quality Wisconsin sand as the price for domestic sand has dropped and service companies appear satisfied with using lower quality domestic sand because of the price differential. This will continue to stress the Company's liquidity until such time as the market demand recovers and operations can resume on a consistent basis.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from its frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to restructure its debt and improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including debt servicing, project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern. Failure to continue as a going concern would require that the Company's assets and liabilities be restated on a liquidation basis, which would differ from the going concern basis.

## OUTLOOK

As a typical junior resource company with little to no access to financial and capital markets necessary to move mineral projects forward, the Company had to find an alternative. Waiting for the resource markets, more specifically the nickel markets, to turn around was not considered to be an acceptable option. So in June 2012, the Company announced its intention to enter the frac sand business with a plan that was certainly considered very aggressive and a vision at best. With the efforts of the talented team that was put together under the leadership of Ken Murdock, CEO of Victory Silica, that vision is now a reality.

Victory Nickel, through its wholly owned subsidiary Victory Silica is now a producer and distributor of high-quality northern white frac sand for sale into the northern markets of Canada and the U.S. Victory Silica's product has received universal acceptance in the oil and gas service industry and the Company now boasts a customer list of leading companies in the industry.

Choosing to enter the frac sand business was not without reason. The strong market fundamentals for frac sand suggested continuing growth of the industry and new public information and strong peer group valuations indicated the availability of near-term cash flow. With an entry fee of approximately $6,000,000 to build a frac sand processing facility, the risk was considered acceptable based on expected cash flows. Suddenly, toward the end of 2014 and apparently to everyone's surprise, the bottom fell out of the oil industry and the price of oil crashed from in excess of $100 per barrel to the mid $40s. There were indications of a recovery to $60 during the first quarter but this appears to have disappeared as the price retreated. In the United States, 2014 production of 9.42 million barrels was the highest since 1983. Aided by fracking, the United States was on its way to becoming energy self-sufficient. One can only assume that the U.S. would rather provide their own oil than have to be dependent on other nations.

During the first quarter of 2015 we saw demand for frac sand come to a full stop as exploration and production ("E&P") companies cancelled or deferred capital programs. To further exaggerate the slowdown caused by a decline in drilling due to the price drop, this all happened during the typical slow period while road restrictions are in place due to spring breakup. We are now in November and the reduced demand for sand is continuing into the fourth quarter. However, we have seen some signs of returning demand. The price of oil necessary to create a resurgence of demand is yet to be understood. Major suppliers of frac sand have said that the long-term fundamental trends for sand demand remain favorable and that the price discounts are not sustainable in the long term.

The sudden negative turn of events could not have come at a more crucial time in our development and entry into the frac sand industry. Production was ramping up but the sudden slowdown in demand required that the Company temporarily suspend production at its 7P Plant. Once demand returns, the Company has in excess of 40,000 tons of sand at various stages of completion to enable the Company to immediately respond to customer needs.

The 7P plant is Phase One of the Company's three-phased plan to enter the frac sand business. During the ongoing temporary suspension of production at the 7P Plant, small plant improvements are being made which should reduce or eliminate issues experienced during the commissioning and start up stages.

The Company has reduced staffing but kept a core group of employees to ensure that the plant can be operated as needed and reactivated without delay. The Company has reduced its fixed costs by returning equipment under lease such as rail cars and unloaders. In addition, the marketing and logistics team are developing programs which should allow the Company to better compete in the Canadian market where exchange rates now make domestic sand more competitive compared to imported tier one sand.

The business plan has not changed; it is only deferred. Having completed Phase One, the board of directors approved moving forward to Phase Two of the Company's three phase business plan. With the decline in demand caused by the drop in the price of oil, Phase Two will be difficult to finance. However, Phase Two is a desirable next step which would not only make the Company more competitive but also provide significant flexibility to target certain markets which often require different grades of sand.

Phase Two is to build a wash plant on a Wisconsin sand resource. Frac sand production is a two-stage process: the wet stage and the dry stage. The Company has historically contracted out the wet stage in Wisconsin prior to shipping the wet sand to its plant in Alberta. The wet stage removes the fines and clays, allowing transport of only the coarser fractions. The dry stage, where the sand is dried and separated into several products of different sizes, is completed at the Company's 7P Plant a 500,000 tpa dry processing facility. This is of great advantage in maintaining the high quality of the sand.

The three-phase approach to entry into the business was designed to minimize risk to Victory Nickel shareholders. The cost of entry with Phase One was approximately $6,000,000, or less than $12 per ton of annual plant production capacity. This represents approximately 30% of the expected capital required to build a new plant. The capital recovery period is generally in excess of two years with a new plant; In Victory Nickel's case, this period is approximately six months at full pricing and production levels.

Phase Three of the business plan is to build a second dry processing facility in or around Winnipeg, Manitoba capable of producing 1,000,000 tpa. The Company is targeting a site which is serviced by multiple rail carriers. This gives the Company more flexibility in accessing only the highest quality sand from the Wisconsin/Minnesota region. The ultimate plan is to provide customers with a variety of qualities which would include domestic sand, possibly from the Company's Minago project in Manitoba which has been permitted and is ready for development when the price of nickel recovers. The Minago project is a nickel project overlain by overburden which includes sand meeting the frac sand specs. The Winnipeg formation sand located at Minago is the highest-quality domestic sand and would be a welcome addition to the Company's mix of products. Not all of our customers' applications require Wisconsin sand.

The Minago FS completed in 2009 indicated that the frac sand component of the Minago open pit contributed approximately $2.90 per pound of nickel; a very significant co-product. The sand resource at Minago is not restricted to the footprint of the open pit but extends beyond the pit limit such that it is not unreasonable to expect that there is sufficient sand to last in excess of 100 years at the million ton per year rate of extraction; this would be a new industry for Manitoba

E&P companies continue to squeeze oil services companies to reduce costs. Oilfield service companies in return push suppliers including frac sand suppliers to reduce costs. The uncertainty is causing panic selling in some cases. Conversely, there are indications that oilfield services companies are being opportunistic and stocking up on cheap sand. This is not sustainable.

We cannot change the market. All we can do is work with it and within it. The immediate concern is to satisfy the secured lender and to implement an acceptable an achievable debt restructuring plan to allow the Company to bridge the gap until markets recover. Management has been working with not only its secured lender but also with unsecured lenders and suppliers to implement an acceptable recapitalization plan. Management believes that a solution is near and expects to have the restructuring completed during the fourth quarter.

Management salaries and director's fees currently due are being deferred or eliminated. To this end we thank our employees, many suppliers and our lenders who are showing patience.

## RESULTS OF OPERATIONS

### Overall

For the three months ended September 30, 2015, the Company had a net loss of $1,599,000 and a net loss of $2,776,000 for the nine months ended September 30, 2015, or a loss of $0.03 and $0.05 per share for both the three and nine month periods (losses for the three months ended September 30, 2014 - $373,000 or $0.01 per share and nine months ended September 30, 2014 - $2,512,000 or $0.04 per share). The following narrative discusses the relevant operations of the Frac Sand and Exploration and Development segments first, and then addresses more general and corporate activities.

### *Three Months Ended September 30, 2015 Compared with Three Months Ended September 30, 2014*

| Three months ended Sept 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total | Sept 30, 2014 Total |
|---|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 325** | **$ -** | **$ 325** | $ 5,463 |
| Cost of goods sold | - | - | **(888)** | - | **(888)** | (4,774) |
| **Gross margin** | **-** | **-** | **(563)** | **-** | **(563)** | 689 |
| **Operating expenses** | | | | | | |
| General and administrative | **(185)** | **(22)** | **(106)** | - | **(313)** | (579) |
| Share-based payments: | **-** | **-** | **-** | - | | - |
| Options | **(5)** | - | - | - | **(5)** | (235) |
| Amortization of property, plant and equipment | **(2)** | **(2)** | **(157)** | - | **(161)** | (174) |
| Recovery (writedown) of E and E projects | - | - | - | - | - | (24) |
| Pre-exploration costs | - | - | - | - | - | (4) |
| Net frac sand pre-operating costs | - | - | - | - | - | - |
| Non-recurring plant costs [(1)] | - | - | **13** | - | **13** | - |
| **Operating income (loss)** | **(192)** | **(24)** | **(813)** | **-** | **(1,029)** | (327) |
| Finance income | **185** | - | - | - | **185** | 987 |
| Finance costs | **(755)** | - | - | - | **(755)** | (1,242) |
| **Net finance costs** | **(570)** | **-** | **-** | **-** | **(570)** | (255) |
| **Income (loss) before income taxes** | **(762)** | **(24)** | **(813)** | **-** | **(1,599)** | (582) |
| Income tax expense | - | - | - | - | - | 209 |
| **Net Income (loss) for the Period** | **$ (762)** | **$ (24)** | **$ (813)** | **$ -** | **$ (1,599)** | $ (373) |

## Frac Sand

Due to the recent sudden decline in the price of oil combined with the spring break up period when road restrictions are in place, demand for frac sand in the Company's target markets basically came to a full stop in the first quarter of 2015. The Company accumulated inventory of in excess of 40,000 tons at various stages of the process. Until inventories are drawn down through sales, the Company temporarily suspended production. Sales resumed on a spot basis in May, 2015. During this period, operating personnel were trained and equipment was debugged.

The commissioning of the Company's 7P Plant was completed during the third quarter of 2014 and, during that three-month period, produced 39,121 tons of various grades of frac sand.

*Revenues*

During the third quarter ended September 30, 2015, revenue was $325,000 or $114.88 per ton on sales of 2,829 tons resulting in a negative gross margin of $563,000. This period was not a typical sales period as the sudden and material drop in the price of oil caused such uncertainty in the market that E&P companies effectively stopped activities in our market area.

Revenues of $5,463,000 for the three months ended September 30, 2014 were generated from the sale of 34,892 tons of frac sand. The three-month period included approximately one month of commissioning

*Cost of goods sold*

The cost of goods sold includes the cost of concentrated sand purchased in Wisconsin, the cost of delivery to the 7P Plant including handling and transloading costs and the operating cost to dry and screen the concentrated sand into four main dry products. These costs are capitalized as a component of inventory on a normalized basis and are charged to cost of goods sold when title to the product passes to the customer.

The cost of goods sold was $888,000, or $313.89 per ton of frac sand sold for the three months ended September 30, 2015, including an inventory write-down of $494,000 as the Company wrote off obsolete inventory and recorded finished inventory at the lower of cost or net realizable value. The price per ton of frac sand after the inventory adjustment was $138.92. This compares with $4,774,000 for the same period of 2014 or $136.82 per ton; a portion of the sales are priced on a delivered basis and include transportation costs to the customer. Included in the three month period of 2014 is approximately one month of commissioning during which time production and sales were below full capacity levels as the plant was not operating at its design level.

Costs incurred from the 2015 temporary suspension are included in *Non-recurring plant costs* and do not form part of the cost of sales or inventory. The Company has now reduced manpower to a skeleton crew sufficient to start production as demand returns on a consistent basis.

Costs per ton are per dry ton, unless otherwise stated.

Concentrated wet sand is purchased through long-term supply agreements with third parties at specified prices per ton. For the three months ended September 30, 2015 the cost of washed concentrated sand delivered to rail and included as a component of inventory was $32.81 per ton. Transportation costs including freight charges and fuel surcharges when transporting sand from Wisconsin to the 7P Plant, transload costs at the source and at the 7P Plant, as well as railcar lease payments were $59.79 per ton for the three months ended September 30, 2015. Other elements of cost of goods sold were $25.78 per ton during the three months ended September 30, 2015 and were primarily operating expenditures at the plant and mobile equipment lease payments. This adds to a finished goods inventory cost of $119.4 per ton. Finish goods inventory was written-down to the net realizable value of $105.00 per ton to reflect current market conditions in the quarter. Finished goods inventory does not include freight for sales sold delivered to the customer.

*Gross margin*
The 7P Plant generated a negative gross margin of $563,000 (2014-gross margin of $689,000).(2014-$19.75) for the three months ended September 30, 2015 on sales revenue of $325,000 (2014-$5,463,000). The negative gross margin was affected by a combination of price reductions and cost increases due to the low production level during 2015 and the inventory adjustment. The sustained drop in the price of oil is putting pressure on the price of frac sand as producers discount excess inventory.

*General and administrative and other costs*

General and administrative ("G&A") costs for the frac segment amounted to $106,000 for the three months ended September 30, 2015. These costs include Victory Silica administration, marketing and logistics management. The Company has now reduced manpower to a skeleton crew and overhead sufficient to start production as demand requires.

Amortization of property, plant and equipment of $157,000 was recorded for the quarter, compared with $171,000 for the same period of 2014 for items in use at the 7P Plant including owned and leased equipment. The 7P Plant assets came into use primarily in the second quarter of 2014, at which time amortization commenced.

*Net income/ (loss)*
All of the above items combined to produce a net loss for the frac sand segment of $813,000 for the three months ended September 30, 2015.

**Exploration and Development**
There were no write-downs necessary for impairment of projects and no pre-exploration expenditures for the three months ended September 30, 2015 and $24,000 for the same period in 2014. On November 4, 2014, the Company announced it had optioned the Lynn Lake project to Corazon. As part of that transaction, the Company received 40,000,000 shares of Corazon on April 6, 2015 valued at $192,000.

**Net Loss for the three month period ended September 30, 2014 – Corporate and Total**

The net loss for the three months ended September 30, 2015 was $1,599,000, compared with $373,000 for the same period of 2014, including operating expenses of $466,000 (2014 - $1,016,000), net finance costs of $570,000 (net finance costs 2014 – $255,000) and an income tax loss of $nil (2014 recovery - $209,000).

G&A expenses were $313,000 as the Company has reduced its overhead due to the slowdown in the market for frac sands, as compared with $579,000 incurred in the third quarter of 2014.

G&A costs include: statutory costs incurred as a public company, general investor relations expenses, consulting, travel costs, health benefits and director costs. G&A expenses include costs charged by Nuinsco for administrative services described under Transactions with Related Parties and Management Agreement with Nuinsco below. Effective March 2015, the Management Agreement has been terminated by Victory Nickel but the Company continues to share resources and costs with Nuinsco under a cost sharing arrangement.

The share-based payment expense for options for the three months ended September 30, 2015 of $5,000 reflects partial vesting of 671,875 options with a weighted average fair value of C$0.42. There were no options granted during the current quarter.

On September 12, 2014, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”). In the prior comparative period, share-based payment expense of $235,000 reflects 443,071 shares (after giving retroactive effect to the Share Consolidation) issued during the third quarter 2014 upon the exercise of warrants issued as part of the rights offering completed in July 2013.

*Net finance income (costs)*

| | Three months ended Sept 30, | | Nine months ended Sept 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Interest income on bank deposits | **$ -** | $ - | **$ -** | $ - |
| Net change in fair value of financial liabilities at fair value through operations | **-** | 987 | **226** | 1,569 |
| Gain on adjustment of estimated cash flows | **73** | - | **1,566** | - |
| Net foreign exchange gain | **112** | - | **152** | - |
| **Finance income** | **185** | 987 | **1,944** | 1,569 |
| Interest expense on loans | | | | |
| Accrued and Cash settled | **494** | 376 | **1,477** | 765 |
| Amortization of loan fees | **102** | 277 | **587** | 466 |
| Amortization of embedded option derivatives | **159** | 175 | **531** | 277 |
| Commitment fee | **-** | 1 | **-** | 3 |
| Loss on adjustment of estimated cash flows | **-** | 20 | **-** | 269 |
| Net change in fair value of financial liabilities at fair value through operations | **-** | - (73) | **-** | - - |
| Net foreign exchange loss | | 464 | | 963 |
| **Finance costs** | **755** | 1,242 | **2,595** | 2,742 |
| **Net Finance Income/(Costs)** | **$ (570)** | $ (256) | **$ (651)** | $ (1,174) |

For the three months ended September 30, 2015 and 2014, net finance cost was $570,000 and $256,000 respectively. The Company considers financing activities, other than those related to equipment leased in the frac sand segment, to be part of the Corporate segment.

The finance income decreased $802,000 from $987,000 from the corresponding prior year quarter due to the income from the fair value of the warrants issued in connection with the SPA Loan which have a cashless exercise feature and from a gain of $73,000 (2014 – loss of $20,000) from the estimated cash flows from the Participating Interest. Both of these instruments and their accounting are described below. The recent slowdown in demand and the losses incurred during the first nine months of 2015 necessitated deferral for payment of the Participating Interest and resulted in a gain. The Company applied probability weightings of 5%, 40% and 55% as risk factors to varying levels of expected cash flows. The probability weighted average cash flows has remained at 75% as at September 30 2015 (2014 – 75%) The percentage participation in net cash flows under the Participation Interest is 52.16%.

Finance costs were $755,000 for the three months ended September 30, 2015, compared with $1,242,000 for the same period of 2014. The components were quite different when comparing the quarters. Cash and accrued interest expense was $494,000 for the quarter ended September 30, 2015 (2014 - $376000). The increase in interest expense during 2015 was primarily attributable to interest on the SPA Loan, an additional Promissory Convertible Note issued in July 2014, and another short-term loan issued to fund the construction and working capital for the frac sand business.

The Company has issued several tranches of convertible notes. There are several elements of finance expense associated with these: cash-settled interest expense paid on a calendar quarter basis, non-cash amortization of loan fees, non-cash amortization of the embedded derivative related to the value of the convertibility feature at inception and the change in the value of that embedded derivative at the end of a reporting period. All amortizable elements are calculated using the effective interest rate method. Promissory Convertible notes were issued in 2013 and 2014 with similar terms and requiring similar accounting treatments. The aggregate outstanding principal value of the Promissory Convertible Notes as at September 30, 2015 is $5,979,000, which are due at various times over the next 12 months.

Aggregate interest settled in cash or accrued for the three months ended September 30, 2015 amounted to $494,000. On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and the approximately $6.0 million of Promissory Convertible Notes. On July 30, 2015 the Company announced that it had not repaid the amounts due, including the principal amount, on July 30, 2015, under the SPA Loan. The Company was also unable to make the quarterly interest payments due September 30, 2015.

Amortization of cash-settled loan fees in the quarter ended September 30, 2015 amounted to $102,000 with an additional $159,000 for amortization of a portion of the embedded option derivatives related to the convertible Promissory Convertible Notes remaining of $580,000 calculated at inception ($878,000 of which was recorded in 2014). The value of the embedded option derivatives did not decrease in the third quarter and, accordingly, $nil was credited through operations as finance income during the quarter ending September 30, 2015.

The embedded option derivatives are calculated using the Black-Scholes option-pricing methodology and are a function of share price, the C$1.00 conversion price (after the retroactive effect of the Share Consolidation), risk-free interest rate, length of time to expiry and share price volatility as well as the US dollar exchange rate for loans denominated in US dollars but convertible using a Canadian dollar price. All other things being equal, one would expect the value of the option to decline as time approaches the expiry date. However, because of the volatility of exchange rates and the Company's share price, this may not always be the case.
Further, since one Promissory Convertible Note was exchanged into a portion of the SPA Loan in the second quarter of 2014, a portion of the embedded option derivative was de-recognized. The SPA Loan does not contain an embedded option derivative feature; however, the warrants which were issued therewith may be exercised on a cashless basis. The value of the warrants is considered to be debt rather than equity and changes in the fair value of the warrants is also recorded through net finance income.

*Income tax recovery*
The Company does not allocate income taxes between segments. In the three months ended September 30, 2015, the Company did not record any tax loses or recovery. In 2014 it recorded an income tax recovery of $228,000. This was primarily a function of higher taxable losses. Furthermore, because the losses are expected to be used to shelter frac sand income in a lower tax rate jurisdiction, the income tax rate in place is expected to be 25%.

### *Nine Months Ended September 30, 2015 Compared With Nine Months Ended September 30, 2014*

| Nine months ended Sept 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total | Sept 30, 2014 Total |
|---|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 2,478** | **$ -** | **$ 2,478** | $ 6,773 |
| Cost of goods sold | - | - | **(3,212)** | - | **(3,212)** | (6,230) |
| **Gross margin** | - | - | **(734)** | - | **(734)** | 543 |
| **Operating expenses** | | | | | | |
| General and administrative | **(741)** | **(25)** | **(186)** | - | **(952)** | (1,847) |
| Share-based payments: | | | | | | - |
| Options | **(53)** | - | - | - | **(53)** | (312) |
| Amortization of property, plant and equipment | **(3)** | **(3)** | **(485)** | - | **(491)** | (390) |
| Recovery (writedown) of E and E projects | - | **186** | - | - | **186** | (50) |
| Pre-exploration costs | - | - | - | - | **-** | (4) |
| Net frac sand pre-operating costs | - | - | - | - | **-** | (194) |
| Non-recurring plant costs [(1)] | - | - | **(643)** | - | **(643)** | - |
| **Operating income (loss)** | **(797)** | **158** | **(2,048)** | **-** | **(2,687)** | (2,254) |
| Finance income | **1,962** | **-** | **2** | **(20)** | **1,944** | 1,569 |
| Finance costs | **(2,592)** | **-** | **(23)** | **20** | **(2,595)** | (2,742) |
| **Net finance costs** | **(630)** | **-** | **(21)** | **-** | **(651)** | (1,173) |
| **Income (loss) before income taxes** | **(1,427)** | **158** | **(2,069)** | **-** | **(3,338)** | (3,427) |
| Income tax recovery | **562** | **-** | **-** | **-** | **562** | 915 |
| **Net Income (loss) for the Period** | **$ (865)** | **$ 158** | **$ (2,069)** | **$ -** | **$ (2,776)** | $ (2,512) |

For the nine months ended September 30, 2015, the Company had a net loss of $2,776,000, or $0.05 per share, compared with a net loss of $2,512,000, or $0.04 per share, for the nine months ended September 30, 2014 on sales of $2,478,000 and $6,773,000 respectively.

The main components creating the net loss were G&A expenses of $952,000 (2014 - $1,847,000), amortization of property and equipment of $491,000 (2014-$390,000), net frac sand pre-operating costs of $nil (2014 - $194,000), non-recurring plant costs of 643,000 (2014 - $nil.) and net finance costs of $651,000 (2014 - $1,173,000). The results in 2014 also included a recovery of $244,000 related to the Lynn Lake option which is no longer in force. Furthermore, income tax recoveries were recorded in both nine month periods being $562,000 in 2015 and $706,000 in 2014.

G&A expenses decreased by $895,000 in 2015 compared with the same period of 2014. The main reason for the decrease is related to the Company reducing its overhead due to the slowdown in the market for frac sand and the reversal of $225,000 of accrued bonuses.

*Income tax recovery*

The Company does not allocate income taxes between segments. In the quarter ended September 30, 2015, the Company recorded an income tax recovery of $562,000, compared with an income tax recovery of $915,000 for the same period of 2014. This is primarily a function of higher taxable losses.

*Other significant changes*

The changes in other balances not specifically addressed in other sections of this MD&A are described herein.

Cash and cash equivalents have decreased from $712,000 to $9,000 excluding restricted deposits of $37,000 which support a letter of credit provided to one equipment supplier. The Liquidity and Capital Resources section describes the cash flows for the period in detail.

Inventory of $3,367,000 comprises various grades of finished product and concentrated sand at various locations from the transload facilities in Wisconsin and Minnesota, in transit to Seven Persons and at the 7P Plant itself. Valuation of the inventory is based on normalized costs anticipated during normal production levels. Obsolete inventory was written off and finished goods inventory was written-down to its net realizable value during the third quarter of 2015.

Property, plant and equipment decreased to $5,761,000 at the end of September 2015 from $6,179,000 as at December 31, 2014 primarily due to amortization. The mobile equipment is in use and is being depreciated; amortization on the plant commenced in the second quarter 2014 given its availability for use in production. The first sand was processed through the 7P Plant in March, 2014 and commissioning occurred in early August 2014.

Receivables and prepaids decreased from $3,367,000 to $350,000 during the nine months ended September 30, 2015. The decrease of $2,499,000 to $226,000 in trade accounts receivable from frac sand sales reflects the slowdown in demand. The majority of the receivables have been collected by the date of this report and we do not expect to experience any losses given the quality of our customers. Prepaids include $50,000 of deposits to sand suppliers as at September 30, 2015 (December 31, 2014 - $555,000).

Marketable securities as at September 30, 2015 increased by $109,000 from December 31, 2014, primarily as a result of the Company receiving 40,000,000 shares of Corazon Mining Limited on April 6, 2015 valued at $192,000 as part of the option agreement of Lynn Lake offset by market adjustments. No sales occurred during 2015 or 2014.

Project expenditures are described below in Mine Property and Development Activities and Exploration and Evaluation Activities.

The increase in trade and other payables of $379,000 to $3,411,000 relates primarily to an increase in days outstanding for trade payables of $200,000 for supplies, transportation and property, plant and equipment for the 7P Plant and an increase in accrued liabilities of $254,000 related to the frac sand business. With the slowdown in sales and the resulting impact on cash availability, the Company has had to defer payments to suppliers.
As previously described, Victory Nickel has several loans and borrowings due within one year amounting to $11,271,000 a total decrease of $821,000 over the loans and borrowings as at December 31, 2014 of $10,450,000. Changes in the embedded option derivatives described earlier, account for the remaining changes in loans and borrowings.

Note 14 to the Unaudited Condensed Consolidated Financial Statements include an analysis of the loans and borrowings balances. Refer to the Liquidity and Capital Resources section for additional discussion.

The Company has entered into several finance leases to purchase mobile equipment with a total fair value of $570,000 at various acquisition dates; the long-term portion of the related obligation is $170,000 at the end of September 2015 (December 31, 2014 - $275,000) and the short-term lease obligation of $140,000 (December 31, 2014 - $137,000) is included in *Trade and other payables*. Note 16 to the Unaudited Condensed Consolidated Financial Statements includes an analysis of the lease obligation.

The Participating Interest is a financial liability carried at amortized cost. The valuation thereof is determined by a model of estimated cash flows. As a result of changes in model assumptions resulted in revised amortized cost carrying amount of the Participating Interest of $1,979,000 (December 31, 2014 - $3,548,000) and, accordingly $1,569,000 was recorded as a *gain on adjustment of estimated cash flows* through the statement of operations.

The deferred tax liability balance amounts to $264,000 as at September 30, 2015 (December 31, 2014 - $817,000). The main components of the balance relate to the tax effects of E&E projects and the MP&D project, offset by the tax value of net operating tax losses carried forward. The deferred tax liability amount reflects a rate of 25%.

The share capital balance has not changed as at September 30, 2015 (December 31, 2014 - $52,570,000). On September 12, 2014, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”); any reference to the number of common shares, options and warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period referred to in this MD&A. In 2014, the increase in share capital of $344,000 was primarily due to the exercise of 463,000 options (after giving retroactive effect to the Share Consolidation) in the first quarter of 2014 generating cash of $201,000 and requiring a transfer from contributed surplus to share capital of $144,000.

Contributed surplus has increased to $5,696,000 from $5,644,000 as at December 31, 2014 primarily as a result of options vesting during the first nine months of 2015 of $52,000.

Costs of $417,000 were incurred during the nine months ending September 30, 2015 related to 7P Plant being placed on care and maintenance as a result of reduced production from the unexpected decline in sales during the first nine months of 2015. Another $118,000 was incurred relating to railcar storage costs and one-time preparation costs for railcars to be leased that was later cancelled. Furthermore, costs totalling $108,000 relating to additional equipment rental and casual labour to move frozen sand as a result of the protracted spring break-up were incurred.

The finance income of $1,944,000 for the nine month period ending September 30, 2015 primarily relates to the gain on the estimated cash flows from the Participating Interest discussed above. Finance income of $1,569,000 for the nine month period ending September 30, 2014 primarily due to the reduction in the value of the embedded option derivatives related to the Company’s convertible debt combined with a reduction in the fair value of the warrants issued in connection with the SPA Loan which have a cashless exercise feature.

Finance costs for the first nine months of 2015 were to $2,595,000 compared to $2,742,000 for the same period in 2014. These include cash-settled and accrued interest, amortization of cash and non-cash-based fees, changes in embedded option values associated with the convertible debt and amortization of inception values of embedded option derivatives related to debt as well as the change in value of estimated cash flows associated with the Participating Interest. Note 19 to the Unaudited Condensed Consolidated Financial Statements provides an analysis of the costs. Of all the elements in the table, the only ones which are immediately cash-settled are interest income on bank deposits (which is insignificant) and cash-settled interest expense.

The income tax recovery has increased significantly, as has the pre-tax loss. Certain of the elements in finance costs are not taxable and their volatility has an apparent effect on the effective income tax recovery rate.

## SUMMARY OF QUARTERLY RESULTS

Selected financial information for each of the last eleven quarters ended September 30, 2015 is as follows:

| Fiscal year 2015 | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|
| Revenue | $ 325 (1) | $ 631 (1) | $ 1,522 (1) |
| Gross margin (loss) | $ (563) (2) | $ 76 (2) | $ (247) (2) |
| Net finance income (costs) | $ (570) (3) | $ (794) (3) | $ 713 (3) |
| Net income (loss) | $ (1,599) (4) | $ (906) (4) | $ (271) (4) |
| Total comprehensive loss | $ (1,679) | $ (945) | $ (178) |
| Earnings (loss) per share - basic and diluted (16) | $ (0.03) | $ (0.02) | $ (0.00) |

| Fiscal year 2014 | 4th Quarter | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|
| Revenue | $ 7,203 (1) | $ 5,463 (1) | $ 1,310 (1) | $ - |
| Gross margin (loss) | $ 670 (2) | $ 689 (2) | $ (146) (2) | $ - |
| Net finance income (costs) | $ 714 (5) | $ (255) (7) | $ (47) (9) | $ (872) (11) |
| Net income (loss) | $ 96 (6) | $ (373) (8) | $ (693) (10) | $ (1,446) (12) |
| Total comprehensive loss | $ (2,287) | $ (464) | $ (724) | $ (1,371) |
| Earnings (loss) per share - basic and diluted (16) | $ 0.00 | $ (0.01) | $ (0.01) | $ (0.02) |

| Fiscal year 2013 | 4th Quarter | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|
| Net finance costs | $ (3,443) (13) | $ (66) | $ (73) | $ (37) |
| Net loss | $ (3,656) (14) | $ (503) | $ (417) | $ (313) |
| Total comprehensive loss | $ (3,628) (15) | $ (518) | $ (493) | $ (436) |
| Loss per share - basic and diluted (16) | $ (0.07) | $ (0.01) | $ (0.01) | $ (0.01) |

(1) Revenue represents sales of frac sand (first sales were recognized in the second quarter of 2014).
(2) Gross margin (loss) includes cost of goods sold which include operating costs for a full period despite production being at less-than-full capacity.
(3) Net finance income include the change in the fair value of the embedded option derivatives related to the Convertible Notes, a reduction in fair value of warrants issued in connection with SPA Loan, and a gain on adjustment of estimated cash flows for the Participating Interest, offset by amortization of embedded derivatives and loan fees.
(4) Includes the effects noted above.
(5) Net finance costs include $708,000 change in the fair value of the embedded option derivatives related to the Convertible Notes partly offset by $493,000 gain on adjustment of estimated cash flows for the Participating Interest.
(6) Includes the effects noted in (1), (2), and (5).
(7) Net finance costs include $827,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $20,000 loss on adjustment of estimated cash flows for the Participating Interest.
(8) Includes the effects noted in (1), (2), and (7).

(9) Net finance costs include $450,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $135,000 loss on adjustment of estimated cash flows for the Participating Interest.
(10) Includes the effects noted in (1), (2), and (9).
(11) Net finance costs include $505,000 change in the fair value of the embedded derivatives related to the Convertible Notes as well as $97,000 loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco.
(12) Includes the effects noted above combined with increased costs relating to the frac sand business and net frac sand pre-operating costs of $194,000.
(13) Net finance costs for the period includes $3,133,000 for the loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco and $154,000 for the increase in value of the embedded derivative related to the convertible promissory note.
(14) Net loss for the period includes $229,000 for costs charged under the Management Agreement with Nuinsco and cost sharing arrangement and reflects increased activity on the frac sand business and an income tax recovery of $532,000.
(15) Total comprehensive loss for the period includes the effects noted above.

## LIQUIDITY AND CAPITAL RESOURCES

As at September 30, 2015, the Company had a working capital deficiency of $10,657,000, compared with a working capital deficiency of $3,045,000 as at December 31, 2014.

The increase in working capital deficiency of $7,612,000 since December 31, 2014 resulted primarily from the outstanding financing and accrued interest of $11,271,000 used to fund the construction and upgrading of the 7P Plant and working capital, coming due within one year. Of this amount, $5,150,000 is secured by the assets of the Company. Working capital was also affected, an increase in accounts payable of $379,000 as well as a large decrease in accounts receivable balance, offset by a $1,046,000 increase in inventory, both of which are due to the decline in frac sand demand during the first half of 2015.

### Participating Interest

On April 22, 2014, Nuinsco exercised its conversion option and converted its loan to the Participating Interest. At the same time, it relinquished its security over the assets of the Company since the Conversion constituted payment of the loan in full. This obligation will be settled through a 52.16% participation in net operating cash flows from the frac sand business after recoupment of capital costs for Phase One and pre-operating expenses. The participation is capped at $6,053,000 provided the Company proceeds with Phase Two, otherwise the cap is approximately $8,071,000. Distributions under the Participating Interest terms are calculated based on operating cash flow after recovery of capital and pre-operating costs and take into account working capital. It is presently anticipated that the first payment under the Participating Interest could occur in the second quarter of 2017.

As at September 30, 2015 the carrying value of the Participating Interest was revalued at $1,979,000 to take into account future expected cash flows based on current market information. This compares with $3,548,000 at December 31, 2014. The change in value of $1,569,000 in the nine months ended September 30, 2015 has been recorded through *Finance Income* in the statement of operations (for further description see Note 15 to the Unaudited Condensed Consolidated Financial Statements).

The Company will continue to reassess the carrying value of the Participating Interest as circumstances warrant.

**Convertible Notes** – During 2013 and 2014 two-year Promissory Convertible Notes bearing interest at the rate of 14.8% per annum and aggregating $5,979,000 were issued to fund the construction of the 7P Plant and working capital requirements. The accounting complexities of these financial liabilities have been described earlier. The Promissory Convertible Notes may be converted in whole or in part, at any time, at the option of the holders into Victory Nickel shares at a conversion price of C$1.00 per share.

**SPA Loan** - On May 15, 2014, the Company entered into a senior secured line of credit agreement in the amount of $4,000,000 (the “SPA” Loan”). The SPA Loan bears interest of 14.8% per annum and matures on July 30, 2015 and is now is classified as a current liability due within one year. Full details of the SPA Loan are described in the 2014 Audited Consolidated Financial Statements.

The terms of the SPA warrants contain a cashless exercise feature which requires the warrants to be recognized as a liability rather than as equity within contributed surplus. Accordingly, the fair value of the warrants at inception of $554,000 is recorded as a liability with the balance of the SPA Loan. Any change in the fair value of the warrants is also recorded as a component of the SPA Loan and charged to finance income or costs in the statement of operations. The fair value change amounted to a decrease of $7,000 in the three months ended September 30, 2015 (a net decrease of $554,000 since inception) bringing the fair value of the cashless warrants to $0 as at September 30, 2015.

In the three months ended September 30, 2015, the Company paid $nil in cash and accrued $410,000 for interest and amortized $102,000 in loan fees into interest income.

In June 2015 the SPA loan was increased by $1,150,000 to $5,150,000. Of the increase, $1,000,000 was used to repay its short-term facility and $150,000 was made available for working capital purposes. As consideration, the warrant price was reduced from $1.00 per share to $0.50 per share and additional warrants of 575,000 were granted.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and on the Promissory Convertible Notes outlined above, and that it was in discussion with its lenders and other potential financiers to restructure the Company's debt and recapitalize the Company.

On July 30, 2015, the Company announced it had not repaid the principal amounts due under the SPA Loan, and that it was continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. The Company was unable to make the interest payment due September 30, 2015. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due.

**Short Term Facility** – On October 1, 2014, the Company completed a short-term financing by way of a $2,000,000 promissory note. The promissory note bears interest at 28%, calculated and settled monthly. This short-term loan has been renewed on a monthly basis upon payment of extension fees and penalties. The Company repaid $1,000,000 during the first two months of 2015 and in June the Company announced it had entered into an amending agreement (the "Amending Agreement") whereby the short-term facility and the SPA loan were combined to create the Amended Loan Facility.

**Cash flows in the first nine months of 2015** - Cash and cash equivalents as at September 30, 2015 and December 31, 2014 were held with major Canadian banks. The Company has a policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board.

For the nine months ended September 30, 2015, the Company generated cash from operating activities of $895,000 compared with cash used of $5,953,000 during the same period of 2014. The build-up of receivables as at December 31, 2014 was essentially all collected during the first nine months of 2015 and provided an increase in cash of $3,017,000 compared to the first half of 2014 and extending payables and accrued interest contributed $225,000. However, there continues to be limited revenues due to the slowdown in operating activity during the first nine months of 2015 as mentioned earlier. The Company will require a restructuring of its debt and likely an infusion of new capital while ramping up operations to the level where cash flow is sufficient to meet it needs.

Costs incurred to advance the Company's exploration, evaluation and development projects are capitalized, as summarized below under the discussion of investing activities.

Costs to set up the Company's frac sand operations and operating costs were recorded as part of pre-operating expenditures net of sales revenue of $194,000 for the first nine months of 2014 and thereafter are part of cost of goods sold or other expense lines. In the nine months ended September 30, 2015, $3,212,000 was charged to cost of goods sold, including a write-down of finished goods inventory to the lower of cost or net realizable value and the write off of obsolete inventory in the third quarter of 2015 in the amount of $495,000. Revenue in 2015 amounted to $2,478,000.

As operating activity began to slow down during the first nine months of 2015 due the sudden and material drop in the price of oil and the spring breakup period as mentioned earlier, receivables decreased to $350,000 as at September 30, 2015 compared with $3,367,000 as at December 31, 2014, while inventory and trade and other payables continue to grow. The Company continues to hold discussions with financiers and potential business partners to fund the working capital deficit.

During the nine months ended September 30, 2015, costs incurred by investing activities were $173,000, compared with cash used of $2,455,000 in the prior comparable period. Aggregate amounts of $26,000 and $114,000 were used to advance the MP&D project and E&E projects, respectively, during the periods (2014 - $1,566,000 and $608,000). In the first nine months of 2015, $33,000 was used for expenditures on the 7P Plant acquisition, equipment and improvements (2014 – $2,056,000).

The Company used $1,425,000 in financing activities during the nine months ended September 30, 2015 compared with $7,209,000 generated in the corresponding period in 2014. In 2014, the main source of funds was an additional $4,000,000 from various Promissory Convertible Notes issued to March 2014. In 2015, $1,000,000 of the short-term facility was repaid. Loan interest was $1,481,000 compared with $765,000 in 2014. The increase is due to the increased debt described elsewhere. Aggregate payments under leases for deposits and other principal payments totalled $102,000 for mobile equipment used in the frac sand business, compared with payments of $101,000 in 2014. The Company also deposited $37,000 (2014 – $271,000) of funds to support letters of credit issued to facilitate the Company's frac sand business.

There were no equity financings completed during the period. During the same period in 2014 the Company received $341,000 through the exercise of options.

The Company's activities during the nine months ended September 30, 2015 used cash and cash equivalents of $703,000, compared with $1,199,000 during the first nine months of 2014.

## Table of Contractual Commitments

| | Due Date | Currency | September 30, 2015 | December 31, 2014 |
|---|---|---|---|---|
| Transformer and electrical equipment | On shipping | US Dollar | $ 1,296 | $ 1,296 |
| Loans and borrowings (including unpaid accrued interest) | | | | |
| Amended Loan | January 31, 2015 | Canadian Dollar | $ - | $ - |
| Participating Interest | Refer to note below | Canadian Dollar | $ - | $ - |
| Convertible Notes | November 11, 2015 to July 7, 2016 January 30, 2016 | US Dollar | $ 5,750 | $ 5,750 |
| Convertible Notes | to March 13, 2016 | Canadian Dollar | $ 265 | $ 265 |
| SPA Loan | July 30, 2015 | US Dollar | $ 5,150 | $ 4,000 |
| Promissory Note [(1)] | May 31, 2015 | US Dollar | $ - | $ 2,000 |
| Purchase of 7P Plant | Refer to note below | Canadian Dollar | $ - | $ - |
| Leased mobile equipment | Within one year | Canadian Dollar | $ 187 | $ 179 |
| | One to five years | Canadian Dollar | $ 227 | $ 328 |

Using November 12, 2015 prices, the aggregate market value of the Company's marketable securities held in public company shares is approximately $221,000.

As at November 12, 2015, the Company had options and warrants outstanding which could bring in additional funds. Most of those instruments are not "in-the-money" and the receipt of such funds cannot be relied upon.

The Company has good title to its projects and will continue to maintain the projects in good standing.

The Company recognizes the imminent cash requirement to repay debt and is actively pursuing restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

Development of the Minago mine will require considerable financial resources. The Company recognizes that the current state of the financial markets and the apparent lack of support for mining projects will make financing this project difficult. However, validating the frac sand portion of the project could provide leverage to get potential partners interested in the nickel portion of the project.

The Company has in excess of 40,000 tons of sand in inventory which should generate cash to bring suppliers debt up-to-date. The Company is also reducing all discretionary costs which should not have a negative impact on its ability to resume production. Staffing, salaries, and director fees have been reduced or deferred where possible.

The Company continues to hold discussions with local and overseas financiers and potential business partners with respect to the nickel and frac sand opportunities.

## BUSINESS UPDATE

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company also produces frac sand for the oil and gas industry in Canada and the northern US. Accordingly, the Company commenced reporting on a segmented basis in 2014. The Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand.

The Corporate segment supports all of the Company's activities.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 20 in the Unaudited Condensed Consolidated Financial Statements). The segment is located in Canada although sand as raw material is imported from the US.

The following table provides additional information on the Company's total segment assets. The segmented Statement of Operations has been presented earlier in the MD&A in the discussion of operating results for the nine months ended September 30, 2015.

| | | **Sept 30, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| **Canada** | | | | |
| Corporate | **$** | **1,415** | $ | 1,860 |
| Exploration and Development | | **49,958** | | 49,734 |
| Frac Sand | | **7,895** | | 11,300 |
| Intersegment elimination | | **(1,068)** | | (962) |
| **Total Assets** | **$** | **58,199** | $ | 61,932 |

## EXPLORATION AND DEVELOPMENT ACTIVITIES

Paul Jones, Vice-President, Exploration, is a "qualified person" as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Company described herein.

## MINE PROPERTY AND DEVELOPMENT ACTIVITIES

During the nine months ended September 30, 2015, $114,000 was incurred on the Minago project (September 30, 2014 - $271,000).

**Minago Project**

The Company's 100%-owned Minago project is a permitted project ready for development. It is located on the unexposed southern part of the Thompson Nickel Belt in Manitoba, and is one of Canada's largest undeveloped sulphide nickel deposits. Minago has been shown to be capable of producing a nickel concentrate grading from 22.3% up to 35.0%, making it reportedly the world's highest grade nickel concentrate. In addition to metal by-products such as copper, cobalt, gold, platinum, palladium, silver and rhodium, a layer of silica sand averaging approximately nine metres thick overlies the nickel mineralization within the open pit. Approximately 84% of the sand is marketable as frac sand. The frac sand forms part of the overburden that must be removed prior to mining the nickel ore. According to the FS, production of frac sand could begin 20 months after the start of mine development.

The analytical data and geological interpretations obtained from a work program in 2010 were incorporated into an updated geological model and resource estimate. The updated resource incorporates a 24% increase (over the previous resource estimate) in the NI-43-101-compliant measured and indicated and pit-constrained sulphide nickel resource used in the Minago FS. The FS is posted at www.sedar.com. Note that all resources are contained in the Nose Deposit and the update below does not include the results of the 2011 drilling program.

| | **April 2011 Pit-Constrained Resource[1]** | | | **March 2010 In-Pit Resource[2]** | | | **Increase (Decrease) in Contained Metal** | |
|---|---|---|---|---|---|---|---|---|
| | **Tonnes** | **Grade** | **Ni Content** | Tonnes | Grade | Ni Content | **Ni Content** | **Change** |
| **Category** | **Millions** | **%NiS[3]** | **M Lb** | Millions | %NiS[3] | M Lb | **M Lb** | **%** |
| **Measured** | **8.2** | **0.473** | **85.0** | 6.6 | 0.488 | 71.4 | **13.7** | **19.2** |
| **Indicated** | **22.8** | **0.432** | **217.2** | 19.1 | 0.410 | 172.6 | **44.6** | **25.9** |
| **M&I** | **31.0** | **0.443** | **302.2** | 25.7 | 0.430 | 243.9 | **58.3** | **23.9** |
| **Inferred** | **0.2** | **0.380** | **1.4** | 1.4 | 0.402 | 12.2 | **(10.8)** | **(88.4)** |

[1] Lerch-Grossman pit optimization shell [2] Whittle pit optimization shell [3] Nickel in sulphide form

A winter work program was conducted at Minago in 2011 comprised 8,793m of diamond drilling in 20 drill holes with associated ground and borehole electromagnetic geophysics. A total of 15 holes were collared to intersect the "North Limb", a domain of nickel-bearing ultramafic rock extending at least 1.5km north from the Nose Deposit.

A 3,500m winter work program was conducted in early 2012 to test a number of targets around the property that have been identified in previous work programs as well as areas that are scheduled for Minago mine infrastructure development. In part, the drilling evaluated the nickel-bearing Ospwagan Group/Pipe Formation rocks in the vicinity of the Minago Nose Deposit.

Importantly, two holes of the 2012 program tested known nickel-bearing serpentinite that underlies mining lease ML-003 approximately 5km south of the Nose Deposit. Thirteen historic drill holes are known to have been drilled by previous operators in the area between 1968 and 1971. Ten of the thirteen holes intersected serpentinized ultramafic rock, while seven of these holes obtained significant intersections of nickel-mineralized serpentinite from within a body interpreted to be >2 km long. The most extensive intersection, in MXB-70-60, was 605m grading 0.3% Ni from 154m down hole. DDHs V-12-07 and V-12-09 completed in the winter of 2012 both intersected significant widths of serpentinite and obtained analytical results consistent with historic results.

No fieldwork has been conducted on the project subsequent to the winter 2012 work program; current work is related to reporting and evaluation of existing results as well as gathering additional geochemical information from existing drill core. An application to renew the Minago mining leases ML-002 and ML-003 was successful and both leases have been renewed for a 21-year term.

On August 23, 2011, the Manitoba Government issued Victory Nickel's final EAL for the Minago project. The licence expires on August 22, 2014 unless the Company completes a certain amount of work to move the project forward. During 2014, the Company has complied with the conditions of the EAL and, in December, filed an Environmental Act Proposal ("EAP") to amend the EAL to relocate the proposed tailings and waste rock management facility. The construction of drainage ditches installed to lower down the water table within the pit shell limits, the installation of Flow Gauging and Telemetry systems and the implementation of a comprehensive environmental monitoring program are considered part of the site development necessary to maintain the EAL which would otherwise expire in August, 2014.

*Frac Sand*

An indicated resource of 15 million tonnes of sandstone has been estimated to occur within the current Minago pit shell. The frac sand component of this resource of approximately 11 million tonnes is a significant contributor to the positive economics at Minago. As part of the FS, Outotec produced a feasibility-level design for a frac sand plant complete with capital and operating costs to produce 1,140,000 tonnes of frac sand annually for a ten-year period. Considerable potential exists to expand the resource beyond the limits of the current pit.

## EXPLORATION AND EVALUATION ACTIVITIES

For the nine months ended September 30, 2015, the Company incurred exploration expenditures on its E&E projects of $26,000 for (September 30, 2014 – $79,000). Expenditures have been minimal due to the tight equity markets and management's focus on Victory Silica and the frac sand business.

## FRAC SAND

### Bear Coulee Property

In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in Trempeleau County Wisconsin, USA (the “Bear Coulee Property”). The option agreement provides for a cash payment of $10,000 on signing of the agreement (and paid in 2014), a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months following receipt of permits with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced the completion of a National Instrument 43-101 technical report describing a resource estimate of approximately 11 million tons of frac sand on the Bear Coulee Property.

## NICKEL

### Lac Rocher

Lac Rocher, with year round access, is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cutoff, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per lb in the Lac Rocher PEA was US$9.74 with copper at US$3.65.

The Lac Rocher property is subject to a discovery incentive plan (the “DIP”) to reward certain individuals involved in the discovery of Lac Rocher with a 2% net smelter royalty (”NSR”) for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

**Mel Project**

The 100% owned Mel project is located on the Thompson Nickel Belt, just north of Thompson, Manitoba. It is a large property, approximately 25km east-west by about 6km north-south, and remains underexplored.

Mel has an indicated resource of 4.3 million tonnes grading 0.88% nickel (approximately 83 million pounds in-situ nickel) and an additional inferred resource of one million tonnes grading 0.84% nickel (approximately 19 million pounds in-situ nickel) and offers significant exploration upside as well as near-term production potential.

The re-evaluation of the Mel dataset is continuing for both the drill hole data on the Mel deposit and the considerable drilling (111 drill holes) conducted of the claims portion of the property. The study has included reinterpretation of the geological context in order to evaluate new or under-tested target areas for future work and that can be incorporated into further, more refined, modelling of the Mel resource. No fieldwork was conducted during 2013, 2014 or in 2015 to date. An application to renew Mel mining lease ML-007 was successful and the lease has been renewed for a 21-year term.

Under the terms of the option agreement, Vale must mill ore from the Mel project at cash costs plus 5% subject to capacity availability and metallurgy – this is unaffected by Vale's decision not to exercise its back-in right. Furthermore, in accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

**Lynn Lake**

The Lynn Lake property is located in the historic mining town of Lynn Lake in northern Manitoba, about 320km by road northwest of the Thompson mining camp. The property is the former Sherritt Gordon Mines Limited ("Sherritt") mine site known as the Lynn Lake A Mine and Farley Mine, comprised of 13 mining claims, 14 mining claim leases and 2 mineral leases covering an area of 2,170.26 hectares. The property was operated by Sherritt from 1953 to 1976 with reported production of 22.2 million tons at an average grade of 1.023% nickel and 0.535% copper.

As discussed earlier and described in Note 12 to the 2014 Audited Consolidated Financial Statements, the Company had optioned Lynn Lake to Prophecy Coal with subsequent assignment to Wellgreen. In March, 2014, Wellgreen relinquished the option on the property and it has reverted to the Company.

On November 4, 2014, the Company announced that it had optioned the Lynn Lake project to Corazon, an Australian listed public company with assets in the Lynn Lake area. Under the terms of the agreement, Corazon can acquire a 100% interest in Lynn Lake by issuing 40 million Corazon shares to the Company upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project.

On April 6, 2015 Corazon Mining Ltd. (“Corazon”) issued 40,000,000 Corazon shares to Victory Nickel as part of the terms of the option agreement between the two companies.

Also under the agreement, Victory Nickel retains a 1.5% net smelter return royalty on any production from the claims and leases transferred by Victory Nickel to Corazon, 1% of which can be purchased by Corazon for A$1M. Corazon must spend A$3.5M in exploration and resource development over five years upon execution of the agreement - should Corazon fail to make the expenditures, the difference between the expenditure requirement and the actual expenditures must be paid to Victory Nickel in cash or shares of Corazon, or the project is returned to Victory Nickel. Within 30 days of the commencement of commercial ore processing at Lynn Lake, Corazon is required to make a payment of A$1M in cash and/or shares of Corazon to Victory Nickel.

**FRAC SAND SEGMENT**

As explained above, the Frac Sand segment is managed and operated by Victory Silica’s executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 21 in the Unaudited Condensed Consolidated Financial Statements). The segment is located in Canada although sand as raw material is currently imported from the US. The plan is to eventually produce both domestic and imported sand.

The Company completed Phase One of its three phase business plan. Phase One provided for the refurbishment and upgrading of the 7P Plant to a capacity of 500,000 tpa of high-quality frac sand. The 7P Plant was completed in March 2014 followed by commissioning until early August.

Successful completion of Phase One was expected to lead to Phase Two which provides for the building of a wash plant in Wisconsin, USA followed by Phase Three which provides for the construction of a second dry processing facility in Manitoba with a capacity of approximately 1,000,000 tpa. With the completion of Phase One, the Board of Directors approved proceeding with Phase Two provided non-dilutive financing can be arranged. However, in February 2015, the Company announced that Phase Two had been deferred due to the uncertainty caused by the drop in the price of oil.

As mentioned above, sales decreased monthly from January to March and, as a result of commodity market uncertainty and longer than expected spring break-up conditions, the Company temporarily suspended the frac sand operations on April 14, 2015. In May, spot sales of frac sand from the 7P Plant resumed and the 7P Plant continues to operate on an as-needed basis only. Frac sand sales typically slow down during spring break-up road restrictions in Alberta. This year, the spring break-up slowdown was more pronounced than in prior years as the majority of E&P companies to conserve capital by postponing drilling activity to less costly periods after spring break-up. Since that time due to continued uncertainty in the oil price E&P companies are reducing capital expenditure programs and, as a result, drilling activity has slowed. The market uncertainty is placing pressure on Victory Nickel's oilfield service company customers to reduce E&P company drilling costs.

These companies, in turn, look to their suppliers, including frac sand producers, to help lower their costs. Accordingly, frac sand prices in Canada have decreased to levels that do not appear to be sustainable over the long term. The weakness of the Canadian dollar has made domestic sand more competitive over this period and is taking some of the market previously available for imported sand.

The Company has built approximately 40,000 tons of finished product and raw material inventory at its 7P Plant which is using to supply its customers as fracking activity warrants.

## IMPAIRMENT ANALYSIS UPDATE

While the metals markets and other general economic factors continue to be relatively stable, there has been no marked recovery except for a strengthening US dollar. The Company performed a detailed impairment analysis on each of its E&E projects and the MP&D project as at December 31, 2014. The Company does not believe that there have been any material changes to date which would adversely affect this analysis. Furthermore there has been no change in management’s plans for the projects which would cause a reassessment.

Management concluded that no impairment existed in each of its projects effective September 30, 2015 and that costs incurred to date are recoverable. The Company will continue to monitor developments as they occur in the metals markets and the economy and will update its impairment analysis to take account of any such changes, as appropriate.

## CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

Critical accounting estimates and judgements used in the preparation of the consolidated financial statements include determining the carrying value of investments, MP&D and E&E projects, assessing the impairment and classification of long-lived assets, determining the recoverability of deferred income tax assets, the valuation of the convertibility feature of the loans and promissory notes, the valuation of share-based payments and the disclosure of contingencies and going concern matters. These estimates involve considerable judgement and are, or could be, affected by significant factors that are out of the Company’s control.

For a complete list of the significant accounting policies as well as information concerning the use of estimates, judgements and measurement uncertainty, reference should be made to Note 3 to the Company's 2014 Audited Consolidated Financial Statements. The Company's financial statements have been prepared using the going concern assumption; reference should be made to Note 1 to the Company's 2014 Audited Consolidated Financial Statements.

The recorded value of the Company's E&E projects and the MP&D project is based on historic costs that are expected to be recovered in the future. The Company's recoverability evaluation is based on market conditions for minerals, underlying mineral resources associated with the properties and future costs that may be required for ultimate realization through mining operations or by sale. The Company is in an industry that is exposed to a number of risks and there is always the potential for a material adjustment to the value assigned to these assets. Such risks also extend to the evaluation of fair values of net assets upon acquisition.
The value of the Participating Interest is a significant estimate which uses a model of estimated cash flows and applies probability-weighted estimates to the model. Assumptions are made about the phase at which the frac sand business will be when payments are being made as well as production costs and volumes and sales prices and volumes.

The fair value of the stock options and warrants, as well as the embedded option derivative in the promissory note, is calculated using the Black-Scholes option-pricing model that takes into account the exercise price, expected life of the option/warrant, expected volatility of the underlying shares, expected dividend yield, and the risk-free interest rate for the term of the option/warrant or embedded option derivative.

The Company has determined that it is highly probable that Victory Nickel will generate returns sufficient to utilize its taxable losses prior to their expiry. This is a significant judgement that, dependent upon future events, may turn out to be incorrect. Presently, since Victory Silica is not revenue-generating, a full valuation allowance has been recorded against losses incurred in that subsidiary. The Company will monitor any changes in circumstances which could require a reversal of the valuation allowance.

## NEW ACCOUNTING POLICIES

IFRS issued by the International Accounting Standards Board ("IASB") have been adopted in the Company's 2014 Audited Consolidated Financial Statements. There have been no new accounting policies adopted by the Company, except as noted Note 3 to those statements.

## FUTURE ACCOUNTING CHANGES

### New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations. However, the revised standards and interpretations are not applicable to the Company or are expected to have minimal impact.

## CORPORATE GOVERNANCE

The Company's Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of directors, none of whom are employees or officers of the Company, meets with management to review the Unaudited Condensed Consolidated Financial Statements to satisfy itself that management is properly discharging its responsibilities to the directors who approve the financial statements. The Board of Directors has also appointed compensation and corporate governance and nominating committees composed of non-executive directors.

### Evaluation of Disclosure Controls and Procedures

The Company's Chief Executive Officer and Chief Financial Officer, (collectively, the "Certifying Officers"), are responsible for designing a system of disclosure controls and procedures, or causing them to be designed under their supervision, to provide reasonable assurance that information required to be disclosed in reports filed with or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities laws and that material information relating to the Company is made known to them with respect to financial and operational conditions to allow timely decisions regarding required disclosure. For the fiscal quarter ended September 30, 2015, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's disclosure controls and procedures as defined under the rules adopted by the Canadian securities regulatory authorities. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's disclosure controls and procedures were effective as at September 30, 2015. Such controls are facilitated by the small size of the Company's senior management team and their access to material information.

There were no changes to the Company's disclosure controls and procedures that occurred during the quarter ended September 30, 2015 that materially affected, or are reasonably likely to affect, the Company's disclosure controls and procedures.

### Evaluation of Internal Control over Financial Reporting

The Company's Certifying Officers are responsible for designing a system of internal controls over financial reporting, or causing them to be designed under their supervision, to provide reasonable assurance regarding the reliability of financial reporting and preparation of consolidated financial statements for external purposes in accordance with Canadian GAAP. The Company used the COSO (1992) control framework and is in the process of updating its methodology to incorporate the COSO (2013) framework into its analyses for the future. The COSO Board has made the COSO (1992) framework available for use until an unspecified date at which point it is expected to be considered superseded. For the fiscal quarter ended September 30, 2015, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's internal control over financial reporting. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's internal controls over financial reporting and procedures were effective as at September 30, 2015.

The management of the Company was required to apply its judgement in evaluating the cost-benefit relationship of possible controls and procedures. The result of the inherent limitations in all control systems means no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected.

There were no changes to the Company's internal controls over financial reporting that occurred during the quarter ended September 30, 2015 that materially affected, or are reasonably likely to affect, the Company's internal controls over financial reporting. However, reliance was placed on mitigating controls around processes that are currently still evolving to reduce risk of material misstatement on the financial statements to an acceptable level.

## TRANSACTIONS WITH RELATED PARTIES AND MANAGEMENT AGREEMENT WITH NUINSCO RESOURCES LIMITED

### Related Party Balances and Transactions for Services

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19 to the 2014 Audited Consolidated Financial Statements). Payables to key management personnel generally relate to directors' fees, consulting fees, and expense reimbursements.

Balances and transactions with related parties as at September 30, 2015 and December 31, 2014 and for the three and nine months ended September 30, 2015 and 2014 are shown in the following tables:

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| **Balances Outstanding** | | |
| Payable to key management personnel | **$ 152** | $ 251 |

Key management personnel compensation comprises:

| | Three months ended Sept 30, | | Nine months ended Sept 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Short-term employee benefits | **$ 53** | $ 215 | **$ 310** | $ 826 |
| Share-based payments - options | **-** | 168 | **-** | 233 |
| | **$ 53** | $ 383 | **$ 310** | $ 1,059 |

## Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shared management, administrative assistance and facilities with Nuinsco pursuant to a Management Agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. As described in Note 15 to the Unaudited Condensed Consolidated Financial Statements, Nuinsco, who became a related party of the Company effective July 30, 2013, is no longer considered a related party as their shareholding in the Company decreased below 10%. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The Management Agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the Management Agreement ceased in March 2015. The Company has continued to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at September 30, 2015 and December 31, 2014 and for the three and nine months ended September 30, 2015 and 2014 are shown in the following tables:

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| **Balances Outstanding under the Management Agreement** | | |
| Payable to Nuinsco Resources Limited | **$ 6** | $ 45 |

| | Three months ended Sept 30, | | Six months ended Sept 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$ 28** | $ 174 | **$ 221** | $ 501 |
| Project costs charged to Nuinsco Resources Limited | **$ 18** | $ 6 | **$ 24** | $ 18 |
| Project recoveries charged by Nuinsco Resources Limit | **$ -** | $ 22 | **$ 16** | $ 48 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis.

**Balances and Transactions with Nuinsco under the Participating Interest**

The terms of the Participating Interest are described in Note 14 to the Unaudited Condensed Consolidated Financial Statements as well as in the Liquidity and Capital Resources section of this MD&A. A summary of the balances and transactions related thereto is included in the table and accompanying note below:

| **Participating Interest** | ***Note*** | | **Sept 30 2015** | | December 31, 2014 |
|---|---|---|---|---|---|
| Advance for working capital | | **$** | **-** | $ | 940 |
| Advance under Amended Loan for standby commitment | | | **-** | | 1,135 |
| Aggregate advances | | | **-** | | 2,075 |
| Less: settled in Units of Victory Nickel | | | **-** | | (1,135) |
| Less: unamortized loan fees | | | **-** | | (51) |
| Opening balance | | | **3,548** | | 889 |
| Change in fair value | *20* | | **(1,569)** | | 2,875 |
| Effect of foreign exchange | | | **-** | | (216) |
| **Participating Interest** | | **$** | **1,979** | $ | 3,548 |
| Current portion - due within one year [(1)] | | **$** | **-** | $ | - |
| Long-term portion [(2)] | | | **1,979** | | 3,548 |
| **Participating Interest** | | **$** | **1,979** | $ | 3,548 |

## OUTSTANDING SHARE DATA

As at November 12, 2015, the Company had 57,634,578 common shares issued and outstanding. In addition, there were 2,701,000 stock options and 3,825,000 warrants outstanding. However, none of the options and warrants are “in the money”, all the warrants are exercisable.

## RECENT DEVELOPMENTS

The slowdown in demand for frac sand and the necessary temporary suspension of production has required the Company to implement initiatives to conserve cash. The rail car leases were cancelled and arrangements are being made with other suppliers to bridge the period until sales resume. Funds placed on deposit to support letters of credit to facilitate the railcar leases have been redeemed by the lessor to reduce the Company’s payables.

The Company has in excess of 40,000 tons of sand in inventory which could generate cash when sold to bring suppliers debt up-to-date. The Company has eliminated all discretionary costs which should not have a negative impact on its ability to resume production. Staff, salaries, and director fees are being reduced or deferred where possible.

In June the Company announced it had entered into the Amending Agreement whereby the short-term facility and the SPA loan were restructured to create the Amended Loan Facility in the aggregate amount of $5,150,000.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the Amended Loan Facility and approximately $6.0 million of unsecured Promissory Convertible Notes. On July 30, 2015, the Company announced it had not repaid the principal amounts due under the SPA Loan, and on September 30, 2015, the Company was unable to make any of its quarterly interest payments. Discussions with the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company continue with the fourth quarter set as a target for settlement. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due.

There can be no assurance that the Company will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the lenders may take in light of these defaults.

Shares of the Company trade on the Toronto Stock Exchange ("TSX") under the symbol NI. On August 4, 2015, the Company received a letter from the TSX advising that its eligibility for continued listing on the TSX is under review. Under the TSX's Remedial Review Process, the Company has been granted 60 days from that date to comply with all requirements for continued listing. On October 2, 2015, the Company announced that the TSX's Continued Listing Committee had granted an extension of its delisting review, deferring its delisting decision until no later than December 4, 2015. By that date the Company is required to comply with all requirements for continued listing.

## RISKS AND UNCERTAINTIES

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

## FORWARD-LOOKING STATEMENTS

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

**Interim MD&A, for the Three and Six Months Ended June 30, 2015 (Dated August 14, 2015)**

The following discussion of the results of operations, financial condition and cash flows of Victory Nickel Inc. ("Victory Nickel" or the "Company") prepared as of August 14, 2015 consolidates management's review of the factors that affected the Company's financial and operating performance for the three and six months ended June 30, 2015, and factors reasonably expected to impact on future operations and results. This discussion is intended to supplement and complement the Company's unaudited condensed consolidated financial statements for the three and six months ended June 30, 2015 ("Unaudited Condensed Consolidated Financial Statements") and the notes thereto.

Certain information and discussion included in this management's discussion and analysis ("MD&A") constitutes forward-looking information. Readers are encouraged to refer to the cautionary notes contained in the section *Forward-Looking Statements* at the end of this MD&A.

Readers are also encouraged to consult the audited consolidated financial statements for the year ended December 31, 2014 ("2014 Audited Consolidated Financial Statements") which were prepared in accordance with International Financial Reporting Standards ("IFRS" or "GAAP"). The Unaudited Condensed Consolidated Financial Statements and the 2014 Audited Consolidated Financial Statements are available at www.sedar.com and at the Company's website www.victorynickel.ca. All amounts disclosed are in United States dollars ("US$" or "US dollars") unless otherwise stated. All tabular amounts are in thousands of US dollars.

Shares of the Company trade on the Toronto Stock Exchange ("TSX") under the symbol NI. On August 4, 2015, the Company received a letter from the TSX advising that its eligibility for continued listing on the TSX is under review. Under the TSX's Remedial Review Process, the Company has been granted 60 days from that date to comply with all requirements for continued listing. It is the intent of the Company to maintain a public listing for the Company's shares. In addition to working with the TSX during this period, management will evaluate alternative listing options. There can be no assurance that either the Company will be able to achieve compliance with the TSX's listing requirements within the required time frame or will secure an alternative listing.

**Change in Functional and Presentation Currency**

Effective October 1, 2014, the Company changed its functional currency to the US dollar from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) to the 2014 Audited Consolidated Financial Statements for additional information.

## COMPANY OVERVIEW

Victory Nickel is a Canadian producer of high-quality “Northern White” frac sand sourced from Wisconsin, USA, through its wholly-owned subsidiary Victory Silica Ltd. (“VSL” or “Victory Silica”). Northern White occurs predominantly in the US Mid-West and generally exceeds American Petroleum Institute (“API”) specifications. For this reason, it is a highly-desirable and preferred frac sand. Frac sand is used as a proppant to enhance the recovery from oil and gas wells. The Company’s frac sand processing facilities are located in Seven Persons, Alberta and comprise a wet plant with capacity of approximately 120,000 tons per annum (“tpa”) and a fully-operational dry plant with a nominal capacity of 500,000 tpa (the “7P Plant”). In April 2015 the Company announced the temporary suspension of production at its 7P Plant as demand for frac sand dropped off during the spring break-up season and due to the decrease in activity related to the sudden drop in the price of oil. In May 2015, spot sales of frac sand from the 7P Plant resumed and the 7P Plant operates on an as-needed basis only.

In addition to the significant frac sand resource at its Minago project in Manitoba, in October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the “Bear Coulee Property”). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months from receipt of permits with two equivalent extensions available under certain circumstances. Prior to production the Company will be required to pay $40,000 per annum an as advance royalty on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin. In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit Envirosolutions Inc. ("Summit") on the Bear Coulee Property and was incorporated into a National Instrument 43-101 technical report.

The Company has considered constructing a wet plant in Wisconsin or Minnesota and is also completing preliminary studies to build a second 1,000,000 tpa dry plant in or near Winnipeg, Manitoba. Market conditions necessitate the deferral of any such construction until more certainty returns to the oil and gas sector.

Crucial to the success of its frac sand operations is the Company’s ability to build a solid customer base within an economic distance of its production facilities. The Company was able to establish itself as a preferred supplier in the areas around Medicine Hat, Alberta through spot-market sales and short-term contracts. The Company’s 7P Plant is located in close proximity to oil and gas producing plays in Alberta, BC, Saskatchewan and North Dakota, allowing customers to purchase sand FOB the 7P Plant and use their own trucks to deliver to the wellhead or, alternatively, to have the Company deliver frac sand directly to the wellhead. A small portion of finished sand is delivered by rail.

The Company was formed on February 1, 2007 as exploration and development mineral resource company and, until recently, was primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada. Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Corazon Mining Ltd. (“Corazon”), an Australian public company (ASX: CZN) refer below) and Mel projects in Manitoba and the Lac Rocher project in Québec. The results of a feasibility study on the Minago Project (“FS”) were announced in December 2009, the Environmental Impact Study (“EIS”) was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Environmental Act Licence (“EAL”) was announced in August 2011. In April 2014 the Company announced the filing of an amendment to the EAL. A preliminary economic assessment of Lac Rocher (“PEA”) was announced in November 2008. Baseline environmental studies are ongoing at Mel in preparation for permit applications should the economics support development.

In November 2014, Corazon optioned Lynn Lake. Under the terms of the agreement, Corazon can acquire a 100% interest by issuing to Victory Nickel 40 million Corazon shares upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project. The Company received 40,000,000 shares of Corazon in April 2015.

The Company’s decision to enter the frac sand business was initially based on the need to highlight the value of the frac sand as a co-product at its Minago nickel project in Manitoba. Based on the FS, approximately 11 million tonnes of frac sand exist within the Minago pit footprint. The frac sand is a significant contributor to the economics of the Minago project. On June 19, 2012, the Company announced the creation of Victory Silica, a wholly-owned subsidiary that has been established to manage the Company’s entry into frac sand production and distribution. The Company has established itself as a frac sand producer by acquiring concentrated sand in Wisconsin, USA and processing it into four main categories of finished frac sand products at the 7P Plant. The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014. Due to the sudden drop in the price of oil during late 2014, drilling activities has decreased and sales of frac sand have been significantly affected in 2015. The drop in sales required a temporary suspension in production in 2015.

**Going Concern**

These condensed consolidated financial statements have been prepared using Generally Accepted Accounting Principles (“GAAP”) applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at June 30, 2015, the Company had a working capital deficiency of $6,062,000. The

Company generated net cash from operating activities of $1,464,000 during the first half of 2015 but this is not yet at levels sufficient to wholly fund its activities.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the securities purchase and line of credit agreement (the “SPA Loan”) and on the Promissory Convertible Notes outlined below, and that it was in discussion with its lenders and other potential financiers to restructure the Company’s debt and recapitalize the Company. On July 30, 2015, the Company announced it had not repaid the amounts due under the SPA Loan. The Company is continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company’s debt and recapitalize the Company. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due. There can be no assurance that the Company will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the lenders may take in light of these defaults.

On May 15, 2014, the Company announced that it had executed the SPA Loan to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a “SPA Note”).

In October 2014, the Company obtained a short-term facility of $2,000,000 through the issuance of a promissory note. This facility was paid down to $1,000,000 and the due date extended on a monthly basis by the lender to May 31, 2015 (Note 14).

On June 3, 2015, the Company announced it had entered into an amending agreement (the “Amending Agreement”) with respect to the SPA loan. Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note and for working capital purposes. The aggregate amount of $5,150,000 under the amended loan is due on July 30, 2015. The interest rate on the Amended Loan is 14.8% per annum. As noted earlier, the Company was unable to repay the amounts due under the SPA Loan on July 30, 2015.

In addition to the SPA loan, the Company issued two year unsecured promissory convertible notes aggregating approximately $6,000,000 (the “Promissory Convertible Notes”). One Convertible Note in the amount of $2,000,000 is due in November 2015, three Promissory Convertible Notes aggregating $750,000 are due in February 2016, and four Convertible Notes aggregating to C$265,000 are due at various times between January and March, 2016, accordingly, they are classified as current liabilities, due within one year. Interest due on the Convertible Notes is due quarterly in arrears. As noted earlier, the Company was not able to make the interest payment due on June 30, 2015.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. During the second quarter of 2014, the Company was in the start-up and commissioning stage and began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. On April 14, 2015, the Company announced that operations at the 7P Plant were temporarily suspended until the demand for frac sand improves; this temporary suspension was due to the dramatic decrease in energy pricing that began in 2014. On June 23, 2015, the Company announced that there were no sales made during the period from March 14 to May 12, 2015 at which time frac sand sales activity resumed. Sales activity has not resumed at the rates achieved during 2014 and the 7P Plant operates temporarily on an as-needed basis in order to fulfil customer needs.

Despite these sales, the near-term outlook in the frac sand market remains unclear due to the continuing downward pressure on the oil price and related impact on exploration and production and oilfield services companies. The strength of the US dollar is also impacting demand for high-quality Wisconsin sand as the price for domestic sand has dropped and service companies appear satisfied with using lower quality domestic sand because of the price differential. This will continue to stress the Company's liquidity until such time as the market demand recovers and operations can resume.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment

and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to restructure its debt and improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including debt servicing, project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern. Failure to continue as a going concern would require that the Company's assets and liabilities be restated on a liquidation basis, which would differ from the going concern basis.

**OUTLOOK**

As a typical junior resource company with little to no access to financial and capital markets necessary to move mineral projects forward, the Company had to find an alternative. Waiting for the resource markets to turn around was not considered to be an acceptable option. So in June 2012, the Company announced its intention to enter the frac sand business with a plan that was certainly considered very aggressive and a vision at best. With the efforts of the talented team that was put together under the leadership of Ken Murdock, CEO of Victory Silica, that vision is now a reality. Victory Nickel, through its wholly owned subsidiary Victory Silica is now a producer and distributor of high-quality northern white frac sand for sale into the northern markets of Canada and the U.S. Victory Silica's product has received universal acceptance in the oil and gas service industry and the Company now boasts a customer list of leading companies in the industry.

Choosing to enter the frac sand business was not without reason. The strong market fundamentals for frac sand suggested continuing growth of the industry and new public information and strong peer group valuations indicated the availability of near-term cash flow. Suddenly, toward the end of 2014 and apparently to everyone's surprise, the bottom fell out of the oil industry and the price of oil crashed from in excess of $100 per barrel to the mid $40s. There were indications of a recovery to $60 during the first quarter but this appears to have disappeared as the price retreated to mid $40. In the United States, 2014 production of 9.42 million barrels was the highest since 1983. Aided by fracking, the United States was on its way to becoming energy self-sufficient. One can only assume that the U.S. would rather provide their own oil than have to be dependent on other nations.

During the first quarter of 2015 we saw demand for frac sand come to a full stop as exploration and production ("E&P ") companies cancelled or deferred capital programs. To further exaggerate the slowdown caused by a decline in drilling due to the price drop, this all happened during the typical slow period while road restrictions are in place due to spring breakup. We are now in August and the reduced demand for sand is continuing into the third quarter. However, we are seeing signs of returning demand as oil service companies are looking for pricing and availability of frac sand in preparation for anticipated increased activity. The price of oil necessary to create a resurgence of demand is yet to be understood. Major suppliers of frac

sand have said that the long-term fundamental trends for sand demand remain favorable and that the price discounts are temporary in the current market.

The sudden negative turn of events could not have come at a more crucial time in our development and entry into the frac sand industry. Production was ramping up but the sudden slowdown in demand required that the Company temporarily suspend production at its Seven Person plant. Once demand returns, the Company has in excess of 40,000 tons of sand at various stages of completion to enable the Company to immediately respond to customer needs.

The 7P plant is Phase One of the Company's three-phased plan to enter the frac sand business. During the ongoing temporary suspension of production at the 7P plant, small plant improvements are being made which should reduce or eliminate issues experienced during the commissioning and start up stages.

The Company has reduced staffing but kept a core group of employees to ensure that the plant can be reactivated without delay. The Company has reduced its fixed costs by returning equipment under lease such as rail cars and unloaders. In addition, the marketing and logistics team are developing programs which should allow the Company to better compete in the Canadian market when exchange rates make domestic sand more competitive.

The business plan has not changed; it is only deferred. Having completed Phase One, the board of directors approved moving forward to Phase Two of the Company's business plan. With the recent decline caused by the drop in the price of oil, Phase Two will be difficult to finance in a non-dilutive manner. However, Phase Two is a desirable next step which would not only make the Company more competitive but also provide significant flexibility to target certain markets which often require different grades of sand.

Phase Two of the Company's three phase plan is to build a wash plant on a Wisconsin sand resource. Frac sand production is a two-stage process; the wet stage and the dry stage. The Company now contracts out the wet stage which is completed in Wisconsin prior to shipping the wet sand to its plant in Alberta. The wet stage removes the fines and clays, allowing transport of only the coarser fractions. The dry stage, where the sand is dried and separated into four products of different sizes, is completed at the Company's 7P Plant a 500,000 tpa dry processing facility. This is of great advantage in maintaining the high quality of the sand. By dry processing and finishing close to markets, where customers can ship directly to the wellhead by truck, Victory Nickel's finished product is only handled once rather than five or six times as is the case with most Wisconsin sand. Every time finished product is handled, the quality deteriorates. Our customers have recognized the need to maintain the high quality which, importantly, makes quality one of Victory Nickel's key competitive advantages.

The three-phase approach to entry into the business was designed to minimize risk to Victory Nickel shareholders. The cost of entry with Phase One was approximately $6,000,000, or less than $12 per ton of annual plant production capacity. This represents approximately 30% of the

expected capital required to build a new plant. The capital recovery period is generally in excess of two years with a new plant; In Victory Nickel's case, this period is approximately six months at full pricing and production levels.

Phase Three of the business plan is to build a second dry processing facility in or around Winnipeg, Manitoba capable of producing 1,000,000 tpa. The Company is targeting a site which is serviced by multiple rail carriers. This gives the Company more flexibility in accessing only the highest quality sand from the Wisconsin/Minnesota region. The ultimate plan is to provide customers with a variety of qualities which would include domestic sand, possibly from the Company's Minago project in Manitoba which has been permitted and is ready for development when the price of nickel recovers. The Minago project is a nickel project overlain by overburden which includes sand meeting the frac sand specs. The Winnipeg formation sand located at Minago is the highest-quality domestic sand and would be a welcome addition to the Company's mix of products. Not all of our customers' applications require Wisconsin sand.

The Minago FS completed in 2009 indicated that the frac sand component of the Minago open pit contributed approximately $2.90 per pound of nickel; a very significant co-product. The sand resource at Minago is not restricted to the footprint of the open pit but extends beyond the pit limit such that it is not unreasonable to expect that there is sufficient sand to last in excess of 100 years at the million ton per year rate of extraction; this would be a new industry for Manitoba

E&P companies continue to squeeze oil services companies to reduce costs. Oilfield service companies in return push suppliers including frac sand suppliers to reduce costs. The uncertainty is causing panic selling in some cases. Conversely, there are indications that oilfield services companies are being opportunistic and stocking up on cheap sand. This is not sustainable.

We cannot change the market. All we can do is work with it and within it.

The Company must now focus on managing liquidity until markets settle down. A significant portion of staff and management salaries and director's fees currently due are being deferred or eliminated until the demand for frac sand returns. In addition, there will be no discretionary expenditures. To this end we thank our employees, many suppliers and our lenders who are showing patience.

## RESULTS OF OPERATIONS

### Overall

For the three months ended June 30, 2015, the Company had a net loss of $906,000 and a net loss of $1,177,000 for the six months ended June 30, 2015, or a loss of $0.02 per share for both the three and six month period (losses for the three month ended June 30, 2014 - $693,000 or $0.01 per share and six month ended June 30, 2014 - $2,139,000 or $0.04 per share). The

following narrative discusses the relevant operations of the Frac Sand and Exploration and Development segments first, and then addresses more general and corporate activities.

### *Three Months Ended June 30, 2015 Compared with Three Months Ended June 30, 2014*

| Three months ended June 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total | June 30, 2014 Total |
|---|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 631** | **$ -** | **$ 631** | $ 1,310 |
| Cost of goods sold | **-** | **-** | **(555)** | **-** | **(555)** | (1,456) |
| **Gross margin** | **-** | **-** | **76** | **-** | **76** | (146) |
| **Operating expenses** | | | | | | |
| General and administrative | **16** | **(22)** | **(124)** | **-** | **(130)** | (777) |
| Share-based payments: | **-** | **-** | **-** | **-** | | - |
| Options | **(22)** | **-** | **-** | **-** | **(22)** | (19) |
| Amortization of property, plant and equipment | **(1)** | **(1)** | **(162)** | **-** | **(164)** | (172) |
| Recovery (writedown) of E and E projects | **-** | **192** | **-** | **-** | **192** | (26) |
| Net frac sand pre-operating costs | **-** | **-** | **-** | **-** | **-** | - |
| Non-recurring plant costs [(1)] | **-** | **-** | **(56)** | **-** | **(56)** | - |
| **Operating income (loss)** | **(7)** | **169** | **(266)** | **-** | **(104)** | (1,140) |
| Finance income | **86** | **-** | **-** | **-** | **86** | 581 |
| Finance costs | **(880)** | **-** | **-** | **-** | **(880)** | (628) |
| **Net finance costs** | **(794)** | **-** | **-** | **-** | **(794)** | (47) |
| **Income (loss) before income taxes** | **(801)** | **169** | **(266)** | **-** | **(898)** | (1,187) |
| Income tax expense | **(8)** | **-** | **-** | **-** | **(8)** | 494 |
| **Net Income (loss) for the Period** | **$ (809)** | **$ 169** | **$ (266)** | **$ -** | **$ (906)** | $ (693) |

## Frac Sand

Due to the recent sudden decline in the price of oil combined with the spring break up period when road restrictions are in place, demand for frac sand in the Company's target markets basically came to a full stop in the first quarter of 2015. The Company accumulated inventory of in excess of 40,000 tons at various stages of the process. Until inventories are drawn down through sales, the Company temporarily suspended production. Sales resumed in May, 2015. During this period, operating personnel were trained and equipment was debugged.

*Revenues*

During the second quarter ended June 30, 2015, revenue was $631,000 including a one-time revenue item of $50,000 related to a freight transaction. This equates to $133.74 per ton on sales of 4,344 tons resulting in a gross margin of $76,000. This period was not a typical sales period as the sudden and material drop in the price of oil caused such uncertainty in the market that exploration and production ("E&P") companies effectively stopped activities in our market area. This was compounded by the spring breakup period which typically results in a slowdown of activity while road restrictions are in place. During the three-month period ending June 30, 2014, the Company's 7P plant was in process of being commissioned and produced 19,408 tons of various grades of frac sand 9,470, tons of which was sold generating revenue of $1,310,000

*Cost of goods sold*

The cost of goods sold includes the cost of concentrated sand purchased in Wisconsin, the cost of delivery to the 7P Plant including handling and transloading costs and the operating cost to dry and screen the concentrated sand into four main dry products. These costs are capitalized as a component of inventory on a normalized basis and are charged to cost of goods sold when title to the product passes to the customer.

The cost of goods sold was $555,000, or $127.76 per ton of frac sand sold for the three months ended June 30, 2015 compared with $1,456,000 for the same period of 2014 or $153.75 per ton; a portion of the sales are priced on a delivered basis and include transportation costs to the customer. As is expected during commissioning in 2014, the plant did not operate at full capacity or on a consistent basis, resulting in higher operating costs per ton of product produced than what is expected once full production is achieved. Costs incurred from the 2015 temporary suspension are included in *Non-recurring plant costs* and do not form part of the cost of sales or inventory. The Company has now reduced manpower to a skeleton crew sufficient to start production as demand returns on a consistent basis.

Costs per ton are per dry ton, unless otherwise stated.

Concentrated wet sand is purchased through long-term supply agreements with third parties at specified prices per ton. For the three months ended June 30, 2015 the cost of washed concentrated sand delivered to rail and included as a component of inventory was $31.75 per ton. Transportation costs including freight charges and fuel surcharges when transporting sand from Wisconsin to the 7P Plant, transload costs at the source and at the 7P Plant, as well as railcar lease payments were $59.79 per ton for the three months ended June 30, 2015. Other elements of cost of goods sold were $25.78 per ton during the three months ended June 30, 2015 and were primarily operating expenditures at the plant and mobile equipment lease payments. This adds to a finished goods inventory cost of $117.32 per ton. Finished goods inventory does not include freight for sales sold delivered to the customer. The difference from that to the cost of goods sold per ton of $10.44 essentially represents a combination of transportation costs to the customer’s specified location which is included in cost of goods sold but not included in inventory cost.

*Gross margin*

The 7P Plant generated a gross margin of $76,000 (2014-negative gross margin of $146,000) or $18 per ton (2014-$(15.42)) for the three months ended June 30, 2015 on sales revenue of $631,000 (2014-$1,310,000). The gross margin was affected by a combination of price reductions and cost increases due to the low production level during the first and second quarter of 2015. The sustained drop in the price of oil is putting pressure on the price of frac sand as producers discount excess inventory.

*General and administrative and other costs*
General and administrative ("G&A") costs for the frac segment amounted to $124,000 for the three months ended June 30, 2015. These costs include Victory Silica administration, marketing and logistics management. The Company has now reduced manpower to a skeleton crew and overhead sufficient to start production as demand returns on a consistent basis.

Amortization of property, plant and equipment of $162,000 was recorded for the quarter compared with $171,000 for the same period of 2014 for items in use at the 7P Plant including owned and leased equipment. The 7P Plant assets came into use primarily in the second quarter of 2014, at which time amortization commenced.

*Non-recurring plant costs*
As a result of the aforementioned temporary suspension of production, the Company incurred $56,000 in non-recurring plant costs during the three months ended June 30, 2015.

*Net income/ (loss)*
All of the above items combined to produce a net loss for the frac sand segment of $266,000 for the three months ended June 30, 2015.

**Exploration and Development**
There were no write-downs necessary for impairment of projects and no pre-exploration expenditures for the three months ended June 30, 2015 and $26,000 for the same period in 2014. On November 4, 2014, the Company announced it had optioned the Lynn Lake project to Corazon. As part of that transaction, the Company received 40,000,000 shares of Corazon on April 6, 2015 valued at $192,000.

**Net Loss for the three month period ended June 30, 2014 – Corporate and Total**

The net loss for the three months ended June 30, 2015 was $906,000, compared with $693,000 for the same period of 2014, including operating expenses of $104,000 (2014 - $1,140,000), net finance costs of $794,000 (net finance costs 2014 – $47,000) and an income tax loss of $8,000 (2014 recovery - $494,000).

G&A expenses of $130,000 include the reversal of previous accrued bonuses of approximately $225,000. The Company has reduced its overhead due to the slowdown in the market for frac sands, as compared with $777,000 incurred in the second quarter of 2014.

G&A costs include: statutory costs incurred as a public company, general investor relations expenses, consulting, travel costs, health benefits and director costs. G&A expenses include costs charged by Nuinsco for administrative services described under Transactions with Related Parties and Management Agreement with Nuinsco below. Effective March 2015, the

Management Agreement has been terminated by Victory Nickel but the Company continues to share resources and costs with Nuinsco under a cost sharing arrangement.

The share-based payment expense for options for the three months ended June 30, 2015 of $22,000 reflects partial vesting of 671,875 options with a weighted average fair value of C$0.42. There were no options granted during the current quarter. In the prior comparative period, share-based payment expense of $19,000 reflects the grant and partial vesting of 1,515,000 options with a weighted average fair value of C$0.31.

*Net finance income (costs)*

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Interest income on bank deposits | **$ -** | $ - | **$ -** | $ 1 |
| Net change in fair value of financial liabilities at fair value through operations | **32** | 445 | **226** | 445 |
| Gain on adjustment of estimated cash flows | **78** | - | **1,493** | - |
| Net foreign exchange gain | **(4)** | 137 | **40** | 137 |
| **Finance income** | **106** | 581 | **1,759** | 582 |
| Interest expense on loans | | | | |
| Cash settled | **432** | 260 | **983** | 389 |
| Amortization of loan fees | **255** | 147 | **485** | 190 |
| Amortization of embedded option derivatives | **213** | 51 | **372** | 102 |
| Commitment fee | **-** | 1 | **-** | 2 |
| Loss on adjustment of estimated cash flows | **-** | 151 | **-** | 248 |
| Net change in fair value of financial liabilities at fair value through operations | **-** | -<br>18 | **-** | -<br>73 |
| Net foreign exchange loss | | - | | 496 |
| **Finance costs** | **900** | 628 | **1,840** | 1,500 |
| **Net Finance Income/(Costs)** | **$ (794)** | $ (47) | **$ (81)** | $ (918) |

For the three months ended June 30, 2015 and 2014, net finance cost was $794,000 and $47,000 respectively. The Company considers financing activities, other than those related to equipment leased in the frac sand segment, to be part of the Corporate segment.

The finance income decreased $475,000 from $581,000 from the corresponding prior year quarter due to the income from the fair value of the warrants issued in connection with the SPA Loan which have a cashless exercise feature and from a gain of $78,000 (2014 – loss of $151,000) from the estimated cash flows from the Participating Interest. Both of these instruments and their accounting are described below. The recent slowdown in demand and the losses incurred during the first six months of 2015 necessitated deferral for payment of the Participating Interest and resulted in a gain. The Company applied probability weightings of 5%, 40% and 55% as risk factors to varying levels of expected cash flows. The probability weighted average cash flows has remained at 75% as at June 30 2015 (2014 – 75%) The percentage participation in net cash flows under the Participation Interest is 52.16%. As well, the Company

incurred $4,000 in net foreign exchange loss on transactions and balances denominated in the Canadian dollar.

Finance costs were $900,000 for the three months ended June 30, 2015, compared with $628,000 for the same period of 2014. The components were quite different when comparing the quarters. Cash and accrued interest expense was $432,000 for the quarter ended June 30, 2015 (2014 - $260,000). The increase in interest expense during 2015 was primarily attributable to interest on the SPA Loan, an additional Promissory Convertible Note issued in July 2014, and another short-term loan issued to fund the construction and working capital for the frac sand business.

The Company has issued several tranches of convertible notes. There are several elements of finance expense associated with these: cash-settled interest expense paid on a calendar quarter basis, non-cash amortization of loan fees, non-cash amortization of the embedded derivative related to the value of the convertibility feature at inception and the change in the value of that embedded derivative at the end of a reporting period. All amortizable elements are calculated using the effective interest rate method. Promissory Convertible notes were issued in 2013 and 2014 with similar terms and requiring similar accounting treatments. The aggregate outstanding principal value of the Promissory Convertible Notes as at June 30, 2015 is $5,979,000, of which $2,180,000 are due at various times over the next 12 months.

Aggregate interest settled in cash or accrued for the three months ended June 30, 2015 amounted to $432,000. On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and the approximately $6.0 million of Promissory Convertible Notes. On July 30, 2015 the Company announced that it had not repaid the amounts due, including the principal amount, on July 30, 2015, under the SPA Loan.

Amortization of cash-settled loan fees in the quarter ended June 30, 2015 amounted to $255,000 with an additional $177,000 for amortization of a portion of the embedded option derivatives related to the Promissory Convertible Notes remaining of $1,003,000 calculated at inception ($878,000 of which was recorded in 2014). The value of the embedded option derivatives decreased by $78,000 in the second quarter due to reductions in the value of the embedded option derivatives from their inception values and, accordingly, $0 was credited through operations as finance income during the quarter ending June 30, 2015.

The embedded option derivatives are calculated using the Black-Scholes option-pricing methodology and are a function of share price, the C$1.00 conversion price (after the retroactive effect of the Share Consolidation), risk-free interest rate, length of time to expiry and share price volatility as well as the US dollar exchange rate for loans denominated in US dollars but convertible using a Canadian dollar price. All other things being equal, one would expect the value of the option to decline as time approaches the expiry date. However, because of the volatility of exchange rates and the Company’s share price, this may not always be the case.

Further, since one Convertible Note was exchanged into a portion of the SPA Loan in the second quarter of 2014, a portion of the embedded option derivative was de-recognized. The SPA Loan does not contain an embedded option derivative feature; however, the warrants which were issued therewith may be exercised on a cashless basis. The value of the warrants is considered to be debt rather than equity and changes in the fair value of the warrants is also recorded through net finance income. For the three months ended June 30, 2015, this amounted to $32,000 in finance income.

### *Six Months Ended June 30, 2015 Compared With Six Months Ended June 30, 2014*

| Six months ended June 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total | June 30, 2014 Total |
|---|---|---|---|---|---|---|
| **Revenues** | $ - | $ - | $ 2,153 | $ - | $ 2,153 | $ 1,310 |
| Cost of goods sold | - | - | (2,324) | - | (2,324) | (1,456) |
| **Gross margin** | - | - | (171) | - | (171) | (146) |
| **Operating expenses** | | | | | | |
| General and administrative | (410) | (25) | (204) | - | (639) | (1,268) |
| Share-based payments: | | | | | | - |
| Options | (48) | - | - | - | (48) | (77) |
| Amortization of property, plant and equipment | (2) | (2) | (326) | - | (330) | (216) |
| Recovery (writedown) of E and E projects | - | 186 | - | - | 186 | (26) |
| Net frac sand pre-operating costs | - | - | - | - | - | (194) |
| Non-recurring plant costs [(1)] | - | - | (656) | - | (656) | - |
| **Operating income (loss)** | (460) | 159 | (1,357) | - | (1,658) | (1,927) |
| Finance income | 1,757 | - | 2 | (20) | 1,739 | 582 |
| Finance costs | (1,817) | - | (23) | 20 | (1,820) | (1,500) |
| **Net finance costs** | (60) | - | (21) | - | (81) | (918) |
| **Income (loss) before income taxes** | (520) | 159 | (1,378) | - | (1,739) | (2,845) |
| Income tax recovery | 562 | - | - | - | 562 | 706 |
| **Net Income (loss) for the Period** | $ 42 | $ 159 | $ (1,378) | $ - | $ (1,177) | $ (2,139) |

For the six months ended June 30, 2015, the Company had a net loss of $1,177,000, or $0.02 per share, compared with a net loss of $2,139,000, or $0.04 per share, for the six months ended June 30, 2014 on sales of $2,153,000 and $1,310,000 respectively.

The main components creating the net loss were G&A expenses of $639,000 (2014 - $1,268,000), amortization of property and equipment of $330,000 (2014-$216,000), net frac sand pre-operating costs of $0 (2014 - $194,000), non-recurring plant costs of 656,000 (2014 - $0.) and net finance costs of $81,000 (2014 - $918,000). The results in 2014 also included a recovery of $244,000 related to the Lynn Lake option which is no longer in force. Furthermore, income tax recoveries were recorded in both six month periods being $562,000 in 2015 and $706,000 in 2014.

G&A expenses decreased by $627,000 in 2015 compared with the same period of 2014. The main reason for the decrease is related to the Company reducing its overhead due to the slowdown in the market for frac sand and the reversal of $225,000 of accrued bonuses.

*Income tax recovery*
The Company does not allocate income taxes between segments. In the quarter ended June 30, 2015, the Company recorded an income tax recovery of $562,000, compared with an income tax recovery of $706,000 for the same period of 2014. This is primarily a function of higher taxable losses.

*Other significant changes*
The changes in other balances not specifically addressed in other sections of this MD&A are described herein.

Cash and cash equivalents have decreased from $712,000 to $153,000 excluding restricted deposits of $40,000 which support a letter of credit provided to one equipment supplier. The Liquidity and Capital Resources section describes the cash flows for the period in detail.

Inventory of $4,083,000 comprises various grades of finished product and concentrated sand at various locations from the transload facilities in Wisconsin and Minnesota, in transit to Seven Persons and at the 7P Plant itself. Valuation of the inventory is based on normalized costs anticipated during normal production levels.

Property, plant and equipment decreased to $5,878,000 at the end of June 2015 from $6,179,000 as at December 31, 2014 primarily due to amortization. The mobile equipment is in use and is being depreciated; amortization on the plant commenced in the second quarter 2014 given its availability for use in production. The first sand was processed through the 7P Plant in March, 2014 and commissioning occurred in early August 2014.

Receivables and prepaids decreased from $3,367,000 to $607,000 during the six months ended June 30, 2015. The decrease of $2,203,000 to $522,000 in trade accounts receivable from frac sand sales reflects the slowdown in demand. The majority of the receivables have been collected by the date of this report and we do not expect to experience any losses given the quality of our customers. Prepaids include $50,000 of deposits to sand suppliers as at June 30, 2015 (December 31, 2014 - $555,000).

Marketable securities as at June 30, 2015 increased by $178,000 from December 31, 2014 as a result of the Company receiving 40,000,000 shares of Corazon Mining Limited on April 6, 2015 valued at $192,000 as part of the option agreement of Lynn Lake. No sales occurred during 2015 or 2014.

Project expenditures are described below in Mine Property and Development Activities and Exploration and Evaluation Activities.

The increase in trade and other payables of $997,000 to $4,029,000 relates primarily to an increase in days outstanding for trade payables of $886,000 for supplies, transportation and

property, plant and equipment for the 7P Plant offset by a decrease in accrued liabilities of $219,000 related to the frac sand business. With the slowdown in sales and the resulting impact on cash availability, the Company has had to defer payments to suppliers.

As previously described, Victory Nickel has several loans and borrowings due within one year amounting to $7,247,000 and long-term loans of $2,935,000 aggregating $10,182,000; a total decrease of $268,000 over the loans and borrowings as at December 31, 2014 of $10,450,000. Changes in the embedded option derivatives described earlier, account for the remaining changes in loans and borrowings.

Note 14 to the Unaudited Condensed Consolidated Financial Statements include an analysis of the loans and borrowings balances. Refer to the Liquidity and Capital Resources section for additional discussion.

The Company has entered into several finance leases to purchase mobile equipment with a total fair value of $570,000 at various acquisition dates; the long-term portion of the related obligation is $204,000 at the end of June 2015 (December 31, 2014 - $275,000) and the short-term lease obligation of $140,000 (December 31, 2014 - $137,000) is included in *Trade and other payables*. Note 16 to the Unaudited Condensed Consolidated Financial Statements includes an analysis of the lease obligation.

The Participating Interest is a financial liability carried at amortized cost. The valuation thereof is determined by a model of estimated cash flows. As a result of changes in model assumptions resulted in revised amortized cost carrying amount of the Participating Interest of $2,054,000 (December 31, 2014 - $3,548,000) and, accordingly $1,494,000 was recorded as a *gain on adjustment of estimated cash flows* through the statement of operations.

The deferred tax liability balance amounts to $264,000 as at June 30, 2015 (December 31, 2014 - $817,000). The main components of the balance relate to the tax effects of E&E projects and the MP&D project, offset by the tax value of net operating tax losses carried forward. The deferred tax liability amount reflects a rate of 25%.

The share capital balance has not changed as at June 30, 2015 (December 31, 2014 - $52,570,000). On September 12, 2014, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”); any reference to the number of common shares, options and warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period referred to in this MD&A. In 2014, the increase in share capital of $344,000 was primarily due to the exercise of 463,000 options (after giving retroactive effect to the Share Consolidation) in the first quarter of 2014 generating cash of $201,000 and requiring a transfer from contributed surplus to share capital of $144,000.

Contributed surplus has increased to $5,692,000 from $5,644,000 as at December 31, 2014 primarily as a result of options vesting during the first half of $48,000.

Costs of $417,000 were incurred during the six months ending June 30, 2015 related to 7P Plant being placed on care and maintenance as a result of reduced production from the unexpected decline in sales during the first six months of 2015. Another $131,000 was incurred relating to railcar storage costs and one-time preparation costs for railcars to be leased that was later cancelled. Furthermore, costs totalling $108,000 relating to additional equipment rental and casual labour to move frozen sand as a result of the protracted spring break-up were incurred.

The finance income increase from $582,000 in the six months ended June 30, 2014 to $1,759,000 primarily relates to the gain on the estimated cash flows from the Participating Interest discussed above.

Finance costs increased from $1,500,000 for the first six months of 2014 to $1,840,000 for the same period in 2015. These include cash-settled interest, amortization of cash and non-cash-based fees, changes in embedded option values associated with the convertible debt and amortization of inception values of embedded option derivatives related to debt as well as the change in value of estimated cash flows associated with the Participating Interest. Note 19 to the Unaudited Condensed Consolidated Financial Statements provides an analysis of the costs. Of all the elements in the table, the only ones which are immediately cash-settled are interest income on bank deposits (which is insignificant) and cash-settled interest expense.

The income tax recovery has increased significantly, as has the pre-tax loss. Certain of the elements in finance costs are not taxable and their volatility has an apparent effect on the effective income tax recovery rate.

## SUMMARY OF QUARTERLY RESULTS

Selected financial information for each of the last ten quarters ended June 30, 2015 is as follows:

| Fiscal year 2015 | 2nd Quarter | | 1st Quarter | |
|---|---|---|---|---|
| Revenue | $ 631 | (1) | $ 1,522 | (1) |
| Gross margin (loss) | $ 76 | (2) | $ (247) | (2) |
| Net finance income (costs) | $ (794) | (3) | $ 713 | (3) |
| Net income (loss) | $ (906) | (4) | $ (271) | (4) |
| Total comprehensive loss | $ (945) | | $ (178) | |
| Earnings (loss) per share - basic and diluted (16) | $ (0.02) | | $ (0.00) | |

| Fiscal year 2014 | 4th Quarter | | 3rd Quarter | | 2nd Quarter | | 1st Quarter | |
|---|---|---|---|---|---|---|---|---|
| Revenue | $ 7,203 | (1) | $ 5,463 | (1) | $ 1,310 | (1) | $ - | |
| Gross margin (loss) | $ 670 | (2) | $ 689 | (2) | $ (146) | (2) | $ - | |
| Net finance income (costs) | $ 714 | (5) | $ (255) | (7) | $ (47) | (9) | $ (872) | (11) |
| Net income (loss) | $ 96 | (6) | $ (373) | (8) | $ (693) | (10) | $ (1,446) | (12) |
| Total comprehensive loss | $ (2,287) | | $ (464) | | $ (724) | | $ (1,371) | |
| Earnings (loss) per share - basic and diluted (16) | $ 0.00 | | $ (0.01) | | $ (0.01) | | $ (0.02) | |

| Fiscal year 2013 | 4th Quarter | | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|---|
| Net finance costs | $ (3,443) | (13) | $ (66) | $ (73) | $ (37) |
| Net loss | $ (3,656) | (14) | $ (503) | $ (417) | $ (313) |
| Total comprehensive loss | $ (3,628) | (15) | $ (518) | $ (493) | $ (436) |
| Loss per share - basic and diluted (16) | $ (0.07) | | $ (0.01) | $ (0.01) | $ (0.01) |

| Fiscal year 2012 | 4th Quarter | | 3rd Quarter | | 2nd Quarter | | 1st Quarter | |
|---|---|---|---|---|---|---|---|---|
| Net finance (costs) income | $ (9) | | $ (2) | | $ 2 | | $ (4) | |
| Net (loss) income | $ (139) | | $ 60 | (13) | $ (571) | (14) | $ 467 | (16) |
| Total comprehensive (loss) income | $ (193) | (12) | $ 6 | | $ (1,252) | (15) | $ 689 | (17) |
| (Loss) earnings per share - basic and diluted (16) | $ (0.00) | | $ 0.00 | | $ (0.01) | | $ 0.01 | |

(1) Revenue represents sales of frac sand (first sales were recognized in the second quarter of 2014).
(2) Gross margin (loss) includes cost of goods sold which include operating costs for a full period despite production being at less-than-full capacity.
(3) Net finance income include the change in the fair value of the embedded option derivatives related to the Convertible Notes, a reduction in fair value of warrants issued in connection with SPA Loan, and a gain on adjustment of estimated cash flows for the Participating Interest, offset by amortization of embedded derivatives and loan fees.
(4) Includes the effects noted above.
(5) Net finance costs include $708,000 change in the fair value of the embedded option derivatives related to the Convertible Notes partly offset by $493,000 gain on adjustment of estimated cash flows for the Participating Interest.
(6) Includes the effects noted in (1), (2), and (5).
(7) Net finance costs include $827,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $20,000 loss on adjustment of estimated cash flows for the Participating Interest.

(8) Includes the effects noted in (1), (2), and (7).
(9) Net finance costs include $450,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $135,000 loss on adjustment of estimated cash flows for the Participating Interest.
(10) Includes the effects noted in (1), (2), and (9).
(11) Net finance costs include $505,000 change in the fair value of the embedded derivatives related to the Convertible Notes as well as $97,000 loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco.
(12) Includes the effects noted above combined with increased costs relating to the frac sand business and net frac sand pre-operating costs of $194,000.
(13) Net finance costs for the period includes $3,133,000 for the loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco and $154,000 for the increase in value of the embedded derivative related to the convertible promissory note.
(14) Net loss for the period includes $229,000 for costs charged under the Management Agreement with Nuinsco and cost sharing arrangement and reflects increased activity on the frac sand business and an income tax recovery of $532,000.
(15) Total comprehensive loss for the period includes the effects noted above.
(16) After the retroactive effect of the Share Consolidation.

## LIQUIDITY AND CAPITAL RESOURCES

As at June 30, 2015, the Company had a working capital deficiency of $6,062,000, compared with a working capital deficiency of $3,045,000 as at December 31, 2014.

The increase in working capital deficiency of $3,017,000 since December 31, 2014 resulted primarily from an increase in accounts payable of $997,000 as well as a large decrease in accounts receivable balance, offset by a $1,106,000 increase in inventory, both of which are due to the decline in frac sand demand during the first half of 2015.

Of the financings of $10,979,000 used to fund the construction and upgrading of the 7P Plant and working capital, $7,247,000 are due within one year. Of this amount, $5,150,000 is secured by the assets of the Company.

### Participating Interest

On April 22, 2014, Nuinsco exercised its conversion option and converted its loan to the Participating Interest. At the same time, it relinquished its security over the assets of the Company since the Conversion constituted payment of the loan in full. This obligation will be settled through a 52.16% participation in net operating cash flows from the frac sand business after recoupment of capital costs for Phase One and pre-operating expenses. The participation is capped at $6,053,000 provided the Company proceeds with Phase Two, Otherwise the cap is approximately $8,071,000. Distributions under the Participating Interest terms are calculated based on operating cash flow after recovery of capital and pre-operating costs and take into

account working capital. It is presently anticipated that the first payment under the Participating Interest could occur in the second quarter of 2017.

As at June 30, 2015 the carrying value of the Participating Interest was revalued at $2,054,000 to take into account future expected cash flows based on current market information. This compares with $3,548,000 at December 31, 2014. The change in value of $1,494,000 in the six months ended June 30, 2015 has been recorded through *Finance Income* in the statement of operations (for further description see Note 15 to the Unaudited Condensed Consolidated Financial Statements).

The Company will continue to reassess the carrying value of the Participating Interest as circumstances warrant.

**Convertible Notes** – During 2013 and 2014 two-year Convertible Notes bearing interest at the rate of 14.8% per annum and aggregating $5,979,000 were issued to fund the construction of the 7P Plant and working capital requirements. The accounting complexities of these financial liabilities have been described earlier. The Convertible Notes may be converted in whole or in part, at any time, at the option of the holders into Victory Nickel shares at a conversion price of C$1.00 per share.

**SPA Loan** - On May 15, 2014, the Company entered into a senior secured line of credit agreement in the amount of $4,000,000 (the “SPA” Loan”). The SPA Loan bears interest of 14.8% per annum and matures on July 30, 2015 and is now is classified as a current liability due within one year. Full details of the SPA Loan are described in the 2014 Audited Consolidated Financial Statements.

The terms of the SPA warrants contain a cashless exercise feature which requires the warrants to be recognized as a liability rather than as equity within contributed surplus. Accordingly, the fair value of the warrants at inception of $554,000 is recorded as a liability with the balance of the SPA Loan. Any change in the fair value of the warrants is also recorded as a component of the SPA Loan and charged to finance income or costs in the statement of operations. The fair value change amounted to a decrease of $32,000 in the three months ended June 30, 2015 (a net decrease of $554,000 since inception) bringing the fair value of the cashless warrants to $0 as at June 30, 2015.

In the three months ended June 30, 2015, the Company paid $43,000 in cash and accrued $395,000 for interest and amortized $256,000 in loan fees into interest income.

In June 2015 the SPA loan was increased by $1,150,000 to $5,150,000. Of the increase, $1,000,000 was used to repay its short-term facility and $150,000 was made available for working capital purposes. As consideration, the warrant price was reduced from $1.00 per share to $0.50 per share and additional warrants of 575,000 were granted.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and on the Promissory Convertible Notes outlined above, and that it was in discussion with its lenders and other potential financiers to restructure the Company's debt and recapitalize the Company.

On July 30, 2015, the Company announced it had not repaid the amounts due under the SPA Loan, and that it was continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due.

Short Term Facility – On October 1, 2014, the Company completed a short-term financing by way of a $2,000,000 promissory note. The promissory note bears interest at 28%, calculated and settled monthly. This short-term loan has been renewed on a monthly basis upon payment of extension fees and penalties. The Company repaid $1,000,000 during the first two months of 2015 and in June the Company announced it had entered into an amending agreement (the "Amending Agreement") whereby the short-term facility and the SPA loan were combined to create the Amended Loan Facility.

**Cash flows in the first six months of 2015** - Cash and cash equivalents as at June 30, 2015 and December 31, 2014 were held with major Canadian banks. The Company has a policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board.

For the six months ended June 30, 2015, the Company generated cash from operating activities of $1,464,000 compared with cash used of $3,098,000 during the same period of 2014. The build-up of receivables as at December 31, 2014 was essentially all collected during the first half of 2015 and provided an increase in cash of $2,760,000 compared to the first half of 2014 and extending payables contributed $874,000. However, there continues to be limited revenues due to the slowdown in operating activity during the first half of 2015 as mentioned earlier. The Company will require a restructuring of its debt and likely an infusion of new capital while ramping up operations to the level where cash flow is sufficient to meet it needs.

Costs incurred to advance the Company's exploration, evaluation and development projects are capitalized, as summarized below under the discussion of investing activities. Costs to set up the Company's frac sand operations and operating costs were recorded as part of pre-operating expenditures net of sales revenue of $194,000 for the first six months of 2014 and thereafter are part of cost of goods sold or other expense lines. In the six months ended June 30, 2015, $2,324,000 was charged to cost of goods sold. Revenue in 2015 amounted to $2,153,000.

As operating activity began to slow down during the first half of 2015 due the sudden and material drop in the price of oil and the spring breakup period as mentioned earlier, receivables decreased to $607,000 as at June 30, 2015 compared with $3,367,000 as at December 31, 2014, while inventory and trade and other payables continue to grow. This also led to $56,000 of non-recurring plant costs which were incurred for the quarter as described earlier. The Company continues to hold discussions with financiers and potential business partners to fund the growing working capital deficit.

During the six months ended June 30, 2015, costs incurred by investing activities were $343,000, compared with cash used of $1,527,000 in the prior comparable period. Aggregate amounts of $204,000 and $85,000 were used to advance the MP&D project and E&E projects, respectively, during the periods (2014 - $156,000 and $62,000). In the first half of 2015, $54,000 was used for expenditures on the 7P Plant acquisition, equipment and improvements (2014 – $1,309,000).

The Company used $1,680,000 in financing activities during the six months ended June 30, 2015 compared with $3,850,000 generated in the corresponding period in 2014. In 2014, the main source of funds was an additional $4,000,000 from various Promissory Convertible Notes issued to March 2014. In 2015, $1,000,000 of the short-term facility was repaid. Loan interest was $983,000 compared with $389,000 in 2014. The increase is due to the increased debt described elsewhere. Aggregate payments under leases for deposits and other principal payments totalled $70,000 for mobile equipment used in the frac sand business, compared with payments of $69,000 in 2014. The Company also deposited $40,000 (2014 – $271,000) of funds to support letters of credit issued to facilitate the Company's frac sand business.

There were no equity financings completed during the period. During the same period in 2014 the Company received $201,000 through the exercise of options.

The Company's activities during the six months ended June 30, 2015 used cash and cash equivalents of $559,000, compared with $776,000 during the first half of 2014.

**Table of Contractual Commitments**

| | Due Date | Currency | June 30, 2015 | December 31, 2014 |
|---|---|---|---|---|
| Transformer and electrical equipment | On shipping | US Dollar | $ 1,296 | $ 1,296 |
| Loans and borrowings (including unpaid accrued interest) | | | | |
| Amended Loan | January 31, 2015 | Canadian Dollar | $ - | $ - |
| Participating Interest | Refer to note below | Canadian Dollar | $ - | $ - |
| Convertible Notes | November 11, 2015 to July 7, 2016 | US Dollar | $ 5,750 | $ 5,750 |
| Convertible Notes | January 30, 2016 to March 13, 2016 | Canadian Dollar | $ 265 | $ 265 |
| SPA Loan | July 30, 2015 | US Dollar | $ 5,150 | $ 4,000 |
| Promissory Note [1] | May 31, 2015 | US Dollar | $ - | $ 2,000 |
| Purchase of 7P Plant | Refer to note below | Canadian Dollar | $ - | $ - |
| Leased mobile equipment | Within one year | Canadian Dollar | $ 175 | $ 179 |
| | One to five years | Canadian Dollar | $ 255 | $ 328 |

Using August 14, 2015 prices, the aggregate market value of the Company's marketable securities held in public company shares is approximately $331,000.

As at August 14, 2015, the Company had options and warrants outstanding which could bring in additional funds. Most of those instruments are not "in-the-money" and the receipt of such funds cannot be relied upon.

The Company has good title to its projects and will continue to maintain the projects in good standing.

The Company recognizes the imminent cash requirement to repay debt and is actively pursuing restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

Development of the Minago mine will require considerable financial resources. The Company recognizes that the current state of the financial markets and the apparent lack of support for mining projects will make financing this project difficult. However, validating the frac sand portion of the project could provide leverage to get potential partners interested in the nickel portion of the project.

The Company has in excess of 40,000 tons of sand in inventory which should generate cash to bring suppliers debt up-to-date. The Company is also reducing all discretionary costs which should not have a negative impact on its ability to resume production. Staff, salaries, and director fees are being reduced or deferred where possible.

The Company continues to hold discussions with local and overseas financiers and potential business partners with respect to the nickel and frac sand opportunities.

## BUSINESS UPDATE

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company also now produces frac sand for the oil and gas industry in Canada and the northern US. Accordingly, the Company has commenced reporting on a segmented basis in 2014. The Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand.

The Corporate segment supports all of the Company's activities.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 20 in the Unaudited Condensed Consolidated Financial Statements). The segment is located in Canada although sand as raw material is imported from the US.

The following table provides additional information on the Company's total segment assets. The segmented Statement of Operations has been presented earlier in the MD&A in the discussion of operating results for the six months ended June 30, 2015.

| | **June 30, 2015** | December 31, |
|---|---|---|
| | **2015** | 2014 |
| **Canada** | | |
| Corporate | **$ 1,605** | $ 1,860 |
| Exploration and Development | **49,836** | 49,734 |
| Frac Sand | **9,078** | 11,300 |
| Intersegment elimination | **(1,052)** | (962) |
| **Total Assets** | **$ 59,468** | $ 61,932 |

## EXPLORATION AND DEVELOPMENT ACTIVITIES

Paul Jones, Vice-President, Exploration, is a "qualified person" as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Company described herein.

## MINE PROPERTY AND DEVELOPMENT ACTIVITIES

During the six months ended June 30, 2015, $85,000 was incurred on the Minago project (June 30, 2014 - $179,000).

### Minago Project

The Company's 100%-owned Minago project is a permitted project ready for development. It is located on the unexposed southern part of the Thompson Nickel Belt in Manitoba, and is one of Canada's largest undeveloped sulphide nickel deposits. Minago has been shown to be capable of producing a nickel concentrate grading from 22.3% up to 35.0%, making it reportedly the world's highest grade nickel concentrate. In addition to metal by-products such as copper, cobalt, gold, platinum, palladium, silver and rhodium, a layer of silica sand averaging approximately nine metres thick overlies the nickel mineralization within the open pit. Approximately 84% of the sand is marketable as frac sand. The frac sand forms part of the overburden that must be removed prior to mining the nickel ore. According to the FS, production of frac sand could begin 20 months after the start of mine development.

The analytical data and geological interpretations obtained from a work program in 2010 were incorporated into an updated geological model and resource estimate. The updated resource incorporates a 24% increase (over the previous resource estimate) in the NI-43-101-compliant measured and indicated, pit-constrained, sulphide nickel resource used in the Minago FS. The

FS is posted at www.sedar.com. Note that all resources are contained in the Nose Deposit and the update below does not include the results of the 2011 drilling program.

| | **April 2011 Pit-Constrained Resource[1]** | | | **March 2010 In-Pit Resource[2]** | | | **Increase (Decrease) in Contained Metal** | |
|---|---|---|---|---|---|---|---|---|
| | **Tonnes** | **Grade** | **Ni Content** | Tonnes | Grade | Ni Content | **Ni Content** | **Change** |
| **Category** | **Millions** | **%NiS[3]** | **M Lb** | Millions | %NiS[3] | M Lb | **M Lb** | **%** |
| **Measured** | **8.2** | **0.473** | **85.0** | 6.6 | 0.488 | 71.4 | **13.7** | **19.2** |
| **Indicated** | **22.8** | **0.432** | **217.2** | 19.1 | 0.410 | 172.6 | **44.6** | **25.9** |
| **M&I** | **31.0** | **0.443** | **302.2** | 25.7 | 0.430 | 243.9 | **58.3** | **23.9** |
| **Inferred** | **0.2** | **0.380** | **1.4** | 1.4 | 0.402 | 12.2 | **(10.8)** | **(88.4)** |

[1] Lerch-Grossman pit optimization shell [2] Whittle pit optimization shell [3] Nickel in sulphide form

A winter work program was conducted at Minago in 2011. The program comprised 8,793m of diamond drilling in 20 drill holes with associated ground and borehole electromagnetic geophysics. The program was intended to evaluate parts of the project that have seen little work to date as well as to build upon the existing data-set of the Nose Deposit nickel mineralization. The entire pit-constrained resource is located within the Nose Deposit. A total of 15 holes were collared to intersect the “North Limb”, a domain of nickel-bearing ultramafic rock extending at least 1.5km north from the Nose Deposit. A single deep hole was collared on the Nose Deposit to evaluate the depth extension of the ultramafic host rock and nickel mineralization. The hole was drilled to a total length of 1,527m and intersected approximately 160m of ultramafic rock near the bottom of the hole – confirming the extension of the host rock to depths several hundred metres below that previously tested. A single drill hole was collared in the western part of the property in order to test the thickness of the Winnipeg Formation sand horizon. As anticipated, the hole successfully intersected the Winnipeg Formation sandstone layer (frac sand horizon) immediately above the unconformity with the Thompson Nickel Belt rocks.

A 3,500m winter work program was conducted in early 2012. The program tested a number of targets around the property that have been identified in previous work programs as well as areas that are scheduled for Minago mine infrastructure development. In part, the drilling evaluated the nickel-bearing Ospwagan Group/Pipe Formation rocks in the vicinity of the Minago Nose Deposit. Given the widespread nature of nickel mineralization on the Minago property and the number of targets identified, the possibility of intersecting completely new nickel mineralization was considered good. The drilling intersected magnetite-bearing amphibolite domains, pyrite-pyrrhotite intervals and minor serpentinite.

Importantly, two holes of the 2012 program tested known nickel-bearing serpentinite that underlies mining lease ML-003 approximately 5km south of the Nose Deposit. Thirteen historic drill holes are known to have been drilled by previous operators in the area between 1968 and 1971. Ten of the thirteen holes intersected serpentinized ultramafic rock, while seven of these holes obtained significant intersections of nickel-mineralized serpentinite from within a body

interpreted to be >2 km long. The most extensive intersection, in MXB-70-60, was 605m grading 0.3% Ni from 154m down hole. DDHs V-12-07 and V-12-09 completed in the winter of 2012 both intersected significant widths of serpentinite and obtained analytical results consistent with historic results.

No fieldwork has been conducted on the project subsequent to the winter 2012 work program; current work is related to reporting and evaluation of existing results as well as gathering additional geochemical information from existing drill core. An application to renew the Minago mining leases ML-002 and ML-003 was successful and both leases have been renewed for a 21-year term.

On August 23, 2011, the Manitoba Government issued Victory Nickel's final EAL for the Minago project. The licence expires on August 22, 2014 unless the Company completes a certain amount of work to move the project forward. During 2014, the Company has complied with the conditions of the EAL and, in December, filed an Environmental Act Proposal ("EAP") to amend the EAL to relocate the proposed tailings and waste rock management facility. The construction of drainage ditches installed to lower down the water table within the pit shell limits, the installation of Flow Gauging and Telemetry systems and the implementation of a comprehensive environmental monitoring program are considered part of the site development necessary to maintain the EAL which would otherwise expire in August, 2014.

*Frac Sand*
An indicated resource of 15 million tonnes of sandstone has been estimated to occur within the current Minago pit shell. The frac sand component of this resource of approximately 11 million tonnes is a significant contributor to the positive economics at Minago. As part of the FS, Outotec produced a feasibility-level design for a frac sand plant complete with capital and operating costs to produce 1,140,000 tonnes of frac sand annually for a ten-year period. Considerable potential exists to expand the resource beyond the limits of the current pit.

**EXPLORATION AND EVALUATION ACTIVITIES**
For the three months ended June 30, 2015, the Company incurred exploration expenditures on its E&E projects of $12,000 and $25,000 for the six months ended June 30, 2015 (June 30, 2014 – three months $124,000 and six months $160,000). Expenditures have been minimal due to the tight equity markets and management's focus on Victory Silica and the frac sand business.

## FRAC SAND

**Bear Coulee Property**
In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in Trempeleau County Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment of $10,000 on signing of the agreement (and paid in 2014), a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months following receipt of permits

with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced the completion of a National Instrument 43-101 technical report describing a resource estimate of approximately 11 million tons of frac sand on the Bear Coulee Property.

## NICKEL

### Lac Rocher

Lac Rocher is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cutoff, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per lb in the Lac Rocher PEA was US$9.74 with copper at US$3.65.

The Lac Rocher property is subject to a discovery incentive plan (the “DIP”) to reward certain individuals involved in the discovery of Lac Rocher with a 2% net smelter royalty (”NSR”) for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

Year round access is now available to the site. In December 2009, diamond drilling was conducted to provide geotechnical data deemed necessary for future portal and ramp development. An InfiniTem ground electromagnetic survey was conducted over a portion of the property to test for deeper extensions to the nickel mineralization. At the same time, evaluation of the availability of borrow material was also conducted in the local region. In 2013, a program to retrieve all accessible drill core from the site was conducted. This core will be securely stored in Chibougamau at the Copper Rand mine site before being moved to permanent storage.

### Mel Project

The Mel project is located on the Thompson Nickel Belt, just north of Thompson, Manitoba. It is a large property, approximately 25km east-west by about 6km north-south, and remains underexplored.

Mel has an indicated resource of 4.3 million tonnes grading 0.88% nickel (approximately 83 million pounds in-situ nickel) and an additional inferred resource of one million tonnes grading 0.84% nickel (approximately 19 million pounds in-situ nickel) and offers significant exploration upside as well as near-term production potential.

The Company had earned a 100% ownership of Mel subject to a 51% Vale back-in right. During the third quarter of 2010, the Company announced that Vale had determined that it would not exercise its back-in right. Title to the property has been transferred. Accordingly, the Company is in a position to determine future programs at Mel in its sole discretion.

Ten drill holes, totalling 3,459m, comprised the 2011 winter work program on the Mel Property, the first managed by the Company. Two drill holes, totalling 739m, were collared to test a UTEM geophysical anomaly approximately 700m north of the Mel deposit associated with earlier prospective nickel results; no sulphide mineralization was encountered. Eight drill holes, totalling 2,720m, were collared to test the down-dip extension of the Mel resource shell; all holes intersected nickel mineralization of grade and width comparable to that obtained in holes that comprise the existing resource.

The re-evaluation of the Mel dataset is continuing for both the drill hole data on the Mel deposit and the considerable drilling (111 drill holes) conducted of the claims portion of the property. The study has included reinterpretation of the geological context in order to evaluate new or under-tested target areas for future work and that can be incorporated into further, more refined, modelling of the Mel resource. No fieldwork was conducted during 2013, 2014 or in 2015 to date. An application to renew Mel mining lease ML-007 was successful and the lease has been renewed for a 21-year term.

Under the terms of the option agreement, Vale must mill ore from the Mel project at cash costs plus 5% subject to capacity availability and metallurgy – this is unaffected by Vale's decision not to exercise its back-in right. Furthermore, in accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

**Lynn Lake**

The Lynn Lake property is located in the historic mining town of Lynn Lake in northern Manitoba, about 320km by road northwest of the Thompson mining camp. The property is the former Sherritt Gordon Mines Limited ("Sherritt") mine site known as the Lynn Lake A Mine and Farley Mine, comprised of 13 mining claims, 14 mining claim leases and 2 mineral leases covering an area of 2,170.26 hectares. The property was operated by Sherritt from 1953 to 1976 with reported production of 22.2 million tons at an average grade of 1.023% nickel and 0.535% copper.

As discussed earlier and described in Note 12 to the 2014 Audited Consolidated Financial Statements, the Company had optioned Lynn Lake to Prophecy Coal with subsequent assignment to Wellgreen. In March, 2014, Wellgreen relinquished the option on the property and it has reverted to the Company. On November 4, 2014, the Company announced that it had optioned the Lynn Lake project to Corazon, an Australian listed public company with assets in the Lynn Lake area. Under the terms of the agreement, Corazon can acquire a 100% interest in Lynn Lake by issuing 40 million Corazon shares to the Company upon closing and incurring A $3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project.

On April 6, 2015 Corazon Mining Ltd. (“Corazon”) issued 40,000,000 Corazon shares to Victory Nickel as part of the terms of the option agreement between the two companies.

Also under the agreement, Victory Nickel retains a 1.5% net smelter return royalty on any production from the claims and leases transferred by Victory Nickel to Corazon, 1% of which can be purchased by Corazon for A$1M. Corazon must spend A$3.5M in exploration and resource development over five years upon execution of the agreement - should Corazon fail to make the expenditures, the difference between the expenditure requirement and the actual expenditures must be paid to Victory Nickel in cash or shares of Corazon, or the project is returned to Victory Nickel. Within 30 days of the commencement of commercial ore processing at Lynn Lake, Corazon is required to make a payment of A$1M in cash and/or shares of Corazon to Victory Nickel.

**FRAC SAND SEGMENT**

As explained above, the Frac Sand segment is managed and operated by Victory Silica’s executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 21 in the Unaudited Condensed Consolidated Financial Statements). The segment is located in Canada although sand as raw material is currently imported from the US. The plan is to eventually produce both domestic and imported sand.

The Company completed Phase One of its three phase business plan. Phase One provided for the refurbishment and upgrading of the 7P Plant to a capacity of 500,000 tpa of high-quality frac sand. The 7P Plant was completed in March 2014 followed by commissioning until early August.

Successful completion of Phase One was expected to lead to Phase Two which provides for the building of a wash plant in Wisconsin, USA followed by Phase Three which provides for the construction of a second dry processing facility in Manitoba with a capacity of approximately 1,000,000 tpa. With the completion of Phase One, the Board of Directors approved proceeding with Phase Two provided non-dilutive financing can be arranged. However, in February 2015,

the Company announced that Phase Two had been deferred due to the uncertainty caused by the drop in the price of oil.

As mentioned above, sales decreased monthly from January to March and, as a result of commodity market uncertainty and longer than expected spring break-up conditions, the Company temporarily suspended the frac sand operations on April 14, 2015. In May, spot sales of frac sand from the 7P Plant resumed and the 7P Plant continues to operate on an as-needed basis only. Frac sand sales typically slow down during this period of the year due to spring break-up road restrictions in Alberta. This year, the spring break-up slowdown was more pronounced than in prior years as the majority of the oil and gas exploration and production ("E&P") companies appear to be trying to conserve capital by postponing drilling activity to less costly periods after spring break-up. With the price of oil dropping by approximately 50% since November 2014, E&P companies are reducing capital expenditure programs and, as a result, drilling activity has also slowed. The slowdown, combined with spring break-up, is placing pressure on Victory Nickel's oilfield service company customers to reduce E&P company drilling costs.

These companies, in turn, look to their suppliers, including frac sand producers, to help lower their costs. As a result of market uncertainty in Canada and the USA frac sand prices in Canada have decreased to levels that do not appear to be sustainable over the long term. The weakness of the Canadian dollar has made domestic sand more competitive over this period and is taking some of the market previously available for imported sand.

The Company has built approximately 40,000 tons of finished product and raw material inventory at its 7P Plant which is available to supply its customers as fracking activity resumes following spring break-up.

## IMPAIRMENT ANALYSIS UPDATE

While the metals markets and other general economic factors continue to be relatively stable, there has been no marked recovery except for a strengthening US dollar. The Company performed a detailed impairment analysis on each of its E&E projects and the MP&D project as at December 31, 2014. The Company does not believe that there have been any material changes to date which would adversely affect this analysis. Furthermore there has been no change in management’s plans for the projects which would cause a reassessment.

Management concluded that no impairment existed in each of its projects effective June 30, 2015 and that costs incurred to date are recoverable. The Company will continue to monitor developments as they occur in the metals markets and the economy and will update its impairment analysis to take account of any such changes, as appropriate.

## CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

Critical accounting estimates and judgements used in the preparation of the consolidated financial statements include determining the carrying value of investments, MP&D and E&E

projects, assessing the impairment and classification of long-lived assets, determining the recoverability of deferred income tax assets, the valuation of the convertibility feature of the loans and promissory notes, the valuation of share-based payments and the disclosure of contingencies and going concern matters. These estimates involve considerable judgement and are, or could be, affected by significant factors that are out of the Company's control.

For a complete list of the significant accounting policies as well as information concerning the use of estimates, judgements and measurement uncertainty, reference should be made to Note 3 to the Company's 2014 Audited Consolidated Financial Statements. The Company's financial statements have been prepared using the going concern assumption; reference should be made to Note 1 to the Company's 2014 Audited Consolidated Financial Statements.

The recorded value of the Company's E&E projects and the MP&D project is based on historic costs that are expected to be recovered in the future. The Company's recoverability evaluation is based on market conditions for minerals, underlying mineral resources associated with the properties and future costs that may be required for ultimate realization through mining operations or by sale. The Company is in an industry that is exposed to a number of risks and there is always the potential for a material adjustment to the value assigned to these assets. Such risks also extend to the evaluation of fair values of net assets upon acquisition.
The value of the Participating Interest is a significant estimate which uses a model of estimated cash flows and applies probability-weighted estimates to the model. Assumptions are made about the phase at which the frac sand business will be when payments are being made as well as production costs and volumes and sales prices and volumes.

The fair value of the stock options and warrants, as well as the embedded option derivative in the promissory note, is calculated using the Black-Scholes option-pricing model that takes into account the exercise price, expected life of the option/warrant, expected volatility of the underlying shares, expected dividend yield, and the risk-free interest rate for the term of the option/warrant or embedded option derivative.

The Company has determined that it is highly probable that Victory Nickel will generate returns sufficient to utilize its taxable losses prior to their expiry. This is a significant judgement that, dependent upon future events, may turn out to be incorrect. Presently, since Victory Silica is not revenue-generating, a full valuation allowance has been recorded against losses incurred in that subsidiary. The Company will monitor any changes in circumstances which could require a reversal of the valuation allowance.

## NEW ACCOUNTING POLICIES

IFRS issued by the International Accounting Standards Board ("IASB") have been adopted in the Company's 2014 Audited Consolidated Financial Statements. There have been no new accounting policies adopted by the Company, except as noted Note 3 to those statements.

## FUTURE ACCOUNTING CHANGES

### New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations. However, the revised standards and interpretations are not applicable to the Company or are expected to have minimal impact.

## CORPORATE GOVERNANCE

The Company's Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of directors, none of whom are employees or officers of the Company, meets with management to review the Unaudited Condensed Consolidated Financial Statements to satisfy itself that management is properly discharging its responsibilities to the directors who approve the financial statements. The Board of Directors has also appointed compensation and corporate governance and nominating committees composed of non-executive directors.

### Evaluation of Disclosure Controls and Procedures

The Company's Chief Executive Officer and Chief Financial Officer, (collectively, the "Certifying Officers"), are responsible for designing a system of disclosure controls and procedures, or causing them to be designed under their supervision, to provide reasonable assurance that information required to be disclosed in reports filed with or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities laws and that material information relating to the Company is made known to them with respect to financial and operational conditions to allow timely decisions regarding required disclosure. For the fiscal quarter ended June 30, 2015, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's disclosure controls and procedures as defined under the rules adopted by the Canadian securities regulatory authorities. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's disclosure controls and procedures were effective as at June 30, 2015. Such controls are facilitated by the small size of the Company's senior management team and their access to material information.

There were no changes to the Company's disclosure controls and procedures that occurred during the quarter ended June 30, 2015 that materially affected, or are reasonably likely to affect, the Company's disclosure controls and procedures.

### Evaluation of Internal Control over Financial Reporting

The Company's Certifying Officers are responsible for designing a system of internal controls over financial reporting, or causing them to be designed under their supervision, to provide reasonable assurance regarding the reliability of financial reporting and preparation of consolidated financial statements for external purposes in accordance with Canadian GAAP. The

Company used the COSO (1992) control framework and is in the process of updating its methodology to incorporate the COSO (2013) framework into its analyses for the future. The COSO Board has made the COSO (1992) framework available for use until an unspecified date at which point it is expected to be considered superseded. For the fiscal quarter ended June 30, 2015, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's internal control over financial reporting. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's internal controls over financial reporting and procedures were effective as at June 30, 2015.

The management of the Company was required to apply its judgement in evaluating the cost-benefit relationship of possible controls and procedures. The result of the inherent limitations in all control systems means no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected.

There were no changes to the Company's internal controls over financial reporting that occurred during the quarter ended June 30, 2015 that materially affected, or are reasonably likely to affect, the Company's internal controls over financial reporting. However, reliance was placed on mitigating controls around processes that are currently still evolving to reduce risk of material misstatement on the financial statements to an acceptable level.

## TRANSACTIONS WITH RELATED PARTIES AND MANAGEMENT AGREEMENT WITH NUINSCO RESOURCES LIMITED

### Related Party Balances and Transactions for Services

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19 to the 2014 Audited Consolidated Financial Statements). Payables to key management personnel generally relate to directors' fees, consulting fees, and expense reimbursements.

Balances and transactions with related parties as at June 30, 2015 and December 31, 2014 and for the three and six months ended June 30, 2015 and 2014 are shown in the following tables:

| | **June 30, 2015** | December 31, 2014 |
|---|---|---|
| **Balances Outstanding** | | |
| Payable to key management personnel | **$ 203** | $ 251 |

Key management personnel compensation comprises:

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Short-term employee benefits | **$ 51** | $ 422 | **$ 257** | $ 666 |
| Share-based payments - options | **-** | $ - | **-** | 71 |
| | **$ 51** | $ 422 | **$ 257** | $ 737 |

## Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shared management, administrative assistance and facilities with Nuinsco pursuant to a Management Agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. As described in Note 15 to the Unaudited Condensed Consolidated Financial Statements, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The Management Agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the Management Agreement ceased in March 2015. The Company has continued to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at June 30, 2015 and December 31, 2014 and for the three and six months ended June 30, 2015 and 2014 are shown in the following tables:

| | **June 30, 2015** | December 31, 2014 |
|---|---|---|
| **Balances Outstanding under the Management Agreement** | | |
| Payable to Nuinsco Resources Limited | **$ 8** | $ 45 |

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$ 69** | $ 145 | **$ 223** | $ 327 |
| Project costs charged to Nuinsco Resources Limited | **$ -** | $ 8 | **$ 6** | $ 13 |
| Project recoveries charged by Nuinsco Resources Limit | **$ -** | $ 15 | **$ 16** | $ 26 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis.

## Balances and Transactions with Nuinsco under the Participating Interest

The terms of the Participating Interest are described in Note 14 to the Unaudited Condensed Consolidated Financial Statements as well as in the Liquidity and Capital Resources section of

this MD&A. A summary of the balances and transactions related thereto is included in the table and accompanying note below:

| Participating Interest | *Note* | | June 30 2015 | | December 31, 2014 |
|---|---|---|---|---|---|
| Advance for working capital | | **$** | **-** | $ | 940 |
| Advance under Amended Loan for standby commitment | | | **-** | | 1,135 |
| Aggregate advances | | | **-** | | 2,075 |
| Less: settled in Units of Victory Nickel | | | **-** | | (1,135) |
| Less: unamortized loan fees | | | **-** | | (51) |
| Opening balance | | | **3,548** | | 889 |
| Change in fair value | *20* | | **(1,494)** | | 2,875 |
| Effect of foreign exchange | | | **-** | | (216) |
| **Participating Interest** | | **$** | **2,054** | $ | 3,548 |
| Current portion - due within one year | | **$** | **-** | $ | - |
| Long-term portion | | | **2,054** | | 3,548 |
| **Participating Interest** | | **$** | **2,054** | $ | 3,548 |

## OUTSTANDING SHARE DATA

As at August 14, 2015, the Company had 57,634,578 common shares issued and outstanding. In addition, there were 2,841,000 stock options and 13,374,935 warrants outstanding. However, none of the options and warrants are “in the money”, all the warrants are exercisable.

## RECENT DEVELOPMENTS

The slowdown in demand for frac sand and the necessary temporary suspension of production has required the Company to implement initiatives to conserve cash. The rail car leases were cancelled and arrangements are being made with other suppliers to bridge the period until sales resume. Funds placed on deposit to support letters of credit to facilitate the railcar leases have been redeemed by the lessor to reduce the Company’s payables.

The Company has in excess of 40,000 tons of sand in inventory which could generate cash when sold to bring suppliers debt up-to-date. The Company is also reducing all discretionary costs which should to have a negative impact on its ability to resume production. Staff, salaries, and director fees are being reduced or deferred where possible.

In June the Company announced it had entered into the Amending Agreement whereby the short-term facility and the SPA loan were restructured to create the Amended Loan Facility in the aggregate amount of $5,150,000.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the Amended Loan Facility and approximately $6.0 million of convertible unsecured promissory notes.

On July 30, 2015, the Company announced it had not repaid the amounts due under the SPA Loan, and that it was continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due.

The Company is continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. There can be no assurance that the Company will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the lenders may take in light of these defaults.

**RISKS AND UNCERTAINTIES**

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

**FORWARD-LOOKING STATEMENTS**

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

**Interim MD&A, for the Three Months Ended March 31, 2015 (Dated May 11, 2015)**

The following discussion of the results of operations, financial condition and cash flows of Victory Nickel Inc. ("Victory Nickel" or the "Company") prepared as of May 11, 2015 consolidates management's review of the factors that affected the Company's financial and operating performance for the three months ended March 31, 2015, and factors reasonably expected to impact on future operations and results. This discussion is intended to supplement and complement the Company's unaudited condensed consolidated financial statements for the three months ended March 31, 2015 ("Unaudited Condensed Consolidated Financial Statements") and the notes thereto.

Certain information and discussion included in this management's discussion and analysis ("MD&A") constitutes forward-looking information. Readers are encouraged to refer to the cautionary notes contained in the section Forward-Looking Statements at the end of this MD&A.

Readers are also encouraged to consult the audited consolidated financial statements for the years ended December 31, 2014 and 2013 (“2014 Audited Consolidated Financial Statements”) which were prepared in accordance with International Financial Reporting Standards (“IFRS” or “GAAP”). The Unaudited Condensed Consolidated Financial Statements and the 2014 Audited Consolidated Financial Statements are available at www.sedar.com and at the Company’s website www.victorynickel.ca. All amounts disclosed are in United States dollars (“US$” or “US dollars”) unless otherwise stated. All tabular amounts are in thousands of US dollars.

**Change in Functional and Presentation Currency**

Effective October 1, 2014, the Company changed its functional currency to the US dollar from the Canadian dollar (“C$”). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) to the 2014 Audited Consolidated Financial Statements for additional information.

## COMPANY OVERVIEW

Victory Nickel is a Canadian producer of high-quality “Northern White” frac sand sourced from Wisconsin, USA, through its wholly-owned subsidiary Victory Silica Ltd. (“VSL” or “Victory Silica”). Northern White occurs predominantly in the US Mid-West and generally exceeds American Petroleum Institute (“API”) specifications. For this reason, it is a highly-desirable and preferred frac sand. Frac sand is used as a proppant in the oil and gas industry which enhances the recovery from oil and gas wells. The Company’s frac sand processing facilities are located in Seven Persons, Alberta and comprise a wet plant with capacity of approximately 120,000 tons per annum (“tpa”) and a fully-operational dry plant with a nominal capacity of 500,000 tpa (the “7P Plant”). In April 2015 the Company announced the temporary suspension of production at its 7P Plant as demand for frac sand dropped off during the spring break-up season and due to the decrease in activity related to the sudden drop in the price of oil.

In addition to the significant sand resource at its Minago project in Manitoba, in October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the “Bear Coulee Property”). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months from receipt of permits with two equivalent extensions available under certain circumstances. Prior to production the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin. In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit Envirosolutions Inc. ("Summit") on the Company's Bear Coulee Property and was incorporated into a National Instrument 43-101 technical report.

The Company has considered constructing a wet plant in Wisconsin or Minnesota and is also completing preliminary studies to build a second 1,000,000 tpa dry plant in or near Winnipeg, Manitoba. Market conditions necessitate the deferral of construction until more certainty returns to the oil and gas sector.

Crucial to the success of its frac sand operations is the Company's ability to build a solid customer base within an economic distance of its production facilities. To date, the Company has been able to establish itself as a preferred supplier in the areas around Medicine Hat, Alberta through spot-market sales and short term contracts. The Company's 7P Plant is located in close proximity to drilling activity in Alberta, BC, Saskatchewan and North Dakota, allowing customers to purchase sand FOB the 7P Plant and use their own trucks to deliver to the wellhead or, alternatively, to have the Company deliver frac sand directly to the wellhead. A small portion of finished sand is delivered by rail.

The Company was formed on February 1, 2007 as exploration and development mineral resource company and, until recently, was primarily engaged in the acquisition, exploration, evaluation and development of nickel projects and associated products in Canada. Victory Nickel owns 100% of four advanced sulphide nickel projects: the Minago, Lynn Lake (under option with Corazon Mining Ltd. ("Corazon") an Australian public company (ASX: CZN) refer below) and Mel projects in Manitoba and the Lac Rocher project in Québec. The results of a feasibility study on the Minago Project ("FS") were announced in December 2009, the Environmental Impact Study ("EIS") was filed in May 2010 with subsequent improvements to the project announced in June 2010 and July 2011. Receipt of the Environmental Act Licence ("EAL") was announced in August 2011. In April 2014 the Company announced the filing of an amendment to the EAL. A preliminary economic assessment of Lac Rocher ("PEA") was announced in November 2008. Baseline environmental studies are ongoing at Mel in preparation for permit applications should the economics support development.

In November 2014, Corazon optioned Lynn Lake. Under the terms of the agreement, Corazon can acquire a 100% interest by issuing to Victory Nickel 40 million Corazon shares upon closing and incurring A$3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project. The Company received 40,000,000 shares of Corazon in April 2015.

The Company's decision to enter the frac sand business was initially based on the need to highlight the value of the frac sand as a co-product at its Minago nickel project in Manitoba. Based on the FS, approximately 11 million tonnes of frac sand exist within the Minago pit footprint. The frac sand is a significant contributor to the economics of the Minago project. On June 19, 2012, the Company announced the creation of Victory Silica a wholly-owned subsidiary

that has been established to manage the Company's entry into frac sand production and distribution. The Company has established itself as a frac sand producer by acquiring concentrated sand in Wisconsin, USA and processing it into four main categories of finished frac sand products at the 7P Plant. This strategy is expected to generate cash flow for Victory Nickel prior to development and sale of frac sand from its Minago project. The 7P Plant processed its first sand during the week commencing March 24, 2014. The plant was considered out of commissioning in early August 2014.

**Going Concern**

The Company's Unaudited Condensed Consolidated Financial Statements have been prepared using the going concern assumption which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at March 31, 2015, the Company had a working capital deficiency of $5,912,000. Of the deficiency, $7,472,000 represents debt due within twelve months.

During the second quarter of 2014, the Company began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. The Company generated operating cash flow during the second half of 2014 but not at levels sufficient to wholly fund its activities. In the first quarter ended March 31, 2015 the Company did not generate operating cash flow as the market softened as a result of the rapid drop in the price of oil and also due to the typically slow period during spring break-up when road restrictions are in place.

During the fourth quarter of 2013 and into the third quarter of 2014, Convertible Notes aggregating $5,979,000 were issued to fund working capital and the construction of the 7P Plant. In July 2014 the Company entered into a bridge loan facility of $4,000,000 (the "SPA Loan") which was fully drawn in August, 2014 and is due on July 30, 2015.

A one-month short-term facility of $2,000,000 to fund working capital was fully drawn down by October, 2014. The short-term facility has been paid down to $1,000,000. The loan due date has been renewed on a monthly basis and the $1,000,000 balance is now due May 31, 2015. – refer to the Liquidity and Capital Resources section. Of the $11 million of debt, the SPA Loan of $4,000,000 is due in July, 2015; seven Convertible Notes in the amount of $2,979,000 is due prior to March, 2016, and a $1,000,000 short-term note for receivables financing now due May 31, 2015 which are classified as current liabilities.

The Company recognizes the imminent cash requirement to repay debt and is actively negotiating restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company's funds will be depleted in June.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds to finance nickel projects may prove difficult. Refer to the Risks and Uncertainties and Liquidity and Capital Resources sections for additional information.

None of the Company's nickel mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, and the optioning and/or sale of resource or resource-related assets such as royalty interests and/or the ability to generate sufficient cash flow from its other operating activities for its funding and ultimately continue as a going concern. The Company's 7P Plant completed commissioning in August, 2014. During the start-up period, the Company experienced various events which prevented it from reaching the designed capacity of 500,000 tpa at its 7P Plant. Although steps have been taken to reduce the impact of these events, there is no certainty that operations will not be affected by similar events in the future. The recent drop in the price of oil has caused confusion in the frac sand business and it is not known when business will return to normal. The timing of future cash flow will be sufficient to meet operating requirements with the ultimate potential to advance the Company's mining interest, the timing of this is not certain.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources and the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

Should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to the financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

## OUTLOOK

As a typical junior resource company with superior nickel projects but little to no access to financial and capital markets necessary to move these projects forward, the Company had to find an alternative. Waiting for the resource markets to turn around was not considered to be an acceptable option. So in June 2012, the Company announced its intention to enter the frac sand business with a plan that was certainly considered very aggressive and a vision at best. With the efforts of the talented team that was put together under the leadership of Ken Murdock, CEO of Victory Silica, that vision is now a reality. Victory Nickel, through its wholly owned subsidiary Victory Silica is now a producer and distributor of high-quality northern white frac sand for sale into the northern markets of Canada and the U.S. Victory Silica's product has received universal acceptance in the oil and gas service industry and the Company now boasts a list of leading companies in the industry.

Choosing to enter the frac sand business was not without reason. The strong market fundamentals for frac sand suggested continuing growth of the industry and new public information and strong peer group valuations indicated the availability of near-term cash flow. Suddenly, towards the end of 2014 and apparently to everyone's surprise, the bottom fell out of the oil industry and the price of oil crashed from in excess of $100 per barrel to the mid $40s but has recently recovered to the $60 per barrel range. In the United States, 2014 production of 9.42 million barrels was the highest since 1983, presumably aided by fracking and the United States was on its way to becoming self-sufficient. One can only assume that the U.S. would rather provide their own oil than have to be dependent on other nations.

During the first quarter of 2015 we saw demand for frac sand come to a full stop as E&P companies cancelled or deferred capital programs. To further exaggerate the slowdown caused by a decline in drilling due to the price drop, this all happened during the typical slow period while road restrictions are in place due to spring breakup. We are now in May and the reduced demand for sand is continuing into the second quarter. However, we are seeing signs of returning demand as oil service companies are looking for pricing and availability of frac sand in preparation for anticipated increased activity. The price of oil necessary to create a resurgence of demand is yet to be understood. Major suppliers of frac sand have said that the long-term fundamental trends for sand demand remain favorable and that price discounts experienced during the first quarter are temporary.

The sudden negative turn of events could not have come at a more crucial time in our development and entry into the frac sand industry. Production was ramping up but the sudden slowdown in demand required that the Company temporarily suspend production at its Seven Person plant. Once demand returns, the Company has in excess of 40,000 tons of sand at various stages of completion to enable the Company to immediately respond to customer needs.

The 7P plant is Phase One of the Company's three-phased plan to enter the frac sand business. During the ongoing temporary suspension of production at the 7P plant, small plant

improvements are being made which should reduce or eliminate issues experienced during the commissioning and startup stages.

The Company has reduced staffing but kept a core group of employees to ensure that the plant can be reactivated without delay. The Company has reduced its fixed costs by returning equipment under lease such as rail cars and unloaders. In addition, our marketing and logistics team are developing programs which should allow the Company to better compete in the Canadian market when exchange rates make domestic sand more competitive.

Our business plan has not changed; it is only deferred. Having completed Phase One, the board of directors approved moving forward to Phase Two of the Company's business plan. With the recent decline caused by the drop in the price of oil, Phase Two will be difficult to finance in a non-dilutive manner. However, this is a desirable next step which would not only make the Company more competitive but also provide significant flexibility to target certain markets which often require different grades of sand.

Phase Two of the Company's three phase plan is to build a wash plant on a Wisconsin sand resource. Frac sand production is a two-stage process; the wet stage and the dry stage. The Company now contracts out the wet stage which is completed in Wisconsin prior to shipping the wet sand to its plant in Alberta. The wet stage removes the fines and clays, allowing transport of only the coarser fractions. The dry stage, where the sand is dried and separated into four products of different sizes, is completed at the Company's 7P Plant a 500,000 tpa dry processing facility. This is of great advantage in maintaining the high quality of the sand. By dry processing and finishing close to markets, where customers can ship directly to the wellhead by truck, Victory Nickel's finished product is only handled once rather than five or six times as is the case with most Wisconsin sand. Every time finished product is handled, the quality deteriorates. Our customers have recognized the need to maintain the high quality which, importantly, makes quality one of Victory Nickel's key competitive advantages.

The three-phase approach to entry into the business was designed to minimize risk to Victory Nickel shareholders. The cost of entry with Phase One was approximately $6,000,000, or less than $12 per ton of annual plant production capacity. This represents approximately 30% of the expected capital required to build a new plant. The capital recovery period is generally in excess of two years with a new plant; in Victory Nickel's case, this period is approximately six months at full production levels.

Phase Three of the business plan is to build a second dry processing facility in or around Winnipeg, Manitoba capable of producing 1,000,000 tpa. The Company is targeting a site which is serviced by multiple rail carriers. This gives the Company more flexibility in accessing only the highest quality sand from the Wisconsin/Minnesota region. The ultimate plan is to provide customers with a variety of qualities which would include domestic sand, possibly from the Company's Minago project in Manitoba which has been permitted and is ready for development when the price of nickel recovers. The Minago project is a nickel project overlain by overburden

which includes sand meeting the frac sand specs. The Winnipeg formation sand located at Minago is the highest-quality domestic sand and would be a welcome addition to the Company's mix of products. Not all of our customers' applications require Wisconsin sand.

The Minago FS completed in 2009 indicated that the frac sand component of the Minago open pit contributed approximately $2.90 per pound of nickel; a very significant co-product. The sand resource at Minago is not restricted to the footprint of the open pit but extends beyond the pit limit such that it is not unreasonable to expect that there is sufficient sand to last in excess of 100 years at the million ton per year rate of extraction; this would be a new industry for Manitoba

We cannot change the market. All we can do is work with it and within it.

E&P companies continue to squeeze oil services companies to reduce costs. Oilfield service companies in return push suppliers including frac sand suppliers to reduce costs. The uncertainty is causing panic selling in some cases. Conversely, there are indications that oilfield services companies are being opportunistic and stocking up on cheap sand. This is not sustainable.

The Company must now focus on managing liquidity until markets settle down. A significant portion of staff and management salaries and director's fees currently due are being deferred until the demand for frac sand returns. In addition, there will be no discretionary expenditures. We will manage the current downturn. To this end we thank our employees and many suppliers who are showing patience.

## RESULTS OF OPERATIONS

### *Three Months Ended March 31, 2015 Compared with Three Months Ended March 31, 2014*

| Three months ended March 31, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total | March 31, 2014 Total |
|---|---|---|---|---|---|---|
| **Revenues** | $ - | $ - | $ 1,522 | $ - | $ 1,522 | $ - |
| Cost of goods sold | - | - | (1,769) | - | (1,769) | - |
| **Gross margin** | - | - | (247) | - | (247) | - |
| **Operating expenses** | | | | | | |
| General and administrative | (426) | (3) | (80) | - | (509) | (491) |
| Share-based payments: | | | | | | |
| Options | (26) | - | - | - | (26) | (58) |
| Amortization of property, plant and equipment | (1) | (1) | (164) | - | (166) | (44) |
| Writedown of E and E projects | - | (6) | - | - | (6) | - |
| Pre-exploration costs | - | - | - | - | - | - |
| Net frac sand pre-operating costs | - | - | - | - | - | (194) |
| Non-recurring plant costs | - | - | (600) | - | (600) | - |
| **Operating loss** | (453) | (10) | (1,091) | - | (1,554) | (787) |
| Finance income | 1,671 | - | 2 | (20) | 1,653 | 1 |
| Finance costs | (937) | - | (23) | 20 | (940) | (872) |
| **Net finance income (costs)** | 734 | - | (21) | - | 713 | (871) |
| **Loss before income taxes** | 281 | (10) | (1,112) | - | (841) | (1,658) |
| Income tax recovery | 570 | - | - | - | 570 | 212 |
| **Net Loss for the Period** | $ 851 | $ (10) | $ (1,112) | $ - | $ (271) | $ (1,446) |

### Overall

For the three months ended March 31, 2015, the Company had a net loss of $271,000, or a loss of $0.00 per share (March 31, 2014 - $1,446,000 or $0.02 per share. The following narrative discusses the relevant operations of the Frac Sand and Exploration and Development segments first, and then addresses more general and Corporate activities.

### Frac Sand

The Company's 7P Plant produced 13,721 tons of various grades of frac sand during the first quarter ended March 31, 2015. Due to the recent sudden decline in the price of oil combined with the spring break up period when road restrictions are in place, demand for frac sand basically came to a full stop in the first quarter of 2015. The Company accumulated inventory of in excess of 40,000 tons at various stages of the process. Until inventories are drawn down through sales, the Company temporarily suspended production. The 7P Plant was in the pre-operating stage during the first quarter of 2014 therefore there are no comparative numbers.

*Revenues*

During the first quarter ended March 31, 2015, revenue was $1,522,000 or $149.54 per ton on sales of 10,178 tons resulting in a gross loss of $247,000 or loss of $24.27 per ton sold. This period was not a typical sales period as the sudden and material drop in the price of oil caused such uncertainty in the market that exploration and production ("E&P") companies basically

stopped activities in our market area. This was compounded by the spring breakup period which typically results in a slowdown of activity while road restrictions are in place. During the prior year comparative quarter, sales revenue of $274,000 was generated but netted against pre-operating costs.

*Cost of goods sold*

The cost of goods sold includes the cost of concentrated sand purchased in Wisconsin, the cost of delivery to the 7P Plant including handling and transloading costs and the operating cost to dry and screen the concentrated sand into four main dry products. These costs are capitalized as a component of inventory on a normalized basis and are charged to cost of goods sold when title to the product passes to the customer.

The cost of goods sold, including freight to some customers, was $1,769,000, or $173.81 per ton of frac sand sold for the three months ended March 31, 2015; a portion of the sales are priced on a delivered basis and include transportation costs to the customer. During the first quarter the plant operated a minimum number of days to build inventory such that product will be available once demand returns. Costs incurred from temporary suspension are included in *Non-recurring plant costs* and do not form part of the cost of sales or inventory. The Company has now reduced manpower to a skeleton crew of sufficient to start production as demand returns.

Costs per ton are stated as costs per dry ton unless otherwise stated.

Concentrated wet sand is purchased through long-term supply agreements with third parties at specified prices per ton. For the three months ended March 31, 2015 the cost of washed concentrated sand delivered to rail and included as a component of inventory was $33.85 per ton. Transportation costs including freight charges and fuel surcharges when transporting sand from Wisconsin to the 7P Plant, transload costs at the source and at the 7P Plant, as well as railcar lease payments were $64.65 per ton for the three months ended March 31, 2015. Other elements of cost of goods sold were $26.20 per ton during the three months ended March 31, 2015 and were primarily operating expenditures at the plant and mobile equipment lease payments. This adds to a finished goods inventory cost of $124.70 per ton. Finished goods inventory does not include freight for sales sold delivered to the customer. The difference from that to the cost of goods sold per ton of $49.11 essentially represents a combination of transportation costs to the customer's specified location which is included in cost of goods sold but not included in inventory cost.

*Gross margin*

The 7P Plant generated a negative gross margin of $247,000 or $24.27 per ton for the three months ended March 31, 2015 on sales revenue of $1,522,000. The gross loss is due to a combination of price reductions and cost increases due to the low production level during the first quarter. The drop in the price of oil is putting pressure on the price of frac sand as producers sell excess inventory at unsustainably low prices.

*General and administrative and other costs*
General and administrative ("G&A") costs for the segment amounted to $80,000 for the three months ended March 31, 2015. These costs include Victory Silica administration, marketing and logistics management.

Amortization of property, plant and equipment of $164,000 was recorded for the quarter compared with $44,000 for the same period of 2014 for items in use at the 7P Plant including owned and leased equipment. The 7P Plant assets came into use primarily in the second quarter of 2014, at which time amortization commenced.

*Non-recurring plant costs*
As a result of the aforementioned temporary suspension of production, the Company incurred $600,000 in non-recurring plant costs. The plant was placed in care and maintenance at a cost of $361,000. Another $131,000 was incurred relating to railcar storage costs and one-time preparation costs for railcars to be leased (such lease not completed) due to slowdown in activity. Furthermore, $108,000 was incurred relating to additional equipment rental and casual labour to move frozen sand as a result of unexpected spring break-up.

*Net income/(loss)*
All of the above items combined to produce a net loss for the frac sand segment of $1,112,000 for the three months ended March 31, 2015, after interest expense relating to equipment leases of $3,000 and foreign exchange loss of $20,000 that is re-classed to finance income.

**Exploration and Development**
There were no write-downs necessary for impairment of projects and no pre-exploration expenditures for the three months ended March 31, 2015 and 2014. On November 4, 2014, the Company announced it had optioned the Lynn Lake project to Corazon. As part of that transaction, the Company received 40,000,000 shares of Corazon in April 2015.

**Net Loss for the period – Corporate and Total**
The net loss for the three months ended March 31, 2015 was $271,000, compared with $1,446,000 for the same period of 2014, after operating expenses of $1,554,000 (2014 - $787,000), net finance income of $713,000 (net finance costs 2014 – $871,000) and an income tax recovery of $570,000 (2014 - $212,000).

G&A expenses of $509,000 remained fairly consistent compared with $491,000 in the first three months of 2014. The costs attributable to the Company's frac sand business with G&A of $80,000 along with indirect costs attributed to frac sand business incurred at Corporate.

G&A costs include: statutory costs incurred as a public company, general investor relations expenses, consulting, travel costs, health benefits and director costs. G&A expenses include costs charged by Nuinsco for administrative services described under Transactions with Related Parties and Management Agreement with Nuinsco below; which amounted to $154,000 (2014 -

$182,000), respectively. Effective March 2015, the Management Agreement has been terminated by Victory Nickel but the Company will continue to share resources and costs with Nuinsco under a cost sharing arrangement.

The costs of public company compliance were mitigated by sharing arrangements under the Management Agreement with Nuinsco but are still significant. For the three months ended March 31, 2015 they are estimated to be $240,000, compared with $230,000 for the same period of 2014. The increase is due to higher audit fees and insurance costs directly attributable to the frac sand business.

The share-based payment expense for options for the three months ended March 31, 2015 of $26,000 reflects partial vesting of 1,063,000 options with a weighted average fair value of C$0.39. There were no options granted during the current quarter. In the prior comparative period, share-based payment expense of $58,000 reflects the grant and partial vesting of 263,000 options with a weighted average fair value of C$0.31.

*Net finance income (costs)*

| | Three months ended March 31, | |
|---|---|---|
| | **2015** | 2014 |
| Interest income on bank deposits | **$ -** | $ 1 |
| Net change in fair value of financial liabilities at fair value through operations | **194** | - |
| Gain on adjustment of estimated cash flows | **1,415** | - |
| Net foreign exchange gain | **44** | - |
| **Finance income** | **1,653** | 1 |
| Interest expense on loans | | |
| Cash settled | **551** | 130 |
| Amortization of loan fees | **230** | 43 |
| Amortization of embedded option derivatives | **159** | 51 |
| Commitment fee | **-** | 1 |
| Loss on adjustment of estimated cash flows | **-** | 97 |
| Net change in fair value of financial liabilities at fair value through operations | **-** | 494 |
| Net foreign exchange loss | | 56 |
| **Finance costs** | **940** | 872 |
| **Net Finance Income/(Costs)** | **$ 713** | $ (871) |

For the three months ended March 31, 2015 and 2014, net finance income was $713,000 compared with net finance costs of $871,000 respectively. The Company considers financing activities, other than those related to equipment leased in the frac sand segment, to be part of the Corporate segment.

Finance income increased to $1,653,000 from $1,000 in the corresponding prior year quarter primarily due to the reduction in the value of the embedded option derivatives related to the Company's convertible debt of $105,000 since the end of 2014 combined with a $89,000

reduction in the fair value of the warrants issued in connection with the SPA Loan which have a cashless exercise feature. Both of these instruments and their accounting are described below. In addition, revisions to assumptions to the estimated cash flows related to the Participating Interest resulted in a gain of $1,415,000 for the three months ended March 31, 2015. The recent slowdown in demand and the losses incurred during the first quarter necessitated deferral for payment of the Participating Interest and resulted in a gain. The Company applied probability weightings of 5%, 40% and 55% as risk factors to varying levels of expected cash flows. The probability weighted average cash flows has remained at 75% as at March 31 2015 (2014 – 75%) The percentage participation in net cash flows under the Participation Interest is 52.16%. As well, the Company incurred $44,000 in net foreign exchange gain on transactions and balances denominated in the Canadian dollar, compared with a foreign exchange loss $56,000 in the prior period.

There is no comparative balance as the conversion of loan to Participating Interest occurred in April 2014 (refer to Note 15.)

Finance costs were $940,000 for the three months ended March 31, 2015, compared with $872,000 for the same period of 2014. The components were quite different when comparing the quarters. Cash interest expense was $551,000 for the quarter ended March 31, 2015 (2014 - $130,000). The increase in interest expense during 2015 was primarily attributable to interest on the SPA Loan, an additional Convertible Note issued in July 2014, and another short-term loan issued to fund the construction and working capital for the frac sand business (trade accounts receivable and inventory attributable to the frac sand business amounted to an aggregate of $4,868,000 as at March 31, 2015).

The Company has issued several tranches of convertible notes. There are several elements of finance expense associated with these: cash-settled interest expense paid on a calendar quarter basis, non-cash amortization of loan fees, non-cash amortization of the embedded derivative related to the value of the convertibility feature at inception and the change in the value of that embedded derivative at the end of a reporting period. All amortizable elements are calculated using the effective interest rate method. Convertible notes were issued in 2013 and 2014 with similar terms and requiring similar accounting treatments. Collectively, these are termed the “Convertible Notes”. The aggregate outstanding principal value of the Convertible Notes as at March 31, 2015 is $5,979,000 (March 31, 2014 - $3,990,000) of which $2,979,000 are due at various times over the next twelve months.

Aggregate interest settled in cash for the three months ended March 31, 2015 amounted to $551,000, of which $220,000 relates to Convertible Notes, $148,000 relates to the SPA Loan, and $179,000 relates to the short-term facility**.** The balance of interest is on leased mobile equipment and other items. In the quarter ended March 31, 2014, interest was $130,000 of which $27,000 related to the Amended Loan prior to its conversion to a Participating Interest and $96,000 related to the Convertible Notes outstanding at that time. The balance of interest relates to leased mobile equipment.

Amortization of cash-settled loan fees in the quarter ended March 31, 2015 amounted to $230,000 with an additional $159,000 for amortization of a portion of the embedded option derivatives related to the Convertible Notes remaining of $1,003,000 calculated at inception ($878,000 of which was recorded in 2014). The value of the embedded option derivatives at March 31, 2015 decreased by $1,420,000 due to reductions in the value of the embedded option derivatives from their inception values and, accordingly, $105,000 was credited through operations as finance income during the first quarter of 2015.

The embedded option derivatives are calculated using the Black-Scholes option-pricing methodology and are a function of share price, the C$1.00 conversion price (after the retroactive effect of the Share Consolidation), risk-free interest rate, length of time to expiry and share price volatility as well as the US dollar exchange rate for loans denominated in US dollars but convertible using a Canadian dollar price. All other things being equal, one would expect the value of the option to decline as time approaches the expiry date. However, because of the volatility of exchange rates and the Company's share price, this may not always be the case. Further, since one Convertible Note was exchanged into a portion of the SPA Loan in the second quarter of 2014, a portion of the embedded option derivative was de-recognized. The SPA Loan does not contain an embedded option derivative feature; however, the warrants which were issued therewith may be exercised on a cashless basis. The value of the warrants is considered to be debt rather than equity and changes in the fair value of the warrants is also recorded through net finance income. For the three months ended March 31, 2015, this amounted to $88,000 in finance income.

*Income tax recovery*

The Company does not allocate income taxes between segments. In the first quarter ended March 31, 2015, the Company recorded an income tax recovery of $570,000, compared to as income tax recovery of $212,000 for the same period of 2014. This is primarily a function of higher taxable losses.

*Other comprehensive income/(loss)*

Other comprehensive income ("OCI") for the quarter ended March 31, 2015 relates to an increase of $6,000 compared with an increase of $87,000 in the market value of the Company's financial assets at fair value through OCI along with an income tax expense recorded through OCI of $3,000 in 2015 and $12,000 in the same period of 2014. These changes are a result of net market value changes in the Company's marketable securities. Furthermore, foreign exchange gain in OCI of $90,000 was incurred compared with foreign exchange loss of $1,812,000 in the comparative quarter of 2014 due to the change in functional and presentation currency to the US$ from the C$, as described earlier.

*Other significant changes*

The changes in other balances not specifically addressed in other sections of this MD&A are described herein.

Cash and cash equivalents have decreased from $712,000 to $49,000 excluding restricted deposits of $291,000 which support several letters of credit provided to one equipment supplier. The Liquidity and Capital Resources section describes the cash flows for the period in detail.

Receivables and prepaids decreased from $3,367,000 to $809,000 during the three months ended March 31, 2015. The decrease of $2,106,000 to $619,000 in trade accounts receivable from frac sand sales reflects the slowdown in demand. While some balances are in excess of 30-day terms, we do not expect to experience any losses given the quality of our customers. The Company has received payments to date for 100% of the trade accounts receivable outstanding as at March 31, 2015. Prepaids include $50,000 of deposits to sand suppliers as at March 31, 2015 (December 31, 2014 - $555,000).

Marketable securities as at March 31, 2015 increased by $6,000 from December 31, 2014 as a result of improvements in market prices of shares. No sales occurred during 2015 or 2014.

Inventory of $4,249,000 comprises various grades of finished product and concentrated sand at various locations from the transload facilities in Wisconsin and Minnesota, in transit to Seven Persons and at the 7P Plant itself. Valuation of the inventory is based on normalized costs anticipated during normal production levels.

Property, plant and equipment decreased to $6,018,000 at the end of March 2015 from $6,179,000 as at December 31, 2014 primarily due to amortization. The mobile equipment is in use and is being depreciated; amortization on the plant commenced in the second quarter 2014 given its availability for use in production. The first sand was processed through the 7P Plant in March, 2014 and commissioning occurred in early August 2014.

Project expenditures are described below in Mine Property and Development Activities and Exploration and Evaluation Activities.

The increase in trade and other payables of $965,000 to $3,997,000 relates primarily to an increase in outstanding trade payables of $1,267,000 for supplies, transportation and property, plant and equipment for the 7P Plant offset by a decrease in accrued liabilities of $241,000 related to the frac sand business. With the slowdown in sales and the resulting impact on cash availability, the Company has had to defer payments to suppliers.

As previously described, Victory Nickel has several loans and borrowings due within one year amounting to $7,472,000 and long-term loans aggregate $2,157,000; a total decrease of $821,000 over the loans and borrowings as at December 31, 2014 of $10,450,000. Changes in the embedded option derivatives described earlier, account for the remaining changes in loans and borrowings.

Note 14 to the Unaudited Condensed Consolidated Financial Statements includes an analysis of the loans and borrowings balances. Refer to the Liquidity and Capital Resources section for additional discussion.

The Company has entered into several finance leases to purchase mobile equipment with a total fair value of $666,000 at various acquisition dates; the long-term portion of the related obligation is $239,000 at the end of March 2015 (December 31, 2014 - $275,000) and the short-term lease obligation of $139,000 (December 31, 2014 - $137,000) is included in *Trade and other payables*. Note 16 to the Unaudited Condensed Consolidated Financial Statements includes an analysis of the lease obligation.

The Participating Interest is a financial liability carried at amortized cost. The valuation thereof is determined by a model of estimated cash flows. As at March 31, 2015, the estimated value of the Participating Interest was $2,133,000, a decrease of $1,415,000 compared with $3,548,000 as at December 31, 2014. This is a result of changes in amortized loan fees combined with changes in the effect of foreign exchange.

The deferred tax liability balance amounts to $251,000 as at March 31, 2015 (December 31, 2014 - $817,000). The main components of the balance relate to the tax effects of E&E projects and the MP&D project, offset by the tax value of net operating tax losses carried forward. The deferred tax liability amount reflects a rate of 25%.

The share capital balance has not changed as at March 31, 2015 (December 31, 2014 - $52,570,000). On September 12, 2014, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”); any reference to the number of common shares, options and warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period referred to in this MD&A. In 2014, the increase in share capital of $522,000 was primarily due to the exercise of 463,000 options (after giving retroactive effect to the Share Consolidation) in the first quarter of 2014 generating cash of $201,000 and requiring a transfer from contributed surplus to share capital of $144,000.

Contributed surplus has increased to $5,670,000 from $5,644,000 as at March 31, 2015 primarily as a result of options vesting during the current quarter of $26,000.

## SUMMARY OF QUARTERLY RESULTS

Selected financial information for each of the last nine quarters ended March 31, 2015 is as follows:

| Fiscal year 2015 | 1st Quarter | |
|---|---|---|
| Revenue | $ 1,522 | (1) |
| Gross margin (loss) | $ (247) | (2) |
| Net finance income (costs) | $ 713 | (3) |
| Net income (loss) | $ (271) | (4) |
| Total comprehensive loss | $ (178) | |
| Earnings (loss) per share - basic and diluted (16) | $ (0.00) | |

| Fiscal year 2014 | 4th Quarter | | 3rd Quarter | | 2nd Quarter | | 1st Quarter | |
|---|---|---|---|---|---|---|---|---|
| Revenue | $ 7,203 | (1) | $ 5,463 | (1) | $ 1,310 | (1) | $ - | |
| Gross margin (loss) | $ 670 | (2) | $ 689 | (2) | $ (146) | (2) | $ - | |
| Net finance income (costs) | $ 714 | (5) | $ (255) | (7) | $ (47) | (9) | $ (872) | (11) |
| Net income (loss) | $ 96 | (6) | $ (373) | (8) | $ (693) | (10) | $ (1,446) | (12) |
| Total comprehensive loss | $ (2,287) | | $ (464) | | $ (724) | | $ (1,371) | |
| Earnings (loss) per share - basic and diluted (16) | $ 0.00 | | $ (0.01) | | $ (0.01) | | $ (0.02) | |

| Fiscal year 2013 | 4th Quarter | | 3rd Quarter | 2nd Quarter | 1st Quarter |
|---|---|---|---|---|---|
| Net finance costs | $ (3,443) | (13) | $ (66) | $ (73) | $ (37) |
| Net loss | $ (3,656) | (14) | $ (503) | $ (417) | $ (313) |
| Total comprehensive loss | $ (3,628) | (15) | $ (518) | $ (493) | $ (436) |
| Loss per share - basic and diluted (16) | $ (0.07) | | $ (0.01) | $ (0.01) | $ (0.01) |

(1) Revenue represents sales of frac sand (first sales were recognized in the second quarter of 2014).

(2) Gross margin (loss) includes cost of goods sold which include operating costs for a full period despite production being at less-than-full capacity.

(3) Net finance income include $194,000 change in the fair value of the embedded option derivatives related to the Convertible Notes, $89,000 reduction in fair value of warrants issued in connection with SPA Loan, and $1,415,000 gain on adjustment of estimated cash flows for the Participating Interest, offset by amortization of embedded derivatives and loan fees of $389,000.

(4) Includes the effects noted above.

(5) Net finance costs include $708,000 change in the fair value of the embedded option derivatives related to the Convertible Notes partly offset by $493,000 gain on adjustment of estimated cash flows for the Participating Interest.

(6) Includes the effects noted in (1), (2), and (5).

(7) Net finance costs include $827,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $20,000 loss on adjustment of estimated cash flows for the Participating Interest.

(8) Includes the effects noted in (1), (2), and (7).

(9) Net finance costs include $450,000 change in the fair value of the embedded option derivatives related to the Convertible Notes as well as $135,000 loss on adjustment of estimated cash flows for the Participating Interest.

(10) Includes the effects noted in (1), (2), and (9).

(11) Net finance costs include $505,000 change in the fair value of the embedded derivatives related to the Convertible Notes as well as $97,000 loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco.

(12) Includes the effects noted above combined with increased costs relating to the frac sand business and net frac sand pre-operating costs of $194,000.
(13) Net finance costs for the period includes $3,133,000 for the loss on adjustment of estimated cash flows for the Long-term liability with Nuinsco and $154,000 for the increase in value of the embedded derivative related to the convertible promissory note.
(14) Net loss for the period includes $229,000 for costs charged under the Management Agreement with Nuinsco and cost sharing arrangement and reflects increased activity on the frac sand business and an income tax recovery of $532,000.
(15) Total comprehensive loss for the period includes the effects noted above.
(16) After the retroactive effect of the Share Consolidation.

## LIQUIDITY AND CAPITAL RESOURCES

As at March 31, 2015, the Company had a working capital deficiency of $5,912,000 compared with $3,045,000 as at December 31, 2014.

The increase in working capital deficiency of $2,867,000 resulted primarily from a repayment of $1,000,000 on the short-term facility, Convertible Notes that have become a current liability this quarter as well as a large decrease in accounts receivable balance offset by an increase in inventory, both of which are due to decline in frac sand demand during the first quarter of 2015.

Of the financings of $10,979,000 used to fund the construction and upgrading of the 7P Plant as well as to fund the working capital, $7,979,000 are due within one year. Of this amount, $5,000,000 is secured by the assets of the Company.

### Participating Interest

On April 22, 2014, Nuinsco exercised its conversion option and converted its loan to the Participating Interest. At the same time, it relinquished its security over the assets of the Company since the Conversion constituted payment of the loan in full. This obligation will be settled through a 52.16% participation in net operating cash flows from the frac sand business after recoupment of capital costs for Phase One and pre-operating expenses. The participation is capped at $6,053,000 provided the Company proceeds with Phase Two, Otherwise the cap is approximately $8,071,000. Distributions under the Participating Interest terms are calculated based on operating cash flow after recovery of capital and pre-operating costs and take into account working capital. It is presently anticipated that the first payment under the Participating Interest could occur in the second quarter of 2017.

As at March 31, 2015 the carrying value of the Participating Interest was revalued at $2,133,000 to take into account future expected cash flows based on current market information. This compares with $3,548,000 at December 31, 2014. The change in value of $1,415,000 in the quarter ended March 31, 2015 has been recorded through *Finance Costs* in the statement of operations (for further description see Note 15 to the Unaudited Condensed Consolidated Financial Statements).

The Company will continue to reassess the carrying value of the Participating Interest as circumstances warrant.

**Convertible Notes** – During 2013 and 2014 two year Convertible Notes bearing interest at the rate of 14.8% per annum and aggregating $5,979,000 were issued to fund the construction of the 7P Plant and working capital requirements. The accounting complexities of these financial liabilities have been described earlier. The Convertible Notes may be converted in whole or in part, at any time, at the option of the holders into Victory Nickel shares at a conversion price of C$1.00 per share.

**SPA Loan** - On May 15, 2014, the Company entered into a senior secured line of credit agreement in the amount of $4,000,000 (the “SPA” Loan”). The SPA Loan bears interest of 14.8% per annum and matures on July 30, 2015 and is now is classified as a current liability due within one year. Full details of the SPA Loan are described in the 2014 Audited Consolidated Financial Statements.

The terms of the SPA warrants contain a cashless exercise feature which requires the warrants to be recognized as a liability rather than as equity within contributed surplus. Accordingly, the fair value of the warrants at inception of $554,000 is recorded as a liability with the balance of the SPA Loan. Any change in the fair value of the warrants is also recorded as a component of the SPA Loan and charged to finance income or costs in the statement of operations. The fair value change amounted to a decrease of $89,000 in the three months ended March 31, 2015 (a net decrease of $550 since inception) bringing the fair value of the cashless warrants to $33,000 as at March 31, 2015.

In the three months ended March 31, 2015, the Company paid $148,000 in cash for interest and amortized $214,000 in loan fees into interest income.

**Short Term Facility** – On October 1, 2014, the Company completed a short-term financing by way of a $2,000,000 promissory note. The promissory note bears interest at 28%, calculated and settled monthly. This short-term loan has been renewed on a monthly basis upon payment of extension fees and penalties. The Company has repaid $1,000,000 during the first two months of 2015. The remaining balance of $1,000,000 is presently due May 31, 2015.

**Cash flows in the first quarter of 2015** - Cash and cash equivalents as at March 31, 2015 and December 31, 2014 were held with major Canadian banks. The Company has a policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board.

For the quarter ended March 31, 2015, the Company generated cash from operating activities of $939,000 compared with cash used of $2,054,000 during the same period of 2014. The build-up

of receivables as at December 31, 2014 was essentially all collected during the first quarter of 2015 and provided an increase in cash of $3,786,000 compared to the first quarter of 2014 and extending payables contributed $522,000. However, there continues to be limited revenues due to slowdown in operating activity during the first quarter of 2015 as mentioned earlier. The Company will require a restructuring of its debt while ramping up operations to the level where cash flow is sufficient to meet it needs.

The Company estimates that costs to manage a public company in the quarter ended March 31, 2015 amounted to $258,000. Many of these costs are incurred in the early part of the year. In the same period of 2014, such costs were approximately $345,000.

Costs incurred to advance the Company's exploration, evaluation and development projects are capitalized, as summarized below under the discussion of investing activities. Costs to set up the Company's frac sand operations and operating costs were recorded as part of pre-operating expenditures net of sales revenue of $274,000 for the first three months of 2014 and thereafter are part of cost of goods sold or other expense lines. In the three months ended March 31, 2015, $1,769,000 was charged to cost of goods sold. Revenue in 2015 amounted to $1,522,000.

As operating activity began to slow down during the first quarter of 2015 due the sudden and material drop in the price of oil and the spring breakup period as mentioned earlier, receivables have decreased to $619,000 as at March 31, 2015 compared with $2,727,000 as at December 31, 2014, while inventory and trade and other payables continue to grow. Furthermore, this also led to $600,000 of non-recurring plant costs which were incurred for the quarter as described earlier. The Company continues to hold discussions with financiers and potential business partners to fund the growing working capital deficit.

During the three months ended March 31, 2015, net cash used by investing activities was $71,000, compared with cash used of $861,000 in the prior comparable period. Aggregate amounts of $22,000 and $18,000 were used to advance the MP&D project and E&E projects, respectively, during the periods (2014 - $97,000 and $36,000). In the first quarter of 2015, $31,000 was used for expenditures on the 7P Plant acquisition, equipment and improvements (2014 – $728,000).

The Company used $1,531,000 in financing activities during the three months ended March 31, 2015 compared with $1,833,000 generated in 2014. In 2014, the main source of funds was an additional $1,990,000 from various Convertible Notes issued to March 2014. In 2015, $1,000,000 of the short-term facility was repaid. Loan interest was $471,000 compared with $130,000 in 2014, of which $9,000 related to interest accrued in 2013. The increase is due to the increased debt described elsewhere. Aggregate payments under leases for deposits and other principal payments totalled $40,000 for mobile equipment used in the frac sand business, compared with payments of $41,000 in 2014. The Company also deposited $20,000 (2014 – $187,000) of funds to support letters of credit issued to facilitate the Company's frac sand business.

There were no equity financings completed during the quarter. During the same quarter of 2014 the Company received $201,000 through the exercise of options.

The Company's activities during the quarter ended March 31, 2015 used cash and cash equivalents of $663,000, compared with $1,082,000 during the first quarter of 2014.

**Table of Contractual Commitments**

| | Due Date | Currency | March 31, 2015 | December 31, 2014 |
|---|---|---|---|---|
| Transformer and electrical equipment | On shipping | US Dollar | $ 1,296 | $ 1,296 |
| Loans and borrowings (including unpaid accrued interest) | | | | |
| Amended Loan | January 31, 2015 | Canadian Dollar | $ - | $ - |
| Participating Interest | Refer to note below | Canadian Dollar | $ - | $ - |
| Convertible Notes | November 11, 2015 to July 7, 2016 | US Dollar | $ 5,750 | $ 5,750 |
| Convertible Notes | January 30, 2016 to March 13, 2016 | Canadian Dollar | $ 265 | $ 265 |
| SPA Loan | July 30, 2015 | US Dollar | $ 4,000 | $ 4,000 |
| Promissory Note [(1)] | May 31, 2015 | US Dollar | $ 1,000 | $ 2,000 |
| Purchase of 7P Plant | Refer to note below | Canadian Dollar | $ - | $ - |
| Leased mobile equipment | Within one year | Canadian Dollar | $ 179 | $ 179 |
| | One to five years | Canadian Dollar | $ 283 | $ 328 |

Using May 11, 2015 prices, the aggregate market value of the Company's marketable securities held in public company shares is approximately $220,000.

As at May 11, 2015, the Company had options outstanding which could bring in additional funds of approximately C$1,731,000. Most of those instruments are not "in-the-money" and the receipt of such funds cannot be relied upon. Furthermore, the remaining warrants issued under the rights offering and private placement could generate additional cash of C$3,780,000.

The Company has good title to its projects and will continue to maintain the projects in good standing.

The Company recognizes the imminent cash requirement to repay debt and is actively considering restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

Development of the Minago mine will require considerable financial resources. The Company recognizes that the state of the financial markets and the apparent lack of support for mining projects will make financing this project difficult. However, validating the frac sand portion of the project could provide leverage to get potential partners interested in the nickel portion of the project.

The Company has in excess of 40,000 tons of sand in inventory which should generate cash to bring suppliers debt up-to-date. The Company is also reducing all discretionary costs which

should not have a negative impact on its ability to resume production. Staff, salaries, and director fees are being reduced or deferred where possible.

The Company continues to hold discussions with local and overseas financiers and potential business partners with respect to the nickel and frac sand opportunities.

## BUSINESS UPDATE

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company also now produces frac sand for the oil and gas industry in Canada and the northern US. Accordingly, the Company is reporting on a segmented basis since 2014. The Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand.

The Corporate segment supports all of the Company's activities.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 24 in the 2014 Audited Consolidated Financial Statements). The segment is located in Canada although we sand concentrate as raw material is imported from the USA.

The following table provides information on the Company's segmented assets. The segmented Statement of Operations has been presented earlier in the MD&A in the discussion of operating results for the three months ended March 31, 2015.

| | **March 31, 2015** | December 31, 2014 |
|---|---|---|
| **Canada** | | |
| Corporate | **$ 1,233** | $ 1,860 |
| Exploration and Development | **49,792** | 49,734 |
| Frac Sand | **9,795** | 11,300 |
| Intersegment elimination | **(913)** | (962) |
| **Total Assets** | **$ 59,907** | $ 61,932 |

## EXPLORATION AND DEVELOPMENT ACTIVITIES

Paul Jones, Vice-President, Exploration, is a "qualified person" as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Company described herein.

## MINE PROPERTY AND DEVELOPMENT ACTIVITIES

### NICKEL

### Minago Project

During the first quarter ended March 31, 2015 expenditures of $52,000 (March 31, 2014 - $94,000) were incurred on the Minago project.

The Company's 100%-owned Minago project is a permitted project ready for development. It is located on the unexposed southern part of the Thompson Nickel Belt in Manitoba, and is one of Canada's largest undeveloped sulphide nickel deposits. Minago has been shown to be capable of producing a nickel concentrate grading from 22.3% up to 35.0%, making it reportedly the world's highest grade nickel concentrate. In addition to metal by-products such as copper, cobalt, gold, platinum, palladium, silver and rhodium, a layer of silica sand averaging approximately nine metres thick overlies the nickel mineralization within the open pit. Approximately 84% of the sand is marketable as frac sand. The frac sand forms part of the overburden that must be removed prior to mining the nickel ore.

The analytical data and geological interpretations obtained from a work program in 2010 were incorporated into an updated geological model and resource estimate. The updated resource incorporates a 24% increase (over the previous resource estimate) in the NI-43-101-compliant measured and indicated, pit-constrained, sulphide nickel resource used in the Minago FS. The FS is posted at www.sedar.com. Note that all resources are contained in the Nose Deposit and the update below does not include the results of the winter 2011 and 2012 drilling program disclosed below.

| | **April 2011 Pit-Constrained Resource[1]** | | | **March 2010 In-Pit Resource[2]** | | | **Increase (Decrease) in Contained Metal** | |
|---|---|---|---|---|---|---|---|---|
| | **Tonnes** | **Grade** | **Ni Content** | Tonnes | Grade | Ni Content | **Ni Content** | **Change** |
| **Category** | **Millions** | **%NiS[3]** | **M Lb** | Millions | %NiS[3] | M Lb | **M Lb** | **%** |
| **Measured** | **8.2** | **0.473** | **85.0** | 6.6 | 0.488 | 71.4 | **13.7** | **19.2** |
| **Indicated** | **22.8** | **0.432** | **217.2** | 19.1 | 0.410 | 172.6 | **44.6** | **25.9** |
| **M&I** | **31.0** | **0.443** | **302.2** | 25.7 | 0.430 | 243.9 | **58.3** | **23.9** |
| **Inferred** | **0.2** | **0.380** | **1.4** | 1.4 | 0.402 | 12.2 | **(10.8)** | **(88.4)** |

[1] Lerch-Grossman pit optimization shell [2] Whittle pit optimization shell [3] Nickel in sulphide form

A winter work program was conducted at Minago in 2011. The program comprised 8,793m of diamond drilling in 20 drill holes with associated ground and borehole electromagnetic geophysics. The program was intended to evaluate parts of the project that have seen little work to date as well as to build upon the existing data-set of the Nose Deposit nickel mineralization.

The entire pit-constrained resource is located within the Nose Deposit. A total of 15 holes were collared to intersect the “North Limb”, a domain of nickel-bearing ultramafic rock extending at least 1.5km north from the Nose Deposit. A single deep hole was collared on the Nose Deposit to evaluate the depth extension of the ultramafic host rock and nickel mineralization. The hole was drilled to a total length of 1,527m and intersected approximately 160m of ultramafic rock near the bottom of the hole – confirming the extension of the host rock to depths several hundred metres below that previously tested. A single drill hole was collared in the western part of the property in order to test the thickness of the Winnipeg Formation sand horizon. As anticipated, the hole successfully intersected the Winnipeg Formation sandstone layer (frac sand horizon) immediately above the unconformity with the Thompson Nickel Belt rocks.

A 3,500m winter work program was conducted in early 2012. The program tested a number of targets around the property that have been identified in previous work programs as well as areas that are scheduled for Minago mine infrastructure development. In part, the drilling evaluated the nickel-bearing Ospwagan Group/Pipe Formation rocks in the vicinity of the Minago Nose Deposit. Given the widespread nature of nickel mineralization on the Minago property and the number of targets identified, the possibility of intersecting completely new nickel mineralization was considered good. The drilling intersected magnetite-bearing amphibolite domains, pyrite-pyrrhotite intervals and minor serpentinite.

Importantly, two holes of the 2012 program tested known nickel-bearing serpentinite that underlies mining lease ML-003 approximately 5km south of the Nose Deposit. Thirteen historic drill holes are known to have been drilled by previous operators in the area between 1968 and 1971. Ten of the thirteen holes intersected serpentinized ultramafic rock, while seven of these holes obtained significant intersections of nickel-mineralized serpentinite from within a body interpreted to be >2 km long. The most extensive intersection, in MXB-70-60, was 605m grading 0.3% Ni from 154m down hole. DDHs V-12-07 and V-12-09 completed in the winter of 2012 both intersected significant widths of serpentinite and obtained analytical results consistent with historic results.

No exploration or development programs have been conducted on the project subsequent to the winter 2012 work program; current work is related to reporting and evaluation of existing results as well as gathering additional geochemical information from existing drill core. An application to renew the Minago mining leases ML-002 and ML-003 was successful and both leases have been renewed for a 21-year term.

On August 23, 2011, the Manitoba Government issued Victory Nickel’s final EAL for the Minago project. During 2013, the Company has complied with the conditions of the EAL and, in December, filed an Environmental Act Proposal (“EAP”) to amend the EAL to relocate the proposed tailings and waste rock management facility. The construction of drainage ditches installed to lower the water table within the pit shell limits, the installation of Flow Gauging and Telemetry systems and the implementation of a comprehensive environmental monitoring

program are considered part of the site development work commencement necessary to maintain the EAL which would have otherwise expired in August, 2014.

*Minago Frac Sand*
An indicated resource of 15 million tonnes of sandstone has been estimated to occur within the current Minago pit shell. The frac sand component of this resource of approximately 11 million tonnes is a significant contributor to the positive economics at Minago. As part of the FS, Outotec produced a feasibility-level design for a frac sand plant complete with capital and operating costs to produce 1,140,000 tonnes of frac sand annually for a ten-year period. Considerable potential exists to expand the resource beyond the limits of the current pit.

## EXPLORATION AND EVALUATION ACTIVITIES

For the three months ended March 31, 2015, the Company incurred exploration expenditures on its E&E projects of $13,000 (March 31, 2014 - $36,000). Expenditures have been minimal due to the tight equity markets and management's focus on Victory Silica and the frac sand business.

## FRAC SAND

### Bear Coulee Property

In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment of $10,000 on signing of the agreement (and paid in 2014), a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months following receipt of permits with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Property is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced the completion of a National Instrument 43-101 technical report describing a resource estimate of approximately 11 million tons of on the Bear Coulee Property located in Trempeleau County, Wisconsin.

## NICKEL

### Lac Rocher

Lac Rocher is located in northwestern Québec and has measured (0.29 million tonnes grading 1.23% Ni) and indicated (0.51 million tonnes grading 1.05% Ni) resources of 0.80 million tonnes grading 1.12% nickel, at a 0.5% nickel cutoff, for approximately 20 million pounds of in-situ nickel located between surface and 125 vertical metres. Additional inferred resources total 0.44 million tonnes grading 0.65% Ni. Mineralization remains open to the southwest. The breakeven price of nickel per lb in the Lac Rocher PEA was $9.74 with copper at $3.65.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% net smelter royalty ("NSR") for

mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

Year round access is now available to the site. In December 2009, diamond drilling was conducted to provide geotechnical data deemed necessary for future portal and ramp development. An InfiniTem ground electromagnetic survey was conducted over a portion of the property to test for deeper extensions to the nickel mineralization. At the same time, evaluation of the availability of borrow material was also conducted in the local region. No work was conducted at the site in 2014 and 2015.

**Mel Project**

The Mel project is located on the Thompson Nickel Belt, just north of Thompson, Manitoba. It is a large property, approximately 25km east-west by about 6km north-south, and remains underexplored.

Mel has an indicated resource of 4.3 million tonnes grading 0.88% nickel (approximately 83 million pounds in-situ nickel) and an additional inferred resource of one million tonnes grading 0.84% nickel (approximately 19 million pounds in-situ nickel) and offers significant exploration upside as well as near-term production potential.

The Company had earned a 100% ownership of Mel subject to a 51% Vale back-in right. During the third quarter of 2010, the Company announced that Vale had determined that it would not exercise its back-in right. Title to the property has been transferred. Accordingly, the Company is in a position to determine future programs at Mel in its sole discretion.

Ten drill holes, totalling 3,459m, comprised the 2011 winter work program on the Mel Property, the first managed by the Company. Two drill holes, totalling 739m, were collared to test a UTEM geophysical anomaly approximately 700m north of the Mel deposit associated with earlier prospective nickel results; no sulphide mineralization was encountered. Eight drill holes, totalling 2,720m, were collared to test the down-dip extension of the Mel resource shell; all holes intersected nickel mineralization of grade and width comparable to that obtained in holes that comprise the existing resource.

A re-evaluation of the Mel dataset has been completed for both the drill hole data on the Mel deposit and the considerable drilling (111 drill holes) conducted of the claims portion of the property. The study has included reinterpretation of the geological context in order to evaluate new or under-tested target areas, particularly on the portion of the property comprised of claims,

for future work and that can be incorporated into further, more refined, modelling of the Mel resource. No fieldwork was conducted during 2014. An application to renew Mel mining lease ML-007 was successful and the lease has been renewed for a 21-year term.

Under the terms of the option agreement, Vale must mill ore from the Mel project at cash costs plus 5% subject to capacity availability and metallurgy – this is unaffected by Vale's decision not to exercise its back-in right. Furthermore, in accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

**Lynn Lake**

The Lynn Lake property is located in the historic mining town of Lynn Lake in northern Manitoba, about 320km by road northwest of the Thompson mining camp. The property is the former Sherritt Gordon Mines Limited ("Sherritt") mine site known as the Lynn Lake A Mine and Farley Mine, comprised of 13 mining claims, 14 mining claim leases and 2 mineral leases covering an area of 2,170.26 hectares. The property was operated by Sherritt from 1953 to 1976 with reported production of 22.2 million tons at an average grade of 1.023% nickel and 0.535% copper.

As discussed earlier and described in Note 12 to the 2014 Audited Consolidated Financial Statements, the Company had optioned Lynn Lake to Prophecy Coal with subsequent assignment to Wellgreen. In March, 2014, Wellgreen relinquished the option on the property and it has reverted to the Company. On November 4, 2014, the Company announced that it had optioned the Lynn Lake project to Corazon, an Australian listed public company with assets in the Lynn Lake area. Under the terms of the agreement, Corazon can acquire a 100% interest in Lynn Lake by issuing 40 million Corazon shares to the Company upon closing and incurring A $3,500,000 in exploration expenditures or in payments (in cash or Corazon shares at Corazon's option) to Victory Nickel over five years. In addition, Victory Nickel will retain a 1.5% net smelter royalty on production from the Lynn Lake nickel project, and receive a payment of A$1,000,000 (in cash or Corazon shares at Corazon's option) within 30 days of the commencement of ore processing activities at the Lynn Lake nickel project.

On April 6, 2015 Corazon Mining Ltd. ("Corazon") issued 40,000,000 Corazon shares to Victory Nickel as part of the terms of the option agreement between the two companies.

Also under the agreement, Victory Nickel retains a 1.5% net smelter return royalty on any production from the claims and leases transferred by Victory Nickel to Corazon, 1% of which can be purchased by Corazon for A$1M. Corazon must spend A$3.5M in exploration and resource development over five years upon execution of the agreement - should Corazon fail to make the expenditures, the difference between the expenditure requirement and the actual expenditures must be paid to Victory Nickel in cash or shares of Corazon, or the project is returned to Victory

Nickel. Within 30 days of the commencement of commercial ore processing at Lynn Lake, Corazon is required to make a payment of A$1M in cash and/or shares of Corazon to Victory Nickel.

**FRAC SAND SEGMENT**

As explained above, the Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 21 in the Unaudited Condensed Consolidated Financial Statements). The segment is located in Canada although sand as raw material is currently imported from the US. The plan is to eventually produce both domestic and imported sand.

The Company completed Phase One of its three phase business plan. Phase One provided for the refurbishment and upgrading of the 7P Plant to a capacity of 500,000 tpa of high-quality frac sand. The 7P Plant was completed in March 2014 followed by commissioning until early August.

Successful completion of Phase One was expected to lead to Phase Two which provides for the building of a wash plant in Wisconsin, USA followed by Phase Three which provides for the construction of a second dry processing facility in Manitoba with a capacity of approximately 1,000,000 tpa. With the completion of Phase One, the Board of Directors approved proceeding with Phase Two provided non-dilutive financing can be arranged. However, in February 2105, the Company announced that Phase Two had been deferred due to the uncertainty caused by the drop in the price of oil.

As mentioned above, sales decreased monthly from January to March and, as a result of unusual market uncertainty and longer than expected spring break-up conditions, the Company temporarily suspended the frac sand operations on April 14, 2015. Management will continue to monitor the situation and re-start production as soon as possible. Frac sand sales typically slow down during this period of the year due to spring break-up road restrictions in Alberta. This year, spring break-up is more pronounced than in prior years as the majority of the oil and gas exploration and production ("E&P") companies appear to be trying to conserve capital by postponing drilling activity to less costly periods after spring break-up. With the price of oil dropping by approximately 50% since November 2014, E&P companies are reducing capital expenditure programs and, as a result, drilling activity has also slowed. The slowdown, combined with spring break-up, is placing pressure on Victory Nickel's oilfield service company customers to reduce E&P company drilling costs.

These companies, in turn, look to their suppliers, including frac sand producers, to help lower their costs. As a result of market uncertainty in Canada and the USA frac sand prices in Canada have decreased to levels that do not appear to be sustainable over the long term. The weakness of the Canadian dollar has made domestic sand more competitive over this period and is taking some of the market previously available for imported sand.

The Company has built approximately 40,000 tons of finished product and raw material inventory at its 7P Plant which is available to supply its customers as fracking activity resumes following spring break-up.

**IMPAIRMENT ANALYSIS**

There has been no marked recovery in the metals markets and more general economic indicators except for a strengthening US dollar, a small increase in the nickel price and a reduction in the oil and gas prices. The Company performed a detailed impairment analysis on each of its E&E projects and the MP&D project as at December 31, 2014. The Company does not believe that there have been any material changes to date which would adversely affect this analysis. Furthermore there has been no change in management's plans for the projects which would cause a reassessment.

Management concluded that no impairment existed in each of its projects effective March 31, 2015 and that costs incurred to date are recoverable. The Company will continue to monitor developments as they occur in the metals markets and the economy and will update its impairment analysis to take account of any such changes, as appropriate.

**CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS**

Critical accounting estimates and judgements used in the preparation of the consolidated financial statements include determining the carrying value of investments, MP&D and E&E projects, assessing the impairment and classification of long-lived assets, determining the recoverability of deferred income tax assets, the valuation of the Participating Interest and the convertibility feature of the promissory notes, the valuation of share-based payments and the disclosure of contingencies and going concern matters. These estimates involve considerable judgement and are, or could be, affected by significant factors that are out of the Company's control.

For a complete list of the significant accounting policies as well as information concerning the use of estimates, judgements and measurement uncertainty, reference should be made to Note 3 to the Company's 2014 Audited Consolidated Financial Statements. The Company's financial statements have been prepared using the going concern assumption; reference should be made to Note 1 to the Company's 2014 Audited Consolidated Financial Statements.

The recorded value of the Company's E&E projects and the MP&D project is based on historic costs that are expected to be recovered in the future. The Company's recoverability evaluation is based on market conditions for minerals, underlying mineral resources associated with the properties and future costs that may be required for ultimate realization through mining operations or by sale. The Company is in an industry that is exposed to a number of risks and there is always the potential for a material adjustment to the value assigned to these assets. Such risks also extend to the evaluation of fair values of net assets upon acquisition.

The value of the Participating Interest is a significant estimate which uses a model of estimated cash flows and applies probability-weighted estimates to the model. Assumptions are made about the phase at which the frac sand business will be when payments are being made as well as production costs and volumes and sales prices and volumes.

The fair value of the stock options and warrants, as well as the embedded option derivative in the promissory note, is calculated using the Black-Scholes option-pricing model that takes into account the exercise price, expected life of the option/warrant, expected volatility of the underlying shares, expected dividend yield, and the risk-free interest rate for the term of the option/warrant or embedded option derivative.

The Company has determined that it is highly probable that Victory Nickel will generate returns sufficient to utilize its taxable losses prior to their expiry. This is a significant judgement that, dependent upon future events, may turn out to be incorrect. Presently, since Victory Silica is not revenue-generating, a full valuation allowance has been recorded against losses incurred in that subsidiary. The Company will monitor any changes in circumstances which could require a reversal of the valuation allowance.

## NEW ACCOUNTING POLICIES

IFRS issued by the International Accounting Standards Board ("IASB") have been adopted in the Company's 2014 Audited Consolidated Financial Statements. There have been no new accounting policies adopted by the Company, except as noted Note 3 to those statements.

## FUTURE ACCOUNTING CHANGES

### New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued no new and revised standard and interpretations which are applicable to the Company or which have caused changes to its accounting policies. Refer to Note 3 to those statements.

## CORPORATE GOVERNANCE

The Company's Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of directors, none of whom are employees or officers of the Company, meets with management to review the Unaudited Condensed Consolidated Financial Statements to satisfy itself that management is properly discharging its responsibilities to the directors who approve the financial statements. The Board of Directors has also appointed compensation and corporate governance and nominating committees composed of non-executive directors.

### Evaluation of Disclosure Controls and Procedures

The Company's Chief Executive Officer and Chief Financial Officer, (collectively, the "Certifying Officers"), are responsible for designing a system of disclosure controls and procedures, or

causing them to be designed under their supervision, to provide reasonable assurance that information required to be disclosed in reports filed with or submitted to, securities regulatory authorities is recorded, processed, summarized and reported within the time periods specified under Canadian securities laws and that material information relating to the Company is made known to them with respect to financial and operational conditions to allow timely decisions regarding required disclosure. For the fiscal quarter ended March 31, 2015, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's disclosure controls and procedures as defined under the rules adopted by the Canadian securities regulatory authorities. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's disclosure controls and procedures were effective as at March 31, 2015. Such controls are facilitated by the small size of the Company's senior management team and their access to material information.

There were no changes to the Company's disclosure controls and procedures that occurred during the quarter ended March 31, 2015 that materially affected, or are reasonably likely to affect, the Company's disclosure controls and procedures.

**Evaluation of Internal Control over Financial Reporting**

The Company's Certifying Officers are responsible for designing a system of internal controls over financial reporting, or causing them to be designed under their supervision, to provide reasonable assurance regarding the reliability of financial reporting and preparation of consolidated financial statements for external purposes in accordance with Canadian GAAP. The Company used the COSO (1992) control framework and is in the process of updating its methodology to incorporate the COSO (2013) framework into its analyses for the future. The COSO Board has made the COSO (1992) framework available for use until an unspecified date at which point it is expected to be considered superseded. For the fiscal quarter ended March 31, 2015, an evaluation was commissioned by the Company under the supervision of the Certifying Officers and with the participation of management of the effectiveness of the Company's internal control over financial reporting. Based on this evaluation, the Certifying Officers have concluded that the design and operation of the Company's internal controls over financial reporting and procedures were effective as at March 31, 2015.

The management of the Company was required to apply its judgement in evaluating the cost-benefit relationship of possible controls and procedures. The result of the inherent limitations in all control systems means no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected.

There were no changes to the Company's internal controls over financial reporting that occurred during the quarter ended March 31, 2015 that materially affected, or are reasonably likely to affect, the Company's internal controls over financial reporting. However, reliance was placed on mitigating controls around processes that are currently still evolving to reduce risk of material

misstatement on the financial statements to an acceptable level.

## TRANSACTIONS WITH RELATED PARTIES AND MANAGEMENT AGREEMENT WITH NUINSCO RESOURCES LIMITED

### Related Party Balances and Transactions for Services

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 19 and 21 to the 2014 Audited Consolidated Financial Statements). Payables to key management personnel generally relate to directors' fees, consulting fees, and expense reimbursements.

Balances and transactions with related parties as at March 31, 2015 and December 31, 2014 and for the three months ended March 31, 2015 and 2014 are shown in the following tables:

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **169** | $ | 251 |

Key management personnel compensation comprises:

| | **Three months ended March 31,** | | | |
|---|---|---|---|---|
| | | **2015** | | 2014 |
| Short-term employee benefits | **$** | **206** | $ | 221 |
| Share-based payments - options | | **-** | | 64 |
| | **$** | **206** | $ | 285 |

### Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shared management, administrative assistance and facilities with Nuinsco pursuant to a Management Agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. As described earlier in Note 15 to the Unaudited Condensed Consolidated Financial Statements, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The Management Agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the Management Agreement ceased in March 2015. The Company has continued to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at March 31, 2015 and December 31, 2014 and for the three months ended March 31, 2015 and 2014 are shown in the following tables:

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| **Balances Outstanding under the Management Agreement** | | | | |
| Payable to Nuinsco Resources Limited | **$** | **40** | $ | 45 |

| | | **Three months ended March 31, 2015** | | 2014 |
|---|---|---|---|---|
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **154** | $ | 182 |
| Project costs charged to Nuinsco Resources Limited | **$** | **6** | $ | 5 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **16** | $ | 12 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis.

## OUTSTANDING SHARE DATA

As at May 11, 2015, the Company had 57,634,578 common shares issued and outstanding. In addition, there were 3,036,000 stock options and 10,799,935 warrants outstanding which, if exercised and issued, would bring the fully diluted issued common shares to a total of 71,470,513 and would generate cash of approximately $5,510,000. However, although none of the options and warrants are “in the money”, all the warrants are exercisable.

## RECENT DEVELOPMENTS

The slowdown in demand for frac sand and the necessary temporary suspension of production has required the Company to implement initiatives to conserve cash. The rail car leases were cancelled and arrangements are being made with other suppliers to bridge the period until sales resume. Funds placed in deposit to support letters of credit to facilitate the railcar leases have been redeemed by the lessor to reduce the Company’s payables.

The Company has in excess of 40,000 tons of sand in inventory which should generate cash to bring suppliers debt up-to-date. The Company is also reducing all discretionary costs which should to have a negative impact on its ability to resume production. Staff, salaries, and director fees are being reduced or deferred where possible.

## RISKS AND UNCERTAINTIES

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer’s profile at www.sedar.com.

**FORWARD-LOOKING STATEMENTS**

In the interest of brevity this section as presented in the original version of this MD&A has been omitted in this document, but can be found in the original version filed under the Issuer's profile at www.sedar.com.

## 7. Market for Securities

7.1 The Issuer's securities are presently listed and posted for trading on the Toronto Stock Exchange under the trading symbol NI.

## 8. Consolidated Capitalization

8.1 This is not applicable to the Issuer as there has been no material change in the share and loan capital of the Issuer, on a consolidated basis, since the date of the comparative financial statements for the Issuer's most recently completed financial year contained in the Listing Statement.

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## 9. Options to Purchase Securities (as of January 28, 2016)

| Options Granted | Grant Price | Market Value of Securities Underlying Options on the Date of the Grant | Expiry date | (a) Officers & Directors, past & present (11 Individuals) | (b) Officers & Directors past & present of subsidiaries (1 Individual) | (c) All other Employees & Past NI Employees (4 Individuals) | (d) All other Employees & Past Silica Employees (3 Individuals) | (e) All Consultants (4 Individuals) | (f) Stock Options Held by Any Other Person | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 15,000 | $1.10 | $1.10 | 04-May-2016 | 2,120,000 | 135,000 | 253,000 | 70,000 | 125,000 | 0 | 2,703,000 |
| 5,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 30,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 5,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 15,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 20,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 10,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 5,000 | $1.10 | $1.10 | 04-May-2016 | | | | | | | |
| 50,000 | $1.00 | $1.00 | 04-Jul-2016 | | | | | | | |
| 30,000 | $1.00 | $1.00 | 04-Jul-2016 | | | | | | | |

| | | | |
|---|---|---|---|
| 45,000 | $1.00 | $1.00 | 04-Jul-2016 |
| 15,000 | $1.00 | $1.00 | 04-Jul-2016 |
| 45,000 | $1.00 | $1.00 | 04-Jul-2016 |
| 50,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 25,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 10,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 80,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 20,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 50,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 65,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 35,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 45,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 40,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 50,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 45,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 35,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 80,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 25,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 20,000 | $0.50 | $0.50 | 27-Jun-2017 |
| 50,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 15,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 10,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 100,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 20,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 65,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 65,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 35,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 45,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 35,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 35,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 45,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 35,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 80,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 25,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 20,000 | $0.30 | $0.30 | 27-Jun-2018 |
| 20,000 | $0.30 | $0.30 | 17-Sep-2018 |
| 45,000 | $0.30 | $0.30 | 04-Nov-2015 |
| 10,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 4,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 80,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 4,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 40,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 30,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 30,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 30,000 | $0.55 | $0.55 | 04-Feb-2019 |

| | | | |
|---|---|---|---|
| 10,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 5,000 | $0.55 | $0.55 | 04-Feb-2019 |
| 52,500 | $0.70 | $0.70 | 21-Jul-2019 |
| 20,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 20,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 10,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 10,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 110,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 10,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 50,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 52,500 | $0.70 | $0.70 | 21-Jul-2019 |
| 30,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 42,500 | $0.70 | $0.70 | 21-Jul-2019 |
| 30,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 10,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 50,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 50,000 | $0.70 | $0.70 | 21-Jul-2019 |
| 72,500 | $0.70 | $0.70 | 21-Jul-2019 |
| 40,000 | $0.70 | $0.70 | 21-Jul-2019 |
| **2,703,000** | | | |

All currencies are in Canadian Dollars.

Notes:

1 The market value of all securities under option as of the date hereof is C$0.02

## 10. Description of the Securities

10.1 The Issuer has one class of equity securities, common shares, and is authorized to issue an unlimited number of Common Shares. As of the date hereof, the Issuer has 57,635,093 common shares outstanding.

a) Each holder of a common share is entitled to receive any dividend declared by the Issuer.

b) Each holder of a common share is entitled to notice of and the right to vote at all meetings of shareholders of the Issuer.

c) Each holder of a common share is entitled to receive the remaining property of the Issuer on dissolution.

d) This is not applicable to the Issuer as the equity securities carry no pre-emptive rights.

e) This is not applicable to the Issuer as the equity securities carry no conversion or exchange rights.

f) This is not applicable to the Issuer as the equity securities carry no redemption, retraction, purchase for cancellation or surrender provisions.

g) This is not applicable to the Issuer as the equity securities carry no sinking or purchase fund provisions.

h) This is not applicable to the Issuer as the equity securities carry no provisions permitting or restricting the issuance of additional securities and any other material restrictions

i) This is not applicable to the Issuer as the equity securities carry no provisions requiring a securityholder to contribute additional capital.

10.2 This is not applicable to the Issuer as no debt securities are being listed.

10.3 Does not exist in Form 2A.

10.4 Other securities - This is not applicable to the Issuer as no securities other than equity securities are being listed.

10.5 Modification of terms:

(a) This is not applicable to the Issuer as there are no provisions about the modification, amendment or variation of any rights attached to the securities being listed.

(b) This is not applicable to the Issuer as the rights of holders of securities may not be modified otherwise than in accordance with the provisions attached to the securities or the provisions of the governing statute relating to the securities.

10.6 (a) This is not applicable to the Issuer as the Issuer has only one class of securities.

(b) This is not applicable to the Issuer as the class of securities being listed may not be partially redeemed or repurchased.

10.7 This is not applicable to the Issuer as no securities of the same class as the securities to be listed have been sold within the 12 months before the date of the Listing Statement. Under the Debt Settlement Agreement described under paragraph 3.1, the Issuer will be

issuing common shares at $0.05 and $0.25 per share. The number of securities to be issued is dependent on the level of participation by unsecured creditors.

10.8 Toronto Stock Exchange Price:

| Date | High | Low | Close | Volume Traded | Q3 2014 volume[1] |
|---|---|---|---|---|---|
| Feb-16 | 0.025 | 0.015 | 0.02 | 28,245 | |
| Jan-16 | 0.025 | 0.01 | 0.02 | 1,686,746 | |
| Dec-15 | 0.03 | 0.02 | 0.02 | 1,120,720 | |
| Nov-15 | 0.03 | 0.02 | 0.025 | 754,269 | |
| Oct-15 | 0.03 | 0.03 | 0.03 | 1,650,469 | |
| Q3 2015 | 0.05 | 0.02 | 0.02 | 5,608,819 | |
| Q2 2015 | 0.135 | 0.05 | 0.05 | 6,038,295 | |
| Q1 2015 | 0.26 | 0.095 | 0.14 | 5,199,279 | |
| Q4 2014 | 0.51 | 0.225 | 0.23 | 8,334,970 | |
| 2014/09/17-30[1] | 0.6 | 0.385 | 0.48 | 2,272,096 | |
| 2014/09/1-16[1] | 0.06 | 0.055 | 0.055 | 5,279,855 | |
| 2014/08[1] | 0.07 | 0.055 | 0.055 | 8,716,650 | |
| 2014/07[1] | 0.08 | 0.055 | 0.06 | 14,773,680 | 31,042,281 |
| Q2 2014 | 0.07 | 0.055 | 0.065 | 21,549,911 | |
| Q1 2014 | 0.09 | 0.04 | 0.06 | 43,322,616 | |

Notes:
[1]Data in the table reflects trading on a pre-consolidation basis up to and including September 16, 2014, and on a post-consolidation basis from September 17, 2014 onward.

## 11. Escrowed Securities

11.1 This is not applicable to the Issuer as there are no securities of the Issuer held, to the knowledge of the Issuer, in escrow.

## 12. Principal Shareholders

The Issuer has no shareholders owning in excess of 10% of its shares.

## 13 Directors and Officers

13.1-13.5

| Name and Residence | Position with the Corporation | Principal Occupation | Date Elected to Victory Nickel's Board | Shares Held or Controlled or Directed and %[8] |
|---|---|---|---|---|
| Cynthia Thomas[1][3]*[6] Nevada, U.S.A. | Chair and Director | Principal of Conseil Advisory Services Inc. (financial advisory to the natural resource industry). | Feb. 1, 2007 | 41,000 (0.07%) |
| René R. Galipeau[6] Ontario, Canada | Vice-Chair, Chief Executive Officer and Director | Vice-Chairman and Chief Executive Officer of the Issuer; Vice-Chairman and Chief Executive Officer of Nuinsco Resources Limited (2006-2013) (mineral exploration). | Feb. 1, 2007 | 459,904 (0.80%) |
| Roland Horst[1]*[4][6] Ontario, Canada | Director | Retired mining executive. Formerly Chief Executive Officer of CBay Minerals Inc. (2012-2013) (mine development and mineral exploration); CEO of Orvana Minerals Corporation (2010-2011) (copper/gold producer). | Jun. 22, 2010 | 37,500 (0.07%) |
| Michael Anderson[1][2]*[5][6] Ontario, Canada | Director | Retired. Formerly a partner with the law firm of Gowlings Lafleur Henderson LLP and its predecessor, Smith Lyons, from 1985 until March 2011. | Jun. 29, 2011 | 44,457 (0.08%) |

| Name and Residence | Position with the Corporation | Principal Occupation | Date Elected to Victory Nickel's Board | Shares Held or Controlled or Directed and %[8] |
|---|---|---|---|---|
| Peter R. Jones[2][3][5]*[6] Ontario, Canada | Director | Executive Vice President, Century Iron Mines Corporation since Nov. 2013, Chairman and Interim Chief Executive Officer of Augyva Mining Resources Inc. since 2011. Formerly Chief Executive Officer and a director of HudBay Minerals Inc. 2004-2008 and 2009-2010; chairman and Chief Executive Officer of Adanac Molybdenum Corporation 2008-2009. | Jun. 29, 2011 | Nil (0.00%) |
| Steven Cresswell Ontario, Canada | Chief Financial Officer | Financial consultant to mining and energy sector companies (including as CFO of the Issuer on a contract basis since June 2015) as principal with SJC Consultants Ltd. since 2013 and between 2009 and 2011; CFO of FNI Mining (2011-2013) (nickel producer). | N/A | Nil (0.00%) |
| David Mchaina Ontario, Canada | VP of Environment & Sustainable Development | VP of Environment & Sustainable Development of Victory Nickel Inc., and Nuinsco Resources Limited (mineral exploration). | N/A | 94,291 (0.16%) |
| Kenneth Murdock Alberta, Canada | CEO and Director of Victory Silica | CEO of Victory Silica Ltd. (2012-present); Principal with IM&M Consulting (2010-2012). | N/A | Nil (0.00%) |

| Name and Residence | Position with the Corporation | Principal Occupation | Date Elected to Victory Nickel's Board | Shares Held or Controlled or Directed and %[8] |
|---|---|---|---|---|
| Sean Stokes<br>Ontario, Canada | Vice-President, Corporate Affairs and Corporate Secretary | Corporate Secretary and Executive VP of Victory Nickel Inc., and Nuinsco Resources Limited (mineral exploration). | N/A | 90,800<br>(0.16%) |

Footnotes:

(1) Member of the Audit Committee.
(2) Member of the Corporate Governance and Nominating Committee.
(3) Member of the Compensation Committee.
(4) Member of the Technical Committee.
(5) Health, Safety & Environment Committee
(6) All members of the Board are members of the Strategy Committee.
(7) All director appointments expire at the next annual meeting of shareholders.
(8) In aggregate, all directors and executive officers own, directly or indirectly, 767,952 or 1.3%.
(9) The information in the foregoing table as to Common Shares beneficially owned, controlled or directed, not being within the knowledge of the Issuer, has been furnished by each respective nominee.

* denotes Committee Chair

13.6

(a) Mr. René Galipeau, Chief Executive Officer ("**CEO**"), Vice-Chairman and a director of the Issuer, served as Senior Vice-President and Chief Financial Officer ("**CFO**") of HMZ Metals Inc. ("HMZ") and Mr. Sean Stokes, Vice-President Corporate Affairs and Corporate Secretary of the Issuer, served as Vice-President of HMZ in 2005 when a cease trade order was issued halting trading by management and insiders of HMZ due to failure to file interim financial statements. The cease trade order was in effect until two days following the filing of financial statements for the three-month period ended June 30, 2005, which statements were filed on October 19, 2005. Subsequent to resigning from their positions at HMZ Metals Inc., Mr. Galipeau and Mr. Stokes were subject to a management cease trade order in connection with the failure of HMZ Metals Inc. to file annual financial statements for the year ended December 31, 2005, which statements were filed on December 21, 2007.

Mr. Michael Anderson was a director of San Gold Corporation (**"San Gold"**). On December 23, 2014, trading of the common shares and the subordinate unsecured convertible debentures of San Gold was suspended by the Investment Industry Regulatory Organization of Canada and the TSX. On March 24, 2015 the common shares and subordinated unsecured convertible debentures of San Gold were listed on the TSXV and resumed trading.

(b) This is not applicable to the Issuer.

(c) Mr. Peter Jones was Chairman and CEO of Adanac Molybdenum Corporation ("**Adanac**") from August 2008 to March 2009. Adanac entered voluntary Companies' Creditors Arrangement Act protection in December 2008 and emerged from creditor protection in February 2011 following the successful implementation of its plan of compromise and arrangement.

Mr. Michael Anderson was a director of San Gold. On December 22, 2014, San Gold filed a notice of intention to make a proposal under Part III, Division I of the Bankruptcy and Insolvency Act of Canada (the "**BAI**"). San Gold became bankrupt on June 22, 2015, on which date all of its officers and directors resigned.

(d) Mr. René Galipeau, Chief Executive Officer, Vice-Chairman and a director of the Issuer ceased to be a director of Campbell Resources Inc. ("**Campbell**") in November 2008. In early 2009, Campbell announced that it had re-entered protection under the Companies' Creditors Arrangement Act.

13.7 This is not applicable to the Issuer as no director or officer of the Issuer, or a shareholder holding sufficient securities of the Issuer to affect materially the control of the Issuer has:

(a) been subject to any penalties or sanctions imposed by a court relating to Canadian securities legislation or by a Canadian securities regulatory authority or has entered into a settlement agreement with a Canadian securities regulatory authority; or

(b) been subject to any other penalties or sanctions imposed by a court or regulatory body that would be likely to be considered important to a reasonable investor making an investment decision.

13.8 This is not applicable to the Issuer.

13.9 No director or officer of the Issuer or shareholder holding a sufficient number of securities of the Issuer to affect materially control of the Issuer, or a personal holding company of any such persons has, within the ten years prior to the date of the Listing Statement, become bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency, or been subject to or instituted any proceedings, arrangement or compromise with creditors, or had a receiver, receiver manager or trustee appointed to hold the assets of the director or officer.

13.10 This is not applicable to the Issuer as there are no existing or potential material conflicts of interest between the Issuer or a subsidiary of the Issuer and a director or officer of the Issuer or a subsidiary of the Issuer.

13.11

| (a) Manager | (b) Full/Part Time | (c) Employee or Contractor | (d) Principal Occupation for the Previous Five Years | (e) Industry Experience | (f) Non-Disclosure Agreement |
|---|---|---|---|---|---|
| René Galipeau C.G.A.; born March 30, 1945; Vice-Chairman and Chief Executive Officer of Victory Nickel Inc.; principal operating officer of the Issuer. | Full Time | Employee | Vice-Chairman and Chief Executive Officer of the Issuer; Vice-Chairman and Chief Executive Officer of Nuinsco Resources Limited (still in existence). | Over 35 years of mining and mineral exploration and processing experience. Has held senior positions with a number of gold and base metals mining companies in Canada and the U.S., and has been a director of eight public mining companies. Mr. Galipeau is also Chairman of Nuinsco Resources Limited. | Yes |
| Kenneth Murdock; degree in Environmental Engineering from McGill University and a Civil Engineering degree from the University of Manitoba; | Full Time | Employee | CEO and Director of Victory Silica Ltd.; Principal with IM&M Consulting (still in existence). | Has over 25 years' experience in the environmental, industrial minerals and frac sand industries with Lafarge Cement, United Industrial Services Ltd., Canfrac Sands | Yes |

| | | | | | |
|---|---|---|---|---|---|
| born June 6, 1960; involved in all aspects of Victory Silica Ltd. as CEO. Of that company. | | | | Ltd. and I.M.&M. Consulting. | |
| Sean Stokes BA, MBA; born November 9, 1962; VP and Corporate Secretary of the Issuer and also involved in general management and finance. | Full Time | Employee | Corporate Secretary and Executive VP and Corporate Secretary of the Issuer, and of Nuinsco Resources Limited (still in existence). | Has over 25 years of communications/ business development/ finance experience with a broad range of publicly traded and private companies primarily in the metals and mining sector. | Yes |
| Dr. David Mchaina, Ph.D., P.Eng.; born September 14, 1954; Vice-President of Environment & Sustainable Development of the Issuer. | Full Time | Employee | Vice-President of Environment & Sustainable Development of the Issuer and of Nuinsco Resources Limited (still in existence). | Has more than 20 years of progressive technical and management experience in environmental, health and safety protection and sustainable development with several major and junior mining and exploration companies. | Yes |
| Steven Cresswell, C.G.A.; born August 15, 1966; Chief Financial | Approximately 25% | Contractor | Financial consultant to mining and energy sector companies | Has over 20 years of financial experience with both publicly traded and private | Yes |

| | | | | | |
|---|---|---|---|---|---|
| Officer of the Issuer. | | | as principal with SJC Consultants Ltd. since 2013 and between 2009 and 2011; CFO of FNI Mining (2011-2013) (nickel producer). | companies principally in the natural resource and sustainable energy sectors. | |

## 14. Capitalization

**Issued Capital**

| | **Number of Securities (non-diluted)** | **Number of Securities (fully-diluted)** | **% of Issued (non-diluted)** | **% of Issued (fully diluted)** |
|---|---|---|---|---|
| Public Float | | | | |
| Total outstanding (A) | 57,635,093 | 72,163,093 | 100 | 100 |
| Held by Related Persons or employees of the Issuer or Related Person of the Issuer, or by persons or companies who beneficially own or control, directly or indirectly, more than a 5% voting position in the Issuer (or who would beneficially own or control, directly or indirectly, more than a 5% voting position in the Issuer upon exercise or conversion of other securities held) (B) | 11,574,114 | 13,785,364 | 20% | 19% |
| Total Public Float (A-B) | 46,060,979 | 58,377,729 | 80% | 81% |
| Freely-Tradeable Float | | | | |

| | | | | |
|---|---|---|---|---|
| Number of outstanding securities subject to resale restrictions, including restrictions imposed by pooling or other arrangements or in a shareholder agreement and securities held by control block holders (C) | 0 | 0 | 0 | 0 |
| Total Tradeable Float (A-C) | 46,060,979 | 58,377,729 | 80% | 81% |

Public Securityholders (Registered)

**Class of Security**

| **Size of Holding** | **Number of holders** | **Total number of securities** |
|---|---|---|
| 1 – 99 securities | 278 | 3,460 |
| 100 – 499 securities | 38 | 9,488 |
| 500 – 999 securities | 4 | 3,241 |
| 1,000 – 1,999 securities | 7 | 8,041 |
| 2,000 – 2,999 securities | 3 | 6,802 |
| 3,000 – 3,999 securities | 1 | 3,300 |
| 4,000 – 4,999 securities | 2 | 8,493 |
| 5,000 or more securities | 10 | 47,764,006 |
| | 343 | 47,806,831 |

Public Securityholders (Beneficial)

**Class of Security**

| **Size of Holding** | **Number of holders** | **Total number of securities** |
|---|---|---|
| 1 – 99 securities | | |
| 100 – 499 securities | | |
| 500 – 999 securities | | |
| 1,000 – 1,999 securities | | |
| 2,000 – 2,999 securities | | |
| 3,000 – 3,999 securities | | |
| 4,000 – 4,999 securities | | |
| 5,000 or more securities | | |
| Unable to confirm | 1 | 52,991,895 |

Non-Public Securityholders (Registered)

**Class of Security**

| **Size of Holding** | **Number of holders** | **Total number of securities** |
|---|---|---|
| 1 – 99 securities | 0 | 0 |
| 100 – 499 securities | 0 | 0 |
| 500 – 999 securities | 0 | 0 |
| 1,000 – 1,999 securities | 0 | 0 |
| 2,000 – 2,999 securities | 0 | 0 |

| | | |
|---|---|---|
| 3,000 – 3,999 securities | 0 | 0 |
| 4,000 – 4,999 securities | 0 | 0 |
| 5,000 or more securities | 8 | 11,574,114 |
| | 8 | 11,574,114 |

14.2

| Description of Security (include conversion / exercise terms, including conversion / exercise price) | Number of convertible / exchangeable securities outstanding | Number of listed securities issuable upon conversion / exercise |
|---|---|---|
| Warrants to acquire common shares exerciseable at C$0.50 on or before June 3, 2017. | 2,575,000 | 2,575,000 |
| Unsecured promissory convertible notes, convertible at C$ 1.00 into common shares. | 7,972,000 | 7,972,000 |
| Stock options exerciseable into common shares with expiry dates ranging from May 2016 to July 2019 and a weighted average exercise price of C$0.50. | 2,703,000 | 2,703,000 |

14.3 The SPA Loan incorporates an early payment penalty payable to the Secured Lender in warrants with the same terms as those noted in section 14.2. As such, an additional 2,575,000 warrants would become exerciseable in the event of early repayment of the SPA Loan on the part of the Issuer.

## 15. Executive Compensation

15.1

**Compensation Discussion and Analysis**

The information provided in this section is in accordance with Form 51-102F6 extracted from the Issuer's most recently filed Management Information Circular dated May 27, 2015 as the Issuer has not yet held filed its fiscal 2015 audited financial statements nor has it held its 2016 annual meeting of shareholders.

The purpose of this Compensation Discussion and Analysis is to provide information about the Issuer's executive compensation philosophy, objectives, and processes and to discuss compensation decisions relating to the Issuer's senior officers, being the identified named executive officers (the "**NEOs**") in 2014. During 2014, the Issuer had the following NEOs: Mr. René R. Galipeau, Vice-Chairman and Chief Executive Officer; Ms. Alison Sutcliffe, Vice-President, Finance and Chief Financial Officer (Ms. Sutcliffe resigned from the Issuer effective March 31, 2015) and Mr. Ken Murdock, CEO of subsidiary Victory Silica Inc. ("**Victory Silica**").

### *Management Agreement*

During 2014, the Issuer obtained management, administrative assistance and facilities from Nuinsco Resources Limited ("**Nuinsco**") pursuant to a management agreement between the Issuer and Nuinsco. As of the date hereof the management agreement has been terminated. Alison Sutcliffe was not an employee of the Issuer during 2014 and her services were provided to the Issuer under the terms of the management agreement. Mr. Galipeau has, and Ms. Sutcliffe had, a separate written agreement with the Issuer, see *Termination and Change of Control Benefits*.

### *Compensation Committee*

In order to assist the Board in fulfilling its oversight responsibilities with respect to human resources matters, the Board has established the compensation committee (the "**Compensation Committee**"). During the most recently completed fiscal year, the Compensation Committee was comprised of three directors, namely Cynthia Thomas (Chair), Peter R. Jones and Michael Anderson (Alireza Moghadam resigned from the Board of Directors effective March 2014, however prior to his resignation Mr. Moghadam was a member of the Compensation Committee) and, all of whom are independent within the meaning of section 1.4 of National Instrument 52-110 – *Audit Committees* ("**NI 52-110**").

The Compensation Committee's purpose is to: (i) establish the philosophy and objectives that will govern the Issuer's compensation program; (ii) oversee and approve the compensation and benefits paid to the senior officers; (iii) recommend to the Board for approval executive and other compensation and benefits plans and arrangements; (iv) oversee the Issuer's stock option plan and the Share Incentive Plan; and (v) promote the clear and complete disclosure to shareholders of material information regarding executive compensation. In performing its duties, the Compensation Committee has the authority to engage such advisors, including executive compensation consultants, as it considers necessary.

### *Principles and Objectives of the Compensation Program*

The primary goal of the Compensation Committee and the Issuer's compensation

program is to ensure that the compensation provided to the Issuer's senior officers is determined with regard to the Issuer's business strategies and objectives, such that the financial interest of the senior officers is matched with the financial interest of the shareholders. The Compensation Committee and Board of Directors strive to ensure that the Issuer's senior officers are compensated fairly and commensurably with their contributions to furthering the Issuer's strategic direction and objectives and that the compensation program is structured to attract, motivate and retain top quality employees and officers.

Generally, the Issuer places emphasis on annual cash compensation (i.e. salary) in order to attract, retain and motivate senior officers, as opposed to options, stock appreciation rights plans, securities purchase programs and other incentive type compensation. However, in order to ensure the alignment of officers with the Issuer's long-term interests, the Issuer maintains the Stock Option Plan (as defined below) and the Share Incentive Plan.

***Compensation Process***

The Compensation Committee relies on the knowledge and experience of the members of the Compensation Committee. As a whole, the Compensation Committee is comprised of directors who have direct experience and skills relevant to their responsibilities in executive compensation, including with respect to making informed decisions on the suitability of the Issuer's compensation policies and practices. Set out below is a brief summary of each director's relevant skills and experience:

- Cynthia Thomas was Chair of the Audit Committee from the Issuer's inception in 2007 until June, 2011, Chair of the Board for the past three-and-a-half years and a member of the Compensation Committee for four-and-a-half years. Ms. Thomas holds BCom and MBA degrees, has approximately 30 years of experience in banking and mine finance experience and is principal of Conseil Advisory Services Inc., an independent financial advisory firm specializing in the natural resource industry which she founded in 2000. She also currently and previously has served as a director of several public and private companies.

- Peter R. Jones has been a member of the Compensation Committee since his election to the Board in 2011. Mr. Jones is a mining executive and Professional Engineer with 40 years of experience in senior operational and project positions at coal, gold, base metal and potash mines. He has also consulted in many countries. Previously, he was CEO of Hudson Bay Mining and Smelting Co., Limited for Anglo American, President and CEO of HudBay Minerals Inc. and Chairman and CEO of Adanac Molybdenum Corporation. In these positions he has gained considerable experience in managing compensation matters.

- Michael Anderson has had a wide-ranging career that includes positions with law

firms and corporations in the mining, food and beverage and consumer products industries. Mr. Anderson spent four years as General Counsel and Secretary with Denison Mines Limited, a uranium mining company with potash mining, coal mining and oil & gas operations. He was also a partner with Gowling Lafleur Henderson LLP, in-house counsel with John Labatt Limited for nine years, General Counsel for Swift Canadian and served in general practice with a small legal firm in London, Ont.

Neither the Issuer nor the Compensation Committee currently has any contractual arrangement with any executive compensation consultant who has a role in determining or recommending the amount or form of senior officer or director compensation.

When determining senior officer compensation, the Compensation Committee evaluates the officer's performance, including reviewing the Issuer's performance against its business plans and the officer's achievements during the fiscal year. The Compensation Committee uses all data available to it to ensure that the Issuer is maintaining a level of compensation that is both commensurate with the size of the Issuer and sufficient to retain personnel it considers essential to the success of the Issuer. In reviewing comparative data, the Compensation Committee does not engage in benchmarking for the purpose of establishing compensation levels relative to any predetermined level and does not compare its compensation to a specific peer group of companies.

The Compensation Committee reviews the various elements of the NEOs' compensation in the context of the total compensation package (including salary, bonuses and prior awards under the stock option plan) and recommends the NEOs' compensation packages. The Compensation Committee's recommendations regarding NEO compensation are presented to the Board for their consideration and approval. Although the Issuer does not have a formal policy relating to the management of compensation-related risk, the Board and, as applicable, the Compensation Committee, consider and assess, as necessary, risks relating to compensation prior to entering into or amending employment contracts with NEOs and when setting the compensation of directors. The Board and the Compensation Committee believe that the Issuer's compensation policies and practices are appropriate for its industry and stage of business and that such policies and practices do not have associated with them any risks that are reasonably likely to have a material adverse effect on the Issuer or which would encourage a NEO to take any inappropriate or excessive risks. The Compensation Committee will continue to review the Issuer's compensation policies, including its compensation-related risk profile, as necessary, to ensure its compensation policies and practices are not reasonably likely to have a material adverse effect on the Issuer or encourage a NEO to take any inappropriate or excessive risks.

The Board of Directors, on the recommendation of the Compensation Committee, periodically grants/issues employees, directors and other eligible participants' stock options under the stock option plan and Common Shares under the Share Bonus Plan. In determining whether and how many new options will be granted, the Issuer does not

use any formal objectives, criteria or analyses in reaching such determinations; however consideration is given to the amount and terms of outstanding options.

The Issuer's Insider Trading and Blackout Policy does not allow NEOs, directors and other insiders from speculating in the Issuer's securities. The Insider Trading and Blackout Policy defines "speculating" as the purchase or sale of securities with the intention of reselling or buying back in a relatively short period of time in the expectation of a rise or fall in the market price of such securities. Speculating in such securities for a short-term profit is distinguished from purchasing and selling securities as part of a long-term investment program. Insiders are prohibited at any time from selling securities of the Issuer short or buying or selling a call or put option other than call or put options distributed by the Issuer in respect of securities of the Issuer or any of its affiliates.

The Compensation Committee has not specifically identified any significant changes to its compensation policies and practices for the next financial year, however part of the Compensation Committee's mandate is to review and assess the design and competitiveness of the Issuer's compensation and benefit programs generally, and it intends to do this going forward.

***Compensation Elements and 2014 Compensation Decisions***

During the 2014 fiscal year, the above executive compensation philosophy and policies were followed in order to meet the Issuer's objectives.

*Base Salaries and Bonuses.* The Compensation Committee recommends base salaries and bonuses on an individual basis, taking into consideration the individual's performance and contributions to the Issuer's success, tenure in the job, general industry practices, and internal equities among positions. Salary increases are a necessary means of retaining key employees; however in 2009, due to general economic conditions, no base salary increases were implemented for NEOs. Furthermore, a portion of base salaries was deferred and not paid until 2010. In 2010, due to generally improved economic conditions, any deferred salaries were paid and salary increases were approved by the Compensation Committee. Salary increases were again approved by the Compensation Committee in 2011; in 2012, no executive salary increases have been proposed or approved. Similar to 2009, a portion of salaries were deferred in 2012 and not paid until 2013 when economic circumstances improved. There have been no across-the-board salary increases approved since 2011.

*Long-term Incentives – Stock Option Plan.* The Compensation Committee believes that stock options encourage the Issuer's directors, senior officers, employees and consultants to own and hold shares in the Issuer and tie their long-term interests directly to those of the shareholders. Under the terms of the Issuer's Stock Option Plan, the Board of Directors, acting on the recommendations of the Compensation Committee, may designate employees, including directors and senior officers, and consultants eligible to receive options to acquire such numbers of Common Shares as the Board of

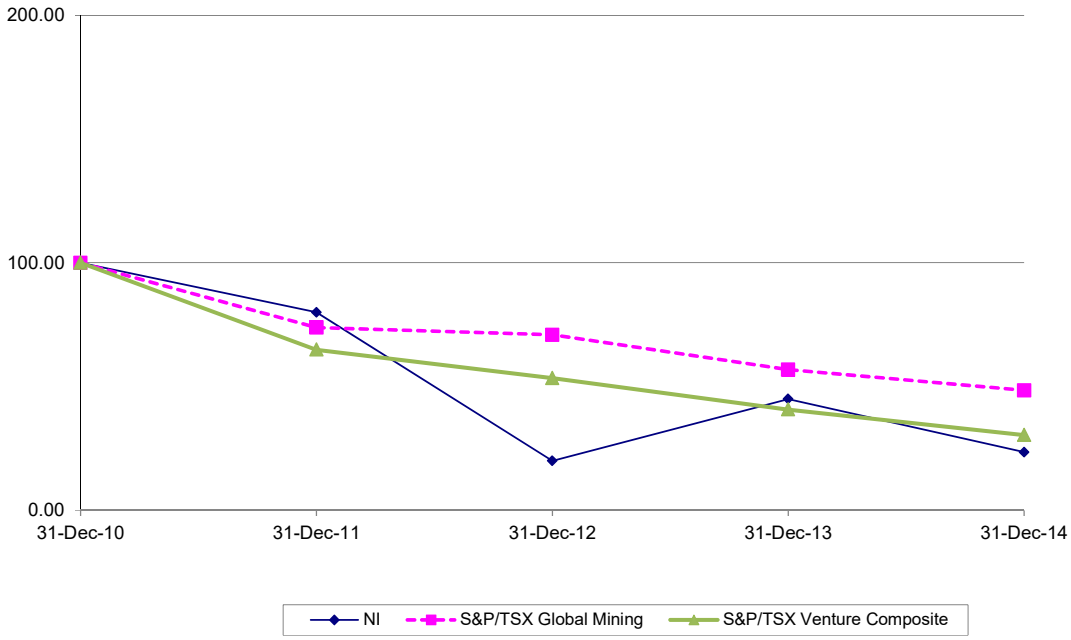
Directors determines, at the then current trading price on the TSX. When awarding options, consideration is given to the exercise price of the aggregate options that would be held by an individual after the award under consideration is made. In determining the individual grants, the Compensation Committee considers the following factors: the individual's performance and contribution to the Issuer's success; relative position; years of service; and, past equity grants. See "Securities Authorized for Issuance under Equity Compensation Plans" for a detailed description of the Stock Option Plan. In the cases of the NEOs other than the Chief Executive Officer, the Compensation Committee receives recommendations from the Chief Executive Officer regarding option awards.

*Long-term Incentives - Share Incentive Plan.* The Issuer also maintains the Share Incentive Plan. The purpose of the Share Incentive Plan is to encourage ownership of the Common Shares by directors, senior officers and employees of the Issuer and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of its business, and to advance the interests of the Issuer by providing additional incentive for superior performance by such persons and to enable the Issuer and its designated affiliates to attract and retain valued directors, officers, employees and consultants. The Share Incentive Plan is comprised of both the Share Bonus Plan and the Share Purchase Plan. When awarding Common Shares under the Share Incentive Plan, consideration is given to the number of options under the Stock Option Plan and the number of Common Shares that would be held by an individual after the award under consideration is made. In determining the individual awards, consideration is given to the following factors: the individual's performance and contribution to the Issuer's success, relative position, years of service and past equity grants.

The Share Bonus Plan permits Common Shares to be issued as a discretionary bonus to eligible directors, senior officers and employees of the Issuer and its designated affiliates, and consultants designated from time to time. The Issuer granted no Common Shares pursuant to the Share Bonus Plan during 2014. Under the Share Purchase Plan, eligible directors, senior officers and employees of the Issuer and its designated affiliates and consultants can contribute up to 10% of their annual basic salary before deductions to purchase Common Shares. The Issuer matches each participant's contribution. As at the date hereof, no Common Shares have been issued pursuant to the Share Purchase Plan.

### *Performance Graph*

The following graph shows the change in the cumulative total shareholder return on the Common Shares compared with the cumulative total return of the S&P/TSX Global Mining Index and the S&P/TSX Venture Composite Index, assuming an investment of $100 and accumulation and re-investment of all cash dividends paid, of which there have been none, through to December 31, 2014.




There is no direct correlation between Common Share price performance and NEO compensation. Compensation of the Issuer's executive officers reflects general industry practices and is not tied directly to share price performance. The Compensation Committee evaluates performance by reference to its business plan rather than by short-term changes in Common Share price, based on its view that the Issuer's long-term operating performance will be reflected by stock price performance over the long-term, which is especially important when the current stock price may be temporarily depressed by short-term factors, such as recessionary economies.

### *Summary*

The Compensation Committee will continue to evaluate the Issuer's executive compensation programs on an ongoing basis to ensure that the Issuer's compensation practices and philosophies are consistent with the objective of enhancing shareholder value over the long term.

## Executive Compensation Tables

### *Summary Compensation Table*

The following table sets out all annual and long-term compensation paid to each NEO for the financial years of the Issuer ended December 31, 2012, December 31, 2013, and December 31, 2014.

| Name and Principal Position | Year | Salary | (1) | Share-based Awards | Option-based Awards (5) | Non-equity Incentive Plan Compensation | | Pension Value | All Other Compensation | Total Compensation |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Annual Incentive Plans (3) | Long-term Incentive Plans | | | |
| Rene R. Galipeau | 2014 | $ 280,000 | | $ nil | $ 65,100 | $ nil | $ nil | $ nil | $ nil | $ 345,100 |
| Vice-Chairman, CEO and | 2013 | $ 203,000 | (2) | $ 9,800 | $ 19,000 | $ 18,200 | $ nil | $ nil | $ nil | $ 250,000 |
| Director | 2012 | $ 168,000 | (2) | $ nil | $ 28,000 | $ nil | $ nil | $ nil | $ nil | $ 196,000 |
| Alison J. Sutcliffe | 2014 | $ 109,800 | (4) | $ nil | $ 21,700 | $ nil | $ nil | $ nil | $ nil | $ 131,500 |
| VP Finance & CFO | 2013 | $ 89,670 | (4) | $ 6,300 | $ 6,650 | $ 11,700 | $ nil | $ nil | $ nil | $ 114,320 |
| | 2012 | $ 69,540 | (4) | $ nil | $ 12,250 | $ nil | $ nil | $ nil | $ nil | $ 81,790 |
| Ken Murdock | 2014 | $ 240,000 | | $ nil | $ 15,500 | $ nil | $ nil | $ nil | $ nil | $ 255,500 |
| CEO Victory Silica | 2013 | $ 120,000 | | $ nil | $ 6,650 | $ nil | $ nil | $ nil | $ nil | $ 126,650 |
| | 2012 | $ 85,000 | | $ nil | $ 17,500 | $ nil | $ nil | $ nil | $ nil | $ 102,500 |

**Footnotes:**

(1) Certain NEOs receive salaries to perform functions for both Victory Nickel and Nuinsco Resources Limited. However, no amounts were charged to Nuinsco Resources Limited on the basis of time spent.

(2) Mr. Galipeau was not an employee of Victory Nickel in 2013 or 2012 but a portion of his salary was charged to Victory Nickel on the basis of time spent.

(3) Represent cash bonuses paid upon receipt of corporate milestones.

(4) Ms. Sutcliffe was not an employee of Victory Nickel but a portion of her salary was charged to Victory Nickel on the basis of time spent.

(5) The grant date fair value for share-based awards is determined using the market value on the date shares were issued; the grant date fair value for option-based awards is calculated using the Black-Scholes option-pricing model, as adjusted for the effects of the one-for-ten share consolidation in September 2014, with the following assumptions:

| | 2014 | 2013 | 2012 |
|---|---|---|---|
| Dividend yield | - | - | - |
| Expected volatility | 93% and 91% | 89% | 104% |
| Risk free interest rate | 1.23% and 1.01% | 1.63% | 1.18% |
| Expected option term - years | 4 | 4 | 4 |
| Fair value per share of options granted | $0.31 and $0.42 | $ 0.190 | $ 0.350 |

## *Incentive Plan Awards*

### *Outstanding Share-Based Awards and Option-Based Awards*

The following table sets out the share-based awards and option-based awards held by each NEO as at December 31, 2014.

| | Option-based Awards | | | | Share-based Awards | | |
|---|---|---|---|---|---|---|---|
| Name | Number of Securities Underlying Unexercised Options (#) | Option Exercise Price ($) | Option Expiration Date | Value of Unexercised in-the-money Options[1] ($) | Number of Shares or Units of Shares that have not Vested (#) | Market or Payout Value of Share-based awards that have not Vested ($) | Market or Payout Value of Vested Share-Based Awards not Paid Out or Distributed ($) |
| René R. Galipeau | 80,000 | 0.55 | February 4, 2019 | nil | nil | nil | nil |
| Vice-Chairman, | 110,000 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| CEO and | 100,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| Director | 80,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |
| | 80,000 | 1.60 | January 4, 2015 | nil | nil | nil | nil |
| | 30,000 | 1.10 | May 4, 2016 | nil | nil | nil | nil |
| Alison J. Sutcliffe | 20,000 | 0.55 | February 4, 2019 | nil | nil | nil | nil |
| VP Finance & CFO | 50,000 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| | 35,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| | 35,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |
| | 15,000 | 1.10 | May 4, 2016 | nil | nil | nil | nil |
| | 30,000 | 0.16 | January 4, 2015 | nil | nil | nil | nil |
| Ken Murdock | 50,000 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| CEO, Victory Silica | 35,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| | 50,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |

**Footnote:**
(1) Based on the closing price of the Common Shares on the TSX on December 31, 2014 of $0.235.

*Incentive Plan Awards – Value vested or earned during the year*

The following table sets forth, for each NEO, the value of all incentive plan awards vested or earned during the year ended December 31, 2014.

| Name | Option-Based Awards Value Vested During the Year[1] ($) | Share-Based Awards Value Vested During the Year ($) | Non-equity Incentive Plan Compensation - Value Earned During The Year ($) |
|---|---|---|---|
| René R Galipeau, Vice-Chairman, CEO and Director | nil | nil | nil |
| Alison J. Sutcliffe, VP Finance & CFO | nil | nil | nil |
| Ken Murdock, CEO Victory Silica | nil | nil | nil |

**Footnote:**
(1) Calculated based on the difference between the market value of the Common Shares on the applicable date of vesting and the applicable exercise price of the options which vested.

For details of the Stock Option Plan and Share Incentive Plan, please see “Securities Authorized for Issuance under Equity Compensation Plans”.

### *Pension Plan Benefits*

The Issuer does not maintain any defined benefit or defined contribution plans or any other retirement plans.

### *Deferred Compensation Plans*

The Issuer does not maintain any deferred compensation plans.

### *Termination and Change of Control Benefits*

René Galipeau has an employment contract, which provides that the Issuer may terminate his employment without cause, upon payment at termination of 12 months’ base salary, plus accrued but unused vacation to the date of termination. The Issuer shall have no obligation to make the foregoing payment if the Issuer either (i) is, at the time such payment is to be made, unable to pay its liabilities as they become due, or (ii), after such payment, would be unable to pay its liabilities as they become due; provided that, in such event, the Issuer shall be obligated to make all payments to the executive required under applicable employment standards legislation, if any. All stock options granted by the Issuer shall vest on the date notice of termination is given and shall remain exercisable until the termination date of such option, notwithstanding the provisions of any agreement or plan. In the event that there is just cause for termination

of employment at common law, employment may be terminated by the Issuer summarily and without notice, or payment in lieu of notice, severance payments, benefits, damages or any sums whatsoever. In this event, estimated incremental payments as of the end of the Issuer's most recently completed financial year would have been $281,615 for Mr. Galipeau. Prior to her departure on March 31, 2015 Ms. Sutcliffe had a similar contract; as of the end of the Issuer's most recently completed financial year estimated incremental payments would have been $109,800 for Ms. Sutcliffe. Ms. Sutcliffe resigned from the Issuer effective March 31, 2015 and no incremental payments were due.

In the event of a change of control, and for a period of twelve (12) months thereafter, Mr. Galipeau's contract provides that if:

a) the Issuer gives notice of its intention to terminate his employment for any reason other than just cause, or

b) certain defined events occur and he/she elects to terminate the employment contract and his employment

he shall be entitled to receive from the Issuer 24 months' base salary, plus accrued but unused vacation to the date of termination plus two (2) times the average bonus paid for the preceding three (3) years. All stock options granted by the Issuer shall vest on the date notice of termination is given and shall remain exercisable until the termination date of such option, notwithstanding the provisions of any agreement or plan.

In addition, he shall continue to be entitled to participate, at the expense of the Issuer, in the Issuer's health and medical plans for its executive personnel, until the earlier of his obtaining alternate coverage under the terms of any new employment or the second anniversary of the termination date. If such participation is not permitted under the terms of any such plan, the Issuer shall pay to him, in addition to all other amounts payable hereunder, an amount sufficient to enable him to obtain individual benefit coverage equivalent to that at the time afforded under such plans. If the terms or conditions of any such benefits have changed since the change of control, then at his election, he may require the Issuer to pay an amount sufficient to enable him to obtain individual benefit coverage equivalent to that in place immediately prior to the change of control, or any combination of the old and new benefits, provided that in no event shall he receive double recovery of replacement cost for any single benefit. In this event, estimated incremental payments would be: $617,459 for Mr. Galipeau. As noted above, Ms. Sutcliffe left the Issuer on March 31, 2015; as of the end of the Issuer's most recently completed financial year estimated incremental payments would have been $248,733 for Ms. Sutcliffe. Ms. Sutcliffe resigned from the Issuer effective March 31, 2015 and no incremental payments were due.

## Director Compensation

In addition to annual retainers and attendance fees, directors may also receive options to purchase Common Shares as recommended by the Compensation Committee and determined by the Board. The exercise price of such options is determined by the Board, but shall in no event be less than the market price of the Common Shares at the time of grant of the options. Please see "Securities Authorized for Issuance under Equity Compensation Plans" below for a detailed description of the Stock Option Plan.

### *Director Compensation Table*

The following compensation table sets out the compensation paid to each of the Issuer's directors in the year ended December 31, 2014.

| Name | Fees Earned | Share-based Awards | Option-based Awards | Non-equity Incentive Plan Compensation | Pension Value | All Other Compensation | Total Compensation |
|---|---|---|---|---|---|---|---|
| Cynthia P. Thomas | $ 65,757 | $ nil | $ 22,475 | $ nil | $ nil | $ nil | $ 88,232 |
| Roland Horst | $ 28,300 | $ nil | $ 16,275 | $ nil | $ nil | $ nil | $ 44,575 |
| Michael J. Anderson | $ 25,683 | $ nil | $ 16,275 | $ nil | $ nil | $ nil | $ 41,958 |
| Peter R. Jones | $ 15,200 | $ nil | $ 13,175 | $ nil | $ nil | $ nil | $ 28,375 |

**Footnotes:**

Mr. Galipeau was a director and officer of the Corporation during 2014 and was not entitled to additional compensation for his service as director. Compensation received by Mr. Galipeau in his capacity as an officer is reported in the Summary Compensation Table under "Executive Compensation Tables" (above).

The grant date fair value for share-based awards is determined using the market value on the date shares were issued; the grant date fair value for option-based awards is calculated using the Black-Scholes option-pricing model, with the following assumptions (after taking effect of the one-for-ten share consolidation in September 2014):

| | 2014 | 2013 |
|---|---|---|
| Dividend yield | - | - |
| Expected volatility | 93% and 91% | 89% |
| Risk free interest rate | 1.23% and 1.01% | 1.63% |
| Expected option term - years | 4 | 4 |
| Fair value per share of options granted | $0.31 and $0.42 | $ 0.190 |

### *Incentive Plan Awards for Directors*

*Outstanding Share-Based Awards and Option-Based Awards*

The following table sets out the share-based awards and option-based awards held by each director as at December 31, 2014.

| | Option-based Awards | | | | Share-based Awards | | |
|---|---|---|---|---|---|---|---|
| Name | Number of Securities Underlying Unexercised Options (#) | Option Exercise Price ($) | Option Expiration Date | Value of Unexercised in-the-money Options[1] ($) | Number of Shares or Units of Shares that have not Vested (#) | Market or Payout Value of Share-Based Awards that have not Vested ($) | Market or Payout Value of Vested Share-Based Awards not Paid Out or Distributed ($) |
| Cynthia P. Thomas | 72,500 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| | 80,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| | 80,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |
| | 45,000 | 1.00 | July 4, 2016 | nil | nil | nil | nil |
| | 20,000 | 1.10 | May 4, 2016 | nil | nil | nil | nil |
| | 100,000 | 1.60 | January 4, 2015 | nil | nil | nil | nil |
| Roland Horst | 52,500 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| | 65,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| | 65,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |
| | 30,000 | 1.00 | July 4, 2016 | nil | nil | nil | nil |
| | 15,000 | 1.10 | May 4, 2016 | nil | nil | nil | nil |
| | 40,000 | 1.60 | January 4, 2015 | nil | nil | nil | nil |
| Michael J. Anderson | 52,500 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| | 50,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| | 50,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |
| | 50,000 | 1.00 | July 4, 2016 | nil | nil | nil | nil |
| Peter R. Jones | 42,500 | 0.70 | July 21, 2019 | nil | nil | nil | nil |
| | 45,000 | 0.30 | June 27, 2018 | nil | nil | nil | nil |
| | 45,000 | 0.50 | June 27, 2017 | nil | nil | nil | nil |
| | 45,000 | 1.00 | July 4, 2016 | nil | nil | nil | nil |

**Footnote:**

(1) Based on the closing price of the Common Shares on the TSX on December 31, 2014 of $0.235.

*Incentive Plan Awards – Value vested or earned during the year*

| Name | Option-Based Awards Value Vested During the Year[1] ($) | Share-Based Awards Value Vested During the Year ($) | Non-equity Incentive Plan Compensation - Value Earned During The Year ($) |
|---|---|---|---|
| Cynthia P. Thomas | nil | nil | nil |
| Roland Horst | nil | nil | nil |
| Michael J. Anderson | nil | nil | nil |
| Peter R. Jones | nil | nil | nil |

**Footnotes:**

(1) Calculated based on the difference between the market value of the Common Shares on the applicable date of vesting and the applicable exercise price of the options which vested.

## SECURITIES AUTHORIZED FOR ISSUANCE UNDER EQUITY COMPENSATION PLANS

The following table provides information as of December 31, 2014 with respect to Common Shares authorized for issuance under the Issuer's equity compensation plans.

| Plan Category | Number of securities to be issued upon exercise of outstanding options, warrants and rights (a) | Weighted-average exercise price of outstanding options, warrants and rights (b) | Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c) |
|---|---|---|---|
| Equity compensation plans approved by securityholders | 32,041,250 | $0.08 | 5,090,186[(1)] |
| Equity compensation plans not approved by securityholders | Nil | Nil | Nil |
| Total | 32,041,250 | $0.08 | 5,090,186 [(2)] |

**Footnotes:**

(1) The Stock Option Plan provides for the issuance of options to purchase up to an aggregate of 15% of the issued and outstanding Common Shares. The amount includes securities remaining available for future issuance under the Stock Option Plan. The maximum number of Common Shares issuable under the Share Purchase Plan is the lesser of: (i) that number of Common Shares that can be purchased with a dollar amount equal to 20% of the annual gross annual salary of the participants; and (ii) 1% of the aggregate number of issued and outstanding Common Shares (calculated on a non-diluted basis) from time to time. As at the date hereof, no Common Shares have been issued pursuant to the Share Purchase Plan.

(2) See also “Long-Term Incentives – Share Incentive Plan” below.

### *Stock Option Plan*

The Issuer maintains a stock option plan (the "**Stock Option Plan**") pursuant to which options may be granted to Eligible Persons. The term "**Eligible Person**" includes, subject to all applicable laws, employees, senior officers, directors or consultants of the Issuer, any subsidiary of the Issuer or any personal holding corporation controlled by an officer or director of the Issuer or any subsidiary.

The Stock Option Plan mandates that there be a "rolling maximum" number of Common Shares issuable that shall not exceed 15% of Common Shares issued and outstanding (calculated on a non-diluted basis) from time to time. As at the date hereof, 3,036,000 options to acquire Common Shares were outstanding, representing 5.27% of the Issuer's issued and outstanding Common Shares as of the date hereof, leaving an additional 5,609,186 Common Shares, representing 9.7% of the Issuer's issued and outstanding Common Shares as at the date hereof, available for issuance pursuant to grants of options under the Stock Option Plan. The maximum number of Common Shares which may be reserved for issuance to any one person under the Stock Option Plan is 5% of the Common Shares outstanding at the time of the grant (calculated on a non-diluted basis) less the number of shares reserved for issuance to such person under any other option to purchase Common Shares from treasury granted as a compensation or incentive mechanism. Any shares subject to an option granted under the Stock Option Plan, which for any reason is surrendered, cancelled or terminated prior to exercise, will be available for a subsequent grant under the Stock Option Plan. The option price of any Common Shares will be determined by the Board but cannot be less than the closing price of the shares on the day immediately preceding the day upon which the option is granted. Options granted under the Stock Option Plan may be exercised during a period not exceeding ten years, subject to earlier termination upon the termination of the optionee's employment, upon the optionee ceasing to be an employee, senior officer, director or consultant of the Issuer or any of its subsidiaries, as applicable, or upon the optionee retiring, becoming permanently disabled or upon death. Any options granted will terminate on the earlier of the following dates (i) the date of expiration specified in the option agreements, (ii) 90 days after such optionee ceases to be an Eligible Person (other than by reason of death), and (iii) 180 days after the optionee's death during which the option may be exercised by the optionee's legal representative or person to whom the deceased optionee's rights under the options have passed by will or other applicable law. In the resolution allocating any option, the Board of Directors may determine that the date or dates of the vesting of any options issued under the Stock Option Plan shall be a future date or dates determined in the manner specified in such resolution. The options are non-transferable.

The Stock Option Plan contains provisions for adjustment in the number of shares issuable thereunder in the event of a subdivision, consolidation, reclassification or

change of the Common Shares, a reorganization, a merger or other relevant changes in the Issuer's capitalization. The Board has the power and authority to approve amendments relating to the Stock Option Plan or to options, without further approval of the shareholders, to the extent that such amendments relate to: (a) complying with the requirements of any applicable regulatory authority; (b) complying with the rules, policies and notices of the TSX or of any stock exchange on which the Issuer's securities are listed; (c) altering, extending or accelerating the terms and conditions of vesting of any options; (d) extending the term of options held by a person other than a person who, at the time of the extension, is an insider of the Issuer; (e) determining, subject to all applicable regulatory requirements, that the provisions of the Stock Option Plan concerning the effect of termination of an optionee's status as an Eligible Person shall not apply to an optionee for any reason acceptable to the Board; (f) accelerating the expiry date of any options; (g) amending the definitions contained within the Stock Option Plan; (h) amending the categories of persons who are Eligible Persons and entitled to be granted options pursuant to the Stock Option Plan; (i) allowing the grant of financial assistance to optionees for the purpose of exercising options granted under the Stock Option Plan, subject to compliance with all applicable regulatory requirements; (j) authorizing the addition or modification of a cashless exercise feature, payable in cash or Common Shares; (k) amending or modifying the mechanics of exercise of options; and (l) amendments of a "housekeeping" nature, including, without limitation, amending the wording of any provisions of the Stock Option Plan for the purpose of clarifying the meaning of existing provisions or to correct or supplement any inconsistency.

The Stock Option Plan provides that the Issuer may provide financial assistance in respect of options granted under the Stock Option Plan by means of loans to optionees. Under the terms of the Stock Option Plan, the Issuer may, but is not obligated to, loan an optionee the funds required to exercise any particular option. The Stock Option Plan provides that any such loan will be for a term not exceeding ten years and will be non-interest bearing. Any such loan will be repayable at maturity or upon earlier termination of the option, including the death or retirement of the optionee. Any loans made under the Stock Option Plan are to be secured by a pledge of the shares acquired upon the exercise of the option exercised being lodged with a trustee for such purposes.

In the event that any loan amount is not fully repaid when due, the trustee holding the pledged shares is entitled to realize on the shares being held by it as security for the loan.

Loans made under the Stock Option Plan are "non-recourse loans" and, as a result, the sole remedy of the Issuer in the event of a default is to realize on the shares being held as security as described above. Thus, in the event there is a shortfall between the loan amount and any such proceeds of realization, the optionee will not be liable for any such shortfall. The Stock Option Plan provides that any shares issued pursuant to loans made under the Stock Option Plan may be sold by the optionee from time to time provided that an amount equal to the aggregate option exercise price or the balance of

the loan is applied in repayment of the loan. Any financial assistance so provided under the Stock Option Plan will be subject to and made in accordance with all applicable laws and regulatory policies at the time of making the loan. At present, no loans are outstanding under these provisions.

***Share Incentive Plan – Share Purchase Plan and Share Bonus Plan***

The Issuer also maintains the Share Incentive Plan, which is comprised of both the Share Purchase Plan and the Share Bonus Plan.

Under the Share Purchase Plan, eligible directors, senior officers and employees of the Issuer and its designated affiliates and consultants can contribute up to 10% of their annual basic salary before deductions to purchase Common Shares. The Issuer matches each participant's contribution. The purchase price per Common Share is the volume weighted-average of the trading prices of the Common Shares on the TSX for the calendar quarter in respect of which the Common Shares are issued, which could be lower than the market price (as defined in the TSX Company Manual) of the Common Shares on a given date. Common Shares issued are held in safekeeping and delivered to employees as soon as practicable following March 31, June 30, September 30 and December 31 in each calendar year. The maximum number of Common Shares issuable under the Share Purchase Plan is the lesser of: (i) that number of Common Shares that can be purchased with a dollar amount equal to 20% of the annual gross salary of the participants; and (ii) 1% of the aggregate number of issued and outstanding Common Shares (calculated on a non-diluted basis) from time to time. As at the date hereof, no Common Shares have been issued pursuant to the Share Purchase Plan.

Participation in the Share Purchase Plan is subject to earlier termination upon the termination of the participant's employment, upon the participant ceasing to be an employee, senior officer or consultant of the Issuer or any death. The right to participate in the Share Incentive Plan is non-assignable and non-transferable, other than pursuant to a will or by the laws of descent and distribution.

The Share Bonus Plan permits the Issuer to issue Common Shares as a discretionary bonus to eligible directors, senior officers and employees of the Issuer and its designated affiliates, and consultants designated from time to time. During the year ended December 31, 2014, the Issuer issued no Common Shares under the Share Bonus Plan. Currently, the maximum number of Common Shares issuable under the Share Bonus Plan is 10,000,000 Common Shares.

The Share Incentive Plan contains provisions for adjustment in the number of shares issuable thereunder in the event of a subdivision, consolidation, reclassification or change of the Common Shares, a reorganization, a merger or other relevant changes in the Issuer's capitalization. The Share Incentive Plan may be amended without further approval of the shareholders to the extent that such amendments relate to: (a)

complying with the requirements of any applicable regulatory authority; (b) complying with the rules, policies and notices of any stock exchange having jurisdiction over the securities of the Issuer; (c) determining, subject to all applicable regulatory requirements, that the provisions of the Share Incentive Plan concerning the effect of termination of a participant's employment on such participant's status under the Share Purchase Plan shall not apply to such participant; (d) amending the definitions contained within the Share Incentive Plan; (e) amending the categories of persons who are participants pursuant to the Share Incentive Plan; (f) amending or modifying the contribution mechanics of the Share Purchase Plan; and (g) amendments of a "housekeeping" nature, including, without limitation, amending the wording of any provisions of the Share Incentive Plan for the purpose of clarifying the meaning of existing provisions or to correct or supplement any provision of the Share Incentive Plan that is inconsistent with any other provision of the Share Incentive Plan, provided that any amendment, modification or change to the provisions of the Share Incentive Plan which would: (a) materially increase the benefits under the Share Incentive Plan; (b) increase the number of Common Shares, other than by virtue of the operation of the Share Incentive Plan, which may be issued; or (c) materially modify the requirements as to eligibility for participation in the Share Incentive Plan; shall only be effective upon such amendment, modification or change being approved by the shareholders of the Issuer.

## 16. Indebtedness of Directors and Executive Officers

16.1 This does not apply to the Issuer as there is no indebtedness owing to the Issuer or its Subsidiaries.

16.2 As of the date hereof, there is no outstanding indebtedness owing to the Issuer or any subsidiary of the Issuer or any other entity where such indebtedness has been the subject of a guarantee, support agreement, letter of credit or other similar arrangement or understanding provided by the Issuer or any of its subsidiaries in connection with a purchase of securities or otherwise by: (i) any director, executive officer or employee of the Issuer or any of its subsidiaries; (ii) any former director, executive officer or employee of the Issuer or any of its subsidiaries; (iii) any proposed nominee for election as a director of the Issuer; (iv) any associate of any individual who is a director or executive officer of the Issuer; or (v) any associate of any proposed nominee for election as a director of the Issuer.

## 17. Risk Factors

17.1 The exploration and development of natural resources are speculative activities that involve a high degree of financial risk. Additionally, there are specific risks related to the Issuer's presence in the frac sand market. The risk factors which should be taken into account in assessing Victory Nickel's activities and an investment in its securities include, but are not necessarily limited to, those set out in detail below.

The relative significance of each risk described below will vary as a function of several factors including, but not limited to, the state of the economy, the stage of Victory Nickel's projects, the availability of financing on acceptable terms and other matters.

Any one or more of these risks could have a material adverse effect on the value of any investment in Victory Nickel and the business, financial condition, operating results or prospects of Victory Nickel and should be taken into account in assessing Victory Nickel's activities.

## Financial and Investment Risks

### *Going Concern*

On July 1, 2015, the Issuer announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and on the Promissory Convertible Notes outlined above, and that it was in discussion with its lenders and other potential financiers to restructure the Issuer's debt and recapitalize the Issuer. On July 30, 2015, the Issuer announced it had not repaid the amounts due, including the principal amount, under the SPA Loan. On September 30, 2015 the Issuer was unable to make the quarterly interest payments on the SPA Loan and the Promissory Convertible Notes due then. On November 12, 2015, the Issuer announced it had not repaid $2,000,000 in principal due under the Promissory Convertible Notes.The Issuer is continuing with discussions among the holder of the SPA Loan, unsecured creditors and other potential financing sources to restructure the Issuer's debt and recapitalize the Issuer. To date, the Issuer has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Issuer to sell its inventory, the Issuer will not be able to meet its outstanding obligations or any new obligations as they become due. There can be no assurance that the Issuer will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the lenders may take in light of these defaults.

None of the Issuer's mining projects has commenced commercial production and, accordingly, the Issuer is dependent upon debt or equity financings, and the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. The Issuer's 7P Plant completed commissioning during the third quarter 2014 and is capable of producing at a commercial level. However, the recent decrease in drilling activity due to the decrease in the price of oil, has delayed the Issuer's ability to generate sufficient cash flow to meet operating requirements.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Issuer's ability to continue as a going concern, is dependent upon either exploration results which have the potential

for the discovery of economically-recoverable reserves and resources, the Issuer's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Issuer not be able to reach successful cash flow generation and achieve profitable operations from its frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Issuer's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to the financial statements should such adverse events impair the Issuer's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Issuer's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Issuer's activities including project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Issuer's ability to continue as a going concern.

***Substantial Capital Requirements***

Victory Nickel will have to make substantial capital expenditures for the development of, and to achieve production from, its nickel projects. Production will only be reached a number of years following the start of development. Until that time, the Issuer is reliant on cash flows generated by its frac sand business, on the equity markets and asset sales to generate cash for ongoing operations and programs. There can be no assurance that any debt or equity financing or cash generated by operations or asset sales will be available or sufficient to meet these requirements or for other corporate purposes or, if debt or equity financing is available, that it will be on terms acceptable to Victory Nickel. Moreover, future activities may require Victory Nickel to alter its capitalization significantly. The inability of Victory Nickel to access sufficient capital for its operations could have a material adverse effect on its financial condition, results of operations or prospects. Flow-through financing cannot be used to fund the Issuer's corporate costs.

The 7P Plant has been substantially completed, however additional capital will be required. Future phases of the business plan as outlined earlier in this MD&A will require additional capital; these phases are independent of the 7P Plant. This capital requirement may be in excess of the net funds generated by the business. The frac sand operations have ongoing requirements for working capital financing. There is a risk that sufficient working capital financing may not be available at suitable prices.

The Issuer recognizes the requirement to repay outstanding principal and interest on existing debt and is actively working on restructuring its obligations. To date, the Issuer has not completed its Debt Restructuring Agreement.

***Market Perception***

Market perception of junior exploration, development and mining companies and frac sand companies may continue to shift such that companies in these sectors continue to be viewed unfavourably by investors. This could impact the value of investors' holdings and Victory Nickel's ability to raise further funds by issue of additional securities or debt.

***Metal and Frac Sand Prices***

There is no assurance that, even if commercial quantities of mineral resources are developed, a profitable market will exist for the sale of such product. Nickel and by-product prices fluctuate on a daily basis and are affected by numerous factors beyond Victory Nickel's control – including factors which are influenced by worldwide circumstances. The level of interest rates, the rate of inflation, world supply and demand for commodities and stability of exchange rates can all cause significant fluctuations in commodity prices. Such external economic factors are in turn influenced by changes in international investment patterns and monetary systems and political developments. The prices of nickel and by-products have historically fluctuated widely and future price declines could cause commercial production to be uneconomical and such fluctuations could have a material adverse effect on Victory Nickel's business, financial condition and prospects. As Victory Nickel has historically been in the exploration and development stage, the above factors have had no material impact on present operations but must be considered in evaluating the impairment of long-lived assets. These factors are of significant importance for the FS and decisions related thereto as well as being important to the developing frac sand business.

The business case developed to support the Issuer's entry into the frac sand business made significant assumptions on pricing of frac sand as well as for important cost elements of production and transportation. The price for frac sand sales is subject to market forces beyond the Issuer's control. Over the past 12 months or more, the impact of such market forces has negatively impacted demand and pricing for frac sand and there can be no assurance that these impacts will not continue in the future.

***Areas of Investment Risk***

The Issuer's Common Shares are listed on the TSX. The share prices of publicly-traded companies can be volatile as the price of shares is dependent upon a number of factors, some of which are general or market or sector specific and others that are specific to the Issuer. On January 7, 2016, the Issuer received a letter from the TSX advising that the TSX has determined to delist the Issuer's common shares effective at the close of market on February 5, 2016 as the Issuer no longer meets the continued listing requirements of the TSX. There can be no assurance that the Issuer will secure an alternative listing.

The market for shares in small public companies is less liquid than for large public companies. Investors should be aware that the value of the Issuer's common shares

may be volatile and may go down as well as up and investors may therefore not recover their original investment.

The market price of the Issuer's common shares may not reflect the underlying value of the Issuer's net assets. The price at which investors may dispose of their securities may be influenced by a number of factors, some of which may pertain to the Issuer and others of which are extraneous. On any disposal of their common shares, investors may realize less than the original amount invested.

**Industry Risks**

***Speculative Nature of Mineral Exploration***

Mineral exploration is highly speculative in nature, involves many risks and frequently is non-productive. There is no assurance that Victory Nickel's exploration efforts will be successful. Few properties that are explored are ultimately developed into economically-viable operating mines. Success in establishing reserves is a result of a number of factors, including the quality of Victory Nickel's management, level of geological and technical expertise, the quality of land available for exploration and other factors. Once mineralization is discovered, it may take several years in the initial phases of drilling until production is possible, during which time the economic feasibility of production may change. Substantial expenditures are required to establish proven and probable reserves through drilling to determine the optimal extraction method for the ore and the metallurgical process to extract the metals from the ore and, in the case of new properties, to construct mining and processing facilities. It is possible that even preliminary due diligence will show adverse results, leading to the abandonment of projects. It is impossible to ensure that preliminary feasibility studies or full feasibility studies, such as has been released with respect to Minago, on Victory Nickel's projects or the current or proposed exploration programs on any of the properties in which Victory Nickel has exploration rights will result in a profitable commercial mining operation. As a result of these uncertainties, no assurance can be given that Victory Nickel's exploration programs will result in the establishment or expansion of resources or reserves.

***Evaluation and Development Projects***

In general, evaluation and development projects have no operating history upon which to base estimates of future cash operating costs. For evaluation and development projects such as the mineral resource properties owned by Victory Nickel, estimates of proven and probable reserves are, to a large extent, based upon the interpretation of geological data obtained from drill holes and other sampling techniques and feasibility studies. This information is used to calculate estimates of the capital cost, cash operating costs based upon anticipated tonnage and grades of ore to be mined and processed, the configuration of the ore body, expected recovery rates, comparable facility and equipment operating costs, anticipated climatic conditions and other factors. In addition, there remains to be undertaken certain feasibility and/or development

preparation work on the projects that could adversely impact estimates of capital and operating costs required for the development of the projects. Costs necessary to develop the projects could be significant and will have a direct impact on the economic evaluation of the projects. As a result, it is possible that the actual capital cost, cash operating costs and economic returns of the projects may differ from those currently estimated. The costs estimated under the FS for Minago differed from the PEA and may differ again upon actual development.

***Frac Sand Industry***

Frac sand processing is a new business for Victory Nickel. The industry is closely linked to the oil and gas industry and is therefore affected by economic factors impacting that industry, including the effect of future cycles based on historic experience. Demand for frac sand is influenced by many factors, including: global and regional economic and political events and conditions, fluctuations in pricing and availability of oil and gas and other energy sources, demand for oil and gas products, demand for cars and other vehicles, technological innovation impacting alternative energy sources, changes in the regulatory framework for mining and processing frac sand and the hydraulic fracturing industry. The oil and gas industry can be prone to sudden, unexpected production slowdowns which may impact exploration, development, production and well completion activities. These factors, such as the recent drop in the price of oil, cannot readily be predicted or controlled. Negative developments could cause the demand for frac sand products to decline which could have adverse effects on business, financial condition, results of operations, cash flows and prospects.

With respect to the frac sand industry itself, risks include: changes in transportation availability and pricing, inclement or hazardous weather conditions from flooding or climate change, environmental hazards, industrial accidents, changes in the regulatory framework impacting mining, processing and the fracking industries in both Canada and the US, inability to procure sand in the required quantities or qualities, inability to obtain replacement parts or equipment on a timely basis, reduction in the availability of water for processing, inability to hire, train and retain qualified staff at acceptable rates; and other technical difficulties or failures. Any prolonged downtime could impact deliveries and reputation.

The fracking industry has been hailed as significantly contributing to North America's energy self-sufficiency. A combination of techniques is used, any changes impacting the use of frac sand as a proppant through regulation or technological innovation may negatively impact the frac sand industry. In addition, heightened political, regulatory and public scrutiny of hydraulic fracturing practices could potentially expose the Issuer or its customers to increased legal and regulatory proceedings, and any such proceedings could be time-consuming, costly or result in substantial legal liability or significant reputational harm.

### *Competition*

The mineral exploration business is highly competitive in all of its phases. Victory Nickel competes with numerous other companies and individuals, including competitors with greater financial, technical and other resources than Victory Nickel, in the search for and acquisition of exploration and development rights on attractive mineral properties. Victory Nickel's ability to acquire exploration and development rights in the future will depend not only on its ability to develop the properties on which it currently has exploration and development rights, but also on its ability to select and acquire exploration and development rights on other suitable properties. There is no assurance that Victory Nickel will compete successfully in acquiring exploration and development rights on such other properties or in securing customers, sand supplies or other resources such as transportation.

Victory Nickel also faces competition in the frac sand market with respect to its frac sand business and there is no assurance that Victory Nickel will compete successfully in processing and selling frac sand in such market. Frac sand is a proppant used in the completion and re-completion of oil and natural gas wells to stimulate and maintain oil and natural gas production through the process of hydraulic fracturing. Frac sand is the most commonly used proppant and is less expensive than other proppants, such as resin-coated sand and manufactured ceramics. A significant shift in demand from frac sand to other proppants; from the Issuer's Northern White frac sand sourced in the United States which is generally of higher quality than, and sells at higher prices than, Canadian domestically-sourced frac sand; or the development of new processes to replace hydraulic fracturing altogether, could cause a decline in the demand for the frac sand the Issuer processes and result in a material adverse effect on the Issuer's financial condition and results of operations. If significant new reserves of raw frac sand are discovered and developed, and those frac sands have similar characteristics to the raw frac sand processed by the Issuer, the Issuer's ability to maintain or acquire contracts may be negatively impacted which could have a material adverse effect on the Issuer's results of operations and cash flows over the long term. Additionally, quality sand supply is a limited resource and the presently-identified sources are a significant distance away from the 7P Plant which provides logistical challenges in securing timely railcar and other transportation at acceptable prices.

## Operational Risks

### *Limited History of Operations*

Victory Nickel has no history of earnings and limited financial resources. Victory Nickel currently has no operating mines and its ultimate success may depend on the ability of active mining operations to generate cash flow in the future, as well as its ability to access capital markets for its development requirements. There is no assurance that Victory Nickel will earn profits in the future. Significant capital investment will be required to achieve commercial production at Victory Nickel's existing nickel projects.

There is no assurance that Victory Nickel will be able to raise the required funds to continue these activities.

Frac sand processing represents a relatively new initiative for Victory Nickel. While the Issuer attempted to mitigate the risks of entering the frac sand market through the hiring of experienced personnel, initial business projections have not yet been achieved primarily due to circumstances outside of the Issuer's control, as discussed above. While the 7P Plant continues to operate on an as-needed basis, there can be no assurance when or if full-time operations will resume.

### *Frac Sand Processing Operations*

The 7P Plant is the Issuer's only frac sand processing facility. Any adverse development at the 7P Plant or in the end markets the 7P Plant serves, including adverse developments due to catastrophic events or weather, decreased demand for commercial silica products, a decrease in the availability of transportation services or adverse developments affecting the Issuer's customers, could have a material adverse effect on the Issuer's financial condition and results of operations. The availability of suitably-qualified staff at acceptable prices also represents a risk.

The procurement, production and delivery of frac sand can be logistically complex – transportation costs represent a significant portion of frac sand costs. Unavailability of appropriate transportation and rail cars or lines on a timely basis may impact turnaround and cause delays in deliveries. Changes in respective transportation costs or decreases in dependability may also impair the Issuer's ability to receive and/or deliver product with adverse effects on costs, revenues and reputation. Further, changes to logistics to reflect changed demand may not be able to occur on a timely basis, resulting in adverse effects on the cost profile.

Processing frac sand includes substantial costs for energy – electricity and gas – as well as water. Problems in securing sufficient energy supply at appropriate prices would have impact on operating costs and the ability to recover those increased costs may be impaired.

The specifications for frac sand are detailed; maintaining a robust quality control process is key to producing a high-quality product. Failure to do so could cause lost revenues and lost reputation.

### *Development Targets, Permitting and Operational Delays*

There can be no assurance that Victory Nickel will be able to complete the planned development of its projects on time or on budget due to, among other things, delays in receiving required consents, permits and registrations, the delivery and installation of plant and equipment and cost overruns, or that the current personnel, systems, procedures and controls will be adequate to support Victory Nickel's operations. Any

failure to meet development targets or other operational delays or inadequacies could have a material adverse effect. In particular, while the Issuer is confident it has complied with the conditions of the EAL and has filed, with the government of Manitoba, an EAP to amend its EAL providing for the relocation of the Minago project tailings impoundment to an area much more suitable than previously proposed in the FS, there is no guarantee that the EAP will be approved or that an amendment to the EAL will be granted.

The Issuer's frac sand business has since its inception been reliant upon third parties to supply Northern White feedstock for its 7P Plant. Any difficulties on the part of these suppliers with respect to securing, maintaining or extending permits for its properties and operations, including appropriate water rights, may have adverse effects on the supply of sand.

***Resources and Reserves***

The figures for mineral resources and mineral reserves are estimates and no assurance can be given that the anticipated level of recovery and/or grades of mineral reserves or mineral resources will be realized. Moreover, short-term operating factors relating to ore reserves and resources, such as the need for orderly development of an ore body or the processing of new or different ore grades, may cause a mining operation to be unprofitable in any particular accounting period.

The Issuer's frac sand business in its present phase is reliant upon a handful of suppliers for its product. The Issuer has no resources or reserves of its own that can presently be exploited; although it has announced reserves on the Bear Coulee option in Wisconsin. Permitting this property for production is expected to take several years. The frac sand resource at Minago is not contemplated to be developed until either Phase Three of the frac sand initiative or as part of the Minago FS which requires significant financing to be developed.

***Title Risks***

Victory Nickel's ability to hold various mineral rights require licences, permits and authorizations and, in some cases, renewals of existing licences, permits and authorizations from various governmental and quasi-governmental authorities. Management believes that Victory Nickel currently holds or has applied for all necessary licences, permits and authorizations to carry on the activities which Victory Nickel is currently conducting and to hold the mineral rights Victory Nickel currently holds under applicable laws and regulations in effect at the present time. Management also believes that Victory Nickel is complying in all material respects with the terms of such licences, permits and authorizations. However, Victory Nickel's ability to obtain, sustain or renew such licences, permits and authorizations on acceptable terms is subject to changes in regulations and policies and to the discretion of the applicable governmental and quasi-governmental bodies.

***Insurance Risk***

Victory Nickel faces all of the hazards and risks normally incidental to the exploration and development of base metals, any of which could result in damage to life or property, environmental damage and possible legal liability for any or all such damage caused. Victory Nickel's activities may be subject to prolonged disruptions due to weather conditions depending on the location of operations in which Victory Nickel has interests; not all such risks are insurable.

Similarly, the frac sand processing plant faces many hazards and risks arising from the transportation and processing of frac sand materials, any of which could result in the matters described above. Again, not all such risks are insurable.

**Regulatory Risks**

***Government Regulation***

Existing and possible future environmental and social impact legislation, regulations and actions, including the regulation of air and water quality, mining reclamation, solid and hazardous waste handling and disposal, the promotion of occupational health and safety, the protection of wildlife and ecological systems and the protection of the societies and communities of indigenous peoples, could cause significant expense, capital expenditures, restrictions and delays in activities, the extent of which cannot be predicted and which may well be beyond Victory Nickel's capacity to fund. Environmental laws are becoming more stringent and actively enforced. Environmental and social impact studies may be required for some operations and significant fines and clean-up responsibilities may be assessed for companies causing damage to the environment in the course of their activities.

***Economic, Political, Judicial, Administrative, Taxation or Other Regulatory Factors***

Victory Nickel may be adversely affected by changes in economic, political, judicial, administrative, taxation or other regulatory factors in the areas in which Victory Nickel does or will operate and holds its interests, as well as unforeseen matters. In particular, the fracking industry is often at the forefront of public attention whether or not deserved. Nonetheless, this provokes attention and scrutiny.

**Other Risks**

***Environmental and Health Risks***

The Issuer has no significant exposure to environmental or health risks from its exploration and development activities, although this will change as the Issuer's projects approach production (a normal characteristic of mineral industry projects). Lynn Lake, acquired pursuant to a takeover bid and recently subject to option with Corazon, is a former operating mine; however indemnifications exist from the Manitoba Government with respect to any pre-existing environmental concerns at that property.

The frac sand operation involves processing silica sand. In addition to environmental regulation, the Issuer is subject to laws and regulations relating to human exposure to crystalline silica under the *Occupational Health and Safety Act*. Workplace exposure to crystalline silica is monitored; the occupational exposure limits in Alberta for respirable crystalline silica are among the lowest in Canada and the US.

***Key Personnel***

Victory Nickel relies on a limited number of key consultants and senior management and there is no assurance that Victory Nickel will be able to retain such key consultants or other senior management. The loss of one or more such key consultants or members of senior management, if not replaced, could have a material adverse effect on Victory Nickel's business, financial condition and prospects. Directors and management had previously accepted deferrals of remuneration in order to assist the Issuer through the economic turmoil; however, this potentially adds to the risk of losing experienced personnel.

***Conflicts of Interest***

Certain of the Issuer's directors and officers are also directors and officers of other natural resource companies. Consequently, there exists the possibility for such directors and officers to be in a position of conflict. Any decision made by any of such directors and officers relating to Victory Nickel will be made in accordance with their duties and obligations to deal fairly and in good faith with Victory Nickel and such other companies.

***Investments and Other Agreements with Resource Companies***

In addition, Victory Nickel makes, from time to time, investments in the common shares of publicly-traded companies in the junior natural resources sector or may enter into option or other agreements therewith. These companies are subject to similar risks and uncertainties as is Victory Nickel, and Victory Nickel's investments in and agreements with these companies are subject to similar areas of risk as noted above. Victory Nickel seeks to manage its exposure by ensuring that appropriate recourse is included in such agreements upon the counterparty's or assignee's failure to meet contractual obligations.

**Summary**

The future success of the Issuer is subject to a number of risk factors that are common to the junior natural resources sector and frac sand producers. These include the extent to which it can outline natural resources on its properties and establish the economic viability of developing those properties and the political, economic and legislative stability of the territories in which the Issuer's interests are located. Another significant factor is the ability of the Issuer to obtain necessary financing or to find strategic partners to fund expenditure commitments as they fall due, as the Issuer currently has limited funds. Furthermore, the development of any nickel resource interest may take years to

complete and the resulting income, if any, from the sale of any nickel or by- or co-products produced by the Issuer is largely dependent upon factors that are beyond its control, such as costs of development, operating costs and the market value of the end product.

The Issuer has attempted to mitigate some of the risks associated with securing financing for the maintenance and advancement of its nickel properties through its entry into the frac sand processing business, however the frac sand business also has its own set of risks as indicated earlier, and of which investors should be aware.

17.2 This is not applicable to the Issuer as there is no risk that securityholders of the Issuer may become liable to make an additional contribution beyond the price of the security.

17.3 This is not applicable to the Issuer as there are no risk factors material to the Issuer that a reasonable investor would consider relevant to an investment in the securities being listed and that are not otherwise described under section 17.1 or 17.2.

## 18. Promoters

18.1 (a) René Galipeau and Sean Stokes.

(b) For the number and percentage of each class of voting securities and equity securities of the Issuer or any of its subsidiaries beneficially owned, directly or indirectly, or over which control is exercised, please see Section 13.5 above.

(c) Mr. Galipeau and Mr. Stokes are both employees of the Issuer and in connection with such employment receive a salary and have, in the past, been issued stock options under the Issuer's stock option plan. During 2015, Mr. Galipeau received a cash salary of C$194,000 and Mr. Stokes a cash salary of C$129,000. Mr. Galipeau owns 620,000 stock options and Mr. Stokes owns 243,750 stock options to acquire shares of the Issuer.

(d) This item is not applicable to the Issuer there are no assets acquired within the two years before the date of the Listing Statement or thereafter, or to be acquired, by the Issuer or by a subsidiary of the Issuer from a promoter.

18.2 This item applies to René Galipeau. Please refer to section 13.6 above.

## 19. Legal Proceedings

19.1 This item is not applicable to the Issuer as there are no proceedings that involve primarily a claim for damages where the amount involved, exclusive of interest and

costs, exceeds 10 per cent of the current assets of the Issuer and its subsidiaries on a consolidated basis.

19.2 This section is not applicable to the Issuer as there have been no:

(a) penalties or sanctions imposed against the Issuer by a court relating to provincial and territorial securities legislation or by a securities regulatory authority within the three years immediately preceding the date hereof;

(b) other penalties or sanctions imposed by a court or regulatory body against the Issuer necessary to contain full, true and plain disclosure of all material facts relating to the securities being listed; and

(c) settlement agreements the Issuer entered into before a court relating to provincial and territorial securities legislation or with a securities regulatory authority within the three years immediately preceding the date hereof.

On January 8, 2016, the Issuer announced that the TSX determined to delist the Issuer's common shares effective at the close of market on February 5, 2016 as the Issuer no longer meets the continued listing requirements of the TSX.

## 20. Interest of Management and Others in Material Transactions

20.1

Other than as disclosed below, no informed person of the Issuer, or any of the associates or affiliates of those persons, has any material interest, direct or indirect, in any transaction during the three years before the date of the Listing Statement, or in any proposed transaction, that has materially affected or will materially affect the Issuer or a subsidiary of the Issuer or any of its subsidiaries

"Informed person" means:

(a) any director or executive officer of the Issuer;
(b) a person or company that is the direct or indirect beneficial owner of, or who exercises control or direction over, more than 10 percent of any class or series of your outstanding voting securities; and
(c) an associate or affiliate of any of the persons or companies referred to in paragraphs (a) or (b).

Kenneth Murdock, CEO of Victory Silica, is entitled to a royalty of C$0.50 per ton of frac sand extracted from the Issuer's Minago project or from any property other than the Minago project and sold by the Issuer or Victory Silica to an arm's length third party and for which the Issuer or Victory Silica has received payment.

## 21. Auditors, Transfer Agents and Registrars

21.1 The auditor of the Issuer is Flabbi & Associates Chartered Accountants, 60 Torlake Cres., Toronto, Ont., M8Z 1C2.

21.2 The transfer agent of the Issuer is Computershare Investor Services Inc., 100 University Avenue, 9th Floor, Toronto, Ontario, M5J 2Y1

## 22. Material Contracts

22.1

| General Nature of the Contract | Date Entered Into | Parties to the Contract | Consideration Provided For in the Contract | Disclosed Elsewhere in This Listing Statement? |
|---|---|---|---|---|
| SPA Loan | April 24, 2014 | Victory Nickel Inc. Victory Silica Ltd. City Hall Capital LLC | US$5,000,000 | Yes, see section 3.1 above. |
| Amendment No 1. To the SPA Loan | June 3, 2015 | Victory Nickel Inc. Victory Silica Ltd. City Hall Capital LLC | US$5,150,000 (including the initial US$5,000,000 received under the SPA Loan). | Yes, see section 3.1 above. |
| Amendment No. 2 to the SPA Loan | | Victory Nickel Inc. Victory Silica Ltd. City Hall Capital LLC | US$5,500,000 (including the initial US$5,000,000 received under the SPA Loan). | Yes, see section 3.1 above. |

22.2 This section is not Applicable to the Issuer as it has no co-tenancy, unitholders' or limited partnership agreements.

# 23 Interest of Experts

23.1

**Names of Experts**

The following are the names of all the persons who have prepared or certified for the Issuer a statement, report or valuation described or included in the disclosure herein.

Cliff Duke, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

Philip Davis, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

Aleksandar Zivkovic, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

Brian Saul, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

John Hope, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101.

Georgi Doundarov, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

Hai Guo, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

John Reid, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

Ken Murdock, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

David Mchaina, P.Eng., a Registered Professional Engineer and Independent Qualified Person, prepared the “Feasibility Study Minago Nickel Mine”, dated March 4, 2010; prepared in accordance with NI 43-101;

Shahé Naccashian, P.Geo., a Registered Professional Geologist and Independent Qualified Person, prepared the “Technical Report on the Mel Deposit, Northern Manitoba", dated March 9, 2007; prepared in accordance with NI 43-101;

Normand Grégoire, a Registered Professional Engineer and Independent Qualified Person, prepared the “Preliminary Economic Assessment Lac Rocher Nickel Project, Quebec,” dated November 5, 2008; prepared in accordance with NI 43-101;

Robert de l’Étoile, a Registered Professional Engineer and Independent Qualified Person, prepared the “Preliminary Economic Assessment Lac Rocher Nickel Project, Quebec,” dated November 5, 2008; prepared in accordance with NI 43-101;

Gaston Gagnon, a Registered Professional Engineer and Independent Qualified Person, prepared the “Preliminary Economic Assessment Lac Rocher Nickel Project, Quebec,” dated November 5, 2008; prepared in accordance with NI 43-101;

Florent Baril, a Registered Professional Engineer and Independent Qualified Person, prepared the “Preliminary Economic Assessment Lac Rocher Nickel Project, Quebec,” dated November 5, 2008; prepared in accordance with NI 43-101.

Paul Jones, formerly Vice-President, Exploration with the Issuer, is a “qualified person” as defined under NI-43-101, and he has supervised and approved the preparation of the information relating to the material mineral projects of the Issuer described in certain Management’s Discussion and Analyses of the Issuer.

Alison Sutcliffe, formerly CFO of the Issuer, prepared certain financial statements and Management’s Discussion and Analyses of the Issuer.

Steven Cresswell, CFO of the Issuer, prepared certain financial statements and Management’s Discussion and Analyses of the Issuer.

To the knowledge of the Issuer, none of the experts named under “**Names of Experts**” has received, or will receive, any interests in the property of the Issuer or of a Related Person of the Issuer.

23.2 To the knowledge of the Issuer, none of the experts named under “**Names of Experts**” holds securities representing more than 1% of all issued and outstanding Common Shares of the Issuer as at the date of this document.

23.3 See 23.2 above.

23.4 At the time of preparation of the Feasibility Study Minago Nickel Mine, David Mchaina, P.Eng. was an employee of the Issuer and remains an employee of the Issuer today. At the time of preparation of the Feasibility Study Minago Nickel Mine, Ken Murdock, P.Eng., was an independent consultant. As disclosed herein, in 2012 Mr. Murdock was hired as CEO of Victory Silica and remains an employee of the Issuer today. As disclosed herein, Steven Cresswell is CFO of the Issuer.

## 24. Other Material Facts

24.1 This section is not applicable as all material facts necessary in order for the Listing Statement to contain full, true and plain disclosure of all material facts relating to the Issuer and its securities have been disclosed.

## 25. Financial Statements

25.1

**(a)**

**Consolidated Financial Statements for the Years Ended December 31, 2014 and 2013 (Dated March 25, 2014)**

**MANAGEMENT'S RESPONSIBILITY**
**FOR CONSOLIDATED FINANCIAL STATEMENTS**

All of the information in the annual report and accompanying consolidated financial statements of Victory Nickel Inc. is the responsibility of management. The consolidated financial statements have been prepared by management in accordance with Canadian generally accepted accounting principles for public companies, being international financial reporting standards. Where necessary, management has made judgements and estimates in preparing the consolidated financial statements and such statements have been prepared within acceptable limits of materiality. The financial information contained elsewhere in the annual report has been reviewed by management to ensure that it is consistent with the consolidated financial statements.

Management maintains appropriate systems of internal control to give reasonable assurance that its assets are safeguarded, and the financial records are properly maintained.

The Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of Directors, none of whom are employees or officers of the Company, meets with management and the external auditors to review the auditors' report and the consolidated financial statements to satisfy itself that

management is properly discharging its responsibilities to the Directors, who approve the consolidated financial statements.

A firm of independent Chartered Professional Accountants, appointed by the shareholders, audits the consolidated financial statements in accordance with Canadian generally accepted auditing standards and provides an independent professional opinion thereon. The external auditors have free and full access to the Audit Committee with respect to their findings regarding the fairness of financial reporting and the adequacy of internal controls.

René R. Galipeau, Vice-Chairman and CEO
Alison J. Sutcliffe, Vice-President, Finance & CFO

March 31, 2015

**INDEPENDENT AUDITOR'S REPORT**
**TO THE SHAREHOLDERS OF VICTORY NICKEL INC.**

We have audited the accompanying consolidated financial statements of Victory Nickel Inc. which comprise the consolidated balance sheets as at December 31, 2014, December 31, 2013 and January 1, 2013, and the consolidated statements of operations, comprehensive loss, shareholders' equity and cash flows for the years ended December 31, 2014 and December 31, 2013 and a summary of significant accounting policies and other explanatory information.

**Management's Responsibility for the Financial Statements**
Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with International Financial Reporting Standards and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

**Auditor's Responsibility**
Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the

circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained in our audits is sufficient and appropriate to provide a basis for our audit opinion.

**Opinion**
In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of Victory Nickel Inc. as at December 31, 2014 and December 31, 2013, and its financial performance and its cash flows for the years ended December 31, 2014 and December 31, 2013 in accordance with International Financial Reporting Standards.

**Emphasis of Matter**
Without qualifying our opinion, we draw attention to Note 1 in the consolidated financial statements which indicates that none of the Company’s mining projects have commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, and the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. These conditions, along with other matters as set forth in Note 1, indicate the existence of a material uncertainty that may cast significant doubt about the Company’s ability to continue as a going concern.

(signed) BDO Canada LLP

Chartered Professional Accountants, Licensed Public Accountants

Toronto, Ontario
March 31, 2015

## Consolidated Balance Sheets

| (in thousands of United States dollars) | Notes | December 31, 2014 | December 31, 2013 (Note 2) | January 1, 2013 (Note 2) |
|---|---|---|---|---|
| **ASSETS** | | | | |
| **Current assets** | | | | |
| Cash and cash equivalents | *6* | **$ 712** | $ 1,338 | $ 257 |
| Restricted deposits | *6* | **271** | - | - |
| Receivables and prepaids | *7* | **3,367** | 358 | 156 |
| Marketable securities | *8* | **153** | 261 | 560 |
| Inventory | *9* | **2,977** | - | - |
| **Total current assets** | | **7,480** | 1,957 | 973 |
| **Non-current assets** | | | | |
| Property, plant and equipment | *11* | **6,179** | 4,963 | 1,431 |
| Mine property and development project | *12* | **34,893** | 36,357 | 38,091 |
| Exploration and evaluation projects | *13* | **13,380** | 13,976 | 14,813 |
| **Total non-current assets** | | **54,452** | 55,296 | 54,335 |
| **Total Assets** | | **$ 61,932** | $ 57,253 | $ 55,308 |
| **LIABILITIES AND SHAREHOLDERS' EQUITY** | | | | |
| **Current liabilities** | | | | |
| Trade and other payables | *14* | **$ 3,032** | $ 1,520 | $ 554 |
| Loans and borrowings - current | *15,16* | **7,493** | - | 1,005 |
| **Total current liabilities** | | **10,525** | 1,520 | 1,559 |
| **Non-current liabilities** | | | | |
| Loans and borrowings - long-term | *15,16* | **2,957** | 2,143 | 8 |
| Participating Interest | *16* | **3,548** | 3,855 | - |
| Lease obligations - long-term | *17* | **275** | 384 | - |
| Deferred tax liability | *18* | **817** | 1,430 | 2,486 |
| **Total non-current liabilities** | | **7,597** | 7,812 | 2,494 |
| **Total Liabilities** | | **18,122** | 9,332 | 4,053 |
| **Shareholders' equity** | | | | |
| Share capital | *19* | **52,570** | 52,048 | 47,926 |
| Contributed surplus | | **5,644** | 5,431 | 4,420 |
| Accumulated other comprehensive (loss) income | | **(4,144)** | (1,714) | 1,863 |
| Deficit | | **(10,260)** | (7,844) | (2,954) |
| **Total shareholders' equity** | | **43,810** | 47,921 | 51,255 |
| **Total Liabilities and Shareholders' Equity** | | **$ 61,932** | $ 57,253 | $ 55,308 |

**NATURE OF OPERATIONS AND GOING CONCERN (Note 1)**
The accompanying notes are an integral part of these consolidated financial statements

Approved by the Board of Directors

(signed)
**Cynthia P. Thomas**
Director

(signed)
**Roland Horst**
Director

The accompanying notes are an integral part of these condensed consolidated financial statements

## Consolidated Statements of Operations

| **Years ended December 31,**<br>(in thousands of United States dollars, except per share amounts) | ***Notes*** | | **2014** | | 2013<br>(Note 2) |
|---|---|---|---|---|---|
| **Revenues** | | **$** | **13,976** | $ | - |
| Cost of goods sold | | | **(12,854)** | | - |
| **Gross margin** | | | **1,122** | | - |
| **Operating expenses** | | | | | |
| General and administrative | | | **(2,436)** | | (1,582) |
| Share-based payments: | *21* | | | | |
| Options | | | **(344)** | | (197) |
| Share Bonus Plan | | | **-** | | (42) |
| Amortization of property, plant and equipment | *11* | | **(553)** | | (26) |
| (Writedown) recovery of E and E projects | *13* | | **(60)** | | 383 |
| Pre-exploration costs | *13* | | **(4)** | | - |
| Net frac sand pre-operating costs | *24* | | **(194)** | | (585) |
| **Operating loss** | | | **(2,469)** | | (2,049) |
| Finance income | *22* | | **2,169** | | 14 |
| Finance costs | *22* | | **(2,629)** | | (3,633) |
| **Net finance costs** | | | **(460)** | | (3,619) |
| **Loss before income taxes** | | | **(2,929)** | | (5,668) |
| Income tax recovery | *23* | | **513** | | 778 |
| **Net Loss for the Year** | | **$** | **(2,416)** | $ | (4,890) |
| **Loss per share** | *2,19,20* | | | | |
| Basic loss per share | | **$** | **(0.04)** | $ | (0.10) |
| Diluted loss per share | | **$** | **(0.04)** | $ | (0.10) |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Comprehensive Loss

| **Years ended December 31,**<br>(in thousands of United States dollars) | ***Notes*** | | **2014** | | 2013<br>(Note 2) |
|---|---|---|---|---|---|
| **Net loss for the year** | | **$** | **(2,416)** | $ | (4,890) |
| **Other comprehensive (loss) income ("OCI")** | | | | | |
| Net change in fair value of financial assets | *8* | | **(104)** | | (217) |
| Income tax recovery | | | **12** | | 30 |
| Foreign exchange on change in functional currency | *2* | | **(2,338)** | | (3,390) |
| **Other comprehensive loss for the year** | | | **(2,430)** | | (3,577) |
| **Total Comprehensive Loss for the Year** | | **$** | **(4,846)** | $ | (8,467) |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Shareholders' Equity

| (in thousands of United States dollars) | *Notes* | Share Capital | Contributed Surplus | Accumulated Other Comprehensive Income / (Loss) | Deficit | Total Equity |
|---|---|---|---|---|---|---|
| **Balances as at January 1, 2013** | | $ 47,926 | $ 4,420 | $ 1,863 | $ (2,954) | $ 51,255 |
| **Total comprehensive loss for the year** | | | | | | |
| Net loss for the year | | | | | (4,890) | (4,890) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | *8* | | | (217) | | (217) |
| Income tax recovery | *23* | | | 30 | | 30 |
| Foreign exchange on change in functional currency | *2* | | | (3,390) | | (3,390) |
| **Total other comprehensive loss** | | | | (3,577) | | (3,577) |
| **Total comprehensive loss for the year** | | | | | | (8,467) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the year** | | | | | | |
| Issue of common shares for settlement of liabilities, net | *19* | 115 | - | - | - | 115 |
| Issue of common shares under private placement, net | *19* | 2,150 | - | - | - | 2,150 |
| Issue of common shares for loan fee | *19* | 265 | - | - | - | 265 |
| Issue of common shares and warrants under private placement, net | *19* | 177 | 103 | - | - | 280 |
| Issue of common shares and warrants under rights offering, net | *19* | 1,352 | 711 | - | - | 2,063 |
| Issue of common shares under Share Bonus Plan | *19* | 63 | - | - | - | 63 |
| Options granted and vesting or modified | *21* | - | 197 | - | - | 197 |
| **Total contributions by owners** | | 4,122 | 1,011 | - | - | 5,133 |
| **Total transactions with owners** | | 4,122 | 1,011 | - | - | 5,133 |
| **Balances as at December 31, 2013** | | $ 52,048 | $ 5,431 | $ (1,714) | $ (7,844) | $ 47,921 |
| **Balances as at January 1, 2014** | | $ 52,048 | $ 5,431 | $ (1,714) | $ (7,844) | $ 47,921 |
| **Total comprehensive loss for the year** | | | | | | |
| Net loss for the year | | | | | (2,416) | (2,416) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | *8* | | | (104) | | (104) |
| Income tax recovery | *23* | | | 12 | | 12 |
| Foreign exchange on change in functional currency | *2* | | | (2,338) | | (2,338) |
| **Total other comprehensive loss** | | | | (2,430) | | (2,430) |
| **Total comprehensive loss for the year** | | | | | | (4,846) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the year** | | | | | | |
| Options granted and vesting | *21* | - | 344 | - | - | 344 |
| Warrants exercised | *19* | 172 | (30) | - | - | 142 |
| Options exercised | *19* | 345 | (144) | - | - | 201 |
| Equity component of debt | *15* | - | 48 | - | - | 48 |
| Issue of common shares for loan fee (net) | *19* | 5 | - | - | - | 5 |
| Effect of foreign exchange conversion | *2* | - | (5) | - | - | (5) |
| **Total contributions by owners** | | 522 | 213 | - | - | 735 |
| **Total transactions with owners** | | 522 | 213 | - | - | 735 |
| **Balances as at December 31, 2014** | | **$ 52,570** | **$ 5,644** | **$ (4,144)** | **$ (10,260)** | **$ 43,810** |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Cash Flows

| **Years ended December 31,**<br>(in thousands of United States dollars) | ***Notes*** | **2014** | 2013<br>(Note 2) |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Net loss for the year | | **$ (2,416)** | $ (4,890) |
| Adjustments for: | | | |
| Share-based payments | *21* | **344** | 239 |
| Amortization of property, plant and equipment | *11* | **553** | 26 |
| Writedown (recovery) of exploration and evaluation project | *13* | **60** | (383) |
| Net finance (income) costs | *22* | **(551)** | 3,609 |
| Income tax recovery | *23* | **(513)** | (778) |
| Net change in working capital: | | | |
| Change in receivables | | **(3,009)** | (219) |
| Change in inventory | | **(2,977)** | - |
| Change in trade and other payables | | **2,248** | 100 |
| **Net cash used by operating activities** | | **(6,261)** | (2,296) |
| **Cash flows from investing activities** | | | |
| Expenditures on mine property and development project | *12* | **(396)** | (945) |
| Expenditures on exploration and evaluation projects | *13* | **(160)** | (134) |
| Proceeds on sale of marketable securities | | **-** | 57 |
| Proceeds from option of Lynn Lake | *13* | **-** | 391 |
| Deposits on equipment | *11* | **(100)** | (150) |
| Expenditures on 7P Plant | *11* | **(2,334)** | (1,962) |
| **Net cash used by investing activities** | | **(2,990)** | (2,743) |
| **Cash flows from financing activities** | | | |
| Issue of common shares | *19* | **338** | 4,382 |
| Payments of interest | *15,16,17* | **(1,274)** | (168) |
| Payments under leases | *17* | **(146)** | (94) |
| Net proceeds of loans | *15* | **9,978** | 2,000 |
| Deposits of restricted cash | *6* | **(271)** | - |
| **Net cash from financing activities** | | **8,625** | 6,120 |
| **Net (decrease) increase in cash and cash equivalents** | | **(626)** | 1,081 |
| **Cash and Cash Equivalents, Beginning of the Year** | | **1,338** | 257 |
| **Cash and Cash Equivalents, End of the Year** | | **$ 712** | $ 1,338 |

The accompanying notes are an integral part of these consolidated financial statements

## 1. NATURE OF OPERATIONS AND GOING CONCERN

### Nature of Operations

Victory Nickel Inc. ("Victory Nickel" or the "Company") is a company domiciled in Canada. The address of the Company's registered office is 80 Richmond St. West, Suite 1802, Toronto, Ontario, M5H 2A4. The consolidated financial statements as at and for the years ended December 31, 2014 and 2013 comprise the Company and its subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica") together referred to as "Victory Nickel" and individually as "Victory Nickel entities". Victory Nickel was primarily engaged in the acquisition, exploration and development of nickel properties and associated products in Canada until the second quarter of 2014 when the Company became a producer and supplier of premium frac sand from its 500,000 ton per annum ("tpa") frac sand plant (the "7P Plant") located near Seven Persons approximately 18kms southwest of Medicine Hat, Alberta. Frac sand is specialized sand that is used as a proppant to enhance recovery from oil and gas wells. The Company was formed on February 1, 2007 pursuant to a plan of arrangement.

The Company is listed on the Toronto Stock Exchange ("TSX") under the symbol NI.

### Change in Functional and Presentation Currency

Effective October 1, 2014, the Company changed its functional currency to the United States dollar ("US$") from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) for additional information.

### Going Concern

These consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at December 31, 2014, the Company had a working capital deficiency of $3,316,000, (December 31, 2013 – working capital of $437,000). Working capital is defined as current assets (excluding any restricted cash) less current liabilities.

During the second quarter of 2014, the Company was in the start-up and commissioning stage and began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. The SPA Loan is due in July, 2015, also one convertible note in the amount of $2,000,000 is due in November 2015 and, accordingly, they are classified as current liabilities, due within one year. The Company has generated operating cash flow during the second half of 2014 but not yet at levels sufficient to wholly fund its activities. In October 2014, the Company secured a short-term facility of $2,000,000 through the issuance of a promissory note (Note 15). This facility has been extended on a monthly basis by the lender and is presently due by March 31, 2015. A further extension to April 30, 2015 was arranged on March 31, 2015 (Note 28).

The Company recognizes the imminent cash requirement to repay debt and is actively considering restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, and the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. The Company's 7P Plant completed commissioning in August, 2014. It is expected that future cash flow will be sufficient to meet operating requirements with the ultimate potential to advance the Company's mining interests the timing of this is not certain.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

## 2. BASIS OF PREPARATION

### (a) Statement of Compliance

The consolidated financial statements have been prepared using accounting policies consistent with International Financial Reporting Standards ("IFRS") and its interpretations adopted by the International Accounting Standards Board ("IASB"). This is GAAP for a Canadian public company.

The management of Victory Nickel prepare the consolidated financial statements which are then reviewed by the Audit Committee and the Board of Directors. The consolidated financial

statements were authorized for issue by the Board of Directors on March 31, 2015 and are made available to shareholders and others through filing on SEDAR shortly thereafter.

**(b) Basis of Measurement**

The financial statements have been prepared on the historic cost basis except for derivative financial instruments such as warrants which are measured at fair value with changes through operations and financial assets such as marketable securities which are measured at fair value with changes recorded through other comprehensive income or loss ("OCI").

**(c) Functional and Presentation Currency**

Under IFRS, an entity's functional currency should reflect the underlying transactions, events and conditions relevant to the entity. Given the Company's transition into an operating entity with revenues and significant expenses driven by prices in US$ and which currency influences management's primary operating, capital and financing decisions, effective October 1, 2014, the Company changed its functional currency to the US$. This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$.

For comparative reporting purposes, historic financial statements were translated into the US$ reporting currency whereby assets and liabilities were translated at the closing rate in effect at the end of the comparative periods; revenues, expenses and cash flows were translated at the average rate in effect for the comparative periods and equity transactions were translated at historic rates. The resultant exchange difference resulting from the translation as at October 1, 2014 was an unrealized foreign exchange loss of $5,757,000 which is included as a separate component of other comprehensive income.

These financial statements are presented in US dollars, which is the Company's functional currency. All financial information is expressed in US dollars unless otherwise stated; tabular amounts are stated in thousands of dollars.

**(d) Use of Estimates and Judgements**

The preparation of financial statements in conformity with IFRS requires management to make estimates, judgements and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

It is reasonably possible that, on the basis of existing knowledge, outcomes in the next financial year that are different from the assumptions used could require a material adjustment to the carrying amount of the asset or liability affected.

The accompanying consolidated financial statements include all adjustments that are, in the opinion of management, necessary for fair presentation.

***Significant estimates and assumptions***

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Information regarding significant areas of estimation uncertainty made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 7 – valuation of receivables;
- Note 8 - valuation of financial assets at fair value through operations and OCI;
- Note 9 – valuation of inventory;
- Note 12 - measurement of the recoverable amount of mine property and development project;
- Note 13 - measurement of the recoverable amount of exploration and evaluation projects;
- Note 15 - measurement and valuation of the embedded options in convertible notes;
- Note 16 – measurement and valuation of the participating interest; and
- Note 21 - measurement of share-based payments.

***Significant judgements***

Judgements are reviewed on an ongoing basis. Changes resulting from the effects of amended judgements are recognized in the period in which the circumstance giving rise to the change occurs and in any future periods presented. Information regarding significant areas of critical judgements made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 1 - going concern assessment;
- Note 2 – determination of the functional currency for the Company and its subsidiaries;
- Note 7 – impairment of receivables;
- Note 9 – impairment of inventory;
- Note 12 - classification of expenditures as mine property and development project or operating expenses;
- Note 13 - classification of expenditures as exploration and evaluation projects or operating expenses;
- Note 12 - impairment of mine property and development project;
- Note 13 - impairment of exploration and evaluation projects; and
- Note 18 - recoverability of deferred tax assets.

***Share Consolidation***

On September 12, 2014, as described more fully in Note 19, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period of these financial statements. Refer to Notes 19, 20 and 21.

***Reclassifications***

Certain of the prior year’s balances have been reclassified to conform with the current presentation.

## 3. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies of the Company are set out in detail below. Such policies have been applied consistently to all periods presented in these consolidated financial statements, and have been applied consistently by Victory Nickel entities.

**(a) New Accounting Policies**
There have been no new accounting policies adopted by the Company, except as noted below.

**(b) Basis of Consolidation**
***Subsidiary***
A subsidiary is an entity controlled by Victory Nickel. Control exists when Victory Nickel has the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities. In assessing control, potential voting rights that currently are exercisable are taken into account. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases. The accounting policies of subsidiaries align with the policies adopted by Victory Nickel. Significant Company entities are listed in Note 26.

***Transactions eliminated on consolidation***
Intercompany balances and transactions, and any unrealized income and expenses arising from intercompany transactions, are eliminated in preparing the consolidated financial statements. Unrealized gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of Victory Nickel's interest in the investee. Unrealized losses are eliminated in the same way as unrealized gains, but only to the extent that there is no evidence of impairment.

**(c) Foreign Currency**
***Foreign currency transactions***
Transactions in foreign currencies are translated to the respective functional currency of Victory Nickel at exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies at the reporting date are retranslated to the functional currency at the exchange rate at that date. The foreign currency gain or loss on monetary items is the difference between amortized cost in the functional currency at the beginning of the period, adjusted for effective interest and payments during the period, and the amortized cost in foreign currency translated at the exchange rate at the end of the period. Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are retranslated to the functional currency at the exchange rate at the date that the fair value was determined. Foreign currency differences arising on retranslation are recognized through operations, except for differences arising on the retranslation of marketable securities, which are recognized directly in OCI. Non-monetary items that are measured in terms of historic cost in a foreign currency are translated using the exchange rate at the date of the transaction.

As reported earlier, the Company changed its functional and presentation currency to the US$ effective October 1, 2014.

**(d) Financial Instruments**

**IFRS 9 Financial Instruments**
IFRS 9 Financial Instruments ("IFRS 9"), which impacts the classification and measurement of financial assets, has been adopted by the Company.

***(i) Non-derivative financial instruments***
Non-derivative financial instruments comprise investments in equity securities, receivables, cash and cash equivalents and trade and other payables.

Non-derivative financial instruments, with the exception of financial assets and liabilities at fair value through OCI, are recognized initially at fair value plus, for instruments not at fair value through operations, any directly attributable transaction costs. Subsequent to initial recognition, non-derivative financial instruments are measured as described below.

Cash and cash equivalents comprise cash balances and call deposits. Restricted deposits are funds on deposit with a Canadian chartered bank to support letters of credit being used to facilitate business activity with certain vendors.

Loans, receivables and borrowings are financial assets with fixed or determinable payments that are not quoted in an active market. Such assets and liabilities are recognized initially at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, loans, receivables and borrowings are measured at amortized cost using the effective interest method, less any impairment losses. Loans, receivables and borrowings comprise receivables or payables.

Accounting for finance income and expenses is discussed in Note 3(o).
*Financial assets at fair value through OCI*
Victory Nickel's investments in equity securities are measured at fair value and changes therein, as well as foreign currency differences on monetary items (which do not include equity investments), are recognized directly in OCI.

*Financial instruments at amortized cost*
Other non-derivative financial instruments are measured at amortized cost using the effective interest method, less any impairment losses.

***(ii) Derivative financial instruments***
Victory Nickel may periodically hold warrants as part of its portfolio of marketable securities which are financial assets at fair value through operations. Convertible promissory notes contain embedded derivatives which are separated from the financial instrument measured at amortized cost.

Derivatives are recognized initially at fair value; attributable transaction costs are recognized through operations when incurred. Subsequent to initial recognition, derivatives are measured at fair value and changes therein are recognized immediately through operations.

**(e) Inventory**
Finished products and raw materials inventories are valued at the lower of cost and net realizable value. Cost comprises all costs of purchase, costs of processing and other costs

incurred in bringing inventories to their present location and condition. Net realizable value for finished products and raw materials is generally considered to be the selling price of the finished product in the ordinary course of business less the estimated costs of completion and estimated costs to make the sale. Inventory is reviewed to ensure the carrying value does not exceed net realizable value. A writedown is recognized when carrying cost exceeds net realizable value. The writedown may be reversed if the circumstances which caused it no longer exist.

**(f) Property and Equipment**

***(i) Recognition and measurement***

Items of property and equipment are measured at cost less accumulated depreciation and accumulated impairment losses. Cost includes any expenditure that is directly attributable to the acquisition of the asset.

When parts of an item of property and equipment have different useful lives, they are accounted for as separate items (major components) of property and equipment. Gains and losses on disposal of an item of property and equipment are determined by comparing the proceeds from disposal with the carrying amount of property and equipment and are recognized net within *Other income* in the consolidated statement of operations.

***(ii) Depreciation***

Depreciation is calculated as a function of the depreciable amount, which is the cost of an asset less its residual value. Depreciation is recognized through operations as follows over the estimated useful lives of each part of an item of property and equipment. Land is not depreciated. Depreciation commences when an asset is placed into service. The 7P Plant has commenced operation and accordingly, amortization of plant equipment commenced during 2014.

The depreciation rates and methods for the current and comparative periods are as follows:

| **Item** | **Method** | **2014** | 2013 |
|---|---|---|---|
| Building | Declining-balance | **5%** | 5% |
| Plant and Equipment at 7P Plant | Straight-line | **10% to 20%** | n/a |
| Other Equipment and Furniture | Declining-balance | **20%** | 20% |
| Vehicles and Mobile Equipment | Declining-balance | **30%** | 30% |

Depreciation methods, useful lives and residual values are reviewed at each financial year end and adjusted if appropriate.

**(g) Exploration and Evaluation Projects**

***(i) Exploration and Evaluation expenditures***

Exploration and Evaluation ("E&E") expenditures relate to costs incurred on the exploration for and evaluation of potential mineral reserves and includes costs related to the following: acquisition of exploration rights; conducting geological studies; exploratory drilling and sampling and evaluating the technical feasibility and commercial viability of extracting a mineral resource.

E&E expenditures, including costs of acquiring licenses, are capitalized as E&E assets on an "area of interest basis" which generally is defined as a project. The Company considers a project to be an individual geological area whereby the presence of a mineral deposit is considered favourable or has been proved to exist and, in most cases, comprises a single mine or deposit.

E&E assets are recognized if the rights to the project are current and either:

- the expenditures are expected to be recouped through successful development and exploitation of the project, or alternatively by its sale; or
- activities on the project have not, at the reporting date, reached a stage which permits a reasonable assessment of the existence or otherwise of economically recoverable reserves and active and significant operations in, or in relation to, the project are continuing.

E&E expenditures are initially capitalized as intangible E&E assets. Such E&E expenditures may include costs of licence acquisition, technical services and studies, geophysical surveys, exploration drilling and testing, materials and fuels used, rentals and payments made to contractors and consultants. To the extent that a tangible asset is consumed in developing an intangible E&E asset, the amount reflecting that consumption is recorded as part of the cost of the intangible asset.

Once the technical feasibility and commercial viability of the extraction of mineral reserves in a project are demonstrable, permitted and development is approved by the Board, E&E assets attributable to that project are first tested for impairment and then reclassified to *Mine property and development projects* on the consolidated balance sheet.

***(ii) Pre-E&E expenditures***

Pre-E&E expenditures are incurred on activities that precede exploration for an evaluation of mineral resources, being all expenditures incurred prior to securing the legal rights to explore an area. Pre-E&E expenditures are expensed immediately as *Pre-exploration write-offs* through the consolidated statement of operations.

***(iii)Impairment***

E&E assets are assessed for impairment when facts and circumstances suggest that the carrying amount of an E&E asset may exceed its recoverable amount and any impairment loss is recognized as *Writedown of E and E projects* through the consolidated statement of operations. The following facts and circumstances, among other things, indicate that E&E assets must be tested for impairment:

- the term of exploration license for the project has expired during the reporting period or will expire in the near future, and is not expected to be renewed;
- substantive expenditure on further exploration for and evaluation of mineral resources in the project area is neither budgeted nor planned;
- exploration for and evaluation of mineral resources in the project area have not led to the discovery of commercially viable quantities of mineral resources and the Company plans to discontinue activities in the specific area; or
- sufficient data exists to indicate that while development activity is likely to proceed, the carrying amount of the E&E asset is unlikely to be recovered in full through such activity.

E&E assets are tested for impairment on an individual project (area of interest) basis. As noted above, a project would also be tested for impairment before being transferred to *Mine property and development projects* on the consolidated balance sheet.

**(h) Mine Property and Development Project**

***(i) Pre-production development expenditures***

The Company considers a project to be in the development phase when an identified mineral reserve is being prepared for production as approved by the Board, for example when there is construction of access to the mineral reserves upon determination that there is economic viability of the project under a successful feasibility study and is permitted for development. As such, project development activities are related to the construction of an asset to be used in production or preparation for extraction of a specific mineral resource.

The costs of mining properties, which include the costs of acquiring and developing mining properties and mineral rights, are capitalized in the same manner as property and equipment under *Mine property and development project* ("MP&D") assets on the consolidated balance sheet in the period in which they are incurred or transferred from E&E assets upon determination of economic viability. At that point, all further pre-production primary development expenditure other than land, buildings, plant and equipment, etc. is capitalized as part of the cost of the project until the project is capable of commercial production. This includes costs incurred in preparing the site for mining operations, including pre-stripping costs.

Presently, the Company's sole project classified as *Mine property and development project* on the consolidated balance sheet is the Minago project; it continues to be in the pre-production phase and costs continue to be capitalized without depreciation.

***(ii) Impairment***

If a property were to be abandoned, there is little likelihood of a mineral right being exploited, or the value of the exploitable mineral right has diminished below cost, the cumulative capitalized cost relating to the property is written off to its recoverable amount through operations.

**(i) Borrowing Costs**

The Company's policy is to capitalize project-related borrowing costs related to qualifying assets as incurred. A qualifying asset is an asset that necessarily takes a substantial period of

time to get ready for its intended use or sale. The Company presently does not have any project-related borrowings on qualifying assets.

**(j) Government Grants**

Government grants that compensate Victory Nickel for expenses incurred are recognized through operations on a systematic basis in the same periods in which the expenses are recognized. Grants that compensate Victory Nickel for the cost of an asset are recognized through operations on a systematic basis over the useful life of the asset. For assets which are not being amortized, such as E&E assets or MP&D assets, the government grant is deducted from the related asset.

**(k) Investment Tax Credits ("ITCs")**

Investment tax credits may be claimed by the Company on qualifying expenditures. The Company accounts for these when such qualifying expenditures have been made by reducing the deferred tax liability and recording an income tax recovery through the consolidated statement of operations.

**(l) Impairment**

***(i) Financial assets***

A financial asset is assessed at each reporting date to determine whether there is any objective evidence that it is impaired. A financial asset is considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of that asset.

An impairment loss in respect of a financial asset measured at amortized cost is calculated as the difference between its carrying amount and the present value of the estimated future cash flows discounted at the original effective interest rate. Individually significant financial assets are tested for impairment on an individual basis. The remaining financial assets are assessed collectively in groups that share similar credit risk characteristics.

An impairment loss is reversed if the reversal can be related objectively to an event occurring after the impairment loss was recognized. For financial assets measured at amortized cost, the reversal is recognized through operations.

***(ii) Non-financial assets***

The carrying amounts of Victory Nickel's non-financial assets, other than deferred tax assets, are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. For goodwill and intangible assets that have indefinite lives or that are not yet available for use, the recoverable amount is estimated each year at the same time.

The recoverable amount of an asset or cash-generating unit ("CGU") (see definition below) is the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. For the purpose of impairment testing, assets are grouped together into the smallest group of assets that generates, or has the potential to generate, cash inflows from

continuing use that are largely independent of the cash inflows of other assets or groups of assets. Generally, a CGU is analogous to an individual project. The goodwill acquired in a business combination, for the purpose of impairment testing, is allocated to CGUs that are expected to benefit from the synergies of the combination.

An impairment loss is recognized if the carrying amount of an asset or a CGU exceeds its estimated recoverable amount. Impairment losses are recognized through operations. Impairment losses recognized in respect of CGUs are allocated first to reduce the carrying amount of any goodwill allocated to the units and then to reduce the carrying amounts of the other assets in the unit (group of units) on a pro rata basis.

Impairment losses recognized in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized.

**(m) Employee Benefits**

***(i) Termination benefits***

Termination benefits are recognized as an expense when Victory Nickel is demonstrably committed, without realistic possibility of withdrawal, to a formal detailed plan to either terminate employment before the normal retirement date, or to provide termination benefits as a result of an offer made to encourage voluntary redundancy. Termination benefits for voluntary redundancies are recognized as an expense if Victory Nickel has made an offer of voluntary redundancy, it is probable that the offer will be accepted and the number of acceptances can be reliably estimated.

***(ii) Short-term benefits***

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided. A liability is recognized for the amount expected to be paid under short-term cash bonus plans if Victory Nickel has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be reliably estimated.

***(iii)Share-based payment transactions***

The grant-date fair value of options granted to employees, directors and consultants is recognized as an employee expense, with a corresponding increase in equity, over the period that the individuals become unconditionally entitled to the options. The amount recognized as an expense is adjusted to reflect the actual number of share options for which the related service and non-market vesting conditions are met.

Share-based payment arrangements in which the Company receives properties, goods or services as consideration for its own equity instruments are accounted for as equity-settled share-based payment transactions, regardless of how the equity instruments are obtained by Victory Nickel.

**(n) Provisions**

A provision is recognized if, as a result of a past event, the Company has a present legal or constructive obligation that can be reliably estimated and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognized as a finance cost.

In accordance with the Company's environmental policy and applicable legal requirements, a provision for site restoration or decommissioning in respect of land restoration, and the related expense, is recognized when the land is contaminated and there is a legal obligation to restore the site. The Company presently has no decommissioning liabilities.

**(o) Finance Income and Finance Costs**

Finance income comprises interest income on funds invested (including financial assets at fair value through operations), gains on the disposal of financial assets at fair value through operations, amortization of flow-through premiums and changes in the fair value of financial assets (warrants) at fair value through operations. Interest income is recognized as it accrues through operations, using the effective interest method. Gains on the disposal of financial assets are recognized on the settlement date.

Finance costs comprise interest expense on borrowings, unwinding of the discount on provisions, changes in the fair value of financial assets and liabilities at fair value through operations and losses recognized on financial assets that are recognized through operations. All borrowing costs are recognized through operations using the effective interest method, except for those amounts capitalized as part of the cost of qualifying assets.

Foreign currency gains and losses are reported on a net basis.

**(p) Income Taxes**

Income tax expense comprises current and deferred tax. Income tax expense is recognized through operations except to the extent that it relates to items recognized either in OCI or directly in equity, in which case it is recognized in OCI or in equity respectively.

Current tax is the expected tax payable on the taxable income for the period, using tax rates enacted or substantively enacted at the reporting date and any adjustment to tax payable in respect of previous years.

Deferred tax is recognized using the balance sheet method, providing for temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognized for the following temporary differences: the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss, and differences relating to investments in subsidiaries and jointly-controlled entities to the extent that it is probable that they will not reverse in the foreseeable future. In addition, deferred tax is not recognized for taxable temporary differences arising on the initial recognition of goodwill. Deferred tax is measured at the tax rates that are expected to be applied to temporary differences when they reverse, based on the laws that have been

enacted or substantively enacted by the reporting date. Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realized simultaneously.

A deferred tax asset is recognized to the extent that it is probable that future taxable profits will be available against which the temporary difference can be utilized. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realized.

In 2009, pursuant to the receipt of a positive feasibility study for the Minago project, Victory Nickel determined that it was probable that it would be able to realize the benefit associated with its losses and costs prior to their expiry. Accordingly, the Company recognized the deferred tax assets (to the extent of the deferred tax liability) at that time. Victory Nickel continues to believe it is probable that the benefit of its losses and other costs will be realized prior to their expiry. The Company has not recognized any deferred tax assets relating to Victory Silica.

**(q) Share Capital**

***(i) Common shares***

Common shares are classified as equity. Incremental costs directly attributable to the issue of common shares and share options are recognized as a deduction from equity, net of any tax effects.

The Company has financed a portion of its E&E activities through the issue of flow-through shares. Under the terms of these share issues, the tax attributes of the related expenditures are renounced to subscribers. Common shares issued on a flow-through basis typically include a premium because of the tax benefits associated therewith (“flow-through premium”). Flow-through shares may also be issued with a warrant feature. At the time of issue, the Company estimates the proportion of proceeds attributable to the flow-through premium, the common share and the warrant with reference to closing market prices and such techniques as the Black-Scholes option-pricing model. The flow-through premium is estimated as the excess of the subscription price over the market value of the share and is recorded as a liability in *Trade and other payables* on the consolidated balance sheet (Note 14). The proceeds attributable to the warrants is also treated as equity and recorded in *Contributed surplus* on the consolidated balance sheet until exercise, when the associated proportion is transferred to share capital along with the cash proceeds received on exercise.

The effect of renunciation of the tax benefits to holders of such shares is recognized pro rata with the associated expenditures being incurred by the Company. This could occur either before or after the formal renunciation of expenditures to the tax authorities have been made. When the eligible expenditures are incurred, the tax value of the renunciation is recorded as a deferred tax liability and charged against operations as a deferred tax provision.

Furthermore, as eligible expenditures are incurred, the Company recognises a pro rata amount of the flow-through premium through *Finance income* in the consolidated statement of

operations (Note 22) with a decrement to the liability in *Trade and other payables* on the consolidated balance sheet.

***(ii) Share-based payment arrangements***

***Stock Option Plan***

The Company has a stock option plan (the "Stock Option Plan") which is described in Note 21. Awards to non-employees are measured at the fair value of the goods or services received. Awards made to employees are measured at the grant date. All stock-based awards made to employees and non-employees are recognized at the date of grant using a fair-value-based method to calculate the share-based payment. The share-based payment is charged to operations over the vesting period of the options or service period, whichever is shorter. Stock options vest either immediately or over a 12-month period.

***Share Incentive Plan***

The Company has a share incentive plan (the "Share Incentive Plan"), which includes both a share purchase plan (the "Share Purchase Plan") and a share bonus plan (the "Share Bonus Plan"). The Share Incentive Plan is administered by the directors of the Company. The Share Incentive Plan provides that eligible persons thereunder include directors, senior officers and employees of the Company and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of the business.

The Share Incentive Plan is described in Note 19. The Company uses the fair value method of accounting for, and to recognize as compensation expense, its share-based payments for employees. Shares issued under the Share Incentive Plan are valued based on the quoted market price on the date of the award. This amount is expensed over the vesting period.

**(r) Revenue Recognition**

Revenues from frac sand sales are recognized when legal title passes to the customer which may occur at the Company's production facility, rail origin or at the destination terminal or transload facility. At that point, delivery has occurred, evidence of a contractual arrangement exists and collectability is reasonably assured.

**(s) Earnings (Loss) per Share**

The Company presents basic and diluted earnings (loss) per share ("EPS") data for its common shares. Basic EPS is calculated by dividing the results of operations attributable to ordinary shareholders of the Company by the weighted average number of common shares outstanding during the period. Diluted EPS is determined by adjusting the results of operations attributable to common shareholders and the weighted average number of common shares outstanding for the effects of all dilutive potential common shares, which comprise warrants and share options.

**(t) New Standards and Interpretations Not Yet Adopted**

The IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations which are not yet effective for the year ended December 31, 2014 and have not been applied in preparing these consolidated financial statements unless stated otherwise. However, the revised standards and interpretations are either not applicable to the Company or are expected to have minimal impact.

## 4. FINANCIAL RISK MANAGEMENT AND CAPITAL MANAGEMENT DISCLOSURES

### Overview

The Company has exposure to the following risks from its use of financial instruments:

- credit risk;
- liquidity risk;
- market risk; and
- operational risk.

This note presents information about the Company's exposure to each of the above risks, the Company's objectives, policies and processes for measuring and managing risk, and the Company's management of capital. Further quantitative disclosures are included throughout these consolidated financial statements.

### Risk Management Framework

The Board of Directors has overall responsibility for the establishment and oversight of the Company's risk management framework. The Board fulfils its responsibility through the Audit Committee which is responsible for overseeing the Company's risk management policies.

The Company's risk management policies are established to identify and analyze the risks faced by the Company, to set appropriate risk limits and controls, and to monitor risks and adherence to limits. Risk management practices are reviewed regularly to reflect changes in market conditions and the Company's activities including entry into new operations such as the frac sand business. The Company has an established code of conduct which sets out the control environment within which framework all directors' and employees' roles and obligations are outlined. The Company's risk and control framework is facilitated by the small-sized and hands-on executive team.

### Credit Risk

Credit risk is the risk of an unexpected financial loss to the Company if a customer or third party to a financial instrument fails to meet its contractual obligations and arises principally from the Company's cash and cash equivalents, restricted deposits, receivables and marketable securities.

#### *Cash and cash equivalents and restricted deposits*

The Company's cash and cash equivalents and restricted deposits are held through large Canadian financial institutions. The Company has a corporate policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board.

#### *Receivables*

The Company has increased its exposure to credit risk upon commencement of sales of frac sand. The Company's other receivables consist primarily of amounts due from federal and provincial governments. Amounts due from other parties are settled on a regular basis.

When necessary, the Company establishes an allowance for impairment that represents its

estimate of incurred losses in respect of receivables. The main component of this allowance is a specific loss component that relates to individually significant exposures.

Further, when the Company engages in corporate transactions, it seeks to manage its exposure by ensuring that appropriate recourse is included in such agreements upon the counterparty's failure to meet contractual obligations.

***Marketable securities***

The Company limits its exposure to credit risk by investing only in securities which are listed on public stock exchanges. Such strategic investments are approved by the Board of Directors of the Company. Management actively monitors changes in the markets and management does not expect any counterparty to fail to meet its obligations. The Company's investments are generally in the junior natural resources sector and these companies are subject to similar areas of risk as the Company itself.

***Guarantees***

The Company's policy is to provide financial guarantees only to wholly-owned subsidiaries or under business arrangements where the benefit of the guarantee will enure to the Company. As at December 31, 2014, the Company had $nil in third party guarantees outstanding (2013 - $nil).

**Liquidity Risk**

Liquidity risk is the risk that the Company will encounter difficulty in meeting the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Company's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due without incurring unacceptable losses or risking undue damage to the Company's reputation.

The Company's objective is to maintain sufficient capital in order to meet short-term business requirements, after taking into account cash flows from operations and the Company's holdings of cash and cash equivalents and marketable securities. This is accomplished by budgets and forecasts which are updated on a periodic basis to understand future cash needs and sources. When possible, spending plans are adjusted accordingly to provide for liquidity.

The Company manages its liquidity risk through the mechanisms described above and as part of Capital Disclosures below. The Company has historically relied on issuances of shares to develop projects and to finance day-to-day operations and may do so again in the future. However, the frac sand business is expected to provide liquidity to the Company.

The Company has several long-term liabilities including its deferred tax liability and long-term obligations relating to equipment financing, Participating Interest with Nuinsco Resources Limited ("Nuinsco") and other promissory notes. All other contractually-obligated cash flows are payable within the next fiscal year. It was expected that operating funds from frac sand activity would significantly assist in servicing and repaying such long-term obligations. In addition, certain loan obligations are convertible into equity and successful implementation of the frac sand business was expected to improve the attractiveness of conversion. However, the present downturn being experienced so far in 2015 is having an adverse effect on sales

and share prices which affect the likelihood of debt conversion. Accordingly, the Company is seeking to restructure its debt.

**Market Risk**

Market risk is the risk that changes in market prices, such as foreign exchange rates, interest rates, commodity prices and equity prices, will affect the Company's income, the value of its E&E and MP&D properties or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimizing the return. The frac sand market is relatively new to the Company and is subject to market forces affecting oil and natural gas pricing and related demand for frac sand.

***Currency risk***

The Company is exposed to currency risk on purchases and other payables that are denominated in a currency other than the functional currency of the Company; the US dollar. The primary currency in which these transactions are denominated is the Canadian dollar. The Company does not actively hedge its foreign currency exposure.

***Interest rate risk***

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Company's cash equivalents earn interest at variable short-term rates. The Company's debt bears interest at fixed rates (Note 15). Accordingly, the estimated effect of a 50bps change in interest rate would not have a material effect on the Company's results of operations. None of the Company's other financial instruments are interest-bearing. Consequently, the Company is not presently exposed to any significant interest rate risk which could be caused by a sudden change in market interest rates. The Company is in the process of securing working capital financing to support the short-term requirements of the frac sand business and to replace the short-term facility in place as at December 31, 2014; this financing is expected to have variable interest rates.

***Other market price risk***

The Company's marketable securities and strategic investments are subject to equity price risk. The values of these investments will fluctuate as a result of changes in market prices, the price of metals or other factors affecting the value of the investments.

Commodity price risk is the potential adverse impact on earnings and economic value due to commodity price movements and volatilities. The value of the Company's mineral resource properties is related to the price of, and outlook for, base and precious metals. Historically, such prices have fluctuated and are affected by numerous factors outside of the Company's control, including, but not limited to: industrial and retail demand, central bank lending, forward sales by producers and speculators, levels of worldwide production, short-term changes in supply and demand because of speculative hedging activities and other factors such as significant mine closures.

The Company does not have any hedging or other commodity-based risks respecting its operations. The value of the Company's strategic investments is also related to the price of,

and outlook for, base and precious metals and other minerals. The future prices of frac sand sales are also subject to similar risks.

**Operational Risk**

Operational risk is the risk of direct or indirect loss arising from a wide variety of causes associated with the Company's processes, personnel, technology and infrastructure, and from external factors other than credit, market and liquidity risks such as those arising from legal and regulatory requirements and generally accepted standards of corporate behaviour. Operational risks arise from all of the Company's operations. The Company presently has two main sand suppliers and, in order to partly mitigate supply risk, has optioned the Bear Coulee property.

The Company's objective is to manage operational risk so as to balance the avoidance of financial losses and damage to the Company's reputation with overall cost effectiveness and to avoid control procedures that restrict initiative and creativity.

The primary responsibility for the development and implementation of controls to address operational risk is assigned to senior management. The Company has a small but hands-on and experienced executive team which facilitates communication across the Company. This expertise is supplemented, when necessary, by the use of experienced consultants in legal, compliance and industry-related specialties. The Company also has standards for the management of operational risk in the following areas:

- requirements for appropriate segregation of duties, including the independent authorization of transactions;
- requirements for the reconciliation and monitoring of transactions;
- compliance with regulatory and other legal requirements, including the Occupational Health and Safety Act and related regulations and codes, and the Railway Safety Act and requirements of the Canadian Transportation Agency;
- documentation of controls and procedures, including quality control and plant maintenance;
- development of contingency plans;
- ethical and business standards; and
- risk mitigation, including insurance when this is effective and available.

Compliance with Company standards is supported by a code of conduct which is provided to salaried employees, officers and directors. The Company requires sign-off of compliance with the code of conduct.

**Capital Management Disclosures**

The Company's objective when managing capital is to safeguard its accumulated capital in order to provide an adequate return to shareholders by maintaining a sufficient level of funds to support continued project development and corporate activities. Capital is defined by the Company as the aggregate of its shareholders' equity as well as any long-term debt, equipment-based and/or project-based financing.

| | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Shareholders' equity | **$ 43,810** | $ 47,921 | $ 51,255 |
| Loans and borrowings - long-term portion | **2,957** | 2,143 | 8 |
| Participating Interest | **3,548** | 3,855 | - |
| Lease obligations - long-term portion | **275** | 384 | - |
| Loans and borrowings - available | **-** | 470 | - |
| | **$ 50,590** | $ 54,773 | $ 51,263 |

The Company manages its capital structure and makes adjustments to it based on the level of funds available to the Company to manage its operations. In order to maintain or adjust the capital structure, the Company expects that it will be able to obtain equity, long-term debt, equipment-based, working capital and/or project-based financing sufficient to maintain and expand its operations. There are no assurances that these initiatives will be successful. In order to achieve these objectives, the Company invests its unexpended cash in highly-liquid, rated financial instruments.

Neither the Company, nor its subsidiary, are subject to externally-imposed capital requirements. There were no changes in the Company's approach to capital management during the year.

## 5. DETERMINATION OF FAIR VALUES

A number of the Company's accounting policies and disclosures require the determination of fair value for both financial and non-financial assets and liabilities. Fair values have been determined for measurement and/or disclosure purposes based on the methods described below. When applicable, further information about the assumptions made in determining fair values is disclosed in the notes specific to that asset or liability.

### *Fair value hierarchy*

The different levels of valuation are defined as follows:

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities;
Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices); and
Level 3: Inputs for the asset or liability are not based on observable market data (unobservable inputs).

### (a) Property and Equipment

The fair value of property and equipment recognized as a result of a business combination is based on the amount for which a property could be exchanged on the date of valuation between knowledgeable, willing parties in an arm's length transaction.

### (b) Intangible Assets

The fair value of other intangible assets is based on the discounted cash flows expected to be derived from the use and eventual sale of the assets.

### (c) Marketable Securities

The fair value of financial assets at fair value through operations or OCI is determined by

reference to their quoted closing bid price at the reporting date.

**(d) Receivables**
The fair value of receivables is estimated as the present value of future cash flows, discounted at the market rate of interest at the reporting date. This fair value is determined for disclosure purposes only.

**(e) Warrants**
The fair values of warrants included in either financial assets at fair value through operations or in equity are based upon the Black-Scholes option-pricing model. Measurement inputs include: share price on measurement date, exercise price of the instrument, expected volatility (based on weighted average historic volatility adjusted for changes expected due to publicly-available information), weighted average expected life of the instruments (based on historic experience and general option-holder behaviour), expected dividends and the risk-free interest rate (based on government bonds).

**(f) Non-derivative Financial Liabilities**
Fair value, which is determined for disclosure purposes, is calculated based on the present value of future principal and interest cash flows, discounted at the market rate of interest at the reporting date.

**(g) Share-based Payment Transactions**
The fair value of share options is measured using the Black-Scholes option-pricing model. The measurement inputs are described above under Note 5(e). Any service and non-market performance conditions attached to the transactions are not taken into account in determining fair value.

## 6. CASH AND CASH EQUIVALENTS

| | **December 31, 2014** | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Bank balances | **$ 707** | $ 1,333 | $ 257 |
| Short-term deposits | **5** | 5 | - |
| **Cash and Cash Equivalents in the Statement of Cash Flows** | **$ 712** | $ 1,338 | $ 257 |

The Company has placed $271,000 funds on deposit with a Canadian chartered bank to support letters of credit being used to facilitate business activity with certain vendors and are presented as restricted cash on the consolidated balance sheet. The term deposits mature within one year and bear interest at either 0.35% or 0.95%.

## 7. RECEIVABLES AND PREPAIDS

| | Note | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|---|
| Trade accounts receivable | | **$ 2,725** | $ - | $ - |
| Less: Allowance for doubtful accounts | | **-** | - | - |
| | | **2,725** | - | - |
| Other receivables | | **48** | 217 | 69 |
| Receivable from Nuinsco Resources Limited | *25* | **-** | - | 37 |
| Prepaid expenses and deposits | | **594** | 141 | 50 |
| | | **$ 3,367** | $ 358 | $ 156 |

The aging of trade accounts receivable is as follows:

| | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Trade accounts receivable | | | |
| Current | **$ 1,945** | $ - | $ - |
| Past due 0-30 days | **454** | - | - |
| Past due 31-60 days | **253** | - | - |
| Past due 61-90 days | **42** | - | - |
| Past due > 90 days | **31** | - | - |
| | **$ 2,725** | $ - | $ - |

The Company maintains an allowance for doubtful accounts that represents its estimate of the uncollectible amounts based on specific losses estimated on individual exposures. As at December 31, 2014, the Company determined that it had no exposure to losses due to the quality of its customers; approximately 99% of the balances outstanding had been collected by the date of this report.

As at December 31, 2014, four of the Company's customers accounted for 85% of the trade accounts receivable balance.

## 8. MARKETABLE SECURITIES

| | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Financial assets at fair value through OCI: | | | |
| Shares | **$ 153** | $ 261 | $ 560 |
| | **$ 153** | $ 261 | $ 560 |

The Company records its portfolio of shares at available market prices with any difference in fair value compared with acquisition cost being recorded as gain or loss on financial assets at fair value through OCI.

### Sensitivity Analysis – Equity Price Risk

All of the Company's financial assets at fair value through OCI are listed on public stock exchanges, including the TSX and the TSX-V. Recently, the markets have experienced extreme volatility; therefore the sensitivity analysis is performed using 15%. For such investments, a 15% increase in the equity prices at the reporting date would have increased equity by $20,000, after tax effects of $3,000 (as at December 31, 2013 - an increase of $34,000, after tax effects of $5,000); an equal change in the opposite direction would have had the equal but opposite effect on the amounts shown above.

## 9. INVENTORY

| | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Raw material | | | |
| At transload facility | **$ 118** | $ - | $ - |
| In transit | **951** | - | - |
| Stored at 7P Plant | **463** | - | - |
| | **1,532** | - | - |
| Finished goods | **1,445** | - | - |
| | **$ 2,977** | $ - | $ - |

## 10. FINANCIAL INSTRUMENTS

### Credit Risk

***Exposure to credit risk***

The carrying amount of financial assets represents the maximum credit exposure. All amounts are held in Canada.

The maximum exposure to credit risk at the reporting date was:

| | *Notes* | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|---|
| **Carrying amount** | | | | |
| Cash and cash equivalents | *6* | **$ 712** | $ 1,338 | $ 257 |
| Restricted deposits | *6* | **271** | - | - |
| Receivables | *7* | **3,367** | 358 | 156 |
| Financial assets at fair value through OCI | *8* | **153** | 261 | 560 |
| | | **$ 4,503** | $ 1,957 | $ 973 |

### Liquidity Risk

The following table shows the contractual maturities of financial liabilities including estimated interest payments.

| | Non-derivative financial liabilities | | | | |
|---|---|---|---|---|---|
| | Trade and other payables [1] | Short-term loans | Leases payable [1] | Long-term liabilities [2] | Total |
| **As at December 31, 2014** | | | | | |
| Carrying amount | $ 2,895 | $ 7,493 | $ 412 | $ 2,957 | $ 13,757 |
| Contractual cash flows | 2,895 | 8,651 | 452 | 4,818 | 16,816 |
| 6 months or less | 2,895 | 2,493 | 80 | 295 | 5,763 |
| 6 - 12 months | - | 6,158 | 80 | 299 | 6,537 |
| 1 - 2 years | - | - | 154 | 4,224 | 4,378 |
| 2 - 5 years | - | - | 138 | - | 138 |
| **As at December 31, 2013** | | | | | |
| Carrying amount | $ 1,520 | $ - | $ 534 | $ 2,143 | $ 4,197 |
| Contractual cash flows | 1,520 | - | 599 | 2,551 | 4,670 |
| 6 months or less | 1,520 | - | 105 | 147 | 1,772 |
| 6 - 12 months | - | - | 70 | 149 | 219 |
| 1 - 2 years | - | - | 148 | 2,255 | 2,403 |
| 2 - 5 years | - | - | 276 | - | 276 |
| **As at January 1, 2013** | | | | | |
| Carrying amount | $ 554 | $ 1,005 | $ - | $ - | $ 1,559 |
| Contractual cash flows | 554 | 1,255 | - | - | 1,809 |
| 6 months or less | 554 | 60 | - | - | 614 |
| 6 - 12 months | - | 60 | - | - | 60 |
| 1 - 2 years | - | 120 | - | - | 120 |
| 2 - 5 years | - | 1,015 | - | - | 1,015 |

(15) Balances reflect current leases payable as *Leases payable*; these are disclosed within *Trade and other payables* (Note 14) on the consolidated balance sheet.

(16) Note that the long-term loan to Nuinsco prior to its conversion to a Participating interest was contractually payable on January 31, 2015, however up to $nil (January 1, 2013 - $1,005,000) of option payments may be diverted to the lender as prepayment, that amount is classified as a current liability on the consolidated balance sheet (See Notes 13 and 15).

## Currency Risk

### *Exposure to currency risk*

**As at December 31, 2014**

| (in thousands of United States dollars) | US$ | C$ |
|---|---|---|
| Cash and cash equivalents | $ 376 | $ 336 |
| Restricted deposits | 224 | 47 |
| Receivables and prepaids | 3,355 | 12 |
| Marketable securities | - | 153 |
| Trade and other payables | (801) | (2,231) |
| Loans and borrowings - current | (7,493) | - |
| Loans and borrowings - long-term | (2,745) | (212) |
| Participating Interest | - | (3,548) |
| | $ (7,084) | $ (5,443) |

**As at December 31, 2013**

| (in thousands of United States dollars) | US$ | C$ |
|---|---|---|
| Cash and cash equivalents | $ 1,275 | $ 63 |
| Receivables and prepaids | 134 | 224 |
| Marketable securities | (0) | 261 |
| Trade and other payables | (111) | (1,409) |
| Loans and borrowings - long-term | (2,143) | (384) |
| Participating Interest | - | (3,855) |
| | $ (845) | $ (5,100) |

| As at January 1, 2013<br>(in thousands of United States dollars) | US$ | C$ |
|---|---|---|
| Cash and cash equivalents | $ - | $ 257 |
| Receivables | - | 156 |
| Marketable securities | - | 560 |
| Trade and other payables | 3 | 551 |
| Loans and borrowings | - | 1,013 |
| | $ 3 | $ 2,537 |

### *Sensitivity analysis*

A 10% weakening of the United States dollar would have an approximate effect on the Company's equity of $544,000 or $560,000 on profit or loss on balances denominated in C$ as at December 31, 2014 ($510,000 and $536,000 as at December 31, 2013; $254,000 and $228,000 as at January 1, 2013, respectively). The analysis assumes that all other variables, in particular interest rates, remain constant.

## Fair Value

### *Fair values versus carrying amounts*

The fair values of the Company's financial assets and liabilities equal their carrying amounts shown in the consolidated balance sheets. The Company has not made any reclassifications between assets recorded at cost or amortized cost and fair value.

The table below analyses financial instruments carried at fair value by valuation method:

| | Level 1 | Level 2 | Level 3 | Total |
|---|---|---|---|---|
| **As at December 31, 2014** | | | | |
| Financial assets at fair value through OCI | **$ 153** | **$ -** | **$ -** | **$ 153** |
| | **$ 153** | **$ -** | **$ -** | **$ 153** |
| **As at December 31, 2013** | | | | |
| Financial assets at fair value through OCI | $ 261 | $ - | $ - | $ 261 |
| | $ 261 | $ - | $ - | $ 261 |
| **As at January 1, 2013** | | | | |
| Financial assets at fair value through OCI | $ 560 | $ - | $ - | $ 560 |
| | $ 560 | $ - | $ - | $ 560 |

There have been no transfers between Level 1, Level 2 and Level 3 during the current and prior reporting periods. All of the shares owned by the Company are valued using Level 1 methodologies.

## 11. PROPERTY AND EQUIPMENT

| Balances as at January 1, 2013 | Land and Building | 7P Plant | Vehicles and Mobile Equipment | Equipment and Furniture | Total |
|---|---|---|---|---|---|
| Cost | $ 83 | $ - | $ 32 | $ 1,367 | $ 1,482 |
| Accumulated Amortization | (8) | - | (17) | (26) | (51) |
| **Carrying Amount** | **75** | **-** | **15** | **1,341** | **1,431** |
| Additions | - | 2,922 | 603 | 159 | 3,684 |
| Amortization | (1) | - | (21) | (3) | (25) |
| **Balances as at December 31, 2013** | | | | | |
| Cost | 83 | 2,922 | 635 | 1,526 | 5,166 |
| Accumulated Amortization | (9) | - | (38) | (28) | (75) |
| Effect of Foreign Exchange (Note 2) | (16) | (10) | (3) | (99) | (128) |
| **Carrying Amount** | **58** | **2,912** | **594** | **1,399** | **4,963** |
| Additions | - | 1,852 | 73 | 115 | 2,040 |
| Amortization | (2) | (382) | (168) | (2) | (554) |
| **Balances as at December 31, 2014** | | | | | |
| Cost | 83 | 4,774 | 708 | 1,641 | 7,206 |
| Accumulated Amortization | (11) | (382) | (202) | (30) | (625) |
| Effect of Foreign Exchange (Note 2) | (8) | (187) | (47) | (160) | (402) |
| **Carrying Amount** | **$ 64** | **$ 4,205** | **$ 459** | **$ 1,451** | **$ 6,179** |

Equipment and furniture includes deposits of $1,544,000 related to the purchase of transformers and other electrical equipment; the equipment is not available for use and is not being depreciated. On May 10, 2010, the Company entered into an agreement to purchase the transformers and other electrical equipment for the Minago project. The total price is $2,840,000 (Note 27). Vehicles and Mobile Equipment include $666,000 (2013 - $603,000) of equipment acquired under leases (Note 17).

## 12. MINE PROPERTY AND DEVELOPMENT PROJECT

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | December 31, 2014 |
|---|---|---|---|---|---|
| Minago | $ 36,357 | $ (1,836) | $ 372 | $ - | **$ 34,893** |
| | $ 36,357 | $ (1,836) | $ 372 | $ - | **$ 34,893** |

| | January 1, 2013 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | December 31, 2013 |
|---|---|---|---|---|---|
| Minago | $ 38,091 | $ (2,483) | $ 819 | $ (70) | **$ 36,357** |
| | $ 38,091 | $ (2,483) | $ 819 | $ (70) | **$ 36,357** |

Recoveries in 2013 represent grants from the Manitoba Government.

### Minago

The 100%-owned Minago project covers approximately 28,928 ha, through a combination of mining claims, mineral leases and a mineral exploration licence, on Manitoba's Thompson Nickel Belt. The property encompasses the Nose Deposit, which contains the entire current nickel mineral resource, and the North Limb, a zone of nickel mineralization with a known strike length of 1.5 kilometres located to the north of the Nose Deposit.

From 2006 to date, considerable work has been performed, including diamond drilling, metallurgical testing and engineering studies and all the studies required to complete the

Environmental Impact Study which was filed in May 2010. As a result, in August 2011, the Company received its Environmental Act Licence. The results of the Minago Feasibility Study ("FS") were announced in December 2009 and improvements thereto announced in June 2010 and July 2011.

Five mineral claims totalling 691 ha located at the north end of the Company's existing Minago property package are subject to a maximum 2% net smelter return royalty with a 50% back-in right; these claims represent approximately 2.4% of the total Minago project.
The Minago project is not in production. Accordingly, the Minago project is not being depreciated. On September 19, 2011, the Company announced that the Board of Directors had approved the development of Minago and directed management to proceed with securing financing arrangements.

As at December 31, 2014, the Company tested the Minago project for impairment. The economic model in the FS was used as a base. The business model used in the FS and the intention of management is to develop and produce the nickel and frac sand co-product simultaneously. For the purposes of assessing the impairment of Minago, frac sand is treated as a raw material for sale into the market and is not processed to a finished product. This required elimination from the FS economic model of the following: processing plant capital, processing operating costs, transportation costs and the finished goods margin. This does not reflect how management intends to develop Minago, nor, in management's opinion, does it reflect how any other organization would develop the project.

In addition, adjustments were made for prices derived from the forecasted average of $9.29 for nickel and an exchange rate of US$0.80:C$1.00. A discount rate of 11% was used in the analysis and includes estimates for income taxes. These factors resulted in a recoverable amount in excess of the book value of Minago. Accordingly, no impairment exists on the Minago project.

The impairment model is sensitive to several of the model key input variables. The following table indicates the estimated impact on the recoverable amount:

| Change in Model Key Input | Change in Recoverable Amount of Minago |
|---|---|
| Effect of: | |
| Increase discount rate by 1% | (55%) |
| Increase exchange rate by 0.05 | (65%) |
| Increase frac sand and nickel prices by 1% | 14% |
| Increase operating costs by 5% | (30%) |

## 13. EXPLORATION AND EVALUATION PROJECTS

Cumulative costs relating to the acquisition of mineral properties and E&E expenditures have been incurred on the following projects:

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | Excess Proceeds | **December 31, 2014** |
|---|---|---|---|---|---|---|
| Lac Rocher | $ 6,946 | $ (349) | $ 12 | $ - | $ - | **$ 6,609** |
| Mel | 7,026 | (347) | 92 | - | - | **6,771** |
| Lynn Lake | - | - | 44 | (44) | - | **-** |
| Other | 4 | - | 12 | (16) | - | **-** |
| | $ 13,976 | $ (696) | $ 160 | $ (60) | $ - | **$ 13,380** |

| | January 1, 2013 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | Excess Proceeds | **December 31, 2013** |
|---|---|---|---|---|---|---|
| Lac Rocher | $ 7,354 | $ (477) | $ 69 | $ - | $ - | **$ 6,946** |
| Mel | 7,459 | (483) | 50 | - | - | **7,026** |
| Lynn Lake | - | - | 8 | (391) | 383 | **-** |
| Other | - | - | 4 | - | - | **4** |
| | $ 14,813 | $ (960) | $ 131 | $ (391) | $ 383 | **$ 13,976** |

The expenditures on the Lynn Lake property are shown net of cumulative option payments received which include $nil in 2014 and $391,000 in 2013. The excess proceeds of $nil and $383,000 for the years ended December 31, 2014 and 2013, respectively, represent the excess of consideration received under the option agreement above carrying value and are reflected in *Writedown (recovery) of exploration and evaluation project* through operations.

**Lac Rocher**

The Lac Rocher project, which is 100%-owned, is located 140 kilometres northeast of Matagami in northwestern Québec. The project is subject to a royalty of C$0.50 per ton on any ores mined and milled from the property and a 2% NSR described below.

In 2007, the Company began environmental work in support of obtaining a permit for the Lac Rocher deposit in order to extract and direct-ship mineralized material to an offsite mill for processing. A 12-hole, 1,500 metre drill program was also completed to test for extensions to the nickel sulphide mineralization and to provide metallurgical samples for the Preliminary Economic Assessment (“PEA”) to determine the near-term production and cash generation potential of the project.

Metallurgical testing of the massive sulphide mineralization from the deposit was completed in December, 2007. In February, 2008, the Company announced the results from metallurgical testing of the disseminated sulphide zone and they were incorporated into the PEA completed in November 2008. The Company completed the construction of an access road in the third quarter of 2009 and performed diamond drilling to provide geotechnical data for portal and ramp development.

The Lac Rocher property is subject to a discovery incentive plan (the “DIP”) to reward certain individuals involved in the discovery of Lac Rocher with a 2% NSR for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be

required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

**Mel**

Effective August 27, 1999, Nuinsco Resources Limited ("Nuinsco") (the predecessor entity of Victory Nickel) entered into an option agreement (the "Agreement") with Inco Limited (predecessor to CVRD Inco Limited, now Vale) for the exploration and development of Vale's Mel properties (the "Mel Properties") located in the Thompson area of northern Manitoba. Pursuant to the Agreement, sufficient expenditures have been incurred to earn a 100% interest in the Mel Properties, and in 2007 the Company exercised its option to acquire such interest. Vale had the right to earn back a 51% interest by incurring expenditures of C$6,000,000 over a four-year period. On September 14, 2010, Vale notified the Company that it would not exercise this back-in right. In accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

Also under the Agreement, Vale has a contractual obligation to mill ore mined from the Mel deposit at its cash cost plus 5% (provided that the product meets Vale specifications and that Vale has sufficient mill capacity). Ongoing updating of Mel data is being conducted and applies to both the drilling data on the Mel deposit/lease as well as the 111 drill holes collared on the claims portion of the property. When completed, additional modelling of the resource will be continued. No fieldwork has been conducted during 2014 and 2013.

**Lynn Lake**

The Company owns a 100% right, title and interest in the Lynn Lake nickel property ("Lynn Lake"), covering approximately 600 ha in northern Manitoba. As at December 31, 2013, the Lynn Lake property was subject to an option agreement with Wellgreen Platinum Ltd. ("Wellgreen") (formerly Prophecy Platinum Corp.). The Company received all payments scheduled under the option agreement to December 31, 2012. Accordingly, under the original agreement, the sole remaining condition for the Lynn Lake property to transfer to Wellgreen was the C$1,000,000 option payment which was originally due from Wellgreen by March 1, 2013.

On March 1, 2013, the Company agreed to an additional amendment to the option agreement which allowed Wellgreen to make a series of payments through 2013 and 2014 aggregating C$1,125,000 in satisfaction of the remaining option conditions. On March 1, 2013, the Company received the first payment of C$125,000; C$125,000 was received in May 2013 and C$150,000 in September 2013 (being an aggregate of $391,000); C$175,000 was due in December 2013 with a further C$550,000 being payable by August 29, 2014.

On March 17, 2014, Wellgreen formally confirmed to the Company that it was relinquishing the Lynn Lake option which included vacating the option properties in good condition and returning all exploration materials and data to the Company. In 2013, $383,000 excess of proceeds under the option agreement above the book value of the property had been received and

accordingly was recorded through the consolidated statement of operations as a recovery of exploration and evaluation project in respect of Lynn Lake.

On November 4, 2014, the Company announced that it had optioned the Lynn Lake property to Corazon Mining Ltd. (“Corazon”) an Australian public company (ASX: CZN).

**Other Projects**
The Company has incurred minimal expenditures on other properties in 2014 and 2013.

**Impairment and Pre-exploration Costs**
Costs relating to discontinued projects in the amounts of $60,000 were provided for through operations as *Writedown (recovery) of exploration and evaluation projects* in the consolidated statement of operations during the years ended December 31, 2014 (2013 - $nil, apart from the $383,000 recovery on Lynn Lake as referred to above). Pre-exploration costs of $4,000 (2013 - $nil) were incurred in the year ended December 31, 2014.

## 14. TRADE AND OTHER PAYABLES

| | Notes | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|---|
| Accounts payable | | | | |
| Mine property and development project | | **$ 13** | $ 24 | $ 295 |
| Exploration and evaluation projects | | **1** | - | 3 |
| Property and equipment | | **402** | 697 | - |
| Other accounts payable | | **1,708** | 109 | 84 |
| Accrued liabilities | | | | |
| Mine property and development project | | **22** | 26 | 2 |
| Exploration and evaluation projects | | **-** | 1 | 1 |
| Property and equipment | | **-** | 306 | - |
| Other accrued liabilities | | **683** | 144 | 161 |
| Other payables | | **21** | - | 8 |
| Lease obligations - current portion | *17* | **137** | 150 | - |
| Due to Nuinsco Resources Limited | | | | |
| Under the Management Agreement | *25* | **45** | 53 | - |
| Commitment fees | *16* | **-** | 10 | - |
| | | **$ 3,032** | $ 1,520 | $ 554 |

## 15. LOANS AND BORROWINGS

| | Notes | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|---|
| Current loans | | | | |
| SPA Loan | (a) | **$ 3,585** | $ - | $ - |
| Short-term loan | (b) | **2,000** | - | - |
| Current portion of long-term loans | (c) | **1,908** | - | - |
| Total current loans | | **7,493** | - | - |
| Long-term loans | | | | |
| Promissory notes | (c) | **2,957** | 2,143 | 8 |
| Total long-term loans | | **2,957** | 2,143 | 8 |
| | | **$ 10,450** | $ 2,143 | $ 8 |

| **(a) SPA Loan** | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Advances in US$ | **$ 3,000** | $ - | $ - |
| Conversion from Promissory Notes | **1,000** | - | - |
| Add: fair value of warrants with a cashless exercise feature | **121** | - | - |
| | **4,121** | - | - |
| Less: unamortized loan fees | **(536)** | - | - |
| **SPA Loan** | **$ 3,585** | $ - | $ - |

On May 15, 2014, the Company announced that it had executed a securities purchase and line of credit agreement (the "SPA Loan") to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a "SPA Note"). The SPA Loan matures on July 30, 2015. The purchaser previously purchased a convertible note in the amount of $1,000,000 and this was converted into a SPA Note on the initial closing date of May 15, 2014 (the "Initial Closing Date") refer below.

The Company has issued to the purchaser 2,000,000 common share purchase warrants (after giving retroactive effect to the Share Consolidation Note 19). The number of warrants is subject to an increase to 1,000,000 warrants (after giving retroactive effect to the Share Consolidation Note 19) for each $1,000,000 Note issued if any of the Notes is prepaid and the closing price of the Company's common shares is C$2.00 or lower (after giving retroactive effect to the Share Consolidation Note 19) on the trading day preceding the date of such prepayment. Given that there are costs associated with the prepayment right, the Company has valued the prepayment right at $nil. Each warrant (after giving retroactive effect to the Share Consolidation Note 19) entitles the holder to purchase one common share of the Company at an exercise price of C$1.00 (after giving retroactive effect to the Share Consolidation Note 19) for a period of 36 months from the Initial Closing Date. The warrants are subject to a cashless exercise provision and are therefore considered a component of debt rather than equity; the fair value at inception was calculated at C$620,000 and was revalued at December 31, 2014 at $121,000 with the aggregate change in fair value of $462,000 being recorded in finance income (Note 22).

In the year ended December 31, 2014, the Company paid $352,000 in interest and amortized $450,000 in loan fees into finance costs. There are no amounts remaining to be drawn under the SPA Loan.

The values of the warrants with a cashless exercise provision have been calculated using the Black-Scholes option-pricing model using the following parameters:

| (after retroactive effect of Share Consolidation - Note 19) | December 31, 2014 | May 15, 2014 |
|---|---|---|
| | | (At inception) |
| Fair values | C$0.07 | C$0.31 |
| Share prices at valuation dates | C$0.24 | C$0.60 |
| **Assumptions** | | |
| Exercise price | C$1.00 | C$1.00 |
| Expected volatilities | 111% | 101% |
| Expected remaining terms (years) | 2.37 | 3.00 |
| Expected dividends | - | - |
| Risk-free interest rates | 1.00% | 1.12% |

## (b) Short-term loan

On October 1, 2014, the Company completed the arrangement of short-term financing by way of a promissory note amounting to $2,000,000. The promissory note bears interest at an annual rate of 28% and was originally due on December 1, 2014. The lender has agreed to several monthly extensions of the short-term facility upon payment of extension fees.

The first amendment extended the repayment to December 31, 2014 for an extension fee of $20,000; the second amendment extended the repayment to January 31, 2015, also with an extension fee of $20,000. A third amendment extended the repayment to February 27, 2015 with an extension fee of $22,500 and an additional penalty of $22,500 should the balance not be repaid by that date. On January 31, 2015, February 6, 2015 and February 27, 2015 the Company repaid $500,000, $250,000 and $250,000, respectively. A fourth amendment extended the short-term loan to March 31, 2015 under similar terms. The balance outstanding as at March 31, 2015 is $1,000,000 (Note 28).

Interest expense (including the applicable commitment and extension fees) for the year amounted to $206,000.

| (c) Promissory Notes | Notes | | December 31, 2014 | | December 31, 2013 | | January 1, 2013 |
|---|---|---|---|---|---|---|---|
| Advances | | | **$ 6,979** | | $ 2,000 | | $ - |
| Conversion to SPA Loan | | | **(1,000)** | | - | | - |
| | | | **5,979** | | 2,000 | | - |
| Embedded option derivatives at inception | | **$ (1,420)** | | $ (160) | | | - |
| Less: effect of conversion to SPA Loan | | **417** | | - | | | - |
| Less: accumulated amortization | *22* | **339** | | 11 | | | - |
| | | | **(664)** | | (149) | | - |
| Less: unamortized loan fees | | | **(108)** | | (33) | | - |
| Add: Effect of foreign exchange | | | **19** | | - | | - |
| Less: Equity component of debt | | | **(48)** | | - | | - |
| Net promissory notes | | | **5,178** | | 1,818 | | - |
| Embedded option derivatives at inception | | **1,420** | | 160 | | | - |
| Less: effect of conversion to SPA Loan | | **(417)** | | - | | | - |
| Change in value of embedded option derivatives | *22* | **(1,316)** | | 165 | | | - |
| | | | **(313)** | | 325 | | - |
| | | | **4,865** | | 2,143 | | - |
| Less: current portion of promissory notes | | | **(1,908)** | | - | | - |
| **Promissory Notes - long-term portion** | | | **$ 2,957** | | $ 2,143 | | $ - |

On November 11, 2013 and during 2014, the Company entered into several unsecured convertible promissory notes by way of private placements (the "Convertible Notes"). The Convertible Notes bear interest calculated and payable quarterly at 14.8% and are convertible at the option of the holder into the Company's shares at C$1.00 (after retroactive effect of the Share Consolidation). All Convertible Notes have two-year terms. The Company paid $669,000 for interest in cash and amortized $53,000 for loan fees and $328,000 for the embedded option derivatives at inception using the effective interest rate method during the year (2013 - $41,000, $2,000 and $11,000, respectively).

The embedded option derivatives have been calculated using the Black-Scholes option-pricing model using the following parameters:

| (after retroactive effect of Share Consolidation - Note 19) | December 31, 2014 | (Various inception dates) | November 11, 2013 | December 31, 2013 |
|---|---|---|---|---|
| | | | (At inception) | |
| Fair values | **C$0.00 to C$0.03** | **C$0.22 to C$0.40** | C$0.08 | C$0.16 |
| Share prices at valuation dates | **C$0.24** | **C$0.50 to C$0.70** | C$0.30 | C$0.45 |
| **Assumptions** | | | | |
| Exercise price | **C$1.00** | **C$1.00** | C$1.00 | C$1.00 |
| Expected volatilities | **82% to 109%** | **116%** | 103% | 109% |
| Expected remaining terms (years) | **0.86 to 1.52** | **2.00** | 2.00 | 1.87 |
| Expected dividends | **-** | - | - | - |
| Risk-free interest rates | **1.00%** | **1.20%** | 1.20% | 1.20% |

## 16. PARTICIPATING INTEREST

| Participating Interest | Note | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|---|
| Advance for working capital | | **$ 940** | $ 940 | $ 1,005 |
| Advance under Amended Loan for standby commitment | | **1,135** | 1,135 | - |
| Accrued interest payable | | **-** | - | 8 |
| Aggregate advances | | **2,075** | 2,075 | 1,013 |
| Less: settled in Units of Victory Nickel | | **(1,135)** | (1,135) | - |
| Less: unamortized loan fees | | **(51)** | (185) | - |
| | | **889** | 755 | 1,013 |
| Change in fair value | *22* | **2,875** | 3,100 | - |
| Effect of foreign exchange | | **(216)** | - | - |
| **Participating Interest** | | **$ 3,548** | $ 3,855 | $ 1,013 |
| Current portion - due within one year [1] | | **$ -** | $ - | $ 1,005 |
| Long-term portion [2] | | **3,548** | 3,855 | 8 |
| **Participating Interest** | | **$ 3,548** | $ 3,855 | $ 1,013 |

(1) Classified as loans and borrowings - current
(2) Classified as loans and borrowings - long-term

In 2012, the Company entered into a loan agreement for C$1,000,000 with Nuinsco (the "Lender"). The loan was amended and restated on March 25, 2013 (the "Amended Loan") to up to C$3,000,000 with the additional amount being available to fund capital expenditures relating to the 7P Plant. The Amended Loan bore interest at 12% per annum and was set to mature on January 31, 2015; the loan was secured by equipment and a general security agreement over the equipment of the Company. At the option of the Lender, and under certain circumstances, the Lender could elect to receive prepayment of the loan from up to C$1,000,000 of the proceeds of the Lynn Lake option payments originally due by March 1, 2013. As at January 1, 2013, this amounted to C$1,000,000 and, accordingly, C$1,000,000 of the loan, or $1,005,000, was classified as a current liability due within one year effective that date. As described in Note 13, Wellgreen relinquished the option effective March 17, 2014, and no further option payments are due therefore the whole of the amount due to Nuinsco became classified as long-term.

Prior to June 1, 2014, the Lender had the right to convert the outstanding balance of the Amended Loan into a limited participating interest (the "Conversion") whereby the Lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender's participation was capped at C$10,000,000, with a minimum of C$7,500,000, and was subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. The Lender had also agreed to backstop an equity issue, if any was announced, with cash or by converting a portion of the Amended Loan into shares, at the Lender's option, to an amount up to C$1,500,000 under certain circumstances. On June 14, 2013, the Company announced a rights offering for existing shareholders to raise gross proceeds of up to approximately C$2,700,000 (see Note 19). The rights offering closed on July 30, 2013 and raised gross proceeds of C$2,400,000 which included the backstop provided by the Lender in cash of C$1,207,584 ($1,135,000). This capped the Amended Loan at C$2,707,584 and reduced the amount available to be drawn down to C$500,000. Upon

exercise of the backstop, Nuinsco increased its shareholding in the Company to approximately 12.24% on a non-diluted basis, thereby becoming a related party of the Company.

The Company was to pay, with shares, an arrangement fee of up to C$300,000 plus a commitment fee of 1.5% per annum on unutilized balances. Commitment fees of C$11,000 were accrued to December 31, 2013 and are included in *Finance costs* in Note 22; shares were issued in December 2014. Effective March 2013, the Company issued 5,681,818 shares in satisfaction of the arrangement fee at that time of C$250,000; an additional 789,294 shares with a stated value of C$20,758 were issued in August 2013 under the loan terms related to the backstop of the rights offering; this satisfies the arrangement fee in full. These amounts, along with other loan fees, are being amortized as interest expense using the effective interest rate method; in the year ended December 31, 2014, $119,000 was amortized as interest expense and $46,000 interest was paid to the Lender in cash (2013 - $128,000 and $115,000, respectively).

On February 4, 2014, both Nuinsco and Victory Nickel agreed to cancel the amount that remained available to be drawn down under the Amended Loan. This fixed the commitment fee to be paid in shares at C$12,000 and also amended the range of the Company's participation in the net cash flows earned from the sale of frac sand to a maximum of C$10,222,831 with a minimum of C$7,667,124. As at December 31, 2014, these limits approximate $8,812,000 and $6,609,000.

The loan is classified as a financial liability carried at amortized cost and is defined as "Participating Interest". From recognition until the fourth quarter of 2013, the Company considered that there were no changes in estimated cash flows since Nuinsco had not converted its loan and the 7P Plant was not built and there were other significant uncertainties. During the fourth quarter of 2013, the plant construction was well underway and the probability of Conversion had increased substantially. Accordingly, the Company revised the estimated future cash flows and discounted these cash flows at 15%. The estimated future cash flows were determined using a probability-weighted estimation of future expected cash flow scenarios from the frac sand business based on current expectations of business results, capital costs and pre-operating expenditures. An assessment is made regarding the applicable ceiling for the cash flows which is dependent upon the phase attained by the Company when payments under the Participating Interest are anticipated. These cash flows were on the basis of Phase Two completion; the Company still expects to enter Phase Two before paying out the expected cash flows despite announcing a deferral of Phase Two during February, 2015. The Company also included probability weightings of 5%, 40% and 55% as risk factors applied to varying levels of expected cash flows – being zero, 50% and 100% of the applicable ceiling maximum of C$10,222,831. As at December 31, 2013, the probability weightings used in the model were 34%, 16% and 50%; representing a probability-weighted average of 75% (2013 – 58%).

As described earlier, the percentage participation in net cash flows is 52.16% and the applicable ceiling for Phase Two is C$7,667,124 (Phase One - C$10,222,831). These assumptions resulted in revised amortized cost carrying amount of the Participating Interest of $3,548,000 and, accordingly $225,000 was recorded as a *gain on adjustment of estimated cash flows* through the statement of operations. As at December 31, 2013, the Participating

Interest was estimated to be $3,855,000 with $3,100,000 being recorded as a loss through the statement of operations. This is a Level 3 methodology and is subject to the highest level of uncertainty. The Company will continue to review and revise its estimates of expected future cash flows as the expectations of payments of the Participating Interest change. Changes in that estimate will be recorded through operations with appropriate adjustment for actual cash flows paid.

## 17. LEASE OBLIGATIONS

| | Note | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|---|
| Vehicles and Mobile Equipment: | | | | |
| Total present value of minimum lease payments | | **$ 570** | $ 623 | $ - |
| Principal payments | | **(158)** | (89) | - |
| **Total present value of minimum lease payments remaining** | | **412** | 534 | - |
| Lease obligations - current portion | *14* | **(137)** | (150) | - |
| **Lease obligations - long-term** | | **$ 275** | $ 384 | $ - |

The Company has finance lease obligations for equipment in use at the 7P Plant. At the end of the lease obligations, ownership is transferred to the Company for all leases except one, whereby an election is to be made 60 days prior to the end of the lease term at the purchase option price of C$1.

The future minimum lease payments (also reflected in the liquidity analysis in Note 10) are as follows:

| | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| Less than 1 year | **$ 160** | $ 179 | $ - |
| Between 1 and 5 years | **293** | 421 | - |
| **Total minimum lease payments payable** | **453** | 600 | - |
| Future finance charges on minimum lease payments | **41** | 66 | - |
| **Present value of minimum lease payments** | **$ 412** | $ 534 | $ - |

## 18. DEFERRED TAX LIABILITY

Deferred income tax assets and liabilities are recognized for temporary differences between the carrying value of the balance sheet items and their corresponding tax values as well as for the benefit of losses available to be carried forward to future years for tax purposes that are considered probable to be realized.

Significant components of the Company's deferred tax assets and liability, after applying enacted corporate income tax rates, are as follows:

| | December 31, 2014 | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| **Temporary differences** | | | |
| Property and equipment | **$ (93)** | **$ (11)** | $ (24) |
| Exploration, evaluation and development projects | **4,986** | **5,482** | 6,379 |
| Share issue and other costs | **(392)** | **(662)** | (194) |
| Non-capital tax losses carried forward | **(4,169)** | **(3,862)** | (3,588) |
| Capital losses carried forward | **(50)** | **-** | (63) |
| Capital losses unrealized | **(77)** | **(71)** | (66) |
| | **205** | **876** | 2,444 |
| Unrecognized deferred tax assets | **612** | **554** | 42 |
| | **$ 817** | **$ 1,430** | $ 2,486 |

The income tax recovery represents the recognition of deferred income tax assets (to the extent of the deferred tax liability) since the Company currently believes that it is probable that the benefit associated with these losses and costs will be realized prior to their expiry. It also includes the effect of enacted rate changes.

Non-capital losses, on which a deferred tax asset was recorded, expire as follows:

| | |
|---|---|
| **2015** | **$ 345** |
| **2026** | **598** |
| **2027** | **3,201** |
| **2028** | **2,342** |
| **2029** | **1,693** |
| **2030** | **1,831** |
| **2031** | **848** |
| **2032** | **1,438** |
| **2033** | **2,099** |
| **2034** | **2,878** |
| | **$ 17,273** |

Non-capital losses on which a deferred tax asset was not recorded expire as follows:

| | |
|---|---|
| **2032** | **$ 146** |
| **2033** | **488** |
| **2034** | **206** |
| | **$ 840** |

As at December 31, 2014, the Company had estimated capital losses of $463,000 available for carryforward (December 31, 2013 - $nil).

**Movement in Deferred Tax Assets and Liability during the Year**

| | As at January 1, 2014 | Effect of foreign exchange (Note 2) | Recognized in operations | Recognized in OCI | Recognized in share capital | **As at December 31, 2014** |
|---|---|---|---|---|---|---|
| Property and equipment | $ (11) | $ 4 | $ (86) | $ - | $ - | **$ (93)** |
| Exploration and evaluation projects | 5,482 | (453) | (43) | - | - | **4,986** |
| Share issue and other costs | (662) | 46 | 224 | - | - | **(392)** |
| Net tax losses carried forward | (3,862) | 358 | (665) | - | - | **(4,169)** |
| Capital losses (net) | - | 3 | (53) | - | - | **(50)** |
| Capital losses unrealized | (71) | 6 | - | (12) | - | **(77)** |
| | 876 | (36) | (623) | (12) | - | **205** |
| Unrecognized deferred tax assets | 554 | (52) | 110 | - | - | **612** |
| Deferred tax liability, net | $ 1,430 | $ (88) | $ (513) | $ (12) | $ - | **$ 817** |

| | As at January 1, 2013 | Effect of foreign exchange (Note 2) | Recognized in operations | Recognized in OCI | Recognized in share capital | **As at December 31, 2013** |
|---|---|---|---|---|---|---|
| Property and equipment | $ (24) | $ - | $ 13 | $ - | $ - | **$ (11)** |
| Exploration and evaluation projects | 6,379 | (403) | (494) | - | - | **5,482** |
| Share issue and other costs | (194) | 23 | (383) | - | (108) | **(662)** |
| Net tax losses carried forward | (3,588) | 245 | (439) | (80) | - | **(3,862)** |
| Capital losses (net) | (63) | 2 | - | 61 | - | **-** |
| Capital losses unrealized | (66) | 6 | - | (11) | - | **(71)** |
| | 2,444 | (127) | (1,303) | (30) | (108) | **876** |
| Unrecognized deferred tax assets | 42 | (13) | 525 | - | - | **554** |
| Deferred tax liability, net | $ 2,486 | $ (140) | $ (778) | $ (30) | $ (108) | **$ 1,430** |

## 19. CAPITAL AND OTHER COMPONENTS OF EQUITY

### Share Capital

#### *Authorized*

The Company is authorized to issue an unlimited number of common shares with no par value.

#### *Share Consolidation*

On September 12, 2014, pursuant to shareholder approval granted at the Company's Annual and Special Meeting of Shareholders held on May 29, 2014 (the "ASM"), the Company consolidated its common shares on a one-for-ten basis (the "Share Consolidation"). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of these financial statements. Refer to Notes 2, 19 and 21.

#### *Number of shares issued and outstanding*

The issued and outstanding common shares for 2013 and 2014 are as follows:

| (after retroactive effect of Share Consolidation) | Notes | Number of Shares | Gross Proceeds/ Consideration | Non-cash Items | Share Issue Costs | Income Taxes | Other Warrants and Options | Share Capital |
|---|---|---|---|---|---|---|---|---|
| **Balance as at January 1, 2013** | | **39,734,704** | | | | | | **$ 47,926** |
| Issue of common shares for liabilities | *(a)* | **472,000** | $ - | $ 120 | $ (5) | $ 1 | $ - | **116** |
| Issue of common shares for cash | *(b)* | **4,417,850** | 2,158 | - | (10) | 3 | - | **2,151** |
| Issue of common shares for loan fee | *(c)* | **568,182** | - | 245 | - | - | - | **245** |
| Issue of shares under Share Bonus Plan | *(d)* | **36,750** | - | 16 | - | - | - | **16** |
| Issue of shares under Share Bonus Plan | *(e)* | **118,000** | - | 39 | - | - | - | **39** |
| Issue of common shares and warrants under rights offering | *(f)* | **10,000,000** | 2,332 | - | (364) | 100 | (713) | **1,355** |
| Issue of common shares for loan fee | *(g)* | **78,929** | - | 20 | - | - | - | **20** |
| Issue of shares under Share Bonus Plan | *(h)* | **26,667** | - | 8 | - | - | - | **8** |
| Issue of common shares and warrants under private placement | *(i)* | **1,250,000** | 291 | - | (20) | 4 | (103) | **172** |
| **Balance as at December 31, 2013** | | **56,703,082** | $ 4,781 | $ 448 | $ (399) | $ 108 | $ (816) | **$ 52,048** |

| (after retroactive effect of Share Consolidation) | Notes | Number of Shares | Gross Proceeds/ Consideration | Non-cash Items | Share Issue Costs | Income Taxes | Other Warrants and Options | Share Capital |
|---|---|---|---|---|---|---|---|---|
| **Balance as at January 1, 2014** | | **56,703,082** | | | | | | **$ 52,048** |
| Options exercised | *(j)* | **463,000** | $ 201 | $ 144 | $ - | $ - | $ - | **345** |
| Warrants exercised | *(k)* | **450,065** | 144 | 30 | (2) | - | - | **172** |
| Issue of common shares for fractional positions | *(l)* | **163** | - | - | - | - | - | **-** |
| Issue of common shares for commitment fee | *(m)* | **18,268** | 10 | - | (5) | - | - | **5** |
| **Balance as at December 31, 2014** | | **57,634,578** | $ 355 | $ 174 | $ (7) | $ - | $ - | **$ 52,570** |

(a) In January 2013, the Company issued 472,000 shares (after giving retroactive effect to the Share Consolidation) to satisfy $120,000 in accounts payable owing to a vendor for settlement of outstanding amounts owed by the Company.

(b) In March 2013, the Company entered into a private placement with a key investor and issued 4,417,850 shares (after giving retroactive effect to the Share Consolidation) at C$0.50 per share generating gross proceeds of approximately $2,158,000.

(c) Effective March 2013, the Company issued 568,182 shares (after giving retroactive effect to the Share Consolidation) to satisfy $245,000 of the arrangement fee then outstanding on the Amended Loan.

(d) In April 2013, the Company issued 36,750 shares (after giving retroactive effect to the Share Consolidation) under the Share Bonus Plan to an employee.

(e) In July 2013, the Company issued 118,000 shares (after giving retroactive effect to the Share Consolidation) under the Share Bonus Plan to senior officers of the Company.

(f) On June 14, 2013, the Company announced the terms of a rights offering to existing shareholders to raise gross proceeds of up to approximately C$2,700,000. The offering closed on July 30, 2013 and raised gross proceeds of $2,332,000 (excluding any potential proceeds from the exercise of the warrants). Accordingly, the Company issued 10,000,000 shares and 10,000,000 share purchase warrants (after giving retroactive effect to the Share Consolidation). Each warrant entitles the holder to purchase one common share at a price of C$0.35 during the 12-month period beginning July 31, 2014.

(g) In August 2013, the Company issued 78,929 shares (after giving retroactive effect to the Share Consolidation) with a stated value of $20,000 for the arrangement fee under the terms related to the backstop of the rights offering (Note 16).

(h) In September 2013, the Company issued 26,667 shares (after giving retroactive effect to the Share Consolidation) under the Share Bonus Plan to an officer and employee of the Company.

(i) In September 2013, the Company entered into a private placement and issued 1,250,000 shares and 1,250,000 share purchase warrants at C$0.24 per share (after giving retroactive effect to the Share Consolidation) generating gross proceeds of $291,000. Each warrant entitles the holder to purchase one common share at a price of C$0.35 for two years from issue date.

(j) In January and February, 2014, various officers, employees and consultants of the Company exercised 463,000 options (after giving retroactive effect to the Share Consolidation) generating aggregate cash proceeds of $201,000; $144,000 was transferred from contributed surplus.

(k) In the second half of 2014, various shareholders exercised 450,065 warrants (after giving retroactive effect to the Share Consolidation) generating aggregate cash proceeds of $144,000; $30,000 was transferred from contributed surplus.

(l) As mentioned earlier, on September 12, 2014, the Company undertook a one-for-ten share consolidation of its common shares. Accordingly, the number of common shares of the Company outstanding at that time was reduced by 518,356,826 to 57,595,203; approximately 163 shares were issued for fractional positions.

(m) In December, 2014, the Company issued common shares to a third party for settlement of a commitment fee on the Amended Loan (Note 16).

**Share Incentive Plan**

The Company has a Share Incentive Plan which includes a Share Purchase Plan and a Share Bonus Plan. The purpose of the Share Incentive Plan is to encourage ownership of common shares by directors, senior officers and employees of the Company and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of its business, to advance the interests of the Company by providing additional incentive for superior performance by such persons and to enable the Company and its designated affiliates to attract and retain valued directors, officers, employees and consultants.

***Share Purchase Plan***

Under the Share Purchase Plan, eligible directors, senior officers and employees of the Company and its designated affiliates and consultants can contribute up to 10% of their annual basic salary before deductions to purchase common shares. The Company matches each participant's contribution. The purchase price per common share is the volume-weighted average of the trading prices of the common shares on the TSX for the calendar quarter in respect of which the common shares are issued. Common shares acquired are held in safekeeping and delivered to employees as soon as practicable following March 31, June 30, September 30 and December 31 in each calendar year. No common shares have yet been issued pursuant to the Share Purchase Plan. The maximum number of common shares issuable under the Share Purchase Plan is the lesser of: (i) that number of common shares that can be purchased with a dollar amount equal to 20% of the gross annual salary of the Participants (as defined in the Share Incentive Plan); and (ii) 1% of the aggregate number of issued and outstanding common shares (calculated on a non-diluted basis) from time to time.

***Share Bonus Plan***

The Share Bonus Plan permits common shares to be issued as a discretionary bonus to eligible directors, senior officers and employees of the Company and its designated affiliates, and consultants from time to time. At the Company's Annual and Special Meeting of Shareholders held on June 26, 2012, shareholders approved an increase in the maximum number of common shares issuable under the Share Bonus Plan to 1,000,000 (after giving retroactive effect to the Share Consolidation).

In 2013, 181,417 shares were issued under the Share Bonus Plan (after giving retroactive effect to the Share Consolidation). The entitlement to shares issued under the Share Bonus Plan in 2013 vested immediately. The fair value of common share entitlements granted under the Share Bonus Plan is determined using the quoted market value on the date of grant for an aggregate fair value of $64,000 in 2013, which was charged immediately. No shares were issued under this plan during 2014.

**Shareholder Rights Plan**

In March, 2009, the Board of Directors approved the adoption of a shareholder rights plan (the "Shareholder Rights Plan") which was subsequently confirmed by its shareholders at the Company's Annual and Special Meeting held on June 3, 2009 (the "ASM"). At the ASM, shareholders approved the extension of this plan to the termination of the annual meeting of shareholders in 2012, at which meeting this plan was further extended to the termination of the annual meeting of shareholders in 2015.

In order to implement the adoption of the Shareholder Rights Plan, the Board of Directors authorized the issuance of one right (a "Right") in respect of each common share outstanding at the close of business on April 17, 2009 (the "Record Time"). In addition, the Board authorized the issuance of one Right in respect of each additional common share issued after the Record Time. Rights trade with and are represented by common share certificates, including certificates issued prior to the Record Time. Until such time as the Rights separate from the common shares and become exercisable, Rights certificates will not be distributed to shareholders.

If a person, or a group acting in concert, acquires (other than pursuant to an exemption available under the Shareholder Rights Plan) beneficial ownership of 20% or more of the common shares, Rights (other than those held by such acquiring person which will become void) will separate from the common shares and permit the holder thereof to purchase common shares at a 50% discount to their market price. A person, or a group acting in concert, who is the beneficial owner of 20% or more of the outstanding common shares as of the Record Time is exempt from the dilutive effects of the Shareholder Rights Plan provided such person (or persons) does not increase its beneficial ownership by more than 1% (other than in accordance with the terms of the Shareholder Rights Plan). At any time prior to the Rights becoming exercisable, the Board may waive the operation of the Shareholder Rights Plan with respect to certain events before they occur.

The issuance of the Rights is not dilutive until the Rights separate from the underlying common shares and become exercisable or until the exercise of the Rights. The issuance of the Rights will not change the manner in which shareholders currently trade their common

shares.

**Accumulated Other Comprehensive Income or (Loss) ("AOCI")**
AOCI is comprised of the following separate components of equity:

***Net change of financial assets at fair value through OCI***
This comprises the cumulative net change in the fair value of financial assets at fair value through OCI.

***Income tax on other comprehensive income***
This comprises the amount of income tax determined to be required on the cumulative net change in the fair value of financial assets at fair value through OCI.

***Foreign exchange on change in functional currency***
This comprises the effects of the Company's decision to change the Company's functional and presentation currency to the US$ effective October 1, 2014. Refer to Note 2.

## 20. EARNINGS (LOSS) PER SHARE

The calculation of basic and diluted EPS for the years ended December 31, 2014 and 2013 was based on the information in the table below.

| (after retroactive effect of Share Consolidation - Note 19) | December 31, 2014 | December 31, 2013 |
|---|---|---|
| **Balance as at beginning of year** | **56,703,100** | 39,734,700 |
| Effect of shares issued to settle liabilities | **-** | 452,600 |
| Effect of shares issued for private placements | **-** | 3,805,700 |
| Effect of shares issued for loan fees | **-** | 472,500 |
| Effect of shares issued under rights offering | **-** | 4,246,600 |
| Effect of shares issued under Share Bonus Plan | **-** | 96,200 |
| Effect of shares issued for commitment fee | **4,700** | - |
| Effect of options exercised | **445,500** | - |
| Effect of warrants exercised | **172,600** | - |
| **Weighted average number of common shares as at end of period - Basic and Diluted** | **57,325,900** | 48,808,300 |
| Effect of options granted and outstanding | **495,100** | 590,000 |
| **Weighted average number of common shares as at end of year - Diluted** | **57,821,000** | 49,398,300 |
| Number of options excluded | **3,555,000** | 3,145,100 |
| Number of warrants excluded | **12,356,864** | 11,250,000 |
| Number of shares from conversion of promissory notes excluded | **6,935,575** | 2,127,200 |
| **Net loss attributable to shareholders - Basic** | **$ (2,416)** | $ (4,890) |
| **Net loss attributable to shareholders - Diluted** | **$ (2,416)** | $ (4,890) |
| **Basic loss per share** | **$ (0.04)** | $ (0.10) |
| **Diluted loss per share** | **$ (0.04)** | $ (0.10) |

The effect of adjustments to the weighted average number of common shares would be anti-dilutive when the Company incurs losses. The table above provides the weighted average number of shares on a diluted basis for periods where losses are incurred for information only. The average market value of the Company's shares for purposes of calculating the dilutive effect of share options is based on quoted market prices for the respective periods during which the options were outstanding.

There have been no share issuances subsequent to the end of the year which would have had a significant effect on the EPS.

## 21. SHARE-BASED PAYMENTS

### Description of the Share-based Payment Arrangements

The Company's share-based payment arrangements are described below.

***Stock Option Plan (equity-settled)***

The Company has a Stock Option Plan to encourage ownership of its shares by key management personnel (directors and executive management), employees and consultants, and to provide compensation for certain services. The terms of the Stock Option Plan provide that the directors have the right to grant options to acquire common shares of the Company at not less than the closing market price of the shares on the day preceding the grant. No compensation is recognized when options are exercised. The number of shares reserved for issuance is not to exceed 15% of the aggregate number of common shares issued and outstanding (calculated on a non-diluted basis) from time to time.

As at December 31, 2014, the Company had 5,125,187 common shares available for the granting of future options (December 31, 2013 – 5,330,134 common shares) (after giving retroactive effect to the Share Consolidation). Options are exercisable at the closing market price of the shares at the date prior to grant. The Company does not have any cash-settled transactions.

***Share purchase warrants (equity-settled)***

Pursuant to the rights offering which closed on July 30, 2013, the Company issued 10,000,000 warrants (after giving retroactive effect to the Share Consolidation in Note 19). The Company also issued 1,250,000 warrants (after giving retroactive effect to the Share Consolidation in Note 19) pursuant to a private placement on September 19, 2013. The 2,000,000 warrants (after giving retroactive effect to the Share Consolidation in Note 19) issued pursuant to the SPA Loan may be settled without cash and are, accordingly, classified as debt (Note 15). The Company does not have any cash-settled transactions.

***Share Bonus Plan***

The terms of the Share Bonus Plan are set out in Note 19.

### Terms and Conditions of Share-based Payment Arrangements

The terms and conditions relating to the grants of the Stock Option Plan are as follows:

- Options issued during the year and granted to executive management, consultants and employees have a maximum term of five years and are equity-settled. Of the options granted, 50% vest immediately, while the remaining options are exercisable after one year.
- Options issued during the year and granted to directors have a maximum term of five years and are equity-settled. All options granted vest immediately.
- Certain options issued upon formation of the Company under a plan of arrangement had terms of up to 10 years.

- All options are to be settled by physical delivery of shares.

***Share purchase warrants***

The terms and conditions relating to the grants of the share purchase warrants are as follows: all warrants are to be settled by physical delivery of shares and as such, are equity-settled. Warrants issued are generally exercisable for a period of 12 to 18 months from issue date; the warrants issued under the rights offering in 2013 are exercisable on July 31, 2014 and expire on July 31, 2015. The Company's share purchase warrants issued pursuant to the private placement are exercisable on issue and expire on September 19, 2015.

## Disclosure of Share-based Payment Arrangements

***Stock Option Plan***

The number and weighted average exercise prices of options (after giving retroactive effect to the Share Consolidation in Note 19) are as follows:

| **(after retroactive effect of Share Consolidation - Note 19)** | | | | **Weighted** |
|---|---|---|---|---|
| **(amounts in Canadian dollars)** | **Number of options** | | **average exercise price** | |
| **As at and for the years ended December 31** | **2014** | 2013 | **2014** | 2013 |
| **Outstanding as at beginning of year** | **3,204,125** | 2,865,150 | **$ 0.80** | $ 1.30 |
| Granted | **1,063,000** | 937,000 | **$ 0.66** | $ 0.30 |
| Exercised | **(463,000)** | - | **$ 0.46** | $ - |
| Expired or forfeit | **(249,125)** | (598,025) | **$ 1.70** | $ 2.40 |
| **Outstanding as at end of year** | **3,555,000** | 3,204,125 | **$ 0.72** | $ 0.80 |
| **Exercisable as at end of year** | **3,209,750** | 2,945,625 | **$ 0.73** | $ 0.80 |

| **(after retroactive effect of Share Consolidation - Note 19)** | **Number of options outstanding** | | **Weighted average remaining contractual life (years)** | |
|---|---|---|---|---|
| **As at December 31,** | **2014** | 2013 | **2014** | 2013 |
| **Range of exercise prices (Canadian dollars)** | | | | |
| $0.25 to $0.50 | **1,587,000** | 2,101,000 | **2.96** | 3.19 |
| $0.55 to $0.55 | **263,000** | - | **4.10** | - |
| $0.60 to $1.40 | **1,186,000** | 424,750 | **3.22** | 2.33 |
| $1.50 to $1.60 | **519,000** | 519,000 | **0.01** | 1.01 |
| $1.70 to $2.50 | **-** | 159,375 | **-** | 0.07 |
| | **3,555,000** | 3,204,125 | **2.61** | 2.57 |

Additional disclosures relating to the Company's options are as follows:

| **(after retroactive effect of Share Consolidation - Note 19)** | | | |
|---|---|---|---|
| **As at and for the years ended December 31,** | | **2014** | 2013 |
| Number of options granted during the year | | **1,063,000** | 937,000 |
| Weighted average fair value of options granted at grant date (Canadian dollars) | **$** | **0.393** | $ 0.180 |
| Number of options subject to vesting as at end of year | | **3,209,750** | 2,585,000 |
| Share-based payment expense - vesting options | **$** | **344** | $ 177 |
| Share-based payment expense - extended options | **$** | **-** | $ 20 |
| Unvested options not yet charged to operations | **$** | **58** | $ 25 |

***Share purchase warrants***

The number and weighted average exercise prices of warrants are as follows:

| (after retroactive effect of Share Consolidation - Note 19) (amounts in Canadian dollars) As at and for the years ended | Date Issued | Life | Number of warrants 2014 | 2013 | Weighted average exercise price 2014 | 2013 |
|---|---|---|---|---|---|---|
| **Issued pursuant to rights offering** | | | | | | |
| Unit warrants | July 30, 2013 | 12 [(a)] | **10,000,000** | 10,000,000 | **$ 0.35** | $ 0.35 |
| Exercised | | | **(450,065)** | - | | |
| **Issued pursuant to private placements** | | | | | | |
| Unit warrants | Sept. 19, 2013 | 24 | **1,250,000** | 1,250,000 | **$ 0.35** | $ 0.35 |
| SPA warrants | May 15, 2014 | 36 | **2,000,000** | - | **$ 1.00** | n/a |
| **Outstanding as at end of year** | | | **12,799,935** | 11,250,000 | **$ 0.45** | $ 0.35 |

(a) The life of warrants is shown in number of months from issue date, except for those issued pursuant to the rights offering which became exercisable 12 months from issue.
(b) The SPA warrants may be settled without cash and are, accordingly, classified as debt rather than as a component of contributed surplus.
(c) The number of warrants and weighted average exercise prices are disclosed after giving retroactive effect to the Share Consolidation in Note 19.

## Inputs for Measurement of Grant-Date Fair Values

The grant-date fair values of share-based payments were measured based on the Black-Scholes option-pricing model. Expected volatility is estimated by considering historic average share price volatility.

The inputs used in the measurement of the fair values at grant date of the share-based payments granted, modified or issued during the years are as follows:

| (after retroactive effect of Share Consolidation - Note 19) (amounts in Canadian dollars) Years ended December 31, | Options 2014 | 2013 | Warrants 2014 | 2013 |
|---|---|---|---|---|
| Fair values at grant dates | **$0.31 and $0.42** | $0.12 to $0.19 | **n/a** | $0.11 and $0.19 |
| Fair values of options modified | **n/a** | $0.04 to $0.23 | **n/a** | n/a |
| Share prices at grant and modification dates | **$0.70 and $0.50** | $0.25 and $0.30 | **n/a** | $ 0.25 |
| **Assumptions** | | | | |
| Exercise prices | **$0.70 and $0.55** | $0.25 to $1.60 | **n/a** | $ 0.35 |
| Expected volatilities | **93% and 91%** | 88% to 111% | **n/a** | 101% and 107% |
| Life (years) | **4** | 0.5 to 4.9 | **n/a** | 2 |
| Expected dividends | **-** | - | **n/a** | - |
| Risk-free interest rates | **1.23% and 1.01%** | 0.78% to 1.63% | **n/a** | 1.15% and 1.22% |

## 22. FINANCE INCOME AND FINANCE COSTS

| Years ended December 31, | *Notes* | 2014 | 2013 |
|---|---|---|---|
| Interest income on bank deposits | | **$ 1** | $ 14 |
| Net change in fair value of financial liabilities at fair value through operations | *15,16* | **1,943** | - |
| Gain on adjustment of estimated cash flows | *16* | **225** | - |
| **Finance income** | | **2,169** | 14 |
| Interest expense on loans | | | |
| Cash settled | *15* | **1,274** | 160 |
| Amortization of loan fees | *15* | **770** | 130 |
| Amortization of embedded option derivatives | *15* | **339** | 11 |
| Commitment fee | *16* | **3** | 10 |
| Loss on adjustment of estimated cash flows | *16* | **-** | 3,100 |
| Net change in fair value of financial liabilities at fair value through operations | *15,16* | **-** | 165 |
| Net foreign exchange loss | | **243** | 57 |
| **Finance costs** | | **2,629** | 3,633 |
| **Net Finance Costs** | | **$ (460)** | $ (3,619) |

## 23. INCOME TAXES

The income tax amount in 2014 is a recovery of $490,000 (2013 – recovery of $778,000).

The income tax recovery differs from the amount computed by applying the statutory federal and provincial income tax rates for 2014 of 25.0% and 2013 of 26.5%, to the loss before income taxes. The differences are summarized as follows:

| Years ended December 31, | 2014 | 2013 |
|---|---|---|
| Statutory rate applied to loss before income taxes | **$ (732)** | $ (1,505) |
| Effect of investment tax credits, net | **(28)** | (33) |
| Non-deductible items, net | **137** | 64 |
| Non-taxable portion of capital loss on financial liabilities through operations | **(30)** | 395 |
| Effect of change in expected future income tax rates and other | **30** | (225) |
| Unrecognized deferred tax assets | **110** | 526 |
| **Income Tax Recovery** | **$ (513)** | $ (778) |

## 24. OPERATING SEGMENT

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products; since January 1, 2014, it also is a producer and supplier of premium frac sand from its 7P Plant. Accordingly, the Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand. Prior to January1, 2014, there were no formal operating segments; for comparative purposes, the Company estimated the assets involved in each segment and has reported them in the table below.

The Corporate segment operates to support the Company's activities, including exploration and development projects and the frac sand business. The Company will continue to share

services with Nuinsco (Note 25) to do so.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada. Any applicable amounts relating to such projects will continue to be capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.
The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 26). The segment is located in Canada although raw materials purchases are sourced from the US.

The following tables provide information on the Company's segments:

| | **December 31, 2014** | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| **Canada** | | | |
| Corporate | **$ 1,860** | $ 2,290 | $ 2,404 |
| Exploration and Development | **49,734** | 51,764 | 52,904 |
| Frac Sand | **11,300** | 3,654 | - |
| Intersegment elimination | **(962)** | (455) | - |
| **Total Assets** | **$ 61,932** | $ 57,253 | $ 55,308 |

| **Year ended December 31, 2014** | **Corporate** | **Exploration and Development** | **Frac Sand** | **Intersegment Reclassification** | **Total** |
|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 13,976** | **$ -** | **$ 13,976** |
| Cost of goods sold | **-** | **-** | **(12,854)** | **-** | **(12,854)** |
| **Gross margin** | **-** | **-** | **1,122** | **-** | **1,122** |
| **Operating expenses** | | | | | |
| General and administrative | **(1,914)** | **(26)** | **(496)** | **-** | **(2,436)** |
| Share-based payments: | | | | | |
| Options | **(344)** | **-** | **-** | **-** | **(344)** |
| Share Bonus plan | **-** | **-** | **-** | | **-** |
| Amortization of property, plant and equipment | **(1)** | **(4)** | **(548)** | **-** | **(553)** |
| Writedown of E and E projects | **-** | **(60)** | **-** | **-** | **(60)** |
| Pre-exploration costs | **-** | **(4)** | **-** | **-** | **(4)** |
| Net frac sand pre-operating costs | **-** | **-** | **(194)** | **-** | **(194)** |
| **Operating loss** | **(2,259)** | **(94)** | **(116)** | **-** | **(2,469)** |
| Finance income | **2,169** | **-** | **11** | **(11)** | **2,169** |
| Finance costs | **(2,611)** | **-** | **(29)** | **11** | **(2,629)** |
| **Net finance costs** | **(442)** | **-** | **(18)** | **-** | **(460)** |
| **Loss before income taxes** | **(2,701)** | **(94)** | **(134)** | **-** | **(2,929)** |
| Income tax recovery | **513** | **-** | **-** | **-** | **513** |
| **Net Loss for the Year** | **$ (2,188)** | **$ (94)** | **$ (134)** | **$ -** | **$ (2,416)** |

There have been no changes in the reportable segments or the treatment of segmented assets and revenues during the year.

## 25. RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 19 and 21).

Balances and transactions with related parties as at and for the years ended December 31, 2014 and 2013 are shown in the following tables:

| **As at December 31,** | **December 31, 2014** | December 31, 2013 | January 1, 2013 |
|---|---|---|---|
| **Balances Outstanding** | | | |
| Payable to key management personnel | **$ 251** | $ 112 | $ 158 |

Key management personnel compensation comprises:

| **Years ended December 31,** | **2014** | 2013 |
|---|---|---|
| Short-term employee benefits | **$ 891** | $ 924 |
| Share-based payments - options | **233** | 115 |
| Share-based payments - Share Bonus Plan | **-** | 64 |
| | **$ 1,124** | $ 1,103 |

## Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director, Mr. René Galipeau. As described in Note 16, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the management agreement will cease around the end of February 2015. The Company expects to continue to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at and for the years ended December 31, 2014 and 2013 are shown in the following tables:

| | **December 31, 2014** | **December 31, 2013** | **January 1, 2013** |
|---|---|---|---|
| **Balances Outstanding under the Management Agreement** | | | |
| Payable to Nuinsco Resources Limited | **$ 45** | $ 53 | $ - |
| Receivable from Nuinsco Resources Limited | **$ -** | $ - | $ 37 |

| Years ended December 31, | | 2014 | | 2013 |
|---|---|---|---|---|
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **671** | $ | 733 |
| Overhead charges to Nuinsco Resources Limited | **$** | **-** | $ | 17 |
| Project costs charged to Nuinsco Resources Limited | **$** | **21** | $ | 36 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **70** | $ | 29 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis. Payables to key management personnel generally relate to directors' fees, consulting fees and expense reimbursements.

**Balances and Transactions with Nuinsco Resources Limited under the Amended Loan/Participating interest**

The terms of the Amended Loan/Participating Interest with Nuinsco and the balances and transactions related thereto are described in Note 16.

## 26. COMPANY ENTITY

**Significant Subsidiary - Victory Silica**

On June 19, 2012, the Company announced a new initiative through the creation of Victory Silica. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Victory Silica's executives and employees manage the frac sand business on behalf of the Company. Until the end of the first quarter, most costs of the frac sand business related either to pre-operating costs which have been expensed through operations or to plant commissioning and mobile equipment which have been capitalized. In the first three months of 2014, sales of frac sand produced during the pre-operating stage amounted to $248,000; these have been netted against the pre-operating expenditures recorded in the first quarter resulting in *Net frac sand pre-operating costs* recorded in the statement of operations of $194,000.

Significant production and sales volumes were achieved during the second quarter of 2014 thus the 7P Plant was no longer considered to be pre-operating. Consequently, operating results commenced being reported and amortization of the 7P Plant commenced in the second quarter of 2014. Full commissioning of the 7P Plant occurred in August, 2014.

| As at and for the years ended December 31, | | December 31, 2014 | | December 31, 2013 | | January 1, 2013 |
|---|---|---|---|---|---|---|
| **Victory Silica Ltd.** | | | | | | |
| Current assets | **$** | **46** | $ | 76 | $ | - |
| Current liabilities | **$** | **143** | $ | 260 | $ | - |
| Pre-operating costs | **$** | **194** | $ | 585 | $ | 160 |

## 27. COMMITMENT

**Transformer Equipment**

On May 10, 2010, the Company entered into an agreement to purchase equipment for the Minago project. The total price is $2,840,000. The Company has made aggregate deposits of $1,544,000 as at December 31, 2014.

## 28. SUBSEQUENT EVENT

### Extension of short-term loan

On March 31, 2015, the Company agreed on an additional extension of the short-term loan with the lender. The balance outstanding is $1,000,000 and is now due on or before April 30, 2015 under similar terms. On March 31, 2015, the Company paid an extension fee of $10,000 along with a penalty for not repaying the amount originally due on March 31, 2015 of $15,000. In addition, with respect to the promissory note, the Company agreed upon an extension of a $73,000 interest payment required on March 31, 2015 to be paid on April 1, 2015.

## Consolidated Financial Statements for the Years Ended December 31, 2013 and 2012 (Dated March 25, 2014)

### MANAGEMENT'S RESPONSIBILITY FOR CONSOLIDATED FINANCIAL STATEMENTS

All of the information in the annual report and accompanying consolidated financial statements of Victory Nickel Inc. is the responsibility of management. The consolidated financial statements have been prepared by management in accordance with Canadian generally accepted accounting principles for public companies, being international financial reporting standards. Where necessary, management has made judgements and estimates in preparing the consolidated financial statements and such statements have been prepared within acceptable limits of materiality. The financial information contained elsewhere in the annual report has been reviewed to ensure that it is consistent with the consolidated financial statements.

Management maintains appropriate systems of internal control to give reasonable assurance that its assets are safeguarded, and the financial records are properly maintained.

The Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of Directors, none of whom are employees or officers of the Company, meets with management and the external auditors to review the auditors' report and the consolidated financial statements to satisfy itself that management is properly discharging its responsibilities to the Directors, who approve the consolidated financial statements.

A firm of independent Chartered Accountants, appointed by the shareholders, audits the consolidated financial statements in accordance with Canadian generally accepted auditing standards and provides an independent professional opinion thereon. The external auditors have free and full access to the Audit Committee with respect to their findings regarding the fairness of financial reporting and the adequacy of internal controls.

René R. Galipeau, Vice-Chairman and CEO
Alison J. Sutcliffe, Vice-President, Finance & CFO
March 31, 2014

**INDEPENDENT AUDITOR'S REPORT**
**TO THE SHAREHOLDERS OF VICTORY NICKEL INC.**

We have audited the accompanying consolidated financial statements of Victory Nickel Inc. which comprise the consolidated balance sheets as at December 31, 2013 and December 31, 2012, and the consolidated statements of operations, comprehensive loss, shareholders' equity and cash flows for the years ended December 31, 2013 and December 31, 2012 and a summary of significant accounting policies and other explanatory information.

**Management's Responsibility for the Financial Statements**
Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with International Financial Reporting Standards and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

**Auditor's Responsibility**
Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

**Opinion**
In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of Victory Nickel Inc. as at December 31, 2013 and December 31, 2012, and its financial performance and its cash flows for the years ended December 31, 2013 and December 31, 2012 in accordance with International Financial Reporting Standards.

**Emphasis of Matter**
Without qualifying our opinion, we draw attention to Note 1 in the consolidated financial statements which indicates that the Company has not commenced commercial production and accordingly the Company is dependent upon debt or equity financing and the optioning and/or sale of resource or resource-related assets for its funding. These conditions, along with other

matters as set forth in Note 1, indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

(signed) BDO Canada LLP

Chartered Accountants, Licensed Public Accountants

Toronto, Ontario
March 31, 2014

## Consolidated Balance Sheets

| As at December 31,<br>(in thousands of Canadian dollars) | *Notes* | | **2013** | | 2012 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| **Current assets** | | | | | |
| Cash and cash equivalents | *6* | **$** | **1,423** | $ | 256 |
| Receivables and prepaids | *7* | | **381** | | 155 |
| Marketable securities | *8* | | **278** | | 557 |
| **Total current assets** | | | **2,082** | | 968 |
| **Non-current assets** | | | | | |
| Property and equipment | *10* | | **5,279** | | 1,424 |
| Mine property and development project | *11* | | **38,668** | | 37,897 |
| Exploration and evaluation projects | *12* | | **14,865** | | 14,738 |
| **Total non-current assets** | | | **58,812** | | 54,059 |
| **Total Assets** | | **$** | **60,894** | $ | 55,027 |
| **LIABILITIES AND SHAREHOLDERS' EQUITY** | | | | | |
| **Current liabilities** | | | | | |
| Trade and other payables | *13* | **$** | **1,617** | $ | 551 |
| Loans and borrowings - current portion | *14* | | **-** | | 1,000 |
| **Total current liabilities** | | | **1,617** | | 1,551 |
| **Non-current liabilities** | | | | | |
| Loans and borrowings - long-term portion | *14* | | **6,379** | | 8 |
| Lease obligations - long-term portion | *15* | | **408** | | - |
| Deferred tax liability | *16* | | **1,521** | | 2,473 |
| **Total non-current liabilities** | | | **8,308** | | 2,481 |
| **Total Liabilities** | | | **9,925** | | 4,032 |
| **Shareholders' equity** | | | | | |
| Share capital | *17* | | **51,907** | | 47,683 |
| Contributed surplus | | | **5,441** | | 4,397 |
| Accumulated other comprehensive income | | | **1,665** | | 1,855 |
| Deficit | | | **(8,044)** | | (2,940) |
| **Total shareholders' equity** | | | **50,969** | | 50,995 |
| **Total Liabilities and Shareholders' Equity** | | **$** | **60,894** | $ | 55,027 |

**NATURE OF OPERATIONS (Note 1)**

The accompanying notes are an integral part of these consolidated financial statements

Approved by the Board of Directors

(signed)
**Cynthia P. Thomas**
Director

(signed)
**Roland Horst**
Director

## Consolidated Statements of Operations

| **Years ended December 31,**<br>(in thousands of Canadian dollars, except per share amounts) | ***Notes*** | | **2013** | | 2012 |
|---|---|---|---|---|---|
| **Operating expenses** | | | | | |
| General and administrative | | **$** | **(1,631)** | $ | (1,321) |
| Share-based payments: | *19* | | | | |
| Options | | | **(205)** | | (263) |
| Share Bonus Plan | | | **(43)** | | - |
| Amortization of property and equipment | *10* | | **(27)** | | (18) |
| Recovery of exploration and evaluation project | *12* | | **392** | | 1,450 |
| Frac sand pre-operating costs | | | **(605)** | | (159) |
| **Operating loss** | | | **(2,119)** | | (311) |
| Finance income | *20* | | **13** | | 3 |
| Finance costs | *20* | | **(3,808)** | | (16) |
| **Net finance costs** | | | **(3,795)** | | (13) |
| **Loss before income taxes** | | | **(5,914)** | | (324) |
| Income tax recovery | *21* | | **810** | | 141 |
| **Net Loss for the Year** | | **$** | **(5,104)** | $ | (183) |
| **(Loss) earnings per share** | *18* | | | | |
| Basic (loss) earnings per share | | **$** | **(0.01)** | $ | (0.00) |
| Diluted (loss) earnings per share | | **$** | **(0.01)** | $ | (0.00) |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Comprehensive Loss

| **Years ended December 31,**<br>(in thousands of Canadian dollars) | ***Notes*** | | **2013** | | 2012 |
|---|---|---|---|---|---|
| **Net loss for the year** | | **$** | **(5,104)** | $ | (183) |
| **Other comprehensive loss ("OCI")** | | | | | |
| Net change in fair value of financial assets | *9* | | **(220)** | | (655) |
| Income tax recovery | *16* | | **30** | | 88 |
| **Other comprehensive loss for the year** | | | **(190)** | | (567) |
| **Total Comprehensive Loss for the Year** | | **$** | **(5,294)** | $ | (750) |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Shareholders' Equity

| (in thousands of Canadian dollars) | *Notes* | Share Capital | Contributed Surplus | Accumulated Other Comprehensive Income / (Loss) | Deficit | Total Equity |
|---|---|---|---|---|---|---|
| **Balances as at January 1, 2012** | | $ 47,631 | $ 4,134 | $ 2,422 | $ (2,757) | $ 51,430 |
| **Total comprehensive loss for the year** | | | | | | |
| Net loss for the year | | | | | (183) | (183) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | *9* | | | (655) | | (655) |
| Income tax recovery | *16* | | | 88 | | 88 |
| **Total other comprehensive loss** | | | | (567) | | (567) |
| **Total comprehensive loss for the year** | | | | | | (750) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the year** | | | | | | |
| Issue of common shares for settlement of liabilities | *17* | 38 | - | - | - | 38 |
| Expiry of finder's unit warrants | *17* | 14 | - | - | - | 14 |
| Options granted and vesting or modified | *19* | - | 263 | - | - | 263 |
| **Total contributions by owners** | | 52 | 263 | - | - | 315 |
| **Total transactions with owners** | | 52 | 263 | - | - | 315 |
| **Balances as at December 31, 2012** | | $ 47,683 | $ 4,397 | $ 1,855 | $ (2,940) | $ 50,995 |
| **Balances as at January 1, 2013** | | $ 47,683 | $ 4,397 | $ 1,855 | $ (2,940) | $ 50,995 |
| **Total comprehensive loss for the year** | | | | | | |
| Net loss for the year | | | | | (5,104) | (5,104) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | *9* | | | (220) | | (220) |
| Income tax recovery | *16* | | | 30 | | 30 |
| **Total other comprehensive loss** | | | | (190) | | (190) |
| **Total comprehensive loss for the year** | | | | | | (5,294) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the year** | | | | | | |
| Issue of common shares for settlement of liabilities, net | *17* | 115 | - | - | - | 115 |
| Issue of common shares under private placement, net | *17* | 2,200 | - | - | - | 2,200 |
| Issue of common shares for loan fee | *17* | 271 | - | - | - | 271 |
| Issue of common shares and warrants under private placement, net | *17* | 179 | 106 | - | - | 285 |
| Issue of common shares and warrants under rights offering, net | *17* | 1,393 | 733 | - | - | 2,126 |
| Issue of common shares under Share Bonus Plan | *17* | 66 | - | - | - | 66 |
| Options granted and vesting or modified | *19* | - | 205 | - | - | 205 |
| **Total contributions by owners** | | 4,224 | 1,044 | - | - | 5,268 |
| **Total transactions with owners** | | 4,224 | 1,044 | - | - | 5,268 |
| **Balances as at December 31, 2013** | | **$ 51,907** | **$ 5,441** | **$ 1,665** | **$ (8,044)** | **$ 50,969** |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Cash Flows

| **Years ended December 31,** (in thousands of Canadian dollars) | ***Notes*** | **2013** | 2012 |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Net loss for the year | | **$ (5,104)** | $ (183) |
| Adjustments for: | | | |
| Share-based payments | *19* | **248** | 263 |
| Expiry of finder's unit warrants | *17* | **-** | 14 |
| Amortization of property and equipment | *10* | **27** | 18 |
| Recovery of exploration and evaluation project | *12* | **(392)** | (1,450) |
| Net finance costs | *20* | **3,781** | 11 |
| Income tax recovery | *21* | **(810)** | (141) |
| Net change in working capital: | | | |
| Change in receivables | | **(227)** | 9 |
| Change in trade and other payables | | **103** | 164 |
| **Net cash used by operating activities** | | **(2,374)** | (1,295) |
| **Cash flows from investing activities** | | | |
| Expenditures on mine property and development project | *11* | **(973)** | (2,201) |
| Expenditures on exploration and evaluation projects | *12* | **(138)** | (183) |
| Proceeds on sale of marketable securities | | **59** | 1,168 |
| Proceeds from option of Lynn Lake | *12* | **400** | 1,450 |
| Deposits on equipment | *7,10* | **(152)** | (200) |
| Expenditures on 7P Plant | *10* | **(2,021)** | - |
| Net sale of furniture and equipment | *10* | **27** | - |
| **Net cash (used by) from investing activities** | | **(2,798)** | 34 |
| **Cash flows from financing activities** | | | |
| Issue of common shares and warrants | *17* | **4,496** | - |
| Payments of interest | *14* | **(173)** | - |
| Payments under leases | *15* | **(100)** | - |
| Net proceeds of loans | *14* | **2,096** | 1,000 |
| **Net cash from financing activities** | | **6,319** | 1,000 |
| **Net increase (decrease) in cash and cash equivalents** | | **1,147** | (261) |
| Unrealized foreign exchange gain on cash and cash equivalents | | **20** | - |
| **Cash and Cash Equivalents, Beginning of the Year** | | **256** | 517 |
| **Cash and Cash Equivalents, End of the Year** | | **$ 1,423** | $ 256 |

The accompanying notes are an integral part of these consolidated financial statements

## NATURE OF OPERATIONS

### Nature of Operations

Victory Nickel Inc. ("Victory Nickel" or the "Company") is a company domiciled in Canada. The address of the Company's registered office is 80 Richmond St. West, Suite 1802, Toronto, Ontario, M5H 2A4. The consolidated financial statements as at and for the years ended December 31, 2013 and 2012 comprise the Company and its subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica") together referred to as "Victory Nickel" and individually as "Victory Nickel entities". Victory Nickel is primarily engaged in the acquisition, exploration and development of nickel properties and associated products in Canada and is preparing to enter the oilfield services market via the sale of frac sand. The Company was formed on February 1, 2007 pursuant to a plan of arrangement.

The Company is listed on the Toronto Stock Exchange ("TSX") under the symbol NI.

### Going Concern

These consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at December 31, 2013, the Company had working capital of $465,000, (December 31, 2012 – working capital deficiency of $583,000 which included approximately $176,000 of voluntary deferrals owing to directors and senior management and $118,000 of accounts payable subsequently settled through issuing shares). Working capital is defined as current assets less current liabilities. The Company has initiatives underway to improve working capital which are expected to be announced shortly as well as the convertible promissory notes described in Note 26.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings and the optioning and/or sale of resource or resource-related assets for its funding. Plans to enter the frac sand business and generate cash flow are significantly advanced with expected production in early 2014. The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding.

Should the Company not be able to continue to achieve favourable exploration results, obtain the necessary financing, achieve profitable operations on the frac sand business or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary

to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

## 1. BASIS OF PREPARATION

### (a) Statement of Compliance

The consolidated financial statements have been prepared using accounting policies consistent with International Financial Reporting Standards ("IFRS") and its interpretations adopted by the International Accounting Standards Board ("IASB"). This is GAAP for a Canadian public company.

The management of Victory Nickel prepare the consolidated financial statements which are then reviewed by the Audit Committee and the Board of Directors. The consolidated financial statements were authorized for issue by the Board of Directors on March 31, 2014 and are made available to shareholders and others through filing on SEDAR shortly thereafter.

### (b) Basis of Measurement

The financial statements have been prepared on the historic cost basis except for derivative financial instruments such as warrants which are measured at fair value with changes through operations and financial assets such as marketable securities which are measured at fair value with changes recorded through other comprehensive income or loss ("OCI").

### (c) Functional and Presentation Currency

These financial statements are presented in Canadian dollars, which is the Company's functional currency. All financial information is expressed in Canadian dollars unless otherwise stated; tabular amounts are stated in thousands of dollars.

### (d) Use of Estimates and Judgements

The preparation of financial statements in conformity with IFRS requires management to make estimates, judgements and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

It is reasonably possible that, on the basis of existing knowledge, outcomes in the next financial year that are different from the assumptions used could require a material adjustment to the carrying amount of the asset or liability affected.

The accompanying consolidated financial statements include all adjustments that are, in the opinion of management, necessary for fair presentation.

#### *Significant estimates and assumptions*

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Information regarding significant areas of estimation uncertainty made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 9 - valuation of financial assets at fair value through operations and OCI;
- Note 11 - measurement of the recoverable amount of mine property and development project;
- Note 12 - measurement of the recoverable amount of exploration and evaluation projects;
- Note 14 – measurement and valuation of the loan payable;
- Note 14 - measurement and valuation of the embedded options in convertible notes; and
- Note 19 - measurement of share-based payments.

***Significant judgements***

Judgements are reviewed on an ongoing basis. Changes resulting from the effects of amended judgements are recognized in the period in which the circumstance giving rise to the change occurs and in any future periods presented.

Information regarding significant areas of critical judgements made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 1 - going concern assessment;
- Note 11 - classification of expenditures as mine property and development project or operating expenses;
- Note 12 - classification of expenditures as exploration and evaluation projects or operating expenses;
- Note 11 - impairment of mine property and development project;
- Note 12 - impairment of exploration and evaluation projects;
- Note 16 - recoverability of deferred tax assets.

## 2. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies of the Company are set out in detail below. Such policies have been applied consistently to all periods presented in these consolidated financial statements, and have been applied consistently by Victory Nickel entities.

### (a) New Accounting Policies

There have been no new accounting policies adopted by the Company.

### (b) Basis of Consolidation

***Subsidiary***

A subsidiary is an entity controlled by Victory Nickel. Control exists when Victory Nickel has the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities. In assessing control, potential voting rights that currently are exercisable are taken into account. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases. The

accounting policies of subsidiaries align with the policies adopted by Victory Nickel. Significant Company entities are listed in Note 24.

***(i) Transactions eliminated on consolidation***

Intercompany balances and transactions, and any unrealized income and expenses arising from intercompany transactions, are eliminated in preparing the consolidated financial statements. Unrealized gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of Victory Nickel's interest in the investee. Unrealized losses are eliminated in the same way as unrealized gains, but only to the extent that there is no evidence of impairment.

**(c) Foreign Currency**

***(i) Foreign currency transactions***

Transactions in foreign currencies are translated to the respective functional currency of Victory Nickel at exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies at the reporting date are retranslated to the functional currency at the exchange rate at that date. The foreign currency gain or loss on monetary items is the difference between amortized cost in the functional currency at the beginning of the period, adjusted for effective interest and payments during the period, and the amortized cost in foreign currency translated at the exchange rate at the end of the period. Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are retranslated to the functional currency at the exchange rate at the date that the fair value was determined. Foreign currency differences arising on retranslation are recognized through operations, except for differences arising on the retranslation of marketable securities, which are recognized directly in OCI. Non-monetary items that are measured in terms of historic cost in a foreign currency are translated using the exchange rate at the date of the transaction.

**(d) Financial Instruments**

**IFRS 9 Financial Instruments**

IFRS 9 Financial Instruments ("IFRS 9"), which impacts the classification and measurement of financial assets, has been adopted by the Company.

***(iii)Non-derivative financial instruments***

Non-derivative financial instruments comprise investments in equity securities, receivables, cash and cash equivalents and trade and other payables.

Non-derivative financial instruments, with the exception of financial assets and liabilities at fair value through OCI, are recognized initially at fair value plus, for instruments not at fair value through operations, any directly attributable transaction costs. Subsequent to initial recognition, non-derivative financial instruments are measured as described below.

Cash and cash equivalents comprise cash balances and call deposits.

Loans, receivables and borrowings are financial assets with fixed or determinable payments that are not quoted in an active market. Such assets and liabilities are recognized initially at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, loans, receivables and borrowings are measured at amortized cost using the effective interest method, less any impairment losses. Loans, receivables and borrowings comprise receivables

or payables.

Accounting for finance income and expenses is discussed in Note 3(n).

*Financial assets at fair value through OCI*
Victory Nickel's investments in equity securities are measured at fair value and changes therein, as well as foreign currency differences on monetary items (which do not include equity investments), are recognized directly in OCI.

*Financial instruments at amortized cost*
Other non-derivative financial instruments are measured at amortized cost using the effective interest method, less any impairment losses.

***(iv)Derivative financial instruments***
Victory Nickel may periodically hold warrants as part of its portfolio of marketable securities which are financial assets at fair value through operations. Convertible promissory notes contain embedded derivatives which are separated from the financial instrument measured at amortized cost.

Derivatives are recognized initially at fair value; attributable transaction costs are recognized through operations when incurred. Subsequent to initial recognition, derivatives are measured at fair value and changes therein are recognized immediately through operations.

**(e) Property and Equipment**
***(iii)Recognition and measurement***
Items of property and equipment are measured at cost less accumulated depreciation and accumulated impairment losses. Cost includes any expenditure that is directly attributable to the acquisition of the asset.

When parts of an item of property and equipment have different useful lives, they are accounted for as separate items (major components) of property and equipment. Gains and losses on disposal of an item of property and equipment are determined by comparing the proceeds from disposal with the carrying amount of property and equipment and are recognized net within *Other income* in the consolidated statement of operations.

***(iv)Depreciation***
Depreciation is calculated as a function of the depreciable amount, which is the cost of an asset less its residual value. Depreciation is recognized through operations as follows over the estimated useful lives of each part of an item of property and equipment. Land is not depreciated. Depreciation commences when an asset is placed into service. The plant at Seven Persons, near Medicine Hat, Alberta (the "7P Plant") has not yet been commissioned and is not being depreciated.

The estimated useful lives for the current and comparative periods are as follows:

| Item | Method | 2013 | 2012 |
|---|---|---|---|
| Building | Declining-balance | **5%** | 5% |
| Equipment and Furniture | Declining-balance | **20%** | 20% |
| Vehicles and Mobile Equipment | Declining-balance | **30%** | 30% |

Depreciation methods, useful lives and residual values are reviewed at each financial year end and adjusted if appropriate.

**(f) Exploration and Evaluation Projects**

***(iv)Exploration and Evaluation expenditures***

Exploration and Evaluation ("E&E") expenditures relate to costs incurred on the exploration for and evaluation of potential mineral reserves and includes costs related to the following: acquisition of exploration rights; conducting geological studies; exploratory drilling and sampling and evaluating the technical feasibility and commercial viability of extracting a mineral resource.

E&E expenditures, including costs of acquiring licenses, are capitalized as E&E assets on an "area of interest basis" which generally is defined as a project. The Company considers a project to be an individual geological area whereby the presence of a mineral deposit is considered favourable or has been proved to exist and, in most cases, comprises a single mine or deposit.

E&E assets are recognized if the rights to the project are current and either:

- the expenditures are expected to be recouped through successful development and exploitation of the project, or alternatively by its sale; or
- activities on the project have not, at the reporting date, reached a stage which permits a reasonable assessment of the existence or otherwise of economically recoverable reserves and active and significant operations in, or in relation to, the project are continuing.

E&E expenditures are initially capitalized as intangible E&E assets. Such E&E expenditures may include costs of licence acquisition, technical services and studies, seismic acquisition, exploration drilling and testing, materials and fuels used, rentals and payments made to contractors and consultants. To the extent that a tangible asset is consumed in developing an intangible E&E asset, the amount reflecting that consumption is recorded as part of the cost of the intangible asset.

Once the technical feasibility and commercial viability of the extraction of mineral reserves in a project are demonstrable, permitted and development is approved by the Board, E&E assets attributable to that project are first tested for impairment and then reclassified to *Mine property and development projects* on the consolidated balance sheet.

***(v) Pre-E&E expenditures***

Pre-E&E expenditures are incurred on activities that precede exploration for an evaluation of mineral resources, being all expenditures incurred prior to securing the legal rights to explore an area. Pre-E&E expenditures are expensed immediately as *Pre-exploration write-offs* through the consolidated statement of operations.

***(vi)Impairment***

E&E assets are assessed for impairment when facts and circumstances suggest that the carrying amount of an E&E asset may exceed its recoverable amount and any impairment loss is recognized as *Writedown of exploration and evaluation projects* through the consolidated statement of operations. The following facts and circumstances, among other things, indicate that E&E assets must be tested for impairment:

- the term of exploration license for the project has expired during the reporting period or will expire in the near future, and is not expected to be renewed;
- substantive expenditure on further exploration for and evaluation of mineral resources in the project area is neither budgeted nor planned;
- exploration for and evaluation of mineral resources in the project area have not led to the discovery of commercially viable quantities of mineral resources and the Company plans to discontinue activities in the specific area; or
- sufficient data exists to indicate that while development activity is likely to proceed, the carrying amount of the E&E asset is unlikely to be recovered in full through such activity.

E&E assets are tested for impairment on an individual project (area of interest) basis. As noted above, a project would also be tested for impairment before being transferred to *Mine property and development projects* on the consolidated balance sheet.

**(g) Mine Property and Development Project**

***(iii)Pre-production development expenditures***

The Company considers a project to be in the development phase when an identified mineral reserve is being prepared for production as approved by the Board, for example when there is construction of access to the mineral reserves upon determination that there is economic viability of the project under a successful feasibility study and is permitted for development. As such, project development activities are related to the construction of an asset to be used in production or preparation for extraction of a specific mineral resource.

The costs of mining properties, which include the costs of acquiring and developing mining properties and mineral rights, are capitalized in the same manner as property and equipment under *Mine property and development project* (“MP&D”) assets on the consolidated balance sheet in the period in which they are incurred or transferred from E&E assets upon determination of economic viability. At that point, all further pre-production primary development expenditure other than land, buildings, plant and equipment, etc. is capitalized as part of the cost of the project until the project is capable of commercial production. This includes costs incurred in preparing the site for mining operations, including pre-stripping costs.

Presently, the Company’s sole project classified as *Mine property and development project* on the consolidated balance sheet is the Minago project; it continues to be in the pre-production phase and costs continue to be capitalized without depreciation.

***(iv)Impairment***

If a property were to be abandoned, there is little likelihood of a mineral right being exploited, or the value of the exploitable mineral right has diminished below cost, the cumulative

capitalized cost relating to the property is written off to its recoverable amount through operations.

**(h) Borrowing Costs**

The Company's policy is to capitalize project-related borrowing costs related to qualifying assets as incurred. A qualifying asset is an asset that necessarily takes a substantial period of time to get ready for its intended use or sale. The Company presently does not have any project-related borrowings on qualifying assets.

**(i) Government Grants**

Government grants that compensate Victory Nickel for expenses incurred are recognized through operations on a systematic basis in the same periods in which the expenses are recognized. Grants that compensate Victory Nickel for the cost of an asset are recognized through operations on a systematic basis over the useful life of the asset. For assets which are not being amortized, such as E&E assets or MP&D assets, the government grant is deducted from the related asset.

**(j) Investment Tax Credits ("ITCs")**

Investment tax credits may be claimed by the Company on qualifying expenditures. The Company accounts for these when such qualifying expenditures have been made by reducing the deferred tax liability and recording an income tax recovery through the consolidated statement of operations.

**(k) Impairment**

***(iii)Financial assets***

A financial asset is assessed at each reporting date to determine whether there is any objective evidence that it is impaired. A financial asset is considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of that asset.

An impairment loss in respect of a financial asset measured at amortized cost is calculated as the difference between its carrying amount and the present value of the estimated future cash flows discounted at the original effective interest rate. Individually significant financial assets are tested for impairment on an individual basis. The remaining financial assets are assessed collectively in groups that share similar credit risk characteristics.

An impairment loss is reversed if the reversal can be related objectively to an event occurring after the impairment loss was recognized. For financial assets measured at amortized cost, the reversal is recognized through operations.

***(iv)Non-financial assets***

The carrying amounts of Victory Nickel's non-financial assets, other than deferred tax assets, are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. For goodwill and intangible assets that have indefinite lives or that are not yet available for use, the recoverable amount is estimated each year at the same time.

The recoverable amount of an asset or cash-generating unit ("CGU") (see definition below) is

the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. For the purpose of impairment testing, assets are grouped together into the smallest group of assets that generates, or has the potential to generate, cash inflows from continuing use that are largely independent of the cash inflows of other assets or groups of assets. Generally, a CGU is analogous to an individual project. The goodwill acquired in a business combination, for the purpose of impairment testing, is allocated to CGUs that are expected to benefit from the synergies of the combination.

An impairment loss is recognized if the carrying amount of an asset or a CGU exceeds its estimated recoverable amount. Impairment losses are recognized through operations. Impairment losses recognized in respect of CGUs are allocated first to reduce the carrying amount of any goodwill allocated to the units and then to reduce the carrying amounts of the other assets in the unit (group of units) on a pro rata basis.

Impairment losses recognized in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized.

**(l) Employee Benefits**

***(iv)Termination benefits***

Termination benefits are recognized as an expense when Victory Nickel is demonstrably committed, without realistic possibility of withdrawal, to a formal detailed plan to either terminate employment before the normal retirement date, or to provide termination benefits as a result of an offer made to encourage voluntary redundancy. Termination benefits for voluntary redundancies are recognized as an expense if Victory Nickel has made an offer of voluntary redundancy, it is probable that the offer will be accepted and the number of acceptances can be reliably estimated.

***(v) Short-term benefits***

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided. A liability is recognized for the amount expected to be paid under short-term cash bonus plans if Victory Nickel has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be reliably estimated.

***(vi)Share-based payment transactions***

The grant-date fair value of options granted to employees, directors and consultants is recognized as an employee expense, with a corresponding increase in equity, over the period that the individuals become unconditionally entitled to the options. The amount recognized as an expense is adjusted to reflect the actual number of share options for which the related service and non-market vesting conditions are met.

Share-based payment arrangements in which the Company receives properties, goods or services as consideration for its own equity instruments are accounted for as equity-settled

share-based payment transactions, regardless of how the equity instruments are obtained by Victory Nickel.

**(m) Provisions**

A provision is recognized if, as a result of a past event, the Company has a present legal or constructive obligation that can be reliably estimated and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognized as a finance cost.

In accordance with the Company's environmental policy and applicable legal requirements, a provision for site restoration or decommissioning in respect of land restoration, and the related expense, is recognized when the land is contaminated and there is a legal obligation to restore the site. The Company presently has no decommissioning liabilities.

**(n) Finance Income and Finance Costs**

Finance income comprises interest income on funds invested (including financial assets at fair value through operations), dividend income, gains on the disposal of financial assets at fair value through operations, amortization of flow-through premiums and changes in the fair value of financial assets (warrants) at fair value through operations. Interest income is recognized as it accrues through operations, using the effective interest method. Dividend income is recognized through operations on the date that the Company's right to receive payment is established, which in the case of quoted securities is the ex-dividend date. Gains on the disposal of financial assets are recognized on the settlement date.

Finance costs comprise interest expense on borrowings, unwinding of the discount on provisions, dividends on preferred shares classified as liabilities, changes in the fair value of financial assets and liabilities at fair value through operations and losses recognized on financial assets that are recognized through operations. All borrowing costs are recognized through operations using the effective interest method, except for those amounts capitalized as part of the cost of qualifying assets.

Foreign currency gains and losses are reported on a net basis.

**(o) Income Taxes**

Income tax expense comprises current and deferred tax. Income tax expense is recognized through operations except to the extent that it relates to items recognized either in OCI or directly in equity, in which case it is recognized in OCI or in equity respectively.

Current tax is the expected tax payable on the taxable income for the period, using tax rates enacted or substantively enacted at the reporting date and any adjustment to tax payable in respect of previous years.

Deferred tax is recognized using the balance sheet method, providing for temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognized for the following temporary differences: the initial recognition of assets or liabilities in a transaction

that is not a business combination and that affects neither accounting nor taxable profit or loss, and differences relating to investments in subsidiaries and jointly-controlled entities to the extent that it is probable that they will not reverse in the foreseeable future. In addition, deferred tax is not recognized for taxable temporary differences arising on the initial recognition of goodwill. Deferred tax is measured at the tax rates that are expected to be applied to temporary differences when they reverse, based on the laws that have been enacted or substantively enacted by the reporting date. Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realized simultaneously.

A deferred tax asset is recognized to the extent that it is probable that future taxable profits will be available against which the temporary difference can be utilized. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realized.

In 2009, pursuant to the receipt of a positive feasibility study for the Minago project, Victory Nickel determined that it was probable that it would be able to realize the benefit associated with its losses and costs prior to their expiry. Accordingly, the Company recognized the deferred tax assets (to the extent of the deferred tax liability) at that time. Victory Nickel continues to believe it is probable that the benefit of its losses and other costs will be realized prior to their expiry. The frac sand business represents a new venture for the Company; as the plant is not yet in operation and sales have not yet been generated, the Company has not recognized any deferred tax assets relating to Victory Silica.

**(p) Share Capital**

***(iii)Common shares***

Common shares are classified as equity. Incremental costs directly attributable to the issue of common shares and share options are recognized as a deduction from equity, net of any tax effects.

The Company has financed a portion of its E&E activities through the issue of flow-through shares. Under the terms of these share issues, the tax attributes of the related expenditures are renounced to subscribers. Common shares issued on a flow-through basis typically include a premium because of the tax benefits associated therewith (“flow-through premium”). Flow-through shares may also be issued with a warrant feature. At the time of issue, the Company estimates the proportion of proceeds attributable to the flow-through premium, the common share and the warrant with reference to closing market prices and such techniques as the Black-Scholes option-pricing model. The flow-through premium is estimated as the excess of the subscription price over the market value of the share and is recorded as a liability in *Trade and other payables* on the consolidated balance sheet (Note 13). The proceeds attributable to the warrants is also treated as equity and recorded in *Contributed surplus* on the consolidated balance sheet until exercise, when the associated proportion is transferred to share capital along with the cash proceeds received on exercise.

The effect of renunciation of the tax benefits to holders of such shares is recognized pro rata with the associated expenditures being incurred by the Company. This could occur either

before or after the formal renunciation of expenditures to the tax authorities have been made. When the eligible expenditures are incurred, the tax value of the renunciation is recorded as a deferred tax liability and charged against operations as a deferred tax provision.

Furthermore, as eligible expenditures are incurred, the Company recognises a pro rata amount of the flow-through premium through *Finance income* in the consolidated statement of operations (Note 20) with a decrement to the liability in *Trade and other payables* on the consolidated balance sheet.

***(iv)Share-based payment arrangements***

***Stock Option Plan***

The Company has a stock option plan (the "Stock Option Plan") which is described in Note 19. Awards to non-employees are measured at the fair value of the goods or services received. Awards made to employees are measured at the grant date. All stock-based awards made to employees and non-employees are recognized at the date of grant using a fair-value-based method to calculate the share-based payment. The share-based payment is charged to operations over the vesting period of the options or service period, whichever is shorter. Stock options vest either immediately or over a 12-month period.

***Share Incentive Plan***

The Company has a share incentive plan (the "Share Incentive Plan"), which includes both a share purchase plan (the "Share Purchase Plan") and a share bonus plan (the "Share Bonus Plan"). The Share Incentive Plan is administered by the directors of the Company. The Share Incentive Plan provides that eligible persons thereunder include directors, senior officers and employees of the Company and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of the business.

The Share Incentive Plan is described in Note 17. The Company uses the fair value method of accounting for, and to recognize as compensation expense, its share-based payments for employees. Shares issued under the Share Incentive Plan are valued based on the quoted market price on the date of the award. This amount is expensed over the vesting period.

**(q) Earnings (Loss) per Share**

The Company presents basic and diluted earnings (loss) per share ("EPS") data for its common shares. Basic EPS is calculated by dividing the results of operations attributable to ordinary shareholders of the Company by the weighted average number of common shares outstanding during the period. Diluted EPS is determined by adjusting the results of operations attributable to common shareholders and the weighted average number of common shares outstanding for the effects of all dilutive potential common shares, which comprise warrants and share options.

**(r) New Standards and Interpretations Not Yet Adopted**

The IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations which are not yet effective for the year ended December 31, 2013 and have not been applied in preparing these consolidated financial statements unless stated otherwise. However, the revised standards and interpretations are either not applicable to the Company or are expected to have minimal impact.

## 3. FINANCIAL RISK MANAGEMENT AND CAPITAL MANAGEMENT DISCLOSURES

### Overview

The Company has exposure to the following risks from its use of financial instruments:

- credit risk;
- liquidity risk;
- market risk; and
- operational risk.

This note presents information about the Company's exposure to each of the above risks, the Company's objectives, policies and processes for measuring and managing risk, and the Company's management of capital. Further quantitative disclosures are included throughout these consolidated financial statements.

### Risk Management Framework

The Board of Directors has overall responsibility for the establishment and oversight of the Company's risk management framework. The Board fulfils its responsibility through the Audit Committee which is responsible for overseeing the Company's risk management policies.

The Company's risk management policies are established to identify and analyze the risks faced by the Company, to set appropriate risk limits and controls, and to monitor risks and adherence to limits. Risk management practices are reviewed regularly to reflect changes in market conditions and the Company's activities including entry into new operations such as the frac sand business. The Company has an established code of conduct which sets out the control environment within which framework all directors' and employees' roles and obligations are outlined. The Company's risk and control framework is facilitated by the small-sized and hands-on executive team.

### Credit Risk

Credit risk is the risk of an unexpected financial loss to the Company if a customer or third party to a financial instrument fails to meet its contractual obligations and arises principally from the Company's cash and cash equivalents, receivables and marketable securities.

#### *Cash and cash equivalents*

The Company's cash and cash equivalents are held through large Canadian financial institutions. The Company has a corporate policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board.

#### *Receivables*

The Company's receivables presently consist primarily of amounts due from federal and provincial governments. Amounts due from other parties are settled on a regular basis. The Company will increase its exposure to credit risk upon commencement of sales of frac sand.

When necessary, the Company establishes an allowance for impairment that represents its estimate of incurred losses in respect of receivables. The main component of this allowance is a specific loss component that relates to individually significant exposures.

Further, when the Company engages in corporate transactions, it seeks to manage its exposure by ensuring that appropriate recourse is included in such agreements upon the counterparty's failure to meet contractual obligations.

***Marketable securities***

The Company limits its exposure to credit risk by investing only in securities which are listed on public stock exchanges. Such strategic investments are approved by the Board of Directors of the Company. Management actively monitors changes in the markets and management does not expect any counterparty to fail to meet its obligations. The Company's investments are generally in the junior natural resources sector and these companies are subject to similar areas of risk as the Company itself.

***Guarantees***

The Company's policy is to provide financial guarantees only to wholly-owned subsidiaries or under business arrangements where the benefit of the guarantee will enure to the Company. As at December 31, 2013, the Company had $nil in third party guarantees outstanding (2012 - $nil).

**Liquidity Risk**

Liquidity risk is the risk that the Company will encounter difficulty in meeting the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Company's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due without incurring unacceptable losses or risking undue damage to the Company's reputation.

The Company's objective is to maintain sufficient capital in order to meet short-term business requirements, after taking into account cash flows from operations and the Company's holdings of cash and cash equivalents and marketable securities. This is accomplished by budgets and forecasts which are updated on a periodic basis to understand future cash needs and sources. When possible, spending plans are adjusted accordingly to provide for liquidity.

The Company manages its liquidity risk through the mechanisms described above and as part of Capital Disclosures below. The Company has historically relied on issuances of shares to develop projects and to finance day-to-day operations and may do so again in the future. However, the frac sand business is expected to provide liquidity to the Company shortly after it has commenced operation.

The Company has several long-term liabilities including its deferred tax liability and long-term obligations relating to equipment financing, loan with Nuinsco Resources Limited ("Nuinsco") and other promissory notes. All other contractually-obligated cash flows are payable within the next fiscal year. It is expected that operating funds from frac sand activity will significantly assist in servicing and repaying such long-term obligations. In addition, certain loan obligations are convertible into equity and successful implementation of the frac sand business could improve the attractiveness of conversion.

**Market Risk**

Market risk is the risk that changes in market prices, such as foreign exchange rates, interest

rates, commodity prices and equity prices, will affect the Company's income, the value of its E&E and MP&D properties or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimizing the return. The frac sand market is relatively new to the Company and is subject to market forces affecting oil and natural gas pricing and related demand for frac sand.

***Currency risk***

The Company is exposed to currency risk on purchases and other payables that are denominated in a currency other than the functional currency of the Company; the Canadian dollar. The primary currency in which these transactions are denominated is the United States dollar ("US$"). The Company does not actively hedge its foreign currency exposure. Frac sand sales are expected to be denominated in the US$; presently, many of the costs of that business are expected also to be denominated in the US$ therefore providing a natural hedge.

***Interest rate risk***

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Company's cash equivalents earn interest at variable short-term rates. The Company's debt bears interest at fixed rates (Note 14). Accordingly, the estimated effect of a 50bps change in interest rate would not have a material effect on the Company's results of operations. None of the Company's other financial instruments are interest-bearing. Consequently, the Company is not presently exposed to any significant interest rate risk which could be caused by a sudden change in market interest rates. The Company is in the process of securing working capital financing to support the short-term requirements of the frac sand business; this financing may have variable interest rates.

***Other market price risk***

The Company's marketable securities and strategic investments are subject to equity price risk. The values of these investments will fluctuate as a result of changes in market prices, the price of metals or other factors affecting the value of the investments.

Commodity price risk is the potential adverse impact on earnings and economic value due to commodity price movements and volatilities. The value of the Company's mineral resource properties is related to the price of, and outlook for, base and precious metals. Historically, such prices have fluctuated and are affected by numerous factors outside of the Company's control, including, but not limited to: industrial and retail demand, central bank lending, forward sales by producers and speculators, levels of worldwide production, short-term changes in supply and demand because of speculative hedging activities and other factors such as significant mine closures.

The Company does not have any hedging or other commodity-based risks respecting its operations. The value of the Company's strategic investments is also related to the price of, and outlook for, base and precious metals and other minerals. The future prices of frac sand sales are also subject to similar risks.

**Operational Risk**

Operational risk is the risk of direct or indirect loss arising from a wide variety of causes associated with the Company's processes, personnel, technology and infrastructure, and from external factors other than credit, market and liquidity risks such as those arising from legal and regulatory requirements and generally accepted standards of corporate behaviour. Operational risks arise from all of the Company's operations.

The Company's objective is to manage operational risk so as to balance the avoidance of financial losses and damage to the Company's reputation with overall cost effectiveness and to avoid control procedures that restrict initiative and creativity.

The primary responsibility for the development and implementation of controls to address operational risk is assigned to senior management. The Company has a small but hands-on and experienced executive team which facilitates communication across the Company. This expertise is supplemented, when necessary, by the use of experienced consultants in legal, compliance and industry-related specialties. The Company also has standards for the management of operational risk in the following areas:

- requirements for appropriate segregation of duties, including the independent authorization of transactions;
- requirements for the reconciliation and monitoring of transactions;
- compliance with regulatory and other legal requirements, including the Occupational Health and Safety Act and related regulations and codes, and the Railway Safety Act and requirements of the Canadian Transportation Agency;
- documentation of controls and procedures, including quality control and plant maintenance;
- development of contingency plans;
- ethical and business standards; and
- risk mitigation, including insurance when this is effective and available.

Compliance with Company standards is supported by a code of conduct which is provided to employees, officers and directors. The Company requires sign-off of compliance with the code of conduct.

**Capital Management Disclosures**

The Company's objective when managing capital is to safeguard its accumulated capital in order to provide an adequate return to shareholders by maintaining a sufficient level of funds to support continued project development and corporate activities. Capital is defined by the Company as the aggregate of its shareholders' equity as well as any long-term debt, equipment-based and/or project-based financing.

| | **December 31, 2013** | December 31, 2012 |
|---|---|---|
| Shareholders' equity | **$ 50,969** | $ 50,995 |
| Loans and borrowings - long-term portion | **6,379** | 8 |
| Lease obligations - long-term portion | **408** | - |
| Loans and borrowings - available | **500** | - |
| | **$ 58,256** | $ 51,003 |

The Company manages its capital structure and makes adjustments to it based on the level of funds available to the Company to manage its operations. In order to maintain or adjust the capital structure, the Company expects that it will be able to obtain equity, long-term debt,

equipment-based, working capital and/or project-based financing sufficient to maintain and expand its operations. There are no assurances that these initiatives will be successful. In order to achieve these objectives, the Company invests its unexpended cash in highly-liquid, rated financial instruments. Refer to Note 26 for financings closed subsequent to December 31, 2013.

Neither the Company, nor its subsidiary, are subject to externally-imposed capital requirements. There were no changes in the Company's approach to capital management during the year.

## 4. DETERMINATION OF FAIR VALUES

A number of the Company's accounting policies and disclosures require the determination of fair value for both financial and non-financial assets and liabilities. Fair values have been determined for measurement and/or disclosure purposes based on the methods described below. When applicable, further information about the assumptions made in determining fair values is disclosed in the notes specific to that asset or liability.

### (h) Property and Equipment

The fair value of property and equipment recognized as a result of a business combination is based on the amount for which a property could be exchanged on the date of valuation between knowledgeable, willing parties in an arm's length transaction.

### (i) Intangible Assets

The fair value of other intangible assets is based on the discounted cash flows expected to be derived from the use and eventual sale of the assets.

### (j) Marketable Securities

The fair value of financial assets at fair value through operations or OCI is determined by reference to their quoted closing bid price at the reporting date.

***Fair value hierarchy***

The different levels of valuation are defined as follows:

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities;
Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices); and
Level 3: Inputs for the asset or liability are not based on observable market data (unobservable inputs).

### (k) Receivables

The fair value of receivables is estimated as the present value of future cash flows, discounted at the market rate of interest at the reporting date. This fair value is determined for disclosure purposes only.

### (l) Warrants

The fair values of warrants included in either financial assets at fair value through operations

or in equity are based upon the Black-Scholes option-pricing model. Measurement inputs include: share price on measurement date, exercise price of the instrument, expected volatility (based on weighted average historic volatility adjusted for changes expected due to publicly-available information), weighted average expected life of the instruments (based on historic experience and general option-holder behaviour), expected dividends and the risk-free interest rate (based on government bonds).

**(m) Non-derivative Financial Liabilities**

Fair value, which is determined for disclosure purposes, is calculated based on the present value of future principal and interest cash flows, discounted at the market rate of interest at the reporting date.

**(n) Share-based Payment Transactions**

The fair value of share options is measured using the Black-Scholes option-pricing model. The measurement inputs are described above under Note 5(e). Any service and non-market performance conditions attached to the transactions are not taken into account in determining fair value.

## 5. CASH AND CASH EQUIVALENTS

| | **December 31, 2013** | December 31, 2012 |
|---|---|---|
| Bank balances | **$ 1,418** | $ 256 |
| Short-term deposits | **5** | - |
| **Cash and Cash Equivalents in the Statement of Cash Flows** | **$ 1,423** | $ 256 |

## 6. RECEIVABLES AND PREPAIDS

| | ***Note*** | **December 31, 2013** | December 31, 2012 |
|---|---|---|---|
| Receivables | | **$ 231** | $ 68 |
| Prepaid expenses and deposits | | **150** | 50 |
| Due from Nuinsco Resources Limited | *23* | **-** | 37 |
| | | **$ 381** | $ 155 |

## 7. MARKETABLE SECURITIES

| | **December 31, 2013** | December 31, 2012 |
|---|---|---|
| Financial assets at fair value through OCI: | | |
| Shares | **$ 278** | $ 557 |
| | **$ 278** | $ 557 |

The Company records its portfolio of shares at available market prices with any difference in fair value compared with acquisition cost being recorded as gain or loss on financial assets at fair value through OCI.

**Sensitivity Analysis – Equity Price Risk**

All of the Company's financial assets at fair value through OCI are listed on public stock exchanges, including the TSX and the TSX-V. Recently, the markets have experienced extreme volatility; therefore the sensitivity analysis is performed using 15%. For such

investments, a 15% increase in the equity prices at the reporting date would have increased equity by $36,000, after tax effects of $6,000 (as at December 31, 2012 - an increase of $72,000, after tax effects of $11,000); an equal change in the opposite direction would have had the equal but opposite effect on the amounts shown above.

## 8. FINANCIAL INSTRUMENTS

### Credit Risk

***Exposure to credit risk***

The carrying amount of financial assets represents the maximum credit exposure. All amounts are held in Canada.

The maximum exposure to credit risk at the reporting date was:

| | *Notes* | **December 31, 2013** | December 31, 2012 |
|---|---|---|---|
| **Carrying amount** | | | |
| Cash and cash equivalents | *6* | **$ 1,423** | $ 256 |
| Receivables | *7* | **381** | 155 |
| Financial assets at fair value through OCI | *8* | **278** | 557 |
| | | **$ 2,082** | $ 968 |

### Liquidity Risk

The following table shows the contractual maturities of financial liabilities including estimated interest payments.

| | Non-derivative financial liabilities | | | |
|---|---|---|---|---|
| | **Leases payable [1]** | **Long-term liabilities [2]** | **Trade and other payables [1]** | **Total** |
| **As at December 31, 2013** | | | | |
| Carrying amount | $ 567 | $ 6,379 | $ 1,446 | $ 8,392 |
| Contractual cash flows | 637 | 3,844 | 1,446 | 5,927 |
| 6 months or less | 112 | 216 | 1,446 | 1,774 |
| 6 - 12 months | 78 | 219 | - | 297 |
| 1 - 2 years | 157 | 3,409 | - | 3,566 |
| 2 - 5 years | 290 | - | - | 290 |
| **As at December 31, 2012** | | | | |
| Carrying amount | $ - | $ 1,008 | $ 551 | $ 1,559 |
| Contractual cash flows | - | 1,250 | 551 | 1,801 |
| 6 months or less | - | 60 | 551 | 611 |
| 6 - 12 months | - | 60 | - | 60 |
| 1 - 2 years | - | 120 | - | 120 |
| 2 - 5 years | - | 1,010 | - | 1,010 |

(17) Balances reflect $160,000 current leases payable as Leases payable; these are disclosed within Trade and other payables (Note 13) on the consolidated balance sheet.

(18) Note that the long-term loan to Nuinsco is contractually payable on January 31, 2015, however up to $nil (December 31, 2012 - $1,000,000) of option payments may be diverted to the lender as prepayment, that amount is classified as a current liability on the consolidated balance sheet (See Notes 12 and 14).

### Currency Risk

***Exposure to currency risk***

| As at December 31, 2013<br>(in thousands of Canadian dollars) | US$ |
|---|---|
| Cash and cash equivalents | $ 1,356 |
| Receivables | 143 |
| Marketable securities | - |
| Trade and other payables | (118) |
| Loans and borrowings | (2,127) |
| | $ (746) |

The Company's exposure to foreign currency risk as at and for the year ended December 31, 2012 was immaterial; refer also to Note 25 for commitment.

***Sensitivity analysis***

A 10% weakening of the Canadian dollar would have an approximate effect on the Company's equity or profit or loss of $75,000 on balances denominated in US$ as at December 31, 2013. The analysis assumes that all other variables, in particular interest rates, remain constant. There would have been an immaterial impact on balances as at December 31, 2012.

## Fair Value

***Fair values versus carrying amounts***

The fair values of the Company's financial assets and liabilities equal their carrying amounts shown in the consolidated balance sheets. The Company has not made any reclassifications between assets recorded at cost or amortized cost and fair value.

The table below analyses financial instruments carried at fair value by valuation method:

| | Level 1 | Level 2 | Level 3 | Total |
|---|---|---|---|---|
| **As at December 31, 2013** | | | | |
| Financial assets at fair value through OCI | **$ 278** | **$ -** | **$ -** | **$ 278** |
| | **$ 278** | **$ -** | **$ -** | **$ 278** |
| **As at December 31, 2012** | | | | |
| Financial assets at fair value through OCI | $ 557 | $ - | $ - | $ 557 |
| | $ 557 | $ - | $ - | $ 557 |

There have been no transfers between Level 1 and Level 2 during the current and prior reporting periods. All of the shares owned by the Company are valued using Level 1 methodologies.

## 9. PROPERTY AND EQUIPMENT

| Balance as at January 1, 2012 | Land and Building | 7P Plant | Vehicles and Mobile Equipment | Equipment and Furniture | Total |
|---|---|---|---|---|---|
| Cost | $ 83 | $ - | $ 32 | $ 1,211 | $ 1,326 |
| Accumulated Amortization | (6) | - | (11) | (32) | (49) |
| **Carrying Amount** | **77** | **-** | **21** | **1,179** | **1,277** |
| Additions | - | - | - | 200 | 200 |
| Disposals - cost | - | - | - | (52) | (52) |
| Disposals - accumulated amortization | - | - | - | (17) | (17) |
| Amortization | (2) | - | (6) | (10) | (18) |
| **Balance as at December 31, 2012** | | | | | |
| Cost | 83 | - | 32 | 1,359 | 1,474 |
| Accumulated Amortization | (8) | - | (17) | (25) | (50) |
| **Carrying Amount** | **75** | **-** | **15** | **1,334** | **1,424** |
| Additions | - | 3,086 | 636 | 160 | 3,882 |
| Amortization | (1) | - | (23) | (3) | (27) |
| **Balance as at December 31, 2013** | | | | | |
| Cost | 83 | 3,086 | 668 | 1,519 | 5,356 |
| Accumulated Amortization | (9) | - | (40) | (28) | (77) |
| **Carrying Amount** | **$ 74** | **$ 3,086** | **$ 628** | **$ 1,491** | **$ 5,279** |

Equipment and furniture includes deposits of $1,485,000 related to the purchase of transformers and other electrical equipment; the equipment is not available for use and is not being depreciated. Property and equipment also includes assets amounting to $2,288,000 at the 7P Plant which has not yet been commissioned, accordingly, neither it nor the cost to acquire the 7P Plant of $800,000 is being depreciated. On May 10, 2010, the Company entered into an agreement to purchase the transformers and other electrical equipment for the Minago project. The total price is US$2,840,000 (Note 25). Vehicles and Mobile Equipment include $636,000 (2012 - $nil) of equipment acquired under leases (Note 15).

## 10. MINE PROPERTY AND DEVELOPMENT PROJECT

| | January 1, 2013 | Current Expenditures | Recoveries | **December 31, 2013** |
|---|---|---|---|---|
| Minago | $ 37,897 | $ 843 | $ (72) | **$ 38,668** |
| | $ 37,897 | $ 843 | $ (72) | **$ 38,668** |

| | January 1, 2012 | Current Expenditures | Recoveries | December 31, 2012 |
|---|---|---|---|---|
| Minago | $ 35,571 | $ 2,376 | $ (50) | $ 37,897 |
| | $ 35,571 | $ 2,376 | $ (50) | $ 37,897 |

Recoveries in 2013 and 2012 represent grants from the Manitoba Government.

### Minago

The 100%-owned Minago project covers approximately 28,928 ha, through a combination of mining claims, mineral leases and a mineral exploration licence, on Manitoba's Thompson Nickel Belt. The property encompasses the Nose Deposit, which contains the entire current nickel mineral resource, and the North Limb, a zone of nickel mineralization with a known strike length of 1.5 kilometres located to the north of the Nose Deposit.

From 2006 to date, considerable work has been performed, including diamond drilling,

metallurgical testing and engineering studies and all the studies required to complete the Environmental Impact Study which was filed in May 2010. As a result, in August 2011, the Company received its Environmental Act Licence. The results of the Minago Feasibility Study ("FS") were announced in December 2009 and improvements thereto announced in June 2010 and July 2011.

Five mineral claims totalling 691 ha located at the north end of the Company's existing Minago property package are subject to a maximum 2% net smelter return royalty with a 50% back-in right; these claims represent approximately 2.4% of the total Minago project.

The Minago project is not in production. Accordingly, the Minago project is not being depreciated. On September 19, 2011, the Company announced that the Board of Directors had approved the development of Minago and directed management to proceed with securing financing arrangements.

As at December 31, 2013, the Company tested the Minago project for impairment. The economic model in the FS was re-run using a range of prices derived from forecasts from US$7.18 to US$8.75 for nickel and an exchange rate of US$0.8978:C$1.00. Identified cost savings from subsequent evaluation relating to costs of overburden removal and transformers and electrical equipment were reflected. A discount rate of 12% was used in the analysis. These factors resulted in an NPV in excess of the book value of Minago.

## 11. EXPLORATION AND EVALUATION PROJECTS

Cumulative costs relating to the acquisition of mineral properties and E&E expenditures have been incurred on the following projects:

| | January 1, 2013 | Current Expenditures | Recoveries | Excess Proceeds | **December 31, 2013** |
|---|---|---|---|---|---|
| Lac Rocher | $ 7,317 | $ 71 | $ - | $ - | **$ 7,388** |
| Mel | 7,421 | 52 | - | - | **7,473** |
| Lynn Lake | - | 8 | (400) | 392 | **-** |
| Other | - | 4 | - | - | **4** |
| | $ 14,738 | $ 135 | $ (400) | $ 392 | **$ 14,865** |

| | January 1, 2012 | Current Expenditures | Recoveries | Excess Proceeds | December 31, 2012 |
|---|---|---|---|---|---|
| Lac Rocher | $ 7,254 | $ 63 | $ - | $ - | $ 7,317 |
| Mel | 7,323 | 98 | - | - | 7,421 |
| Lynn Lake | - | - | (1,450) | 1,450 | - |
| | $ 14,577 | $ 161 | $ (1,450) | $ 1,450 | $ 14,738 |

The expenditures on the Lynn Lake property are shown net of cumulative option payments received which include $400,000 in 2013 and $1,450,000 in 2012. The excess proceeds of $392,000 and $1,450,000 for the years ended December 31, 2013 and 2012, respectively, represent the excess of consideration received under the option agreement above carrying value and are reflected in *Recovery of exploration and evaluation project* through operations.

### Lac Rocher

The Lac Rocher project, which is 100%-owned, is located 140 kilometres northeast of Matagami in northwestern Québec. The project is subject to a royalty of $0.50 per ton on any ores mined and milled from the property and a 2% NSR described below.

In 2007, the Company began environmental work in support of obtaining a permit for the Lac Rocher deposit in order to extract and direct-ship mineralized material to an offsite mill for processing. A 12-hole, 1,500 metre drill program was also completed to test for extensions to the nickel sulphide mineralization and to provide metallurgical samples for the Preliminary Economic Assessment ("PEA") to determine the near-term production and cash generation potential of the project.

Metallurgical testing of the massive sulphide mineralization from the deposit was completed in December, 2007. In February, 2008, the Company announced the results from metallurgical testing of the disseminated sulphide zone and they were incorporated into the PEA completed in November 2008. The Company completed the construction of an access road in the third quarter of 2009 and performed diamond drilling to provide geotechnical data for portal and ramp development.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% NSR for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

**Mel**

Effective August 27, 1999, Nuinsco Resources Limited ("Nuinsco") (the predecessor entity of Victory Nickel) entered into an option agreement (the "Agreement") with Inco Limited (predecessor to CVRD Inco Limited, now Vale) for the exploration and development of Vale's Mel properties (the "Mel Properties") located in the Thompson area of northern Manitoba. Pursuant to the Agreement, sufficient expenditures have been incurred to earn a 100% interest in the Mel Properties, and in 2007 the Company exercised its option to acquire such interest. Vale had the right to earn back a 51% interest by incurring expenditures of $6,000,000 over a four-year period. On September 14, 2010, Vale notified the Company that it would not exercise this back-in right. In accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

Also under the Agreement, Vale has a contractual obligation to mill ore mined from the Mel deposit at its cash cost plus 5% (provided that the product meets Vale specifications and that Vale has sufficient mill capacity).

Ongoing updating of Mel data is being conducted and applies to both the drilling data on the Mel deposit/lease as well as the 111 drill holes collared on the claims portion of the property. When completed, additional modelling of the resource will be continued. No fieldwork has

been conducted during 2013.

**Lynn Lake**
The Company owns a 100% right, title and interest in the Lynn Lake nickel property ("Lynn Lake"), covering approximately 600 ha in northern Manitoba. As at December 31, 2013, the Lynn Lake property was subject to an option agreement with Wellgreen Platinum Ltd. ("Wellgreen") (formerly Prophecy Platinum Corp.). The Company received $1,000,000 in February 2012; on August 8, 2012, the Company received $450,000 from Wellgreen in consideration for removal of the exploration expenditure condition from the Lynn Lake option agreement and had received all payments scheduled under the option agreement to December 31, 2012. Accordingly, under the original agreement, the sole remaining condition for the Lynn Lake property to transfer to Wellgreen was the $1,000,000 option payment which was originally due from Wellgreen by March 1, 2013.

On March 1, 2013, the Company agreed to an additional amendment to the option agreement which allowed Wellgreen to make a series of payments through 2013 and 2014 aggregating $1,125,000 in satisfaction of the remaining option conditions. On March 1, 2013, the Company received the first payment of $125,000; $125,000 was received in May 2013 and $150,000 in September 2013; $175,000 was due in December 2013 with a further $550,000 being payable by August 29, 2014.

On March 17, 2014, Wellgreen formally confirmed to the Company that it was relinquishing the Lynn Lake option and is presently in the process of fulfilling the termination conditions within the option agreement which includes vacating the option properties in good condition and returning all exploration materials and data to the Company.

In 2013, $392,000 excess of proceeds under the option agreement above the book value of the property had been received and accordingly was recorded through the consolidated statement of operations as a recovery of exploration and evaluation project in respect of Lynn Lake (December 31, 2012 - $1,450,000).

**Other Projects**
The Company has incurred minimal expenditures on other properties in 2013 and 2012.

**Impairment and Pre-exploration Costs**
Costs relating to discontinued projects in the amounts of $nil were provided for through operations as *Writedown of exploration and evaluation projects* in the consolidated statement of operations during the years ended December 31, 2013 and 2012.

## 12. TRADE AND OTHER PAYABLES

| | Notes | December 31, 2013 | December 31, 2012 |
|---|---|---|---|
| Trade payables | | | |
| Mine property and development project | | **$ 25** | $ 293 |
| Exploration and evaluation projects | | **-** | 3 |
| Property and equipment | | **742** | - |
| Non-project related | | **116** | 84 |
| Accrued liabilities | | | |
| Mine property and development project | | **28** | 2 |
| Exploration and evaluation projects | | **1** | 1 |
| Property and equipment | | **325** | - |
| Non-project related | | **153** | 160 |
| Other payables | | **-** | 8 |
| Lease obligations - current portion | *15* | **160** | - |
| Due to Nuinsco Resources Limited | | | |
| Under the Management Agreement | *23* | **56** | - |
| Commitment fees | *14* | **11** | - |
| | | **$ 1,617** | $ 551 |

## 13. LOANS AND BORROWINGS

| | December 31, 2013 | December 31, 2012 |
|---|---|---|
| Loan payable to Nuinsco Resources Limited - long-term portion | **$ 4,100** | $ 8 |
| Promissory note | **2,279** | - |
| | **$ 6,379** | $ 8 |

| **Loan payable to Nuinsco Resources Limited** | *Notes* | December 31, 2013 | December 31, 2012 |
|---|---|---|---|
| Advance for working capital | | **$ 1,000** | $ 1,000 |
| Advance under Amended Loan for standby commitment | | **1,207** | - |
| Aggregate advances | | **2,207** | 1,000 |
| Accrued interest payable | | **-** | 9 |
| | | **2,207** | 1,009 |
| Less: settled in Units of Victory Nickel | *17* | **(1,207)** | - |
| Less: unamortized loan fees | | **(189)** | (1) |
| | | **811** | 1,008 |
| Less: loans and borrowings - current portion | | **-** | (1,000) |
| Change in fair value of loan | *20* | **3,289** | - |
| **Loans and borrowings - long-term portion** | | **$ 4,100** | $ 8 |

In 2012, the Company entered into a loan agreement for $1,000,000 with Nuinsco (the "Lender"). The loan was amended and restated on March 25, 2013 (the "Amended Loan") to up to $3,000,000 with the additional amount being available to fund capital expenditures relating to the 7P Plant. The Amended Loan bears interest at 12% per annum and matures on January 31, 2015; the loan is secured by equipment and a general security agreement over the equipment of the Company. At the option of the Lender, and under certain circumstances, the Lender can elect to receive prepayment of the loan from up to $1,000,000 of the proceeds of the Lynn Lake option payments originally due by March 1, 2013. As at December 31, 2012,

this amounted to $1,000,000 and, accordingly, $1,000,000 of the loan has been classified as a current liability due within one year effective that date. As described in Note 12, Wellgreen has relinquished the option and no further option payments are due therefore the whole of the amount due to Nuinsco is classified as long-term.

Prior to June 1, 2014, the Lender has the right to convert the outstanding balance of the Amended Loan into a limited participating interest (the "Conversion") whereby the Lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender's participation is capped at $10,000,000, with a minimum of $7,500,000, and is subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. The Lender had also agreed to backstop an equity issue, if any was announced, with cash or by converting a portion of the Amended Loan into shares, at the Lender's option, to an amount up to $1,500,000 under certain circumstances. On June 14, 2013, the Company announced a rights offering for existing shareholders to raise gross proceeds of up to approximately $2,700,000 (see Note 17). The rights offering closed on July 30, 2013 and raised gross proceeds of $2,400,000 which included the backstop provided by the Lender in cash of $1,207,584. This has capped the Amended Loan at $2,707,584 and reduced the amount available to be drawn down to $500,000. Upon exercise of the backstop, Nuinsco increased its shareholding in the Company to approximately 12.24%, thereby becoming a related party of the Company.

The Company was to pay, with shares, an arrangement fee of up to $300,000 plus a commitment fee of 1.5% per annum on unutilized balances. Commitment fees of $11,000 have been accrued to December 31, 2013 and are included in *Finance costs* in Note 20; shares will be issued upon the final advance under the loan terms. Effective March 2013, the Company issued 5,681,818 shares in satisfaction of the arrangement fee at that time of $250,000; an additional 789,294 shares with a stated value of $20,758 were issued in August 2013 under the loan terms related to the backstop of the rights offering; this satisfies the arrangement fee in full. These amounts, along with other loan fees, are being amortized as interest expense using the effective interest rate method; in the year ended December 31, 2013, $134,000 was amortized as interest expense and $129,000 interest was paid to the Lender in cash. The payment in the first quarter included $9,000 which was accrued in 2012.

On February 4, 2014, both Nuinsco and Victory Nickel agreed to cancel the amount that remained available to be drawn down under the Amended Loan. This fixed the commitment fee to be paid in shares at $12,000 and also amended the range of the Company's participation in the net cash flows earned from the sale of frac sand to a maximum of $10,222,831 with a minimum of $7,667,124. This range could be decreased should Victory Nickel repay some or all of the $1,000,000 balance outstanding before Conversion.

The loan is classified as a financial liability carried at amortized cost. From recognition until the fourth quarter of 2013, the Company considered that there were no changes in estimated cash flows since Nuinsco has not converted its loan and the 7P Plant was not built and there were other significant uncertainties. During the fourth quarter, the plant construction was well underway and the probability of Conversion has increased substantially. Accordingly, the Company has revised the estimated future cash flows and discounted these cash flows at the loan's original effective interest rate of 22%. The estimated future cash flows were determined using a probability-weighted estimation of future expected cash flow scenarios from the frac sand business based on current expectations of business results, capital costs and pre-

operating expenditures. These cash flows were on the basis of Phase 1 completion only. The Company also included probability weightings of 34%, 16% and 50% as risk factors applied to varying levels of expected cash flows – being zero, 50% and 100% of the ceiling maximum of $10,222,831.

As described earlier, the percentage participation in net cash flows is 52.16% and the applicable ceiling for Phase 1 is $10,222,831. Based on the estimated cash flows described above, payments could commence as early as mid-2015. These assumptions resulted in revised amortized cost carrying amount of the loan of $4,100,000 and, accordingly $3,289,000 was recorded as a *loss on adjustment of estimated cash flows* through the statement of operations. This is a Level 3 methodology and is subject to the highest level of uncertainty. The Company will review and revise its estimates of expected future cash flows as the expectations of payments of the participating interest change. Changes in that estimate will be recorded through operations with appropriate adjustment for actual cash flows paid.

| **Promissory Note** | ***Notes*** | | | **December 31, 2013** |
|---|---|---|---|---|
| Advance in US$ | | | | **$ 2,000** |
| Add: effect of foreign exchange | | | | **127** |
| | | | | **2,127** |
| Embedded option derivative at inception | | **$ 168** | | |
| Less: amortization | *20* | **(12)** | | |
| | | **156** | | **(156)** |
| Less: unamortized loan fees | | | | **(33)** |
| Net promissory note | | | | **1,938** |
| Embedded option derivative at inception | | **168** | | |
| Change in value of embedded option derivative | *20* | **173** | | |
| | | | | **341** |
| **Loans and borrowings - long-term portion** | | | | **$ 2,279** |

On November 11, 2013, the Company entered into an unsecured convertible promissory note by way of a private placement (the “Convertible Note”). The Convertible Note is denominated in US$, bears interest calculated and payable quarterly at 14.8% and is convertible at the option of the holder into the Company’s shares at $0.10. The Convertible Note has a two-year term. The Company paid US$41,000 ($44,000) for interest in cash and amortized $2,000 for loan fees and $12,000 for the embedded option derivative at inception using the effective interest rate method during the year.

The embedded option derivatives have been calculated using the Black-Scholes option-pricing model using the following parameters:

| | November 11, 2013 | December 31, 2013 |
|---|---|---|
| | (At inception) | |
| Fair values | $ 0.008 | $ 0.016 |
| Share prices at valuation date | $ 0.030 | $ 0.045 |
| **Assumptions** | | |
| Exercise price | $ 0.10 | $ 0.10 |
| Expected volatilities | 103% | 109% |
| Expected remaining terms (years) | 2.00 | 1.87 |
| Expected dividends | - | - |
| Risk-free interest rates | 1.20% | 1.20% |

## 14. LEASE OBLIGATIONS

| | *Note* | December 31, 2013 | December 31, 2012 |
|---|---|---|---|
| Vehicles and Mobile Equipment: | | | |
| Total present value of minimum lease payments | | $ 668 | $ - |
| Principal payments | | (100) | - |
| **Total present value of minimum lease payments remaining** | | 568 | - |
| Lease obligations - current portion | *13* | (160) | - |
| **Lease obligations - long-term** | | $ 408 | $ - |

The Company has finance lease obligations for equipment in use at the 7P Plant. At the end of the lease obligations, ownership is transferred to the Company for all leases except one, whereby an election is to be made 60 days prior to the end of the lease term at the purchase option price of $1. The future minimum lease payments (also reflected in the liquidity analysis in Note 9) are as follows:

| | December 31, 2013 | December 31, 2012 |
|---|---|---|
| Less than 1 year | $ 190 | $ - |
| Between 1 and 5 years | 447 | - |
| **Total minimum lease payments payable** | 637 | - |
| Future finance charges on minimum lease payments | 69 | - |
| **Present value of minimum lease payments** | $ 568 | $ - |

## 15. DEFERRED TAX LIABILITY

Deferred income tax assets and liabilities are recognized for temporary differences between the carrying value of the balance sheet items and their corresponding tax values as well as for the benefit of losses available to be carried forward to future years for tax purposes that are considered probable to be realized.

Significant components of the Company's deferred tax assets and liability, after applying enacted corporate income tax rates, are as follows:

| | December 31, 2013 | December 31, 2012 |
|---|---|---|
| **Temporary differences** | | |
| Property and equipment | **$ (11)** | $ (24) |
| Exploration, evaluation and development projects | **5,831** | 6,345 |
| Share issue and other costs | **(704)** | (193) |
| Non-capital tax losses carried forward | **(4,108)** | (3,569) |
| Capital losses carried forward | **-** | (63) |
| Capital losses unrealized | **(76)** | (65) |
| | **932** | 2,431 |
| Unrecognized deferred tax assets | **589** | 42 |
| | **$ 1,521** | $ 2,473 |

The income tax recovery represents the recognition of deferred income tax assets (to the extent of the deferred tax liability) since the Company currently believes that it is probable that the benefit associated with these losses and costs will be realized prior to their expiry. It also includes the effect of enacted rate changes.

Non-capital losses, on which a deferred tax asset was recorded, expire as follows:

| | |
|---|---|
| **2014** | **$ 367** |
| **2015** | **636** |
| **2026** | **1,092** |
| **2027** | **2,312** |
| **2028** | **2,491** |
| **2029** | **1,801** |
| **2030** | **1,947** |
| **2031** | **1,134** |
| **2032** | **1,529** |
| **2033** | **2,253** |
| | **$ 15,562** |

Non-capital losses on which a deferred tax asset was not recorded expire as follows:

| | |
|---|---|
| **2032** | **$ 155** |
| **2033** | **519** |
| | **$ 674** |

As at December 31, 2013, the Company had estimated capital losses of $nil available for carryforward (December 31, 2012 - $467,000).

**Movement in Deferred Tax Assets and Liability during the Year**

| | As at January 1, 2013 | Recognized in operations | Recognized in OCI | Recognized in share capital | **As at December 31, 2013** |
|---|---|---|---|---|---|
| Property and equipment | $ (24) | $ 13 | $ - | $ - | **$ (11)** |
| Exploration and evaluation projects | 6,345 | (514) | - | - | **5,831** |
| Share issue and other costs | (193) | (399) | - | (112) | **(704)** |
| Net tax losses carried forward | (3,569) | (457) | (82) | - | **(4,108)** |
| Capital losses (net) | (63) | - | 63 | - | **-** |
| Capital losses unrealized | (65) | - | (11) | - | **(76)** |
| | 2,431 | (1,357) | (30) | (112) | **932** |
| Unrecognized deferred tax assets | 42 | 547 | - | - | **589** |
| Deferred tax liability, net | $ 2,473 | $ (810) | $ (30) | $ (112) | **$ 1,521** |

| | As at January 1, 2012 | Recognized in operations | Recognized in OCI | Recognized in share capital | **As at December 31, 2012** |
|---|---|---|---|---|---|
| Property and equipment | $ (26) | $ 2 | $ - | $ - | **$ (24)** |
| Exploration and evaluation projects | 6,179 | 166 | - | - | **6,345** |
| Share issue and other costs | (247) | 54 | - | - | **(193)** |
| Net tax losses carried forward | (3,147) | (317) | (105) | - | **(3,569)** |
| Capital losses (net) | - | (63) | - | - | **(63)** |
| Capital losses unrealized | (57) | (25) | 17 | - | **(65)** |
| | 2,702 | (183) | (88) | - | **2,431** |
| Unrecognized deferred tax assets | - | 42 | - | - | **42** |
| Deferred tax liability, net | $ 2,702 | $ (141) | $ (88) | $ - | **$ 2,473** |

## 16. CAPITAL AND OTHER COMPONENTS OF EQUITY

### Share Capital

#### *Authorized*

The Company is authorized to issue an unlimited number of common shares with no par value.

#### *Number of shares issued and outstanding*

The issued and outstanding common shares for 2013 and 2012 are as follows:

| | *Notes* | **Number of Shares** | Gross Proceeds/ Consideration | Non-cash Items | Share Issue Costs | Income Taxes | Finder's Unit Warrants | Other Warrants and Options | **Share Capital** |
|---|---|---|---|---|---|---|---|---|---|
| **Balance as at January 1, 2012** | | **395,807,042** | | | | | | | **$ 47,631** |
| Issue of common shares | *(a)* | **1,540,000** | $ - | $ 38 | $ - | $ - | $ - | $ - | **38** |
| Expiry of finder's unit warrants | *(b)* | **-** | - | - | - | - | 14 | - | **14** |
| **Balance as at December 31, 2012** | | **397,347,042** | $ - | $ 38 | $ - | $ - | $ 14 | $ - | **$ 47,683** |

| | Notes | Number of Shares | Gross Proceeds/ Consideration | Non-cash Items | Share Issue Costs | Income Taxes | Finder's Unit Warrants | Other Warrants and Options | Share Capital |
|---|---|---|---|---|---|---|---|---|---|
| **Balance as at January 1, 2013** | | **397,347,042** | | | | | | | **$ 47,683** |
| Issue of common shares for liabilities | *(c)* | **4,720,000** | $ - | $ 118 | $ (5) | $ 2 | $ - | $ - | **115** |
| Issue of common shares for cash | *(d)* | **44,178,500** | 2,209 | - | (12) | 3 | - | - | **2,200** |
| Issue of common shares for loan fee | *(e)* | **5,681,818** | - | 250 | - | - | - | - | **250** |
| Issue of shares under Share Bonus Plan | *(f)* | **367,500** | - | 17 | - | - | - | - | **17** |
| Issue of shares under Share Bonus Plan | *(g)* | **1,180,000** | - | 41 | - | - | - | - | **41** |
| Issue of common shares and warrants under rights offering | *(h)* | **100,000,000** | 2,400 | - | (375) | 101 | - | (733) | **1,393** |
| Issue of common shares for loan fee | *(i)* | **789,294** | - | 21 | - | - | - | - | **21** |
| Issue of shares under Share Bonus Plan | *(j)* | **266,666** | - | 8 | - | - | - | - | **8** |
| Issue of common shares and warrants under private placement | *(k)* | **12,500,000** | 300 | - | (21) | 6 | - | (106) | **179** |
| **Balance as at December 31, 2013** | | **567,030,820** | $ 4,909 | $ 455 | $ (413) | $ 112 | $ - | $ (839) | **$ 51,907** |

(n) In December, 2012, the Company issued common shares to a vendor for settlement of outstanding amounts owed by the Company.

(o) On May 25, 2011 the Company completed a private placement on a flow-through basis which included finder's warrants which also included finder's unit warrants. The finder's unit warrants were recorded at a fair value of $14,000 in accrued liabilities. The finder's warrants expired unexercised; accordingly, the finder's unit warrants expired and related costs were reversed in 2012.

(p) In January 2013, the Company issued 4,720,000 shares to satisfy $118,000 in accounts payable owing to a vendor for settlement of outstanding amounts owed by the Company.

(q) In March 2013, the Company entered into a private placement with a key investor and issued 44,178,500 shares at $0.05 per share generating gross proceeds of approximately $2,209,000.

(r) Effective March 2013, the Company issued 5,681,818 shares to satisfy $250,000 of the arrangement fee then outstanding on the Amended Loan.

(s) In April 2013, the Company issued 367,500 shares under the Share Bonus Plan to an employee.

(t) In July 2013, the Company issued 1,180,000 shares under the Share Bonus Plan to senior officers of the Company.

(u) On June 14, 2013, the Company announced the terms of a rights offering to existing shareholders to raise gross proceeds of up to approximately $2,700,000. The offering closed on July 30, 2013 and raised gross proceeds of $2,400,000 (excluding any potential proceeds from the exercise of the warrants). Accordingly, the Company issued 100,000,000 shares and 100,000,000 share purchase warrants. Each warrant entitles the holder to purchase one common share at a price of $0.035 during the 12-month period beginning July 31, 2014.

(v) In August 2013, the Company issued 789,294 shares with a stated value of $20,758 for the arrangement fee under the terms related to the backstop of the rights offering (Note 14).

(w) In September 2013, the Company issued 266,666 shares under the Share Bonus Plan to an officer and employee of the Company.

(x) In September 2013, the Company entered into a private placement and issued 12,500,000 shares and 12,500,000 share purchase warrants at $0.024 per share generating gross proceeds of $300,000. Each warrant entitles the holder to purchase one common share at a price of $0.035 for two years from issue date.

**Share Incentive Plan**

The Company has a Share Incentive Plan which includes a Share Purchase Plan and a Share Bonus Plan. The purpose of the Share Incentive Plan is to encourage ownership of common shares by directors, senior officers and employees of the Company and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of its business, to advance the interests of the Company by providing additional incentive for superior performance by such persons and to enable the Company and its designated affiliates to attract and retain valued directors, officers, employees and consultants.

***Share Purchase Plan***

Under the Share Purchase Plan, eligible directors, senior officers and employees of the Company and its designated affiliates and consultants can contribute up to 10% of their annual basic salary before deductions to purchase common shares. The Company matches each participant's contribution. The purchase price per common share is the volume-weighted average of the trading prices of the common shares on the TSX for the calendar quarter in respect of which the common shares are issued. Common shares acquired are held in safekeeping and delivered to employees as soon as practicable following March 31, June 30, September 30 and December 31 in each calendar year. No common shares have yet been issued pursuant to the Share Purchase Plan. The maximum number of common shares issuable under the Share Purchase Plan is the lesser of: (i) that number of common shares that can be purchased with a dollar amount equal to 20% of the gross annual salary of the Participants (as defined in the Share Incentive Plan); and (ii) 1% of the aggregate number of issued and outstanding common shares (calculated on a non-diluted basis) from time to time.

***Share Bonus Plan***

The Share Bonus Plan permits common shares to be issued as a discretionary bonus to eligible directors, senior officers and employees of the Company and its designated affiliates, and consultants from time to time. At the Company's Annual and Special Meeting of Shareholders held on June 26, 2012, shareholders approved an increase in the maximum number of common shares issuable under the Share Bonus Plan to 10,000,000.

In 2013, 1,814,166 shares were issued under the Share Bonus Plan (2012 – nil). The entitlement to shares issued under the Share Bonus Plan in 2013 vested immediately. The fair value of common share entitlements granted under the Share Bonus Plan is determined using the quoted market value on the date of grant for an aggregate fair value of $66,000 in 2013, which was charged immediately.

**Shareholder Rights Plan**

In March, 2009, the Board of Directors approved the adoption of a shareholder rights plan (the "Shareholder Rights Plan") which was subsequently confirmed by its shareholders at the Company's Annual and Special Meeting held on June 3, 2009 (the "ASM"). At the ASM, shareholders approved the extension of this plan to the termination of the annual meeting of shareholders in 2012, at which meeting this plan was further extended to the termination of the annual meeting of shareholders in 2015.

In order to implement the adoption of the Shareholder Rights Plan, the Board of Directors authorized the issuance of one right (a “Right”) in respect of each common share outstanding at the close of business on April 17, 2009 (the “Record Time”). In addition, the Board authorized the issuance of one Right in respect of each additional common share issued after the Record Time. Rights trade with and are represented by common share certificates, including certificates issued prior to the Record Time. Until such time as the Rights separate from the common shares and become exercisable, Rights certificates will not be distributed to shareholders.

If a person, or a group acting in concert, acquires (other than pursuant to an exemption available under the Shareholder Rights Plan) beneficial ownership of 20% or more of the common shares, Rights (other than those held by such acquiring person which will become void) will separate from the common shares and permit the holder thereof to purchase common shares at a 50% discount to their market price. A person, or a group acting in concert, who is the beneficial owner of 20% or more of the outstanding common shares as of the Record Time is exempt from the dilutive effects of the Shareholder Rights Plan provided such person (or persons) does not increase its beneficial ownership by more than 1% (other than in accordance with the terms of the Shareholder Rights Plan). At any time prior to the Rights becoming exercisable, the Board may waive the operation of the Shareholder Rights Plan with respect to certain events before they occur.

The issuance of the Rights is not dilutive until the Rights separate from the underlying common shares and become exercisable or until the exercise of the Rights. The issuance of the Rights will not change the manner in which shareholders currently trade their common shares.

**Accumulated Other Comprehensive Income or (Loss) (“AOCI”)**
AOCI is comprised of the following separate components of equity:

***Net change of financial assets at fair value through OCI***
This comprises the cumulative net change in the fair value of financial assets at fair value through OCI.

***Income tax on other comprehensive income***
This comprises the amount of income tax determined to be required on the cumulative net change in the fair value of financial assets at fair value through OCI.

## 17. EARNINGS (LOSS) PER SHARE

The calculation of basic and diluted EPS for the years ended December 31, 2013 and 2012 was based on the information in the table below.

| Years ended December 31, | 2013 | 2012 |
|---|---|---|
| **Balance as at beginning of year** | **397,347,000** | 395,807,000 |
| Effect of shares issued to settle liabilities | **4,526,000** | 55,000 |
| Effect of shares issued for private placements | **38,057,000** | - |
| Effect of shares issued for loan fees | **4,725,000** | - |
| Effect of shares issued under rights offering | **42,466,000** | - |
| Effect of shares issued under Share Bonus Plan | **962,000** | - |
| **Weighted average number of common shares as at end of year - Basic** | **488,083,000** | 395,862,000 |
| Effect of options granted and outstanding | **590,000** | 19,000 |
| Effect of warrants issued and outstanding | **-** | - |
| Effect of convertible promissory note | **-** | - |
| **Weighted average number of common shares as at end of year - Diluted** | **488,673,000** | 395,881,000 |
| Number of options excluded | **31,451,000** | 28,632,500 |
| Number of warrants excluded | **112,500,000** | - |
| Number of shares from conversion of promissory note excluded | **21,272,000** | - |
| **Net loss attributable to shareholders - Basic** | **$ (5,104)** | $ (183) |
| **Net loss attributable to shareholders - Diluted** | **$ (5,104)** | $ (183) |
| **Basic (loss) earnings per share** | **$ (0.01)** | $ (0.00) |
| **Diluted (loss) earnings per share** | **$ (0.01)** | $ (0.00) |

The effect of adjustments to the weighted average number of common shares would be anti-dilutive when the Company incurs losses. The table above provides the weighted average number of shares on a diluted basis for periods where losses are incurred for information only. The average market value of the Company's shares for purposes of calculating the dilutive effect of share options is based on quoted market prices for the respective periods during which the options were outstanding.

There have been no share issuances subsequent to the end of the year which would have had a significant effect on the EPS; however, the Company has issued convertible promissory notes (Note 26).

## 18. SHARE-BASED PAYMENTS

### Description of the Share-based Payment Arrangements

The Company's share-based payment arrangements are described below.

### *Stock Option Plan (equity-settled)*

The Company has a Stock Option Plan to encourage ownership of its shares by key management personnel (directors and executive management), employees and consultants, and to provide compensation for certain services. The terms of the Stock Option Plan provide that the directors have the right to grant options to acquire common shares of the Company at not less than the closing market price of the shares on the day preceding the grant. No compensation is recognized when options are exercised. The number of shares reserved for issuance is not to exceed 15% of the aggregate number of common shares issued and outstanding (calculated on a non-diluted basis) from time to time

As at December 31, 2013, the Company had 53,013,373 common shares available for the granting of future options (December 31, 2012 – 30,951,000 common shares). Options are exercisable at the closing market price of the shares at the date prior to grant. The Company does not have any cash-settled transactions.

***Share purchase warrants (equity-settled)***
Pursuant to the rights offering which closed on July 30, 2013, the Company issued 100,000,000 warrants. The Company also issued 12,500,000 warrants pursuant to a private placement on September 19, 2013. The Company does not have any cash-settled transactions.

***Share Bonus Plan***
The terms of the Share Bonus Plan are set out in Note 17.

**Terms and Conditions of Share-based Payment Arrangements**
The terms and conditions relating to the grants of the Stock Option Plan are as follows:

- Options issued during the year and granted to executive management, consultants and employees have a maximum term of five years and are equity-settled. Of the options granted, 50% vest immediately, while the remaining options are exercisable after one year.
- Options issued during the year and granted to directors have a maximum term of five years and are equity-settled. All options granted vest immediately.
- Certain options issued upon formation of the Company under a plan of arrangement had terms of up to 10 years.
- All options are to be settled by physical delivery of shares.

***Share purchase warrants***
The terms and conditions relating to the grants of the share purchase warrants are as follows: all warrants are to be settled by physical delivery of shares and as such, are equity-settled. Warrants issued are generally exercisable for a period of 12 to 18 months from issue date; the warrants issued under the rights offering in 2013 are exercisable on July 31, 2014 and expire on July 31, 2015. The Company's share purchase warrants issued pursuant to the private placement are exercisable on issue and expire on September 19, 2015.

**Disclosure of Share-based Payment Arrangements**
***Stock Option Plan***
The number and weighted average exercise prices of options are as follows:

| | Number of options | | Weighted average exercise price | |
|---|---|---|---|---|
| **As at and for the years ended** | **December 31, 2013** | December 31, 2012 | **December 31, 2013** | December 31, 2012 |
| **Outstanding as at beginning of year** | **28,651,500** | 27,074,736 | **$ 0.13** | $ 0.28 |
| Granted | **9,370,000** | 8,050,000 | **$ 0.03** | $ 0.05 |
| Expired or forfeit | **(5,980,250)** | (6,473,236) | **$ 0.24** | $ 0.65 |
| **Outstanding as at end of year** | **32,041,250** | 28,651,500 | **$ 0.08** | $ 0.13 |
| **Exercisable as at end of year** | **29,456,250** | 26,426,500 | **$ 0.08** | $ 0.15 |

There were no options exercised during 2013 or 2012.

| As at December 31, | Number of options outstanding 2013 | 2012 | Weighted average remaining contractual life (years) 2013 | 2012 |
|---|---|---|---|---|
| **Range of exercise prices** | | | | |
| $0.025 to $0.05 | **21,010,000** | 12,315,000 | **3.19** | 3.31 |
| $0.06 to $0.14 | **4,247,500** | 5,322,500 | **2.33** | 2.86 |
| $0.15 to $0.16 | **5,190,000** | 5,490,000 | **1.01** | 2.01 |
| $0.17 to $0.25 | **1,593,750** | 1,593,750 | **0.07** | 1.07 |
| $0.26 to $0.32 | **-** | 2,956,250 | **-** | 0.34 |
| $0.33 to $0.50 | **-** | 974,000 | **-** | 0.40 |
| | **32,041,250** | 28,651,500 | **2.57** | 2.45 |

Additional disclosures relating to the Company's options are as follows:

| As at and for the years ended December 31, | 2013 | 2012 |
|---|---|---|
| Number of options granted during the year | **9,370,000** | 8,050,000 |
| Weighted average fair value of options granted at grant date | **$ 0.018** | $ 0.035 |
| Number of options subject to vesting as at end of year | **2,585,000** | 2,225,000 |
| Share-based payment expense - vesting options | **$ 184** | $ 263 |
| Share-based payment expense - extended options | **$ 21** | $ - |
| Unvested options not yet charged to operations | **$ 26** | $ 38 |

### *Share purchase warrants*

The number and weighted average exercise prices of warrants are as follows:

| As at and for the years ended December 31, | Date Issued | Life | Number of warrants 2013 | 2012 | Weighted average exercise price 2013 | 2012 |
|---|---|---|---|---|---|---|
| **Issued pursuant to rights offering** | | | | | | |
| Unit warrants | July 30, 2013 | 12 [(a)] | **100,000,000** | - | **$ 0.035** | $ - |
| **Issued pursuant to private placements** | | | | | | |
| Unit warrants | September 19, 2013 | 24 | **12,500,000** | - | **$ 0.035** | $ - |
| Unit warrants | January 10, 2011 | 12 | | 2,500,000 | | $ 0.140 |
| Expired | | | | (2,500,000) | | |
| Unit warrants | May 25, 2011 | 18 | | 4,347,826 | | $ 0.150 |
| Expired | | | | (4,347,826) | | |
| Finder's warrants | May 25, 2011 | 18 | | 456,960 | | $ 0.150 |
| Expired | | | | (456,960) | | |
| **Outstanding as at end of year** | | | **112,500,000** | - | **$ 0.035** | $ - |

(a) The life of warrants is shown in number of months from issue date, except for those issued pursuant to the rights offering which became exercisable 12 months from issue.

### Inputs for Measurement of Grant-Date Fair Values

The grant-date fair values of share-based payments were measured based on the Black-Scholes option-pricing model. Expected volatility is estimated by considering historic average share price volatility.

The inputs used in the measurement of the fair values at grant date of the share-based payments granted, modified or issued during the years are as follows:

| | Options | | Warrants | |
|---|---|---|---|---|
| **Years ended December 31,** | **2013** | 2012 | **2013** | 2012 |
| Fair values at grant dates | **$0.012 to $0.019** | $ 0.035 | **$0.011 and $0.019** | n/a |
| Fair values of options modified | **$0.004 to $0.023** | n/a | **n/a** | n/a |
| Share prices at grant and modification dates | **$0.025 and $0.03** | $ 0.050 | **$ 0.025** | n/a |
| **Assumptions** | | | | |
| Exercise prices | **$0.025 to $0.16** | $ 0.050 | **$ 0.035** | n/a |
| Expected volatilities | **88% to 111%** | 104% | **101% and 107%** | n/a |
| Life (years) | **0.5 to 4.9** | 4 | **2** | n/a |
| Expected dividends | **-** | - | **-** | n/a |
| Risk-free interest rates | **0.78% to 1.63%** | 1.18% | **1.15% and 1.22%** | n/a |

## 19. FINANCE INCOME AND FINANCE COSTS

| **Years ended December 31,** | ***Notes*** | **2013** | 2012 |
|---|---|---|---|
| Interest income on bank deposits | | **$ 13** | $ 3 |
| **Finance income** | | **13** | 3 |
| Interest expense on loans | | | |
| Cash settled | | **168** | 9 |
| Amortization of loan fees | | **136** | - |
| Amortization of embedded derivative | *14* | **12** | - |
| Commitment fee | | **11** | - |
| Loss on adjustment of estimated cash flows | *14* | **3,289** | - |
| Net change in fair value of financial liabilities at fair value through operations | *14* | **173** | - |
| Net change in fair value of financial assets at fair value through operations | | **-** | 3 |
| Net foreign exchange loss | | **19** | 4 |
| **Finance costs** | | **3,808** | 16 |
| **Net Finance Costs** | | **$ (3,795)** | $ (13) |

## 20. INCOME TAXES

The income tax amount in 2013 is a recovery of $810,000 (2012 – recovery of $141,000).

The income tax recovery differs from the amount computed by applying the statutory federal and provincial income tax rates for 2013 of 26.5% and 2012 of 26.5%, to the loss before income taxes. The differences are summarized as follows:

| **Years ended December 31,** | **2013** | 2012 |
|---|---|---|
| Statutory rate applied to loss before income taxes | **$ (1,567)** | $ (86) |
| Effect of investment tax credits, net | **(34)** | (182) |
| Non-deductible items, net | **67** | 78 |
| Non-taxable portion of capital loss on financial liabilities through operations | **411** | - |
| Effect of change in expected future income tax rates and other | **(234)** | 7 |
| Unrecognized deferred tax assets | **547** | 42 |
| **Income Tax Recovery** | **$ (810)** | $ (141) |

## 21. OPERATING SEGMENT

## Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company is about to enter the frac sand market and will have formal operating segments in 2014 when it expects to have operating revenues, products, processes and customers. Accordingly, the Company will commence reporting on a segmented basis in 2014. The Company expects to have three reporting segments: Corporate, Exploration and Development, and Frac Sand.

The Corporate segment will operate to support the Company's activities, including exploration and development projects and the frac sand business. The Company will continue to receive administrative support from Nuinsco (Note 23) to do so.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada. Any applicable amounts relating to such projects will continue to be capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 24). The segment is located in Canada although sand purchases are expected to be sourced from the US.

## Geographic Information

| **As at December 31,** | | **2013** | | 2012 |
|---|---|---|---|---|
| **Canada** | | | | |
| Corporate | **$** | **7,365** | $ | 2,392 |
| Minago | | **38,668** | | 37,897 |
| Lac Rocher | | **7,388** | | 7,317 |
| Mel | | **7,473** | | 7,421 |
| **Total Assets** | **$** | **60,894** | $ | 55,027 |

Any revenues in each year are presently wholly attributable to the corporate office. There have been no changes in the reportable segment or the treatment of segmented assets and revenues year over year.

In order to assist in understanding the Company's transition, the following tables provide information on the Company's segments in accordance with expected reporting for 2014 onwards.

| **As at December 31,** | | **2013** |
|---|---|---|
| **Canada** | | |
| Corporate | **$** | **1,952** |
| Exploration and Development | | **55,056** |
| Frac Sand | | **3,886** |
| **Total Assets** | **$** | **60,894** |

| Year ended December 31, | | 2013 |
|---|---|---|
| **Canada** | | |
| Corporate | **$** | **324** |
| Exploration and Development | | **-** |
| Frac Sand | | **-** |
| Inter segment elimination | | **(324)** |
| **Total Revenues** | **$** | **-** |

## 22. RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19).

Balances and transactions with related parties as at and for the years ended December 31, 2013 and 2012 are shown in the following tables:

| As at December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **119** | $ | 157 |

Key management personnel compensation comprises:

| Years ended December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| Short-term employee benefits | **$** | **952** | $ | 807 |
| Share-based payments - options | | **118** | | 217 |
| Share-based payments - Share Bonus Plan | | **66** | | - |
| | **$** | **1,136** | $ | 1,024 |

### Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director, Mr. René Galipeau. As described in Note 14, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice.

Balances and transactions with Nuinsco under the management agreement as at and for the years ended December 31, 2013 and 2012 are shown in the following tables:

| As at December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| **Balances Outstanding under the Management Agreement** | | | | |
| Payable to Nuinsco Resources Limited | **$** | **56** | $ | - |
| Receivable from Nuinsco Resources Limited | **$** | **-** | $ | 37 |

| Years ended December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **755** | $ | 654 |
| Overhead charges to Nuinsco Resources Limited | **$** | **18** | $ | 27 |
| Project costs charged to Nuinsco Resources Limited | **$** | **37** | $ | 22 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **30** | $ | 31 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis. Payables to key management personnel generally relate to directors' fees, consulting fees and expense reimbursements.

**Balances and Transactions with Nuinsco Resources Limited under the Amended Loan**
The terms of the Amended Loan with Nuinsco and the balances and transactions related thereto are described in Note 14.

## 23. COMPANY ENTITY

**Significant Subsidiary - Victory Silica**

On June 19, 2012, the Company announced a new initiative through the hiring of Ken Murdock as the CEO and the creation of Victory Silica. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Victory Silica's executives and employees will manage the frac sand business on behalf of the Company. Presently, costs of the frac sand business relate either to pre-operating costs which have been expensed through operations or to plant commissioning and mobile equipment which have been capitalized. Refer also to Note 22.

| As at and for the years ended December 31, | | 2013 | | 2012 |
|---|---|---|---|---|
| **Victory Silica Ltd.** | | | | |
| Current assets | **$** | **81** | $ | - |
| Current liabilities | **$** | **277** | $ | - |
| Pre-operating costs | **$** | **520** | $ | 159 |

## 24. COMMITMENT

**Transformer Equipment**

On May 10, 2010, the Company entered into an agreement to purchase equipment for the Minago project. The total price is US$2,840,000. The Company has made aggregate deposits of $1,485,000 as at December 31, 2013.

## 25. SUBSEQUENT EVENTS

**Private Placements**

In January and March, 2014, the Company issued promissory notes under private placements, generating gross proceeds of approximately $265,000. The promissory notes bear interest at

a rate of 14.8% payable quarterly, have terms of two years and are convertible into the Company's common shares at the holder's option at $0.10 per share.

In February and March, 2014, the Company issued promissory notes under private placements, generating gross proceeds of approximately US$1,750,000. The promissory notes bear interest at a rate of 14.8% payable quarterly, have terms of two years and are convertible into the Company's common shares at the holder's option at $0.10 per share.

**Stock Options**

In January and February, 2014, 4,630,000 options were exercised generating aggregate gross proceeds of $220,000.

On February 4, 2014, the Company granted 2,630,000 options to officers, employees and consultants at an exercise price of $0.055. Of these options, 1,465,000 vest immediately and 1,165,000 vest over one year.

**Other**

There have been no other additional developments not already discussed elsewhere in these consolidated financial statements.

**Consolidated Financial Statements for the Years Ended December 31, 2012 and 2011 (Dated March 25, 2013)**

**MANAGEMENT'S RESPONSIBILITY FOR CONSOLIDATED FINANCIAL STATEMENTS**

All of the information in the annual report and accompanying consolidated financial statements of Victory Nickel Inc. is the responsibility of management. The consolidated financial statements have been prepared by management in accordance with Canadian generally accepted accounting principles for public companies, being international financial reporting standards. Where necessary, management has made judgements and estimates in preparing the consolidated financial statements and such statements have been prepared within acceptable limits of materiality. The financial information contained elsewhere in the annual report has been reviewed to ensure that it is consistent with the consolidated financial statements.

Management maintains appropriate systems of internal control to give reasonable assurance that its assets are safeguarded, and the financial records are properly maintained.

The Board of Directors is responsible for ensuring that management fulfils its responsibilities for financial reporting and internal control and exercises this responsibility principally through the Audit Committee. The Audit Committee, which is comprised of Directors, none of whom are employees or officers of the Company, meets with management and the external auditors to review the auditors' report and the consolidated financial statements to satisfy itself that management is properly discharging its responsibilities to the Directors, who approve the consolidated financial statements.

A firm of independent Chartered Accountants, appointed by the shareholders, audits the consolidated financial statements in accordance with Canadian generally accepted auditing standards and provides an independent professional opinion thereon. The external auditors have free and full access to the Audit Committee with respect to their findings regarding the fairness of financial reporting and the adequacy of internal controls.

René R. Galipeau, Vice-Chairman and CEO
Alison J. Sutcliffe, Vice-President, Finance & CFO

March 25, 2013

**INDEPENDENT AUDITOR'S REPORT TO THE SHAREHOLDERS OF VICTORY NICKEL INC.**

We have audited the accompanying consolidated financial statements of Victory Nickel Inc. which comprise the consolidated balance sheets as at December 31, 2012 and December 31, 2011, and the consolidated statements of operations, comprehensive loss, shareholders' equity and cash flows for the years ended December 31, 2012 and December 31, 2011 and a summary of significant accounting policies and other explanatory information.

**Management's Responsibility for the Financial Statements**
Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with International Financial Reporting Standards and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

**Auditor's Responsibility**
Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

**Opinion**
In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of Victory Nickel Inc. as at December 31, 2012 and December 31, 2011, and its financial performance and its cash flows for the years ended December 31, 2012 and December 31, 2011 in accordance with International Financial Reporting Standards.

**Emphasis of Matter**
Without qualifying our opinion, we draw attention to Note 1 in the consolidated financial statements which indicates that the Company has not commenced commercial production and accordingly the Company is dependent upon debt or equity financing and the optioning and/or sale of resource or resource-related assets for its funding. These conditions, along with other matters as set forth in Note 1, indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

(signed) BDO Canada LLP

Chartered Accountants, Licensed Public Accountants

Toronto, Ontario
March 25, 2013

## Consolidated Balance Sheets

| **As at December 31,**<br>(in thousands of Canadian dollars) | ***Notes*** | | **2012** | | 2011 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| **Current assets** | | | | | |
| Cash and cash equivalents | *6* | **$** | **256** | $ | 517 |
| Receivables and prepaids | *7* | | **155** | | 129 |
| Marketable securities | *8* | | **557** | | 2,383 |
| **Total current assets** | | | **968** | | 3,029 |
| **Non-current assets** | | | | | |
| Property and equipment | *10* | | **1,424** | | 1,277 |
| Mine property and development project | *11* | | **37,897** | | 35,571 |
| Exploration and evaluation projects | *12* | | **14,738** | | 14,577 |
| **Total non-current assets** | | | **54,059** | | 51,425 |
| **Total Assets** | | **$** | **55,027** | $ | 54,454 |
| **LIABILITIES AND SHAREHOLDERS' EQUITY** | | | | | |
| **Current liabilities** | | | | | |
| Trade and other payables | *13* | **$** | **551** | $ | 322 |
| Loans and borrowings | *14* | | **1,000** | | - |
| **Total current liabilities** | | | **1,551** | | 322 |
| **Non-current liabilities** | | | | | |
| Accrued interest | *14* | | **8** | | - |
| Deferred tax liability | *15* | | **2,473** | | 2,702 |
| **Total non-current liabilities** | | | **2,481** | | 2,702 |
| **Total Liabilities** | | | **4,032** | | 3,024 |
| **Shareholders' equity** | | | | | |
| Share capital | *16* | | **47,683** | | 47,631 |
| Contributed surplus | | | **4,397** | | 4,134 |
| Accumulated other comprehensive income | | | **1,855** | | 2,422 |
| Deficit | | | **(2,940)** | | (2,757) |
| **Total shareholders' equity** | | | **50,995** | | 51,430 |
| **Total Liabilities and Shareholders' Equity** | | **$** | **55,027** | $ | 54,454 |

**NATURE OF OPERATIONS (Note 1)**

Approved by the Board of Directors

(signed)
**Cynthia P. Thomas**
Director

(signed)
**Roland Horst**
Director

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Operations

| **Years ended December 31,** (in thousands of Canadian dollars, except per share amounts) | ***Notes*** | | **2012** | | 2011 |
|---|---|---|---|---|---|
| **Operating expenses** | | | | | |
| General and administrative | | **$** | **(1,321)** | $ | (1,575) |
| Share-based payments: | *18* | | | | |
| Options | | | **(263)** | | (342) |
| Share Bonus Plan | | | **-** | | (24) |
| Amortization of property and equipment | *10* | | **(18)** | | (12) |
| Recovery of exploration and evaluation project | *12* | | **1,450** | | 597 |
| Victory Silica pre-operating costs | *12* | | **(159)** | | - |
| **Operating loss** | | | **(311)** | | (1,356) |
| Finance income | *19* | | **3** | | 96 |
| Finance costs | *19* | | **(16)** | | (217) |
| **Net finance costs** | | | **(13)** | | (121) |
| **Loss before income taxes** | | | **(324)** | | (1,477) |
| Income tax recovery | *20* | | **141** | | 340 |
| **Net Loss for the Year** | | **$** | **(183)** | $ | (1,137) |
| **Loss per share** | *17* | | | | |
| Basic loss per share | | **$** | **(0.00)** | $ | (0.00) |
| Diluted loss per share | | **$** | **(0.00)** | $ | (0.00) |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Comprehensive Loss

| **Years ended December 31,** (in thousands of Canadian dollars) | ***Notes*** | | **2012** | | 2011 |
|---|---|---|---|---|---|
| **Net loss for the year** | | **$** | **(183)** | $ | (1,137) |
| **Other comprehensive (loss) income ("OCI")** | | | | | |
| Net change in fair value of financial assets | *9* | | **(655)** | | (1,962) |
| Income tax recovery | *15* | | **88** | | 265 |
| **Other comprehensive loss for the year** | | | **(567)** | | (1,697) |
| **Total Comprehensive Loss for the Year** | | **$** | **(750)** | $ | (2,834) |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Shareholders' Equity

| (in thousands of Canadian dollars) | *Notes* | Share Capital | Contributed Surplus | Accumulated Other Comprehensive Income / (Loss) | Deficit | Total Equity |
|---|---|---|---|---|---|---|
| **Balances as at January 1, 2011** | | $ 46,114 | $ 3,721 | $ 4,119 | $ (1,620) | $ 52,334 |
| **Total comprehensive loss for the year** | | | | | | |
| Net loss for the year | | | | | (1,137) | (1,137) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | *9* | | | (1,962) | | (1,962) |
| Income tax recovery | *15* | | | 265 | | 265 |
| **Total other comprehensive loss** | | | | (1,697) | | (1,697) |
| **Total comprehensive loss for the year** | | | | | | (2,834) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the year** | | | | | | |
| Issue of common shares and warrants under private placement | *16* | 471 | 26 | - | - | 497 |
| Issue of flow-through common shares and warrants under private placement | *16* | 797 | 88 | - | - | 885 |
| Issue of common shares under Share Bonus Plan | *16* | 55 | - | - | - | 55 |
| Options granted and vesting or modified | *18* | - | 342 | - | - | 342 |
| Warrants exercised | *16,18* | 168 | (32) | - | - | 136 |
| Options exercised | *16,18* | 26 | (11) | - | - | 15 |
| **Total contributions by owners** | | 1,517 | 413 | - | - | 1,930 |
| **Total transactions with owners** | | 1,517 | 413 | - | - | 1,930 |
| **Balances as at December 31, 2011** | | $ 47,631 | $ 4,134 | $ 2,422 | $ (2,757) | $ 51,430 |
| **Balances as at January 1, 2012** | | $ 47,631 | $ 4,134 | $ 2,422 | $ (2,757) | $ 51,430 |
| **Total comprehensive loss for the year** | | | | | | |
| Net loss for the year | | | | | (183) | (183) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | *9* | | | (655) | | (655) |
| Income tax recovery | *15* | | | 88 | | 88 |
| **Total other comprehensive loss** | | | | (567) | | (567) |
| **Total comprehensive loss for the year** | | | | | | (750) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the year** | | | | | | |
| Issue of common shares | *16* | 38 | - | - | - | 38 |
| Expiry of finders' warrants | *16* | 14 | - | - | - | 14 |
| Options granted and vesting | *18* | - | 263 | - | - | 263 |
| **Total contributions by owners** | | 52 | 263 | - | - | 315 |
| **Total transactions with owners** | | 52 | 263 | - | - | 315 |
| **Balances as at December 31, 2012** | | **$ 47,683** | **$ 4,397** | **$ 1,855** | **$ (2,940)** | **$ 50,995** |

The accompanying notes are an integral part of these consolidated financial statements

## Consolidated Statements of Cash Flows

| **Years ended December 31,**<br>(in thousands of Canadian dollars) | ***Notes*** | **2012** | 2011 |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Net loss for the year | | **$ (183)** | $ (1,137) |
| Adjustments for: | | | |
| Share-based payments | *18* | **263** | 366 |
| Expiry of finder's unit warrants | *16* | **14** | - |
| Amortization of property and equipment | *10* | **18** | 12 |
| Recovery of exploration and evaluation project | *12* | **(1,450)** | (597) |
| Net finance costs | | **11** | 126 |
| Income tax recovery | *20* | **(141)** | (340) |
| Net change in working capital: | | | |
| Change in receivables | | **9** | (33) |
| Change in trade and other payables | | **164** | (51) |
| **Net cash used by operating activities** | | **(1,295)** | (1,654) |
| **Cash flows from investing activities** | | | |
| Expenditures on mine property and development project | *11* | **(2,201)** | (594) |
| Expenditures on exploration and evaluation projects | *12* | **(183)** | (5,056) |
| Purchase of marketable securities | | **-** | (114) |
| Proceeds on sale of marketable securities | | **1,168** | 6,112 |
| Proceeds from option of Lynn Lake | *12* | **1,450** | 600 |
| Deposits on equipment | *10* | **(200)** | (526) |
| Purchase of furniture | *10* | **-** | (48) |
| **Net cash from investing activities** | | **34** | 374 |
| **Cash flows from financing activities** | | | |
| Issue of common shares and warrants | *16* | **-** | 1,627 |
| Net proceeds of loan | *14* | **1,000** | - |
| **Net cash from financing activities** | | **1,000** | 1,627 |
| **Net (decrease) increase in cash and cash equivalents** | | **(261)** | 347 |
| Cash and Cash Equivalents, Beginning of the Year | | **517** | 170 |
| **Cash and Cash Equivalents, End of the Year** | | **$ 256** | $ 517 |

The accompanying notes are an integral part of these consolidated financial statements

## 1. NATURE OF OPERATIONS

### Nature of Operations

Victory Nickel Inc. ("Victory Nickel" or the "Company") is a company domiciled in Canada. The address of the Company's registered office is 80 Richmond St. West, Suite 1802, Toronto, Ontario, M5H 2A4. The consolidated financial statements as at and for the years ended December 31, 2012 and 2011 comprise the Company and its subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica") together referred to as "Victory Nickel" and individually as "Victory Nickel entities". Victory Nickel is primarily engaged in the acquisition, exploration and development of nickel properties in Canada. The Company was formed on February 1, 2007 pursuant to a plan of arrangement.

The Company is listed on the Toronto Stock Exchange ("TSX") under the symbol NI.

### Going Concern

These consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at December 31, 2012, the Company had a working capital deficiency of $583,000, which includes approximately $176,000 of voluntary deferrals owing to directors and senior management and $118,000 of accounts payable subsequently settled through issuing shares, (December 31, 2011 – working capital of $2,707,000). Working capital is defined as current assets less current liabilities. The Company has initiatives underway to improve working capital which are expected to be announced shortly; these include the private placement of $2,209,000 which closed on March 22, 2013 (Note 25).

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings and the optioning and/or sale of resource or resource-related assets for its funding. The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding.

Should the Company not be able to continue to achieve favourable exploration results, obtain the necessary financing, achieve profitable operations on the frac sand business or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in

the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including project expenditures and corporate costs.

## 2. BASIS OF PREPARATION

### (a) Statement of Compliance

The consolidated financial statements have been prepared using accounting policies consistent with International Financial Reporting Standards ("IFRS") and its interpretations adopted by the International Accounting Standards Board ("IASB"). This is GAAP for a Canadian public company.

The management of Victory Nickel prepare the consolidated financial statements which are then reviewed by the Audit Committee and the Board of Directors. The consolidated financial statements were authorized for issue by the Board of Directors on March 25, 2013 and are made available to shareholders and others through filing on SEDAR shortly thereafter.

### (b) Basis of Measurement

The financial statements have been prepared on the historic cost basis except for derivative financial instruments such as warrants which are measured at fair value with changes through operations and financial assets such as marketable securities which are measured at fair value with changes recorded through other comprehensive income or loss ("OCI").

### (c) Functional and Presentation Currency

These financial statements are presented in Canadian dollars, which is the Company's functional currency. All financial information is expressed in Canadian dollars unless otherwise stated; tabular amounts are stated in thousands of dollars.

### (d) Use of Estimates and Judgements

The preparation of financial statements in conformity with IFRS requires management to make estimates, judgements and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

It is reasonably possible that, on the basis of existing knowledge, outcomes in the next financial year that are different from the assumptions used could require a material adjustment to the carrying amount of the asset or liability affected.

The accompanying consolidated financial statements include all adjustments that are, in the opinion of management, necessary for fair presentation.

#### *Significant estimates and assumptions*

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Information regarding significant areas of estimation uncertainty made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 9 - valuation of financial assets at fair value through operations and OCI;

- Note 11 - measurement of the recoverable amount of mine property and development project;
- Note 12 - measurement of the recoverable amount of exploration and evaluation projects; and
- Note 18 - measurement of share-based payments.

***Significant judgements***
Judgements are reviewed on an ongoing basis. Changes resulting from the effects of amended judgements are recognized in the period in which the circumstance giving rise to the change occurs and in any future periods presented.

Information regarding significant areas of critical judgements made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 1 - going concern assessment;
- Note 11 - classification of expenditures as mine property and development project or operating expenses;
- Note 12 - classification of expenditures as exploration and evaluation projects or operating expenses;
- Note 11 - impairment of mine property and development project;
- Note 12 - impairment of exploration and evaluation projects; and
- Note 15 - recoverability of deferred tax assets.

## 3. SIGNIFICANT ACCOUNTING POLICIES
The accounting policies of the Company are set out in detail below. Such policies have been applied consistently to all periods presented in these consolidated financial statements, and have been applied consistently by Victory Nickel entities.

### (a) New Accounting Policies
There have been no new accounting policies adopted by the Company, except that the financial statements are now prepared on the consolidated basis in accordance with IFRS 10 and 12.

### (b) Basis of Consolidation
***Subsidiary***
A subsidiary is an entity controlled by Victory Nickel. Control exists when Victory Nickel has the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities. In assessing control, potential voting rights that currently are exercisable are taken into account. The financial statements of subsidiaries are included in the consolidated financial statements from the date that control commences until the date that control ceases. The accounting policies of subsidiaries align with the policies adopted by Victory Nickel. Significant Company entities are listed in Note 23.

***(i) Transactions eliminated on consolidation***
Intercompany balances and transactions, and any unrealized income and expenses arising from intercompany transactions, are eliminated in preparing the consolidated financial statements. Unrealized gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of Victory Nickel's interest in the investee.

Unrealized losses are eliminated in the same way as unrealized gains, but only to the extent that there is no evidence of impairment.

**(c) Foreign Currency**

**(i) *Foreign currency transactions***

Transactions in foreign currencies are translated to the respective functional currency of Victory Nickel at exchange rates at the dates of the transactions. Monetary assets and liabilities denominated in foreign currencies at the reporting date are retranslated to the functional currency at the exchange rate at that date. The foreign currency gain or loss on monetary items is the difference between amortized cost in the functional currency at the beginning of the period, adjusted for effective interest and payments during the period, and the amortized cost in foreign currency translated at the exchange rate at the end of the period. Non-monetary assets and liabilities denominated in foreign currencies that are measured at fair value are retranslated to the functional currency at the exchange rate at the date that the fair value was determined. Foreign currency differences arising on retranslation are recognized through operations, except for differences arising on the retranslation of marketable securities, which are recognized directly in OCI. Non-monetary items that are measured in terms of historic cost in a foreign currency are translated using the exchange rate at the date of the transaction.

**(d) Financial Instruments**

**IFRS 9 Financial Instruments**

IFRS 9 Financial Instruments ("IFRS 9"), which impacts the classification and measurement of financial assets, has been early-adopted by the Company.

***(i) Non-derivative financial instruments***

Non-derivative financial instruments comprise investments in equity securities, receivables, cash and cash equivalents and trade and other payables.

Non-derivative financial instruments, with the exception of financial assets at fair value through OCI, are recognized initially at fair value plus, for instruments not at fair value through operations, any directly attributable transaction costs. Subsequent to initial recognition, non-derivative financial instruments are measured as described below.

Cash and cash equivalents comprise cash balances and call deposits.

Loans, receivables and borrowings are financial assets with fixed or determinable payments that are not quoted in an active market. Such assets and liabilities are recognized initially at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, loans, receivables and borrowings are measured at amortized cost using the effective interest method, less any impairment losses. Loans, receivables and borrowings comprise receivables or payables.

Accounting for finance income and expenses is discussed in Note 3(n).

*Financial assets at fair value through OCI*

Victory Nickel's investments in equity securities are measured at fair value and changes therein, as well as foreign currency differences on monetary items (which do not include equity investments), are recognized directly in OCI.

*Financial instruments at amortized cost*
Other non-derivative financial instruments are measured at amortized cost using the effective interest method, less any impairment losses.

***(ii) Derivative financial instruments***
Victory Nickel holds warrants as part of its portfolio of marketable securities which are financial assets at fair value through operations.

Derivatives are recognized initially at fair value; attributable transaction costs are recognized through operations when incurred. Subsequent to initial recognition, derivatives are measured at fair value and changes therein are recognized immediately through operations.

**(e) Property and Equipment**
***(i) Recognition and measurement***
Items of property and equipment are measured at cost less accumulated depreciation and accumulated impairment losses. Cost includes any expenditure that is directly attributable to the acquisition of the asset.

When parts of an item of property and equipment have different useful lives, they are accounted for as separate items (major components) of property and equipment. Gains and losses on disposal of an item of property and equipment are determined by comparing the proceeds from disposal with the carrying amount of property and equipment and are recognized net within *Other income* in the consolidated statement of operations.

***(ii) Depreciation***
Depreciation is calculated as a function of the depreciable amount, which is the cost of an asset less its residual value. Depreciation is recognized through operations as follows over the estimated useful lives of each part of an item of property and equipment. Land is not depreciated.

The estimated useful lives for the current and comparative periods are as follows:

| **Item** | **Method** | **2012** | 2011 |
|---|---|---|---|
| Building | Declining-balance | **5%** | 5% |
| Equipment & Furniture | Declining-balance | **20%** | 20% |
| Vehicle | Declining-balance | **30%** | 30% |

Depreciation methods, useful lives and residual values are reviewed at each financial year end and adjusted if appropriate.

**(f) Exploration and Evaluation Projects**
***(i) Exploration and Evaluation expenditures***
Exploration and Evaluation ("E&E") expenditures relate to costs incurred on the exploration for and evaluation of potential mineral reserves and includes costs related to the following: acquisition of exploration rights; conducting geological studies; exploratory drilling and sampling and evaluating the technical feasibility and commercial viability of extracting a mineral resource.

E&E expenditures, including costs of acquiring licenses, are capitalized as E&E assets on an "area of interest basis" which generally is defined as a project. The Company considers a project to be an individual geological area whereby the presence of a mineral deposit is considered favourable or has been proved to exist and, in most cases, comprises a single mine or deposit.

E&E assets are recognized if the rights to the project are current and either:

- the expenditures are expected to be recouped through successful development and exploitation of the project, or alternatively by its sale; or
- activities on the project have not, at the reporting date, reached a stage which permits a reasonable assessment of the existence or other otherwise of economically recoverable reserves and active and significant operations in, or in relation to, the project are continuing.

E&E expenditures are initially capitalized as intangible E&E assets. Such E&E expenditures may include costs of licence acquisition, technical services and studies, seismic acquisition, exploration drilling and testing, materials and fuels used, rentals and payments made to contractors and consultants. To the extent that a tangible asset is consumed in developing an intangible E&E asset, the amount reflecting that consumption is recorded as part of the cost of the intangible asset.

Once the technical feasibility and commercial viability of the extraction of mineral reserves in a project are demonstrable, permitted and development is approved by the Board, E&E assets attributable to that project are first tested for impairment and then reclassified to *Mine property and development projects* on the consolidated balance sheet.

***(ii) Pre-E&E (project generation) expenditures***

Pre-E&E (project generation) expenditures are incurred on activities that precede exploration for an evaluation of mineral resources, being all expenditures incurred prior to securing the legal rights to explore an area. Pre-E&E expenditures are expensed immediately as *Pre-exploration write-offs* through the consolidated statement of operations.

***(iii)Impairment***

E&E assets are assessed for impairment when facts and circumstances suggest that the carrying amount of an E&E asset may exceed its recoverable amount and any impairment loss is recognized as *Writedown of exploration and evaluation projects* through the consolidated statement of operations. The following facts and circumstances, among other things, indicate that E&E assets must be tested for impairment:

- the term of exploration license for the project has expired during the reporting period or will expire in the near future, and is not expected to be renewed;
- substantive expenditure on further exploration for and evaluation of mineral resources in the project area is neither budgeted nor planned;
- exploration for and evaluation of mineral resources in the project area have not led to the discovery of commercially viable quantities of mineral resources and the Company plans to discontinue activities in the specific area; or
- sufficient data exists to indicate that while development activity is likely to proceed, the carrying amount of the E&E asset is unlikely to be recovered in full through such activity.

E&E assets are tested for impairment on an individual project (area of interest) basis. As noted above, a project would also be tested for impairment before being transferred to *Mine property and development projects* on the consolidated balance sheet.

**(g) Mine Property and Development Project**

***(i) Pre-production development expenditures***

The Company considers a project to be in the development phase when an identified mineral reserve is being prepared for production as approved by the Board, for example when there is construction of access to the mineral reserves upon determination that there is economic viability of the project under a successful feasibility study and is permitted for development. As such, project development activities are related to the construction of an asset to be used in production or preparation for extraction of a specific mineral resource.

The costs of mining properties, which include the costs of acquiring and developing mining properties and mineral rights, are capitalized in the same manner as property and equipment under *Mine property and development project* ("MP&D") assets on the consolidated balance sheet in the period in which they are incurred or transferred from E&E assets upon determination of economic viability. At that point, all further pre-production primary development expenditure other than land, buildings, plant and equipment, etc. is capitalized as part of the cost of the project until the project is capable of commercial production. This includes costs incurred in preparing the site for mining operations, including pre-stripping costs.

Presently, the Company's sole project classified as *Mine property and development project* on the consolidated balance sheet is the Minago project; it continues to be in the pre-production phase and costs continue to be capitalized without depreciation.

***(ii) Impairment***

If a property were to be abandoned, there is little likelihood of a mineral right being exploited, or the value of the exploitable mineral right has diminished below cost, the cumulative capitalized cost relating to the property is written off to its recoverable amount through operations.

**(h) Borrowing Costs**

The Company's policy is to capitalize project-related borrowing costs related to qualifying assets as incurred. A qualifying asset is an asset that necessarily takes a substantial period of time to get ready for its intended use or sale. The Company presently does not have any project-related borrowings on qualifying assets.

**(i) Government Grants**

Government grants that compensate Victory Nickel for expenses incurred are recognized through operations on a systematic basis in the same periods in which the expenses are recognized. Grants that compensate Victory Nickel for the cost of an asset are recognized through operations on a systematic basis over the useful life of the asset. For assets which are not being amortized, such as E&E assets or MP&D assets, the government grant is deducted from the related asset.

**(j) Investment Tax Credits ("ITCs")**

Investment tax credits may be claimed by the Company on qualifying expenditures. The Company accounts for these when such qualifying expenditures have been made by reducing the deferred tax liability and recording an income tax recovery through the consolidated statement of operations.

**(k) Impairment**

***(i) Financial assets***

A financial asset is assessed at each reporting date to determine whether there is any objective evidence that it is impaired. A financial asset is considered to be impaired if objective evidence indicates that one or more events have had a negative effect on the estimated future cash flows of that asset.

An impairment loss in respect of a financial asset measured at amortized cost is calculated as the difference between its carrying amount and the present value of the estimated future cash flows discounted at the original effective interest rate. Individually significant financial assets are tested for impairment on an individual basis. The remaining financial assets are assessed collectively in groups that share similar credit risk characteristics.

An impairment loss is reversed if the reversal can be related objectively to an event occurring after the impairment loss was recognized. For financial assets measured at amortized cost, the reversal is recognized through operations.

***(ii) Non-financial assets***

The carrying amounts of Victory Nickel's non-financial assets, other than deferred tax assets, are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. For goodwill and intangible assets that have indefinite lives or that are not yet available for use, the recoverable amount is estimated each year at the same time.

The recoverable amount of an asset or cash-generating unit ("CGU") (see definition below) is the greater of its value in use and its fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. For the purpose of impairment testing, assets are grouped together into the smallest group of assets that generates, or has the potential to generate, cash inflows from continuing use that are largely independent of the cash inflows of other assets or groups of assets. Generally, a CGU is analogous to an individual project. The goodwill acquired in a business combination, for the purpose of impairment testing, is allocated to CGUs that are expected to benefit from the synergies of the combination.

An impairment loss is recognized if the carrying amount of an asset or a CGU exceeds its estimated recoverable amount. Impairment losses are recognized through operations. Impairment losses recognized in respect of CGUs are allocated first to reduce the carrying amount of any goodwill allocated to the units and then to reduce the carrying amounts of the other assets in the unit (group of units) on a pro rata basis.

Impairment losses recognized in prior periods are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An

impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized.

**(l) Employee Benefits**

***(i) Termination benefits***

Termination benefits are recognized as an expense when Victory Nickel is demonstrably committed, without realistic possibility of withdrawal, to a formal detailed plan to either terminate employment before the normal retirement date, or to provide termination benefits as a result of an offer made to encourage voluntary redundancy. Termination benefits for voluntary redundancies are recognized as an expense if Victory Nickel has made an offer of voluntary redundancy, it is probable that the offer will be accepted and the number of acceptances can be reliably estimated.

***(ii) Short-term benefits***

Short-term employee benefit obligations are measured on an undiscounted basis and are expensed as the related service is provided. A liability is recognized for the amount expected to be paid under short-term cash bonus plans if Victory Nickel has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be reliably estimated.

***(iii)Share-based payment transactions***

The grant-date fair value of options granted to employees, directors and consultants is recognized as an employee expense, with a corresponding increase in equity, over the period that the individuals become unconditionally entitled to the options. The amount recognized as an expense is adjusted to reflect the actual number of share options for which the related service and non-market vesting conditions are met.

Share-based payment arrangements in which the Company receives properties, goods or services as consideration for its own equity instruments are accounted for as equity-settled share-based payment transactions, regardless of how the equity instruments are obtained by Victory Nickel.

**(m) Provisions**

A provision is recognized if, as a result of a past event, the Company has a present legal or constructive obligation that can be reliably estimated and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognized as a finance cost.

In accordance with the Company's environmental policy and applicable legal requirements, a provision for site restoration or decommissioning in respect of land restoration, and the related expense, is recognized when the land is contaminated and there is a legal obligation to restore the site. The Company presently has no decommissioning liabilities.

**(n) Finance Income and Finance Costs**

Finance income comprises interest income on funds invested (including financial assets at fair value through operations), dividend income, gains on the disposal of financial assets at fair value through operations, amortization of flow-through premiums and changes in the fair value

of financial assets (warrants) at fair value through operations. Interest income is recognized as it accrues through operations, using the effective interest method. Dividend income is recognized through operations on the date that the Company's right to receive payment is established, which in the case of quoted securities is the ex-dividend date. Gains on the disposal of financial assets are recognized on the settlement date.

Finance costs comprise interest expense on borrowings, unwinding of the discount on provisions, dividends on preferred shares classified as liabilities, changes in the fair value of financial assets at fair value through operations and losses recognized on financial assets that are recognized through operations. All borrowing costs are recognized through operations using the effective interest method, except for those amounts capitalized as part of the cost of qualifying assets.

Foreign currency gains and losses are reported on a net basis.

**(o) Income Taxes**

Income tax expense comprises current and deferred tax. Income tax expense is recognized through operations except to the extent that it relates to items recognized either in OCI or directly in equity, in which case it is recognized in OCI or in equity respectively.

Current tax is the expected tax payable on the taxable income for the period, using tax rates enacted or substantively enacted at the reporting date and any adjustment to tax payable in respect of previous years.

Deferred tax is recognized using the balance sheet method, providing for temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognized for the following temporary differences: the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss, and differences relating to investments in subsidiaries and jointly-controlled entities to the extent that it is probable that they will not reverse in the foreseeable future. In addition, deferred tax is not recognized for taxable temporary differences arising on the initial recognition of goodwill. Deferred tax is measured at the tax rates that are expected to be applied to temporary differences when they reverse, based on the laws that have been enacted or substantively enacted by the reporting date. Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realized simultaneously.

A deferred tax asset is recognized to the extent that it is probable that future taxable profits will be available against which the temporary difference can be utilized. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realized.

In 2009, pursuant to the receipt of a positive feasibility study for the Minago project, Victory Nickel determined that it was probable that it would be able to realize the benefit associated with its losses and costs prior to their expiry. Accordingly, the Company recognized the deferred tax assets (to the extent of the deferred tax liability) at that time. Victory Nickel

continues to believe it is probable that the benefit of its losses and other costs will be realized prior to their expiry. Victory Silica represents a new business venture for the Company; as it is not yet in operation, the Company has not recognized its deferred tax assets.

**(p) Share Capital**

***(i) Common shares***

Common shares are classified as equity. Incremental costs directly attributable to the issue of common shares and share options are recognized as a deduction from equity, net of any tax effects.

The Company has financed a portion of its exploration and evaluation activities through the issue of flow-through shares. Under the terms of these share issues, the tax attributes of the related expenditures are renounced to subscribers. Common shares issued on a flow-through basis typically include a premium because of the tax benefits associated therewith ("flow-through premium"). Flow-through shares may also be issued with a warrant feature. At the time of issue, the Company estimates the proportion of proceeds attributable to the flow-through premium, the common share and the warrant with reference to closing market prices and such techniques as the Black-Scholes option-pricing model. The flow-through premium is estimated as the excess of the subscription price over the market value of the share and is recorded as a liability in *Trade and other payables* on the consolidated balance sheet (Note 13). The proceeds attributable to the warrants is also treated as equity and recorded in *Contributed surplus* on the consolidated balance sheet until exercise, when the associated proportion is transferred to share capital along with the cash proceeds received on exercise.

The effect of renunciation of the tax benefits to holders of such shares is recognized pro rata with the associated expenditures being incurred by the Company. This could occur either before or after the formal renunciation of expenditures to the tax authorities have been made. When the eligible expenditures are incurred, the tax value of the renunciation is recorded as a deferred tax liability and charged against operations as a deferred tax provision.

Furthermore, as eligible expenditures are incurred, the Company recognises a pro rata amount of the flow-through premium through *Finance income* in the consolidated statement of operations (Note 19) with a decrement to the liability in *Trade and other payables* on the consolidated balance sheet.

***(ii) Share-based payment arrangements***

***Stock Option Plan***

The Company has a stock option plan (the "Stock Option Plan") which is described in Note 18. Awards to non-employees are measured at the fair value of the goods or services received. Awards made to employees are measured at the grant date. All stock-based awards made to employees and non-employees are recognized at the date of grant using a fair-value-based method to calculate the share-based payment. The share-based payment is charged to operations over the vesting period of the options or service period, whichever is shorter. Stock options vest either immediately or over a 12-month period.

***Share Incentive Plan***

The Company has a share incentive plan (the "Share Incentive Plan"), which includes both a share purchase plan (the "Share Purchase Plan") and a share bonus plan (the "Share Bonus Plan"). The Share Incentive Plan is administered by the Directors of the Company. The Share

Incentive Plan provides that eligible persons thereunder include Directors, senior officers and employees of the Company and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of the business.

The Share Incentive Plan is described in Note 16. The Company uses the fair value method of accounting for, and to recognize as compensation expense, its share-based payments for employees. Shares issued under the Share Incentive Plan are valued based on the quoted market price on the date of the award. This amount is expensed over the vesting period.

**(q) Earnings (Loss) per Share**

The Company presents basic and diluted earnings (loss) per share ("EPS") data for its common shares. Basic EPS is calculated by dividing the results of operations attributable to ordinary shareholders of the Company by the weighted average number of common shares outstanding during the period. Diluted EPS is determined by adjusting the results of operations attributable to common shareholders and the weighted average number of common shares outstanding for the effects of all dilutive potential common shares, which comprise warrants and share options.

**(r) New Standards and Interpretations Not Yet Adopted**

The IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued the following new and revised standards and interpretations which are applicable to the Company but which are not yet effective for the year ended December 31, 2012 and have not been applied in preparing these consolidated financial statements unless stated otherwise.

***IFRS 10 - Consolidated Financial Statements***

Effective for annual periods beginning on or after January 1, 2013, with early adoption permitted, IFRS 10 establishes principles for the presentation and preparation of consolidated financial statements when an entity controls one or more other entities. The IFRS defines the principle of control and establishes control as the basis for determining which entities are consolidated in the consolidated financial statements.

***IFRS 12 – Disclosure of Interests in Other Entities***

Effective for annual periods beginning on or after January 1, 2013, with early adoption permitted, IFRS 12 requires the disclosure of information that enables users of financial statements to evaluate the nature of, and risks associated with, its interest in other entities and the effects of those interests on its financial position, financial performance and cash flows.

Early adoption of these standards is only permitted if IFRS 10, IFRS 11, IFRS 12 and the consequential amendments to IAS 17 and IAS 18 are adopted at the same time, with the exception of early-adopting only the disclosure provisions for IFRS 12 without the other new standards.

The Company has early-adopted these standards when consolidating its subsidiary Victory Silica (Note 23).

***IFRS 13 – Fair Value Measurement***

Effective for annual periods beginning on or after January 1, 2013, with early adoption permitted, IFRS 13 provides a definition of fair value, a single framework for measuring fair value and disclosure requirements about fair value measurements.

***Amendments to IAS 1 – Presentation of Financial Statements***
Effective for annual periods beginning on or after July 1, 2012, the amendments to IAS 1 require companies preparing financial statements in accordance with IFRS to group together items within OCI that may be reclassified to the income or loss section of the statement of operations.

IFRS 13 and Amendments to IAS 1 have not been early-adopted by the Company. However, the Company does not believe that the application of these pronouncements will have a material impact on the consolidated financial statements of the Company.

## 4. FINANCIAL RISK MANAGEMENT AND CAPITAL MANAGEMENT DISCLOSURES

**Overview**
The Company has exposure to the following risks from its use of financial instruments:

- credit risk;
- liquidity risk;
- market risk; and
- operational risk.

This note presents information about the Company's exposure to each of the above risks, the Company's objectives, policies and processes for measuring and managing risk, and the Company's management of capital. Further quantitative disclosures are included throughout these consolidated financial statements.

**Risk Management Framework**
The Board of Directors has overall responsibility for the establishment and oversight of the Company's risk management framework. The Board fulfils its responsibility through the Audit Committee which is responsible for overseeing the Company's risk management policies.

The Company's risk management policies are established to identify and analyze the risks faced by the Company, to set appropriate risk limits and controls, and to monitor risks and adherence to limits. Risk management practices are reviewed regularly to reflect changes in market conditions and the Company's activities. The Company has an established code of conduct which sets out the control environment within which framework all directors' and employees' roles and obligations are outlined. The Company's risk and control framework is facilitated by the small-sized and hands-on executive team.

**Credit Risk**
Credit risk is the risk of an unexpected financial loss to the Company if a customer or third party to a financial instrument fails to meet its contractual obligations and arises principally from the Company's cash and cash equivalents, receivables and marketable securities.

***Cash and cash equivalents***
The Company's cash and cash equivalents are held through large Canadian financial institutions. The Company has a corporate policy of investing its available cash in Canadian government instruments and certificates of deposit or other direct obligations of major Canadian banks, unless otherwise specifically approved by the Board.

***Receivables***
The Company's receivables consist primarily of amounts due from federal and provincial governments. Amounts due from other parties are settled on a regular basis.

When necessary, the Company establishes an allowance for impairment that represents its estimate of incurred losses in respect of receivables. The main component of this allowance is a specific loss component that relates to individually significant exposures.

Further, when the Company engages in corporate transactions, it seeks to manage its exposure by ensuring that appropriate recourse is included in such agreements upon the counterparty's failure to meet contractual obligations.

***Marketable securities***
The Company limits its exposure to credit risk by investing only in securities which are listed on public stock exchanges. Such strategic investments are approved by the Board of Directors of the Company. Management actively monitors changes in the markets and management does not expect any counterparty to fail to meet its obligations. The Company's investments are generally in the junior natural resources sector and these companies are subject to similar areas of risk as the Company itself.

***Guarantees***
The Company's policy is to provide financial guarantees only to wholly-owned subsidiaries or under business arrangements where the benefit of the guarantee will enure to the Company. As at December 31, 2012, the Company had $nil in guarantees outstanding (2011 - $nil).

**Liquidity Risk**
Liquidity risk is the risk that the Company will encounter difficulty in meeting the obligations associated with its financial liabilities that are settled by delivering cash or another financial asset. The Company's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient liquidity to meet its liabilities when due without incurring unacceptable losses or risking undue damage to the Company's reputation.

The Company's objective is to maintain sufficient capital in order to meet short-term business requirements, after taking into account cash flows from operations and the Company's holdings of cash and cash equivalents and marketable securities. This is accomplished by budgets and forecasts which are updated on a periodic basis to understand future cash needs and sources. When possible, spending plans are adjusted accordingly to provide for liquidity.

The Company manages its liquidity risk through the mechanisms described above and as part of Capital Disclosures below. The Company has historically relied on issuances of shares to develop projects and to finance day-to-day operations and may do so again in the future.

The Company has no significant long-term liabilities except for its deferred tax liability and long-term loan. All other contractually-obligated cash flows are payable within the next fiscal year.

**Market Risk**
Market risk is the risk that changes in market prices, such as foreign exchange rates, interest rates, commodity prices and equity prices will affect the Company's income, the value of its

E&E and MP&D properties or the value of its holdings of financial instruments. The objective of market risk management is to manage and control market risk exposures within acceptable parameters, while optimizing the return.

***Currency risk***

The Company is exposed to currency risk on purchases and other payables that are denominated in a currency other than the functional currency of the Company; the Canadian dollar. The primary currency in which these transactions are denominated is the United States dollar ("US$"). The Company does not actively hedge its foreign currency exposure.

***Interest rate risk***

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Company's cash equivalents earn interest at variable short-term rates. The Company's debt bears interest at a fixed rate (Note 14). Accordingly, the estimated effect of a 50bps change in interest rate would not have a material effect on the Company's results of operations. None of the Company's other financial instruments are interest-bearing. Consequently, the Company is not exposed to any significant interest rate risk which could be caused by a sudden change in market interest rates.

***Other market price risk***

The Company's marketable securities and strategic investments are subject to equity price risk. The values of these investments will fluctuate as a result of changes in market prices, the price of metals or other factors affecting the value of the investments.

Commodity price risk is the potential adverse impact on earnings and economic value due to commodity price movements and volatilities. The value of the Company's mineral resource properties is related to the price of, and outlook for, base and precious metals. Historically, such prices have fluctuated and are affected by numerous factors outside of the Company's control, including, but not limited to: industrial and retail demand, central bank lending, forward sales by producers and speculators, levels of worldwide production, short-term changes in supply and demand because of speculative hedging activities and other factors such as significant mine closures. The Company does not have any hedging or other commodity-based risks respecting its operations. The value of the Company's strategic investments is also related to the price of, and outlook for, base and precious metals and other minerals.

**Operational Risk**

Operational risk is the risk of direct or indirect loss arising from a wide variety of causes associated with the Company's processes, personnel, technology and infrastructure, and from external factors other than credit, market and liquidity risks such as those arising from legal and regulatory requirements and generally accepted standards of corporate behaviour. Operational risks arise from all of the Company's operations.

The Company's objective is to manage operational risk so as to balance the avoidance of financial losses and damage to the Company's reputation with overall cost effectiveness and to avoid control procedures that restrict initiative and creativity.

The primary responsibility for the development and implementation of controls to address

operational risk is assigned to senior management. The Company has a small but hands-on and experienced executive team which facilitates communication across the Company. This expertise is supplemented, when necessary, by the use of experienced consultants in legal, compliance and industry-related specialties. The Company also has standards for the management of operational risk in the following areas:

- requirements for appropriate segregation of duties, including the independent authorization of transactions;
- requirements for the reconciliation and monitoring of transactions;
- compliance with regulatory and other legal requirements;
- documentation of controls and procedures;
- development of contingency plans;
- ethical and business standards; and
- risk mitigation, including insurance when this is effective and available.

Compliance with Company standards is supported by a code of conduct which is provided to employees, officers and directors. The Company requires sign-off of compliance with the code of conduct.

**Capital Management Disclosures**

The Company's objective when managing capital is to safeguard its accumulated capital in order to provide an adequate return to shareholders by maintaining a sufficient level of funds to support continued project development and corporate activities. Capital is defined by the Company as the aggregate of its shareholders' equity as well as any long-term debt, equipment-based and/or project-based financing.

| | **December 31, 2012** | December 31, 2011 |
|---|---|---|
| Shareholders' equity | **$ 50,995** | $ 51,430 |
| Long-term debt | **8** | - |
| | **$ 51,003** | $ 51,430 |

The Company manages its capital structure and makes adjustments to it based on the level of funds available to the Company to manage its operations. In order to maintain or adjust the capital structure, the Company expects that it will be able to obtain equity, long-term debt, equipment-based financing and/or project-based financing sufficient to maintain and expand its operations. There are no assurances that these initiatives will be successful. In order to achieve these objectives, the Company invests its unexpended cash in highly-liquid, rated financial instruments. Refer to Note 25.

Neither the Company, nor its subsidiary, are subject to externally-imposed capital requirements. There were no changes in the Company's approach to capital management during the year.

## 5. DETERMINATION OF FAIR VALUES

A number of the Company's accounting policies and disclosures require the determination of fair value for both financial and non-financial assets and liabilities. Fair values have been determined for measurement and/or disclosure purposes based on the methods described below. When applicable, further information about the assumptions made in determining fair values is disclosed in the notes specific to that asset or liability.

**(o) Property and Equipment**
The fair value of property and equipment recognized as a result of a business combination is based on the amount for which a property could be exchanged on the date of valuation between knowledgeable, willing parties in an arm's length transaction.

**(p) Intangible Assets**
The fair value of other intangible assets is based on the discounted cash flows expected to be derived from the use and eventual sale of the assets.

**(q) Marketable Securities**
The fair value of financial assets at fair value through operations or OCI is determined by reference to their quoted closing bid price at the reporting date.

***Fair value hierarchy***
The different levels of valuation are defined as follows:

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities;
Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices); and
Level 3: Inputs for the asset or liability are not based on observable market data (unobservable inputs).

**(r) Receivables**
The fair value of receivables is estimated as the present value of future cash flows, discounted at the market rate of interest at the reporting date. This fair value is determined for disclosure purposes only.

**(s) Warrants**
The fair value of warrants included in financial assets at fair value through operations is based upon the Black-Scholes option-pricing model. Measurement inputs include: share price on measurement date, exercise price of the instrument, expected volatility (based on weighted average historic volatility adjusted for changes expected due to publicly-available information), weighted average expected life of the instruments (based on historic experience and general option-holder behaviour), expected dividends and the risk-free interest rate (based on government bonds).

**(t) Non-derivative Financial Liabilities**
Fair value, which is determined for disclosure purposes, is calculated based on the present value of future principal and interest cash flows, discounted at the market rate of interest at the reporting date.

**(u) Share-based Payment Transactions**
The fair value of share options is measured using the Black-Scholes option-pricing model. The measurement inputs are described above under Note 5(e). Any service and non-market performance conditions attached to the transactions are not taken into account in determining fair value.

## 6. CASH AND CASH EQUIVALENTS

| | December 31, 2012 | December 31, 2011 |
|---|---|---|
| Bank balances | **$ 256** | $ 517 |
| **Cash and Cash Equivalents in the Statement of Cash Flows** | **$ 256** | $ 517 |

## 7. RECEIVABLES AND PREPAIDS

| | *Note* | December 31, 2012 | December 31, 2011 |
|---|---|---|---|
| Receivables | | **$ 68** | $ 106 |
| Prepaid expenses and deposits | | **50** | 3 |
| Due from Nuinsco Resources Limited | *22* | **37** | 20 |
| | | **$ 155** | $ 129 |

## 8. MARKETABLE SECURITIES

| | *Note* | December 31, 2012 | December 31, 2011 |
|---|---|---|---|
| Financial assets at fair value through OCI: | | | |
| Shares | *9* | **$ 557** | $ 2,380 |
| Financial assets at fair value through operations: | | | |
| Warrants | *9* | **-** | 3 |
| | | **$ 557** | $ 2,383 |

The Company records its portfolio of shares at available market prices with any difference in fair value compared with acquisition cost being recorded as gain or loss on financial assets at fair value through OCI.

The financial assets at fair value through operations consist of warrants which are not publicly-traded. However, they are susceptible to valuation using the Black-Scholes option-pricing model, the inputs for which are readily determinable. Any change in fair value after initial recognition, is recorded through the consolidated statement of operations as a gain or loss on financial assets at fair value in *Finance income* or *Finance costs* (Note 19). The change in the fair value of the warrants was a net decline of $3,000 during the year ended December 31, 2012 and is included in *Finance costs* (December 31, 2011 – net decline of $213,000 in *Finance costs*).

**Sensitivity Analysis – Equity Price Risk**

All of the Company's financial assets at fair value through OCI are listed on public stock exchanges, including the TSX and the TSX-V. Recently, the markets have experienced extreme volatility, therefore the sensitivity analysis is now performed using 15%; the analysis was previously performed using 5%. For such investments, a 15% increase in the equity prices at the reporting date would have increased equity by $72,000, after tax effects of $12,000 (as at December 31, 2011 at 15% - an increase of $306,000, after tax effects of $51,000); an equal change in the opposite direction would have had the equal but opposite effect on the amounts shown above.

For financial assets at fair value through operations, the impact on operations of a 15% increase in the fair value at December 31, 2012 and at December 31, 2011 would not have been material.

## 9. FINANCIAL INSTRUMENTS

## Credit Risk

### *Exposure to credit risk*

The carrying amount of financial assets represents the maximum credit exposure. All amounts are held in Canada.

The maximum exposure to credit risk at the reporting date was:

| | *Notes* | **December 31, 2012** | December 31, 2011 |
|---|---|---|---|
| **Carrying amount** | | | |
| Cash and cash equivalents | *6* | **$ 256** | $ 517 |
| Receivables | *7* | **155** | 129 |
| Financial assets at fair value through OCI | *8* | **557** | 2,380 |
| Financial assets at fair value through operations | *8* | **-** | 3 |
| | | **$ 968** | $ 3,029 |

## Liquidity Risk

The following table shows the contractual maturities of financial liabilities including estimated interest payments.

| | **Non-derivative financial liabilities** | | |
|---|---|---|---|
| | **Long-term liability** | **Trade and other payables** | **Total** |
| **As at December 31, 2012** | | | |
| Carrying amount | $ 1,009 | $ 551 | $ 1,560 |
| Contractual cash flows | 1,009 | 551 | 1,560 |
| 6 months or less | - | 551 | 551 |
| 2 - 5 years | 1,009 | - | 1,009 |
| **As at December 31, 2011** | | | |
| Carrying amount | $ - | $ 322 | $ 322 |
| Contractual cash flows | - | 322 | 322 |
| 6 months or less | - | 322 | 322 |

Note that the long-term loan is contractually payable on January 31, 2015, however, because up to $1,000,000 of option payments may be diverted to the lender as prepayment, that amount is classified as a current liability on the Consolidated Balance Sheet (Notes 12, 14 and 25).

## Currency Risk

### *Exposure to currency risk*

The Company's exposure to foreign currency risk is immaterial; periodically, the Company may have trade payables in US$. Refer also to Note 24 for commitments.

### *Sensitivity analysis*

A 10% strengthening or weakening of the Canadian dollar would have an immaterial effect on the Company's equity or profit or loss. The analysis assumes that all other variables, in particular interest rates, remain constant.

## Fair Value

### *Fair values versus carrying amounts*

The fair values of the Company's financial assets and liabilities equal their carrying amounts shown in the consolidated balance sheets. The Company has not made any reclassifications

between assets recorded at cost or amortized cost and fair value.

The table below analyses financial instruments carried at fair value by valuation method:

| | Level 1 | Level 2 | Level 3 | Total |
|---|---|---|---|---|
| **As at December 31, 2012** | | | | |
| Financial assets at fair value through OCI | **$ 557** | **$ -** | **$ -** | **$ 557** |
| | **$ 557** | **$ -** | **$ -** | **$ 557** |
| **As at December 31, 2011** | | | | |
| Financial assets at fair value through OCI | $ 2,380 | $ - | $ - | $ 2,380 |
| Financial assets at fair value through operations | - | 3 | - | 3 |
| | $ 2,380 | $ 3 | $ - | $ 2,383 |

There have been no transfers between Level 1 and Level 2 during the current and prior reporting periods. All of the shares owned by the Company are valued using Level 1 methodologies; warrants are not publicly-traded but are susceptible to valuation using the Black-Scholes option-pricing model, the inputs for which are readily determinable.

The warrants were valued using the Black-Scholes option-pricing model, using the following parameters and assumptions:

| | **December 31, 2012** | December 31, 2011 |
|---|---|---|
| Fair values | **$0.000** | $0.009 |
| Share prices at valuation date | **$0.12 and $1.01** | $0.41 and $2.05 |
| **Assumptions** | | |
| Exercise prices | **$0.80 and $8.44** | $0.80 and $8.44 |
| Expected volatilities | **72% and 63%** | 81% and 113% |
| Expected remaining terms (years) | **0.308** | 0.308 |
| Expected dividends | **-** | - |
| Risk-free interest rates | **1.13%** | 0.96% |

Pursuant to a corporate transaction entered into by the issuer of the warrants, the warrants entitle the holder to 0.094758 of a share of the spin-off company. Accordingly, the parameters for the shares of both companies have been considered in arriving at the estimated value of the warrant. The issuer announced a one-year extension to the expiry period, effective April 5, 2012.

## 10. PROPERTY AND EQUIPMENT

| Balance as at January 1, 2011 | Land and Building | Vehicle | Equipment and Furniture | Total |
|---|---|---|---|---|
| Cost | $ 83 | $ 32 | $ 637 | $ 752 |
| Accumulated Amortization | (4) | (3) | (30) | (37) |
| **Carrying Amount** | **79** | **29** | **607** | **715** |
| Additions | - | - | 574 | 574 |
| Amortization | (2) | (8) | (2) | (12) |
| **Balance as at December 31, 2011** | | | | |
| Cost | 83 | 32 | 1,211 | 1,326 |
| Accumulated Amortization | (6) | (11) | (32) | (49) |
| **Carrying Amount** | **77** | **21** | **1,179** | **1,277** |
| Additions | - | - | 200 | 200 |
| Disposals - cost | - | - | (52) | (52) |
| Disposals - accumulated amortization | - | - | (17) | (17) |
| Amortization | (2) | (6) | (10) | (18) |
| **Balance as at December 31, 2012** | | | | |
| Cost | 83 | 32 | 1,359 | 1,474 |
| Accumulated Amortization | (8) | (17) | (25) | (50) |
| **Carrying Amount** | **$ 75** | **$ 15** | **$ 1,334** | **$ 1,424** |

Equipment and furniture includes deposits of $1,334,000 related to the purchase of transformers and other electrical equipment; the equipment is not available for use and is not being depreciated. On May 10, 2010, the Company entered into an agreement to purchase the equipment for the Minago project. The total price is US$2,840,000 (Note 24).

## 11. MINE PROPERTY AND DEVELOPMENT PROJECT

Effective September 19, 2011, the Board of Directors approved the development of the Minago mine and, accordingly, the Company transferred expenditures of $34,807,000 on its Minago project from E&E assets to MP&D assets on its consolidated balance sheet.

| | January 1, 2012 | Current Expenditures | Recoveries | December 31, 2012 |
|---|---|---|---|---|
| Minago | $ 35,571 | $ 2,376 | $ (50) | **$ 37,897** |
| | $ 35,571 | $ 2,376 | $ (50) | **$ 37,897** |

| | Transfer from E&E projects September 2011 | Current Expenditures | Recoveries | December 31, 2011 |
|---|---|---|---|---|
| Minago | $ 34,807 | $ 764 | $ - | $ 35,571 |
| | $ 34,807 | $ 764 | $ - | $ 35,571 |

Recoveries in 2012 represent a grant from the Manitoba Government that was received in April, 2012.

### Minago

The 100%-owned Minago project covers approximately 28,928 ha, through a combination of mining claims, mineral leases and a mineral exploration licence, on Manitoba's Thompson Nickel Belt. The property encompasses the Nose Deposit, which contains the entire current nickel mineral resource, and the North Limb, a zone of nickel mineralization with a known strike length of 1.5 kilometres located to the north of the Nose Deposit.

From 2006 to date, considerable work has been performed, including diamond drilling, metallurgical testing and engineering studies and all the studies required to complete the Environmental Impact Study which was filed in May 2010. As a result, in August 2011, the Company received its Environmental Act Licence. The results of the Minago Feasibility Study ("FS") were announced in December 2009 and improvements thereto announced in June 2010 and July 2011.

Five mineral claims totalling 691 ha located at the north end of the Company's existing Minago property package are subject to a maximum 2% net smelter return royalty with a 50% back-in right; these claims represent approximately 2.4% of the total Minago project.

The Minago project is not in production. Accordingly, the Minago project is not being depreciated. On September 19, 2011, the Company announced that the Board of Directors had approved the development of Minago and directed management to proceed with securing financing arrangements.

## 12. EXPLORATION AND EVALUATION PROJECTS

Cumulative costs relating to the acquisition of mineral properties and E&E expenditures have been incurred on the following projects:

| | January 1, 2012 | Current Expenditures | Recoveries | Excess Proceeds | **December 31, 2012** |
|---|---|---|---|---|---|
| Lac Rocher | $ 7,254 | $ 63 | $ - | $ - | **$ 7,317** |
| Lynn Lake | - | - | (1,450) | 1,450 | **-** |
| Mel | 7,323 | 98 | - | - | **7,421** |
| | $ 14,577 | $ 161 | $ (1,450) | $ 1,450 | **$ 14,738** |

| | January 1, 2011 | Current Expenditures | Recoveries/ Transfer to MP&D Project | Excess Proceeds | December 31, 2011 |
|---|---|---|---|---|---|
| Lac Rocher | $ 7,026 | $ 236 | $ (8) | $ - | $ 7,254 |
| Lynn Lake | - | 3 | (600) | 597 | - |
| Mel | 6,618 | 705 | - | - | 7,323 |
| Minago | 31,059 | 3,748 | (34,807) | - | - |
| | $ 44,703 | $ 4,692 | $ (35,415) | $ 597 | $ 14,577 |

The expenditures on the Lynn Lake property are shown net of cumulative option payments received which include $1,000,000 in February 2012 and $450,000 in August 2012. The excess proceeds of $1,450,000 and $597,000 for the years ended December 31, 2012 and 2011, respectively, represent the excess of consideration received under the option agreement above carrying value and are reflected in *Recovery of exploration and evaluation project* through operations.

In September, 2011, the Board approved the development of the Minago project, accordingly, the Company reviewed amounts recorded at that date for impairment and transferred $34,807,000 to MP&D project (Note 11).

### Lac Rocher

The Lac Rocher project, which is 100%-owned, is located 140 kilometres northeast of Matagami in northwestern Québec. The project is subject to a royalty of $0.50 per ton on any ores mined and milled from the property and a 2% NSR described below.

In 2007, the Company began environmental work in support of obtaining a permit for the Lac Rocher deposit in order to extract and direct-ship mineralized material to an offsite mill for processing. A 12-hole, 1,500 metre drill program was also completed to test for extensions to the nickel sulphide mineralization and to provide metallurgical samples for the Preliminary Economic Assessment ("PEA") to determine the near-term production and cash generation potential of the project.

Metallurgical testing of the massive sulphide mineralization from the deposit was completed in December, 2007. In February, 2008, the Company announced the results from metallurgical testing of the disseminated sulphide zone and they were incorporated into the PEA completed in November 2008. The Company completed the construction of an access road in the third quarter of 2009 and performed diamond drilling to provide geotechnical data for portal and ramp development.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% NSR for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

**Lynn Lake**

The Company owns a 100% right, title and interest in the Lynn Lake nickel property ("Lynn Lake"), covering approximately 600 ha in northern Manitoba. The Lynn Lake property is subject to an option agreement with Prophecy Platinum Corp. ("Prophecy Platinum").

The Company received $1,000,000 in February 2012; on August 8, 2012, the Company received $450,000 from Prophecy Platinum in consideration for removal of the exploration expenditure condition from the Lynn Lake option agreement and has received all payments scheduled under the option agreement to December 31, 2012. Accordingly, under the original agreement, the sole remaining condition for the Lynn Lake property to transfer to Prophecy Platinum was the $1,000,000 option payment which was originally due from Prophecy Platinum by March 1, 2013. On March 1, 2013, the Company agreed to an additional amendment to the option agreement which allows Prophecy Platinum to make a series of payments through 2013 and 2014 aggregating $1,125,000 in satisfaction of the remaining option conditions. On March 1, 2013, the Company received the first payment of $125,000; $450,000 remains due across 2013 and $550,000 is payable by August 29, 2014. Upon receipt of the final option payment in 2014, the Company will transfer ownership of Lynn Lake to Prophecy Platinum.

Failure on the part of Prophecy Platinum (if not cured by Prophecy Coal Corp.; the option agreement was assigned by them to Prophecy Platinum with the Company's consent) to meet any of the terms will result in cancellation of the option on the property and it will revert to the Company.

In 2012, $1,450,000 excess of proceeds under the option agreement above the book value of the property had been received and accordingly was recorded through the consolidated statement of operations as a recovery of exploration and evaluation project in respect of Lynn Lake (December 31, 2011 - $597,000).

**Mel**
Effective August 27, 1999, Nuinsco Resources Limited ("Nuinsco") (the predecessor entity of Victory Nickel) entered into an option agreement (the "Agreement") with Inco Limited (predecessor to CVRD Inco Limited, now Vale) for the exploration and development of Vale's Mel properties (the "Mel Properties") located in the Thompson area of northern Manitoba. Pursuant to the Agreement, sufficient expenditures have been incurred to earn a 100% interest in the Mel Properties, and in 2007 the Company exercised its option to acquire such interest. Vale had the right to earn back a 51% interest by incurring expenditures of $6,000,000 over a four-year period. On September 14, 2010, Vale notified the Company that it would not exercise this back-in right. In accordance with the terms of the agreement with Vale, they now are entitled to a 10% royalty on "distributable earnings" as defined in the agreement. Distributable earnings is defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

Also under the Agreement, Vale has a contractual obligation to mill ore mined from the Mel deposit at its cash cost plus 5% (provided that the product meets Vale specifications and that Vale has sufficient mill capacity).

Ongoing updating of Mel data is being conducted and applies to both the drilling data on the Mel deposit/lease as well as the 111 drill holes collared on the claims portion of the property. When completed, additional modelling of the resource will be continued. No fieldwork has been conducted during 2012.

**Victory Silica**
On June 19, 2012, the Company announced a new initiative through the hiring of Ken Murdock as the CEO and the creation of Victory Silica. The objective is to establish VSL as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Presently, all costs relate to pre-operating costs and have been expensed through operations. Refer also to Note 25.

**Wakami, Lar and Wellmet Projects**
The Company has incurred minimal expenditures on these properties in 2012 and 2011.

**Impairment and Pre-exploration Costs**
Costs relating to discontinued projects in the amounts of $nil were provided for through operations as *Writedown of exploration and evaluation projects* in the consolidated statement of operations during the year ended December 31, 2012. In the year ended December 31, 2011, $3,000 of expenditures related to Lynn Lake were recorded against the net recovery for Lynn Lake. There were no pre-exploration costs recorded in either 2012 or 2011.

## 13. TRADE AND OTHER PAYABLES

| | December 31, 2012 | December 31, 2011 |
|---|---|---|
| Trade payables | | |
| Mine property and development project | **$ 293** | $ 158 |
| Exploration and evaluation projects | **3** | 12 |
| Non-project related | **84** | 20 |
| Accrued liabilities | | |
| Mine property and development project | **2** | 12 |
| Exploration and evaluation projects | **1** | 14 |
| Non-project related | **160** | 89 |
| Other payables | **8** | 17 |
| Flow-through premium liability (see table below) | **-** | - |
| | **$ 551** | $ 322 |

**The following table shows the transactions and balances of the flow-through premium liability:**

| **As at and for the years ended December 31,** | **2012** | 2011 |
|---|---|---|
| **Balance as at beginning of year** | **$ -** | $ - |
| Flow-through premium from financing - May, 2011 | **-** | 87 |
| Flow-through premium adjusted through finance income | **-** | (87) |
| **Balance as at end of year** | **$ -** | $ - |

## 14. LOANS AND BORROWINGS

| | December 31, 2012 | December 31, 2011 |
|---|---|---|
| Advances | **$ 1,000** | $ - |
| Interest payable | **9** | - |
| Unamortized loan fees | **(1)** | - |
| | **$ 1,008** | $ - |

The Company has entered into a loan agreement for $1,000,000. The loan bears interest at 12% per annum and matures on January 31, 2015; the loan is secured by equipment and a general security agreement over the assets of the Company. At the option of the lender, and under certain circumstances, the lender can elect to receive prepayment of the loan from up to $1,000,000 of the proceeds of the Lynn Lake option payments originally due by March 1, 2013. Accordingly, $1,000,000 of the loan has been classified as a current liability due within one year since this matches the Lynn Lake option payments which were available to be diverted to the lender at their option under the agreement in place as at December 31, 2012. As described in Note 12, the Lynn Lake option agreement was amended March 1, 2013 and the future classification of the loan payable as current or long-term will be based upon the ability of the lender to direct payments based on the amended schedule.

On March, 25, 2013, the Company increased this loan to up to $3 million (the “Amended Loan”) with the additional amount available to fund capital expenditures relating to the Seven Persons sand recycling facility (the “7P Plant”). Refer to Note 25.

## 15. DEFERRED TAX LIABILITY

Deferred income tax assets and liabilities are recognized for temporary differences between the carrying value of the balance sheet items and their corresponding tax values as well as for

the benefit of losses available to be carried forward to future years for tax purposes that are considered probable to be realized.

Significant components of the Company's deferred tax assets and liability, after applying enacted corporate income tax rates, are as follows:

| | **December 31, 2012** | December 31, 2011 |
|---|---|---|
| **Temporary differences** | | |
| Property and equipment | **$ (24)** | $ (26) |
| Exploration, evaluation and development projects | **6,345** | 6,179 |
| Share issue and other costs | **(193)** | (247) |
| Non-capital tax losses carried forward | **(3,569)** | (3,147) |
| Capital losses carried forward | **(63)** | - |
| Capital gains unrealized | **(65)** | (57) |
| | **2,431** | 2,702 |
| Unrecognized deferred tax assets | **42** | - |
| | **$ 2,473** | $ 2,702 |

The income tax recovery represents the recognition of deferred income tax assets (to the extent of the deferred tax liability) since the Company currently believes that it is probable that the benefit associated with these losses and costs will be realized prior to their expiry. It also includes the effect of enacted rate changes.

Non-capital losses expire as follows:

| | |
|---|---|
| **2013** | **$ 195** |
| **2014** | **367** |
| **2015** | **636** |
| **2026** | **1,092** |
| **2027** | **2,312** |
| **2028** | **2,491** |
| **2029** | **1,801** |
| **2030** | **1,947** |
| **2031** | **857** |
| **2032** | **1,519** |
| | **$ 13,217** |

As at December 31, 2012, the Company had estimated capital losses of $467,000 available for carryforward (December 31, 2011 - $nil).

## Movement in Temporary Differences during the Year

| | As at January 1, 2012 | Recognized in income or | Recognized in OCI | Recognized in share capital | **As at December 31, 2012** |
|---|---|---|---|---|---|
| Property and equipment | $ (26) | $ 2 | $ - | $ - | **$ (24)** |
| Exploration and evaluation projects | 6,179 | 166 | - | - | **6,345** |
| Share issue costs | (247) | 54 | - | - | **(193)** |
| Net tax losses carried forward | (3,147) | (317) | (105) | - | **(3,569)** |
| Capital losses (net) | - | (63) | - | - | **(63)** |
| Capital gains unrealized | (57) | (25) | 17 | - | **(65)** |
| | 2,702 | (183) | (88) | - | **2,431** |
| Unrecognized deferred tax assets | - | 42 | - | - | **42** |
| Deferred tax liability, net | $ 2,702 | $ (141) | $ (88) | $ - | **$ 2,473** |

| | As at January 1, 2011 | Recognized in income or | Recognized in OCI | Recognized in share capital | **As at December 31, 2011** |
|---|---|---|---|---|---|
| Property and equipment | $ (22) | $ (4) | $ - | $ - | **$ (26)** |
| Exploration and evaluation projects | 6,071 | 108 | - | - | **6,179** |
| Share issue costs | (377) | 137 | - | (7) | **(247)** |
| Net tax losses carried forward | (2,927) | (552) | 332 | - | **(3,147)** |
| Capital losses (net) | (87) | - | 87 | - | **-** |
| Capital gains unrealized | 656 | (29) | (684) | - | **(57)** |
| | 3,314 | (340) | (265) | (7) | **2,702** |
| Unrecognized deferred tax assets | - | - | - | - | **-** |
| Deferred tax liability, net | $ 3,314 | $ (340) | $ (265) | $ (7) | **$ 2,702** |

## 16. CAPITAL AND OTHER COMPONENTS OF EQUITY

### Share Capital

#### *Authorized*

The Company is authorized to issue an unlimited number of common shares.

#### *Number of shares issued and outstanding*

The issued and outstanding common shares for 2012 and 2011 are as follows:

| | *Notes* | Number of Shares | Gross Proceeds/ Consideration | Non-cash Items | Share Issue Costs | Income Taxes | Flow-Through Premium | Finder's Unit Warrants | Other Warrants and Options | Share Capital |
|---|---|---|---|---|---|---|---|---|---|---|
| **Balance as at January 1, 2011** | | 380,025,528 | | | | | | | | $ 46,114 |
| Issue of common shares | *(a)* | 5,000,000 | $ 500 | $ - | $ (4) | $ 1 | $ - | $ - | $ (26) | 471 |
| Issue of flow-through common shares | *(b)* | 8,695,652 | 1,000 | - | (20) | 6 | (87) | (14) | (88) | 797 |
| Warrants exercised | *(c)* | 1,137,627 | 136 | - | - | - | - | - | 32 | 168 |
| Options exercised | *(d)* | 300,000 | 15 | - | - | - | - | - | 11 | 26 |
| Issue of shares under Share Bonus Plan | *(e)* | 648,235 | - | 55 | - | - | - | - | - | 55 |
| **Balance as at December 31, 2011** | | 395,807,042 | $ 1,651 | $ 55 | $ (24) | $ 7 | $ (87) | $ (14) | $ (71) | $ 47,631 |

| | *Notes* | **Number of Shares** | Gross Proceeds/ Consideration | Non-cash Items | Share Issue Costs | Income Taxes | Flow-Through Premium | Finder's Unit Warrants | Other Warrants and Options | **Share Capital** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Balance as at January 1, 2012** | | **395,807,042** | | | | | | | | **$ 47,631** |
| Issue of common shares | *(f)* | **1,540,000** | $ - | $ 38 | $ - | $ - | $ - | $ - | $ - | **38** |
| Expiry of finder's unit warrants | *(b)* | **-** | - | - | - | - | - | 14 | - | **14** |
| **Balance as at December 31, 2012** | | **397,347,042** | $ - | $ 38 | $ - | $ - | $ - | $ 14 | $ - | **$ 47,683** |

(y) On January 10, 2011, the Company completed a private placement financing of common shares at a price of $0.10 per unit. Each unit comprises one common share and one-half of one common share purchase warrant. Each whole warrant entitled the holder to purchase one common share at an exercise price of $0.14 for a period of 12 months from closing. The Company apportioned proceeds of $26,000 to the cost of the unit warrants in contributed surplus.

(z) On May 25, 2011, the Company completed a private placement of flow-through common shares at a price of $0.115 per unit. Each unit comprises one common share and one-half of one common share purchase warrant. Each whole warrant entitled the holder to purchase one common share at an exercise price of $0.15 for a period of 18 months from closing. Upon closing, the Company issued 456,960 finder's warrants that entitled the holder to purchase one finder's unit at an exercise price of $0.15 for a period of 18 months from issuance. Each finder's unit entitled the holder to acquire one common share and one-half of one finder's unit warrant. Each whole finder's unit warrant entitled the holder to purchase one common share at an exercise price of $0.15 for a period of 18 months from the issuance of the finder's unit warrant. The Company apportioned proceeds of

$87,000 to the flow-through premium, $79,000 was attributed to the share purchase warrants and $9,000 to the cost of the finder's warrants recorded in contributed surplus. The finder's unit warrants were recorded at a fair value of $14,000 in accrued liabilities. The finder's warrants expired unexercised; accordingly, the finder's unit warrants expired and related costs were reversed in 2012.

(aa) During 2011, 1,137,627 warrants were exercised at an exercise price of $0.12 per share. The aggregate consideration plus the aggregate amount previously recorded through contributed surplus is reflected as an increase in share capital.

(bb) In July, 2011, 300,000 options were exercised at an exercise price of $0.05 per share. The aggregate consideration plus the aggregate amount previously recorded through contributed surplus is reflected as an increase in share capital.

(cc) On October 4, 2011, the Company issued common shares to employees and consultants as discretionary bonuses pursuant to the Company's Share Bonus Plan.

(dd) In December, 2012, the Company issued common shares to a vendor for settlement of outstanding amounts owed by the Company.

**Share Incentive Plan**

The Company has a Share Incentive Plan which includes a Share Purchase Plan and a Share Bonus Plan. The purpose of the Share Incentive Plan is to encourage ownership of common shares by directors, senior officers and employees of the Company and its designated affiliates and consultants who are primarily responsible for the management and profitable growth of its business, to advance the interests of the Company by providing additional incentive for superior performance by such persons and to enable the Company and its designated affiliates to attract and retain valued directors, officers, employees and consultants.

***Share Purchase Plan***

Under the Share Purchase Plan, eligible directors, senior officers and employees of the Company and its designated affiliates and consultants can contribute up to 10% of their annual basic salary before deductions to purchase common shares. The Company matches each participant's contribution. The purchase price per common share is the volume-weighted average of the trading prices of the common shares on the TSX for the calendar quarter in respect of which the common shares are issued. Common shares acquired are held in safekeeping and delivered to employees as soon as practicable following March 31, June 30, September 30 and December 31 in each calendar year. No common shares have yet been issued pursuant to the Share Purchase Plan. The maximum number of common shares issuable under the Share Purchase Plan is the lesser of: (i) that number of common shares that can be purchased with a dollar amount equal to 20% of the gross annual salary of the Participants (as defined in the Share Incentive Plan); and (ii) 1% of the aggregate number of issued and outstanding common shares (calculated on a non-diluted basis) from time to time.

***Share Bonus Plan***

The Share Bonus Plan permits common shares to be issued as a discretionary bonus to eligible directors, senior officers and employees of the Company and its designated affiliates, and consultants from time to time. At the Company's Annual and Special Meeting of Shareholders held on June 26, 2012 (the "ASM"), shareholders approved an increase in the maximum number of common shares issuable under the Share Bonus Plan to 10,000,000.

In 2012, no shares were issued under the Share Bonus Plan (2011 – 648,235).The

entitlement to shares issued under the Share Bonus Plan in 2011 vested immediately. The fair value of common share entitlements granted under the Share Bonus Plan is determined using the quoted market value on the date of grant for an aggregate fair value of $55,000 in 2011, which was charged immediately.

**Shareholder Rights Plan**
In March, 2009, the Board of Directors approved the adoption of a shareholder rights plan (the "Shareholder Rights Plan") which was subsequently confirmed by its shareholders at the Company's Annual and Special Meeting held on June 3, 2009. At the ASM, shareholders approved the extension of this plan to the termination of the annual meeting of shareholders in 2015.

In order to implement the adoption of the Shareholder Rights Plan, the Board of Directors authorized the issuance of one right (a "Right") in respect of each common share outstanding at the close of business on April 17, 2009 (the "Record Time"). In addition, the Board authorized the issuance of one Right in respect of each additional common share issued after the Record Time. Rights trade with and are represented by common share certificates, including certificates issued prior to the Record Time. Until such time as the Rights separate from the common shares and become exercisable, Rights certificates will not be distributed to shareholders.

If a person, or a group acting in concert, acquires (other than pursuant to an exemption available under the Shareholder Rights Plan) beneficial ownership of 20% or more of the common shares, Rights (other than those held by such acquiring person which will become void) will separate from the common shares and permit the holder thereof to purchase common shares at a 50% discount to their market price. A person, or a group acting in concert, who is the beneficial owner of 20% or more of the outstanding common shares as of the Record Time is exempt from the dilutive effects of the Shareholder Rights Plan provided such person (or persons) does not increase its beneficial ownership by more than 1% (other than in accordance with the terms of the Shareholder Rights Plan). At any time prior to the Rights becoming exercisable, the Board may waive the operation of the Shareholder Rights Plan with respect to certain events before they occur.

The issuance of the Rights is not dilutive until the Rights separate from the underlying common shares and become exercisable or until the exercise of the Rights. The issuance of the Rights will not change the manner in which shareholders currently trade their common shares.

**Accumulated Other Comprehensive Income or (Loss) ("AOCI")**
AOCI is comprised of the following separate components of equity:

***Net change of financial assets at fair value through OCI***
This comprises the cumulative net change in the fair value of financial assets at fair value through OCI.

***Income tax on other comprehensive income***
This comprises the amount of income tax determined to be required on the cumulative net change in the fair value of financial assets at fair value through OCI.

## 17. EARNINGS (LOSS) PER SHARE

The calculation of basic and diluted EPS for the years ended December 31, 2012 and 2011 was based on the information in the table below.

| Years ended December 31, | 2012 | 2011 |
|---|---|---|
| **Balance as at beginning of year** | **395,807,000** | 380,026,000 |
| Effect of shares issued | **55,000** | 10,142,000 |
| Effect of shares issued under Share Bonus Plan | **-** | 158,000 |
| Effect of options exercised | **-** | 128,000 |
| Effect of warrants exercised | **-** | 963,000 |
| **Weighted average number of common shares as at end of year - Basic** | **395,862,000** | 391,417,000 |
| Effect of options granted and outstanding | **19,000** | 2,152,000 |
| Effect of warrants issued and outstanding | **-** | - |
| **Weighted average number of common shares as at end of year - Diluted** | **395,881,000** | 393,569,000 |
| **Net loss attributable to shareholders** | **$ (183)** | $ (1,137) |
| **Basic loss per share** | **$ (0.00)** | $ (0.00) |
| **Diluted loss per share** | **$ (0.00)** | $ (0.00) |

The effect of adjustments to the weighted average number of common shares would be anti-dilutive because the Company has incurred losses in each respective year. Therefore all outstanding options and warrants were excluded from the diluted EPS calculation in each of 2012 and 2011. The table above provides the weighted average number of shares on a diluted basis for information only.

The average market value of the Company's shares for purposes of calculating the dilutive effect of share options is based on quoted market prices for the respective periods during which the options were outstanding. There have been no significant capital transactions from the reporting date to the date of this filing which have had a material impact on earnings per share. Refer to Note 25.

## 18. SHARE-BASED PAYMENTS

### Description of the Share-based Payment Arrangements

The Company's share-based payment arrangements are described below.

#### *Stock Option Plan (equity-settled)*

The Company has a Stock Option Plan to encourage ownership of its shares by key management personnel (directors and executive management), employees and consultants, and to provide compensation for certain services. The terms of the Stock Option Plan provide that the directors have the right to grant options to acquire common shares of the Company at not less than the closing market price of the shares on the day preceding the grant. No compensation is recognized when options are exercised. The number of shares reserved for issuance is not to exceed 15% of the aggregate number of common shares issued and outstanding (calculated on a non-diluted basis) from time to time

As at December 31, 2012, the Company had 30,951,000 common shares available for the granting of future options (December 31, 2011 – 32,296,000 common shares). Options are exercisable at the closing market price of the shares at the date prior to grant. The Company does not have any cash-settled transactions.

#### *Share purchase warrants (equity-settled)*

There were no outstanding warrants as at December 31, 2012. The Company does not have any cash-settled transactions.

***Share Bonus Plan***
The terms of the Share Bonus Plan are set out in Note 16.

**Terms and Conditions of Share-based Payment Arrangements**
The terms and conditions relating to the grants of the Stock Option Plan are as follows:

- Options issued during the year and granted to executive management, consultants and employees have a maximum term of five years and are equity-settled. Of the options granted, 50% vest immediately, while the remaining options are exercisable after one year.
- Options issued during the year and granted to directors have a maximum term of five years and are equity-settled. All options granted vest immediately.
- Certain options issued upon formation of the Company under a plan of arrangement had terms of up to 10 years.
- All options are to be settled by physical delivery of shares.

***Share purchase warrants***
The terms and conditions relating to the grants of the share purchase warrants are as follows: all warrants are to be settled by physical delivery of shares and as such, are equity-settled. Warrants issued are generally exercisable for a period of 12 to 18 months from issue date; the warrants issued under the rights offering in 2009 were not exercisable until 12 months from issue and expired 12 months thereafter.

**Disclosure of Share-based Payment Arrangements**
***Stock Option Plan***
The number and weighted average exercise prices of options are as follows:

| | Number of options | | Weighted average exercise price | |
|---|---|---|---|---|
| **Years ended December 31,** | **2012** | 2011 | **2012** | 2011 |
| **Outstanding as at beginning of year** | **27,074,736** | 25,402,248 | **$ 0.28** | $ 0.30 |
| Granted | **8,050,000** | 4,335,000 | **$ 0.05** | $ 0.11 |
| Exercised | **-** | (300,000) | **$ -** | $ 0.05 |
| Expired | **(6,473,236)** | (2,362,512) | **$ 0.65** | $ 0.24 |
| **Outstanding as at end of year** | **28,651,500** | 27,074,736 | **$ 0.13** | $ 0.28 |
| **Exercisable as at end of year** | **26,426,500** | 26,332,236 | **$ 0.15** | $ 0.28 |

There were no options exercised during 2012; for options exercised during 2011, the weighted average share price at the date of exercise was $0.09.

| As at December 31, | Number of options outstanding 2012 | 2011 | Weighted average remaining contractual life (years) 2012 | 2011 |
|---|---|---|---|---|
| **Range of exercise prices** | | | | |
| $0.03 to $0.05 | **12,315,000** | 4,265,000 | **3.31** | 2.08 |
| $0.06 to $0.14 | **5,322,500** | 5,585,000 | **2.86** | 3.71 |
| $0.15 to $0.16 | **5,490,000** | 5,490,000 | **2.01** | 3.01 |
| $0.17 to $0.25 | **1,593,750** | 1,593,750 | **1.07** | 2.07 |
| $0.26 to $0.32 | **2,956,250** | 2,956,250 | **0.34** | 1.34 |
| $0.33 to $0.50 | **974,000** | 2,074,000 | **0.40** | 1.16 |
| $0.51 to $0.64 | **-** | 2,850,000 | **-** | 0.19 |
| $0.65 to $0.82 | **-** | 2,260,736 | **-** | 0.20 |
| | **28,651,500** | 27,074,736 | **2.45** | 2.10 |

There were 8,050,000 options granted in the year ended December 31, 2012 with a weighted average exercise price of $0.05 per share; the weighted average fair value at the date of grant was $0.035. There were 4,335,000 options granted during 2011, with a weighted average fair value at the date of grant of $0.074.

The vesting of options resulted in share-based payment expense of $263,000 in the year ended December 31, 2012 (December 31, 2011 - $304,000). Of the 28,651,500 options outstanding at December 31, 2012, 2,225,000 are subject to vesting (as at December 31, 2011 – 27,074,736 were outstanding of which 742,500 were subject to vesting). The aggregate fair value of these unvested options not yet charged to operations is $38,000 (as at December 31, 2011 - $20,000).

During 2011, the Company agreed to extend 1,550,000 options of a retiring director to their original expiry dates, such options would have otherwise expired 90 days after retirement. The extension was treated as a modification and an additional share-based payment expense of $38,000 was charged to operations.

***Share purchase warrants***

The number and weighted average exercise prices of warrants are as follows:

| As at and for the years ended December 31, | Date Issued | Life [(a)] | Number of warrants 2012 | Number of warrants 2011 | Weighted average exercise price 2012 | Weighted average exercise price 2011 |
|---|---|---|---|---|---|---|
| **Issued pursuant to rights offering** | August 17, 2009 | 12 | | 32,744,976 | | $ 0.120 |
| Exercised in 2010 | | | | (3,339,282) | | |
| Exercised in 2011 | | | | (1,137,627) | | |
| Expired | | | | (28,268,067) | | |
| **Issued pursuant to private placements** | | | | | | |
| Unit warrants | February 26, 2010 | 12 | | 1,714,569 | | $ 0.260 |
| Expired | | | | (1,714,569) | | |
| Unit warrants | April 9, 2010 | 12 | | 3,285,431 | | $ 0.260 |
| Expired | | | | (3,285,431) | | |
| Finder's warrants | April 9, 2010 | 12 | | 250,000 | | $ 0.175 |
| Expired | | | | (250,000) | | |
| Unit warrants | January 10, 2011 | 12 | **2,500,000** | 2,500,000 | **$ 0.140** | $ 0.140 |
| Expired | | | **(2,500,000)** | - | | |
| Unit warrants | May 25, 2011 | 18 | **4,347,826** | 4,347,826 | **$ 0.150** | $ 0.150 |
| Expired | | | **(4,347,826)** | - | | |
| Finder's warrants | May 25, 2011 | 18 | **456,960** | 456,960 | **$ 0.150** | $ 0.150 |
| Expired | | | **(456,960)** | - | | |
| **Outstanding as at end of year** | | | **-** | 7,304,786 | **$ -** | $ 0.147 |

(a) The life of warrants is shown in number of months from issue date, except for those issued pursuant to rights offering which became exercisable 12 months from issue.

### Inputs for Measurement of Grant-Date Fair Values

The grant-date fair values of share-based payments were measured based on the Black-Scholes option-pricing model. Expected volatility is estimated by considering historic average share price volatility.

The inputs used in the measurement of the fair values at grant date of the share-based payments granted, modified or issued during the years are as follows:

| Years ended December 31, | Options 2012 | Options 2011 | Warrants 2012 | Warrants 2011 |
|---|---|---|---|---|
| Fair values at grant dates | **$0.035** | $0.07 and $0.08 | **n/a** | $0.01 and $0.02 |
| Share prices at grant dates | **$0.05** | $0.10 and $0.11 | **n/a** | $0.10 |
| Fair values of options modified | **n/a** | $0.00 to $0.07 | **n/a** | n/a |
| **Assumptions** | | | | |
| Exercise prices | **$0.05** | $0.05 to $0.64 | **n/a** | $0.14 and $0.15 |
| Expected volatilities | **104%** | 42% to 106% | **n/a** | 56% and 65% |
| Life (years) | **4** | 1.3 to 4.7 | **n/a** | 1 and 1.5 |
| Expected dividends | **-** | - | **n/a** | - |
| Risk-free interest rate | **1.18%** | 0.95% to 2.22% | **n/a** | 1.57% and 1.69% |

## 19. FINANCE INCOME AND FINANCE COSTS

| Years ended December 31, | 2012 | 2011 |
|---|---|---|
| Interest income on bank deposits | $ 3 | $ 9 |
| Premium on flow-through spending | - | 87 |
| **Finance income** | **3** | 96 |
| Interest expense on loan | **9** | - |
| Net change in fair value of financial assets at fair value through operations | **3** | 213 |
| Net foreign exchange loss | **4** | 4 |
| **Finance costs** | **16** | 217 |
| **Net Finance Costs** | **$ (13)** | $ (121) |

## 20. INCOME TAXES

The income tax amount in 2012 is a recovery of $141,000 (2011 – recovery of $340,000).

The income tax recovery differs from the amount computed by applying the statutory federal and provincial income tax rates for 2012 of 26.5% and 2011 of 28.5%, to the loss before income taxes. The differences are summarized as follows:

| Years ended December 31, | 2012 | 2011 |
|---|---|---|
| Statutory rate applied to loss before income taxes | $ (86) | $ (421) |
| Effect of flow-through renunciation | - | 270 |
| Effect of investment tax credits, net | (182) | (325) |
| Non-taxable items, net | - | (25) |
| Non-deductible items, net | 78 | 138 |
| Non-deductible portion of gain (loss) on financial assets through operations | - | 31 |
| Effect of change in expected future income tax rates and other | 7 | (8) |
| Unrecognized deferred tax assets | 42 | - |
| **Income Tax Recovery** | **$ (141)** | $ (340) |

## 21. OPERATING SEGMENT

### Reporting Segment

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products. The Company does not have formal operating segments and does not yet have operating revenues, products, processes or customers. The corporate office operates to support the Company's projects, including pre-operating projects, and receives administrative support from Nuinsco (Note 22) to do so. The projects are all located in Canada. Senior management makes decisions by considering exploration potential and results on a project basis. Any applicable amounts relating to projects are capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.

### Geographic Information

| As at December 31, | 2012 | 2011 |
|---|---|---|
| Canada | | |
| Corporate | $ 2,392 | $ 4,306 |
| Lac Rocher | 7,317 | 7,254 |
| Mel | 7,421 | 7,323 |
| Minago | 37,897 | 35,571 |
| **Total Assets** | **$ 55,027** | $ 54,454 |

Revenues in each period are wholly attributable to the corporate office. There have been no changes in the reportable segment or the treatment of segmented assets and revenues year over year.

## 22. RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, deferred directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 16 and 18).

Balances and transactions with related parties as at and for the years ended December 31, 2012 and 2011 are shown in the following tables:

| As at December 31, | | 2012 | | 2011 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **157** | $ | 47 |

Key management personnel compensation comprises:

| Years ended December 31, | | 2012 | | 2011 |
|---|---|---|---|---|
| Short-term employee benefits | **$** | **807** | $ | 1,028 |
| Share-based payments - options | | **217** | | 320 |
| Share-based payments - Share Bonus Plan | | **-** | | 50 |
| | **$** | **1,024** | $ | 1,398 |

### Balances and Transactions with Nuinsco under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice.

Balances and transactions with Nuinsco under the management agreement as at and for the years ended December 31, 2012 and 2011 are shown in the following tables:

| As at December 31, | | 2012 | | 2011 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Receivable from Nuinsco Resources Limited under the management agreement | **$** | **37** | $ | 20 |

| Years ended December 31, | | 2012 | | 2011 |
|---|---|---|---|---|
| **Transaction Values** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$** | **654** | $ | 829 |
| Overhead charges to Nuinsco Resources Limited | **$** | **27** | $ | - |
| Project costs charged to Nuinsco Resources Limited | **$** | **22** | $ | 39 |
| Project recoveries charged by Nuinsco Resources Limited | **$** | **31** | $ | 67 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis; Nuinsco has agreed to defer the payment of a portion of its charges related to management salaries consistent with deferrals accepted by the Company's executive employees. Payables to key management personnel generally relate to deferred directors' fees, consulting fees, deferred salaries and expense reimbursements.

## 23. SIGNIFICANT COMPANY ENTITIES

On June 19, 2012, the Company announced the creation of Victory Silica. While the balances and transactions are presently minimal, the Company expects activity to increase in future periods as the business expands.

## 24. COMMITMENT

### Transformer Equipment

On May 10, 2010, the Company entered into an agreement to purchase equipment for the Minago project. The total price is US$2,840,000. The Company has made aggregate deposits of $1,334,000 as at December 31, 2012.

## 25. SUBSEQUENT EVENTS

### Acquisition of Sand Recycling Plant

On January 9, 2013, the Company announced that it had completed an asset purchase agreement for the purchase of the Seven Persons sand recycling facility (the "7P Plant") for $710,000. The 7P Plant is located near Medicine Hat, Alberta and its acquisition presents Victory Silica with an avenue to generate cash flow from frac sand production and sales in the near-term.

### Shares Issued to Satisfy Accounts Payable

On January 16, 2013, the Company issued 4,720,000 shares to satisfy $118,000 in accounts payable owing.

### Private Placement

On March 22, 2013, the Company issued 44,178,500 common shares under a private placement at $0.05 per share, generating gross proceeds of approximately $2,209,000.

### Amendment and Restatement of Loan Agreement

On March 25, 2013, the Company announced that it had amended and restated the loan agreement to increase the secured loan facility to up to $3,000,000 under certain circumstances (the "Amended Loan"). As with the original loan, the Amended Loan bears interest at 12% per annum, payable quarterly in arrears, and matures on January 31, 2015 and

can be used to fund capital expenditures relating to the 7P Plant. The lender continues to have the right to elect to receive prepayment of $1,000,000 of the Amended Loan from the proceeds of the Lynn Lake option payment due and payable in periodic instalments through August 2014.

Prior to June 1, 2014, the lender has the right to convert the outstanding balance of the Amended Loan into a participating interest (the “Conversion”) whereby the lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender’s participation is capped at $10,000,000, with a minimum of $7,500,000, and is subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. The lender has also agreed to backstop an equity issue, if any is announced, with cash or by converting a portion of the Amended Loan into shares, at the lender’s option to an amount up to $1,500,000 under certain circumstances.

The Company will pay, with shares, an arrangement fee of up to $300,000 plus a commitment fee of 1.5% per annum on unutilized balances.

There have been no other additional developments not already discussed elsewhere in these consolidated financial statements.

**25.1**

(b)

## Unaudited Condensed Consolidated Financial Statements for the Three and Nine Months Ended September 30, 2015 and 2014 (Dated November 12, 2015)

## Condensed Consolidated Balance Sheets

| (in thousands of United States dollars) | *Notes* | **September 30, 2015** (unaudited) | December 31, 2014 |
|---|---|---|---|
| **ASSETS** | | | |
| **Current assets** | | | |
| Cash and cash equivalents | *6* | **$ 9** | $ 712 |
| Restricted deposits | *6* | **37** | 271 |
| Receivables and prepaids | *7* | **350** | 3,367 |
| Marketable securities | *8* | **262** | 153 |
| Inventory | *9* | **3,367** | 2,977 |
| **Total current assets** | | **4,025** | 7,480 |
| **Non-current assets** | | | |
| Property, plant and equipment | *10* | **5,761** | 6,179 |
| Mine property and development project | *11* | **35,007** | 34,893 |
| Exploration and evaluation projects | *12* | **13,406** | 13,380 |
| **Total non-current assets** | | **54,174** | 54,452 |
| **Total Assets** | | **$ 58,199** | $ 61,932 |
| **LIABILITIES AND SHAREHOLDERS' EQUITY** | | | |
| **Current liabilities** | | | |
| Trade and other payables | *13* | **$ 3,411** | $ 3,032 |
| Loans and borrowings - current | *14* | **11,271** | 7,493 |
| **Total current liabilities** | | **14,682** | 10,525 |
| **Non-current liabilities** | | | |
| Loans and borrowings - long-term | *14* | **-** | 2,957 |
| Participating Interest | *15* | **1,979** | 3,548 |
| Lease obligations - long-term | *16* | **170** | 275 |
| Deferred tax liability | | **256** | 817 |
| **Total non-current liabilities** | | **2,405** | 7,597 |
| **Total Liabilities** | | **17,087** | 18,122 |
| **Shareholders' equity** | | | |
| Share capital | *17* | **52,570** | 52,570 |
| Contributed surplus | | **5,696** | 5,644 |
| Accumulated other comprehensive loss | | **(4,118)** | (4,144) |
| Deficit | | **(13,036)** | (10,260) |
| **Total shareholders' equity** | | **41,112** | 43,810 |
| **Total Liabilities and Shareholders' Equity** | | **$ 58,199** | $ 61,932 |

**NATURE OF OPERATIONS AND GOING CONCERN (Note 1)**

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Operations

| (in thousands of United States dollars, except per share amounts) | Notes | Three months ended Sept 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) | Nine months ended Sept 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|---|---|
| **Revenues** | | **$ 325** | $ 5,463 | **$ 2,478** | $ 6,773 |
| Cost of goods sold | | **(888)** | (4,774) | **(3,212)** | (6,230) |
| **Gross margin** | | **(563)** | 689 | **(734)** | 543 |
| **Operating expenses** | | | | | |
| General and administrative | | **(313)** | (579) | **(952)** | (1,847) |
| Share-based payments: | *19* | | | | |
| Options | | **(5)** | (235) | **(53)** | (312) |
| Amortization of property, plant and equipment | *10* | **(161)** | (174) | **(491)** | (390) |
| Recovery (Writedown) of E and E projects | *12* | **-** | (24) | **186** | (50) |
| Pre-exploration costs | | **-** | (4) | **-** | (4) |
| Net frac sand pre-operating costs | *23* | **-** | - | **-** | (194) |
| Non-recurring plant costs | *21* | **13** | - | **(643)** | - |
| **Operating loss** | | **(1,029)** | (327) | **(2,687)** | (2,254) |
| Finance income | *20* | **185** | 987 | **1,944** | 1,569 |
| Finance costs | *20* | **(755)** | (1,242) | **(2,595)** | (2,742) |
| **Net finance income (costs)** | | **(570)** | (255) | **(651)** | (1,173) |
| **Loss before income taxes** | | **(1,599)** | (582) | **(3,338)** | (3,427) |
| Income tax recovery (expense) | | **-** | 209 | **562** | 915 |
| **Net Loss for the Period** | | **$ (1,599)** | $ (373) | **$ (2,776)** | $ (2,512) |
| **Loss per share** | *18* | | | | |
| Basic loss per share | | **$ (0.03)** | $ (0.01) | **$ (0.05)** | $ (0.04) |
| Diluted loss per share | | **$ (0.03)** | $ (0.01) | **$ (0.05)** | $ (0.04) |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Comprehensive Loss

| (in thousands of United States dollars) | Notes | Three months ended Sept 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) | Nine months ended Sept 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|---|---|
| **Net loss for the period** | | **$ (1,599)** | $ (373) | **$ (2,776)** | $ (2,512) |
| **Other comprehensive (loss) income ("OCI")** | | | | | |
| Net change in fair value of financial assets | *8* | **(69)** | (105) | **(83)** | (54) |
| Income tax expense | | **8** | 14 | 0 | 7 |
| Foreign exchange on change in functional currency | *2* | **(20)** | - | **57** | - |
| **Other comprehensive income (loss) for the period** | | **(80)** | (91) | **(26)** | (47) |
| **Total Comprehensive Loss for the period** | | **$ (1,679)** | $ (464) | **$ (2,802)** | $ (2,559) |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Shareholders' Equity

| (unaudited)<br>(in thousands of United States dollars) | Notes | Share Capital | Contributed Surplus | Accumulated Other Comprehensive Income / (Loss) | Deficit | Total Equity |
|---|---|---|---|---|---|---|
| **Balances as at January 1, 2014** | | $ 52,048 | $ 5,431 | $ (1,714) | $ (7,844) | $ 47,921 |
| **Total comprehensive loss for the period** | | | | | | |
| Net loss for the period | | | | | (2,512) | (2,512) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | | | | (54) | - | (54) |
| Income tax expense | | | | 7 | - | 7 |
| **Total other comprehensive income (loss)** | | | | (47) | - | (47) |
| **Total comprehensive loss for the period** | | | | | | (2,559) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the period** | | | | | | |
| Options vesting | *19* | - | 313 | - | - | 313 |
| Warrants exercised | *14, 17* | 185 | (29) | - | - | 156 |
| Options exercised | *17,19* | 378 | (145) | - | - | 233 |
| **Total contributions by owners** | | 563 | 139 | - | - | 702 |
| **Total transactions with owners** | | 563 | 139 | - | - | 702 |
| **Balances as at September 30, 2014** | | $ 52,611 | $ 5,570 | $ (1,761) | $ (10,356) | $ 46,064 |
| **Balances as at January 1, 2015** | | $ 52,570 | $ 5,644 | $ (4,144) | $ (10,260) | $ 43,810 |
| **Total comprehensive loss for the period** | | | | | | |
| Net loss for the period | | | | | (2,776) | (2,776) |
| **Other comprehensive income** | | | | | | |
| Net change in fair value of financial assets | | | | 83 | - | 83 |
| Income tax expense | | | | 0 | - | 0 |
| Foreign exchange on change in functional currency | | | | (57) | - | (57) |
| **Total other comprehensive income (loss)** | | | | 26 | - | 26 |
| **Total comprehensive loss for the period** | | | | | | (2,750) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the period** | | | | | | |
| Options vesting | *19* | - | 52 | - | - | 52 |
| **Total contributions by owners** | | - | 52 | - | - | 52 |
| **Total transactions with owners** | | - | 52 | - | - | 52 |
| **Balances as at September 30, 2015** | | **$ 52,570** | **$ 5,696** | **$ (4,118)** | **$ (13,036)** | **$ 41,112** |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Cash Flows

| (in thousands of United States dollars) | Notes | Nine months ended Sept 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Net loss for the period | | **$ (2,776)** | $ (2,512) |
| Adjustments for: | | | |
| Share-based payments | *19* | **53** | 312 |
| Amortization of property, plant and equipment | *10* | **491** | 390 |
| Provision for inventory | *9* | **494** | 84 |
| Recovery (Writedown) of exploration and evaluation project | *12* | **186** | - |
| Net finance costs | *20* | **651** | 710 |
| Income tax recovery | | **(562)** | (915) |
| Net change in working capital: | | | |
| Change in receivables | *7* | **3,017** | (3,946) |
| Change in inventory | *9* | **(884)** | (3,190) |
| Change in accrued interest | *14* | **804** | - |
| Change in trade and other payables | *13* | **(579)** | 3,115 |
| **Net cash from (used by) operating activities** | | **895** | (5,953) |
| **Cash flows from investing activities** | | | |
| Expenditures on mine property and development project | *11* | **(114)** | (271) |
| Expenditures on exploration and evaluation projects | *12* | **(26)** | (79) |
| Deposits on equipment | *11* | **-** | (49) |
| Expenditures on 7P Plant | *10* | **(33)** | (2,056) |
| **Net cash used by investing activities** | | **(173)** | (2,455) |
| **Cash flows from financing activities** | | | |
| Issue of common shares | *17* | **-** | 341 |
| Payments of interest | *14,15,16* | **(677)** | (765) |
| Payments under leases | *16* | **(132)** | (128) |
| Net (repayment) proceeds of loans | *14* | **(850)** | 8,040 |
| Deposits of restricted cash | *6* | **234** | (279) |
| **Net cash from (used by) financing activities** | | **(1,425)** | 7,209 |
| **Net decrease in cash and cash equivalents** | | **(703)** | (1,199) |
| **Cash and Cash Equivalents, Beginning of the Period** | | **712** | 1,338 |
| **Cash and Cash Equivalents, End of the Period** | | **$ 9** | $ 139 |

The accompanying notes are an integral part of these condensed consolidated financial statements

## 1. NATURE OF OPERATIONS AND GOING CONCERN

### Nature of Operations

Victory Nickel Inc. ("Victory Nickel" or the "Company") is a company domiciled in Canada. The address of the Company's registered office is 80 Richmond St. West, Suite 1802, Toronto, Ontario, M5H 2A4. The condensed consolidated financial statements as at and for the nine months ended September 30, 2015 and 2014 comprise the Company and its subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica") together referred to as "Victory Nickel" and individually as "Victory Nickel entities". Victory Nickel was primarily engaged in the acquisition, exploration and development of nickel properties and associated products in Canada until the second quarter of 2014 when the Company became a producer and supplier of premium frac sand from its 500,000 ton per annum ("tpa") capacity frac sand plant (the "7P Plant") located near Seven Persons approximately 18kms southwest of Medicine Hat, Alberta. Frac sand is specialized sand that is used as a proppant to enhance recovery from oil and gas wells. The Company was formed on February 1, 2007 pursuant to a plan of arrangement.

The Company is listed on the Toronto Stock Exchange ("TSX") under the symbol NI. On August 4, 2015, the Company received a letter from the TSX advising that its eligibility for continued listing on the TSX is under review. Under the TSX's Remedial Review Process, the Company has been granted 60 days from that date to comply with all requirements for continued listing. On October 2, 2015, the Company announced that the TSX's Continued Listing Committee had granted an extension of its delisting review, deferring its delisting decision until no later than December 4, 2015. By that date the Company is required to comply with all requirements for continued listing. It is the intent of the Company to maintain a public listing for the Company's shares. In addition to working with the TSX during this period, management will evaluate alternative listing options. There can be no assurance that either the Company will be able to achieve compliance with the TSX's listing requirements within the required time frame or will secure an alternative listing.

### Change in Functional and Presentation Currency

Effective October 1, 2014, the Company changed its functional currency to the United States dollar ("US$") from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) for additional information.

### Going Concern

These condensed consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at September 30, 2015, the Company had a working capital deficiency of $10,657,000. The Company generated net cash from operating activities of $895,000 during the nine months ending September 30, 2015 but this is not yet at levels sufficient to wholly fund its activities. As a result the Company is in default on its secure debt and as of the date of November 11, 2015 is in default on $2,000,000 of unsecured Promissory Convertible Notes.

On May 15, 2014, the Company announced that it had executed the SPA Loan to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a "SPA Note").

In October 2014, the Company obtained a short-term facility of $2,000,000 through the issuance of a promissory note. This facility was paid down to $1,000,000 and the due date extended on a monthly basis by the lender to May 31, 2015 (Note 14).

On June 3, 2015, the Company announced it had entered into an amending agreement (the "Amending Agreement") with respect to the SPA loan. Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note and for working capital purposes. The aggregate amount of $5,150,000 under the amended loan was due on July 30, 2015. The interest rate on the Amended Loan is 14.8% per annum. As noted earlier, the Company was unable to repay the principal amounts due under the SPA Loan on July 30, 2015.

In addition to the SPA loan, the Company issued two year unsecured promissory convertible notes aggregating approximately $6,000,000 (the "Promissory Convertible Notes"). One Promissory Convertible Note in the amount of $2,000,000 is in default as it was due in November 11, 2015, three Promissory Convertible Notes aggregating $750,000 are due in February 2016, four Promissory Convertible Notes aggregating to C$265,000 are due at various times between January and March, 2016 and one Promissory Convertible Note in the amount of $3,000,000 is due in July, 2016, accordingly, they are classified as current liabilities, due within one year. Interest due on the Promissory Convertible Notes is due quarterly in arrears. As noted earlier, the Company was not able to make the interest payment due on June 30, 2015 and September 30, 2015.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the securities purchase and line of credit agreement (the "SPA Loan") and on the Promissory Convertible Notes outlined below, and that it was in discussion with its lenders and other potential financiers to restructure the Company's debt and recapitalize the Company. On July 30, 2015, the Company announced it had not repaid the principal amounts due under the SPA Loan The Company was unable to make interest payments due on September 30, 2015. On November 12, 2015, the Company announced it had not repaid $2,000,000 in principal due under the Promissory Convertible Notes. The Company is continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. To date, the Company has not received acceptable expressions of interest and has not completed the debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due. There can be no assurance that the Company will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the secured lenders may take in light of these defaults.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will

require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. During the second quarter of 2014, the Company was in the start-up and commissioning stage and began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. On April 14, 2015, the Company announced that operations at the 7P Plant were temporarily suspended until the demand for frac sand improves; this temporary suspension was due to the dramatic decrease in energy pricing that began in 2014. On June 23, 2015, the Company announced that there were no sales made during the period from March 14 to May 12, 2015 at which time frac sand sales activity resumed. Sales activity has not resumed at the rates achieved during 2014 and the 7P Plant operates temporarily on an as-needed basis in order to fulfil customer needs.

Despite these sales, the near-term outlook in the frac sand market remains unclear due to the continuing downward pressure on the oil price and related impact on exploration and production ("E&P) and oilfield services companies. The strength of the US dollar is also impacting demand for high-quality Wisconsin sand as the price for domestic sand has dropped and service companies appear satisfied with using lower quality domestic sand because of the price differential. This will continue to stress the Company's liquidity until such time as the market demand recovers and operations can resume on a consistent basis.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to restructure its debt and improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including debt servicing, project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern. Failure to continue as a going concern would require that the Company's assets and liabilities be restated on a liquidation basis, which would differ from the going concern basis.

## 2. BASIS OF PREPARATION

### (a) Statement of Compliance

The condensed consolidated financial statements have been prepared using accounting policies consistent with International Financial Reporting Standards ("IFRS") and its interpretations adopted by the International Accounting Standards Board ("IASB") and in accordance with IAS 34, *Interim Financial Reporting* ("IAS 34"). This is GAAP for a Canadian public company.

These unaudited condensed consolidated financial statements reflect the accounting policies described in Note 3 to the Company's Audited Consolidated Financial Statements for the years ended December 31, 2014 ("2014 "Audited Financial Statements") (with the exception of any changes set out in Note 3 below) and accordingly, should be read in conjunction with those financial statements and the notes thereto.

The management of Victory Nickel prepares the condensed consolidated financial statements which are then reviewed by the Audit Committee and the Board of Directors. The condensed consolidated financial statements were authorized for issue by the Board of Directors on November 12, 2015 and are made available to shareholders and others through filing on SEDAR shortly thereafter.

### (b) Basis of Measurement

The financial statements have been prepared on the historic cost basis except for derivative financial instruments such as warrants which are measured at fair value with changes through operations and financial assets such as marketable securities which are measured at fair value with changes recorded through other comprehensive income or loss ("OCI").

### (c) Functional and Presentation Currency

Under IFRS, an entity's functional currency should reflect the underlying transactions, events and conditions relevant to the entity. Given the Company's transition into an operating entity with revenues and significant expenses driven by prices in US$ and which currency influences management's primary operating, capital and financing decisions, effective October 1, 2014, the Company changed its functional currency to the US$. This change in accounting treatment is applied prospectively. Concurrently, the Company changed its presentation currency to the US$.

For comparative reporting purposes, historic financial statements were translated into the US$ reporting currency whereby assets and liabilities were translated at the closing rate in effect at the end of the comparative periods; revenues, expenses and cash flows were translated at the average rate in effect for the comparative periods and equity transactions were translated at historic rates.

These condensed consolidated financial statements are presented in US dollars, which is the Company's functional currency. All financial information is expressed in US dollars unless otherwise stated; tabular amounts are stated in thousands of dollars.

### (d) Use of Estimates and Judgements

The preparation of financial statements in conformity with IFRS requires management to make

estimates, judgements and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

It is reasonably possible that, on the basis of existing knowledge, outcomes in the next financial year that are different from the assumptions used could require a material adjustment to the carrying amount of the asset or liability affected.

The accompanying unaudited condensed consolidated financial statements include all adjustments that are, in the opinion of management, necessary for fair presentation. The results of operations and cash flows for the current periods as presented are not necessarily indicative of the results to be expected for the full year.

***Significant estimates and assumptions***

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Information regarding significant areas of estimation uncertainty made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 7 – valuation of receivables;
- Note 8 - valuation of financial assets at fair value through operations and OCI;
- Note 9 – valuation of inventory;
- Note 11 - measurement of the recoverable amount of mine property and development project;
- Note 12 - measurement of the recoverable amount of exploration and evaluation projects;
- Note 14 - measurement and valuation of the embedded options in Promissory Convertible Notes;
- Note 15 – measurement and valuation of the participating interest; and
- Note 19 - measurement of share-based payments.

***Significant judgements***

Judgements are reviewed on an ongoing basis. Changes resulting from the effects of amended judgements are recognized in the period in which the circumstance giving rise to the change occurs and in any future periods presented. Information regarding significant areas of critical judgements made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 1 - going concern assessment;
- Note 2 – determination of the functional currency for the Company and its subsidiaries;
- Note 7 – impairment of receivables;
- Note 9 – impairment of inventory;
- Note 11 - classification of expenditures as mine property and development project or operating expenses;
- Note 12 - classification of expenditures as exploration and evaluation projects or

operating expenses.

***Share Consolidation***

On September 12, 2014, as described more fully in Note 17, the Company consolidated its common shares on a one-for-ten basis (the "Share Consolidation"). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period of these financial statements. Refer to Notes 17, 18 and 19.

***Reclassifications***

Certain of the prior period balances have been reclassified to conform to the current presentation.

## 3. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies of the Company are set out in detail in Note 3 to the 2014 Audited Consolidated Financial Statements. Such policies have been applied consistently to all periods presented in these condensed consolidated financial statements, and have been applied consistently by Victory Nickel entities.

### (a) New Accounting Policies

There have been no new accounting policies adopted by the Company, except as noted below.

### (b) New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations. However, the revised standards and interpretations are not applicable to the Company or are expected to have minimal impact.

### (c) Revenue Recognition

Revenues from frac sand sales are recognized when legal title passes to the customer which may occur at the Company's production facility, rail origin or at the destination terminal or transload facility. At that point, delivery has occurred, evidence of a contractual arrangement exists and collectability is reasonably assured.

### (d) Inventory

Finished products and raw materials inventories are valued at the lower of cost and net realizable value. Cost comprises all costs of purchase, costs of processing and other costs incurred in bringing inventories to their present location and condition. Net realizable value for finished products and raw materials is generally considered to be the selling price of the finished product in the ordinary course of business less the estimated costs of completion and estimated costs to make the sale. Inventory is reviewed to ensure the carrying value does not exceed net realizable value. A write-down is recognized when carrying cost exceeds net realizable value. The write-down may be reversed if the circumstances which caused it no longer exist.

### (e) Property, Plant and Equipment

The 7P Plant has commenced operation mid-2014 and accordingly, amortization of plant equipment commenced during the period. Plant and equipment at the 7P Plant (other than mobile equipment) is being amortized on a straight-line basis based on estimated useful lives of between five and ten years.

## 4. FINANCIAL RISK MANAGEMENT AND CAPITAL MANAGEMENT DISCLOSURES

### Overview

The Company has exposure to the following risks from its use of financial instruments:

- credit risk;
- liquidity risk;
- market risk; and
- operational risk.

A complete description of the Company's financial risk management and capital management is included in Note 4 to the 2014 Audited Consolidated Financial Statements.

This note updates information about the Company's exposure to each of the above risks where there have been material or noteworthy changes. Further quantitative disclosures are included throughout these condensed consolidated financial statements.

### Capital Management Disclosures

The Company's objective when managing capital is to safeguard its accumulated capital in order to provide an adequate return to shareholders by maintaining a sufficient level of funds to support continued project development and corporate activities. Capital is defined by the Company as the aggregate of its shareholders' equity as well as any long-term debt, equipment-based and/or project-based financing.

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Shareholders' equity | **41,112** | $ 43,810 |
| Loans and borrowings - long-term portion | **-** | 2,957 |
| Participating Interest | **1,979** | 3,548 |
| Lease obligations - long-term portion | **170** | 275 |
| | **$ 43,261** | $ 50,590 |

Neither the Company, nor its subsidiary, is subject to externally-imposed capital requirements. There were no changes in the Company's approach to capital management during the year.

## 5. DETERMINATION OF FAIR VALUES

There have been no changes in how the Company determines fair value for both financial and non-financial assets and liabilities from the descriptions included in Note 5 to the Company's 2014 Audited Consolidated Financial Statements. When applicable, further information about the assumptions made in determining fair values is disclosed in the notes specific to that asset or liability.

## 6. CASH AND CASH EQUIVALENTS

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Bank balances | **$ 9** | $ 707 |
| Short-term deposits | **-** | 5 |
| **Cash and Cash Equivalents in the Statement of Cash Flows** | **$ 9** | $ 712 |

The Company has placed $37,000 (December 31, 2014 - $271,000) on deposit with a Canadian chartered bank to support a letter of credit being used to facilitate business activity and are presented as restricted cash on the condensed consolidated balance sheet. The term deposit matures within one year.

## 7. RECEIVABLES AND PREPAIDS

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Trade accounts receivable | **$ 226** | $ 2,725 |
| | **226** | 2,725 |
| Other receivables | **-** | 48 |
| Prepaid expenses and deposits | **124** | 594 |
| | **$ 350** | $ 3,367 |

The aging of trade accounts receivable is as follows:

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Trade accounts receivable | | |
| Current | **$ 132** | $ 1,945 |
| Past due 0-30 days | **94** | 454 |
| Past due 31-60 days | **-** | 253 |
| Past due 61-90 days | **-** | 42 |
| Past due > 90 days | **-** | 31 |
| | **$ 226** | $ 2,725 |

As at September 30, 2015, the Company determined that it had no exposure to losses due to the quality of customers; the majority of the balances outstanding had been collected by the date of this report.

## 8. MARKETABLE SECURITIES

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Financial assets at fair value through OCI: | | |
| Shares | **$ 262** | $ 153 |
| | **$ 262** | $ 153 |

The Company records its portfolio of shares at available market prices with any difference in fair value compared with acquisition cost being recorded as gain or loss on financial assets at fair value through OCI.

On April 6, 2015, the Company received 40,000,000 shares of Corazon Mining Limited valued at $192,000 as part of the option agreement of Lynn Lake as described in Note 12.

## 9. INVENTORY

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Raw material | | |
| At transload facility | **$ 168** | $ 118 |
| In transit | **300** | 951 |
| Stored at 7P Plant | **577** | 463 |
| | **1,045** | 1,532 |
| Finished goods | **2,322** | 1,445 |
| | **$ 3,367** | $ 2,977 |

The Company determined that a writedown of inventory of $494,000 against finished goods was required during the period.

## 10. PROPERTY, PLANT, AND EQUIPMENT

| **Balances as at January 1, 2014** | **Land and Building** | **7P Plant** | **Vehicles and Mobile Equipment** | **Equipment and Furniture** | **Total** |
|---|---|---|---|---|---|
| Cost | $ 83 | $ 2,922 | $ 635 | $ 1,526 | $ 5,166 |
| Accumulated Amortization | (9) | - | (38) | (28) | (75) |
| Effect of Foreign Exchange (Note 2) | (16) | (10) | (3) | (99) | (128) |
| **Carrying Amount** | **58** | **2,912** | **594** | **1,399** | **4,963** |
| Additions | - | 1,852 | 73 | 115 | 2,040 |
| Amortization | (2) | (382) | (168) | (2) | (554) |
| **Balances as at December 31, 2014** | | | | | |
| Cost | 83 | 4,774 | 708 | 1,641 | 7,206 |
| Accumulated Amortization | (11) | (382) | (202) | (30) | (625) |
| Effect of Foreign Exchange (Note 2) | (8) | (187) | (47) | (160) | (402) |
| **Carrying Amount** | **64** | **4,205** | **459** | **1,451** | **6,179** |
| Additions | - | 30 | - | 3 | 33 |
| Amortization | (1) | (389) | (97) | (4) | (491) |
| **Balances as at Sept 30, 2015** | | | | | |
| Cost | 83 | 4,804 | 708 | 1,644 | 7,239 |
| Accumulated Amortization | (12) | (771) | (299) | (34) | (1,116) |
| Effect of Foreign Exchange (Note 2) | (8) | (147) | (47) | (160) | (362) |
| **Carrying Amount** | **$ 63** | **$ 3,886** | **$ 362** | **$ 1,450** | **$ 5,761** |

Equipment and furniture includes deposits of $1,544,000 related to the purchase of transformers and other electrical equipment; the equipment is not available for use and is not being depreciated. Vehicles and Mobile Equipment include $666,000 (December 31, 2014 - $666,000) of equipment acquired under leases (Note 16).

## 11. MINE PROPERTY AND DEVELOPMENT PROJECT

| | January 1, 2015 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | **Sept 30 2015** |
|---|---|---|---|---|---|
| Minago | $ 34,893 | $ - | $ 114 | $ - | **$ 35,007** |
| | $ 34,893 | $ - | $ 114 | $ - | **$ 35,007** |

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | **December 31, 2014** |
|---|---|---|---|---|---|
| Minago | $ 36,357 | $ (1,836) | $ 372 | $ - | **$ 34,893** |
| | $ 36,357 | $ (1,836) | $ 372 | $ - | **$ 34,893** |

**Minago**

The 100%-owned Minago project covers approximately 19,661 ha, through a combination of mining claims, mineral leases and a mineral exploration licence, on Manitoba's Thompson Nickel Belt. The property encompasses the Nose Deposit, which contains the entire current nickel mineral resource, and the North Limb, a zone of nickel mineralization with a known strike length of 1.5 kilometres located to the north of the Nose Deposit.

From 2006 to date, considerable work has been performed, including diamond drilling, metallurgical testing and engineering studies, feasibility study and all the studies required to complete the Environmental Impact Study which was filed in May 2010. As a result, in August 2011, the Company received its Environmental Act Licence ("EAL"). On April 30, 2014, the Company announced the filing of an Environmental Act Proposal ("EAP") to amend the EAL to allow for the relocation of the proposed tailings impoundment. Approval of the EAP is in progress; the EAL remains in good standing. The results of the Minago Feasibility Study ("FS") were announced in December 2009 and improvements thereto announced in June 2010 and July 2011.

Five mineral claims totalling 691 ha located at the north end of the Company's existing Minago property package are subject to a maximum 2% net smelter return royalty with a 50% back-in right; these claims represent approximately 2.4% of the total Minago project.

The Minago project is not in production. Accordingly, the Minago project is not being depreciated.

## 12. EXPLORATION AND EVALUATION PROJECTS

Cumulative costs relating to the acquisition of mineral properties and E&E expenditures have been incurred on the following projects:

| | January 1, 2015 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | Excess Proceeds | **Sept 30, 2015** |
|---|---|---|---|---|---|---|
| Lac Rocher | $ 6,609 | $ - | 8 | $ - | $ - | **$ 6,617** |
| Mel | 6,771 | - | 18 | - | - | **6,789** |
| Lynn Lake | - | - | 7 | (199) | 192 | **-** |
| | $ 13,380 | $ - | $ 33 | $ (199) | $ 192 | **$ 13,406** |

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | Excess Proceeds | **December 31, 2014** |
|---|---|---|---|---|---|---|
| Lac Rocher | $ 6,946 | $ (349) | $ 12 | $ - | $ - | **$ 6,609** |
| Mel | 7,026 | (347) | 92 | - | - | **6,771** |
| Lynn Lake | - | - | 44 | (44) | - | **-** |
| Other | 4 | - | 12 | (16) | - | **-** |
| | $ 13,976 | $ (696) | $ 160 | $ (60) | $ - | **$ 13,380** |

**Lac Rocher**

The Lac Rocher project, which is 100%-owned, is located 140 kilometres northeast of Matagami in northwestern Québec. The project is subject to a royalty of $0.50 per ton on any ores mined and milled from the property and a 2% NSR described below.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% NSR for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on

revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

**Mel**

The Company purchased a 100% interest in the Mel Properties located near Thomson, Manitoba from Vale. Vale is entitled to a 10% royalty on "distributable earnings" defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

Vale has a contractual obligation to mill ore mined from the Mel deposit at its cash cost plus 5% provided that the product meets Vale specifications and that Vale has sufficient mill capacity.

Ongoing updating of Mel data is being conducted and applies to both the drilling data on the Mel deposit/lease as well as the 111 drill holes collared on the claims portion of the property. Additional modelling of the resource will be continued. No fieldwork has been conducted during 2015.

**Lynn Lake**

The Company owns a 100% right, title and interest in the Lynn Lake nickel property ("Lynn Lake"), covering approximately 600 ha in northern Manitoba. As at December 31, 2013, the Lynn Lake property was subject to an option agreement with Wellgreen Platinum Ltd. ("Wellgreen") (formerly Prophecy Platinum Corp.).

On March 17, 2014, Wellgreen formally confirmed to the Company that it was relinquishing the Lynn Lake option.

On November 4, 2014, the Company announced that it had optioned the Lynn Lake property to Corazon Mining Ltd. ("Corazon") an Australian public company (ASX: CZN).

On April 6, 2015, the Company received 40,000,000 shares of Corazon Mining Limited valued at $192,000 as part of the option agreement.

**Bear Coulee**

In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months from receipt of permits with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Proper is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit on the Bear Coulee Property and was incorporated into a National Instrument 43-101 technical report. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin.

## 13. TRADE AND OTHER PAYABLES

| | Notes | Sept 30, 2015 | December 31, 2014 |
|---|---|---|---|
| Accounts payable | | | |
| Mine property and development project | | **$ 19** | $ 13 |
| Exploration and evaluation projects | | **-** | 1 |
| Property and equipment | | **225** | 402 |
| Other accounts payable | | **2,085** | 1,708 |
| Accrued liabilities | | | |
| Mine property and development project | | **-** | 22 |
| Other accrued liabilities | | **937** | 683 |
| Other payables | | - | 21 |
| Lease obligations - current portion | *16* | **140** | 137 |
| Due to Nuinsco Resources Limited | | | |
| Under the Management Agreement | *22* | **6** | 45 |
| | | **$ 3,411** | $ 3,032 |

## 14. LOANS AND BORROWINGS

| | Notes | Sept 30, 2015 | December 31, 2014 |
|---|---|---|---|
| Current loans | | | |
| SPA Loan | *(a)* | **$ 5,150** | $ 3,585 |
| Short-term loan | *(b)* | **-** | 2,000 |
| Current portion of long-term loans | *(c)* | **5,317** | 1,908 |
| Accrued interest | | **804** | - |
| Total current loans | | **11,271** | 7,493 |
| Long-term loans | | | |
| Promissory convertible notes | *(c)* | **-** | 2,957 |
| Total long-term loans | | **-** | 2,957 |
| | | **$ 11,271** | $ 10,450 |

| **(a) SPA Loan** | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| Principal balance | **5,150** | 4,000 |
| Add: fair value of warrants with a cashless exercise feature | **-** | 121 |
| Less: unamortized loan fees | **-** | (536) |
| **SPA Loan** | **$ 5,150** | $ 3,585 |

On May 15, 2014, the Company announced that it had executed a securities purchase and line of credit agreement (the "SPA Loan") to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a "SPA Note").

On June 3, 2015, the Company announced it had entered into an amending agreement (the "Amending Agreement") with respect to the SPA loan. Under terms of the Amending

Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the Promissory Convertible Note, as outlined in note 14 (b), and for working capital purposes. The aggregate principal amount of $5,150,000 under the amended loan was due on July 30, 2015.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan. On July 30, 2015, the Company announced it had not repaid the amounts due, including the principal amount, under the SPA Loan, and that it was continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company.

The Company has issued to the purchaser 2,000,000 common share purchase warrants (after giving retroactive effect to the Share Consolidation Note 17). The number of warrants is subject to an increase from 500,000 to 1,000,000 warrants (after giving retroactive effect to the Share Consolidation Note 17) for each $1,000,000 Note issued if any of the Notes is prepaid and the closing price of the Company's common shares is C$2.00 or lower (after giving retroactive effect to the Share Consolidation Note 17) on the trading day preceding the date of such prepayment. Given that there are costs associated with the prepayment right, the Company has valued the prepayment right at $nil. Each Original Warrant (after giving retroactive effect to the Share Consolidation Note 17) entitles the holder to purchase one common share of the Company at an exercise price of C$1.00 (after giving retroactive effect to the Share Consolidation Note 17) for a period of 36 months from the Initial Closing Date. The Original Warrants are subject to a cashless exercise provision and are therefore considered a component of debt rather than equity; the fair value at inception was calculated at C$620,000 and was revalued at June 30, 2015 at $0 with the aggregate change in fair value of $584,000 being recorded in finance income, of which $121,000 (2014 - $147,000) was recorded in the nine months ending September 30, 2015 (Note 20).

Pursuant to the Amending Agreement, the terms of the Original Warrants were amended to reduce the exercise price to $0.50 and to extend the expiry date to June 3, 2017 (from May 15, 2017). Additionally, as partial consideration for entering into the Amended Loan, the Company has issued to the lender an additional 575,000 common share purchase warrants on the same terms, including the pre-payment terms, as the Original Warrants, as amended (together with the Original Warrants, the "Warrants").

In the nine months ended September 30, 2015, the Company paid $148,000 and accrued $376,000 in interest and amortized $543,000 in loan fees into finance costs. There are no amounts remaining to be drawn under the SPA Loan.

The values of the Warrants with a cashless exercise provision have been calculated using the Black-Scholes option-pricing model using the following parameters:

| (after retroactive effect of Share Consolidation - Note 17) | | Sept 30 2015 | December 31, 2014 | May 15, 2014 |
|---|---|---|---|---|
| | | | | (At inception) |
| Fair values | | **C$0.00** | C$0.07 | C$0.31 |
| Share prices at valuation dates | **$** | **0.00** | C$0.24 | C$0.60 |
| **Assumptions** | | | | |
| Exercise price | | **C$1.00** | C$1.00 | C$1.00 |
| Expected volatilities | | **134%** | 111% | 101% |
| Expected remaining terms (years) | | **1.62** | 2.37 | 3.00 |
| Expected dividends | | **-** | - | - |
| Risk-free interest rates | | **0.53%** | 1.00% | 1.12% |

## b) Short-term loan

On October 1, 2014, the Company completed the arrangement of short-term financing by way of a promissory note amounting to $2,000,000. The promissory note bears interest at an annual rate of 28% and was originally due on December 1, 2014. The lender agreed to several monthly extensions of the short-term facility upon payment of extension fees, and penalties. During the first quarter ended March 31, 2015 the Company repaid $1,000,000 and paid interest expense, extension fees, and penalties aggregating $179,000. The outstanding balance of $1,000,000 was due on or before May 31, 2015. On June 3, 2015, the Company announced it had entered into the Amending Agreement with respect to the SPA loan as explained in Note 14 (a). Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note.

| (c) Promissory Convertible Notes | *Notes* | | Sept 30 2015 | | December 31, 2014 |
|---|---|---|---|---|---|
| Total Principal Outstanding | | | **5,979** | | 5,979 |
| Embedded option derivatives at inception | | **$ (1,420)** | | $ (1,420) | |
| Less: effect of conversion to SPA Loan | | **417** | | 417 | |
| Less: accumulated amortization | *20* | **707** | | 339 | |
| | | | **(296)** | | (664) |
| Less: unamortized loan fees | | | **(74)** | | (108) |
| Add: Effect of foreign exchange | | | **(14)** | | 19 |
| Less: Equity component of debt | | | **(48)** | | (48) |
| Net promissory convertible notes | | | **5,547** | | 5,178 |
| Embedded option derivatives at inception | | **1,420** | | 1,420 | |
| Less: effect of conversion to SPA Loan | | **(417)** | | (417) | |
| Change in value of embedded option derivatives | *20* | **(1,420)** | | (1,316) | |
| | | | **(417)** | | (313) |
| | | | **5,317** | | 4,865 |
| Less: current portion of promissory notes | | | **(5,317)** | | (1,908) |
| **Promissory Convertible Notes - long-term portion** | | **$** | **-** | $ | 2,957 |

On November 11, 2013 and during 2014, the Company entered into several unsecured Promissory Convertible Notes for $6,750,000 and C$265,000 by way of private placements; $1,000,000 was converted into a SPA Note as referred to above. The Promissory Convertible Notes bear interest calculated and payable quarterly at 14.8% and are convertible at the option of the holder into the Company's shares at C$1.00 (after retroactive effect of the Share

Consolidation). All Promissory Convertible Notes have two-year terms.

In the nine months ended September 30, 2015 the Company paid $220,000 for interest in cash and accrued another $428,000 of interest expense; amortization of $43,000 in loan fees and 531,000 for the embedded option derivatives at inception using the effective interest rate method (2014 - $666,000, $58,000 and $455,000, respectively).

The embedded option derivatives have been calculated using the Black-Scholes option-pricing model using the following parameters:

| **(after retroactive effect of Share Consolidation - Note 17)** | **Sept 30 2015** | December 31, 2014 | (Various inception dates) | November 11, 2013 |
|---|---|---|---|---|
| | | | | (At inception) |
| Fair values | **C$0.00** | C$0.00 to C$0.03 | C$0.22 to C$0.40 | C$0.08 |
| Share prices at valuation dates | **C$0.002** | C$0.24 | C$0.50 to C$0.70 | C$0.30 |
| **Assumptions** | | | | |
| Exercise price | **C$1.00** | C$1.00 | C$1.00 | C$1.00 |
| Expected volatilities | **72%** | 82% to 109% | 116% | 103% |
| Expected remaining terms (years) | **0.11 to 0.77** | 0.86 to 1.52 | 2.00 | 2.00 |
| Expected dividends | **-** | - | - | - |
| Risk-free interest rates | **1.18%** | 1.00% | 1.20% | 1.20% |

## 15. PARTICIPATING INTEREST

| **Participating Interest** | ***Note*** | | **Sept 30 2015** | | December 31, 2014 |
|---|---|---|---|---|---|
| Advance for working capital | | **$** | **-** | $ | 940 |
| Advance under Amended Loan for standby commitment | | | **-** | | 1,135 |
| Aggregate advances | | | **-** | | 2,075 |
| Less: settled in Units of Victory Nickel | | | **-** | | (1,135) |
| Less: unamortized loan fees | | | **-** | | (51) |
| Opening balance | | | **3,548** | | 889 |
| Change in fair value | *20* | | **(1,569)** | | 2,875 |
| Effect of foreign exchange | | | **-** | | (216) |
| **Participating Interest** | | **$** | **1,979** | $ | 3,548 |
| Current portion - due within one year [(1)] | | **$** | **-** | $ | - |
| Long-term portion [(2)] | | | **1,979** | | 3,548 |
| **Participating Interest** | | **$** | **1,979** | $ | 3,548 |

(1) Classified as loans and borrowings - current
(2) Classified as loans and borrowings - long-term

In 2012, the Company entered into a loan agreement for C$1,000,000. The loan was amended and restated on March 25, 2013 (the “Amended Loan”) to up to C$3,000,000 with the additional amount being available to fund capital expenditures relating to the 7P Plant. The Amended Loan bore interest at 12% per annum and was set to mature on January 31, 2015; the loan was secured by equipment and a general security agreement over the equipment of the Company.

Prior to June 1, 2014, the Lender had the right to convert the outstanding balance of the Amended Loan into a limited participating interest (the “Conversion”) whereby the Lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender’s participation was capped at C$10,000,000, with a minimum of C$7,500,000, and was subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. Pursuant to the Amended Loan the Lender provided a backstop of C$1,207,584 in cash to a rights offering which closed on July 30, 2013. This capped the Amended Loan at C$2,707,584 and reduced the amount available to be drawn down to C$500,000. Upon exercise of the backstop, the Lender increased its shareholding in the Company to approximately 12.24% on a non-diluted basis, thereby becoming a related party of the Company. The lender is no longer a related party as its shareholding in the Company has fallen below 10%.

The Company was to pay, with shares, an arrangement fee of up to C$300,000 plus a commitment fee of 1.5% per annum on unutilized balances. Commitment fees of C$11,000 were accrued to December 31, 2013 and are included in *Finance costs* in Note 20; shares were issued in December 2014. Effective March 2013, the Company issued 5,681,818 shares in satisfaction of the arrangement fee at that time of C$250,000; an additional 789,294 shares with a stated value of C$20,758 were issued in August 2013 under the loan terms related to the backstop of the rights offering; this satisfies the arrangement fee in full. These amounts, along with other loan fees, are being amortized as interest expense using the effective interest rate method prior to conversion of loan into participating interest; in the nine months ended September 30, 2015, there was no amortization of loan fees as interest expense and or interest paid to the Lender in cash (2014 - $119,000 and $46,000, respectively).

On February 4, 2014, the Lender and Victory Nickel agreed to cancel the amount that remained available to be drawn down under the Amended Loan. This fixed the commitment fee to be paid in shares at C$12,000 and also amended the range of the Company’s participation in the net cash flows earned from the sale of frac sand to a maximum of C$10,222,831 with a minimum of C$7,667,124. As at September 30, 2015, these limits approximate $7,660,000 and $5,745,000.

The loan is classified as a financial liability carried at amortized cost and is defined as “Participating Interest”. From recognition until the fourth quarter of 2013, the Company considered that there were no changes in estimated cash flows since the Lender had not converted its loan and the 7P Plant was not built and there were other significant uncertainties. During the fourth quarter of 2013, the plant construction was well underway and the probability of Conversion had increased substantially. Accordingly, the Company revised the estimated future cash flows and discounted these cash flows at 15%. The estimated future cash flows were determined using a probability-weighted estimation of future expected cash flow scenarios from the frac sand business based on current expectations of business results, capital costs and pre-operating expenditures. An assessment is made regarding the applicable ceiling for the cash flows which is dependent upon the phase attained by the Company when payments under the Participating Interest are anticipated. These cash flows were on the basis of Phase Two completion; the Company still expects to enter Phase Two before paying out the expected cash flows despite announcing a deferral of Phase Two during February, 2015. The Company also included probability weightings of 5%, 40% and 55% as risk factors applied to varying levels of expected cash flows – being zero, 50% and 100% of

the applicable ceiling maximum of C$10,222,831. As at June 30, 2015, the probability weightings used in the model were 5%, 40% and 55%; representing a probability-weighted average of 75% (December 31, 2014 – 75%).

As described earlier, the percentage participation in net cash flows is 52.16% and the applicable ceiling for Phase Two is C$7,667,124 (Phase One - C$10,222,831). These assumptions resulted in revised amortized cost carrying amount of the Participating Interest of $1,979,000 and, accordingly $1,1,566,000 was recorded as a *gain on adjustment of estimated cash flows* through the statement of operations. As at December 31, 2014, the Participating Interest was estimated to be $3,548,000 with $225,000 being recorded as a loss through the statement of operations. This is a Level 3 methodology and is subject to the highest level of uncertainty. The Company will continue to review and revise its estimates of expected future cash flows as the expectations of payments of the Participating Interest change. Changes in that estimate will be recorded through operations with appropriate adjustment for actual cash flows paid.

## 16. LEASE OBLIGATIONS

| | *Note* | | **Sept 30, 2015** | | December 31, 2014 |
|---|---|---|---|---|---|
| Vehicles and Mobile Equipment: | | | | | |
| Total present value of minimum lease payments | | **$** | **570** | $ | 570 |
| Principal payments | | | **(260)** | | (158) |
| **Total present value of minimum lease payments remaining** | | | **310** | | 412 |
| Lease obligations - current portion | *13* | | **(140)** | | (137) |
| **Lease obligations - long-term** | | **$** | **170** | $ | 275 |

The Company has finance lease obligations for equipment in use at the 7P Plant. At the end of the lease obligations, ownership is transferred to the Company for all leases except one, whereby an election is to be made 60 days prior to the end of the lease term at the purchase option price of $1.

The future minimum lease payments are as follows:

| | | **Sept 30, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| Less than 1 year | **$** | **156** | $ | 160 |
| Between 1 and 5 years | | **249** | | 293 |
| **Total minimum lease payments payable** | | **405** | | 453 |
| Future finance charges on minimum lease payments | | **23** | | 41 |
| **Present value of minimum lease payments** | **$** | **382** | $ | 412 |

## 17. CAPITAL AND OTHER COMPONENTS OF EQUITY

### Share Capital

#### *Authorized*

The Company is authorized to issue an unlimited number of common shares with no par value.

#### *Share Consolidation*

On September 12, 2014, pursuant to shareholder approval granted at the Company's Annual and Special Meeting of Shareholders held on May 29, 2014 (the "ASM"), the Company consolidated its common shares on a one-for-ten basis (the "Share Consolidation"). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of these financial statements. Refer to Notes 2, 18 and 19.

***Number of shares issued and outstanding***

As at September 30, 2015, the Company had 57,634,578 shares outstanding. There were no common shares issued during the nine months ended September 30, 2015. In January and February 2014, various officers, employees and consultants of the Company exercised 4,630,000 (after giving retroactive effect to the Share Consolidation) options generating aggregate cash proceeds of $201,000; $144,000 was transferred from contributed surplus. As at September 30, 2014, the number of shares outstanding was 57,130,600 (after giving retroactive effect to the Share Consolidation).

**Share Incentive Plan**

The Company has a Share Incentive Plan which includes a Share Purchase Plan and a Share Bonus Plan. Both are described fully in the Company's 2014 Audited Consolidated Financial Statements.

**Accumulated Other Comprehensive Income or (Loss) ("AOCI")**

AOCI is comprised of the following separate components of equity:

***Net change of financial assets at fair value through OCI***

This comprises the cumulative net change in the fair value of financial assets at fair value through OCI.

***Income tax on other comprehensive income***

This comprises the amount of income tax determined to be required on the cumulative net change in the fair value of financial assets at fair value through OCI.

## 18. EARNINGS (LOSS) PER SHARE

The calculation of basic and diluted EPS for the three and nine months ended September 30, 2015 and 2014 was based on the information in the table below.

| (after retroactive effect of Share Consolidation - Note 17) | Three months ended Sept 30, 2015 | 2014 | Nine months ended Sept 30, 2015 | 2014 |
|---|---|---|---|---|
| **Balance as at beginning of the period** | **57,634,578** | 56,703,100 | **57,634,578** | 56,703,100 |
| Effect of options exercised | **-** | - | **-** | 439,500 |
| Effect of warrants exercised | **-** | 229,300 | **-** | 229,300 |
| **Weighted average number of common shares as at end of period - Basic and Diluted** | **57,634,578** | 56,932,400 | **57,634,578** | 57,371,900 |
| **Weighted average number of common shares as at end of the period - Diluted** | **57,634,578** | 57,579,600 | **57,634,578** | 58,019,100 |
| Number of options excluded | **2,701,000** | 3,590,000 | **2,701,000** | 3,590,000 |
| Number of warrants excluded | **3,825,000** | 12,806,929 | **3,825,000** | 12,806,929 |
| Number of shares from conversion of promissory notes excluded | **6,935,575** | 7,825,000 | **6,935,575** | 7,825,000 |
| **Net loss attributable to shareholders - Basic** | **$ (1,599)** | $ (373) | **$ (2,776)** | $ (2,512) |
| **Net loss attributable to shareholders - Diluted** | **$ (1,599)** | $ (373) | **$ (2,776)** | $ (2,512) |
| **Basic loss per share** | **$ (0.03)** | **$ (0.01)** | **$ (0.05)** | **$ (0.04)** |
| **Diluted loss per share** | **$ (0.03)** | **$ (0.01)** | **$ (0.05)** | **$ (0.04)** |

The disclosures in the table above are provided after giving retroactive effect to the share consolidation on a one-for-ten basis described in Note 17.

The effect of adjustments to the weighted average number of common shares would be anti-dilutive when the Company incurs losses. The table above provides the weighted average number of shares on a diluted basis for periods where losses are incurred for information only. The average market value of the Company's shares for purposes of calculating the dilutive effect of share options is based on quoted market prices for the respective periods during which the options were outstanding.

There have been no share issuances subsequent to the end of the period which would have had a significant effect on the EPS.

## 19. SHARE-BASED PAYMENTS

### Description of the Share-based Payment Arrangements

The Company's share-based payment arrangements are described in the Company's 2014 Audited Consolidated Financial Statements.

### *Stock Option Plan (equity-settled)*

As at September 30, 2015, the Company had 5,944,186 common shares available for the granting of future options (December 31, 2014 – 5,125,187 common shares) after giving retroactive effect to the Share Consolidation in Note 17. Options are exercisable at the closing market price of the shares at the date prior to grant. The Company does not have any cash-settled transactions.

### *Share purchase warrants (equity-settled)*

Pursuant to the rights offering which closed on July 30, 2013, the Company issued 10,000,000 warrants (after giving retroactive effect to the Share Consolidation in Note 17); 9,549,420 of these warrants expired unexercised on July 31, 2015. The Company also issued 1,250,000 warrants (after giving retroactive effect to the Share Consolidation in Note 17) pursuant to a share private placement on September 19, 2013. The 2,575,000 Warrants (after giving retroactive effect to the Share Consolidation in Note 17) issued on June 3, 2015

pursuant to the SPA Loan may be settled without cash and are, accordingly, classified as debt (Note 14).

***Share Bonus Plan***

The terms of the Share Bonus Plan are set out in Note 21 to the Company's 2014 Audited Consolidated Financial Statements.

**Terms and Conditions of Share-based Payment Arrangements**

***Stock Option Plan and Share purchase warrants***

The terms and conditions relating to the grants of the Company's Stock Option Plan are set out in Note 21 to the Company's 2014 Audited Consolidated Financial Statements. The warrants issued under the rights offering in 2013 are exercisable on July 31, 2014 and expired on July 31, 2015. The Company's share purchase warrants issued pursuant to the private placement are exercisable on issue and expire on September 19, 2015.

**Disclosure of Share-based Payment Arrangements**

***Stock Option Plan***

The number and weighted average exercise prices of options are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars)<br>As at and for the periods ended | Number of options<br>Sept 30 2015 | <br>December 31, 2014 | Weighted average exercise price<br>Sept 30 2015 | <br>December 31, 2014 |
|---|---|---|---|---|
| **Outstanding as at beginning of period** | **3,555,000** | 3,204,125 | **$ 0.72** | $ 0.80 |
| Granted | **-** | 1,063,000 | **$ -** | $ 0.66 |
| Exercised | **-** | (463,000) | **$ -** | $ 0.46 |
| Expired or forfeit | **(854,000)** | (249,125) | **$ 1.33** | $ 1.70 |
| **Outstanding as at end of period** | **2,701,000** | 3,555,000 | **$ 0.57** | $ 0.72 |
| **Exercisable as at end of period** | **2,512,250** | 3,209,750 | **$ 0.57** | $ 0.73 |

| (after retroactive effect of Share Consolidation - Note 17) | Number of options outstanding<br>Sept 30 2015 | <br>December 31, 2014 | Weighted average remaining contractual life (years)<br>Sept 30 2015 | <br>December 31, 2014 |
|---|---|---|---|---|
| **Range of exercise prices (Canadian dollars)** | | | | |
| $0.25 to $0.50 | **1,492,000** | 1,587,000 | **2.21** | 2.96 |
| $0.55 to $0.55 | **243,000** | 263,000 | **3.35** | 4.10 |
| $0.60 to $1.40 | **966,000** | 1,186,000 | **2.73** | 3.22 |
| $1.50 to $1.60 | **-** | 519,000 | **-** | 0.01 |
| | **2,701,000** | 3,555,000 | **2.50** | 2.61 |

Additional disclosures relating to the Company's options are as follows:

| (after retroactive effect of Share Consolidation - Note 17) | Sept 30 2015 | December 31, 2014 |
|---|---|---|
| Number of options granted during the period | **-** | 1,063,000 |
| Weighted average fair value of options granted at grant date (Canadian dollars) | **n/a** | $ 0.39 |
| Number of options subject to vesting as at end of period | **188,750** | 345,250 |
| Share-based payment expense - vesting options | **$ 66** | $ 344 |
| Unvested options not yet charged to operations | **$ -** | $ 58 |

***Share purchase warrants***

The number and weighted average exercise prices of warrants are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars)<br>As at and for the periods ended | Date Issued / Cancelled | Life | Number of warrants<br>Sept 30 2015 | <br>December 31, 2014 | Weighted average exercise price<br>Sept 30 2015 | <br>December 31, 2014 |
|---|---|---|---|---|---|---|
| **Issued pursuant to rights offering** | | | | | | |
| Unit warrants | July 30, 2013 | 12 [(a)] | **9,549,935** | 10,000,000 | **$ 0.35** | $ 0.35 |
| Exercised | | | **-** | (450,065) | | |
| Expired | July 30, 2015 | | **(9,549,935)** | n/a | **n/a** | n/a |
| **Issued and cancelled pursuant to private placements** | | | | | | |
| Unit warrants | Sept. 19, 2013 | 24 | **1,250,000** | 1,250,000 | **$ 0.35** | $ 0.35 |
| SPA warrants | May 15, 2014 | 36 | **2,000,000** | 2,000,000 | **$ 1.00** | $ 1.00 |
| SPA warrants cancelled [(d)] | June 3 , 2015 | 36 | **(2,000,000)** | n/a | **n/a** | n/a |
| New SPA warrants [(d)] | June 3 , 2015 | 24 | **2,575,000** | n/a | **$ 0.50** | n/a |
| **Outstanding as at end of the period** | | | **3,825,000** | 12,799,935 | **$ 0.75** | $ 0.45 |

(a) The life of warrants is shown in number of months from issue date, except for those issued pursuant to the rights offering which became exercisable 12 months from issue. The warrants expired July 30, 2015 unexercised.
(b) The SPA warrants may be settled without cash and are, accordingly, classified as debt rather than as a component of contributed surplus.
(c) The number of warrants and weighted average exercise prices are disclosed after giving retroactive effect to the Share Consolidation in Note 17.
(d) On June 3, 2015 the Company entered into an Amending Agreement with respect to the SPA Loan (Note 14). Under the Amending Agreement the 2,000,000 SPA warrants issued on May 15, 2014 were cancelled and were replaced with New SPA warrants with a life of 24 months and an exercise price of C$0.50.

## Inputs for Measurement of Grant-Date Fair Values

The grant-date fair values of share-based payments were measured based on the Black-Scholes option-pricing model. Expected volatility is estimated by considering historic average share price volatility.

The inputs used in the measurement of the fair values at grant date of the share-based payments granted, modified or issued during the years are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars) | Options<br>Sept 30, 2015 | <br>December 31, 2014 | Warrants<br>Sept 30, 2015 | <br>December 31, 2014 |
|---|---|---|---|---|
| Fair values at grant dates | **n/a** | $0.31 and $0.42 | **n/a** | n/a |
| Fair values of options modified | **n/a** | n/a | **n/a** | n/a |
| Share prices at grant and modification dates | **n/a** | $0.70 and $0.50 | **n/a** | n/a |
| **Assumptions** | | | | |
| Exercise prices | **n/a** | $0.70 and $0.55 | **n/a** | n/a |
| Expected volatilities | **n/a** | 93% and 91% | **n/a** | n/a |
| Life (years) | **n/a** | 4 | **n/a** | n/a |
| Expected dividends | **n/a** | - | **n/a** | n/a |
| Risk-free interest rates | **n/a** | 1.23% and 1.01% | **n/a** | n/a |

## 20. FINANCE INCOME AND FINANCE COSTS

| | Three months ended Sept 30, | | Nine months ended Sept 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Interest income on bank deposits | **$ -** | $ - | **$ -** | $ - |
| Net change in fair value of financial liabilities at fair value through operations | **-** | 987 | **226** | 1,569 |
| Gain on adjustment of estimated cash flows | **73** | - | **1,566** | - |
| Net foreign exchange gain | **112** | - | **152** | - |
| **Finance income** | **185** | 987 | **1,944** | 1,569 |
| Interest expense on loans | | | | |
| Accrued and Cash settled | **494** | 376 | **1,477** | 765 |
| Amortization of loan fees | **102** | 277 | **587** | 466 |
| Amortization of embedded option derivatives | **159** | 175 | **531** | 277 |
| Commitment fee | **-** | 1 | **-** | 3 |
| Loss on adjustment of estimated cash flows | **-** | 20 | **-** | 269 |
| Net change in fair value of financial liabilities at fair value through operations | **-** | (73) | **-** | - |
| Net foreign exchange loss | | 464 | | 963 |
| **Finance costs** | **755** | 1,242 | **2,595** | 2,742 |
| **Net Finance Income/(Costs)** | **$ (570)** | $ (255) | **$ (651)** | $ (1,173) |

## 21. OPERATING SEGMENT

### Reporting Segments

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products; since January 1, 2014, it also is a producer and supplier of premium frac sand from its 7P Plant. Accordingly, the Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand. Prior to January 1, 2014, there were no formal operating segments; for comparative purposes, the Company estimated the assets involved in each segment and has reported them in the table below.

The Corporate segment operates to support the Company's activities, including exploration and development projects and the frac sand business. The Company will continue to share services with Nuinsco (Note 22) to do so.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada. Any applicable amounts relating to such projects will continue to be capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 23). The segment is located in Canada although raw materials purchases are sourced from the US.

There have been no changes in the reportable segment or the treatment of segmented assets

and revenues year over year.

The following tables provide information on the Company's segments.

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| **Canada** | | |
| Corporate | **$ 1,415** | $ 1,860 |
| Exploration and Development | **49,958** | 49,734 |
| Frac Sand | **7,895** | 11,300 |
| Intersegment elimination | **(1,068)** | (962) |
| **Total Assets** | **$ 58,199** | $ 61,932 |

| Nine months ended Sept 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total |
|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 2,478** | **$ -** | **$ 2,478** |
| Cost of goods sold | **-** | **-** | **(3,212)** | **-** | **(3,212)** |
| **Gross margin** | **-** | **-** | **(734)** | **-** | **(734)** |
| **Operating expenses** | | | | | |
| General and administrative | **(741)** | **(25)** | **(186)** | **-** | **(952)** |
| Share-based payments: | | | | | |
| Options | **(53)** | **-** | **-** | **-** | **(53)** |
| Amortization of property, plant and equipment | **(3)** | **(3)** | **(485)** | **-** | **(491)** |
| Recovery (writedown) of E and E projects | **-** | **186** | **-** | **-** | **186** |
| Pre-exploration costs | **-** | **-** | **-** | **-** | **-** |
| Net frac sand pre-operating costs | **-** | **-** | **-** | **-** | **-** |
| Non-recurring plant costs [(1)] | **-** | **-** | **(643)** | **-** | **(643)** |
| **Operating income (loss)** | **(797)** | **158** | **(2,048)** | **-** | **(2,687)** |
| Finance income | **1,962** | **-** | **2** | **(20)** | **1,944** |
| Finance costs | **(2,592)** | **-** | **(23)** | **20** | **(2,595)** |
| **Net finance costs** | **(630)** | **-** | **(21)** | **-** | **(651)** |
| **Income (loss) before income taxes** | **(1,427)** | **158** | **(2,069)** | **-** | **(3,338)** |
| Income tax recovery | **562** | **-** | **-** | **-** | **562** |
| **Net Income (loss) for the Period** | **$ (865)** | **$ 158** | **$ (2,069)** | **$ -** | **$ (2,776)** |

| Three months ended Sept 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total |
|---|---|---|---|---|---|
| **Revenues** | $ - | $ - | $ 325 | $ - | $ 325 |
| Cost of goods sold | - | - | (888) | - | (888) |
| **Gross margin** | - | - | (563) | - | (563) |
| **Operating expenses** | | | | | |
| General and administrative | (185) | (22) | (106) | - | (313) |
| Share-based payments: | - | - | - | - | |
| Options | (5) | - | - | - | (5) |
| Amortization of property, plant and equipment | (2) | (2) | (157) | - | (161) |
| Recovery (writedown) of E and E projects | - | - | - | - | - |
| Pre-exploration costs | - | - | - | - | - |
| Net frac sand pre-operating costs | - | - | - | - | - |
| Non-recurring plant costs [1] | - | - | 13 | - | 13 |
| **Operating income (loss)** | (192) | (24) | (813) | - | (1,029) |
| Finance income | 185 | - | - | - | 185 |
| Finance costs | (755) | - | - | - | (755) |
| **Net finance costs** | (570) | - | - | - | (570) |
| **Income (loss) before income taxes** | (762) | (24) | (813) | - | (1,599) |
| Income tax expense | - | - | - | - | - |
| **Net Income (loss) for the Period** | $ (762) | $ (24) | $ (813) | $ - | $ (1,599) |

(1) Costs of $417,000 were incurred relating to 7P Plant being placed on care and maintenance as a result of reduced production from unexpected decline in sales during the first nine months of 2015. Another $118,000 was incurred relating to railcar storage costs and one-time preparation costs for railcars to be leased that was later cancelled. Furthermore, $108,000 was incurred relating to additional equipment rental and casual labour to move frozen sand as a result of the unexpected spring break-up.

## 22. RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19).

Balances and transactions with related parties as at September 30, 2015 and December 31, 2014 and for the three and nine months ended September 30, 2015 and 2014 are shown in the following tables:

| | Sept 30, 2015 | December 31, 2014 |
|---|---|---|
| **Balances Outstanding** | | |
| Payable to key management personnel | **$ 152** | $ 251 |

Key management personnel compensation comprises:

| | Three months ended Sept 30, | | Nine months ended Sept 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Short-term employee benefits | **$ 53** | $ 215 | **$ 310** | $ 826 |
| Share-based payments - options | **-** | 168 | **-** | 233 |
| | **$ 53** | $ 383 | **$ 310** | $ 1,059 |

**Balances and Transactions under the Management Agreement**

The Company shared management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. As described in Note 15, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco were recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and was terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the management agreement ceased in March 2015. The Company has continued to share resources and costs with Nuinsco under a cost sharing arrangement. Nuinsco's shareholding in the Company has fallen below 10% and is no longer considered a related party.

Balances and transactions with Nuinsco under the management agreement as at September 30, 2015 and December 31, 2014 and for the three and nine months ended September 30, 2015 and 2014 are shown in the following tables:

| | **Sept 30, 2015** | December 31, 2014 |
|---|---|---|
| **Balances Outstanding under the Management Agreement** | | |
| Payable to Nuinsco Resources Limited | **$ 6** | $ 45 |

| | Three months ended Sept 30, | | Six months ended Sept 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$ 28** | $ 174 | **$ 221** | $ 501 |
| Project costs charged to Nuinsco Resources Limited | **$ 18** | $ 6 | **$ 24** | $ 18 |
| Project recoveries charged by Nuinsco Resources Limit | **$ -** | $ 22 | **$ 16** | $ 48 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis. Payables to key management personnel generally relate to directors' fees, consulting fees and expense reimbursements.

**Balances and Transactions with Nuinsco Resources Limited under the Amended Loan**

The terms of the Amended Loan with Nuinsco and the balances and transactions related thereto are described in Note 15.

## 23. COMPANY ENTITY

**Significant Subsidiary - Victory Silica**

On June 19, 2012, the Company announced a new initiative through the creation of Victory Silica. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Victory Silica's executives and

employees manage the frac sand business on behalf of the Company. Until the end of the first quarter of 2014, most costs of the frac sand business related either to pre-operating costs which have been expensed through operations or to plant commissioning and mobile equipment which have been capitalized. In the first three months of 2014, sales of frac sand produced during the pre-operating stage amounted to $248,000; these have been netted against the pre-operating expenditures recorded in the first quarter of 2014 resulting in *Net frac sand pre-operating costs* recorded in the statement of operations of $194,000.

Significant production and sales volumes were achieved during the second quarter of 2014 thus the 7P Plant was no longer considered to be pre-operating. Consequently, operating results commenced being reported and amortization of the 7P Plant commenced in the second quarter of 2014. Full commissioning of the 7P Plant occurred in August, 2014.

| | | **Sept 30, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| **Victory Silica Ltd.** | | | | |
| Current assets | **$** | **3** | $ | 46 |
| Current liabilities | **$** | **194** | $ | 143 |
| Pre-operating costs | **$** | **-** | $ | 194 |

## 24. COMMITMENT

### Transformer Equipment

On May 10, 2010, the Company entered into an agreement to purchase equipment for the Minago project. The total price is $2,840,000. The Company has made aggregate deposits of $1,544,000 as at September 30, 2015.

## 25. SUBSEQUENT EVENT

### Extension of short-term loan

As of the date of these financial statements, the Company is continuing with discussions among the holder of the SPA Loan, the holders of the unsecured Promissory Convertible Notes and other potential financing sources to restructure the Company's debt and recapitalize the Company.

On October 2, 2015, the Company announced that the TSX's Continued Listing Committee had granted an extension of its delisting review, deferring its delisting decision until no later than December 4, 2015. By that date the Company is required to comply with all requirements for continued listing. It is the intent of the Company to maintain a public listing for the Company's shares. In addition to working with the TSX during this period, management will evaluate alternative listing options. There can be no assurance that either the Company will be able to achieve compliance with the TSX's listing requirements within the required time frame or will secure an alternative listing.

The Company has not repaid $2,000,000 in principal due under the Promissory Convertible Notes due November 11, 2015.

## Condensed Consolidated Balance Sheets

| (in thousands of United States dollars) | *Notes* | | **June 30, 2015** (unaudited) | | December 31, 2014 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| **Current assets** | | | | | |
| Cash and cash equivalents | *6* | **$** | **153** | $ | 712 |
| Restricted deposits | *6* | | **40** | | 271 |
| Receivables and prepaids | *7* | | **607** | | 3,367 |
| Marketable securities | *8* | | **331** | | 153 |
| Inventory | *9* | | **4,083** | | 2,977 |
| **Total current assets** | | | **5,214** | | 7,480 |
| **Non-current assets** | | | | | |
| Property, plant and equipment | *10* | | **5,878** | | 6,179 |
| Mine property and development project | *11* | | **34,978** | | 34,893 |
| Exploration and evaluation projects | *12* | | **13,398** | | 13,380 |
| **Total non-current assets** | | | **54,254** | | 54,452 |
| **Total Assets** | | **$** | **59,468** | $ | 61,932 |
| **LIABILITIES AND SHAREHOLDERS' EQUITY** | | | | | |
| **Current liabilities** | | | | | |
| Trade and other payables | *13* | **$** | **4,029** | $ | 3,032 |
| Loans and borrowings - current | *14* | | **7,247** | | 7,493 |
| **Total current liabilities** | | | **11,276** | | 10,525 |
| **Non-current liabilities** | | | | | |
| Loans and borrowings - long-term | *14* | | **2,935** | | 2,957 |
| Participating Interest | *15* | | **2,054** | | 3,548 |
| Lease obligations - long-term | *16* | | **204** | | 275 |
| Deferred tax liability | | | **264** | | 817 |
| **Total non-current liabilities** | | | **5,457** | | 7,597 |
| **Total Liabilities** | | | **16,733** | | 18,122 |
| **Shareholders' equity** | | | | | |
| Share capital | *17* | | **52,570** | | 52,570 |
| Contributed surplus | | | **5,692** | | 5,644 |
| Accumulated other comprehensive loss | | | **(4,090)** | | (4,144) |
| Deficit | | | **(11,437)** | | (10,260) |
| **Total shareholders' equity** | | | **42,735** | | 43,810 |
| **Total Liabilities and Shareholders' Equity** | | **$** | **59,468** | $ | 61,932 |

**NATURE OF OPERATIONS AND GOING CONCERN (Note 1)**

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Operations

| (in thousands of United States dollars, except per share amounts) | Notes | Three months ended June 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) | Six months ended June 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|---|---|
| **Revenues** | | **$ 631** | $ 1,310 | **$ 2,153** | $ 1,310 |
| Cost of goods sold | | **(555)** | (1,456) | **(2,324)** | (1,456) |
| **Gross margin** | | **76** | (146) | **(171)** | (146) |
| **Operating expenses** | | | | | |
| General and administrative | | **(130)** | (777) | **(639)** | (1,268) |
| Share-based payments: | *19* | | | | |
| Options | | **(22)** | (19) | **(48)** | (77) |
| Amortization of property, plant and equipment | *10* | **(164)** | (172) | **(330)** | (216) |
| Recovery (Writedown) of E and E projects | *12* | **192** | (26) | **186** | (26) |
| Net frac sand pre-operating costs | *23* | **-** | - | **-** | (194) |
| Non-recurring plant costs | *21* | **(56)** | - | **(656)** | - |
| **Operating loss** | | **(104)** | (1,140) | **(1,658)** | (1,927) |
| Finance income | *20* | **106** | 581 | **1,759** | 582 |
| Finance costs | *20* | **(900)** | (628) | **(1,840)** | (1,500) |
| **Net finance income (costs)** | | **(794)** | (47) | **(81)** | (918) |
| **Loss before income taxes** | | **(898)** | (1,187) | **(1,739)** | (2,845) |
| Income tax recovery (expense) | | **(8)** | 494 | **562** | 706 |
| **Net Loss for the Period** | | **$ (906)** | $ (693) | **$ (1,177)** | $ (2,139) |
| **Loss per share** | *18* | | | | |
| Basic loss per share | | **$ (0.02)** | $ (0.01) | **$ (0.02)** | $ (0.04) |
| Diluted loss per share | | **$ (0.02)** | $ (0.01) | **$ (0.02)** | $ (0.04) |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Comprehensive Loss

| (in thousands of United States dollars) | Notes | Three months ended June 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) | Six months ended June 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|---|---|
| **Net loss for the period** | | **$ (906)** | $ (693) | **$ (1,177)** | $ (2,139) |
| **Other comprehensive (loss) income ("OCI")** | | | | | |
| Net change in fair value of financial assets | *8* | **(20)** | (36) | **(14)** | 51 |
| Income tax expense | | **(5)** | 5 | **(8)** | (7) |
| Foreign exchange on change in functional currency | *2* | **(13)** | - | **77** | - |
| **Other comprehensive income (loss) for the period** | | **(39)** | (31) | **54** | 44 |
| **Total Comprehensive Loss for the period** | | **$ (945)** | $ (724) | **$ (1,123)** | $ (2,095) |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Shareholders' Equity

| (unaudited)<br>(in thousands of United States dollars) | Notes | Share Capital | Contributed Surplus | Accumulated Other Comprehensive Income / (Loss) | Deficit | Total Equity |
|---|---|---|---|---|---|---|
| **Balances as at January 1, 2014** | | $ 52,048 | $ 5,431 | $ (1,714) | $ (7,844) | $ 47,921 |
| **Total comprehensive loss for the period** | | | | | | |
| Net loss for the period | | | | | (2,139) | (2,139) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | | | | 51 | - | 51 |
| Income tax expense | | | | (7) | - | (7) |
| **Total other comprehensive income (loss)** | | | | 44 | - | 44 |
| **Total comprehensive loss for the period** | | | | | | (2,095) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the period** | | | | | | |
| Options vesting | *19* | | 80 | - | - | 80 |
| Options exercised | *17,19* | 344 | (148) | - | - | 196 |
| **Total contributions by owners** | | 344 | (68) | - | - | 276 |
| **Total transactions with owners** | | 344 | (68) | - | - | 276 |
| **Balances as at June 30, 2014** | | $ 52,392 | $ 5,363 | $ (1,670) | $ (9,983) | $ 46,102 |
| **Balances as at January 1, 2015** | | $ 52,570 | $ 5,644 | $ (4,144) | $ (10,260) | $ 43,810 |
| **Total comprehensive loss for the period** | | | | | | |
| Net loss for the period | | | | | (1,177) | (1,177) |
| **Other comprehensive income** | | | | | | |
| Net change in fair value of financial assets | | | | (14) | - | (14) |
| Income tax expense | | | | (8) | - | (8) |
| Foreign exchange on change in functional currency | | | | 77 | - | 77 |
| **Total other comprehensive income (loss)** | | | | 54 | - | 54 |
| **Total comprehensive loss for the period** | | | | | | (1,123) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the period** | | | | | | |
| Options vesting | *19* | - | 48 | - | - | 48 |
| **Total contributions by owners** | | - | 48 | - | - | 48 |
| **Total transactions with owners** | | - | 48 | - | - | 48 |
| **Balances as at June 30, 2015** | | **$ 52,570** | **$ 5,692** | **$ (4,090)** | **$ (11,437)** | **$ 42,735** |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Cash Flows

| (in thousands of United States dollars) | Notes | Six months ended June 30, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Net loss for the period | | **$ (1,177)** | $ (2,141) |
| Adjustments for: | | | |
| Share-based payments | *19* | **60** | 77 |
| Amortization of property, plant and equipment | *10* | **317** | 215 |
| Recovery (Writedown) of exploration and evaluation project | *12* | **187** | - |
| Net finance costs | *20* | **111** | 542 |
| Income tax recovery | | **(562)** | (706) |
| Net change in working capital: | | | |
| Change in receivables | *7* | **2,760** | (880) |
| Change in inventory | *9* | **(1,106)** | (2,350) |
| Change in trade and other payables | *13* | **874** | 2,145 |
| **Net cash from (used by) operating activities** | | **1,464** | (3,098) |
| **Cash flows from investing activities** | | | |
| Expenditures on mine property and development project | *11* | **(204)** | (156) |
| Expenditures on exploration and evaluation projects | *12* | **(85)** | (62) |
| Expenditures on 7P Plant | *10* | **(54)** | (1,309) |
| **Net cash used by investing activities** | | **(343)** | (1,527) |
| **Cash flows from financing activities** | | | |
| Issue of common shares | *17* | **-** | 201 |
| Payments of interest | *14,15,16* | **(983)** | (389) |
| Payments under leases | *16* | **(78)** | (78) |
| Net (repayment) proceeds of loans | *14* | **(850)** | 4,384 |
| Deposits of restricted cash | *6* | **231** | (267) |
| **Net cash from (used by) financing activities** | | **(1,680)** | 3,850 |
| **Net decrease in cash and cash equivalents** | | **(559)** | (776) |
| **Cash and Cash Equivalents, Beginning of the Period** | | **712** | 1,338 |
| **Cash and Cash Equivalents, End of the Period** | | **$ 153** | $ 562 |

The accompanying notes are an integral part of these condensed consolidated financial statements

## 1. NATURE OF OPERATIONS AND GOING CONCERN

### Nature of Operations

Victory Nickel Inc. ("Victory Nickel" or the "Company") is a company domiciled in Canada. The address of the Company's registered office is 80 Richmond St. West, Suite 1802, Toronto, Ontario, M5H 2A4. The condensed consolidated financial statements as at and for the six months ended June 30, 2015 and 2014 comprise the Company and its subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica") together referred to as "Victory Nickel" and individually as "Victory Nickel entities". Victory Nickel was primarily engaged in the acquisition, exploration and development of nickel properties and associated products in Canada until the second quarter of 2014 when the Company became a producer and supplier of premium frac sand from its 500,000 ton per annum ("tpa") capacity frac sand plant (the "7P Plant") located near Seven Persons approximately 18kms southwest of Medicine Hat, Alberta. Frac sand is specialized sand that is used as a proppant to enhance recovery from oil and gas wells. The Company was formed on February 1, 2007 pursuant to a plan of arrangement.

The Company is listed on the Toronto Stock Exchange ("TSX") under the symbol NI. On August 4, 2015, the Company received a letter from the TSX advising that its eligibility for continued listing on the TSX is under review. Under the TSX's Remedial Review Process, the Company has been granted 60 days from that date to comply with all requirements for continued listing. It is the intent of the Company to maintain a public listing for the Company's shares. In addition to working with the TSX during this period, management will evaluate alternative listing options. There can be no assurance that either the Company will be able to achieve compliance with the TSX's listing requirements within the required time frame or will secure an alternative listing.

### Change in Functional and Presentation Currency

Effective October 1, 2014, the Company changed its functional currency to the United States dollar ("US$") from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) for additional information.

### Going Concern

These condensed consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at June 30, 2015, the Company had a working capital deficiency of $6,062,000. The Company generated net cash from operating activities of $1,464,000 during the first half of 2015 but this is not yet at levels sufficient to wholly fund its activities.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the securities purchase and line of credit agreement (the "SPA Loan") and on the Promissory Convertible Notes outlined below, and that it was in discussion with its lenders and other potential financiers to restructure the Company's debt and recapitalize the Company. On July 30, 2015, the Company announced it had not repaid the amounts due under the SPA Loan. The Company is continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an

injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company will not be able to meet its outstanding obligations or any new obligations as they become due. There can be no assurance that the Company will be able to restructure its debt and/or recapitalize and there is no certainty as to what steps the lenders may take in light of these defaults.

On May 15, 2014, the Company announced that it had executed the SPA Loan to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a “SPA Note”).

In October 2014, the Company obtained a short-term facility of $2,000,000 through the issuance of a promissory note. This facility was paid down to $1,000,000 and the due date extended on a monthly basis by the lender to May 31, 2015 (Note 14).

On June 3, 2015, the Company announced it had entered into an amending agreement (the “Amending Agreement”) with respect to the SPA loan. Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note and for working capital purposes. The aggregate amount of $5,150,000 under the amended loan is due on July 30, 2015. The interest rate on the Amended Loan is 14.8% per annum. As noted earlier, the Company was unable to repay the amounts due under the SPA Loan on July 30, 2015.

In addition to the SPA loan, the Company issued two year unsecured promissory convertible notes aggregating approximately $6,000,000 (the “Promissory Convertible Notes”). One Convertible Note in the amount of $2,000,000 is due in November 2015, three Promissory Convertible Notes aggregating $750,000 are due in February 2016, and four Convertible Notes aggregating to C$265,000 are due at various times between January and March, 2016, accordingly, they are classified as current liabilities, due within one year. Interest due on the Convertible Notes is due quarterly in arrears. As noted earlier, the Company was not able to make the interest payment due on June 30, 2015.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company’s ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company’s current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company’s mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. During the second quarter of 2014,

the Company was in the start-up and commissioning stage and began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. On April 14, 2015, the Company announced that operations at the 7P Plant were temporarily suspended until the demand for frac sand improves; this temporary suspension was due to the dramatic decrease in energy pricing that began in 2014. On June 23, 2015, the Company announced that there were no sales made during the period from March 14 to May 12, 2015 at which time frac sand sales activity resumed. Sales activity has not resumed at the rates achieved during 2014 and the 7P Plant operates temporarily on an as-needed basis in order to fulfil customer needs.

Despite these sales, the near-term outlook in the frac sand market remains unclear due to the continuing downward pressure on the oil price and related impact on exploration and production and oilfield services companies. The strength of the US dollar is also impacting demand for high-quality Wisconsin sand as the price for domestic sand has dropped and service companies appear satisfied with using lower quality domestic sand because of the price differential. This will continue to stress the Company's liquidity until such time as the market demand recovers and operations can resume.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to restructure its debt and improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including debt servicing, project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern. Failure to continue as a going concern would require that the Company's assets and liabilities be restated on a liquidation basis, which would differ from the going concern basis.

## 2. BASIS OF PREPARATION

### (a) Statement of Compliance

The condensed consolidated financial statements have been prepared using accounting policies consistent with International Financial Reporting Standards ("IFRS") and its interpretations adopted by the International Accounting Standards Board ("IASB") and in accordance with IAS 34, *Interim Financial Reporting* ("IAS 34"). This is GAAP for a Canadian

public company.

These unaudited condensed consolidated financial statements reflect the accounting policies described in Note 3 to the Company's Audited Consolidated Financial Statements for the years ended December 31, 2014 ("2014 "Audited Financial Statements") (with the exception of any changes set out in Note 3 below) and accordingly, should be read in conjunction with those financial statements and the notes thereto.

The management of Victory Nickel prepares the condensed consolidated financial statements which are then reviewed by the Audit Committee and the Board of Directors. The condensed consolidated financial statements were authorized for issue by the Board of Directors on August 14, 2015 and are made available to shareholders and others through filing on SEDAR shortly thereafter.

**(b) Basis of Measurement**

The financial statements have been prepared on the historic cost basis except for derivative financial instruments such as warrants which are measured at fair value with changes through operations and financial assets such as marketable securities which are measured at fair value with changes recorded through other comprehensive income or loss ("OCI").

**(c) Functional and Presentation Currency**

Under IFRS, an entity's functional currency should reflect the underlying transactions, events and conditions relevant to the entity. Given the Company's transition into an operating entity with revenues and significant expenses driven by prices in US$ and which currency influences management's primary operating, capital and financing decisions, effective October 1, 2014, the Company changed its functional currency to the US$. This change in accounting treatment is applied prospectively. Concurrently, the Company changed its presentation currency to the US$.

For comparative reporting purposes, historic financial statements were translated into the US$ reporting currency whereby assets and liabilities were translated at the closing rate in effect at the end of the comparative periods; revenues, expenses and cash flows were translated at the average rate in effect for the comparative periods and equity transactions were translated at historic rates.

These condensed consolidated financial statements are presented in US dollars, which is the Company's functional currency. All financial information is expressed in US dollars unless otherwise stated; tabular amounts are stated in thousands of dollars.

**(d) Use of Estimates and Judgements**

The preparation of financial statements in conformity with IFRS requires management to make estimates, judgements and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

It is reasonably possible that, on the basis of existing knowledge, outcomes in the next financial year that are different from the assumptions used could require a material adjustment to the carrying amount of the asset or liability affected.

The accompanying unaudited condensed consolidated financial statements include all adjustments that are, in the opinion of management, necessary for fair presentation. The results of operations and cash flows for the current periods as presented are not necessarily indicative of the results to be expected for the full year.

***Significant estimates and assumptions***

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Information regarding significant areas of estimation uncertainty made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 7 – valuation of receivables;
- Note 8 - valuation of financial assets at fair value through operations and OCI;
- Note 9 – valuation of inventory;
- Note 11 - measurement of the recoverable amount of mine property and development project;
- Note 12 - measurement of the recoverable amount of exploration and evaluation projects;
- Note 14 - measurement and valuation of the embedded options in Promissory Convertible Notes;
- Note 15 – measurement and valuation of the participating interest; and
- Note 19 - measurement of share-based payments.

***Significant judgements***

Judgements are reviewed on an ongoing basis. Changes resulting from the effects of amended judgements are recognized in the period in which the circumstance giving rise to the change occurs and in any future periods presented. Information regarding significant areas of critical judgements made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 1 - going concern assessment;
- Note 2 – determination of the functional currency for the Company and its subsidiaries;
- Note 7 – impairment of receivables;
- Note 9 – impairment of inventory;
- Note 11 - classification of expenditures as mine property and development project or operating expenses;
- Note 12 - classification of expenditures as exploration and evaluation projects or operating expenses.

***Share Consolidation***

On September 12, 2014, as described more fully in Note 17, the Company consolidated its common shares on a one-for-ten basis (the “Share Consolidation”). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period of these financial statements. Refer to Notes 17, 18 and 19.

***Reclassifications***
Certain of the prior period balances have been reclassified to conform to the current presentation.

## 3. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies of the Company are set out in detail in Note 3 to the 2014 Audited Consolidated Financial Statements. Such policies have been applied consistently to all periods presented in these condensed consolidated financial statements, and have been applied consistently by Victory Nickel entities.

### (a) New Accounting Policies

There have been no new accounting policies adopted by the Company, except as noted below.

### (b) New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations. However, the revised standards and interpretations are not applicable to the Company or are expected to have minimal impact.

### (c) Revenue Recognition

Revenues from frac sand sales are recognized when legal title passes to the customer which may occur at the Company's production facility, rail origin or at the destination terminal or transload facility. At that point, delivery has occurred, evidence of a contractual arrangement exists and collectability is reasonably assured.

### (d) Inventory

Finished products and raw materials inventories are valued at the lower of cost and net realizable value. Cost comprises all costs of purchase, costs of processing and other costs incurred in bringing inventories to their present location and condition. Net realizable value for finished products and raw materials is generally considered to be the selling price of the finished product in the ordinary course of business less the estimated costs of completion and estimated costs to make the sale. Inventory is reviewed to ensure the carrying value does not exceed net realizable value. A write-down is recognized when carrying cost exceeds net realizable value. The write-down may be reversed if the circumstances which caused it no longer exist.

### (e) Property, Plant and Equipment

The 7P Plant has commenced operation mid-2014 and accordingly, amortization of plant equipment commenced during the period. Plant and equipment at the 7P Plant (other than mobile equipment) is being amortized on a straight-line basis based on estimated useful lives of between five and ten years.

## 4. FINANCIAL RISK MANAGEMENT AND CAPITAL MANAGEMENT DISCLOSURES

### Overview

The Company has exposure to the following risks from its use of financial instruments:

- credit risk;
- liquidity risk;
- market risk; and
- operational risk.

A complete description of the Company's financial risk management and capital management is included in Note 4 to the 2014 Audited Consolidated Financial Statements.

This note updates information about the Company's exposure to each of the above risks where there have been material or noteworthy changes. Further quantitative disclosures are included throughout these condensed consolidated financial statements.

**Capital Management Disclosures**
The Company's objective when managing capital is to safeguard its accumulated capital in order to provide an adequate return to shareholders by maintaining a sufficient level of funds to support continued project development and corporate activities. Capital is defined by the Company as the aggregate of its shareholders' equity as well as any long-term debt, equipment-based and/or project-based financing.

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Shareholders' equity | **42,735** | $ 43,810 |
| Loans and borrowings - long-term portion | **2,935** | 2,957 |
| Participating Interest | **2,054** | 3,548 |
| Lease obligations - long-term portion | **204** | 275 |
| | **$ 47,928** | $ 50,590 |

Neither the Company, nor its subsidiary, is subject to externally-imposed capital requirements. There were no changes in the Company's approach to capital management during the year.

## 5. DETERMINATION OF FAIR VALUES

There have been no changes in how the Company determines fair value for both financial and non-financial assets and liabilities from the descriptions included in Note 5 to the Company's 2014 Audited Consolidated Financial Statements. When applicable, further information about the assumptions made in determining fair values is disclosed in the notes specific to that asset or liability.

## 6. CASH AND CASH EQUIVALENTS

| | **June 30, 2015** | December 31, 2014 |
|---|---|---|
| Bank balances | **$ 153** | $ 707 |
| Short-term deposits | **-** | 5 |
| **Cash and Cash Equivalents in the Statement of Cash Flows** | **$ 153** | $ 712 |

The Company has placed $40,000 (December 31, 2014 - $271,000) on deposit with a Canadian chartered bank to support a letter of credit being used to facilitate business activity and are presented as restricted cash on the condensed consolidated balance sheet. The term deposit matures within one year.

## 7. RECEIVABLES AND PREPAIDS

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Trade accounts receivable | **$ 522** | $ 2,725 |
| | **522** | 2,725 |
| Other receivables | **-** | 48 |
| Prepaid expenses and deposits | **85** | 594 |
| | **$ 607** | $ 3,367 |

The aging of trade accounts receivable is as follows:

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Trade accounts receivable | | |
| Current | **$ 499** | $ 1,945 |
| Past due 0-30 days | **23** | 454 |
| Past due 31-60 days | **-** | 253 |
| Past due 61-90 days | **-** | 42 |
| Past due > 90 days | **-** | 31 |
| | **$ 522** | $ 2,725 |

As at June 30, 2015, the Company determined that it had no exposure to losses due to the quality of customers; the majority of the balances outstanding had been collected by the date of this report.

## 8. MARKETABLE SECURITIES

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Financial assets at fair value through OCI: | | |
| Shares | **$ 331** | $ 153 |
| | **$ 331** | $ 153 |

The Company records its portfolio of shares at available market prices with any difference in fair value compared with acquisition cost being recorded as gain or loss on financial assets at fair value through OCI.

On April 6, 2015, the Company received 40,000,000 shares of Corazon Mining Limited valued at $192,000 as part of the option agreement of Lynn Lake as described in Note 12.

## 9. INVENTORY

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Raw material | | |
| At transload facility | **$ 198** | $ 118 |
| In transit | **371** | 951 |
| Stored at 7P Plant | **1,512** | 463 |
| | **2,081** | 1,532 |
| Finished goods | **2,002** | 1,445 |
| | **$ 4,083** | $ 2,977 |

## 10. PROPERTY, PLANT, AND EQUIPMENT

| Balances as at January 1, 2014 | Land and Building | 7P Plant | Vehicles and Mobile Equipment | Equipment and Furniture | Total |
|---|---|---|---|---|---|
| Cost | $ 83 | $ 2,922 | $ 635 | $ 1,526 | $ 5,166 |
| Accumulated Amortization | (9) | - | (38) | (28) | (75) |
| Effect of Foreign Exchange (Note 2) | (16) | (10) | (3) | (99) | (128) |
| **Carrying Amount** | **58** | **2,912** | **594** | **1,399** | **4,963** |
| Additions | - | 1,852 | 73 | 115 | 2,040 |
| Amortization | (2) | (382) | (168) | (2) | (554) |
| **Balances as at December 31, 2014** | | | | | |
| Cost | 83 | 4,774 | 708 | 1,641 | 7,206 |
| Accumulated Amortization | (11) | (382) | (202) | (30) | (625) |
| Effect of Foreign Exchange (Note 2) | (8) | (187) | (47) | (160) | (402) |
| **Carrying Amount** | **64** | **4,205** | **459** | **1,451** | **6,179** |
| Additions | - | 30 | - | 3 | 33 |
| Amortization | (1) | (259) | (67) | (3) | (330) |
| **Balances as at June 30, 2015** | | | | | |
| Cost | 83 | 4,804 | 708 | 1,644 | 7,239 |
| Accumulated Amortization | (12) | (641) | (269) | (33) | (955) |
| Effect of Foreign Exchange (Note 2) | (8) | (190) | (47) | (160) | (405) |
| **Carrying Amount** | **$ 63** | **$ 3,972** | **$ 392** | **$ 1,451** | **$ 5,878** |

Equipment and furniture includes deposits of $1,544,000 related to the purchase of transformers and other electrical equipment; the equipment is not available for use and is not being depreciated. Vehicles and Mobile Equipment include $666,000 (December 31, 2014 - $666,000) of equipment acquired under leases (Note 16).

## 11. MINE PROPERTY AND DEVELOPMENT PROJECT

| | January 1, 2015 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | June 30 2015 |
|---|---|---|---|---|---|
| Minago | $ 34,893 | $ - | $ 85 | $ - | **$ 34,978** |
| | $ 34,893 | $ - | $ 85 | $ - | **$ 34,978** |

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Recoveries | December 31, 2014 |
|---|---|---|---|---|---|
| Minago | $ 36,357 | $ (1,836) | $ 372 | $ - | **$ 34,893** |
| | $ 36,357 | $ (1,836) | $ 372 | $ - | **$ 34,893** |

### Minago

The 100%-owned Minago project covers approximately 19,661 ha, through a combination of mining claims, mineral leases and a mineral exploration licence, on Manitoba's Thompson Nickel Belt. The property encompasses the Nose Deposit, which contains the entire current nickel mineral resource, and the North Limb, a zone of nickel mineralization with a known strike length of 1.5 kilometres located to the north of the Nose Deposit.

From 2006 to date, considerable work has been performed, including diamond drilling, metallurgical testing and engineering studies and all the studies required to complete the Environmental Impact Study which was filed in May 2010. As a result, in August 2011, the

Company received its Environmental Act Licence ("EAL"). On April 30, 2014, the Company announced the filing of an Environmental Act Proposal ("EAP") to amend the EAL to allow for the relocation of the proposed tailings impoundment. Approval of the EAP is in progress; the EAL remains in good standing. The results of the Minago Feasibility Study ("FS") were announced in December 2009 and improvements thereto announced in June 2010 and July 2011.

Five mineral claims totalling 691 ha located at the north end of the Company's existing Minago property package are subject to a maximum 2% net smelter return royalty with a 50% back-in right; these claims represent approximately 2.4% of the total Minago project.

The Minago project is not in production. Accordingly, the Minago project is not being depreciated.

## 12. EXPLORATION AND EVALUATION PROJECTS

Cumulative costs relating to the acquisition of mineral properties and E&E expenditures have been incurred on the following projects:

| | January 1, 2015 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | Excess Proceeds | **June 30, 2015** |
|---|---|---|---|---|---|---|
| Lac Rocher | $ 6,609 | $ - | - | $ - | $ - | **$ 6,609** |
| Mel | 6,771 | - | 18 | - | - | **6,789** |
| Lynn Lake | - | - | 7 | (199) | 192 | **-** |
| | $ 13,380 | $ - | $ 25 | $ (199) | $ 192 | **$ 13,398** |

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | Excess Proceeds | **December 31, 2014** |
|---|---|---|---|---|---|---|
| Lac Rocher | $ 6,946 | $ (349) | $ 12 | $ - | $ - | **$ 6,609** |
| Mel | 7,026 | (347) | 92 | - | - | **6,771** |
| Lynn Lake | - | - | 44 | (44) | - | **-** |
| Other | 4 | - | 12 | (16) | - | **-** |
| | $ 13,976 | $ (696) | $ 160 | $ (60) | $ - | **$ 13,380** |

### Lac Rocher

The Lac Rocher project, which is 100%-owned, is located 140 kilometres northeast of Matagami in northwestern Québec. The project is subject to a royalty of $0.50 per ton on any ores mined and milled from the property and a 2% NSR described below.

The Lac Rocher property is subject to a discovery incentive plan (the "DIP") to reward certain individuals involved in the discovery of Lac Rocher with a 2% NSR for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

### Mel

The Company purchased a 100% interest in the Mel Properties located near Thomson,

Manitoba from Vale. Vale is entitled to a 10% royalty on “distributable earnings” defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

Vale has a contractual obligation to mill ore mined from the Mel deposit at its cash cost plus 5% provided that the product meets Vale specifications and that Vale has sufficient mill capacity.

Ongoing updating of Mel data is being conducted and applies to both the drilling data on the Mel deposit/lease as well as the 111 drill holes collared on the claims portion of the property. Additional modelling of the resource will be continued. No fieldwork has been conducted during 2015.

**Lynn Lake**
The Company owns a 100% right, title and interest in the Lynn Lake nickel property (“Lynn Lake”), covering approximately 600 ha in northern Manitoba. As at December 31, 2013, the Lynn Lake property was subject to an option agreement with Wellgreen Platinum Ltd. (“Wellgreen”) (formerly Prophecy Platinum Corp.).

On March 17, 2014, Wellgreen formally confirmed to the Company that it was relinquishing the Lynn Lake option.

On November 4, 2014, the Company announced that it had optioned the Lynn Lake property to Corazon Mining Ltd. (“Corazon”) an Australian public company (ASX: CZN).

On April 6, 2015, the Company received 40,000,000 shares of Corazon Mining Limited valued at $192,000 as part of the option agreement.

**Bear Coulee**
In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the “Bear Coulee Property”). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months from receipt of permits with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Proper is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit on the Bear Coulee Property and was incorporated into a National Instrument 43-101 technical report. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin.

## 13. TRADE AND OTHER PAYABLES

| | Notes | June 30, 2015 | December 31, 2014 |
|---|---|---|---|
| Accounts payable | | | |
| Mine property and development project | | **$ 16** | $ 13 |
| Exploration and evaluation projects | | **-** | 1 |
| Property and equipment | | **807** | 402 |
| Other accounts payable | | **2,594** | 1,708 |
| Accrued liabilities | | | |
| Mine property and development project | | **-** | 22 |
| Other accrued liabilities | | **464** | 683 |
| Other payables | | **-** | 21 |
| Lease obligations - current portion | *16* | **140** | 137 |
| Due to Nuinsco Resources Limited | | | |
| Under the Management Agreement | *22* | **8** | 45 |
| | | **$ 4,029** | $ 3,032 |

## 14. LOANS AND BORROWINGS

| | Notes | June 30, 2015 | December 31, 2014 |
|---|---|---|---|
| Current loans | | | |
| SPA Loan | *(a)* | **$ 5,067** | $ 3,585 |
| Short-term loan | *(b)* | **-** | 2,000 |
| Current portion of long-term loans | *(c)* | **2,180** | 1,908 |
| Total current loans | | **7,247** | 7,493 |
| Long-term loans | | | |
| Promissory convertible notes | *(c)* | **2,935** | 2,957 |
| Total long-term loans | | **2,935** | 2,957 |
| | | **$ 10,182** | $ 10,450 |

| **(a) SPA Loan** | June 30 2015 | December 31, 2014 |
|---|---|---|
| Principal balance | **5,150** | 4,000 |
| Add: fair value of warrants with a cashless exercise feature | **-** | 121 |
| Less: unamortized loan fees | **(83)** | (536) |
| **SPA Loan** | **$ 5,067** | $ 3,585 |

On May 15, 2014, the Company announced that it had executed a securities purchase and line of credit agreement (the “SPA Loan”) to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a “SPA Note”).

On June 3, 2015, the Company announced it had entered into an amending agreement (the “Amending Agreement”) with respect to the SPA loan. Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory convertible note, as outlined in note 14 (b), and for working capital purposes. The aggregate amount of $5,150,000 under the amended loan is due on July 30, 2015.

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan. On July 30, 2015, the Company announced it had not repaid the amounts due, including the principal amount, under the SPA Loan, and that it was continuing with discussions among the holder of the SPA Loan and other potential financing sources to restructure the Company's debt and recapitalize the Company.

The Company has issued to the purchaser 2,000,000 common share purchase warrants (after giving retroactive effect to the Share Consolidation Note 17). The number of warrants is subject to an increase from 500,000 to 1,000,000 warrants (after giving retroactive effect to the Share Consolidation Note 17) for each $1,000,000 Note issued if any of the Notes is prepaid and the closing price of the Company's common shares is C$2.00 or lower (after giving retroactive effect to the Share Consolidation Note 17) on the trading day preceding the date of such prepayment. Given that there are costs associated with the prepayment right, the Company has valued the prepayment right at $nil. Each Original Warrant (after giving retroactive effect to the Share Consolidation Note 17) entitles the holder to purchase one common share of the Company at an exercise price of C$1.00 (after giving retroactive effect to the Share Consolidation Note 17) for a period of 36 months from the Initial Closing Date. The Original Warrants are subject to a cashless exercise provision and are therefore considered a component of debt rather than equity; the fair value at inception was calculated at C$620,000 and was revalued at June 30, 2015 at $0 with the aggregate change in fair value of $584,000 being recorded in finance income, of which $121,000 (2014 - $18,000) was recorded in the six months ending June 30, 2015 (Note 20).

Pursuant to the Amending Agreement, the terms of the Original Warrants were amended to reduce the exercise price to $0.50 and to extend the expiry date to June 3, 2017 (from May 15, 2017). Additionally, as partial consideration for entering into the Amended Loan, the Company has issued to the lender an additional 575,000 common share purchase warrants on the same terms, including the pre-payment terms, as the Original Warrants, as amended (together with the Original Warrants, the "Warrants").

In the six months ended June 30, 2015, the Company paid $148,000 and accrued $185,000 in interest and amortized $453,000 in loan fees into finance costs. There are no amounts remaining to be drawn under the SPA Loan.

The values of the Warrants with a cashless exercise provision have been calculated using the Black-Scholes option-pricing model using the following parameters:

| **(after retroactive effect of Share Consolidation - Note 17)** | | **June 30 2015** | December 31, 2014 | May 15, 2014 |
|---|---|---|---|---|
| | | | | (At inception) |
| Fair values | | **C$0.00** | C$0.07 | C$0.31 |
| Share prices at valuation dates | **$** | **0.05** | C$0.24 | C$0.60 |
| **Assumptions** | | | | |
| Exercise price | | **C$1.00** | C$1.00 | C$1.00 |
| Expected volatilities | | **72%** | 111% | 101% |
| Expected remaining terms (years) | | **1.87** | 2.37 | 3.00 |
| Expected dividends | | **-** | - | - |
| Risk-free interest rates | | **0.49%** | 1.00% | 1.12% |

## b) Short-term loan

On October 1, 2014, the Company completed the arrangement of short-term financing by way of a promissory note amounting to $2,000,000. The promissory note bears interest at an annual rate of 28% and was originally due on December 1, 2014. The lender agreed to several monthly extensions of the short-term facility upon payment of extension fees, and penalties. During the first quarter ended March 31, 2015 the Company repaid $1,000,000 and paid interest expense, extension fees, and penalties aggregating $179,000. The outstanding balance of $1,000,000 was due on or before May 31, 2015. On June 3, 2015, the Company announced it had entered into the Amending Agreement with respect to the SPA loan as explained in Note 14 (a). Under terms of the Amending Agreement, the SPA Loan was amended to permit the issuance of additional notes by the Company for an additional sum of $1,150,000, the proceeds of which were used to repay the $1,000,000 owed under the promissory note.

| **(c) Promissory Convertible Notes** | ***Notes*** | | **June 30 2015** | | December 31, 2014 |
|---|---|---|---|---|---|
| Total Principal Outstanding | | | **5,979** | | 5,979 |
| Embedded option derivatives at inception | | **$ (1,420)** | | $ (1,420) | |
| Less: effect of conversion to SPA Loan | | **417** | | 417 | |
| Less: accumulated amortization | *20* | **707** | | 339 | |
| | | | **(296)** | | (664) |
| Less: unamortized loan fees | | | **(74)** | | (108) |
| Add: Effect of foreign exchange | | | **(14)** | | 19 |
| Less: Equity component of debt | | | **(48)** | | (48) |
| Net promissory convertible notes | | | **5,547** | | 5,178 |
| Embedded option derivatives at inception | | **1,420** | | 1,420 | |
| Less: effect of conversion to SPA Loan | | **(417)** | | (417) | |
| Change in value of embedded option derivatives | *20* | **(1,420)** | | (1,316) | |
| | | | **(417)** | | (313) |
| | | | **5,115** | | 4,865 |
| Less: current portion of promissory notes | | | **(2,180)** | | (1,908) |
| **Promissory Convertible Notes - long-term portion** | | **$** | **2,935** | $ | 2,957 |

On November 11, 2013 and during 2014, the Company entered into several unsecured promissory convertible notes for $6,750,000 and C$265,000 by way of private placements; $1,000,000 was converted into a SPA Note as referred to above. The Promissory Convertible Notes bear interest calculated and payable quarterly at 14.8% and are convertible at the option of the holder into the Company's shares at C$1.00 (after retroactive effect of the Share Consolidation). All Promissory Convertible Notes have two-year terms.

In the six months ended June 30, 2015 the Company paid $220,000 for interest in cash and accrued another $210,000 of interest expense; amortization of $32,000 in loan fees and $334,000 for the embedded option derivatives at inception using the effective interest rate method (2014 - $669,000, $53,000 and $328,000, respectively).

The embedded option derivatives have been calculated using the Black-Scholes option-pricing model using the following parameters:

| (after retroactive effect of Share Consolidation - Note 17) | **June 30 2015** | December 31, 2014 | (Various inception dates) | November 11, 2013 |
|---|---|---|---|---|
| | | | | (At inception) |
| Fair values | **C$0.00** | C$0.00 to C$0.03 | C$0.22 to C$0.40 | C$0.08 |
| Share prices at valuation dates | **C$0.05** | C$0.24 | C$0.50 to C$0.70 | C$0.30 |
| **Assumptions** | | | | |
| Exercise price | **C$1.00** | C$1.00 | C$1.00 | C$1.00 |
| Expected volatilities | **72%** | 82% to 109% | 116% | 103% |
| Expected remaining terms (years) | **0.36 to 1.02** | 0.86 to 1.52 | 2.00 | 2.00 |
| Expected dividends | **-** | - | - | - |
| Risk-free interest rates | **0.49%** | 1.00% | 1.20% | 1.20% |

## 15. PARTICIPATING INTEREST

| **Participating Interest** | ***Note*** | | **June 30 2015** | | December 31, 2014 |
|---|---|---|---|---|---|
| Advance for working capital | | **$** | **-** | $ | 940 |
| Advance under Amended Loan for standby commitment | | | **-** | | 1,135 |
| Aggregate advances | | | **-** | | 2,075 |
| Less: settled in Units of Victory Nickel | | | **-** | | (1,135) |
| Less: unamortized loan fees | | | **-** | | (51) |
| Opening balance | | | **3,548** | | 889 |
| Change in fair value | *20* | | **(1,494)** | | 2,875 |
| Effect of foreign exchange | | | **-** | | (216) |
| **Participating Interest** | | **$** | **2,054** | $ | 3,548 |
| Current portion - due within one year [(1)] | | **$** | **-** | $ | - |
| Long-term portion [(2)] | | | **2,054** | | 3,548 |
| **Participating Interest** | | **$** | **2,054** | $ | 3,548 |

(1) Classified as loans and borrowings - current
(2) Classified as loans and borrowings - long-term

In 2012, the Company entered into a loan agreement for C$1,000,000. The loan was amended and restated on March 25, 2013 (the “Amended Loan”) to up to C$3,000,000 with the additional amount being available to fund capital expenditures relating to the 7P Plant. The Amended Loan bore interest at 12% per annum and was set to mature on January 31, 2015; the loan was secured by equipment and a general security agreement over the equipment of the Company.

Prior to June 1, 2014, the Lender had the right to convert the outstanding balance of the Amended Loan into a limited participating interest (the “Conversion”) whereby the Lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender’s participation was capped at C$10,000,000, with a minimum of C$7,500,000, and was subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. Pursuant to the Amended Loan the Lender provided a backstop of C$1,207,584 in cash to a rights offering which closed on July 30, 2013. This capped the Amended Loan at C$2,707,584 and reduced the amount available to be drawn down to C$500,000. Upon exercise of the backstop, the Lender increased its shareholding in

the Company to approximately 12.24% on a non-diluted basis, thereby becoming a related party of the Company.

The Company was to pay, with shares, an arrangement fee of up to C$300,000 plus a commitment fee of 1.5% per annum on unutilized balances. Commitment fees of C$11,000 were accrued to December 31, 2013 and are included in *Finance costs* in Note 20; shares were issued in December 2014. Effective March 2013, the Company issued 5,681,818 shares in satisfaction of the arrangement fee at that time of C$250,000; an additional 789,294 shares with a stated value of C$20,758 were issued in August 2013 under the loan terms related to the backstop of the rights offering; this satisfies the arrangement fee in full. These amounts, along with other loan fees, are being amortized as interest expense using the effective interest rate method prior to conversion of loan into participating interest; in the six months ended June 30, 2015, there was no amortization of loan fees as interest expense and or interest paid to the Lender in cash (2014 - $119,000 and $46,000, respectively).

On February 4, 2014, the Lender and Victory Nickel agreed to cancel the amount that remained available to be drawn down under the Amended Loan. This fixed the commitment fee to be paid in shares at C$12,000 and also amended the range of the Company's participation in the net cash flows earned from the sale of frac sand to a maximum of C$10,222,831 with a minimum of C$7,667,124. As at June 30, 2015, these limits approximate $8,071,000 and $6,053,000.

The loan is classified as a financial liability carried at amortized cost and is defined as "Participating Interest". From recognition until the fourth quarter of 2013, the Company considered that there were no changes in estimated cash flows since Nuinsco had not converted its loan and the 7P Plant was not built and there were other significant uncertainties. During the fourth quarter of 2013, the plant construction was well underway and the probability of Conversion had increased substantially. Accordingly, the Company revised the estimated future cash flows and discounted these cash flows at 15%. The estimated future cash flows were determined using a probability-weighted estimation of future expected cash flow scenarios from the frac sand business based on current expectations of business results, capital costs and pre-operating expenditures. An assessment is made regarding the applicable ceiling for the cash flows which is dependent upon the phase attained by the Company when payments under the Participating Interest are anticipated. These cash flows were on the basis of Phase Two completion; the Company still expects to enter Phase Two before paying out the expected cash flows despite announcing a deferral of Phase Two during February, 2015. The Company also included probability weightings of 5%, 40% and 55% as risk factors applied to varying levels of expected cash flows – being zero, 50% and 100% of the applicable ceiling maximum of C$10,222,831. As at June 30, 2015, the probability weightings used in the model were 5%, 40% and 55%; representing a probability-weighted average of 75% (December 31, 2014 – 75%).

As described earlier, the percentage participation in net cash flows is 52.16% and the applicable ceiling for Phase Two is C$7,667,124 (Phase One - C$10,222,831). These assumptions resulted in revised amortized cost carrying amount of the Participating Interest of $2,054,000 and, accordingly $1,494,000 was recorded as a *gain on adjustment of estimated cash flows* through the statement of operations. As at December 31, 2014, the Participating Interest was estimated to be $3,548,000 with $225,000 being recorded as a loss through the statement of operations. This is a Level 3 methodology and is subject to the highest level of

uncertainty. The Company will continue to review and revise its estimates of expected future cash flows as the expectations of payments of the Participating Interest change. Changes in that estimate will be recorded through operations with appropriate adjustment for actual cash flows paid.

## 16. LEASE OBLIGATIONS

| | Note | June 30, 2015 | December 31, 2014 |
|---|---|---|---|
| Vehicles and Mobile Equipment: | | | |
| Total present value of minimum lease payments | | **$ 570** | $ 570 |
| Principal payments | | **(226)** | (158) |
| **Total present value of minimum lease payments remaining** | | **344** | 412 |
| Lease obligations - current portion | *13* | **(140)** | (137) |
| **Lease obligations - long-term** | | **$ 204** | $ 275 |

The Company has finance lease obligations for equipment in use at the 7P Plant. At the end of the lease obligations, ownership is transferred to the Company for all leases except one, whereby an election is to be made 60 days prior to the end of the lease term at the purchase option price of $1.

The future minimum lease payments are as follows:

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Less than 1 year | **$ 157** | $ 160 |
| Between 1 and 5 years | **216** | 293 |
| **Total minimum lease payments payable** | **$ 373** | 453 |
| Future finance charges on minimum lease payments | **29** | 41 |
| **Present value of minimum lease payments** | **$ 344** | $ 412 |

## 17. CAPITAL AND OTHER COMPONENTS OF EQUITY

### Share Capital

#### *Authorized*

The Company is authorized to issue an unlimited number of common shares with no par value.

#### *Share Consolidation*

On September 12, 2014, pursuant to shareholder approval granted at the Company's Annual and Special Meeting of Shareholders held on May 29, 2014 (the "ASM"), the Company consolidated its common shares on a one-for-ten basis (the "Share Consolidation"). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of these financial statements. Refer to Notes 2, 18 and 19.

#### *Number of shares issued and outstanding*

As at June 30, 2015, the Company had 57,634,578 shares outstanding. There were no common shares issued during the six months ended June 30, 2015. In January and February 2014, various officers, employees and consultants of the Company exercised 4,630,000 (after giving retroactive effect to the Share Consolidation) options generating aggregate cash

proceeds of $201,000; $144,000 was transferred from contributed surplus. As at June 30, 2014, the number of shares outstanding was 57,166,082 (after giving retroactive effect to the Share Consolidation).

**Share Incentive Plan**
The Company has a Share Incentive Plan which includes a Share Purchase Plan and a Share Bonus Plan. Both are described fully in the Company's 2014 Audited Consolidated Financial Statements.

**Accumulated Other Comprehensive Income or (Loss) ("AOCI")**
AOCI is comprised of the following separate components of equity:

***Net change of financial assets at fair value through OCI***
This comprises the cumulative net change in the fair value of financial assets at fair value through OCI.

***Income tax on other comprehensive income***
This comprises the amount of income tax determined to be required on the cumulative net change in the fair value of financial assets at fair value through OCI.

## 18. EARNINGS (LOSS) PER SHARE

The calculation of basic and diluted EPS for the three and six months ended June 30, 2015 and 2014 was based on the information in the table below.

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| **(after retroactive effect of Share Consolidation - Note 17)** | **2015** | 2014 | **2015** | 2014 |
| **Balance as at beginning of the period** | **57,634,578** | 56,703,100 | **57,634,578** | 56,703,100 |
| Effect of options exercised | **-** | 427,500 | **-** | 427,500 |
| **Weighted average number of common shares as at end of period - Basic and Diluted** | **57,634,578** | 57,130,600 | **57,634,578** | 57,130,600 |
| Effect of options granted and outstanding | **-** | 647,200 | **-** | 647,200 |
| **Weighted average number of common shares as at end of the period - Diluted** | **57,634,578** | 57,777,800 | **57,634,578** | 57,777,800 |
| Number of options excluded | **2,841,000** | 2,136,350 | **2,841,000** | 2,171,550 |
| Number of warrants excluded | **12,799,935** | 11,250,000 | **12,799,935** | 13,250,000 |
| Number of shares from conversion of promissory notes excluded | **6,935,575** | 4,409,875 | **6,935,575** | 3,200,900 |
| **Net loss attributable to shareholders - Basic** | **$ (906)** | $ (693) | **$ (1,177)** | $ (2,139) |
| **Net loss attributable to shareholders - Diluted** | **$ (906)** | $ (693) | **$ (1,177)** | $ (2,139) |
| **Basic loss per share** | **$ (0.02)** | **$ (0.01)** | **$ (0.02)** | **$ (0.04)** |
| **Diluted loss per share** | **$ (0.02)** | **$ (0.01)** | **$ (0.02)** | **$ (0.04)** |

The disclosures in the table above are provided after giving retroactive effect to the share consolidation on a one-for-ten basis described in Note 17.

The effect of adjustments to the weighted average number of common shares would be anti-dilutive when the Company incurs losses. The table above provides the weighted average number of shares on a diluted basis for periods where losses are incurred for information only. The average market value of the Company's shares for purposes of calculating the dilutive effect of share options is based on quoted market prices for the respective periods during which the options were outstanding.

There have been no share issuances subsequent to the end of the period which would have

had a significant effect on the EPS.

## 19. SHARE-BASED PAYMENTS

### Description of the Share-based Payment Arrangements

The Company's share-based payment arrangements are described in the Company's 2014 Audited Consolidated Financial Statements.

***Stock Option Plan (equity-settled)***

As at June 30, 2015, the Company had 5,804,186 common shares available for the granting of future options (December 31, 2014 – 5,125,187 common shares) after giving retroactive effect to the Share Consolidation in Note 17. Options are exercisable at the closing market price of the shares at the date prior to grant. The Company does not have any cash-settled transactions.

***Share purchase warrants (equity-settled)***

Pursuant to the rights offering which closed on July 30, 2013, the Company issued 10,000,000 warrants (after giving retroactive effect to the Share Consolidation in Note 17); 9,549,420 of these warrants expired unexercised on July 31, 2015. The Company also issued 1,250,000 warrants (after giving retroactive effect to the Share Consolidation in Note 17) pursuant to a share private placement on September 19, 2013. The 2,575,000 Warrants (after giving retroactive effect to the Share Consolidation in Note 17) issued on June 3, 2015 pursuant to the SPA Loan may be settled without cash and are, accordingly, classified as debt (Note 14).

***Share Bonus Plan***

The terms of the Share Bonus Plan are set out in Note 21 to the Company's 2014 Audited Consolidated Financial Statements.

### Terms and Conditions of Share-based Payment Arrangements

***Stock Option Plan and Share purchase warrants***

The terms and conditions relating to the grants of the Company's Stock Option Plan are set out in Note 21 to the Company's 2014 Audited Consolidated Financial Statements. The warrants issued under the rights offering in 2013 are exercisable on July 31, 2014 and expire on July 31, 2015. The Company's share purchase warrants issued pursuant to the private placement are exercisable on issue and expire on September 19, 2015.

### Disclosure of Share-based Payment Arrangements

***Stock Option Plan***

The number and weighted average exercise prices of options are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars)<br>As at and for the periods ended | Number of options<br>June 30 2015 | <br>December 31, 2014 | Weighted average exercise price<br>June 30 2015 | <br>December 31, 2014 |
|---|---|---|---|---|
| **Outstanding as at beginning of period** | **3,555,000** | 3,204,125 | **$ 0.72** | $ 0.80 |
| Granted | **-** | 1,063,000 | **$ -** | $ 0.66 |
| Exercised | **-** | (463,000) | **$ -** | $ 0.46 |
| Expired or forfeit | **(714,000)** | (249,125) | **$ 1.33** | $ 1.70 |
| **Outstanding as at end of period** | **2,841,000** | 3,555,000 | **$ 0.57** | $ 0.72 |
| **Exercisable as at end of period** | **2,652,250** | 3,209,750 | **$ 0.57** | $ 0.73 |

| (after retroactive effect of Share Consolidation - Note 17) | Number of options outstanding June 30, 2015 | December 31, 2014 | Weighted average remaining contractual life (years) June 30, 2015 | December 31, 2014 |
|---|---|---|---|---|
| **Range of exercise prices (Canadian dollars)** | | | | |
| $0.25 to $0.50 | **1,492,000** | 1,587,000 | **2.46** | 2.96 |
| $0.55 to $0.55 | **243,000** | 263,000 | **3.60** | 4.10 |
| $0.60 to $1.40 | **1,106,000** | 1,186,000 | **2.72** | 3.22 |
| $1.50 to $1.60 | **-** | 519,000 | **-** | 0.01 |
| | **2,841,000** | 3,555,000 | **2.66** | 2.61 |

Additional disclosures relating to the Company's options are as follows:

| (after retroactive effect of Share Consolidation - Note 17) | June 30, 2015 | December 31, 2014 |
|---|---|---|
| Number of options granted during the period | **-** | 1,063,000 |
| Weighted average fair value of options granted at grant date (Canadian dollars) | **n/a** | $ 0.39 |
| Number of options subject to vesting as at end of period | **188,750** | 345,250 |
| Share-based payment expense - vesting options | **$ 60** | $ 344 |
| Unvested options not yet charged to operations | **$ -** | $ 58 |

### *Share purchase warrants*

The number and weighted average exercise prices of warrants are as follows:

| (after retroactive effect of Share Consolidation - Note 17) (amounts in Canadian dollars) As at and for the periods ended | Date Issued / Cancelled | Life | Number of warrants June 30 2015 | December 31, 2014 | Weighted average exercise price June 30 2015 | December 31, 2014 |
|---|---|---|---|---|---|---|
| **Issued pursuant to rights offering** | | | | | | |
| Unit warrants | July 30, 2013 | 12 [(a)] | **9,549,935** | 10,000,000 | **$ 0.35** | $ 0.35 |
| Exercised | | | **-** | (450,065) | | |
| **Issued and cancelled pursuant to private placements** | | | | | | |
| Unit warrants | Sept. 19, 2013 | 24 | **1,250,000** | 1,250,000 | **$ 0.35** | $ 0.35 |
| SPA warrants | May 15, 2014 | 36 | **2,000,000** | 2,000,000 | **$ 1.00** | $ 1.00 |
| SPA warrants cancelled [(d)] | June 3 , 2015 | 36 | **(2,000,000)** | n/a | **n/a** | n/a |
| New SPA warrants [(d)] | June 3 , 2015 | 24 | **2,575,000** | n/a | **$ 0.50** | n/a |
| **Outstanding as at end of the period** | | | **13,374,935** | 12,799,935 | **$ 2.64** | $ 0.45 |

(a) The life of warrants is shown in number of months from issue date, except for those issued pursuant to the rights offering which became exercisable 12 months from issue.
(b) The SPA warrants may be settled without cash and are, accordingly, classified as debt rather than as a component of contributed surplus.
(c) The number of warrants and weighted average exercise prices are disclosed after giving retroactive effect to the Share Consolidation in Note 17.
(d) On June 3, 2015 the Company entered into an Amending Agreement with respect to the SPA Loan (Note 14). Under the Amending Agreement the 2,000,000 SPA warrants issued on May 15, 2014 were cancelled and were replaced with New SPA warrants with a life of 24 months and an exercise price of C$0.50.

### Inputs for Measurement of Grant-Date Fair Values

The grant-date fair values of share-based payments were measured based on the Black-Scholes option-pricing model. Expected volatility is estimated by considering historic average share price volatility.

The inputs used in the measurement of the fair values at grant date of the share-based

payments granted, modified or issued during the years are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars) | Options | | Warrants | |
|---|---|---|---|---|
| | **June 30, 2015** | December 31, 2014 | **June 30, 2015** | December 31, 2014 |
| Fair values at grant dates | **n/a** | $0.31 and $0.42 | **n/a** | n/a |
| Fair values of options modified | **n/a** | n/a | **n/a** | n/a |
| Share prices at grant and modification dates | **n/a** | $0.70 and $0.50 | **n/a** | n/a |
| **Assumptions** | | | | |
| Exercise prices | **n/a** | $0.70 and $0.55 | **n/a** | n/a |
| Expected volatilities | **n/a** | 93% and 91% | **n/a** | n/a |
| Life (years) | **n/a** | 4 | **n/a** | n/a |
| Expected dividends | **n/a** | - | **n/a** | n/a |
| Risk-free interest rates | **n/a** | 1.23% and 1.01% | **n/a** | n/a |

## 20. FINANCE INCOME AND FINANCE COSTS

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Interest income on bank deposits | **$ -** | $ - | **$ -** | $ 1 |
| Net change in fair value of financial liabilities at fair value through operations | **32** | 445 | **226** | 445 |
| Gain on adjustment of estimated cash flows | **78** | - | **1,493** | - |
| Net foreign exchange gain | **(4)** | 137 | **40** | 137 |
| **Finance income** | **106** | 581 | **1,759** | 582 |
| Interest expense on loans | | | | |
| Cash settled | **432** | 260 | **983** | 389 |
| Amortization of loan fees | **255** | 147 | **485** | 190 |
| Amortization of embedded option derivatives | **213** | 51 | **372** | 102 |
| Commitment fee | **-** | 1 | **-** | 2 |
| Loss on adjustment of estimated cash flows | **-** | 151 | **-** | 248 |
| Net change in fair value of financial liabilities at fair value through operations | **-** | -<br>18 | **-** | -<br>73 |
| Net foreign exchange loss | | - | | 496 |
| **Finance costs** | **900** | 628 | **1,840** | 1,500 |
| **Net Finance Income/(Costs)** | **$ (794)** | $ (47) | **$ (81)** | $ (918) |

## 21. OPERATING SEGMENT

### Reporting Segments

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products; since January 1, 2014, it also is a producer and supplier of premium frac sand from its 7P Plant. Accordingly, the Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand. Prior to January 1, 2014, there were no formal operating segments; for comparative purposes, the Company estimated the assets involved in each segment and has reported them in the table below.

The Corporate segment operates to support the Company's activities, including exploration and development projects and the frac sand business. The Company will continue to share

services with Nuinsco (Note 22) to do so.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada. Any applicable amounts relating to such projects will continue to be capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 23). The segment is located in Canada although raw materials purchases are sourced from the US.

There have been no changes in the reportable segment or the treatment of segmented assets and revenues year over year.

The following tables provide information on the Company's segments.

| | **June 30, 2015** | December 31, |
|---|---|---|
| | **2015** | 2014 |
| **Canada** | | |
| Corporate | **$ 1,605** | $ 1,860 |
| Exploration and Development | **49,836** | 49,734 |
| Frac Sand | **9,078** | 11,300 |
| Intersegment elimination | **(1,052)** | (962) |
| **Total Assets** | **$ 59,468** | $ 61,932 |

| **Six months ended June 30, 2015** | **Corporate** | **Exploration and Development** | **Frac Sand** | **Intersegment Reclassification** | **Total** |
|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 2,153** | **$ -** | **$ 2,153** |
| Cost of goods sold | **-** | **-** | **(2,324)** | **-** | **(2,324)** |
| **Gross margin** | **-** | **-** | **(171)** | **-** | **(171)** |
| **Operating expenses** | | | | | |
| General and administrative | **(410)** | **(25)** | **(204)** | **-** | **(639)** |
| Share-based payments: | | | | | |
| Options | **(48)** | **-** | **-** | **-** | **(48)** |
| Amortization of property, plant and equipment | **(2)** | **(2)** | **(326)** | **-** | **(330)** |
| Recovery of E and E projects | **-** | **186** | **-** | **-** | **186** |
| Net frac sand pre-operating costs | **-** | **-** | **-** | **-** | **-** |
| Non-recurring plant costs [(1)] | **-** | **-** | **(656)** | **-** | **(656)** |
| **Operating loss** | **(460)** | **159** | **(1,357)** | **-** | **(1,658)** |
| Finance income | **1,757** | **-** | **2** | **(20)** | **1,739** |
| Finance costs | **(1,817)** | **-** | **(23)** | **20** | **(1,820)** |
| **Net finance costs** | **(60)** | **-** | **(21)** | **-** | **(81)** |
| **Income (loss) before income taxes** | **(520)** | **159** | **(1,378)** | **-** | **(1,739)** |
| Income tax recovery | **562** | **-** | **-** | **-** | **562** |
| **Net Income (loss) for the Period** | **$ 42** | **$ 159** | **$ (1,378)** | **$ -** | **$ (1,177)** |

| Three months ended June 30, 2015 | Corporate | Exploration and Development | Frac Sand | Intersegment Reclassification | Total |
|---|---|---|---|---|---|
| **Revenues** | $ - | $ - | $ 631 | $ - | $ 631 |
| Cost of goods sold | - | - | (555) | - | (555) |
| **Gross margin** | - | - | 76 | - | 76 |
| **Operating expenses** | | | | | |
| General and administrative | 16 | (22) | (124) | - | (130) |
| Share-based payments: | - | - | - | - | |
| Options | (22) | - | - | - | (22) |
| Amortization of property, plant and equipment | (1) | (1) | (162) | - | (164) |
| Recoveryof E and E projects | - | 192 | - | - | 192 |
| Net frac sand pre-operating costs | - | - | - | - | - |
| Non-recurring plant costs [(1)] | - | - | (56) | - | (56) |
| **Operating income (loss)** | (7) | 169 | (266) | - | (104) |
| Finance income | 86 | - | - | - | 86 |
| Finance costs | (880) | - | - | - | (880) |
| **Net finance costs** | (794) | - | - | - | (794) |
| **Loss before income taxes** | (801) | 169 | (266) | - | (898) |
| Income tax expense | (8) | - | - | - | (8) |
| **Net Income (loss) for the Period** | $ (809) | $ 169 | $ (266) | $ - | $ (906) |

(1) Costs of $417,000 were incurred relating to 7P Plant being placed on care and maintenance as a result of reduced production from unexpected decline in sales during the first six months of 2015. Another $131,000 was incurred relating to railcar storage costs and one-time preparation costs for railcars to be leased that was later cancelled. Furthermore, $108,000 was incurred relating to additional equipment rental and casual labour to move frozen sand as a result of the unexpected spring break-up.

## 22. RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19).

Balances and transactions with related parties as at June 30, 2015 and December 31, 2014 and for the three and six months ended June 30, 2015 and 2014 are shown in the following tables:

| | June 30, 2015 | December 31, 2014 |
|---|---|---|
| **Balances Outstanding** | | |
| Payable to key management personnel | **$ 203** | $ 251 |

Key management personnel compensation comprises:

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| Short-term employee benefits | **$ 51** | $ 422 | **$ 257** | $ 666 |
| Share-based payments - options | **-** | $ - | **-** | 71 |
| | **$ 51** | $ 422 | **$ 257** | $ 737 |

**Balances and Transactions with Nuinsco Resources Limited under the Management Agreement**

The Company shared management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. As described in Note 15, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco were recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and was terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the management agreement ceased in March 2015. The Company has continued to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at June 30, 2015 and December 31, 2014 and for the three and six months ended June 30, 2015 and 2014 are shown in the following tables:

| | **June 30, 2015** | December 31, 2014 |
|---|---|---|
| **Balances Outstanding under the Management Agreement** | | |
| Payable to Nuinsco Resources Limited | **$ 8** | $ 45 |

| | Three months ended June 30, | | Six months ended June 30, | |
|---|---|---|---|---|
| | **2015** | 2014 | **2015** | 2014 |
| **Transaction Values under the Management Agreement** | | | | |
| Overhead charges from Nuinsco Resources Limited | **$ 69** | $ 145 | **$ 223** | $ 327 |
| Project costs charged to Nuinsco Resources Limited | **$ -** | $ 8 | **$ 6** | $ 13 |
| Project recoveries charged by Nuinsco Resources Limited | **$ -** | $ 15 | **$ 16** | $ 26 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis. Payables to key management personnel generally relate to directors' fees, consulting fees and expense reimbursements.

**Balances and Transactions with Nuinsco Resources Limited under the Amended Loan**

The terms of the Amended Loan with Nuinsco and the balances and transactions related thereto are described in Note 15.

## 23. COMPANY ENTITY

**Significant Subsidiary - Victory Silica**

On June 19, 2012, the Company announced a new initiative through the creation of Victory Silica. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Victory Silica's executives and employees manage the frac sand business on behalf of the Company. Until the end of the first

quarter of 2014, most costs of the frac sand business related either to pre-operating costs which have been expensed through operations or to plant commissioning and mobile equipment which have been capitalized. In the first three months of 2014, sales of frac sand produced during the pre-operating stage amounted to $248,000; these have been netted against the pre-operating expenditures recorded in the first quarter of 2014 resulting in *Net frac sand pre-operating costs* recorded in the statement of operations of $194,000.

Significant production and sales volumes were achieved during the second quarter of 2014 thus the 7P Plant was no longer considered to be pre-operating. Consequently, operating results commenced being reported and amortization of the 7P Plant commenced in the second quarter of 2014. Full commissioning of the 7P Plant occurred in August, 2014.

| | **June 30, 2015** | December 31, 2014 |
|---|---|---|
| **Victory Silica Ltd.** | | |
| Current assets | **$ 15** | $ 46 |
| Current liabilities | **$ 199** | $ 143 |
| Pre-operating costs | **$ -** | $ 194 |

## 24. COMMITMENT

### Transformer Equipment

On May 10, 2010, the Company entered into an agreement to purchase equipment for the Minago project. The total price is $2,840,000. The Company has made aggregate deposits of $1,544,000 as at June 30, 2015.

## 25. SUBSEQUENT EVENT

### Extension of short-term loan

On July 1, 2015, the Company announced that it was not able to make the quarterly interest payment due June 30, 2015 on the SPA Loan and the approximately $6.0 million of convertible unsecured promissory notes.

On July 30, 2015- the Company announced that it had not repaid the amounts due, including the principal amount, on July 30, 2015, under the SPA Loan.

As of the date of these financial statements, the Company is continuing with discussions among the holder of the SPA Loan, the holders of the convertible unsecured promissory notes and other potential financing sources to restructure the Company's debt and recapitalize the Company.

On August 4, 2015, the Company received a letter from the TSX advising that its eligibility for continued listing on the TSX is under review. Under the TSX's Remedial Review Process, the Company has been granted 60 days from that date to comply with all requirements for continued listing. It is the intent of the Company to maintain a public listing for the Company's shares. In addition to working with the TSX during this period, management will evaluate alternative listing options. There can be no assurance that either the Company will be able to achieve compliance with the TSX's listing requirements within the required time frame or will secure an alternative listing.

## Unaudited Condensed Consolidated Financial Statements for the Three Months Ended March 31, 2015 and 2014 (Dated May 11, 2015)

## Condensed Consolidated Balance Sheets

| (in thousands of United States dollars) | *Notes* | | **March 31, 2015** (unaudited) | | December 31, 2014 |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| **Current assets** | | | | | |
| Cash and cash equivalents | *6* | **$** | **49** | $ | 712 |
| Restricted deposits | *6* | | **291** | | 271 |
| Receivables and prepaids | *7* | | **809** | | 3,367 |
| Marketable securities | *8* | | **159** | | 153 |
| Inventory | *9* | | **4,249** | | 2,977 |
| **Total current assets** | | | **5,557** | | 7,480 |
| **Non-current assets** | | | | | |
| Property, plant and equipment | *10* | | **6,018** | | 6,179 |
| Mine property and development project | *11* | | **34,945** | | 34,893 |
| Exploration and evaluation projects | *12* | | **13,387** | | 13,380 |
| **Total non-current assets** | | | **54,350** | | 54,452 |
| **Total Assets** | | **$** | **59,907** | $ | 61,932 |
| **LIABILITIES AND SHAREHOLDERS' EQUITY** | | | | | |
| **Current liabilities** | | | | | |
| Trade and other payables | *13* | **$** | **3,997** | $ | 3,032 |
| Loans and borrowings - current | *14* | | **7,472** | | 7,493 |
| **Total current liabilities** | | | **11,469** | | 10,525 |
| **Non-current liabilities** | | | | | |
| Loans and borrowings - long-term | *14* | | **2,157** | | 2,957 |
| Participating Interest | *15* | | **2,133** | | 3,548 |
| Lease obligations - long-term | *16* | | **239** | | 275 |
| Deferred tax liability | | | **251** | | 817 |
| **Total non-current liabilities** | | | **4,780** | | 7,597 |
| **Total Liabilities** | | | **16,249** | | 18,122 |
| **Shareholders' equity** | | | | | |
| Share capital | *17* | | **52,570** | | 52,570 |
| Contributed surplus | | | **5,670** | | 5,644 |
| Accumulated other comprehensive loss | | | **(4,051)** | | (4,144) |
| Deficit | | | **(10,531)** | | (10,260) |
| **Total shareholders' equity** | | | **43,658** | | 43,810 |
| **Total Liabilities and Shareholders' Equity** | | **$** | **59,907** | $ | 61,932 |

**NATURE OF OPERATIONS AND GOING CONCERN (Note 1)**

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Operations

| (in thousands of United States dollars, except per share amounts) | Notes | Three months ended March 31, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|
| **Revenues** | | **$ 1,522** | $ - |
| Cost of goods sold | | **(1,769)** | - |
| **Gross margin** | | **(247)** | - |
| **Operating expenses** | | | |
| General and administrative | | **(509)** | (491) |
| Share-based payments: | *19* | | |
| Options | | **(26)** | (58) |
| Amortization of property, plant and equipment | *10* | **(166)** | (44) |
| Writedown of E and E projects | *12* | **(6)** | - |
| Net frac sand pre-operating costs | *23* | **-** | (194) |
| Non-recurring plant costs | *21* | **(600)** | - |
| **Operating loss** | | **(1,554)** | (787) |
| Finance income | *20* | **1,653** | 1 |
| Finance costs | *20* | **(940)** | (872) |
| **Net finance income (costs)** | | **713** | (871) |
| **Loss before income taxes** | | **(841)** | (1,658) |
| Income tax recovery | | **570** | 212 |
| **Net Loss for the Period** | | **$ (271)** | $ (1,446) |
| **Loss per share** | *18* | | |
| Basic loss per share | | **$ (0.00)** | $ (0.02) |
| Diluted loss per share | | **$ (0.00)** | $ (0.02) |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Comprehensive Loss

| (in thousands of United States dollars) | Notes | Three months ended March 31, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|
| **Net loss for the period** | | **$ (271)** | $ (1,446) |
| **Other comprehensive (loss) income ("OCI")** | | | |
| Net change in fair value of financial assets | *8* | **6** | 87 |
| Income tax expense | | **(3)** | (12) |
| Foreign exchange on change in functional currency | *2* | **90** | (1,812) |
| **Other comprehensive income (loss) for the period** | | **93** | (1,737) |
| **Total Comprehensive Loss for the period** | | **$ (178)** | $ (3,183) |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Shareholders' Equity

| (unaudited)<br>(in thousands of United States dollars) | Notes | Share Capital | Contributed Surplus | Accumulated Other Comprehensive Income / (Loss) | Deficit | Total Equity |
|---|---|---|---|---|---|---|
| **Balances as at January 1, 2014** | | $ 52,048 | $ 5,431 | $ (1,714) | $ (7,844) | $ 47,921 |
| **Total comprehensive loss for the period** | | | | | | |
| Net loss for the period | | | | | (1,446) | (1,446) |
| **Other comprehensive loss** | | | | | | |
| Net change in fair value of financial assets | | | | 87 | - | 87 |
| Income tax expense | | | | (12) | - | (12) |
| Foreign exchange on change in functional currency | | | | (1,812) | - | (1,812) |
| **Total other comprehensive loss** | | | | (1,737) | - | (1,737) |
| **Total comprehensive loss for the period** | | | | | | (3,183) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the period** | | | | | | |
| Options vesting | *19* | | 58 | - | - | 58 |
| Options exercised | *17,19* | 344 | (144) | - | - | 200 |
| **Total contributions by owners** | | 344 | (86) | - | - | 258 |
| **Total transactions with owners** | | 344 | (86) | - | - | 258 |
| **Balances as at March 31, 2014** | | $ 52,392 | $ 5,345 | $ (3,451) | $ (9,290) | $ 44,996 |
| **Balances as at January 1, 2015** | | $ 52,570 | $ 5,644 | $ (4,144) | $ (10,260) | $ 43,810 |
| **Total comprehensive loss for the period** | | | | | | |
| Net loss for the period | | | | | (271) | (271) |
| **Other comprehensive income** | | | | | | |
| Net change in fair value of financial assets | | | | 6 | - | 6 |
| Income tax expense | | | | (3) | - | (3) |
| Foreign exchange on change in functional currency | | | | 90 | - | 90 |
| **Total other comprehensive income** | | | | 93 | - | 93 |
| **Total comprehensive loss for the period** | | | | | | (178) |
| **Transactions with owners, recorded directly in equity** | | | | | | |
| **Contributions by owners in the period** | | | | | | |
| Options vesting | *19* | - | 26 | - | - | 26 |
| **Total contributions by owners** | | - | 26 | - | - | 26 |
| **Total transactions with owners** | | - | 26 | - | - | 26 |
| **Balances as at March 31, 2015** | | **$ 52,570** | **$ 5,670** | **$ (4,051)** | **$ (10,531)** | **$ 43,658** |

The accompanying notes are an integral part of these condensed consolidated financial statements

## Condensed Consolidated Statements of Cash Flows

| (in thousands of United States dollars) | Notes | Three months ended March 31, 2015 (unaudited) | 2014 (unaudited) (Note 2) |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Net loss for the period | | **$ (271)** | $ (1,446) |
| Adjustments for: | | | |
| Share-based payments | *19* | **26** | 58 |
| Amortization of property, plant and equipment | *10* | **166** | 44 |
| Writedown of exploration and evaluation project | *12* | **6** | - |
| Net finance costs | *20* | **(713)** | 807 |
| Income tax recovery | | **(570)** | (212) |
| Net change in working capital: | | | |
| Change in receivables | *7* | **2,558** | (1,228) |
| Change in inventory | *9* | **(1,272)** | (564) |
| Change in trade and other payables | *13* | **1,009** | 487 |
| **Net cash from (used by) operating activities** | | **939** | (2,054) |
| **Cash flows from investing activities** | | | |
| Expenditures on mine property and development project | *11* | **(22)** | (97) |
| Expenditures on exploration and evaluation projects | *12* | **(18)** | (36) |
| Expenditures on 7P Plant | *10* | **(31)** | (728) |
| **Net cash used by investing activities** | | **(71)** | (861) |
| **Cash flows from financing activities** | | | |
| Issue of common shares | *17* | **-** | 201 |
| Payments of interest | *14,15,16* | **(471)** | (130) |
| Payments under leases | *16* | **(40)** | (41) |
| Net (repayment) proceeds of loans | *14* | **(1,000)** | 1,990 |
| Deposits of restricted cash | *6* | **(20)** | (187) |
| **Net cash from (used by) financing activities** | | **(1,531)** | 1,833 |
| **Net decrease in cash and cash equivalents** | | **(663)** | (1,082) |
| **Cash and Cash Equivalents, Beginning of the Period** | | **712** | 1,338 |
| **Cash and Cash Equivalents, End of the Period** | | **$ 49** | $ 256 |

The accompanying notes are an integral part of these condensed consolidated financial statements

## 1. NATURE OF OPERATIONS AND GOING CONCERN

### Nature of Operations

Victory Nickel Inc. ("Victory Nickel" or the "Company") is a company domiciled in Canada. The address of the Company's registered office is 80 Richmond St. West, Suite 1802, Toronto, Ontario, M5H 2A4. The condensed consolidated financial statements as at and for the three months ended March 31, 2015 and 2014 comprise the Company and its subsidiary Victory Silica Ltd. ("VSL" or "Victory Silica") together referred to as "Victory Nickel" and individually as "Victory Nickel entities". Victory Nickel was primarily engaged in the acquisition, exploration and development of nickel properties and associated products in Canada until the second quarter of 2014 when the Company became a producer and supplier of premium frac sand from its 500,000 ton per annum ("tpa") frac sand plant (the "7P Plant") located near Seven Persons approximately 18kms southwest of Medicine Hat, Alberta. Frac sand is specialized sand that is used as a proppant to enhance recovery from oil and gas wells. The Company was formed on February 1, 2007 pursuant to a plan of arrangement.

The Company is listed on the Toronto Stock Exchange ("TSX") under the symbol NI.

### Change in Functional and Presentation Currency

Effective October 1, 2014, the Company changed its functional currency to the United States dollar ("US$") from the Canadian dollar ("C$"). This change in accounting treatment is applied prospectively. Concurrently, the Company determined that it would change its presentation currency to the US$. Refer to Note 2 (c) for additional information.

### Going Concern

These condensed consolidated financial statements have been prepared using Generally Accepted Accounting Principles ("GAAP") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they come due. As at March 31, 2015, the Company had a working capital deficiency of $5,912,000.

During the second quarter of 2014, the Company was in the start-up and commissioning stage and began producing and selling frac sand from the 7P Plant; on August 11, 2014, the Company announced that the 7P Plant was commissioned. The SPA Loan is due in July, 2015, one convertible note in the amount of $2,000,000 is due in November 2015, three convertibles notes aggregating $750,000 are due in February 2016, and four convertible notes aggregating to C$265,000 are due at various times between January to March, 2016, accordingly, they are classified as current liabilities, due within one year. The Company generated net cash from operating activities of $939,000 during the first quarter of 2015 but not yet at levels sufficient to wholly fund its activities. In October 2014, the Company secured a short-term facility of $2,000,000 through the issuance of a promissory note (Note 14). This facility has been paid down to $1,000,000. The due date has been extended on a monthly basis by the lender and is presently due by May 31st, 2015 (Note 25).

The Company recognizes the imminent cash requirement to repay debt and is actively

discussing restructuring of its debt to term it out for several years. To date, the Company has not received acceptable expressions of interest and has not completed any debt restructuring. Without an injection of capital until the demand for frac sand returns to allow the Company to sell its inventory, the Company's funds will be depleted in June.

The Company is subject to the risks and challenges experienced by other companies at a comparable stage. These risks include, but are not limited to, continuing losses, an unexpected change in the frac sand market which would limit the Company's ability to generate cash flow from the 7P Plant, dependence on key individuals and the ability to secure adequate financing or to complete corporate transactions to meet the minimum capital required to successfully complete its projects and fund other operating expenses. Development of the Company's current nickel mining projects to the production stage will require significant financing. Given the current economic climate, the ability to raise funds may prove difficult.

None of the Company's mining projects has commenced commercial production and, accordingly, the Company is dependent upon debt or equity financings, the optioning and/or sale of resource or resource-related assets and/or the ability to generate sufficient cash flow from its other operating activities for its funding. The Company's 7P Plant completed commissioning in August, 2014. On April 14, 2015, the Company announced that operations at the 7P Plant were temporarily suspended until the demand for frac sand improves. This will stress the Company's liquidity until such time as the operations can resume.

The recoverability of the carrying value of exploration and evaluation projects and the mine property and development project, and ultimately the Company's ability to continue as a going concern, is dependent upon either exploration results which have the potential for the discovery of economically-recoverable reserves and resources, the Company's ability to finance exploitation of its projects through debt or equity financings and the optioning and/or sale of resource or resource-related assets such as royalty interests for its funding or the success of the frac sand business referred to above.

However, should the Company not be able to reach successful cash flow generation and achieve profitable operations from frac sand business or continue to achieve favourable exploration results, obtain the necessary financing or achieve future profitable production or sale of properties, the carrying value of the Company's assets could be subject to material adjustment and, in addition, other adjustments may be necessary to these financial statements should such adverse events impair the Company's ability to continue as a going concern as contemplated under GAAP. There is no certainty, especially in the present environment, that the Company's initiatives to improve working capital will be successful or that working capital generated thereby will be sufficient to fund the Company's activities including debt servicing, project expenditures and corporate costs. These conditions indicate the existence of a material uncertainty that may cast significant doubt about the Company's ability to continue as a going concern.

## 2. BASIS OF PREPARATION

### (a) Statement of Compliance

The condensed consolidated financial statements have been prepared using accounting policies consistent with International Financial Reporting Standards ("IFRS") and its interpretations adopted by the International Accounting Standards Board ("IASB") and in accordance with IAS 34, *Interim Financial Reporting* ("IAS 34"). This is GAAP for a Canadian public company.

These unaudited condensed consolidated financial statements reflect the accounting policies described in Note 3 to the Company's Audited Consolidated Financial Statements for the years ended December 31, 2014 and 2013 ("2014 "Audited Financial Statements") (with the exception of any changes set out in Note 3 below) and accordingly, should be read in conjunction with those financial statements and the notes thereto.

The management of Victory Nickel prepare the condensed consolidated financial statements which are then reviewed by the Audit Committee and the Board of Directors. The condensed consolidated financial statements were authorized for issue by the Board of Directors on May 11, 2015 and are made available to shareholders and others through filing on SEDAR shortly thereafter.

### (b) Basis of Measurement

The financial statements have been prepared on the historic cost basis except for derivative financial instruments such as warrants which are measured at fair value with changes through operations and financial assets such as marketable securities which are measured at fair value with changes recorded through other comprehensive income or loss ("OCI").

### (c) Functional and Presentation Currency

Under IFRS, an entity's functional currency should reflect the underlying transactions, events and conditions relevant to the entity. Given the Company's transition into an operating entity with revenues and significant expenses driven by prices in US$ and which currency influences management's primary operating, capital and financing decisions, effective October 1, 2014, the Company changed its functional currency to the US$. This change in accounting treatment is applied prospectively. Concurrently, the Company changed its presentation currency to the US$.

For comparative reporting purposes, historic financial statements were translated into the US$ reporting currency whereby assets and liabilities were translated at the closing rate in effect at the end of the comparative periods; revenues, expenses and cash flows were translated at the average rate in effect for the comparative periods and equity transactions were translated at historic rates.

These condensed consolidated financial statements are presented in US dollars, which is the Company's functional currency. All financial information is expressed in US dollars unless otherwise stated; tabular amounts are stated in thousands of dollars.

**(d) Use of Estimates and Judgements**
The preparation of financial statements in conformity with IFRS requires management to make estimates, judgements and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

It is reasonably possible that, on the basis of existing knowledge, outcomes in the next financial year that are different from the assumptions used could require a material adjustment to the carrying amount of the asset or liability affected.

The accompanying unaudited condensed consolidated financial statements include all adjustments that are, in the opinion of management, necessary for fair presentation. The results of operations and cash flows for the current periods as presented are not necessarily indicative of the results to be expected for the full year.

***Significant estimates and assumptions***
Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognized in the period in which the estimates are revised and in any future periods affected.

Information regarding significant areas of estimation uncertainty made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 7 – valuation of receivables;
- Note 8 - valuation of financial assets at fair value through operations and OCI;
- Note 9 – valuation of inventory;
- Note 11 - measurement of the recoverable amount of mine property and development project;
- Note 12 - measurement of the recoverable amount of exploration and evaluation projects;
- Note 14 - measurement and valuation of the embedded options in convertible notes;
- Note 15 – measurement and valuation of the participating interest; and
- Note 19 - measurement of share-based payments.

***Significant judgements***
Judgements are reviewed on an ongoing basis. Changes resulting from the effects of amended judgements are recognized in the period in which the circumstance giving rise to the change occurs and in any future periods presented. Information regarding significant areas of critical judgements made in applying accounting policies that have the most significant effect on the amounts recognized in the financial statements is included in the following notes:

- Note 1 - going concern assessment;
- Note 2 – determination of the functional currency for the Company and its subsidiaries;

- Note 7 – impairment of receivables;
- Note 9 – impairment of inventory;
- Note 11 - classification of expenditures as mine property and development project or operating expenses;
- Note 12 - classification of expenditures as exploration and evaluation projects or operating expenses;
- Note 11 - impairment of mine property and development project;
- Note 12 - impairment of exploration and evaluation projects.

***Share Consolidation***

On September 12, 2014, as described more fully in Note 17, the Company consolidated its common shares on a one-for-ten basis (the "Share Consolidation"). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of the reporting period of these financial statements. Refer to Notes 17, 18 and 19.

***Reclassifications***

Certain of the prior period balances have been reclassified to conform to the current presentation.

## 3. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies of the Company are set out in detail in Note 3 to the 2014 Audited Consolidated Financial Statements. Such policies have been applied consistently to all periods presented in these condensed consolidated financial statements, and have been applied consistently by Victory Nickel entities.

### (a) New Accounting Policies

There have been no new accounting policies adopted by the Company, except as noted below.

### (b) New Standards and Interpretations Not Yet Adopted

Since the issuance of the Company's 2014 Audited Consolidated Financial Statements, the IASB and International Financial Reporting Interpretations Committee ("IFRIC") have issued several new and revised standards and interpretations. However, the revised standards and interpretations are not applicable to the Company or are expected to have minimal impact.

### (c) Revenue Recognition

Revenues from frac sand sales are recognized when legal title passes to the customer which may occur at the Company's production facility, rail origin or at the destination terminal or transload facility. At that point, delivery has occurred, evidence of a contractual arrangement exists and collectability is reasonably assured.

### (d) Inventory

Finished products and raw materials inventories are valued at the lower of cost and net realizable value. Cost comprises all costs of purchase, costs of processing and other

costs incurred in bringing inventories to their present location and condition. Net realizable value for finished products and raw materials is generally considered to be the selling price of the finished product in the ordinary course of business less the estimated costs of completion and estimated costs to make the sale. Inventory is reviewed to ensure the carrying value does not exceed net realizable value. A writedown is recognized when carrying cost exceeds net realizable value. The writedown may be reversed if the circumstances which caused it no longer exist.

**(e) Property, Plant and Equipment**

The 7P Plant has commenced operation mid-2014 and accordingly, amortization of plant equipment commenced during the period. Plant and equipment at the 7P Plant (other than mobile equipment) is being amortized on a straight-line basis based on estimated useful lives of between five and ten years.

## 4. FINANCIAL RISK MANAGEMENT AND CAPITAL MANAGEMENT DISCLOSURES

**Overview**

The Company has exposure to the following risks from its use of financial instruments:

- credit risk;
- liquidity risk;
- market risk; and
- operational risk.

A complete description of the Company's financial risk management and capital management is included in Note 4 to the 2014 Audited Consolidated Financial Statements.

This note updates information about the Company's exposure to each of the above risks where there have been material or noteworthy changes. Further quantitative disclosures are included throughout these condensed consolidated financial statements.

**Capital Management Disclosures**

The Company's objective when managing capital is to safeguard its accumulated capital in order to provide an adequate return to shareholders by maintaining a sufficient level of funds to support continued project development and corporate activities. Capital is defined by the Company as the aggregate of its shareholders' equity as well as any long-term debt, equipment-based and/or project-based financing.

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| Shareholders' equity | **$** | **43,658** | $ | 43,810 |
| Loans and borrowings - long-term portion | | **2,157** | | 2,957 |
| Participating Interest | | **2,133** | | 3,548 |
| Lease obligations - long-term portion | | **239** | | 275 |
| | **$** | **48,187** | $ | 50,590 |

Neither the Company, nor its subsidiary, are subject to externally-imposed capital requirements. There were no changes in the Company's approach to capital

management during the year.

## 5. DETERMINATION OF FAIR VALUES

There have been no changes in how the Company determines fair value for both financial and non-financial assets and liabilities from the descriptions included in Note 5 to the Company's 2014 Audited Consolidated Financial Statements. When applicable, further information about the assumptions made in determining fair values is disclosed in the notes specific to that asset or liability.

## 6. CASH AND CASH EQUIVALENTS

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| Bank balances | **$** | **44** | $ | 707 |
| Short-term deposits | | **5** | | 5 |
| **Cash and Cash Equivalents in the Statement of Cash Flows** | **$** | **49** | $ | 712 |

The Company has placed $291,000 (December 31, 2014 - $271,000) funds on deposit with a Canadian chartered bank to support letters of credit being used to facilitate business activity with certain vendors and are presented as restricted cash on the condensed consolidated balance sheet. The term deposits mature within one year and bear interest at either 0.35% or 0.95%.

## 7. RECEIVABLES AND PREPAIDS

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| Trade accounts receivable | **$** | **619** | $ | 2,725 |
| | | **619** | | 2,725 |
| Other receivables | | **99** | | 48 |
| Prepaid expenses and deposits | | **92** | | 594 |
| | **$** | **809** | $ | 3,367 |

The aging of trade accounts receivable is as follows:

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| Trade accounts receivable | | | | |
| Current | **$** | **278** | $ | 1,945 |
| Past due 0-30 days | | **220** | | 454 |
| Past due 31-60 days | | **121** | | 253 |
| Past due 61-90 days | | **-** | | 42 |
| Past due > 90 days | | **-** | | 31 |
| | **$** | **619** | $ | 2,725 |

As at March 31, 2015, the Company determined that it had no exposure to losses due to the quality of customers; 100% of the balances outstanding had been collected by the date of this report.

## 8. MARKETABLE SECURITIES

| | March 31, 2015 | December 31, 2014 |
|---|---|---|
| Financial assets at fair value through OCI: | | |
| Shares | **$ 159** | $ 153 |
| | **$ 159** | $ 153 |

The Company records its portfolio of shares at available market prices with any difference in fair value compared with acquisition cost being recorded as gain or loss on financial assets at fair value through OCI.

## 9. INVENTORY

| | March 31, 2015 | December 31, 2014 |
|---|---|---|
| Raw material | | |
| At transload facility | **$ 207** | $ 118 |
| In transit | **76** | 951 |
| Stored at 7P Plant | **2,259** | 463 |
| | **2,542** | 1,532 |
| Finished goods | **1,707** | 1,445 |
| | **$ 4,249** | $ 2,977 |

## 10. PROPERTY, PLANT, AND EQUIPMENT

| **Balances as at January 1, 2014** | **Land and Building** | **7P Plant** | **Vehicles and Mobile Equipment** | **Equipment and Furniture** | **Total** |
|---|---|---|---|---|---|
| Cost | $ 83 | $ 2,922 | $ 635 | $ 1,526 | $ 5,166 |
| Accumulated Amortization | (9) | - | (38) | (28) | (75) |
| Effect of Foreign Exchange (Note 2) | (16) | (10) | (3) | (99) | (128) |
| **Carrying Amount** | **58** | **2,912** | **594** | **1,399** | **4,963** |
| Additions | - | 1,852 | 73 | 115 | 2,040 |
| Amortization | (2) | (382) | (168) | (2) | (554) |
| **Balances as at December 31, 2014** | | | | | |
| Cost | 83 | 4,774 | 708 | 1,641 | 7,206 |
| Accumulated Amortization | (11) | (382) | (202) | (30) | (625) |
| Effect of Foreign Exchange (Note 2) | (8) | (187) | (47) | (160) | (402) |
| **Carrying Amount** | **64** | **4,205** | **459** | **1,451** | **6,179** |
| Additions | - | 7 | - | 4 | 11 |
| Amortization | (1) | (129) | (35) | (2) | (166) |
| **Balances as at March 31, 2015** | | | | | |
| Cost | 83 | 4,781 | 708 | 1,645 | 7,217 |
| Accumulated Amortization | (12) | (511) | (233) | (32) | (788) |
| Effect of Foreign Exchange (Note 2) | (8) | (196) | (47) | (160) | (402) |
| **Carrying Amount** | **$ 64** | **$ 4,074** | **$ 428** | **$ 1,453** | **$ 6,018** |

Equipment and furniture includes deposits of $1,544,000 related to the purchase of transformers and other electrical equipment; the equipment is not available for use and is not being depreciated. Vehicles and Mobile Equipment include $666,000 (December 31, 2014 - $666,000) of equipment acquired under leases (Note 16).

## 11. MINE PROPERTY AND DEVELOPMENT PROJECT

| | January 1, 2015 | Effect of Foreign Exchange (Note 2) | Current Expenditures | **March 31, 2015** |
|---|---|---|---|---|
| Minago | $ 34,893 | $ - | $ 52 | **$ 34,945** |
| | $ 34,893 | $ - | $ 52 | **$ 34,945** |

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | March 31, 2014 |
|---|---|---|---|---|
| Minago | $ 36,357 | $ (1,377) | $ 94 | **$ 35,074** |
| | $ 36,357 | $ (1,377) | $ 94 | **$ 35,074** |

### Minago

The 100%-owned Minago project covers approximately 19,661 ha, through a combination of mining claims, mineral leases and a mineral exploration licence, on Manitoba's Thompson Nickel Belt. The property encompasses the Nose Deposit, which contains the entire current nickel mineral resource, and the North Limb, a zone of nickel mineralization with a known strike length of 1.5 kilometres located to the north of the Nose Deposit.

From 2006 to date, considerable work has been performed, including diamond drilling, metallurgical testing and engineering studies and all the studies required to complete the Environmental Impact Study which was filed in May 2010. As a result, in August 2011, the Company received its Environmental Act Licence ("EAL"). On April 30, 2014, the Company announced the filing of an Environmental Act Proposal ("EAP") to amend the EAL to allow for the relocation of the proposed tailings impoundment. Approval of the EAP is in progress; the EAL remains in good standing. The results of the Minago Feasibility Study ("FS") were announced in December 2009 and improvements thereto announced in June 2010 and July 2011.

Five mineral claims totalling 691 ha located at the north end of the Company's existing Minago property package are subject to a maximum 2% net smelter return royalty with a 50% back-in right; these claims represent approximately 2.4% of the total Minago project.

The Minago project is not in production. Accordingly, the Minago project is not being depreciated.

## 12. EXPLORATION AND EVALUATION PROJECTS

Cumulative costs relating to the acquisition of mineral properties and E&E expenditures have been incurred on the following projects:

| | January 1, 2015 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | **March 31, 2015** |
|---|---|---|---|---|---|
| Lac Rocher | $ 6,609 | $ - | $ - | $ - | **$ 6,609** |
| Mel | 6,771 | - | 7 | - | **6,778** |
| Lynn Lake | - | - | 6 | (6) | **-** |
| | $ 13,380 | $ - | $ 13 | $ (6) | **$ 13,387** |

| | January 1, 2014 | Effect of Foreign Exchange (Note 2) | Current Expenditures | Writedowns/ Recoveries | March 31, 2014 |
|---|---|---|---|---|---|
| Lac Rocher | $ 6,946 | $ (264) | $ - | $ - | $ 6,682 |
| Mel | 7,026 | (265) | 22 | $ - | 6,783 |
| Lynn Lake | - | - | 14 | $ - | 14 |
| Other | 4 | - | - | $ - | 4 |
| | $ 13,976 | $ (529) | $ 36 | $ - | $ 13,483 |

## Lac Rocher

The Lac Rocher project, which is 100%-owned, is located 140 kilometres northeast of Matagami in northwestern Québec. The project is subject to a royalty of $0.50 per ton on any ores mined and milled from the property and a 2% NSR described below.

The Lac Rocher property is subject to a discovery incentive plan (the “DIP”) to reward certain individuals involved in the discovery of Lac Rocher with a 2% NSR for mines that were discovered on certain properties prior to the expiry of the DIP. The NSR is payable only on revenues earned after recovery of all development costs for any mine on the property. The terms of the DIP provide the Company with a right of first refusal on any proposed disposition of the NSR. In addition, the DIP contains put/call provisions under which the Company may be required to purchase, or may exercise an option to purchase, the NSR at the value of its discounted cash flows, as defined therein. The Lac Rocher property is the only property subject to the DIP. As the Lac Rocher property is not yet in production, no royalties are currently payable.

## Mel

The Company purchased a 100% interest in the Mel Properties located near Thomson, Manitoba from Vale. Vale is entitled to a 10% royalty on “distributable earnings” defined as net revenue less operating expenses, before federal and provincial income taxes, after provincial mining taxes and less aggregate pre-production capital but before depreciation.

Vale has a contractual obligation to mill ore mined from the Mel deposit at its cash cost plus 5% provided that the product meets Vale specifications and that Vale has sufficient mill capacity.

Ongoing updating of Mel data is being conducted and applies to both the drilling data on the Mel deposit/lease as well as the 111 drill holes collared on the claims portion of the property. Additional modelling of the resource will be continued. No fieldwork has been conducted during 2015.

**Lynn Lake**
The Company owns a 100% right, title and interest in the Lynn Lake nickel property ("Lynn Lake"), covering approximately 600 ha in northern Manitoba. As at December 31, 2013, the Lynn Lake property was subject to an option agreement with Wellgreen Platinum Ltd. ("Wellgreen") (formerly Prophecy Platinum Corp.).

On March 17, 2014, Wellgreen formally confirmed to the Company that it was relinquishing the Lynn Lake option.

On November 4, 2014, the Company announced that it had optioned the Lynn Lake property to Corazon Mining Ltd. ("Corazon") an Australian public company (ASX: CZN).

On April 6, 2015, the Company received 40,000,000 shares of Corazon Mining Limited valued at $192,000 as part of the option agreement.

**Other Projects**
In October 2014, the Company entered into an option to acquire a 100% interest in a frac sand land package totalling over 300 acres in south western Wisconsin, USA (the "Bear Coulee Property"). The option agreement provides for a cash payment on signing of the agreement, a second cash payment on delivery of permits and a third cash payment on exercise of the option. The option is valid for six months with two equivalent extensions available under certain circumstances. Prior to production, the Company will be required to pay $40,000 per annum as advance royalties on the initial 20,000 tons of sand production. Once the Bear Coulee Proper is in production, the Company will be required to pay a royalty of $2.00 per ton of frac sand sold from the property.

In February 2015, the Company announced that a resource estimate of approximately 11 million tons of sand has been completed by Summit on the Bear Coulee Property and will be incorporate into a National Instrument 43-101 technical report. The Bear Coulee frac sand property is located in Trempeleau County, Wisconsin.

No expenditures have yet been made on the Bear Coulee Property.

The Company has incurred minimal expenditures on other properties in 2015 and 2014.

## 13. TRADE AND OTHER PAYABLES

| | Notes | March 31, 2015 | December 31, 2014 |
|---|---|---|---|
| Accounts payable | | | |
| Mine property and development project | | **$ 64** | $ 13 |
| Exploration and evaluation projects | | **4** | 1 |
| Property and equipment | | **323** | 402 |
| Other accounts payable | | **2,975** | 1,708 |
| Accrued liabilities | | | |
| Mine property and development project | | **10** | 22 |
| Other accrued liabilities | | **442** | 683 |
| Other payables | | **-** | 21 |
| Lease obligations - current portion | *16* | **139** | 137 |
| Due to Nuinsco Resources Limited | | | |
| Under the Management Agreement | *22* | **40** | 45 |
| | | **$ 3,997** | $ 3,032 |

## 14. LOANS AND BORROWINGS

| | Notes | March 31, 2015 | December 31, 2014 |
|---|---|---|---|
| Current loans | | | |
| SPA Loan | *(a)* | **$ 3,711** | $ 3,585 |
| Short-term loan | *(b)* | **1,000** | 2,000 |
| Current portion of long-term loans | *(c)* | **2,761** | 1,908 |
| Total current loans | | **7,472** | 7,493 |
| Long-term loans | | | |
| Promissory notes | *(c)* | **2,157** | 2,957 |
| Total long-term loans | | **2,157** | 2,957 |
| | | **$ 9,629** | $ 10,450 |

| **(a) SPA Loan** | March 31, 2015 | December 31, 2014 |
|---|---|---|
| Principal balance | **4,000** | 4,000 |
| Add: fair value of warrants with a cashless exercise feature | **33** | 121 |
| Less: unamortized loan fees | **(322)** | (536) |
| **SPA Loan** | **$ 3,711** | $ 3,585 |

On May 15, 2014, the Company announced that it had executed a securities purchase and line of credit agreement (the “SPA Loan”) to issue and sell to the purchaser senior secured 14.8% notes in the aggregate principal amount of $4,000,000 (each a “SPA Note”). The SPA Loan matures on July 30, 2015.

The Company has issued to the purchaser 2,000,000 common share purchase warrants (after giving retroactive effect to the Share Consolidation Note 17). The number of warrants is subject to an increase to 1,000,000 warrants (after giving retroactive effect to the Share Consolidation Note 17) for each $1,000,000 Note issued if any of the Notes is prepaid and the closing price of the Company’s common shares is C$2.00 or lower (after giving retroactive effect to the Share Consolidation Note 17) on the trading day

preceding the date of such prepayment. Given that there are costs associated with the prepayment right, the Company has valued the prepayment right at $nil. Each warrant (after giving retroactive effect to the Share Consolidation Note 17) entitles the holder to purchase one common share of the Company at an exercise price of C$1.00 (after giving retroactive effect to the Share Consolidation Note 17) for a period of 36 months from the Initial Closing Date. The warrants are subject to a cashless exercise provision and are therefore considered a component of debt rather than equity; the fair value at inception was calculated at C$620,000 and was revalued at March 31, 2015 at $33,000 with the aggregate change in fair value of $551,000 being recorded in finance income, of which $88,000 (2014 - $463,000) was recorded in the three months ending March 31, 2015 (Note 20).

In the three months ended March 31, 2015, the Company paid $148,000 in interest and amortized $214,000 in loan fees into finance costs. There are no amounts remaining to be drawn under the SPA Loan.

The values of the warrants with a cashless exercise provision have been calculated using the Black-Scholes option-pricing model using the following parameters:

| **(after retroactive effect of Share Consolidation - Note 17)** | **March 31, 2015** | December 31, 2014 | May 15, 2014 |
|---|---|---|---|
| | | | (At inception) |
| Fair values | **C$0.02** | C$0.07 | C$0.31 |
| Share prices at valuation dates | **C$0.14** | C$0.24 | C$0.60 |
| **Assumptions** | | | |
| Exercise price | **C$1.00** | C$1.00 | C$1.00 |
| Expected volatilities | **97%** | 111% | 101% |
| Expected remaining terms (years) | **2.13** | 2.37 | 3.00 |
| Expected dividends | **-** | - | - |
| Risk-free interest rates | **0.50%** | 1.00% | 1.12% |

## b) Short-term loan

On October 1, 2014, the Company completed the arrangement of short-term financing by way of a promissory note amounting to $2,000,000. The promissory note bears interest at an annual rate of 28% and was originally due on December 1, 2014. The lender has agreed to several monthly extensions of the short-term facility upon payment of extension fees, and penalties. During the first quarter ended March 31, 2015 the Company repaid $1,000,000 and paid interest expense, extension fees, and penalties aggregating $179,000. The outstanding balance of $1,000,000 is now due on or before May 31, 2015.

| (c) Promissory Notes | *Notes* | | March 31, 2015 | | December 31, 2014 |
|---|---|---|---|---|---|
| Total Principal Outstanding | | | **5,979** | | 5,979 |
| Embedded option derivatives at inception | | **$ (1,420)** | | $ (1,420) | |
| Less: effect of conversion to SPA Loan | | **417** | | 417 | |
| Less: accumulated amortization | *20* | **516** | | 339 | |
| | | | **(487)** | | (664) |
| Less: unamortized loan fees | | | **(91)** | | (108) |
| Add: Effect of foreign exchange | | | **(18)** | | 19 |
| Less: Equity component of debt | | | **(48)** | | (48) |
| Net promissory notes | | | **5,335** | | 5,178 |
| Embedded option derivatives at inception | | **1,420** | | 1,420 | |
| Less: effect of conversion to SPA Loan | | **(417)** | | (417) | |
| Change in value of embedded option derivatives | *20* | **(1,420)** | | (1,316) | |
| | | | **(417)** | | (313) |
| | | | **4,918** | | 4,865 |
| Less: current portion of promissory notes | | | **(2,761)** | | (1,908) |
| **Promissory Notes - long-term portion** | | | **$ 2,157** | | $ 2,957 |

On November 11, 2013 and during 2014, the Company entered into several unsecured convertible promissory notes for $6,750,000 and C$265,000 by way of private placements (the “Convertible Notes”); $1,000,000 was converted into a SPA Note as referred to above. The Convertible Notes bear interest calculated and payable quarterly at 14.8% and are convertible at the option of the holder into the Company’s shares at C$1.00 (after retroactive effect of the Share Consolidation). All Convertible Notes have two-year terms.

In the three months ended March 31, 2015 the Company paid $147,000 for interest in cash and accrued another $73,000 on interest expense that was paid on April 1, 2015; amortization of $17,000 in loan fees and $177,000 for the embedded option derivatives at inception using the effective interest rate method (2014 - $669,000, $53,000 and $328,000, respectively).

The embedded option derivatives have been calculated using the Black-Scholes option-pricing model using the following parameters:

| (after retroactive effect of Share Consolidation - Note 17) | **March 31, 2015** | December 31, 2014 | (Various inception dates) | November 11, 2013 |
|---|---|---|---|---|
| | | | | (At inception) |
| Fair values | **C$.00** | C$0.00 to C$0.03 | C$0.22 to C$0.40 | C$0.08 |
| Share prices at valuation dates | **C$0.14** | C$0.24 | C$0.50 to C$0.70 | C$0.30 |
| **Assumptions** | | | | |
| Exercise price | **C$1.00** | C$1.00 | C$1.00 | C$1.00 |
| Expected volatilities | **80% to 93%** | 82% to 109% | 116% | 103% |
| Expected remaining terms (years) | **0.61 to 1.27** | 0.86 to 1.52 | 2.00 | 2.00 |
| Expected dividends | **-** | - | - | - |
| Risk-free interest rates | **0.50%** | 1.00% | 1.20% | 1.20% |

## 15. PARTICIPATING INTEREST

| **Participating Interest** | ***Note*** | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|---|
| Advance for working capital | | **$** | **-** | $ | 940 |
| Advance under Amended Loan for standby commitment | | | **-** | | 1,135 |
| Aggregate advances | | | **-** | | 2,075 |
| Less: settled in Units of Victory Nickel | | | **-** | | (1,135) |
| Less: unamortized loan fees | | | **-** | | (51) |
| Opening balance | | | **3,548** | | 889 |
| Change in fair value | *20* | | **(1,415)** | | 2,875 |
| Effect of foreign exchange | | | **-** | | (216) |
| **Participating Interest** | | **$** | **2,133** | $ | 3,548 |
| Current portion - due within one year [(1)] | | **$** | **-** | $ | - |
| Long-term portion [(2)] | | | **2,133** | | 3,548 |
| **Participating Interest** | | **$** | **2,133** | $ | 3,548 |

(1) Classified as loans and borrowings - current
(2) Classified as loans and borrowings - long-term

In 2012, the Company entered into a loan agreement for C$1,000,000 with Nuinsco (the "Lender"). The loan was amended and restated on March 25, 2013 (the "Amended Loan") to up to C$3,000,000 with the additional amount being available to fund capital expenditures relating to the 7P Plant. The Amended Loan bore interest at 12% per annum and was set to mature on January 31, 2015; the loan was secured by equipment and a general security agreement over the equipment of the Company.

Prior to June 1, 2014, the Lender had the right to convert the outstanding balance of the Amended Loan into a limited participating interest (the "Conversion") whereby the Lender is entitled to receive a share of cash flows earned from the sale of frac sand from the 7P Plant. The Lender's participation was capped at C$10,000,000, with a minimum of C$7,500,000, and was subject to adjustment under certain circumstances. On Conversion, the Amended Loan would be considered paid in full. Pursuant to the

Amended Loan the Lender provided a backstop of C$1,207,584 in cash to a rights offering which closed on July 30, 2013. This capped the Amended Loan at C$2,707,584 and reduced the amount available to be drawn down to C$500,000. Upon exercise of the backstop, the Lender increased its shareholding in the Company to approximately 12.24% on a non-diluted basis, thereby becoming a related party of the Company.

The Company was to pay, with shares, an arrangement fee of up to C$300,000 plus a commitment fee of 1.5% per annum on unutilized balances. Commitment fees of C$11,000 were accrued to December 31, 2013 and are included in *Finance costs* in Note 20; shares were issued in December 2014. Effective March 2013, the Company issued 5,681,818 shares in satisfaction of the arrangement fee at that time of C$250,000; an additional 789,294 shares with a stated value of C$20,758 were issued in August 2013 under the loan terms related to the backstop of the rights offering; this satisfies the arrangement fee in full. These amounts, along with other loan fees, are being amortized as interest expense using the effective interest rate method prior to conversion of loan into participating interest; in the three months ended March 31, 2015, there was no amortization of loan fees as interest expense and or interest paid to the Lender in cash (2014 - $119,000 and $46,000, respectively).

On February 4, 2014, both Nuinsco and Victory Nickel agreed to cancel the amount that remained available to be drawn down under the Amended Loan. This fixed the commitment fee to be paid in shares at C$12,000 and also amended the range of the Company's participation in the net cash flows earned from the sale of frac sand to a maximum of C$10,222,831 with a minimum of C$7,667,124. As at March 31, 2015, these limits approximate $8,071,000 and $6,053,000.
The loan is classified as a financial liability carried at amortized cost and is defined as "Participating Interest". From recognition until the fourth quarter of 2013, the Company considered that there were no changes in estimated cash flows since Nuinsco had not converted its loan and the 7P Plant was not built and there were other significant uncertainties. During the fourth quarter of 2013, the plant construction was well underway and the probability of Conversion had increased substantially. Accordingly, the Company revised the estimated future cash flows and discounted these cash flows at 15%. The estimated future cash flows were determined using a probability-weighted estimation of future expected cash flow scenarios from the frac sand business based on current expectations of business results, capital costs and pre-operating expenditures. An assessment is made regarding the applicable ceiling for the cash flows which is dependent upon the phase attained by the Company when payments under the Participating Interest are anticipated. These cash flows were on the basis of Phase Two completion; the Company still expects to enter Phase Two before paying out the expected cash flows despite announcing a deferral of Phase Two during February, 2015. The Company also included probability weightings of 5%, 40% and 55% as risk factors applied to varying levels of expected cash flows – being zero, 50% and 100% of the applicable ceiling maximum of C$10,222,831. As at March 31, 2015, the probability weightings used in the model were 5%, 40% and 55%; representing a probability-weighted average of 75% (December 31, 2014 – 75%).

As described earlier, the percentage participation in net cash flows is 52.16% and the applicable ceiling for Phase Two is C$7,667,124 (Phase One - C$10,222,831). These assumptions resulted in revised amortized cost carrying amount of the Participating Interest of $2,133,000 and, accordingly $1,415,000 was recorded as a *gain on adjustment of estimated cash flows* through the statement of operations. As at December 31, 2014, the Participating Interest was estimated to be $3,548,000 with $225,000 being recorded as a loss through the statement of operations. This is a Level 3 methodology and is subject to the highest level of uncertainty. The Company will continue to review and revise its estimates of expected future cash flows as the expectations of payments of the Participating Interest change. Changes in that estimate will be recorded through operations with appropriate adjustment for actual cash flows paid.

## 16. LEASE OBLIGATIONS

| | *Note* | **March 31, 2015** | December 31, 2014 |
|---|---|---|---|
| Vehicles and Mobile Equipment: | | | |
| Total present value of minimum lease payments | | **$ 517** | $ 570 |
| Principal payments | | **(139)** | (158) |
| **Total present value of minimum lease payments remaining** | | **378** | 412 |
| Lease obligations - current portion | *13* | **(139)** | (137) |
| **Lease obligations - long-term** | | **$ 239** | $ 275 |

The Company has finance lease obligations for equipment in use at the 7P Plant. At the end of the lease obligations, ownership is transferred to the Company for all leases except one, whereby an election is to be made 60 days prior to the end of the lease term at the purchase option price of $1.

The future minimum lease payments are as follows:

| | **March 31, 2015** | December 31, 2014 |
|---|---|---|
| Less than 1 year | **$ 160** | $ 160 |
| Between 1 and 5 years | **237** | 293 |
| **Total minimum lease payments payable** | **$ 397** | 453 |
| Future finance charges on minimum lease payments | **19** | 41 |
| **Present value of minimum lease payments** | **$ 378** | $ 412 |

## 17. CAPITAL AND OTHER COMPONENTS OF EQUITY

### Share Capital

***Authorized***

The Company is authorized to issue an unlimited number of common shares with no par value.

***Share Consolidation***

On September 12, 2014, pursuant to shareholder approval granted at the Company's Annual and Special Meeting of Shareholders held on May 29, 2014 (the "ASM"), the Company consolidated its common shares on a one-for-ten basis (the "Share Consolidation"). Accordingly, certain comparative information regarding issued and outstanding common shares, options, warrants, weighted average number and per share information has been adjusted retroactively to be comparable using that basis as if the Share Consolidation had been effective on the first day of these financial statements. Refer to Notes 2, 18 and 19.

***Number of shares issued and outstanding***

As at March 31, 2015, the Company had 57,634,578 (after giving retroactive effect to the Share Consolidation) shares outstanding. There were no common shares issued during the three months ended March 31, 2015. In January and February 2014, various officers, employees and consultants of the Company exercised 4,630,000 (after giving retroactive effect to the Share Consolidation) options generating aggregate cash proceeds of $201,000; $144,000 was transferred from contributed surplus. As at March 31, 2014, the number of shares outstanding was 57,166,082 (after giving retroactive effect to the Share Consolidation).

### Share Incentive Plan

The Company has a Share Incentive Plan which includes a Share Purchase Plan and a Share Bonus Plan. Both are described fully in the Company's 2014 Audited Consolidated Financial Statements.

### Shareholder Rights Plan

The Company has a Shareholder Rights Plan which is described fully in the Company's 2014 Audited Consolidated Financial Statements.

### Accumulated Other Comprehensive Income or (Loss) ("AOCI")

AOCI is comprised of the following separate components of equity:

***Net change of financial assets at fair value through OCI***

This comprises the cumulative net change in the fair value of financial assets at fair value through OCI.

***Income tax on other comprehensive income***

This comprises the amount of income tax determined to be required on the cumulative net change in the fair value of financial assets at fair value through OCI.

## 18. EARNINGS (LOSS) PER SHARE

The calculation of basic and diluted EPS for the three months ended March 31, 2015 and 2014 was based on the information in the table below.

| (after retroactive effect of Share Consolidation - Note 17) | Three months ended March 31, 2015 | 2014 |
|---|---|---|
| **Balance as at beginning of the period** | **57,325,900** | 56,703,100 |
| Effect of options exercised | **-** | 391,700 |
| **Weighted average number of common shares as at end of period - Basic and Diluted** | **57,325,900** | 57,094,800 |
| Effect of options granted and outstanding | **-** | 682,400 |
| **Weighted average number of common shares as at end of the period - Diluted** | **57,325,900** | 57,777,200 |
| Number of options excluded | **3,036,000** | 2,136,350 |
| Number of warrants excluded | **12,799,935** | 11,250,000 |
| Number of shares from conversion of promissory notes excluded | **6,935,575** | 4,409,875 |
| **Net loss attributable to shareholders - Basic** | **$ (271)** | $ (1,446) |
| **Net loss attributable to shareholders - Diluted** | **$ (271)** | $ (1,446) |
| **Basic loss per share** | **$ (0.00)** | $ (0.02) |
| **Diluted loss per share** | **$ (0.00)** | $ (0.02) |

The disclosures in the table above are provided after giving retroactive effect to the share consolidation on a one-for-ten basis described in Note 17.

The effect of adjustments to the weighted average number of common shares would be anti-dilutive when the Company incurs losses. The table above provides the weighted average number of shares on a diluted basis for periods where losses are incurred for information only. The average market value of the Company's shares for purposes of calculating the dilutive effect of share options is based on quoted market prices for the respective periods during which the options were outstanding.

There have been no share issuances subsequent to the end of the period which would have had a significant effect on the EPS.

## 19. SHARE-BASED PAYMENTS

### Description of the Share-based Payment Arrangements

The Company's share-based payment arrangements are described in the Company's 2014 Audited Consolidated Financial Statements.

### *Stock Option Plan (equity-settled)*

As at March 31, 2015, the Company had 5,609,187 common shares available for the granting of future options (December 31, 2014 – 5,125,187 common shares) after giving retroactive effect to the Share Consolidation in Note 17. Options are exercisable at the closing market price of the shares at the date prior to grant. The Company does not have any cash-settled transactions.

### *Share purchase warrants (equity-settled)*

Pursuant to the rights offering which closed on July 30, 2013, the Company issued 10,000,000 warrants (after giving retroactive effect to the Share Consolidation in Note 17). The Company also issued 1,250,000 warrants (after giving retroactive effect to

the Share Consolidation in Note 17) pursuant to a private placement on September 19, 2013. The 2,000,000 warrants (after giving retroactive effect to the Share Consolidation in Note 17) issued on May 15, 2014 pursuant to the SPA Loan may be settled without cash and are, accordingly, classified as debt (Note 14). The Company does not have any cash-settled transactions.

***Share Bonus Plan***

The terms of the Share Bonus Plan are set out in Note 21 to the Company's 2014 Audited Consolidated Financial Statements.

**Terms and Conditions of Share-based Payment Arrangements**

***Stock Option Plan and Share purchase warrants***

The terms and conditions relating to the grants of the Company's Stock Option Plan are set out in Note 21 to the Company's 2014 Audited Consolidated Financial Statements. The warrants issued under the rights offering in 2013 are exercisable on July 31, 2014 and expire on July 31, 2015. The Company's share purchase warrants issued pursuant to the private placement are exercisable on issue and expire on September 19, 2015.

**Disclosure of Share-based Payment Arrangements**

***Stock Option Plan***

The number and weighted average exercise prices of options are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars)<br>As at and for the periods ended | Number of options<br>**March 31, 2015** | <br>December 31, 2014 | Weighted average exercise price<br>**March 31, 2015** | <br>December 31, 2014 |
|---|---|---|---|---|
| **Outstanding as at beginning of period** | **3,555,000** | 3,204,125 | **$ 0.72** | $ 0.80 |
| Granted | **-** | 1,063,000 | **$ -** | $ 0.66 |
| Exercised | **-** | (463,000) | **$ -** | $ 0.46 |
| Expired or forfeit | **(519,000)** | (249,125) | **$ 1.60** | $ 1.70 |
| **Outstanding as at end of period** | **3,036,000** | 3,555,000 | **$ 0.57** | $ 0.72 |
| **Exercisable as at end of period** | **2,690,750** | 3,209,750 | **$ 0.73** | $ 0.73 |

| (after retroactive effect of Share Consolidation - Note 17) | Number of options outstanding<br>**March 31, 2015** | <br>December 31, 2014 | Weighted average remaining contractual life (years)<br>**March 31, 2015** | <br>December 31, 2014 |
|---|---|---|---|---|
| **Range of exercise prices (Canadian dollars)** | | | | |
| $0.25 to $0.50 | **1,587,000** | 1,587,000 | **2.71** | 2.96 |
| $0.55 to $0.55 | **263,000** | 263,000 | **3.85** | 4.10 |
| $0.60 to $1.40 | **1,186,000** | 1,186,000 | **2.97** | 3.22 |
| $1.50 to $1.60 | **-** | 519,000 | **-** | 0.01 |
| | **3,036,000** | 3,555,000 | **3.18** | 2.61 |

Additional disclosures relating to the Company's options are as follows:

| (after retroactive effect of Share Consolidation - Note 17) | Three months ended March 31, | |
|---|---|---|
| | **2015** | 2014 |
| Number of options granted during the period | **-** | 263,000 |
| Weighted average fair value of options granted at grant date (Canadian dollars) | **n/a** | $ 0.60 |
| Number of options subject to vesting as at end of period | **345,250** | 375,000 |
| Share-based payment expense - vesting options | **$ 26** | $ 58 |
| Unvested options not yet charged to operations | **$ 28** | $ 40 |

### *Share purchase warrants*

The number and weighted average exercise prices of warrants are as follows:

| (after retroactive effect of Share Consolidation - Note 17) | | | Number of warrants | | Weighted average exercise price | |
|---|---|---|---|---|---|---|
| (amounts in Canadian dollars) | | | **March 31,** | December 31, | **March 31,** | December 31, |
| **As at and for the periods ended** | **Date Issued** | **Life** | **2015** | 2014 | **2015** | 2014 |
| **Issued pursuant to rights offering** | | | | | | |
| Unit warrants | July 30, 2013 | 12 [(a)] | **9,549,935** | 10,000,000 | **$ 0.35** | $ 0.35 |
| Exercised | | | **-** | (450,065) | | |
| **Issued pursuant to private placements** | | | | | | |
| Unit warrants | Sept. 19, 2013 | 24 | **1,250,000** | 1,250,000 | **$ 0.35** | $ 0.35 |
| SPA warrants | May 15, 2014 | 36 | **2,000,000** | 2,000,000 | **$ 1.00** | $ 1.00 |
| **Outstanding as at end of the period** | | | **12,799,935** | 12,799,935 | **$ 0.45** | $ 0.45 |

(a) The life of warrants is shown in number of months from issue date, except for those issued pursuant to the rights offering which became exercisable 12 months from issue.
(b) The SPA warrants may be settled without cash and are, accordingly, classified as debt rather than as a component of contributed surplus.
(c) The number of warrants and weighted average exercise prices are disclosed after giving retroactive effect to the Share Consolidation in Note 17.

**Inputs for Measurement of Grant-Date Fair Values**

The grant-date fair values of share-based payments were measured based on the Black-Scholes option-pricing model. Expected volatility is estimated by considering historic average share price volatility.

The inputs used in the measurement of the fair values at grant date of the share-based payments granted, modified or issued during the years are as follows:

| (after retroactive effect of Share Consolidation - Note 17)<br>(amounts in Canadian dollars) | Options | | Warrants | |
|---|---|---|---|---|
| | **March 31, 2015** | December 31, 2014 | **March 31, 2015** | December 31, 2014 |
| Fair values at grant dates | **n/a** | $0.31 and $0.42 | **n/a** | n/a |
| Fair values of options modified | **n/a** | n/a | **n/a** | n/a |
| Share prices at grant and modification dates | **n/a** | $0.70 and $0.50 | **n/a** | n/a |
| **Assumptions** | | | | |
| Exercise prices | **n/a** | $0.70 and $0.55 | **n/a** | n/a |
| Expected volatilities | **n/a** | 93% and 91% | **n/a** | n/a |
| Life (years) | **n/a** | 4 | **n/a** | n/a |
| Expected dividends | **n/a** | - | **n/a** | n/a |
| Risk-free interest rates | **n/a** | 1.23% and 1.01% | **n/a** | n/a |

## 20. FINANCE INCOME AND FINANCE COSTS

| | | Three months ended March 31, | |
|---|---|---|---|
| | ***Notes*** | **2015** | 2014 |
| Interest income on bank deposits | | **$ -** | $ 1 |
| Net change in fair value of financial liabilities at fair value through operations | *14,15* | **194** | - |
| Gain on adjustment of estimated cash flows | *15* | **1,415** | - |
| Net foreign exchange gain | | **44** | - |
| **Finance income** | | **1,653** | 1 |
| Interest expense on loans | | | |
| Cash settled | *14* | **551** | 130 |
| Amortization of loan fees | *14* | **230** | 43 |
| Amortization of embedded option derivatives | *14* | **159** | 51 |
| Commitment fee | *15* | **-** | 1 |
| Loss on adjustment of estimated cash flows | *15* | **-** | 97 |
| Net change in fair value of financial liabilities at fair value through operations | *14,15* | **-** | 494 |
| Net foreign exchange loss | | | 56 |
| **Finance costs** | | **940** | 872 |
| **Net Finance Income** | | **$ 713** | $ (871) |

## 21. OPERATING SEGMENT

### Reporting Segments

The Company is engaged in the exploration, evaluation and development of properties for the mining and production of nickel and associated products; since January 1, 2014, it also is a producer and supplier of premium frac sand from its 7P Plant. Accordingly, the Company has three reporting segments: Corporate, Exploration and Development, and Frac Sand. Prior to January 1, 2014, there were no formal operating segments; for comparative purposes, the Company estimated the assets involved in each segment and has reported them in the table below.

The Corporate segment operates to support the Company's activities, including exploration and development projects and the frac sand business. The Company will continue to share services with Nuinsco (Note 22) to do so.

Senior management makes decisions with respect to Exploration and Development by considering exploration and development potential and results on a project basis. The exploration and development projects are all located in Canada. Any applicable amounts relating to such projects will continue to be capitalized to the relevant project as either *Exploration and evaluation projects* or *Mine property and development project* on the consolidated balance sheets.

The Frac Sand segment is managed and operated by Victory Silica's executives and employees although the business and operating assets are part of Victory Nickel (refer also to Note 23). The segment is located in Canada although raw materials purchases are sourced from the US.

There have been no changes in the reportable segment or the treatment of segmented assets and revenues year over year.

The following tables provide information on the Company's segments.

| | **March 31, 2015** | December 31, 2014 |
|---|---|---|
| **Canada** | | |
| Corporate | **$ 1,233** | $ 1,860 |
| Exploration and Development | **49,792** | 49,734 |
| Frac Sand | **9,750** | 11,300 |
| Intersegment elimination | **(912)** | (962) |
| **Total Assets** | **$ 59,863** | $ 61,932 |

| **Three months ended March 31, 2015** | **Corporate** | **Exploration and Development** | **Frac Sand** | **Intersegment Reclassification** | **Total** | March 31, 2014 Total |
|---|---|---|---|---|---|---|
| **Revenues** | **$ -** | **$ -** | **$ 1,522** | **$ -** | **$ 1,522** | $ - |
| Cost of goods sold | **-** | **-** | **(1,769)** | **-** | **(1,769)** | - |
| **Gross margin** | **-** | **-** | **(247)** | **-** | **(247)** | - |
| **Operating expenses** | | | | | | |
| General and administrative | **(426)** | **(3)** | **(80)** | **-** | **(509)** | (491) |
| Share-based payments: | | | | | | |
| Options | **(26)** | **-** | **-** | **-** | **(26)** | (58) |
| Amortization of property, plant and equipment | **(1)** | **(1)** | **(164)** | **-** | **(166)** | (44) |
| Writedown of E and E projects | **-** | **(6)** | **-** | **-** | **(6)** | - |
| Pre-exploration costs | **-** | **-** | **-** | **-** | **-** | - |
| Net frac sand pre-operating costs | **-** | **-** | **-** | **-** | **-** | (194) |
| Non-recurring plant costs [(1)] | **-** | **-** | **(600)** | **-** | **(600)** | - |
| **Operating loss** | **(453)** | **(10)** | **(1,091)** | **-** | **(1,554)** | (787) |
| Finance income | **1,671** | **-** | **2** | **(20)** | **1,653** | 1 |
| Finance costs | **(937)** | **-** | **(23)** | **20** | **(940)** | (872) |
| **Net finance income (costs)** | **734** | **-** | **(21)** | **-** | **713** | (871) |
| **Loss before income taxes** | **281** | **(10)** | **(1,112)** | **-** | **(841)** | (1,658) |
| Income tax recovery | **570** | **-** | **-** | **-** | **570** | 212 |
| **Net Loss for the Period** | **$ 851** | **$ (10)** | **$ (1,112)** | **$ -** | **$ (271)** | $ (1,446) |

(1) Costs of $361,000 were incurred relating to 7P Plant being placed on care and maintenance as a result in reduced production from unexpected decline in sales during the first quarter of 2015. Another $131,000 was incurred relating to railcar storage costs and one-time preparation costs for railcars to be leased that was later cancelled.

Furthermore, $108,000 was incurred relating to additional equipment rental and casual labour to move frozen sand as a result of the unexpected spring break-up.

## 22. RELATED PARTIES AND MANAGEMENT AGREEMENT

### Related Party Balances and Transactions

Short-term employee benefits provided by the Company to key management personnel include salaries, directors' fees, statutory benefit contributions, paid annual vacation and paid sick leave as well as non-monetary benefits such as medical care. The Company's non-monetary benefit package for key management personnel is the same as that available to all full-time employees. In addition to short-term employee benefits, the Company may also issue options and shares as part of the Stock Option Plan and Share Bonus Plan (Notes 17 and 19).

Balances and transactions with related parties as at March 31, 2015 and December 31, 2014 and for the three months ended March 31, 2015 and 2014 are shown in the following tables:

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| **Balances Outstanding** | | | | |
| Payable to key management personnel | **$** | **169** | $ | 251 |

Key management personnel compensation comprises:

| | | **Three months ended March 31, 2015** | | 2014 |
|---|---|---|---|---|
| Short-term employee benefits | **$** | **206** | $ | 221 |
| Share-based payments - options | | **-** | | 64 |
| | **$** | **206** | $ | 285 |

### Balances and Transactions with Nuinsco Resources Limited under the Management Agreement

The Company shares management, administrative assistance and facilities with Nuinsco pursuant to a management agreement; management operates under the supervision of the respective board of directors of each respective company; there is only one common director. As described in Note 15, Nuinsco became a related party of the Company effective July 30, 2013. The costs charged by Nuinsco are recorded at the cost to Nuinsco of such services plus 10 per cent. The management agreement commenced February 1, 2007 and is terminable by the Company upon 180 days' notice and by Nuinsco upon 90 days' notice. The Company served notice of termination on September 5, 2014; accordingly, the management agreement ceased in March 2015. The Company has continued to share resources and costs with Nuinsco under a cost sharing arrangement.

Balances and transactions with Nuinsco under the management agreement as at March 31, 2015 and December 31, 2014 and for the three months ended March 31, 2015 and 2014 are shown in the following tables:

| | March 31, 2015 | December 31, 2014 |
|---|---|---|
| **Balances Outstanding under the Management Agreement** | | |
| Payable to Nuinsco Resources Limited | **$ 40** | $ 45 |

| | Three months ended March 31, 2015 | 2014 |
|---|---|---|
| **Transaction Values under the Management Agreement** | | |
| Overhead charges from Nuinsco Resources Limited | **$ 154** | $ 182 |
| Project costs charged to Nuinsco Resources Limited | **$ 6** | $ 5 |
| Project recoveries charged by Nuinsco Resources Limited | **$ 16** | $ 12 |

Amounts due to or from Nuinsco under the management agreement are unsecured, non-interest bearing and due on demand. Amounts due to or from Nuinsco thereby are settled on a regular basis. Payables to key management personnel generally relate to directors' fees, consulting fees and expense reimbursements.

### Balances and Transactions with Nuinsco Resources Limited under the Amended Loan

The terms of the Amended Loan with Nuinsco and the balances and transactions related thereto are described in Note 15.

## 23. COMPANY ENTITY

### Significant Subsidiary - Victory Silica

On June 19, 2012, the Company announced a new initiative through the creation of Victory Silica. The objective is to establish the Company as a supplier of premium frac sand prior to commencing frac sand sales from the Minago project. Victory Silica's executives and employees manage the frac sand business on behalf of the Company. Until the end of the first quarter of 2014, most costs of the frac sand business related either to pre-operating costs which have been expensed through operations or to plant commissioning and mobile equipment which have been capitalized. In the first three months of 2014, sales of frac sand produced during the pre-operating stage amounted to $248,000; these have been netted against the pre-operating expenditures recorded in the first quarter of 2014 resulting in *Net frac sand pre-operating costs* recorded in the statement of operations of $194,000.

Significant production and sales volumes were achieved during the second quarter of 2014 thus the 7P Plant was no longer considered to be pre-operating. Consequently, operating results commenced being reported and amortization of the 7P Plant commenced in the second quarter of 2014. Full commissioning of the 7P Plant occurred in August, 2014.

| | | **March 31, 2015** | | December 31, 2014 |
|---|---|---|---|---|
| **Victory Silica Ltd.** | | | | |
| Current assets | **$** | **28** | $ | 46 |
| Current liabilities | **$** | **149** | $ | 143 |
| Pre-operating costs | **$** | **-** | $ | 194 |

## 24. COMMITMENT

### Transformer Equipment

On May 10, 2010, the Company entered into an agreement to purchase equipment for the Minago project. The total price is US$2,840,000. The Company has made aggregate deposits of $1,544,000 as at March 31, 2015.

## 25. SUBSEQUENT EVENT

### Extension of short-term loan

On April 30, 2015, the Company agreed on an additional extension of the short-term loan with the lender. The balance outstanding is $1,000,000 and is now due on or before May 31, 2015 under similar terms.

### Receipt of Payment for Lynn Lake Project Option

On April 6, 2015, Corazon Mining Ltd. (“Corazon”) issued 40,000,000 Corazon shares to Victory Nickel as part of the terms of the agreement between the two companies covering the Lynn Lake nickel project in northern Manitoba. Corazon’s shares are listed on the Australian Stock Exchange under the symbol CZN and have traded in the range of A$0.004 and A$0.014 per share during the past year.

### Temporary Suspension of Frac Sand Operation

On April 14, 2014, the Company announced that as a result of first quarter of 2015 sales being slower than anticipated, sales decreased monthly from January to March 2015 and, as a result of the current market conditions, production at the 7P Plant has been temporarily suspended.

25.2 This section is not applicable to the Issuer as it is not re-qualifying for listing following a fundamental change.

CERTIFICATE OF THE ISSUER

Pursuant to a resolution duly passed by its Board of Directors, (full legal name of the Issuer), hereby applies for the listing of the above mentioned securities on the Exchange. The foregoing contains full, true and plain disclosure of all material information relating to (full legal name of the Issuer). It contains no untrue statement of a material fact and does not omit to state a material fact that is required to be stated or that is necessary to prevent a statement that is made from being false or misleading in light of the circumstances in which it was made.

Dated at Toronto, Canada

this 3rd day of February, 2016

René Galipeau

Chief Executive Officer and Promoter

Steven Cresswell

Chief Financial Officer

Sean Stokes

Promoter

Cynthia Thomas

Director

René Galipeau

Director

# Schedule “A”

Each of the reports in this Schedule “A” has been prepared in accordance with NI 43-101, is filed under the Issuer’s profile at www.sedar.com.

Report to:




# Feasibility Study
# Minago Nickel Mine

Document No. 0951330400-REP-R0001-02

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Report to:




# FEASIBILITY STUDY
# MINAGO NICKEL MINE

MARCH 2010

| | | | |
|---|---|---|---|
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# GLOSSARY

## UNITS OF MEASURE

| | |
|---|---|
| Above mean sea level | amsl |
| Acceleration due to gravity | *g* |
| Acre | ac |
| Ampere | A |
| Annum (year) | a |
| Billion | B |
| Billion tonnes | Bt |
| Billion years ago | Ga |
| British thermal unit | BTU |
| Centimetre | cm |
| Centipoise | mPa·s |
| Cubic centimetre | $cm^3$ |
| Cubic feet per minute | cfm |
| Cubic feet per second | $ft^3/s$ |
| Cubic foot | $ft^3$ |
| Cubic inch | $in^3$ |
| Cubic metre | $m^3$ |
| Cubic yard | $yd^3$ |
| Coefficients of Variation | CVs |
| Day | d |
| Days per week | d/wk |
| Days per year (annum) | d/a |
| Dead weight tonnes | DWT |
| Decibel adjusted | dBa |
| Decibel | dB |
| Decimetre | dm |
| Degree | ° |
| Degrees Celsius | °C |
| Diameter | ø |
| Dollar (American) | US$ |
| Dollar (Canadian) | Cdn$ |
| Dry metric ton | dmt |
| Foot | ft |
| Gallon | gal |
| Gallons per minute (US) | gpm |
| Gigajoule | GJ |
| Gigapascal | GPa |

| | |
|---|---|
| Gigawatt | GW |
| Gram | g |
| Grams per litre | g/L |
| Grams per tonne | g/t |
| Greater than | > |
| Hectare (10,000 $m^2$) | ha |
| Hertz | Hz |
| Horsepower | hp |
| Hour | h |
| Hours per day | h/d |
| Hours per week | h/wk |
| Hours per year | h/a |
| Inch | " |
| Kilo (thousand) | k |
| Kilogram | kg |
| Kilograms per cubic metre | $kg/m^3$ |
| Kilograms per hour | kg/h |
| Kilograms per square metre | $kg/m^2$ |
| Kilometre | km |
| Kilometres per hour | km/h |
| Kilopascal | kPa |
| Kilotonne | kt |
| Kilovolt | kV |
| Kilovolt-ampere | kVA |
| Kilovolts | kV |
| Kilowatt | kW |
| Kilowatt hour | kWh |
| Kilowatt hours per tonne (metric ton) | kWh/t |
| Kilowatt hours per year | kWh/a |
| Less than | < |
| Litre | L |
| Litres per minute | L/m |
| Mega Annum | Ma |
| Megabytes per second | Mb/s |
| Megapascal | MPa |
| Megavolt-ampere | MVA |
| Megawatt | MW |
| Metre | m |
| Metres above sea level | masl |
| Metres Baltic sea level | mbsl |
| Metres per minute | m/min |
| Metres per second | m/s |
| Metric ton (tonne) | t |
| Microns | µm |
| Milligram | mg |

| | |
|---|---|
| Milligrams per litre | mg/L |
| Millilitre | mL |
| Millimetre | mm |
| Million | M |
| Million bank cubic metres | $Mbm^3$ |
| Million bank cubic metres per annum | $Mbm^3/a$ |
| Million tonnes | Mt |
| Minute (plane angle) | ' |
| Minute (time) | min |
| Month | mo |
| Ounce | oz |
| Pascal | Pa |
| Parts per million | ppm |
| Parts per billion | ppb |
| Percent | % |
| Pound(s) | lb |
| Pounds per square inch | psi |
| Revolutions per minute | rpm |
| Second (plane angle) | " |
| Second (time) | s |
| Specific gravity | SG |
| Square centimetre | $cm^2$ |
| Square foot | $ft^2$ |
| Square inch | $in^2$ |
| Square kilometre | $km^2$ |
| Square metre | $m^2$ |
| Thousand tonnes | kt |
| Three Dimensional | 3D |
| Three Dimensional Model | 3DM |
| Tonne (1,000 kg) | t |
| Tonnes per day | t/d |
| Tonnes per hour | t/h |
| Tonnes per year | t/a |
| Tonnes seconds per hour metre cubed | $ts/hm^3$ |
| Volt | V |
| Volume/volume | v/v |
| Week | wk |
| Weight/weight | w/w |
| Wet metric ton | wmt |
| Year (annum) | a |

## ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| Minago Property | the Property |
| Preliminary Economic Assessment | PEA |

| | |
|---|---|
| National Instrument 43-101 | NI 43-101 |
| Nuinsco Resources Limited | Nuinsco |
| Victory Nickel Inc. | Victory Nickel |
| Wardrop Engineering Inc. | Wardrop |
| Canadian Institute of Mining, Metallurgy, and Petroleum | CIM |
| Geophysical Reservation 34 | GR 34 |
| Amax Potash Limited | Amax |
| Granges Exploration Aktiebolag | Granges |
| Net Smelter Return | NSR |
| Black Hawk Mining Inc. | Black Hawk |
| Engineer/Procure/Construction Management | EPCM |
| Lump Sum/Turn-key | LSTK |
| Engineer/Procure/Construct | EPC |
| Engineer/Procure and Construct | E&C |
| Design/Build/Own/Operate | DBOO |
| Health, Safety, and Environmental | HS&E |
| Hazard and Operability Analysis | HAZOP |
| Work Breakdown Structure | WBS |
| Estimate at Completion | EAC |
| Process and Utility Flow Diagrams | PFDs |
| Piping & Instrumentation Diagrams | P&IDs |
| Single Line Diagrams | SLDs |

# EXECUTIVE SUMMARY

## PROJECT OVERVIEW

The Feasibility Study Report discusses the scope, design features, and economic viability of the Minago Project (the Project), owned by Victory Nickel Inc. (Victory Nickel). The Minago Property (Property) is located in Manitoba's Thompson Nickel Belt on Highway 6, approximately 225 km south of Thompson, Manitoba, Canada (Figure 1).

This report is structured as a series of volumes: Volume I, Executive Summary; Volumes II and III, the Minago Feasibility Study, Volume IV, Drawings; and Volumes V, VI and VII, Appendices. As an overview of the entire Minago Feasibility Study, Volume I is an outline of Sections 1.0 to Section 19.0. The intent is a Volume I, Executive Summary, which is a "stand-alone" document that can be read without reference to the body of the Minago Feasibility Study.

The deposit has potential as a large tonnage, low-grade nickel sulphide deposit (25.2 Mt at 0.43% nickel (Ni), 0.20% cut-off grade) and contains 14.8 Mt of marketable frac sand. The potential of the Property is supported by a recent metallurgical test program, where a very high grade nickel concentrate of 22.3% was produced. The excellent recoveries for the ore from the open pit mine are substantiated by historical and current metallurgical testing data.

Normally, the economic potential of a deposit would be adversely impacted by an overlay of 80 m of overburden, limestone, and sand, with a high open pit strip ratio. However, the 10 m sand layer just above the ultramafic ore bearing rock contains marketable hydraulic fracturing sand (frac sand) which will offset the cost of the stripping.

The financial analysis assumes that critical revenue streams will be developed from both the nickel and frac sand resources. Table 1 shows the proposed production schedule by year, for the waste, the nickel ore and the sand.

To conserve costs and create more favourable spoil areas, Wardrop chose a dredging option over the mechanical removal of the overburden. By co-depositing the potentially acid generating, metal leaching ultramafic rock and sealing these within the tailings, significant infrastructure and legacy costs will be eliminated. Finally, by shortening the production life of the frac sand plant to more nearly match that of the ore processing plant, general and administrative and surface facility costs will be minimized.

The mine life is estimated to be seven full years and two partial years, with concentrate production mirroring ore production. For six of the nine years the production is at full capacity, for one year there will be a slightly reduced capacity and for two years there will be a reduced capacity. The frac sand, which is to be mined and stockpiled at the start of mining, will be

processed throughout the life of the mine and beyond. The first partial year's ore production (2013) will be stockpiled pending commissioning of the ore processing plant in 2014.

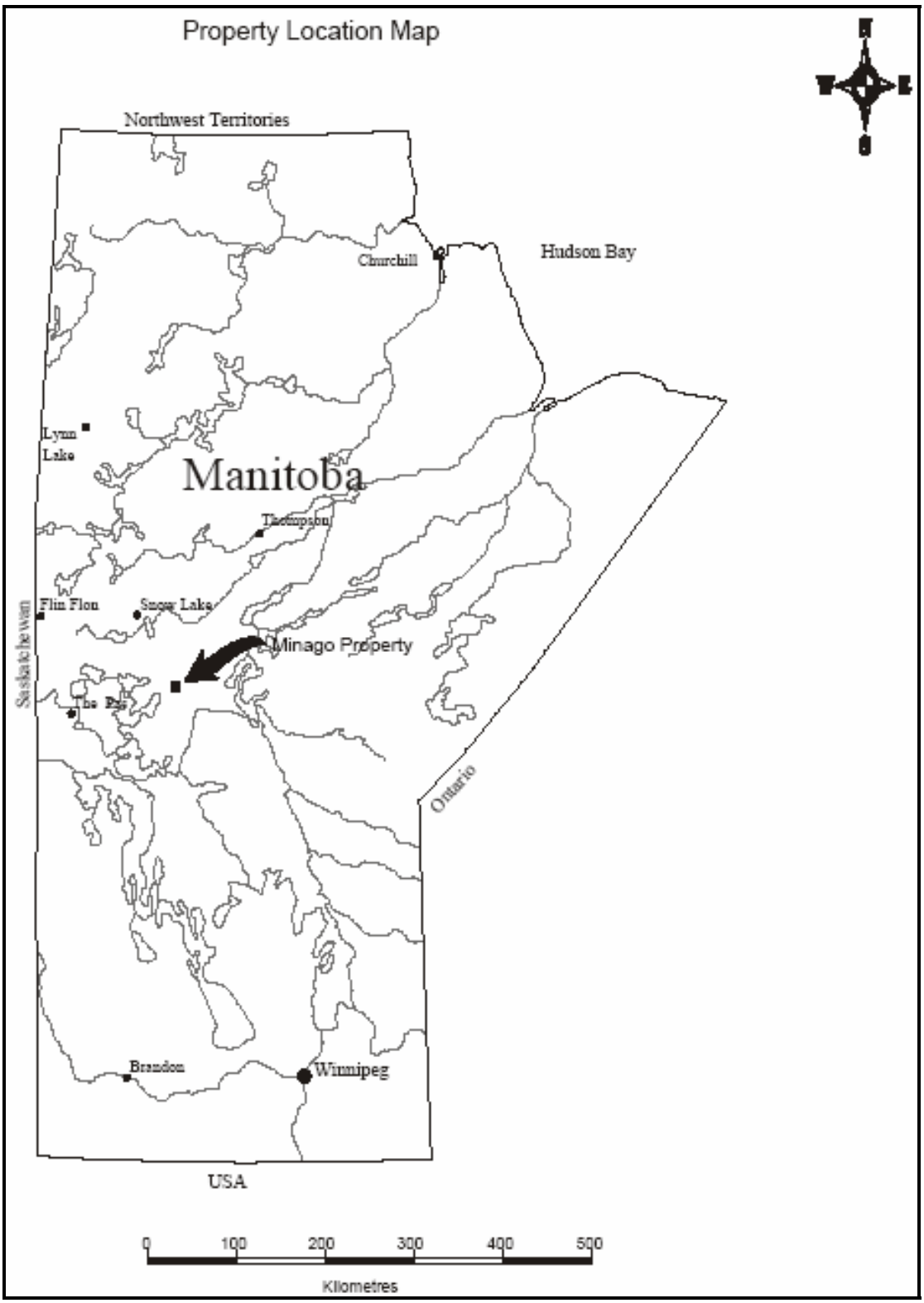
The Project includes an open pit bulk tonnage mining method, a 3.6 Mt/a nickel ore processing plant, and 1.5 Mt/a sand processing plant producing various sand products, including 20/40 and 40/70 frac sand, and other finer-sized sands. The Project will be built over a three year period at a capital cost of $596.3 million. The nickel ore processing plant is scheduled to come online in the spring of 2014, and the frac sand plant in the spring of 2013.

Based on a three year rolling average for nickel metal prices of US$11.19/lb, a frac sand FOB price of CDN$63.02/t, and a currency exchange rate of $1.00:$1.097 (US$/CDN$), the Project will have a pre-tax Internal Rate of Return (IRR) of 17.66% and a pre-tax Net Present Value (NPV) of $294 million at an 8% discount rate, with recovery of capital in four years after the first generation of nickel revenues.

**Table 1 Production Schedule by Year and Product**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dolomite (kt) | 42,655 | 43,179 | 15,183 | 10,015 | 0 | 0 | 0 | 0 | 0 | 0 | 111,032 |
| Granite (kt) | 0 | 1,744 | 20,890 | 20,440 | 35,711 | 24,459 | 9,784 | 4,944 | 3,832 | 199 | 122,005 |
| Ultramafic (kt) | 0 | 861 | 7,941 | 5,524 | 5,667 | 5,732 | 4,382 | 3,026 | 2,297 | 229 | 35,659 |
| Sand (kt) | 0 | 5,289 | 2,092 | 7,466 | 0 | 0 | 0 | 0 | 0 | 0 | 14,847 |
| Total Ore (kt) | 0 | 112 | 3,000 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | 453 | 25,166 |
| % Ni(S), Grade Ore | 0.000 | 0.374 | 0.419 | 0.429 | 0.430 | 0.413 | 0.436 | 0.431 | 0.447 | 0.468 | 0.430 |
| Total Tonnage (kt) | 42,655 | 51,186 | 49,105 | 47,045 | 44,979 | 33,792 | 17,766 | 11,570 | 9,728 | 881 | 308,706 |

**Figure 1 Property Location Map**



### PROJECT SCOPE

As currently configured, the proposed Project will comprise an open pit mine, an ore concentrating plant, a frac sand plant, and supporting infrastructure.

The supporting infrastructure will be comprised of:

- a tailings and waste rock management facility (TWRMF) for the concurrent disposal of tailings and ultramafic waste rock
- rock dumps and overburden disposal repository
- an explosives plant and explosives storage
- water treatment facilities
- de-watering systems with associated pipelines and pumping stations
- roads and laydown areas
- staff accommodations and facilities
- open pit mining equipment, including trucks, shovels, loaders, and drills
- truck repair and maintenance facilities
- associated electrical and mechanical systems.

### PLANT LOCATION AND GEOGRAPHY

The Project site is favorably located close to existing infrastructure, including Manitoba Provincial Highway 6, a 230 kV high voltage transmission line running directly beside Highway 6 on the east side of the road, the OmniTRAX Canada Railway Line, and the town of Grand Rapids.

The mine site is situated within a topographically low area of water-saturated peat and forest terrain. The area is almost entirely swampy muskeg with vegetation consisting of sparse black spruce and tamarack set in a topographic relief of less than 3 m. Although this low area extends for significant distances to the north and east, limestone outcrops exist to the south and west at a distance of 7 to 20 km from the site.

The site is located within the Nelson River sub-basin, which drains northeast into the southern end of the Hudson Bay. The basin has two more catchments in the Minago River and the Hargrave River, which enclose the project site. There are two more tributaries, the William River and the Oakley Creek present at the periphery of the project area. The catchments of these two tributaries are within the Lake Winnipeg basin and drain northward into the Nelson River sub-basin.

*SITE ARRANGEMENT*

The plant and infrastructure facilities shown in Figure 2 have been located as close to the open pit mine as possible on the limestone bluff to the west of the site. The escarpment will be cut back to a general level of 254 m to ensure clearance above the water table for the plant facilities. The crusher is located on the limestone bluff at a position where the elevation grade is most favourable. A more detailed sketch showing the plant and the camp facilities is provided in Figure 3.

The TWRMF has been located on the east side of the property where the geotechnical profile was interpreted to provide favourable foundation conditions. At this location, to the northeast of the mine, the overburden thickness was found to be between 3 to 6 m below the ground surface and comprised mainly competent clays. Typically, on the balance of the site within close proximity of the open pit mine, the overburden clays extended to depths of 10 to 12 m below the surface.

**Figure 2 Overall Site Plan**

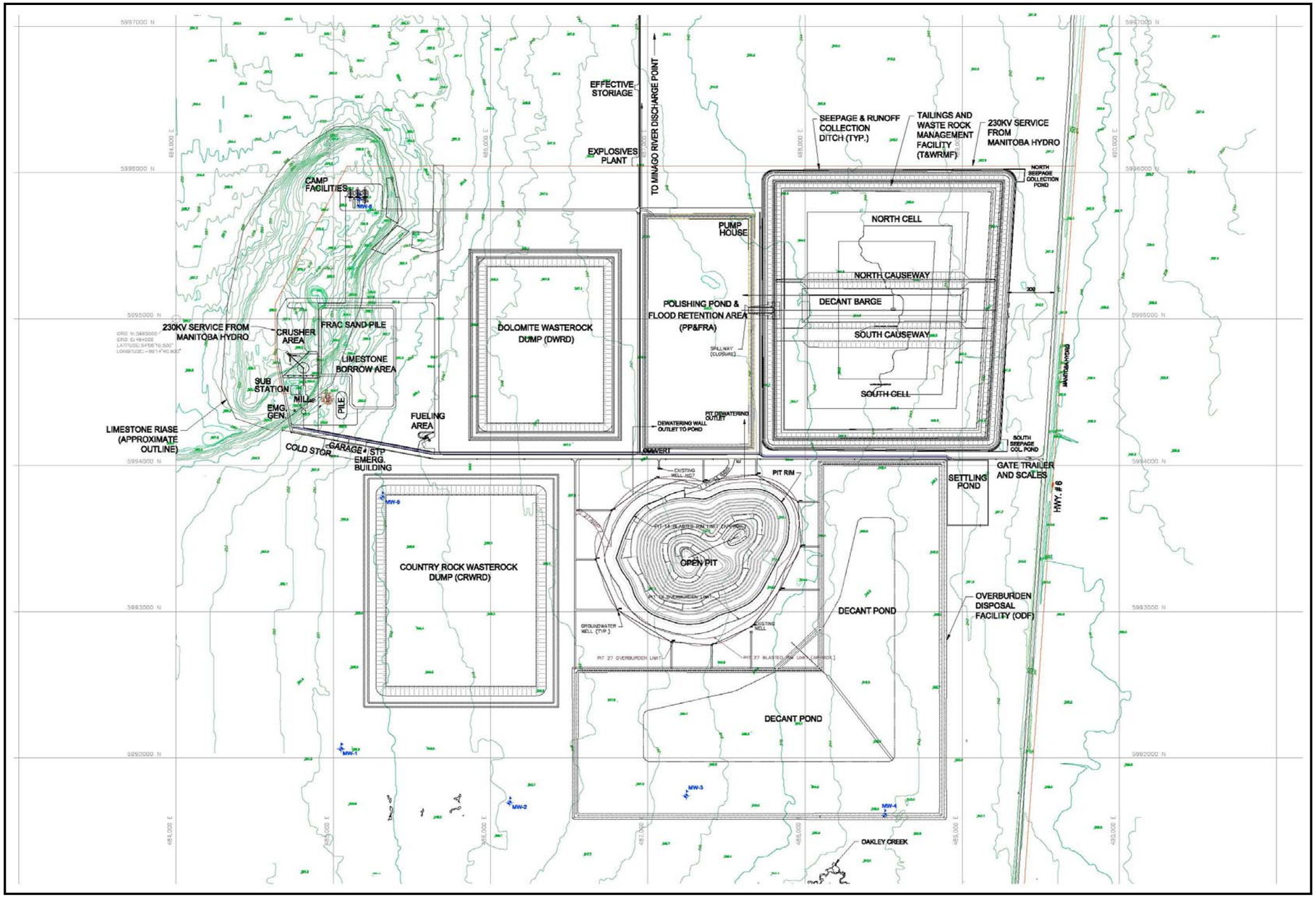
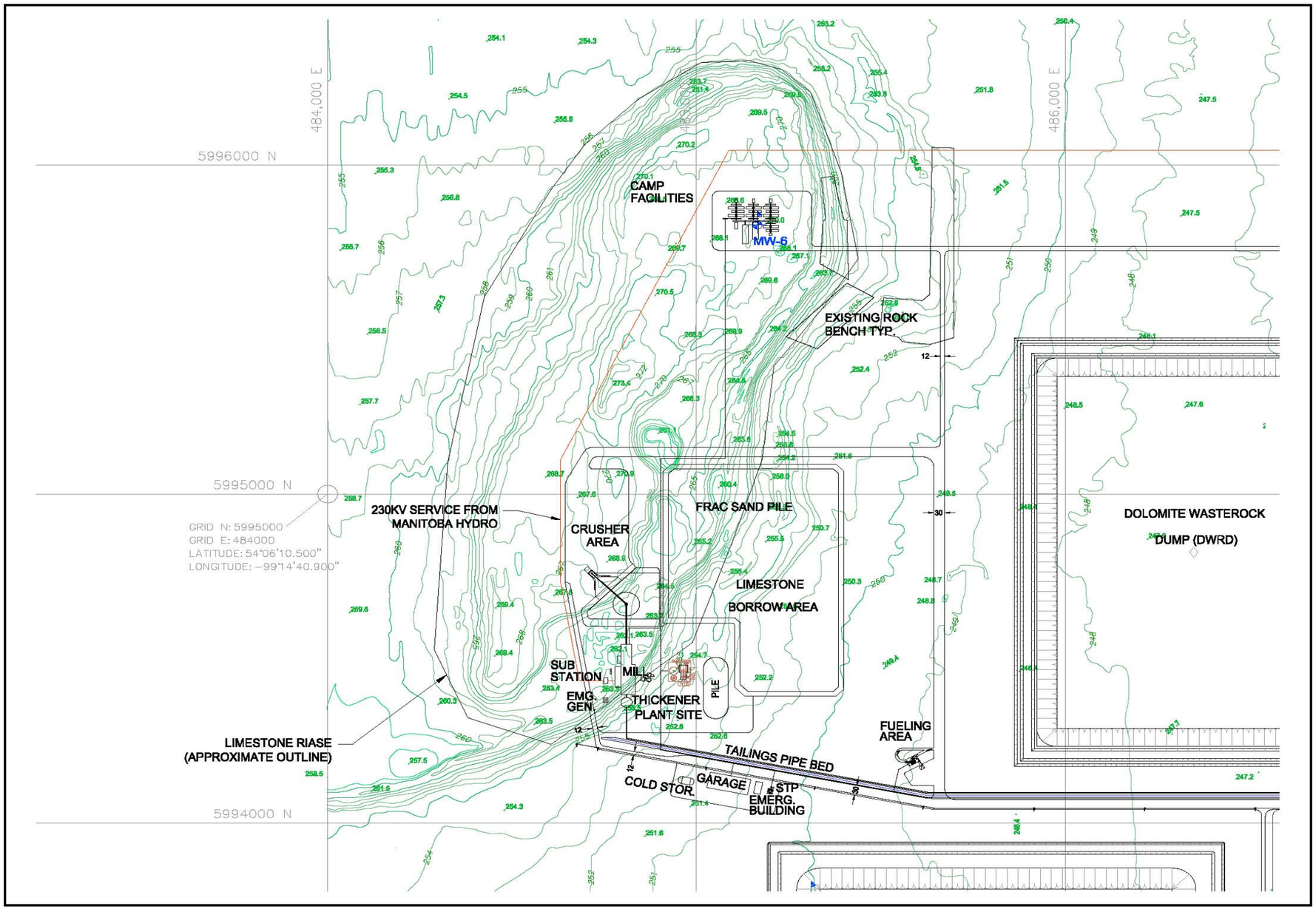


**Figure 3 Plant and Camp Facilities**



*HISTORY*

Geophysical Reservation 34 (GR 34), covering an area of 19.2 by 38.4 km, was granted to Amax Potash Ltd. (Amax) on November 1, 1966 for a period of two years, extended to April 30, 1969 in 1968. In March of 1969, Amax converted the most favourable prospective area of GR 34 to 844 contiguous claims and in April of 1969 an additional 18 claims were staked.

In 1973, the claims covering ground deemed to have the most potential for economically viable nickel mineralization were taken to lease status as Explored Area Lease 3 (North Block) and Explored Area Lease 4 (South Block). A subsequent agreement, dated December 12, 1973, granted Granges Exploration Aktiebolag (Granges) an option on the Explored Area Leases.

- On May 18, 1989 Black Hawk Mining Inc. (Black Hawk) purchased the Amax interest in the Explored Area Leases and on August 2, 1989 purchased the Granges interest and Net Smelter Return (NSR) royalty in the Explored Area Leases.
- On April 1, 1992 Explored Area Lease 3 and Explored Area Lease 4 were converted to Mineral Lease 002 and Mineral Lease 003 respectively.
- On March 18, 1994 a portion of Mineral Lease 002 was converted to mineral claims KON 1, KON 2, and KON 3.
- On March 18, 1994 portion of Mineral Lease 003 was converted to mineral claim KON 4.
- On November 3, 1999 Nuinsco Resources Limited (Nuinsco) purchased the Black Hawk interest, subject to a graduated NSR royalty based on nickel prices.
- On February 1, 2007, Victory Nickel Inc. Was formed through an arrangement with Nuinsco and was assigned the Minago Property along with several others.
- In October 2008, Victory Nickel acquired Independent Nickel Inc. which owned a Royalty on the Minago Property.

The Property is comprised of one contiguous group of claims and one mineral lease, augmented by an isolated claim and a second adjacent mineral lease. The contiguous block consists of one mineral lease and 40 unpatented mineral claims with a combined surface area of 7,298.23 ha. The other block comprises one mineral lease and one unpatented mineral claim that are contiguous with a combined surface area of 281.85 ha.

There are no instruments registered with the Mining Recorder at Manitoba Industry, Economic Development and Mines on any of the mineral dispositions with respect to liens, judgments, debentures, royalties, back-in rights, or other agreements.

There are no environmental liabilities attached to the Property.

The scope of the exploration work is summarized as follows:

### AMAX EXPLORATION WORK – 1966 TO 1972

Amax conducted a regional scale exploration program on the southern extension of the Thompson Nickel Belt.

### GRANGES EXPLORATION WORK – 1973 TO 1976

Granges focused their efforts on the Minago nickel deposit conducting resource estimates, mining, metallurgical, and milling studies. The work concluded that the Minago nickel deposit was sufficiently confirmed and that further delineation and exploration should be conducted from underground workings.

### BLACK HAWK EXPLORATION WORK – 1989 TO 1991

Black Hawk conducted a deep penetrating ground electromagnetic survey, resource estimates, mining, metallurgical, and milling studies. A helicopter borne electromagnetic and magnetic survey covering the Property was obtained from Falconbridge Limited and interpreted.

### NUINSCO WORK – JUNE 2006

In June 2006 Nuinsco, requested an independent review of the geology, exploration history, historical resource estimates, resource estimates, and the potential for discovery of additional nickel mineralization. A report summarized the results of exploration conducted during the period from 1966 to 1991 and the work conducted by Nuinsco from 2004 to October 31, 2006. An independent report was deemed necessary for material disclosure of new diamond drill data, mineral resource estimates, and technical studies.

## *REGIONAL GEOLOGY*

The regional geology comprises the eastern edge of the Phanerozoic sediments of the Western Canada Sedimentary Basin. The basin unconformably overlies Precambrian crystalline basement rocks, including the Thompson Nickel Belt. The basin tapers from a maximum thickness of about 6,000 m in Alberta to zero at the north and east, where it is bound by the Canadian Shield. The Property is located near the northeast corner of the basin, where it comprises approximately 53 m of Ordovician dolomitic limestone underlain by approximately 7.5 m of Ordovician sandstone.

The Precambrian basement rocks of the Thompson Nickel Belt form a northeast southwest trending 10 to 35 km wide belt of variably reworked Archean age basement gneisses and Early Proterozoic age cover rocks along the northwest margin of the Superior Province. Lithotectonically, the Thompson Nickel Belt is part of the Churchill Superior boundary zone.

The Archean age rocks to the southeast of the Thompson Nickel Belt include low to medium grade metamorphosed granite greenstone, and gneiss terranes and the high grade metamorphosed Pikwitonei Granulite Belt. The Pikwitonei Granulite Belt is interpreted to represent exposed portions of deeper level equivalents of the low to medium grade metamorphosed granite greenstone and gneiss terranes. The Superior Province Archean age rocks are cut by mafic to ultramafic dikes of the Molson swarm dated at 1883 mega annum

(Ma). Dikes of the Molson swarm occur in the Thompson Nickel Belt, but not to the northwest in the Kisseynew domain. The early Proterozoic rocks to the northwest of the Thompson Nickel Belt comprise the Kisseynew domain that is interpreted to represent the metamorphosed remnants of a back arc or inter arc basin.

The variably reworked Archean age basement gneisses constitute the dominant portion (volumetrically) of the Thompson Nickel Belt. The Early Proterozoic rocks that occur along the western margin of the Thompson Nickel Belt are a geologically distinguishable stratigraphic sequence of rocks known as the Opswagan Group.

### *CLIMATIC CONDITIONS*

The Project area is located at approximately 250 m above sea level (masl) in north-central Manitoba, approximately 100 km north of Grand Rapids, which is on the western shores of Lake Winnipeg. The region is characterized by warm, wet summers and cold, dry winters. Temperatures range from 23.5°C in July to -24.4°C in January. Annual precipitation is approximately 473.7 mm, of which 77% falls as rain. The majority of this rainfall occurs between June and September, with a smaller amount falling in early spring and late fall. Little rain is recorded for November to March when almost all precipitation falls as snow (Canadian Climate Normals 1971-2000, Grand Rapids Hydro Climate Station).

At Grand Rapids Hydro station from 2003 to 2007 the average mean monthly temperature for January was – 17.42°C and for July was 19.04°C. The average minimum temperature in January was -24°C, and the average maximum in July was 24.6°C.

The Project is located in a region historically exhibiting low seismicity and extensive evaluation extending beyond an examination of historic earthquakes is not considered necessary.

## GEOLOGY AND MINERAL RESOURCES

Wardrop conducted a mineral resource estimate of the Precambrian nickel mineralization, and the Paleozoic Sandstone immediately above. The estimation was completed for total nickel, nickel in sulphide (Ni(S)) and frac sand using data from historic and recent drilling.

For total nickel, Wardrop estimates that the Minago deposit contains a Measured Resource of 11 Mt, grading 0.56% Ni, above a cut-off grade of 0.25% Ni. In addition, the deposit contains 43 Mt of Indicated Resource at 0.51% Ni above a 0.25% Ni cut-off grade. An Inferred Resource of 15 Mt at 0.53% Ni above a 0.25% Ni cut-off has also been estimated.

In order to better define the recovery potential on the nickel, Wardrop also estimated the nickel in sulphide resource within the total nickel resource, which being part of the total nickel resource is not an additional resource. Wardrop estimates that the Minago deposit contains a Measured Resource of 9.1 Mt, grading 0.47% Ni(S), above a cutoff grade of 0.2% Ni(S). In addition, the deposit contains an estimated 35 Mt of Indicated Resource at 0.42% Ni(S) above a 0.2% Ni(S) cut-off grade and an Inferred Resource of 12 Mt at 0.44% Ni(S) above a 0.2% Ni(S) cut-off.

An Indicated Resource of 15 Mt of frac sand within the Winnipeg Formation Sandstone has also been identified within the open pit shell. Of this, 13% of the frac sand will report to the 20/40 size fraction, while 71% will report to the 40/140 size fraction. The sandstone layer must be removed to facilitate access to the mineralized zones within the proposed open pit mine. In the design of the pit shell the extent of the frac sand recovery has been constrained to optimize the recovery of nickel. However, during the development of the mine the full potential for removing frac sand may be realized by extending mining beyond the limits set by modeling.

Prior to estimating the resource, Wardrop conducted an internal validation of the original drill hole logs against the drill hole database. Data verification was completed on collar co-ordinates, length of hole, down-the-hole survey measurements including azimuth and dip, from and to footage measurements of geology and assay sampling intervals, lithological units and nickel and nickel sulphide percentages as compiled from assay certificates merged into a database. Wardrop elected to assign density based on a lithology model, where densities were determined from the lithology of the nearest drill hole.

A wireframe model of the nickel resource was built based on a minimum grade of 0.2% Ni. All of the mineralized serpentinite was included in the solid regardless of the grade. The internal granite lenses could not be separated in the “serpentinite model” as there was not enough continuity of the lithology between drill sections. The wireframe was separated into east and west domains based on the shape of the deposit. Grades were assigned to the blocks in each side, based on variography specific to that side of the deposit.

Interpolation of the Minago deposit nickel resource estimate was completed using ordinary kriging (OK) with nearest neighbour (NN) and inverse distance squared ($ID^2$) check models. There was very little variation between the methods. The frac sand resource was estimated separately using a nearest neighbour method.

The Minago resource estimate was based on Ni(S), the recoverable part of the nickel present in the deposit. A total of 4,557 Ni(S) assays were available compared to 14,829 total Ni assays. Wardrop examined in detail the relationship between the individual Ni(S) and total Ni assays, and calculated the missing Ni(S) values. The population of calculated Ni(S) values was similar to the population of measured Ni(S) values.

Significant parts of the deposit below a depth of 400 m will require additional drilling to upgrade the resource class from Inferred to Indicated.

## OPEN PIT MINING

The open pit design was optimised using the Lerchs-Grossman pit method, which was refined to a detailed design with catch berms and haul roads. Subsequently, mine development and production schedules were developed, equipment items were selected, and the capital and operating costs were evaluated. Information pertaining to the 3D geological block model that was used in the optimization is provided in Section 2.0.

For this Study, Wardrop determined that the deposit was amenable to a conventional open pit mining method. The mine would provide mill feed of sulphide ore at a rate of 10,000 t/d for a total of 25.2 Mt of ore grading 0.43% over a period of approximately 8 years. Further drilling is proposed to reclassify some of the inferred into the measured and indicated categories.

In addition, the open pit will provide sand feed to a frac sand process facility at a rate of about 4,100 t/d of sand for a total of 14.8 Mt of frac sand over a period of about 10 years. Although the sand will be mined over a period of 3 years at the start of the mining period and stockpiled, the throughput of the sand plant will be set to roughly match the same operational period as the ore processing plant.

Previous work completed in December 2008 by Wardrop indicated that, at that time, the economic recovery of underground resource was not feasible due to insufficient diamond drilling density at depth. The current data indicates insufficient resources in the Measured and Indicated categories which are the categories necessary to qualify a resource for a Feasibility Study. For this reason, the pit optimization was based on an “open pit only” option without considering the effect of breakeven open pit and underground costs.

The overall waste-to-ore ratio (tonne per tonne, t/t) to mine both the nickel sulphide ore and frac sand is outlined in Table 2 below.

**Table 2 Open Pit Design 14 Stripping Ratios**

| Case | SR (t/t) (No Overburden) | SR (t/t) (With Overburden) |
|---|---|---|
| Frac Sand Only | 7.48 | 8.23 |
| Nickel Ore Only | 11.27 | 11.71 |
| Nickel Ore and Frac Sand | 6.72 | 7.00 |

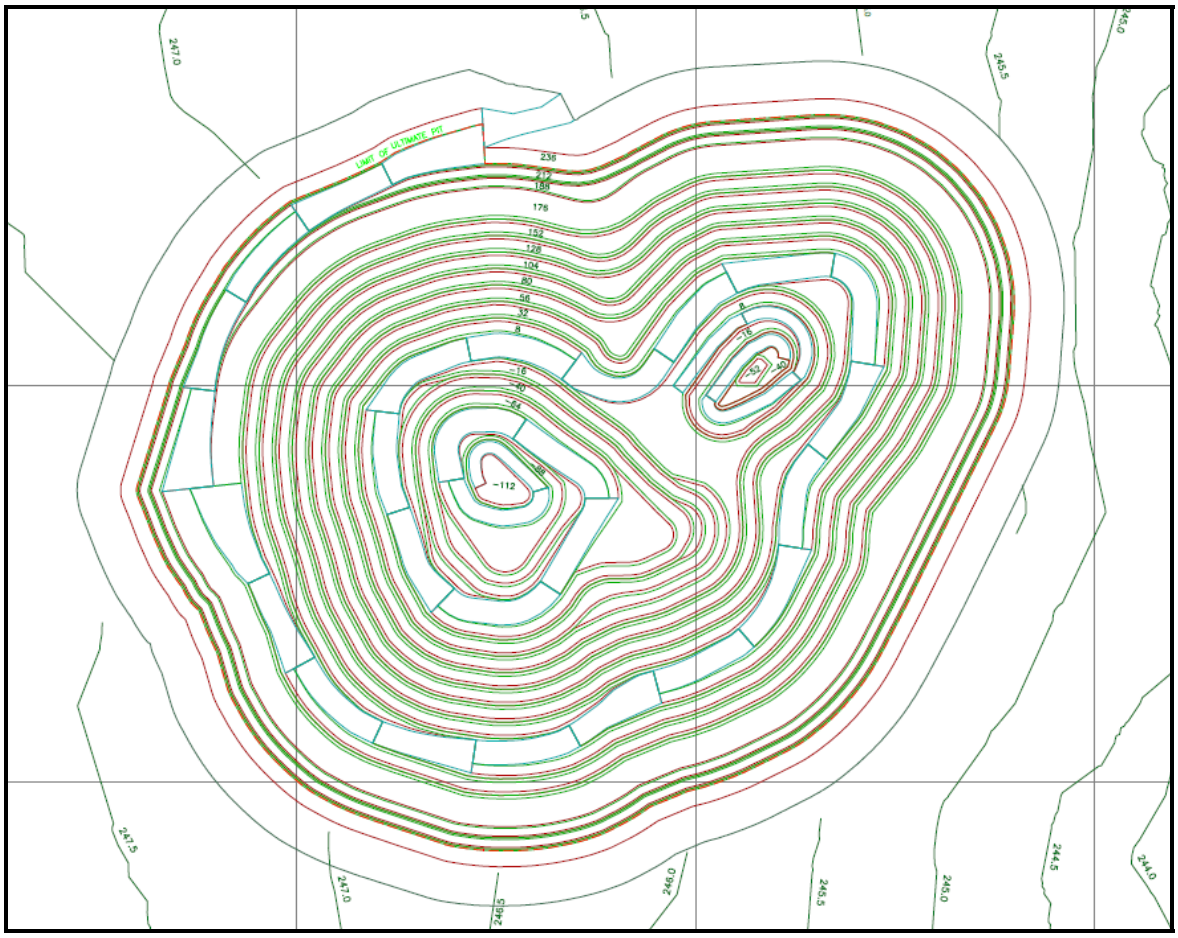
The overall mining sequence was developed in three phases: one initial pit phase and two pushback phases. Each phase corresponds to a designed open pit that is mined in sequence in accordance with the ore grade and stripping ratio. The mine development for the ore and the waste will progress using 12 m high benches.

After removal of trees and significant roots, mine development will commence with the removal of the overburden muskeg and clay overlying the dolomite. For this initial stage of the mining operation, the work would be done as part of capital expenditures using contractors to remove the overburden. Given the logistical challenges, schedule constraints, and cost associated with the mechanical removal of the overburden, a dredging method has been selected to remove the muskeg and clay.

The dredging operation is scheduled to commence in the spring of 2011, to prepare for dolomite removal to start at the beginning of 2012. The removal of the dolomite will take approximately 2 years; frac sand will be available for mining at the beginning of 2013, and nickel ore at the start of 2014.

The general arrangement mine complex is provided in Figure 2 and in Section 1.0. The general layout for the ultimate mine is provided in Figure 4.

**Figure 4 Ultimate Open Pit Mine**




Stability analyses of the open pit walls were undertaken to evaluate the geotechnical domains. These analyses were based upon geological information, field mapping programs, geotechnical logging of rock cores from a diamond drilling program, site visits, and previous studies. The development of these analyses with a brief summary of the results and conclusions presented in the following paragraphs and more detailed information provided in Section 3.0.

An additional geotechnical berm with a width of 35 m will be required at the base of the sandstone unit to catch sloughing material in dolomite above. The weaker sandstone material would promote toppling-type failures of the dolomite along critical jointing.

The bench height of 12 m for the open pit is a function of the working range of production operating equipment. The bench face angles were estimated from the available information on the geological structure or were assigned estimated values

The economic and operating parameters selected by Wardrop in the initial open pit optimization are given in Table 3. Although not exactly the same as the final selected parameters, these selected parameters are sufficiently close to provide a reliable optimization. The break-even plant feed cut-off head grade for the open pit optimization is calculated at 0.2% Ni(S).

**Table 3 Economic Parameters for Pit Optimization**

| Items | | Units | Value |
|---|---|---|---|
| Exchange Rate | | Cdn$:US$ | 1.122 |
| Discount Rate | | % | 8.00 |
| Metal Price (Market) | Nickel (7.40$US/lb) | Cdn$/lb | 8.30 |
| | Payable (95%) | Cdn $/lb | 7.89 |
| | Gain from Cu, PGMs | Cdn $/lb | 0.39 |
| Frac Sand Price | Sand product | Cdn $/tonne, FOB | 58.78 |
| Metal & Sand Recovery | Milling (Nickel Sulphide) | % | Varies see Sec. 3.4.5 |
| | Processing (Frac Sand) | % | 68.8 |
| | Concentrate Transit Loss | % | 0.3 |
| Concentrate Transportation | Landing Freight | Cdn $/wet tonne | 20.34 |
| | Landing Freight | Cdn $/lb FOB Mine | 0.036 |
| Smelter & Refinery Charge | Smelter charge | Cdn$/lb FOB Mine | 0.329 |
| | Refining Charge Nickel | Cdn$/lb FOB Mine | 0.424 |
| | Refining Charge Cu, PGMs | Cdn$/lb FOB Mine | 0.016 |
| | MgO and SiO Penalty | Cdn$/lb FOB Mine | 0.073 |
| Operating Cost | Mining (Ore or Waste) | Cdn$/t mined | 1.55 |
| | Stockpile Rehandle (Ore) | Cdn$/t mined | 0.55 |
| | Milling (Ore) | Cdn$/t milled | 10.03 |
| | Processing (Frac Sand) | Cdn$/t mined | 8.51 |
| | G&A + time cost | Cdn$/t milled | 1.18 |
| Inter-Ramp Overall Pit Slope Angle | Overburden | Degree | 8.9 |
| | Limestone | Degree | 50.2 |
| | Sandstone (with Regolith) | Degree | 16.6 |
| | Country Rock | Degree | Sector A: 46.0<br>Sector B: 45.0<br>Sector C: 42.0<br>Sector D: 50.2 |
| | Host Rock (Minerals) | Degree | 40.0 |

From the series of nested pit shells that were generated using these parameters, Pit Shell 14 was selected as having the highest present value. The mining reserve in Table 4 represents ore contained in the ultimate detailed pit design and included as dilution.

**Table 4 Selected Pit Mining Reserves**

| Classification | Tonnes (millions) | Grade (%Ni(S)) | Nickel (millions of pounds |
|---|---|---|---|
| Proven | 6.6 | 0.487 | 70.5 |
| Probable | 18.6 | 0.410 | 167.5 |
| Total Proven and Probable | 25.2 | 0.430 | 238.0 |

The values shown in Table 5 represent concentrator feed in terms of Nickel (Ni(S)) values will be subject to a 71.2% concentrator recovery at the 0.430% feed grade.

**Table 5 Selected Pit Frac Sand Reserves**

| Classification | Tonnes (millions) | Grade |
|---|---|---|
| Proven | 0.0 | n/a |
| Probable | 14.8 | n/a |
| Total Proven and Probable | 14.8 | n/a |

Wardrop designed three mineable phases, based on the Measured and Indicated mineral resources and the selected open pit shell. Table 6 which is taken from Table 1 shows the mined ore tonnage by grade and period with Table 7 showing the ultimate pit design results:

**Table 6 Mined Ore Tonnage by Grade by Period**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| Ore Tonnes (kt) | 112 | 3000 | 3600 | 3600 | 3600 | 3600 | 3600 | 3600 | 453 |
| Grade (% Ni(S)) | 0.37 | 0.42 | 0.43 | 0.43 | 0.41 | 0.44 | 0.43 | 0.45 | 0.47 |

**Table 7 Ultimate Pit Design Results**

| Item | Size |
|---|---|
| Pit Top Elevation | Approx. 247 m |
| Pit Bottom Elevation | -112 m |
| Pit Depth | . 359 m |
| Volume of Pit | 156.7 million $m^3$ |
| Area of Pit Top | 1.0 million $m^2$ |
| Perimeter at the Top of the Pit | 3.7 km |
| Length from East to West | 1.2 km |
| Length from North to South | 1.1 km |

Figure 5 summarizes the waste and ore mined by period, Figure 6 the ore tonnes by pit and by period and Figure 7 which shows the mined ore tonnage by grade and by period in Table 6 graphically.

**Figure 5 Summary of Waste and Ore Mined**

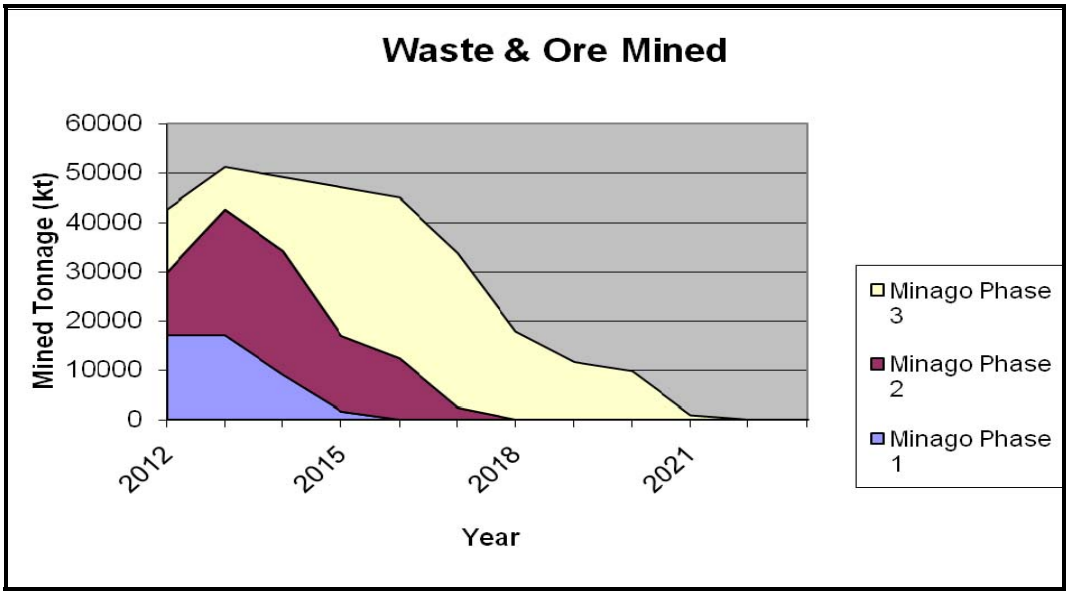



**Figure 6 Mined Ore Tonnage by Pit**

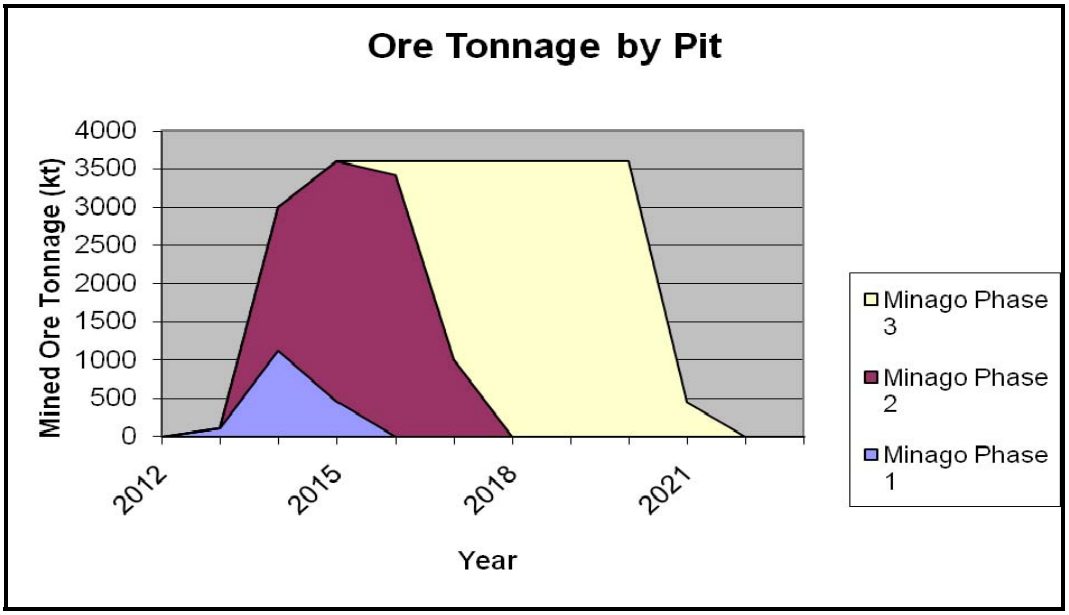
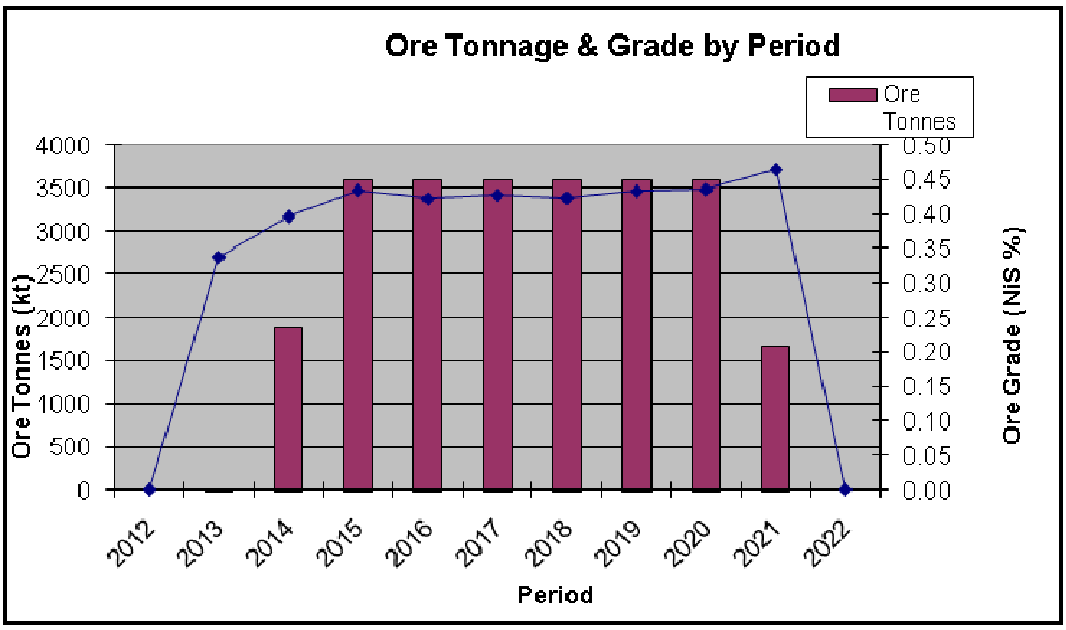


**Figure 7 Mined Ore Tonnage & Grade by Period**




The rock quantities are summarized as follows:

1. A total of 11.2 Mt of overburden comprising peat and clay will be placed in a repository located southeast of the pit, over a one year period. This cell was considered the ideal location for this low-strength material because it is above an area with thick, low-strength clays.

2. Of the 111.0 Mt of dolomite/ limestone from the pit, a portion will be used for the construction of mine infrastructure in various locations, with the remainder going to the dolomite dump. This limestone would be used to building the TWRMF; the remaining roads and the crusher and ore stockpile pad (18.7 Mt).

3. The granite is considered non-acid generating and will be dumped onto the county rock dump. The ultramafic waste (35.7 Mt) which is potentially acid-generating will be co-disposed with the tailings.

The mine water will be managed as follows:

1. The progressive development of the open pit will result in increased water infiltration from precipitation and groundwater inflows. As the pit deepens and the footprint increases dewatering systems such as drainage ditches, sumps, pipelines and pumps will be implemented.

2. To minimize groundwater infiltration and surface run-off, a ring road with upstream clay lining and drainage ditches will be implemented to divert water away from the pit.

Although dewatering wells will be installed at the pit perimeter, a worst-case allowance of 20% of groundwater seepage has been assumed.

3. In the pit, dewatering sumps will be used to contain groundwater and storm water run-off will be pumped directly to the polishing pond. The in-pit pumping requirements will vary annually, increasing with the catchment area as successive pushbacks create the ultimate pit.

4. Storm water from the tailings pond, in-pit dewatering and dewatering wells would be channelled into the polishing pond. This water containment provision would ensure that quality standards are met prior to discharge.

## EQUIPMENT SELECTION

Wardrop performed an economic analysis to evaluate and determine the optimum size and configuration of the truck and shovel fleet. Various sizes and brands of haul trucks, shovels, loaders and electric drill were evaluated. Given the cheap supply of electric power, electric cable shovels were compared with diesel or electric-powered hydraulic shovels and electric drills were compared with diesel-powered drills.

Due to the relatively short mine life and the low capital cost of electric-hydraulic shovels a fleet consisting of 22 $m^3$ electric hydraulic shovels, 20 $m^3$ loaders and 218-t trucks was determined to be the most economic choice. Wardrop selected 270 mm (10 5/8″) blast hole drills, supplemented by auxiliary equipment such as tracked dozers, rubber-tired dozers, graders and other minor support equipment.

The 218-t hauler was selected to match the 22 $m^3$ electric hydraulic shovels and 20 $m^3$ front end loaders in determining the number of trucks required for each operating year. Haul truck cycle times were based on predicted haulage profiles from pit sources by mining phase to destinations based on material types. Truck productivities were based on expected operating conditions, haulage profiles, production cycle times. Ramps were assigned a grade of 10% in the pit and dumps assuming a maximum speed of 40 km/h, reduced to 30 km/h on the main pit ramp.

To meet a production rate of 10 kt/d of ore, ten 218-t trucks, three 22 $m^3$ bucket shovels, and one 20 $m^3$ loader will initially be required. This requirement will increase to 19 trucks in 2016 assuming 15 will be owned and four will be rented as shown in Table 8 below.

**Table 8 Truck, Shovel, Loader Requirements by Year**

| Equipment | 2011 Contract Mining | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trucks** | | | | | | | | | | | |
| Physical Availability | | 95.00% | 92.04% | 89.19% | 86.44% | 83.78% | 81.23% | 78.76% | 76.39% | 75.00% | 75.00% |
| Utilization | | 82.2% | 79.3% | 76.4% | 73.7% | 71.0% | 68.5% | 66.0% | 63.6% | 62.2% | 62.2% |
| Productivity | | 606 | 528 | 460 | 440 | 397 | 364 | 333 | 311 | 289 | 267 |
| Number Required | | 10.0 | 15.0 | 17.0 | 17.0 | 19.0 | 16.0 | 10.0 | 7.0 | 7.0 | 1.0 |
| **Shovels** | | | | | | | | | | | |
| Physical Availability | | 92.00% | 92.00% | 89.00% | 86.00% | 83.00% | 80.00% | 77.00% | 74.00% | 74.00% | 74.00% |
| Utilization | | 71.6% | 71.6% | 68.7% | 65.8% | 62.9% | 60.0% | 57.1% | 54.1% | 54.1% | 54.1% |
| Productivity | | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 |
| Number Required | | 2.5 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 |
| **Loaders** | | | | | | | | | | | |
| Physical Availability | | 90.00% | 90.00% | 90.00% | 89.38% | 88.66% | 87.94% | 87.22% | 86.50% | 85.78% | 85.06% |
| Utilization | | 85.0% | 85.0% | 84.5% | 84.0% | 83.5% | 82.0% | 81.5% | 81.0% | 80.5% | 80.0% |
| Productivity | | 1,495 | 1,495 | 1,486 | 1,478 | 1,469 | 1,442 | 1,434 | 1,425 | 1,416 | 1,407 |
| Number Required | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## GEOTECHNICAL

The geotechnical engineering addresses the foundation conditions resulting from the soft clay overburden comprising a weak clay horizon and the shortage of natural construction material in the critical initial stages of the development of the mine. The layout of the major plant and geotechnical services and facilities is strongly influenced by the geotechnical profile. A number of engineering studies, analyses and optimizations were required to arrive at minimal CAPEX and OPEX within the requirements of a sound technical design.

An extensive geotechnical field investigation and a laboratory program was completed to obtain the necessary data for the feasibility study designs. The site has an initial cover of muskeg which overlies a variable thickness of competent and then weak clay, which in turn is underlain by dolomite bedrock. There is an exposure of limestone bedrock at the west site border, but the site is generally perennially flooded. The piezometric heads in the bedrock generally reached within the upper 1.5 m below the ground surface and in some areas, artesian conditions were encountered. This suggests a confined aquifer which is independent of groundwater conditions encountered within the overburden. Because of the high water level and the presence of artesian effects, construction of the major structures will be most practically achieved after the dewatering of the site.

In some areas, where the current boreholes are spaced far apart, additional geotechnical investigation will be required for detailed engineering design. The current level of information is adequate for feasibility level design interpretations. Further testing and analyses during detailed design and construction stages are expected to result in more optimal geotechnical designs. The geotechnical design development involved supplementary information inputs from hydro-geological and hydrological studies prepared by Golder Associates. Environmental input was obtained from the geochemical report prepared by URS. Geotechnical design aspects in relation to mine closure were developed in conjunction with the overall mine closure plan prepared by Victory Nickel.

The engineering solutions for major earth/rock fill structures are controlled by the deformation characteristics of the peat and clay. The presence of weak clays, found at depths generally in excess of 5 m, posed significant limitations on the designs of major geotechnical structures. These issues were resolved by adjusting the site layouts with the most sensitive structures situated in geotechnical locations with a reduced thickness of weak clays. The geotechnical designs included the benefits resulting from under drainage from open pit dewatering that will precede their construction.

Because of the presence of significant thicknesses of weak clays, the ultimate heights of the rock dumps are limited and these will be constructed in a number of stages in accordance with the waste rock production schedule. The location of the Tailings and Waste Rock Management Facility has been selected in an area where the weak clay thickness is estimated to be minimal, ranging from 3 m to 6 m. Staged construction relying on the pre-consolidation aided by the under drainage has greatly minimized the capital costs.

The heavy mine infrastructure buildings will be constructed on the limestone outcrop/subcrop to resolve the significant foundation excavation and dewatering issuesthat would otherwise be required in areas of significant clay overburden. For the smaller, lighter structures to be constructed on the clays flanking the limestone outcrop there are the options to pile or construct on a rock fill carpet taken down to the clay. At the detailed design stage the option to utilize mini-piles taken down to limestone would be examined against the requirement to minimize settlements and optimize costs.

In addition to the foundation problems the presence of perennially flooded peat and clay overburden with the open pit poses problems for its removal. Initially, Wardrop considered mechanical means for stripping the overburden using excavators and trucks contracted to a specialist earthworks company. This was to be contracted out because of delivery times in procurement of the mining equipment and because contracted equipment would be smaller and more suited to this work.

After further analysis, the option to dredge the muskeg and soft clays was reviewed for cost and schedule considerations. Based on Wardrop's assessment aided by preliminary inputs from a dredging contractor it followed that costs would be reduced and that the more compact schedule would be assured with the dredging option. However, the schedule for the dredging would be tied to a construction season starting with the 2011 spring thaw. Currently, overburden removal is schedule to begin in the spring of 2011 leaving 2010 and the first part of 2011 to prepare for the dredging.

A separate area close to the pit has been dedicated for the disposal of the peat and clay removed during the dredging operation. The dredged overburden material will be pumped to the Overburden Disposal Containment (ODC) area and spigotted in to create a beach around the perimeter of the area. During operations, this dredged clay material is considered in the construction of the low permeability zone on the upstream side of of the TWRMF dam.

Although the leachates from the dolomite and the country rock are not expected to raise environmental concerns in relation to on-land disposal, ultramafic units are considered as potentially acid generating and metal leaching. The TWRMF was conceived to mitigate the environmental issues by encapsulating the PAG waste rock within a single repository using a novel concurrent disposal concept. This TWRMF design consolidates components from known precedents will be supported by observational method during the construction and operation phases. The dolomite and country rock waste rock will be stored in separate dumps that will not require collection and treatment. This concept has resulted in capital and operational cost savings and will eliminate any long term legacy costs in treating effluent from the ultramafic rock.

Field trials and a well thought-out instrumentation and monitoring program, is indispensible for both the confirmation of design assumptions and possible design optimization. Other aspects of the project, such as water balance, deposition plans, construction details and material specifications, additional borrow material sources, closure and reclamation issues have been addressed.

## METALLURGY

Wardrop designed a comprehensive metallurgical testing program to generate data for the mill design and economic assessment for the Project. This program began in early 2007 and was completed in October of 2008 at SGS Lakefield. The major testing components in the metallurgical program included:

- grindability tests to collect data for grinding circuit design
- QEMSCAN analysis to characterize the mineralogy of the ores
- flotation testing to improve the nickel recovery as well as develop design criteria.
- flotation products settling and filtration tests to collect data for sizing tailings and concentrate thickeners and concentrate filtration equipment.
- variability flotation tests to gain a better understanding of the flotation performance of ore from different portions of the deposit which helps in the project risk assessment.

Five drill holes were designed to collect representative testing samples for the project. The open pit master composite 2 (OPMC2) used in developing the design criteria was generated based on the sulphidic nickel block model. It contains 0.54% total Ni and 0.36% sulphidic Ni. The major nickel bearing sulphides are pentlandite and millerite. The main gangue minerals in the composite are serpentine (34.7%), talc (30.2%) and phlogopite (11.2%).

The testing program accommodated an analytical task to determine the sulphidic Ni grade of all the intervals from the 2007 and 2008 drilling programs which contained higher than 0.2% total nickel. These results along with the historical sulphidic nickel assay results obtained by Amax Exploration were used to develop the geological sulphidic nickel block model for accurate accounting of the recoverable nickel. Mining and milling designs were based on this block model

The grindability testing samples have a median SPI of 27.4 minutes; a median RWI of 9.6 kWh/t and a median BWI of 14.9 kWh/t. Two independent simulation programs (JKSimMet and CEET) were used to design the grinding circuit.

Flotation work was completed on various samples to optimize flowsheet and reagent regime as well as to obtain reliable design data for the project. Tests were also performed to validate the viability of developing a head grade-recovery curve based on the sulphidic nickel assay. The mass balance of the mill design was based on the metallurgical projections from a locked cycle test on OPMC2. Variability flotation tests were carried out to investigate the difference in flotation response for samples from various locations of the deposit as well as with different mineralogy.

The sulphidic head grade-recovery formulas developed for pit optimization and economic assessment are shown in Table 9.

**Table 9 Head Grade-Recovery Formula for the Calculation of Nickel Sulphide Recovery at Different Sulphidic Ni Grades**

| Head Grade (Sulphidic Ni%) | Equations for Sulphidic Ni Recovery Calculation |
|---|---|
| G<0.1 | Recovery = 0% |
| 0.1≤G≤1.25 | Recovery = $(61.375X^3 - 198.87X^2 + 218.02X + 9.435)$% |
| G>1.25 | Recovery = 91.1% |

The metallurgical projections from a locked cycle test on the OPMC2 are tabulated in Table 10. The test condition for the locked cycle test were: Grind size, $P_{80}$ = 68 µm; 150 g/t PAX and 500 g/t Calgon in grinding; 250 g/t PAX in rougher flotation and 25 g/t PAX in 1st cleaner flotation; 700 g/t Dep. C in cleaner flotation; and 70 g/t MIBC in rougher flotation.

**Table 10 Metallurgical Projections for OPMC2 of Minago (based on LCT-6)**

| Product | Weight | Assays, % | | | | % Distribution | | | |
|---|---|---|---|---|---|---|---|---|---|
| | % | Ni | Sulphidic Ni | S | MgO | Ni | Sulphidic Ni | S | MgO |
| 5th Cl Conc | 1.26 | 22.27 | 15.31 | 24.36 | 10.43 | 52.28 | 57.89 | 69.15 | 0.39 |
| 1st Cl + Scav Tail | 18.31 | 0.29 | 0.17 | 0.16 | 34.85 | 9.85 | 9.19 | 6.70 | 19.00 |
| Ro Tail | 80.43 | 0.25 | 0.14 | 0.13 | 33.64 | 37.88 | 32.93 | 24.16 | 80.61 |
| Combined Tail | 98.74 | 0.26 | 0.14 | 0.14 | 33.87 | 47.72 | 42.11 | 30.85 | 99.61 |
| Head (calculated) | 100.00 | 0.53 | 0.33 | 0.44 | 32.97 | 100.00 | 100.00 | 100.00 | 100.00 |

The metallurgical projection indicates that a nickel concentrate containing 22.27% Ni and 10.43% MgO will be produced with an equivalent sulphidic nickel recovery of 77.2%.

A second locked cycle test on OPMC2 indicated that recycled water did not have a significant effect on the flotation performance of the composite.

Flotation tests on the variability sample representing the first two years of open pit production show that this composite floated better than OPMC2, which indicate that little difficulty is expected for the start-up and early operation of the plant in terms of the metallurgical performance of the ore.

The overall variability sample flotation results indicated that all the variability samples with a sulphidic nickel assay higher than 0.22% demonstrated floatability similar to those of the sulphidic nickel grade composites used in the generation of the sulphidic nickel head grade – recovery curve. In most of the flotation tests on the variability samples, lower MgO contents in concentrates were achieved as compared to the results of tests on the sulphidic nickel grade composites. Tests on three of the four variability samples containing less than 0.20% sulphidic Ni achieved very low nickel recovery. The variability testing results indicate that the risk of a "metallurgy underperformance" is low for the project if the mining cut off grade is higher or close to 0.20% sulphidic Ni. The risk will increase as the mining cut off grade decreases.

Dewatering tests on locked cycle flotation tails and concentrate indicated that a high rate thickener would work better for the thickening of the tails and a pressure filter could achieve moisture of 8.5% in the concentrate filter cake.

The Minago ore samples were historically tested by SGS Lakefield (formerly Lakefield Research), Process Research Associates (PRA) and Outokumpu Oy.

## NICKEL ORE PROCESSING PLANT

The mineral processing plant will process nickel ore at a nominal rate of 10,000 t/d beginning with the haulage of ore to the primary gyratory crusher and hydraulic rock breaker capable of crushing the ore to an optimal size for grinding (Figure 8).

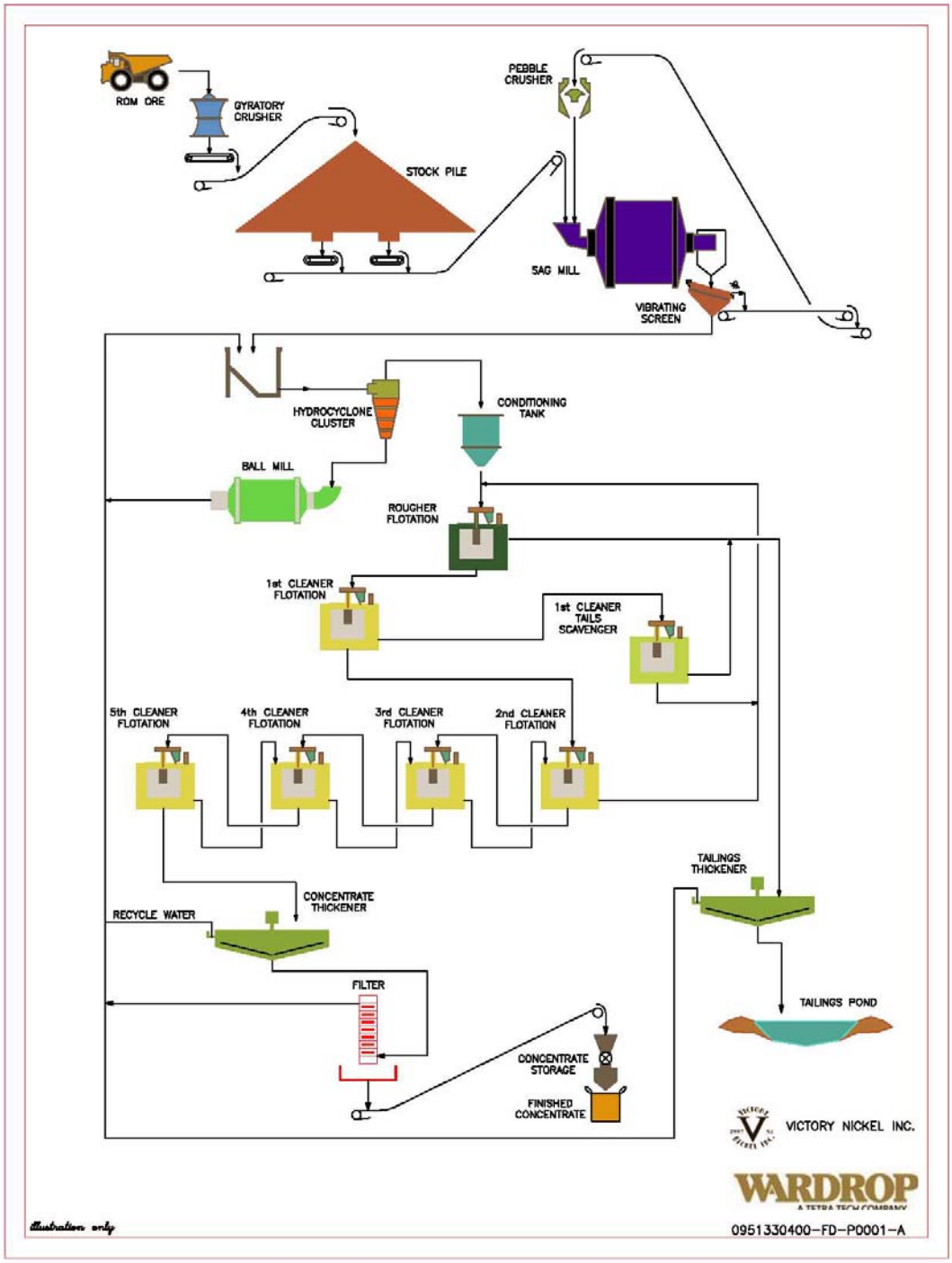
The grinding circuit, consisting of one semi-autogenous grinding (SAG) mill and one ball mill, will grind the ore prior to flotation. An intermediate crushing stage consisting of one pebble cone crusher will crush oversized product from the grinding circuit for recirculation to the SAG mill. A single vibrating screen will be utilized to classify the SAG mill discharge and the oversize that will be crushed. A hydrocyclone cluster will classify the ball mill discharge and the underflow of the vibrating screen. Underflow from the hydrocyclone cluster the oversize ball mill product will be recycled to the ball mill feed while the overflow the undersize product will gravity flow to the conditioning tank at the start of the flotation circuit.

The flotation circuit will consist of conventional rougher, scavenger and cleaner cells to produce a high-grade nickel concentrate and final tailings. One bank of rougher cells, one bank of scavenger cells, and five banks of cleaner cells will be utilized throughout the flotation circuit. The final flotation concentrate will be thickened in an indoor conventional concentrate thickener and stored in a stock tank. Concentrate from the stock tank will be dried for shipment in a horizontal plate filter press. The filter press will dewater the concentrate to an 8.6% moisture content. A bagging machine will bag the final concentrate in 2 t bags for shipping.

A high rate tailings thickener will clarify the final tailings from the flotation circuit and distribute the tailings underflow to the tailings management area. Flocculants will be used in each thickener to assist in settling and generating a precipitate from solution. Reagents including potassium amyl xanthate (PAX) and sodium hexametaphosphate (SHMP or Calgon) will be added to the ore in the grinding stage to enhance the flotation performance downstream. Methyl isobutyl carbinol (MIBC) and depramin C (CMC) will also be added to the cleaner flotation to aid in concentrate quality.

Flotation optimization will be provided by on-stream samplers, particle size analyzers and an on-line x-ray analyzer. The samplers and analyzers will be used to monitor performance of the flotation process to optimize concentrate grade and nickel recoveries. An assay and metallurgical laboratory will be incorporated into the mill building to perform laboratory tests.

**Figure 8 Simplified Flowsheet**



## FRAC SAND PROCESSING PLANT

The Preliminary Economic Assessment (PEA) identified a sandstone horizon averaging nine metres thick above the unconformity of the main nickel bearing serpentinite. This sandstone layer must be removed to access the mineralization within the proposed open pit mine reported in the PEA study. The sandstone unit which is comprised of small, round, uniformly sized silica sand particles is amenable for use as hydraulic fractionating sand or frac sand in the oil and gas industry.

The sandstone is not expected to require drilling and blasting to be removed, but will require additional backhoe cleanup due to the expected undulating contact at the top of the basement rocks. The backhoe will windrow the sand so that a front-end loader can easily load the material while minimizing the loss of sand due to the loaders large bucket size. The sand is then hauled to a stockpile location, separate from the waste dumps, prior to processing. The sand is released each time a mining stage passes through the bedrock contact in Years 1, 2 and 3 (Table 11). The insitu sand would be processed at a feed rate of 1.5 Mt/a, producing different grades of frac sand at a rate of 1.15 Mt of marketable sand annually.

**Table 11 Final Pit Sand Resource by Year**

| Phase | Sand (tonnes) | Year |
|---|---|---|
| Starter Pit | 5,288,864 | 1 |
| Phase I | 2,091,628 | 2 |
| Phase II | 7,466,065 | 3 |
| **Total** | **14,846,557** | |

### PROCESSING PLANT DESIGN

Initial studies determined the deposit was capable of producing three saleable products including two types of fracturing sand and a flux sand product. Based on Marketing study results for annual sales, Outotec designed the plant capable of producing 1.15 Mt/a of marketable sand. Approximately 0.615 Mt/a of the final product would be frac sand capable of meeting the API specifications, and 0.535 Mt/a of the final product would be non-API frac sands to be sold into other markets.

The design takes into account the seasonality of the frac sand market, the inclement winter weather of Manitoba, and the requirement to operate the full plant year-round. The wet and dry plants will operate in series, with a wet plant feed rate of 265 t/h.

A 16-month schedule for plant completion is estimated as the best-case scenario. This would include detailed design, procurement, construction and commissioning with consideration for starting construction in the spring.

## INFRASTRUCTURE FACILITIES

The site infrastructure will consist of several facilities including a maintenance building, fuelling facilities, emergency services building, cold storage, fresh and process water pump house, modular complex building, guardhouse and scale house, treatment plants, dewatering facilities, and tailings management facilities.

The maintenance building with truck shop will be used for vehicle repair, tire replacements, welding and general maintenance. This truck shop will comprise a wash bay, lube storage, hydraulic shop, electrical shop, instrumentation shop, storage warehouse and lunchroom. The fuelling faculties will provide diesel fuel storage for mining trucks and diesel generators.

The modular complex building will consist of mine staff dormitories, staff kitchen and cafeteria, mine dry, recreational facilities and office complex. The water and waste water treatment facilities include sewage treatment plant and potable water treatment plant. Dewatering facilities include groundwater pumps located around the perimeter of the pit as well as portable dewatering pumping stations within the open pit.

The tailings management area will be used to discharge tails and dump ultramafic waste. This area will be equipped with a floating barge system to properly discharge decant water to the polishing pond and flood retention area. The polishing pond pump house will discharge to the Minago water shed north of the Minago mine site.

## ELECTRICAL

Electrical power is required for the ore processing plant, the frac sand plant, the open pit mine, de-watering and general services. A main substation 230 kV/13.8 kV will be installed to transform the primary power at 230 kV to the secondary power at 13.8 kV. The secondary power distribution network would consist of 13.8 kV primary feeders and overhead transmission lines (ACSR). The secondary feeders would consist of 6.6 kV, 4.16 kV and 0.6 kV Teck cable. All operational loads would be calculated on a 24 hr basis for the various load centres.

The processing plant consist mainly of the grinding, flotation, concentrate thickener, process water plant and reagent areas which accounts for 29 Megavolt amperes (MVA) (58 %) of the load requirement. The open pit mine/remote locations consist mainly of the shovels, drills, dewatering pumps, administration buildings, sand plant and transfer pond pumps which accounts for 21 MVA (42 %) of the load. Total operational load for the Victory Nickel Minago mine is approximately 50 MVA.

## LOGISTICS AND TRANSPORTATION

The Minago property enjoys the advantage of being located directly adjacent to Manitoba Provincial Highway 6, a major north-south highway transportation route. Also, the property may be served by the OmniTRAX rail company with a railhead at Ponton 60 km away. Therefore both inbound and outbound goods from the Minago site can be transported by conventional

land transportation methods such as truck and rail. These transportation costs have been taken into consideration in both operational costs and capital costs.

## STAFFING AND PERSONNEL DEVELOPMENT

Well-trained, qualified personnel are an essential requirement to ensure the proper start-up and production targets that define a successful project. The correct staffing levels and the staffing requirements in each category define the basis for assessing labour operating costs. A comprehensive set of human resources policies and practices are required to define training and the human resources policies.

A work force schedule has been prepared to identify the staffing requirement by major facility and by area as summarized in Table 12.

**Table 12 Department Staffing (Including Contracted Services Personnel)**

| Department | Number of Personnel |
|---|---|
| Maintenance Department | 94 |
| Mining Department | 121 |
| Processing Department | 94 |
| Geology Department | 4 |
| Engineering Department | 5 |
| Human Resources Department | 14 |
| Environmental Department | 5 |
| Mine Controller Department | 14 |
| Contracted Services Personnel | 71 |
| Total | 422 |

The staffing levels have been assessed to take into account of vacations, training, and absence relief for the various categories. There will be a requirement to start-up the frac sand plant initially, followed by the open pit mine and ore processing plant.

In estimating labour requirements, allowances will need to be made for the various employee scheduling arrangements described in Section 12.0. For the three employment arrangements, different allowances called “K” factors will be applied to account for absences due to vacation, training, or sick leave.

## SOCIAL CONTEXT

As part of the Minago Feasibility Study, Victory Nickel conducted a Socioeconomic Assessment of the neighbouring communities. A series of meetings and interviews were held with a wide range of key stakeholders to identify their views and opinions with respect to the Minago Project. The stakeholders included Norway House Cree Nation (NHCN) and Norway House

Community (NHC); Grand Rapids Cree Nation (GRCN) and Grand Rapids Community (GRC); Cross Lake Band of Indians (CLBI) and Cross Lake Community (CLC); Moose Lake Cree Nation (MLCN) and Moose Lake Community (MLC); Snow Lake; Manitoba Métis Federation (MMF); Trapline Owners (TLO); Norway House Resource Management Board (NHRMB) and Government Agencies. Consultations, community engagements, and small group and open house meetings were held in the individual communities. Also, Victory Nickel has signed a Memorandum of Understanding (MoU) with Cross Lake, Moose Lake and Grand Rapids First Nations' Bands. The communities to the Minago Property include Grand Rapids (GR), Moose Lake (ML), Cross Lake (CL), Snow Lake (SL) and Norway House (NH). Each community has its own governing infrastructure usually collectively known as the First Nations in the Northern Region of Manitoba.

The objectives of the Socioeconomic Assessment (SEA) for the Minago Project were to:

- introduce the major components of the Minago Project to a wide range of key stakeholders
- inform communities and stakeholders of potential impacts and their relative magnitude on the communities' social and economic well-being
- provide an opportunity for the integration of diverse community values into the decision making process for the mine development
- understand the concerns of the communities and stakeholders to develop potential mitigative measures that are practical and cost effective
- provide information for addressing the potential impacts of the Minago Project on the socio-economic resources of the communities.

The various meetings with government agencies, public, First Nations and Métis consultation and community engagements on various aspects of the Minago Project occurred during the past three years (2007-2009). The issues raised by each of these groups during this process have been documented and are summarized in the Study.

### *REGULATORY AGENCY CONSULTATION AND ENGAGEMENT*

As part of the exploration and development process for the Project, meetings between Victory Nickel and provincial and federal regulatory agencies focused on environmental protection and wildlife, waste management, vegetation, fisheries, benthos, air and water quality, and permitting and regulatory requirements.

### *TECHNICAL ADVISORY COMMITTEE AND GOVERNMENT MEETINGS*

Victory Nickel had technical sessions with the provincial and federal government representatives, including Provincial/Federal Technical Committee and consultants focused on:

- Environmental Baseline Studies including vegetation, soil, fisheries, sediments, wildlife and water quality assessments, hydrology and hydrogeology.

- a socioeconomic assessment,
- geochemical characterization and geotechnical aspects.
- mining, nickel milling and ore processing.
- water management, pit dewatering.
- frac sand mining and processing.
- tailings management, waste rock dumps.
- design basis and criteria.
- site reclamation.
- Métis and First Nations consultations and engagement, and permitting.

The issues and comments raised during these meetings were incorporated in the planning and design of the Minago Project and are summarized in the Study.

### *FIRST NATIONS CONSULTATION AND ENGAGEMENT*

As the Minago Project area falls within the Treaty 5 traditional territory and specifically the Norway House Resource Management Area, in 2007 in-depth community meetings were initiated to introduce the project. In 2008, additional community engagement meetings were initiated to discuss preliminary findings of the Environmental Baseline Studies (EBS) and some of the design basis and criteria for the frac sand plant, water management systems, pit dewatering systems, mine, mill, tailings storage facilities, waste rock dumps, and overall site infrastructure. In 2009, Victory Nickel concentrated on negotiating a Social Economic Participation Agreements with Cross Lake, Grand Rapids and Moose Lake First Nations.

Overwhelmingly, there were more positive impacts issues raised than negative ones as detailed in the previous sections. The concerns that the First Nations (NHCN, CLBI, MLCN and GRCN) and Métis had were in regard to impacts to wildlife, water, social issues and traditional land use.

### *COMMUNITY INVOLVEMENT*

Along with the meetings with Norway House Cree Nation, Misipawistik Cree Nation (Grand Rapids), Mosakahiken Cree Nation (Moose Lake), Cross Lake Band of Bands and the Métis Federation of Manitoba, a series of public open houses were held. These meetings were initiated to allow residents of Norway House, Cross Lake, Moose Lake, Grand Rapids, and Snow Lake to provide comment on the project's progress and proposed activities. The issues raised during these meetings concerned employment and business opportunities, including the issues identified in Table 13. Meetings with the members of the Métis Federation of Manitoba (MMF) were held in Grand Rapids on May 08, 2007, in Norway House on May 23, 2007, and in The Pas on October 08, 2008. Victory Nickel also participated in the 2008 MMF Annual General Meeting that was held in Brandon, Manitoba.

### PUBLIC CONSULTATION

There is some overlap between the COI and the public as the majority of the local communities, notably Grand Rapids, Norway House, Moose Lake, and Cross Lake, are represented by members of the Cree Nations. In addition to respective community band councils, each community has its own local government. People from the local communities also attended scheduled meetings in Norway House, Cross Lake, Moose Lake, and Grand Rapids.

### FUTURE CONSULTATION AND COMMUNITY ENGAGEMENT MEETINGS

As the project progresses, Victory Nickel will hold additional consultation and community engagement meetings with the First Nations, Metis, government, the public and other stakeholders to project related information. These meetings with the First Nations will take place in 2010.

## ENVIRONMENTAL CONSIDERATIONS

### INTRODUCTION

In parallel with the preparation of the Minago Feasibility Study, Victory Nickel conducted base-line studies of the area surrounding the proposed mine site. These studies included surface water quality, monitoring, vegetation surveys, fisheries assessment, benthic community enumeration, wildlife surveys, sediment characterisation, soil assessment, socio-economic assessment, geo-chemical characterisation, hydrology and hydro-geology. The goal of this study is to determine the potential impacts of the Minago Project on those environs by comparing baseline indicators and operational data.

Details of the following aspects of the Environmental Considerations are given in Section 12.0 of this Study:

### PERMITTING

Victory Nickel plans to submit an Environmental Act application to the Manitoba government during the Second Quarter of 2010.

## CLOSURE PLAN

In keeping with high standards for environmental and social responsibility and the Manitoba Closure Regulation 67/99, Victory Nickel will implement an environmentally sound and technically feasible decommissioning and closure plan for the Minago Project. The closure planning and implementation will be undertaken with appropriate environmental care, to meet these Provincial and Federal laws and regulation, satisfy the interests of the public, and achieve the company's environmental standards. In so doing, Victory Nickel will exercise reasonable efforts to plan, design, construct and operate the facilities for closure, with a goal of achieving a walk-away scenario as described in the main body of the Study.

## ORE CONCENTRATE AND FRAC SAND MARKETING

The worldwide recession in 2008 led the price of base metals in general and nickel in particular to levels below marginal costs. After rising from US$4.00/lb in 2003, to a record high of US$24.58/lb in May 2007, the price of nickel returned to US$4.15/lb in November 2008.

Given the recent swings in commodity prices, a certain period of stability would be required before determining reliable commodity price trends. When the project was conceived in 2007, the price of nickel briefly reached over US$24.00/lb and for a time US$15.00/lb nickel seemed assured. However, for a brief period in early 2009, the price of nickel dropped below US$4.00/lb and currently ranges in the US$7.00 to US$8.50/lb range.

For the purposes of the Financial Model, metal prices and exchange rates have been established on the basis of a 3 year rolling average. This approach which is used by the Securities and Exchange Commission in the United States, considers the behaviour of the market in the previous three years. By using this approach, we have not included forecast pricing to establish forward looking pricing for our Financial Analysis.

The frac sand pricing from IM&M suggests that the prices for frac sand will remain at the current levels with pricing dependent on drilling activity in the oil shales.

## CAPITAL COSTS

The capital cost estimate (CAPEX) for the mine, process plant, load out facility and infrastructure for the Project has been prepared in accordance with standard industry practices. For feasibility-level studies the required intended range of accuracy for the given level of definition is assumed to be -10% to +20%.

The estimate includes for direct and overhead cost estimates, based on current pricing for common items. The Indirect Costs, Owner's Costs and Contingency Costs are considered as Overhead Costs in this Capital Cost Estimate. As of December 2009, the estimated CAPEX for the Project is CDN$596,268,000 subject to the qualifications, assumptions and exclusions detailed in this report.

The capital cost summary and distribution is shown in Table 13.

**Table 13 Summary Project Capital Costs**

| Category Number | Description | Total (CDN$) | Pre-Production (CDN$) | Sustaining (CDN$) |
|---|---|---|---|---|
| **Direct Costs** | | | | |
| 00000 | General | 5,883,000 | 5,883,000 | 0 |
| 10000 | Site Development | 37,205,500 | 37,205,500 | 0 |
| 20000 | Site Utilities | 47,616,600 | 45,616,600 | 2,000,000 |
| 30000 | Tailings Management Facilities | 16,481,400 | 15,231,400 | 1,250,000 |
| 40000 | Frac Sand Development | 26,639,000 | 26,639,000 | 0 |
| 50000 | Mine Infrastructure | 35,608,600 | 35,608,600 | 0 |
| 60000 | Mobile Equipment | 106,975,000 | 106,975,000 | 0 |
| 70000 | Ore Processing Facilities | 146,696,900 | 146,696,900 | 0 |
| 80000 | Non-Process Buildings | 19,118,900 | 19,118,900 | 0 |
| | Totals - Direct Costs | 442,224,900 | 438,974,900 | 3,250,000 |
| **Overhead Costs** | | | | |
| X0000 | Indirect Costs | 91,399,100 | 91,399,100 | 0 |
| Y0000 | Owner's Costs | 12,847,500 | 12,847,500 | 0 |
| Z0000 | Contingency | 49,796,500 | 49,796,500 | 0 |
| Overhead Cost Total | | 154,043,100 | 154,043,100 | 0 |
| **Grand Total** | | **596,268,000** | **593,018,000** | **3,250,000** |

The pricing for commodities or the design/supply of equipment is based on non-binding, budgetary quotations from vendors and contractors for major equipment and unit rates. “Budgetary quotations” generally means that indicative pricing has been provided for specified equipment, materials and productivity, but no commitment has been made to provide the equipment or materials at this price at a future date.

The PST is included in the Capital Cost Estimates and the GST is excluded with the costs associated with import duties and tariffs included the Owner’s Costs.

As most equipment was priced towards the end of 2008, where costs are significant these have been re-priced to confirm that costs are still current. In other cases adjustments have been made to the rates to bring these into line with current expectations. Where possible costs are based on current market conditions without provision for future cost escalation.

The project capital cost estimates are expressed in Canadian Dollars with foreign currency exchange rates applied as set out in Table 14.

**Table 14 Foreign Exchange Rates**

| Base Currency | Foreign Currency |
|---|---|
| CDN$*1.097* | US$1.00 |

The CAPEX is based on the assumption that Victory Nickel will follow the Project Implementation Plan described in this feasibility study. Any significant deviation from this Project Implementation Plan may have an impact on both the project schedule and costs. In particular, the various costs have been calculated assuming the timeframe developed in the Project Implementation Plan.

The quantities developed are based on general arrangement drawings, process design criteria, process flow diagrams, and preliminary P&IDs. Design allowances are applied to bulk materials based on discussions between the respective discipline and the estimator. Engineering, Procurement and Construction Management costs were provided by Wardrop based upon a percentage of the expected construction cost for the project.

The Labour rates comprise blended union and non-union rates and include payroll burdens and overtime shift premium rates. In addition to the labour rates, contractors will be paid a rate for their overhead which would include site management

Labour rates pertinent to the estimate are summarized in the Study from which an average labour rate of CDN$75 was evaluated.

The labour rate is based on a construction schedule of three week in and one week out, and a 70-hour work week. Scheduled site hours are 7 days per week at 10 hours per day, totaling 70 hours per week for which 40 hours would be paid at straight time and 30 hours at time and a half. The associated productivity factor for labour hours in the capital cost is estimated to be 1.15 to 1, or 87% efficiency.

A contingency percentage of the total Direct and Indirect Costs has been included to meet unanticipated costs within the scope of the estimate. The contingency was estimated on a discipline-by-discipline basis, taking into account items that have been quoted, estimated, or factored. Contingency is intended to make provision for cost escalation during construction and the costs associated with scope change costs and delays. The schedule delays and associated costs could be due to such factors as unexpected ground conditions, extraordinary climatic events or labour disputes.

## OPERATING COSTS

On-site operating costs are estimated for five cost centres: General & Administrative, Surface Facilities, Frac Sand Processing, Nickel Ore Processing and Mining (Table 16). To provide a consistent framework for expressing costs within these cost centres cost, control categories have been developed for salaries and wages, maintenance, consumables, fuel, power and

service contracts. The details on each of these five cost centres and the six cost control categories can be found below.

The salary and wages costs were developed from the organizational chart and the Work Force Schedule, described in Section 11.0, Staffing and Personnel Development.

**Table 15 Operating Cost Summary**

| Cost Centres | Project Life | Annual | Daily |
|---|---|---|---|
| General & Administrative | 109,072 | 12,450 | 34.6 |
| Surface Facilities | 39,871 | 4,627 | 12.9 |
| Frac Sand Processing | 73,268 | 7,404 | 30.9 |
| Nickel Ore Processing | 249,252 | 37,568 | 104.4 |
| Mining | 388,242 | 59,071 | 164.1 |
| **Total** | **859,705** | **121,120** | **346.9** |

Notes:
Year 4 has been taken as the representative year.
Frac Sand daily cost is calculated based on 240 day annual operation.
Nickel Concentrate Processing is based on 360 day operations.
G&A and Surface Facility are credited against Ore Processing

A full breakdown of the costs associated with the various Cost Centres is provided in Section 16.0, Operating Costs. Similarly, details of the following Manitoba Hydro Rates and the diesel fuel costs have been summarized in Section 16.0 of this Study.

## PROJECT ECONOMIC ANALYSIS

An economic evaluation of the Minago Project was prepared by Wardrop based on a pre-tax financial model. Assuming a 7 year nickel mine life, 7 year mill life and a 10 year frac sand plant life, the following pre-tax financial indicators were calculated:

- An IRR of 17.66%
- A Payback of capital in the fourth year of nickel production
- A $596 million capital cost
- A $294 million NPV at 8% discount rate

As the Economic Analysis in this section has been based on the Capital Cost and Operating Cost Estimates in Sections 15.0 and 16.0, the same qualifications, assumptions and exclusions apply. Further, this economic analysis is subject to the same allowances for variation in currency exchange rates and escalation in prices as capital and operating costs.

The results of the Financial Analysis are presented as the Internal Rate of Return (IRR), the Payback Period and the Net Present Value (NPV) for a given discount rates. To understand the effect of the variables, parametric sensitivity analyses are performed to describe the influence of

capital cost, nickel price and operating costs. Specific graphs are prepared to illustrate the effects of key cost and pricing parameters on the IRR and NPV.

The Financial Analysis has been facilitated through a financial model that describes the economics of the Minago Project by providing a compact summary of the Business case for the project throughout the Life of the Mine. The financial model was calculated on a 100% equity basis. As required by Victory Nickel, Wardrop has not included any post tax financial modeling for the project in the financial model.

The financial model is based upon 3 year rolling average market prices for nickel and pay metals and exchange rates as shown in Table 16. Nickel Concentrate losses were estimated at 0.30% for handling from mine to smelter at an average Moisture Content of 6.00%.

**Table 16 Pricing and Exchange Rate Assumptions**

| Financial Inputs | Units | Base Case | |
|---|---|---|---|
| | | $US | CDN$ |
| Nickel | Lbs | 11.19 | 12.27 |
| Copper | Lbs | 2.91 | 3.19 |
| Palladium | Oz | 322.40 | 353.64 |
| Platinum | Oz | 1353.78 | 1,484.97 |
| Gold | Oz | 836.25 | 917.29 |
| Cobalt | Lbs | 27.73 | 30.42 |
| Silver | Oz | 14.25 | 15.63 |
| Rhodium | Oz | 2,254.56 | 2,473.04 |
| Frac Sand | Tonne | n/a | 63.02 |
| Exchange Rate | n/a | 1.097 | 1.00 |

Within Section 14.0, the report by “Reid Resource Consulting Pty Ltd” reviews the typical progress of pricing from the initial “indicative” to the “final” and reviews Price Participation and Penalty Schedules. The penalty schedule identified the negative impact of the zinc content and the MgO on the smelter pricing.

IM&M of Calgary prepared a report to evaluate the anticipated frac sand pricing in January 2009 based upon location and frac sand grading. On the assumption that transportation costs will follow any pricing increase, the value of the markets available less transportation costs has been assessed to be $72,019,885 per annum.

Sensitivity analyses were carried out to evaluate the effects of increases in Nickel price from US$6.00 to US$20.00/lb on NPV, IRR and Payback of Capital. The NPV were calculated at discount rates of 8%, 6% and 4% for the range of metal prices selected and the results presented in Table 17 below. The Payback Year is estimated from the beginning of the year in which first nickel ore production starts.

**Table 17 Summary of Pre-Tax NPV, IRR, and Payback Sensitivities**

| Nickel Price Scenario US$/lb | NPV at Selected Discount Rates (in Million$) | | | IRR (%) | Payback* (Years) |
|---|---|---|---|---|---|
| | 8% | 6% | 4% | | |
| $4.00 | -286.3 | -271.8 | -249.6 | -4.4% | n/a |
| $6.00 | -119.9 | -78.4 | -23.7 | 3.3% | 8 |
| $8.00 | 39.5 | 107.0 | 192.7 | 9.4% | 6 |
| $10.00 | 198.9 | 292.3 | 409.2 | 14.8% | 5 |
| $12.00 | 358.3 | 477.7 | 625.6 | 19.5% | 4 |
| $14.00 | 517.8 | 663.1 | 842.1 | 23.8% | 4 |
| $16.00 | 677.2 | 848.4 | 1,058.6 | 27.7% | 3 |
| $18.00 | 836.6 | 1,033.8 | 1,275.0 | 31.3% | 3 |
| $20.00 | 996.0 | 1,219.1 | 1,491.5 | 34.6% | 3 |

*stated in terms of years of nickel production

The average life of mine operating costs per pound of nickel before by product credits is estimated to be $6.95 and net of by product credits $2.12. In Table 18 below these costs are summarized by pound of nickel and by tonne of ore.

**Table 18 Total Nickel Cost Summary**

| | Operating Cost ($/lb) | Operating Cost ($/tonne) |
|---|---|---|
| General and Administrative | $0.69 | $4.33 |
| Surface Facilities | $0.25 | $1.58 |
| Ore Processing | $1.57 | $9.90 |
| Mining | $2.45 | $15.43 |
| Concentrate Transportation | $0.06 | $0.39 |
| Smelter and Refining Charges | $1.93 | $12.15 |
| **Cost Before By-product Credits** | **$6.95** | **$43.78** |
| Frac Sand Credit | $4.04 | $25.44 |
| Pay Metal Credit | $0.49 | $4.97 |
| **Cost Net By-product Credits** | **$2.12** | **$13.37** |

## PROJECT IMPLEMENTATION PLAN

The Project Implementation Plan (PIP) is intended to ensure the successful execution of engineering procurement, and construction phases, and the alignment with subsequent mine development phases. The PIP will ensure that necessary costs have been included in the cost estimates for the project detail design, procurement, and construction phases. The PIP will provide a better understanding of the overall risk profile and project risk mitigation strategies.

### PROJECT IMPLEMENTATION STRATEGY

The first stage in establishing a Project Implementation Strategy will be for the Owner to define a strategy which best fits the needs of the project. Wardrop has assumed that the Owner will require full support during the detailed engineering, procurement, and construction phases of the project. The Owner's plans for the hiring and training of personnel and the operation of the plant have not yet been considered but will be considered with the PEP.

The full text of the main document describes the various traditional implementation strategies. The implementation strategy adopted by the Owner will reflect the depth of available skills within the Owner's team, and the degree of involvement the Owner wishes to take. The project management style should reflect the Owner's role in the management of the project and the Owner's risk philosophy.

For the Minago Mine the Implementation Strategy will need to address the schedule restraints posed by weather and the requirement for a flexible contracting strategy in a remote site location utilizing local labour.

- The problems associated with a flooded site dictate that initial winter construction when the ground is frozen is preferable.
- A flexible contracting strategy will be required to accommodate the timely procurement of long-lead items and construction.
- Being some 225 km from Thompson, Manitoba and 485 km from the major city of Winnipeg, Manitoba the site may be classified as having a remote location.
- Wherever possible, labour should be drawn from local labour pools in Norway House, Grand Rapids, Moose Lake, Cross Lake or Snow Lake.

### CONTRACTING STRATEGY

The contracting considerations will include a review of the availability of contractors, a consideration of Union or Non-Union Contractors and the size of packages to attract tenders. Where possible, approved contract proformas will be utilized for construction and service contracts. Generally, construction contractors will be responsible for construction labour, construction equipment, transportation to site, contract surveying, quality control, safety, environmental safeguarding, and supplying permanent materials as required by contract. A summary of the Major Equipment Packages and Major Construction Contracts are outlined in Section 18.0, Project Implementation Plan.

### PROJECT SCHEDULE

The Project Implementation Schedule will address the primary activities required to engineer, procure, construct, performance testing, commissioning and operation of the Minago Project.

The schedule is based on the following:

- An assumed date for the start of Detail Design without a Basic Engineering Phase.
- Full funding required to meet the schedule.
- An EPCM contracting strategy.
- Permitting approvals won't compromise engineering, procurement & construction dates.

The Project Implementation Schedule is summarized in Section 18.0 with the full schedule included in the appendices. Given the requirement to commence the dredging early in 2011, the engineering and procurement for the substation, dewatering and dredging work would need to be advanced early this year.

## PROJECT RISKS AND OPPORTUNITIES

The Minago Project, like many large projects carries with it both risks and opportunities which may influence a successful outcome. Within this Feasibility Study we have attempted to identify the most likely risks and opportunities. Where we have identified a risk the mitigating circumstances which might ameliorate that risk have been identified.

Risks and opportunities range from location, financial, economic, social and political fields. Representative risks and opportunities include commodity issues, construction costs, environmental and regulatory issues, resource estimates, process design, financial risk, logistics, political, labour, social and aboriginal issues.

The most significant immediate factor affecting risk and opportunity is the current economic downturn which has led to a steep deflationary cycle. On the positive side, the economic downturn has stabilized prices, improved the availability of labour and has improved deliveries. The inherent risk is that the commodity prices may remain low for the foreseeable future or that financing may become difficult to obtain.

Wardrop has identified commodity issues as a risk given the recent precipitous drop in the price of nickel since the $24.00/lb peak. Although the frac sand pricing has been affected by the slowdown in the development of new wells, the pricing should improve when the gas prices start to rebound.

On the political front, the aboriginal issues remain to be resolved despite positive press comments from many aboriginal leaders. Although the benefits of the mine have been acknowledged, full agreement with all of the native bands has not been realized. However, by continuing to develop relationships with the local aboriginal bands, Victory Nickel is moving to mitigate this risk.

Until the Environmental Impact Statement, has been submitted and approved, specific environmental approvals may not be forthcoming. Nevertheless, environmental issues do not appear to be insurmountable and Victory Nickel has taken the necessary steps to understand the environmental issues.

Victory Nickel is planning to take advantage of Manitoba Hydro's current power rates which are the lowest in North America. To lock in these preferential rates to ensure that this power is available at current prices, steps should be taken to acquire the approval of Manitoba Hydro early in the process. In addition to determining rates, Victory Nickel needs to finalize the process for getting approval for the connection to the 230 kV Line.

On the upside, the possibility of reclassifying ore resource from inferred to indicated offers the greatest opportunity. The calculation of the inferred resource suggests that significant measured and inferred resources could be realized. In a similar vein, there is the possibility to develop resource in the north arm of the ore body. With mining and milling infrastructure costs carried within this project, the costs for developing these contiguous ore bodies would be reduced.

The annual feed rate for production of frac sand for the developing Canadian oil fields has been set at 1.5 Mt/a.. If advantageous market conditions prevail, additional capacity may be available the design of the Frac Sand Plant is amenable to increasing production.

During the detail design, significant opportunity exists to reduce the construction costs by minimizing excavation, structure, and concrete quantities, and more effective equipment selection. The possibility of utilizing more off-site pre-construction and modularized components such as pre-mounting and pre-wiring of valve skids complete with controls.

Capital costs may be reduced through the purchase of second-hand equipment which is becoming increasingly available due to the economic slowdown. In order to defer the immediate use of capital, Victory Nickel has explored the option of leasing equipment.

Within the site, the location of tailings dams, overburden dump and rock dumps will be optimized to select zones where the soft clays thicknesses are minimal.

As the present locations are close to the pit, these are optimal in terms of haul distance, the preferred option going forward would be to improve the load bearing capacity of the clay below the dumps. By staging construction to consolidate the clay, the dump heights may be increased and the area required minimized reducing the construction and operational costs.

# 1.0 PROJECT OVERVIEW

## 1.1 INTRODUCTION

The Minago property is located on Highway 6 in Manitoba's Thompson Nickel belt, approximately 225 km south of Thompson, Manitoba, Canada (Figure 1.1).

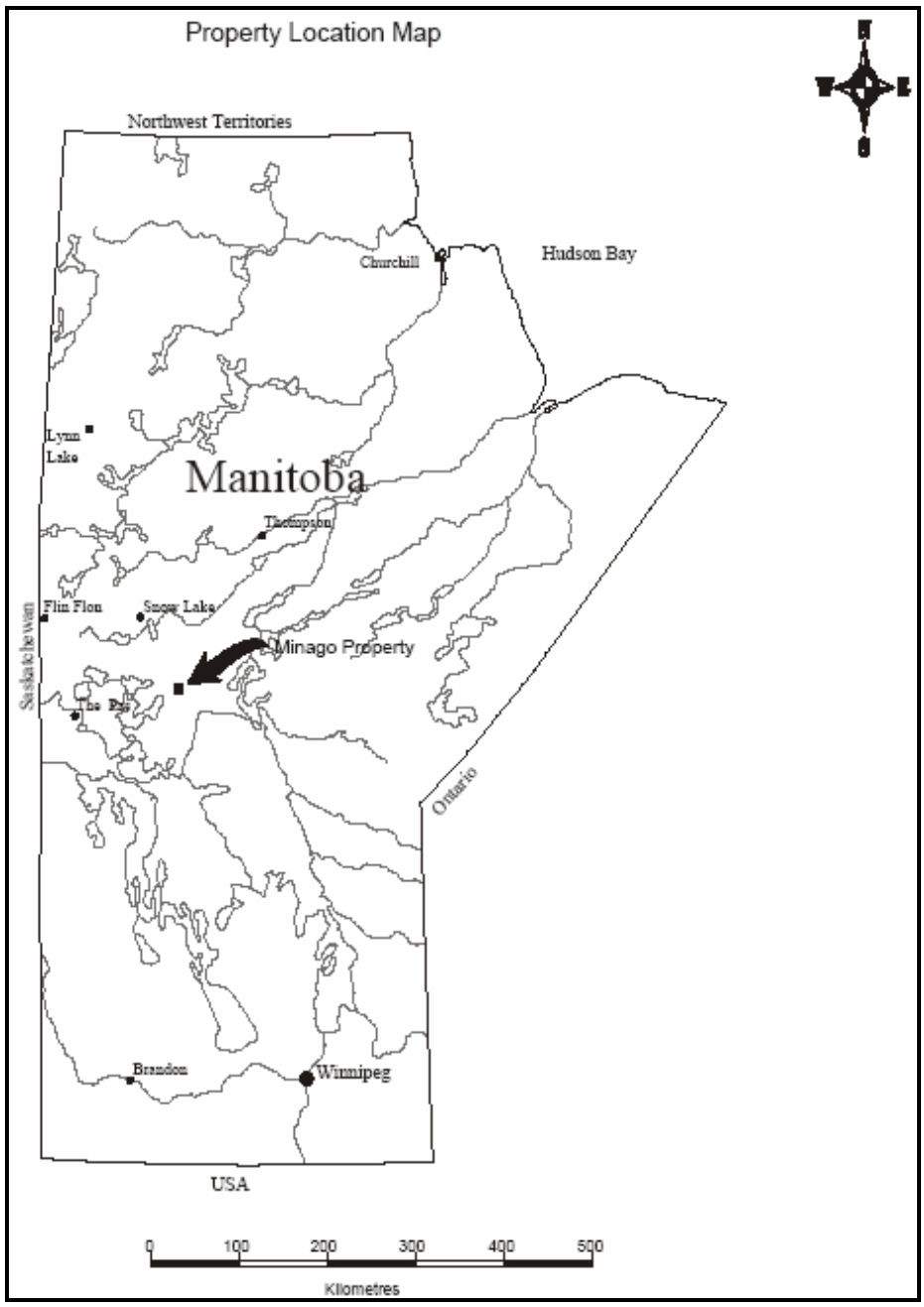
In 2006, Nuinsco Resources Ltd. (Nuinsco) retained Wardrop Engineering Inc. (Wardrop) to provide the Preliminary Economic Assessment (PEA) of the property. The PEA was completed in accordance with the National Instrument 43-101 (NI 43-101) requirements to identify the resources within economic open pit and underground mine designs. The NI 43-101 was submitted on November 24, 2006. The resource estimates were completed by P.J. Chornoby, P.Geo., with assistance from Mirarco Mining Innovation (Mirarco) and the remaining property assessments were completed by Wardrop. The PEA included a summary of the separate independent resource estimate.

At the time the PEA was issued, Nuinsco owned 100% of the mining lease on the property. In early 2007, ownership of the property was transferred to Victory Nickel Inc. (Victory Nickel), through a corporate transaction by Nuinsco. This resulted in 75% of Victory Nickel being publicily held and 25% being held by Nuinsco. On April 24, 2007, Victory Nickel engaged Wardrop to prepare the Minago Feasibility Study and a NI 43-101 compliant report. For this work, the resource estimation was provided by Wardrop in accordance with the Canadian Institute of Mining, Metallurgy, and Petroleum (CIM) Mineral Resource and Mineral Reserves definitions.

The Minago deposit has potential as a large tonnage, low-grade nickel sulphide deposit suitable for open pit mining methods with the possibility for underground mining using bulk tonnage mining methods. Parts of the deposit below a depth of 400 m will require additional drilling to upgrade the resource class from inferred to indicated.

Wardrop estimates that the Minago deposit contains a measured resource of 9.1 Mt grading 0.47% Ni(S) above a cut-off grade of 0.2% Ni(S). In addition, the deposit contains 35 Mt of indicated resource at 0.42% Ni(S) above a 0.2% Ni(S) cut-off grade. An inferred resource of 12 Mt at 0.44% Ni(S) above 0.2% Ni(S) has also been estimated. The mined ore is expected to produce some 345,000 t of concentrate grading at 22.3% nickel along with various other payable metals.

**Figure 1.1 Property Location Map**




The property has a favourable location adjacent to the paved provincial Highway 6, which traverses north to Thompson and south to Winnipeg. A 230 kV Manitoba Hydro power line runs parallel to the highway. The property is only 60 km from the Omnitrax Canada railway line, which extends from Flin Flon and The Pas to Churchill.

The potential of the property is supported by a recent metallurgy test program, where a very high grade nickel concentrate was produced. The current recoveries for the open pit mine are substantiated by previous metallurgical test data.

Normally, the economic potential of a deposit would be adversely impacted by an overlay of 80 m of overburden, limestone, and sand, with a high open pit strip ratio. However, the 10 m sand layer just above the ultramafic ore bearing rock contains marketable hydraulic fracturing sand (frac sand) which will offset the cost of the stripping. The installation of a frac sand processing plant in addition to the nickel ore concentrating plant will generate further revenue for the Project. The analysis assumes that critical revenue streams will be developed from both the nickel and frac sand resources.

The mine life is estimated to be seven years; frac sand will be processed and sold throughout the life of the mine Accommodation facilities and other associated facilities will be provided for the majority of the workforce, who will manage, operate, and maintain the mine on a rotational basis. To the extent possible, the workforce will include members of the local First Nations community.

To effect cost savings and to make the best use of the site, co-deposition of tailings and ultramafic rock and dredging of the overburden have been incorporated into the engineering plan. The co-disposal will effectively seal the contaminant generating ultramafic rocks in the tailings and the Dredging will permit a more effective use of the area where deposition of the overburden is effected.

## 1.2 PROJECT SCOPE

As currently configured, the proposed project will comprise an open pit mine, an ore concentrating plant, a frac sand plant, and supporting infrastructure as shown on Figure 1.2 and Figure 1.3 below. The ore concentrating plant will process 3,600,000 t/a of ore through crushing, grinding, flotation, and gravity operations. This feed rate will produce approximately 49,500 t/a of 22.3% nickel concentrate on an average year before transportation and moisture losses and approximately 46,400 t/a after losses. The frac sand processing plant will be capable of producing 1,350,000 t/a of various sand products including 20/40 and 40/70 frac sand.

The supporting infrastructure will be comprised of:

- tailings dam supporting ultramafic rock disposal with facilities,
- rock dumps, and overburden dumps
- explosives plant and explosives storage
- water treatment plant

- polishing pond
- de-watering systems with associated pipelines and pumping stations
- roads and laydown areas
- staff accommodations and facilities
- open pit mining equipment including trucks, shovels, loaders, and drills
- truck repair and maintenance facilities.

Refer to Figure 1.2 for an Overall Site Plan.

The plant and infrastructure facilities will be located as close to the open pit mine as possible, on the limestone bluff west of the site. The escarpment will be cut back to a general level of 254 m to ensure clearance above the water table for the plant facilities. The crusher will be located on the limestone bluff at a position where the elevation grade is most favourable. The ore reclaim stockpile will be located southeast of the crusher, with the appropriate separations and distances required for the conveyor. The ore processing facilities are located directly to the south of the ore reclaim stockpile with the appropriate separations and distances required for conveyors, access, and movement.

The Tailings and Waste Rock Management Facility (TWRMF) was located on the north-eastern portion of the property. At this location the limestone strata was found to be between 3 to 4 m below the surface, compared to the typical 10 to 12 m for much of the rest of the property.

The mine site buildings were arranged to minimize travel distances. The general maintenance building supporting the truck repair shop will be located close to the ore concentrator building. The modular complex will be situated in a cut north of the process area to provide some shelter and separation from the process area. The electrical substation, emergency diesel generator set, site fuelling area, and water treatment plant were located in the process area. The locations and sizes of the stockpiles for both the ore and the frac sand dictate that the frac sand plant should be separated from the ore processing area.

The plant area will be reasonably close to the modular complex containing the accommodations, cafeteria, and mine offices. The main access will be controlled by the guardhouse, located close to Highway 6 with the weigh scales in close proximity. To minimise interference with haul road traffic, a separate access to the camp area will be provided around the polishing pond and the dolomite dump.

**Figure 1.2 Overall Site Layout**

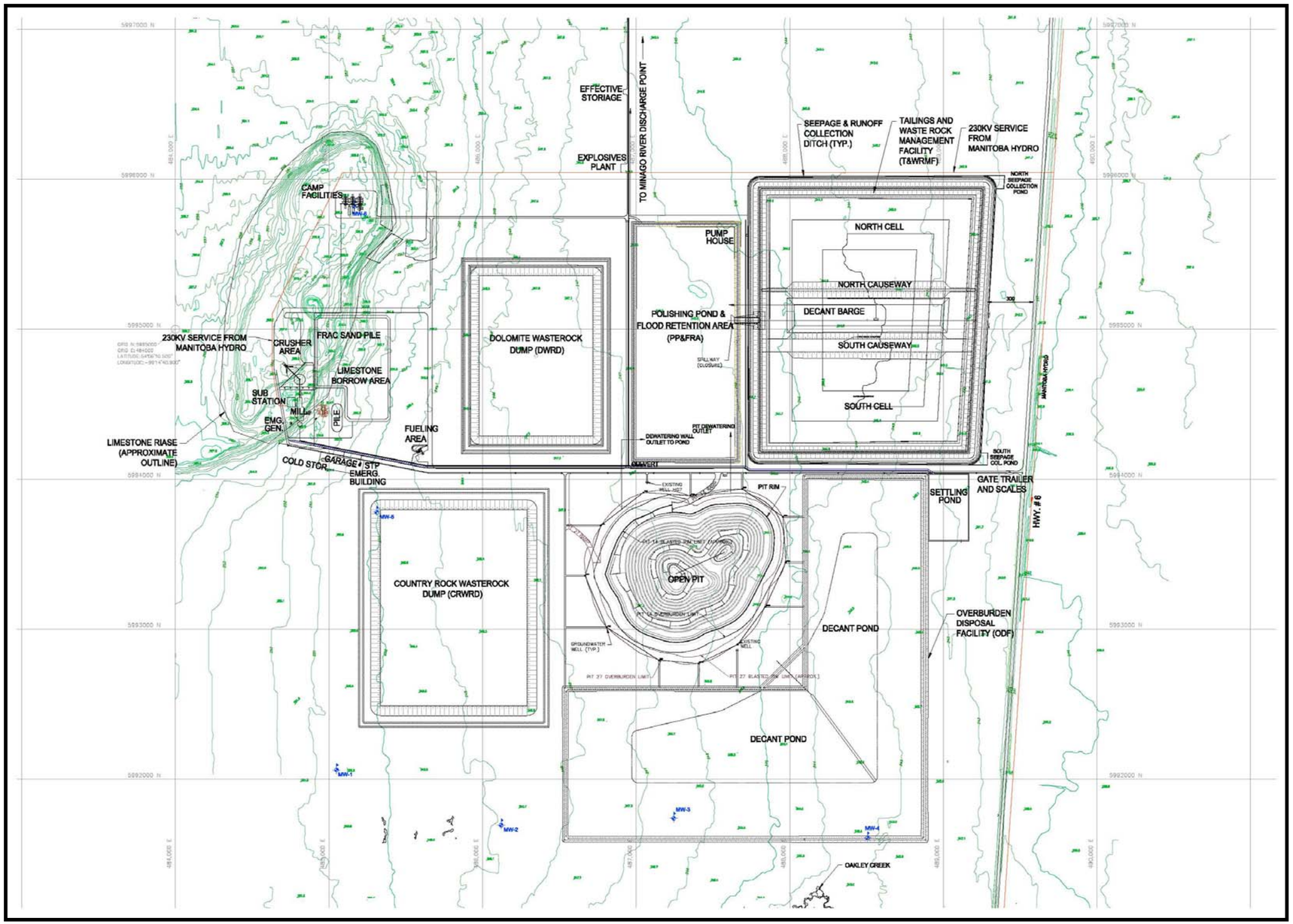
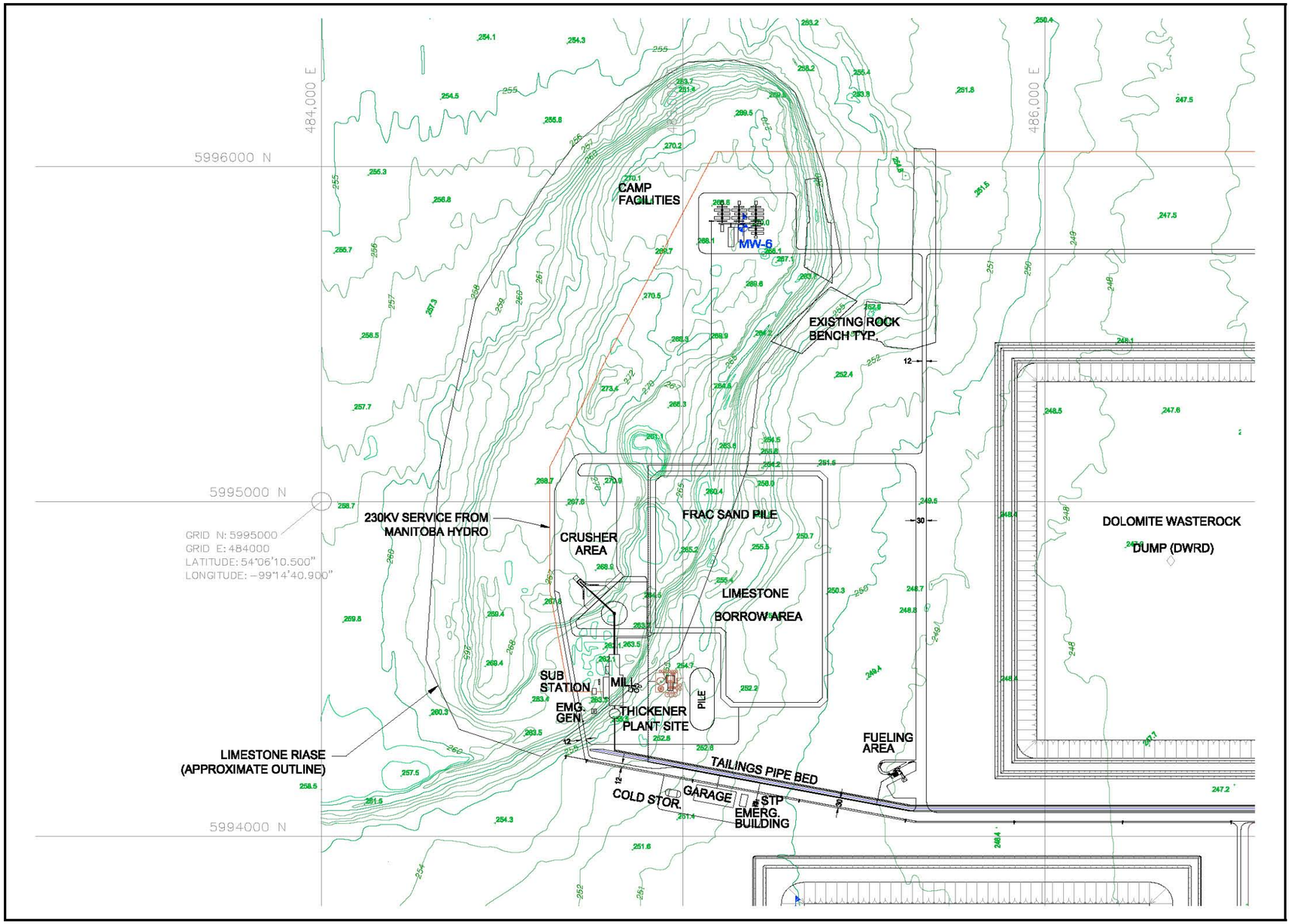


**Figure 1.3 Plant Facilities and Camp Layout**



Although the location of the tailings dam was governed by the geotechnical conditions, the dam is nonetheless reasonably close to the open pit mine. The remaining dumps, namely the dolomite dump and the country rock dump, are located around the pit to minimize the haul distances from the pit. In order to minimize the areas required for the tailings dam, and rock dumps, a consolidation period and setbacks have been designed into the deposition cycle to optimise the dump height.

The road arrangement was governed by the location of the dumps, facilities, and the ring road around the open pit mine to access the de-watering wells. An access and maintenance road to service the discharge line to the Minago River was positioned in relation to the flood retention area and the associated pump houses.

## 1.3 DESIGN BASIS

At the commencement of the engineering design process, a design basis document (Appendix A) was prepared to identify the design requirements and constraints. This document was intended to reflect the design requirements necessary to guide the Feasibility Study design.

The objectives of the design basis are:

- to list known design requirements to satisfy the functional needs
- to document changes to design parameters to reflect design development
- to establish clear accountability and client sign-off for the basis of design.

The design basis document was divided in three portions:

- a general section to provide the necessary context
- a discipline criteria to lay out the standard discipline design guidelines
- process requirements to identify the basic process criteria.

With respect to disciplines, the design basis complements many of the codes and standards of practice referenced therein. The process requirements provides parameters for the basic discipline services that support the operation of the process. In addition to the technical design, the design basis will incorporate maintenance and operating requirements.

The design basis has been updated as necessary to reflect design development through the feasibility phase of engineering. At the sign-off stage, this document has been signed off by the client and Wardrop in order to “freeze” the design changes and commence engineering based on the requirements and inputs established in the document itself.

Once complete, the design basis integrates the work of the engineering disciplines, process systems, maintenance functions, and operational requirements. Ultimately, the design basis provides a benchmark for evaluating designs and vendor packages, and for verifying construction, commissioning, start-up, maintenance, and operating activities.

## 1.4 HISTORY OF THE PROPERTY

A lease, Geophysical Reservation 34 (GR 34), covering an area of 19.2 x 38.4 km, was granted to Amax Potash Ltd. (Amax) on November 1, 1966 for a period of two years. (Reference to Amax in this report includes the subsidiaries and successor companies of Amax, namely Amax of Canada Ltd., 121991 Canada Ltd., and Canamax Resources Inc.). In 1968, the lease was extended to April 30, 1969. In March of 1969, Amax converted the most prospective area of GR 34 to 844 contiguous claims and in April of 1969, an additional 18 claims were staked.

In 1973, the claims that were believed to have the greatest potential for economically viable nickel mineralization were taken to lease status as Explored Area Lease 3 (North Block) and Explored Area Lease 4 (South Block). The subsequent agreement dated December 12, 1973, granted Granges Exploration Aktiebolag (Granges) an option on the Explored Area Leases (note: reference to Granges in this report includes the subsidiaries and successor companies of Granges, namely Granges Exploration Ltd. and Granges International Ltd.). In 1977, Granges became a passive partner with a 25% interest and a 0.5% net smelter return (NSR) royalty in the leases.

The summary of lease ownerships is as follows:

- On May 18, 1989 Black Hawk Mining Inc. (Black Hawk) purchased the Amax interest in the explored area leases.
- On August 2, 1989 Black Hawk purchased the Granges interest and NSR royalty in the explored area leases.
- On April 1, 1992 Explored Area Lease 3 and Explored Area Lease 4 were converted to Mineral Lease 002 and Mineral Lease 003 respectively. On March 18, 1994 a portion of Mineral Lease 002 was converted to mineral claims KON 1, KON 2, and KON 3.
- On March 18, 1994 a portion of Mineral Lease 003 was converted to mineral claim KON 4.
- On November 3, 1999 Nuinsco purchased the Black Hawk interest, subject to a graduated NSR royalty based on nickel prices (see 1.4.5 below).

### 1.4.1 AMAX EXPLORATION WORK – 1966 TO 1972

Amax conducted a regional scale exploration program on the southern extension of the Thompson Nickel Belt.

Amex concluded that the corporate threshold for deposit size justifying production would not be achieved on the property.

### 1.4.2 GRANGES EXPLORATION WORK – 1973 TO 1976

Granges focused their efforts on the Minago nickel deposit conducting resource estimates, mining, metallurgical, and milling studies.

Granges concluded that the Minago nickel deposit was sufficiently confirmed and that further delineation and exploration should be conducted from underground workings.

### 1.4.3 BLACK HAWK EXPLORATION WORK – 1989 TO 1991

Black Hawk conducted a deep penetrating ground electromagnetic survey, resource estimates, and mining, metallurgical, and milling studies. A helicopter borne electromagnetic and magnetic survey covering the property was obtained from Falconbridge Limited and interpreted.

### 1.4.4 NUINSCO WORK – JUNE 2006

In June 2006, at the request of Nuinsco, an independent review of the geology, exploration history, historical resource estimates, resource estimates, and the potential for discovery of additional nickel mineralization on the Minago property was conducted by P.J. Chornoby, P.Geo. This report summarized the results of exploration conducted during the period from 1966 to 1991 and the work conducted by Nuinsco from 2004 to October 31, 2006. An independent report was deemed necessary for material disclosure of new diamond drill data, mineral resource estimates, and technical studies.

### 1.4.5 ACQUISITION OF ROYALTY

Effective December 2008, Victory Nickel completed the acquisition of Independent Nickel Corporation which amongst other assets, owned the NSR royalty referred to in Section 1.4 above. Accordingly the Minago property is no longer subject to this royalty thereby improving project economics.

## 1.5 OWNERSHIP

The property is comprised of one contiguous group of claims and one mineral lease, augmented by an isolated claim and a second adjacent mineral lease (Figure 1.4). The contiguous block consists of one mineral lease and 40 unpatented mineral claims with a combined surface area of 7,298.23 hectares (ha) (Table 1.1 and Table 1.2).

**Figure 1.4 Minago Mineral Dispositions**

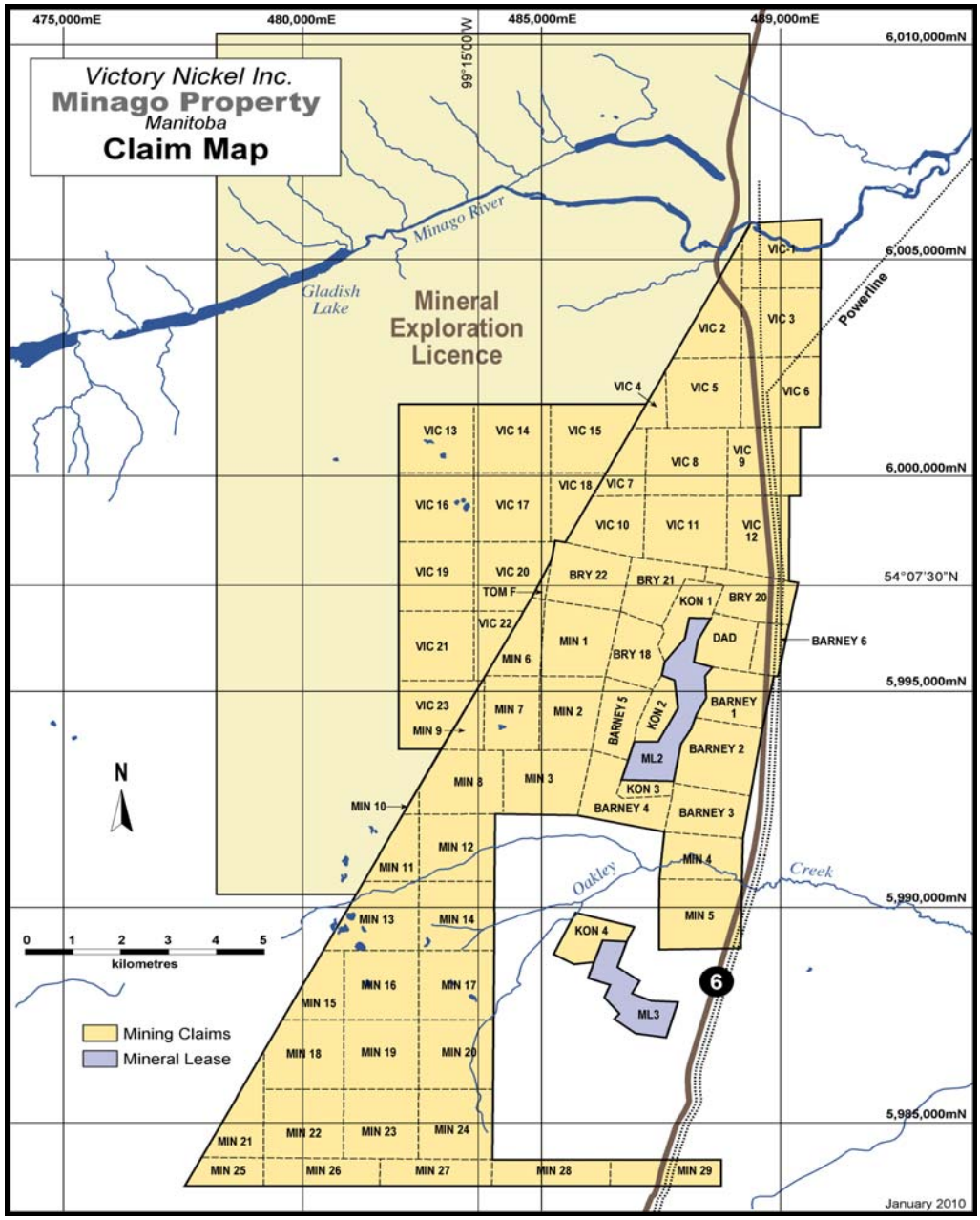


**Table 1.1 Minago Claim Group**

| Claim Name | Claim Number | Claim Holder | Date Staked | Date Recorded | Expiry Date | Area (ha) |
|---|---|---|---|---|---|---|
| KON 1 | P2527F | Victory Nickel Inc. | 1994/03/08 16:30 | 18/03/1994 | 17/05/2021 | 108 |
| KON 3 | P2529F | Victory Nickel Inc. | 1994/03/10 16:05 | 18/03/1994 | 17/05/2021 | 43 |
| KON 2 | P2528F | Victory Nickel Inc. | 1994/03/11 11:50 | 18/03/1994 | 17/05/2021 | 73 |
| KON 4 | P2530F | Victory Nickel Inc. | 1994/03/13 11:00 | 18/03/1994 | 17/05/2021 | 105 |
| BARNEY 1 | MB5390 | Victory Nickel Inc. | 2004/07/04 15:45 | 26/07/2004 | 24/09/2022 | 168 |
| BARNEY 2 | MB5391 | Victory Nickel Inc. | 2004/07/05 16:00 | 26/07/2004 | 24/09/2022 | 242 |
| BARNEY 3 | MB5392 | Victory Nickel Inc. | 2004/07/06 16:00 | 26/07/2004 | 24/09/2022 | 170 |
| BARNEY 4 | MB5393 | Victory Nickel Inc. | 2004/07/07 16:15 | 26/07/2004 | 24/09/2022 | 184 |
| BARNEY 5 | MB5394 | Victory Nickel Inc. | 2004/07/08 15:45 | 26/07/2004 | 24/09/2022 | 155 |
| BARNEY 6 | MB5395 | Victory Nickel Inc. | 2004/07/17 13:30 | 26/07/2004 | 24/09/2022 | 76 |
| MIN 1 | MB7027 | Victory Nickel Inc. | 2006/11/06 19:20 | 27/11/2006 | 26/01/2009 | 235 |
| MIN 2 | MB7028 | Victory Nickel Inc. | 2006/11/07 19:30 | 27/11/2006 | 26/01/2009 | 214 |
| MIN 3 | MB7029 | Victory Nickel Inc. | 2006/11/08 18:30 | 27/11/2006 | 26/01/2009 | 252 |
| MIN 4 | W48594 | Victory Nickel Inc. | 2006/07/27 19:00 | 04/08/2006 | 03/10/2009 | 162 |
| MIN 5 | W48595 | Victory Nickel Inc. | 2006/07/27 19:30 | 04/08/2006 | 03/10/2009 | 256 |
| MIN 6 | MB7030 | Victory Nickel Inc. | 2006/11/06 19:05 | 27/11/2006 | 26/01/2009 | 135 |
| MIN 7 | MB7031 | Victory Nickel Inc. | 2006/11/07 19:15 | 27/11/2006 | 26/01/2009 | 204 |
| MIN 8 | MB7033 | Victory Nickel Inc. | 2006/11/10 18:20 | 27/11/2006 | 26/01/2009 | 205 |
| MIN 9 | MB7032 | Victory Nickel Inc. | 2006/11/10 16:00 | 27/11/2006 | 26/01/2009 | 78 |
| MIN 10 | MB7066 | Victory Nickel Inc. | 2007/01/09 14:20 | 23/01/2007 | 24/03/2009 | 57 |
| MIN 11 | MB7067 | Victory Nickel Inc. | 2007/01/09 13:40 | 23/01/2007 | 24/03/2009 | 121 |
| MIN 12 | MB7141 | Victory Nickel Inc. | 2007/01/10 15:22 | 23/01/2007 | 24/03/2009 | 250 |
| MIN 13 | MB7142 | Victory Nickel Inc. | 2007/01/11 16:51 | 23/01/2007 | 24/03/2009 | 256 |
| MIN 14 | MB7143 | Victory Nickel Inc. | 2007/01/10 16:51 | 23/01/2007 | 24/03/2009 | 256 |
| MIN 15 | MB7144 | Victory Nickel Inc. | 2007/01/12 14:37 | 23/01/2007 | 24/03/2009 | 138 |
| MIN 16 | MB7145 | Victory Nickel Inc. | 2007/01/12 16:05 | 23/01/2007 | 24/03/2009 | 256 |
| MIN 17 | MB7146 | Victory Nickel Inc. | 2007/01/11 15:15 | 23/01/2007 | 24/03/2009 | 247 |
| MIN 18 | MB7147 | Victory Nickel Inc. | 2007/01/13 16:05 | 23/01/2007 | 24/03/2009 | 247 |
| MIN 19 | MB7148 | Victory Nickel Inc. | 2007/01/14 16:01 | 23/01/2007 | 24/03/2009 | 256 |
| MIN 20 | MB7149 | Victory Nickel Inc. | 2007/01/13 15:26 | 23/01/2007 | 24/03/2009 | 243 |
| MIN 21 | MB7150 | Victory Nickel Inc. | 2007/01/15 13:43 | 23/01/2007 | 24/03/2009 | 181 |
| MIN 22 | MB7151 | Victory Nickel Inc. | 2007/01/14 16:15 | 23/01/2007 | 24/03/2009 | 256 |
| MIN 23 | MB7152 | Victory Nickel Inc. | 2007/01/15 15:44 | 23/01/2007 | 24/03/2009 | 256 |
| MIN 24 | MB7153 | Victory Nickel Inc. | 2007/01/08 16:24 | 23/01/2007 | 24/03/2009 | 241 |
| MIN 25 | MB7154 | Victory Nickel Inc. | 2007/01/16 13:09 | 23/01/2007 | 24/03/2009 | 88 |
| MIN 26 | MB7155 | Victory Nickel Inc. | 2007/01/16 15:45 | 23/01/2007 | 24/03/2009 | 145 |
| MIN 27 | MB7156 | Victory Nickel Inc. | 2007/01/07 16:20 | 23/01/2007 | 24/03/2009 | 145 |
| MIN 28 | MB7157 | Victory Nickel Inc. | 2007/01/08 15:40 | 23/01/2007 | 24/03/2009 | 153 |
| MIN 29 | MB7158 | Victory Nickel Inc. | 2007/01/07 15:51 | 23/01/2007 | 24/03/2009 | 153 |
| TOM F | MB8549 | Victory Nickel Inc. | 2008/04/16 15:40 | 12/05/2008 | 11/07/2010 | 14 |
| DAD | MB8497 | Victory Nickel Inc. | 2008/05/22 16:00 | 28/05/2008 | 27/07/2010 | 132 |
| | | | | | **Total** | **7156** |

**Table 1.2 Minago Mineral Leases**

| Lease Name | Lease Number | Lease Holder | Expiry Date | Area (ha) |
|---|---|---|---|---|
| Mineral Lease 2 | ML-002 | Victory Nickel Inc. | 01/04/2013 | 247.2 |
| Mineral Lease 3 | ML-003 | Victory Nickel Inc. | 01/04/2013 | 176.9 |

Mineral Lease 2 and Mineral Lease 3, which were issued on April 1, 1992, for a period of 21 years, may be renewed after that time at the discretion of the Minister of Manitoba Industry, Economic Development, and Mines. The annual rental cost of the mineral leases is $1,984 for Mineral Lease 2 and $1,416 for Mineral Lease 3, both due annually on April 1.

Mineral claims KON 1 through KON 4 are in good standing until May 17, 2021 plus 60 days. Thereafter the cost to keep the KON mineral claims in good standing is $25.00/ha per year in the form of work conducted and submitted for assessment or payment in lieu thereof.

Mineral claims BARNEY 1 to BARNEY 6 inclusive are in good standing until September 24, 2022 plus 60 days. After that, the costs to keep the BARNEY claims in good standing is $25.00/ha per year in the form or work conducted and submitted for assessment or payment in lieu thereof.

The mineral claims MIN 1 through MIN 29 are in good standing until the dates indicated on Table 1.1. The earliest expiry date for this claim group is January 26, 2009. After expiry, the cost to keep the MIN claims in good standing is $12.50/ha per year until the year 2017 in the form of work conducted and submitted for assessment or payment in lieu thereof. Thereafter the cost to keep the MIN mineral claims in good standing is $25.00/ha per year in the form of work conducted and submitted for assessment or payment in lieu thereof.

Mineral claims VIC 1 through VIC 12 are in good standing until April 17, 2021 plus 60 days. Thereafter the cost to keep the KON mineral claims in good standing is $12.00/ha per year in the form of work conducted and submitted for assessment or payment in lieu there of.

Mineral claims VIC 13 through VIC 23 are in good standing until December 21 2011 plus 60 days. Thereafter the cost to keep the KON mineral claims in good standing is $12.00/ha per year in the form of work conducted and submitted for assessment or payment in lieu of.

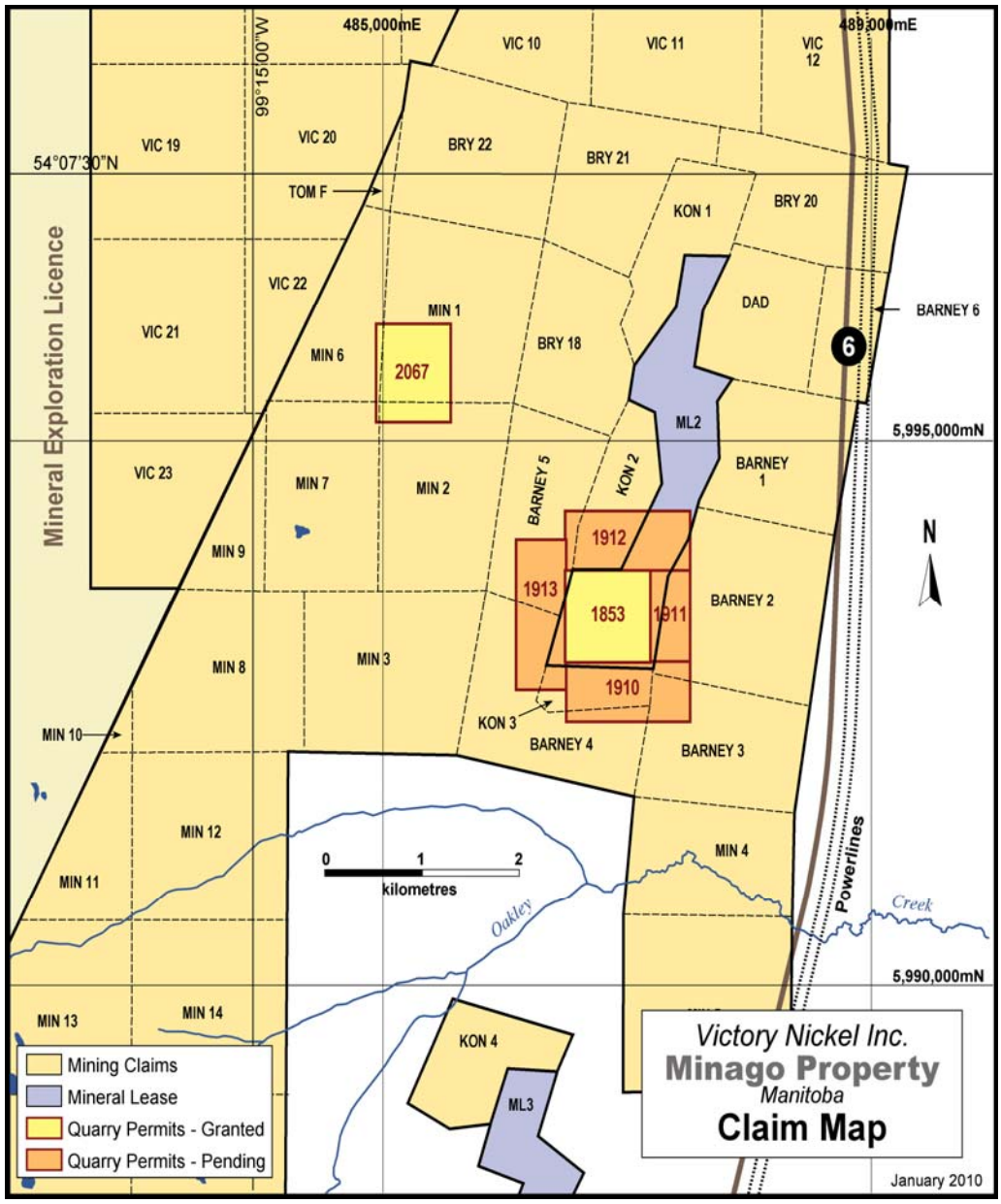
As a result of an option agreement entered into with Xstrata Nickel on claims BRY 18, BRY 20, BRY 21, BRY 22, TOM F, and DAD and subsequently fully exercised at year- end 2008, a NSR is payable to Xstrata on any exploited mineralization found on the claims. The NSR, consists of a 2% royalty when the London Metal Exchange (LME) three-month nickel price is greater than, or equal to, US$13,227.74/t, and a 1% NSR when the three-month price of nickel is less than US$13,227.74/t. All other metals will be subject to a 2% NSR.

Victory Nickel has also obtained a quarry lease (QL-1853) with an area of 69.88 ha on a portion of the mineral lease ML2. Four additional quarry leases, surrounding and contiguous with QL-1853 have been applied for. These pending quarry leases

area totals an additional 244 ha. Victory Nickel has also applied for an additional quarry lease within claims MIN 1 and MIN 2 (4).

Quarry lease QL-1853 has a term of 10 years and may be renewable for further terms of 10 years subject to the discretion of the Minister. The annual rental cost for the quarry lease is $1,677.12 payable on the anniversary date.

**Figure 1.5 Minago Property Quarry Lease Status**



## 1.6 TENURE RIGHTS AND ENCUMBRANCES

The holder of a mineral claim has the exclusive right to explore for and develop the Crown minerals, other than the quarry minerals, found in place on, in, or under the lands covered by the claim (The Mines and Minerals Act, 73[1]).

The lessee of a mineral lease has the exclusive right to the Crown minerals, other than quarry minerals, that are the property of the Crown and are found in place or under the land covered by the mineral lease. The lessee also has access rights to open and work a shaft or mine, and to erect buildings or structures upon the subject land (The Mines and Minerals Act, 108[a], [b], [i], [ii]).

With respect to the pending quarry lease, the lessee of a quarry lease has the exclusive right to the Crown quarry minerals specified in the lease (in this case limestone) that are found on or under the land covered by the lease and that are the property of the Crown (The Mines and Minerals Act ,140[1] [a]).

Encumbrances on the mineral dispositions include:

- For Norway House District: Registered Trap Line (RTL) # 150-07 covering all mineral dispositions.
- For Forestry Branch, Forest Management Licence: (FORM REPAP W 0012 and FORM REPAP 2 0012 covering all mineral dispositions.
- For Manitoba Hydro, Transmission Line and Easement Agreement: Right of Way 319.735 m wide, plan number 5830 N.L.T.O for portions of BARNEY 1, BARNEY 2, BARNEY 6, and MIN 5.
- For Manitoba Department of Highways: Right of way 91.44 m wide that is split 65.532 m west of the centre line and 25.908 m east of the centre line, plan number 6149 N.L.T.O for portions of BARNEY 1, BARNEY 2, BARNEY 3, BARNEY 6, MIN 4, and MIN 5.
- For Manitoba Department of Highways: Quarry Withdrawal, plan number 6148 N.L.T.0.for southeast corner of ML-003.

With respect to the pending quarry lease, royalties are applicable to quarry products such as limestone and frac sand at varying rates depending on their end use. Currently, a rehabilitation levy of $0.10/t is assessed against quarry production.

There is no mining-related infrastructure on the property although the Minago River Nickel Deposit, previously referred to as the Nose Deposit, is located on mineral lease ML-002.

There are no environmental liabilities attached to the property.

## 1.7 PERMITTING

Prior to commencing exploration field work, a work permit describing each work activity must be obtained from the Manitoba Conservation office in Wabowden, Manitoba and a letter of advice from the Federal Department of Fisheries and Oceans. The Norway House Resource Management Area Committee has been advised of the upcoming work.

## 1.8 PLANT LOCATION AND GEOGRAPHY

The Minago site is situated within a topographically low area of water-saturated peat and forest terrain. The property is almost entirely swampy muskeg, and topographic relief is less than 3.0 m with vegetation consisting of sparse black spruce and tamarack. This low area extends for a significant distance to the north and east, but is bounded to the south and west by an elevated limestone outcrops, at a distance of 7 to 20 km from the site.

Small-to-medium size lakes are present to the southwest and northeast, along with Limestone Bay on the north-eastern edge of Lake Winnipeg, within a radius of about 30 km. Local surface flow for the general area drains into a series of watersheds, including Oakley Creek to the south and Minago River to the north, with an overall easterly flow direction. The project site drains primarily to the east via Oakley Creek which discharges to Limestone Bay. Drainage from a minor portion of the site reaches the Minago River.

Geographically, the project site is located within the Nelson River sub-basin, which drains northeast into the southern end of the Hudson Bay. The basin has two more catchments in the Minago River and the Hargrave River which enclose the project site. There are two more tributaries, William River and Oakley Creek, present at the surroundings of the project area. The catchments of these two tributaries are within the Lake Winnipeg basin and drain northward into the Nelson River sub-basin.

The average elevation of the property is approximately 245 m above mean sea level with a level topography apart from a low bluff to the west of the site. . A network of diamond drill roads enables pick-up truck travel on the property in the winter and all-terrain vehicle travel in the summer. The Minago property is located 485 km north-west of Winnipeg, Manitoba as shown on NTS Map Sheet 63J/3.

The Minago mine site is favourably located close to existing infrastructure, such as:

- Manitoba Provincial Highway 6, which serves as a major transportation route in northern Manitoba is a paved two-lane highway directly adjacent to the site.

- A Manitoba Hydro 230 kV High Voltage Transmission Line runs directly beside Highway 6 on the east side of the road.
- The Omnitrax Canada Railway Line, which connects the southern prairie region to Churchill, Manitoba, crosses Highway 6 approximately 60 km north of the site.
- The town of Grand Rapids with provisions for food and accommodation is located 107 km south of the mine site. The population of the town, which is located where the Saskatchewan River flows into Lake Winnipeg, was given as 404 in the 1996 census. Although smaller than Grand Rapids, a further community of Snow Lake with similar facilities is located to the north of the mine.
- Grand Rapids is served by an RCMP detachment, a nursing station, daily bus and truck transportation to Winnipeg, and an airstrip, in addition to the small supply and service businesses.
- The provincial capital of Winnipeg is located 485 km to the south-southeast of the mine, approximately 6 hours driving time.

## 1.9 REGIONAL GEOLOGY

This section is a brief overview of the regional geology of the Thompson Basin, which is described in more detail in Section 2.0.

The regional geology comprises the eastern edge of the Phanerozoic sediments of the Western Canada Sedimentary Basin that unconformably overlie Precambrian crystalline basement rocks, including the Thompson Nickel Belt. The basin tapers from a maximum thickness of about 6,000 m in Alberta to zero at the north and east, where it is bound by the Canadian Shield. The property is located near the northeast corner of the basin, where it comprises approximately 53 m of Ordovician dolomitic limestone underlain by approximately 7.5 m of Ordovician sandstone.

The Precambrian basement rocks of the Thompson Nickel Belt form a northeast southwest trending 10 to 35 km wide belt of variably reworked Archean age basement gneisses and Early Proterozoic age cover rocks along the northwest margin of the Superior Province. Lithotectonically, the Thompson Nickel Belt is part of the Churchill Superior boundary zone.

The Archean age rocks to the southeast of the Thompson Nickel Belt include low to medium grade metamorphosed granite greenstone, and gneiss terranes and the high grade metamorphosed Pikwitonei Granulite Belt. The Pikwitonei Granulite Belt is interpreted to represent exposed portions of deeper level equivalents of the low to medium grade metamorphosed granite greenstone and gneiss terranes. The Superior Province Archean age rocks are cut by mafic to ultramafic dikes of the

Molson swarm dated at 1883 mega annum (Ma). Dikes of the Molson swarm occur in the Thompson Nickel Belt, but not to the northwest in the Kisseynew domain. The early Proterozoic rocks to the northwest of the Thompson Nickel Belt comprise the Kisseynew domain that is interpreted to represent the metamorphosed remnants of a back arc or inter arc basin.

The variably reworked Archean age basement gneisses constitute the dominant portion (volumetrically) of the Thompson Nickel Belt. The Early Proterozoic rocks that occur along the western margin of the Thompson Nickel Belt are a geologically distinguishable stratigraphic sequence of rocks known as the Opswagan Group.

## 1.10 CLIMATE

The Minago project area is located at approximately 250 m above sea level (masl) in north-central Manitoba, approximately 100 km north of Grand Rapids, which is on the western shores of Lake Winnipeg. The region is characterized by warm, wet summers and cold, dry winters. Temperatures range from 23.5°C in July to -24.4°C in January. Annual precipitation is approximately 473.7 mm, of which 77% falls as rain. The majority of this rainfall occurs between June and September, with a smaller amount falling in early spring and late fall. Little rain is recorded for November to March when almost all precipitation falls as snow (Canadian Climate Normals 1971-2000, Grand Rapids Hydro Climate Station).

Seasonal air temperature cycles are comparable between the Grand Rapids Hydro, The Pas Airport, and Norway House climate stations. For all three stations, the coldest months are January and February, and the warmest month is July. Seasonal temperature variations are similar. At approximately 250 masl, the Minago Project site is at an elevation between that of The Pas (270 masl), Grand Rapids (223 masl), and Norway House (224 masl).Given the proximity of the three stations to the Minago project, the air temperatures at the Grand Rapids station, where more copious data is available, were used in this study.

At the Grand Rapids Hydro station from 2003 to 2007, the average mean monthly temperature for January was -17.42°C and 19.04°C for July (Table 1.3). The average minimum temperature in January was -24°C; the average maximum temperature in July was 24.6°C.

Over the period of record available for Grand Rapids (40 years) and The Pas Airport (60 years) (Figure 1.6 and Figure 1.7), there has been a slight trend toward increasing precipitation and less extreme winter temperatures. Grand Rapids Hydro shows a gradual and minor increase in temperature over time, whereas recent increases in temperature at The Pas Airport have apparently moderated over the 60-year observation period. The snow pack at The Pas Airport has notably decreased

over the period of record, while the frequency and magnitude of extreme precipitation events appear to have increased over time.

**Table 1.3 Temperature Summary – Grand Rapids, Manitoba**

| Year | Statistic | Jan (°C) | Feb (°C) | Mar (°C) | Apr (°C) | May (°C) | Jun (°C) | Jul (°C) | Aug (°C) | Sep (°C) | Oct (°C) | Nov (°C) | Dec (°C) | Annual Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2003 | Maximum | -13.2 | -16.2 | -5.2 | 6.2 | 17.7 | 22.1 | 24.1 | 25.8 | 15.5 | 9 | -3.8 | -5.9 | 6.3 |
| | Mean | -18.3 | -21.6 | -11.2 | 0.2 | 10.5 | 16.3 | 18.7 | 20 | 11.1 | 4.7 | -8.3 | -10.9 | 0.9 |
| | Minimum | -23.3 | -26.9 | -17.3 | -5.8 | 3.2 | 10.4 | 13.3 | 14.1 | 6.6 | 0.3 | -12.7 | -16 | -4.5 |
| 2004 | Maximum | -18.1 | -6.8 | -1.5 | 6.1 | 10.4 | 16.9 | 22.6 | 18.5 | 16.4 | 7.6 | 1.4 | -14 | 5 |
| | Mean | -22.5 | -12.1 | -7.8 | 0.8 | 3.7 | 10.8 | 17.1 | 13.5 | 11.4 | 3.3 | -3.8 | -19.9 | -0.5 |
| | Minimum | -27 | -17.3 | -14.1 | -4.4 | -3 | 4.8 | 11.6 | 8.4 | 6.4 | -0.9 | -9 | -25.8 | -5.9 |
| 2005 | Maximum | -15.5 | -8.3 | -4.2 | 9.5 | 13.4 | 19.4 | 24.6 | 21.8 | 17.2 | 9.6 | 0.3 | 5.6 | 6.9 |
| | Mean | -20.15 | -14.7 | -10.9 | 4.15 | 8.25 | 14.7 | 18.45 | 16.15 | 11.75 | 4.55 | -5.6 | -3.9 | 1.45 |
| | Minimum | -24.8 | -21.1 | -17.6 | -1.2 | 3.1 | 10 | 12.3 | 10.5 | 6.3 | -0.5 | -11.5 | -13.4 | -4 |
| 2006 | Maximum | -5.4 | -10.9 | -2 | 11.7 | 12.9 | 23.2 | 26.1 | 23.5 | 13.9 | 6.5 | -4 | -6.1 | 7.5 |
| | Mean | -10.1 | -16.65 | -7.8 | 5.4 | 7.85 | 17.3 | 20.8 | 18.55 | 11.05 | 3.25 | -8.15 | -10.5 | 2.8 |
| | Minimum | -14.8 | -22.4 | -13.6 | -0.9 | 2.8 | 11.4 | 15.5 | 13.6 | 8.2 | 0 | -12.3 | -14.9 | -2.3 |
| 2007 | Maximum | -11.1 | -15.1 | -0.9 | 7.9 | 14.7 | 18.5 | 25.5 | 20.9 | 15 | 9.4 | N/A | N/A | 8.5 |
| | Mean | -15.95 | -19.65 | -7.2 | 1.25 | 9.1 | 13.8 | 20.05 | 16.3 | 10.3 | 5.95 | N/A | N/A | 3.4 |
| | Minimum | -20.8 | -24.2 | -13.5 | -5.4 | 3.5 | 9.1 | 14.6 | 11.7 | 5.6 | 2.5 | N/A | N/A | -1.7 |

**Figure 1.6 Monthly Total Precipitation and Mean Air Temperature at Grand Rapids between 1966 and 2007**

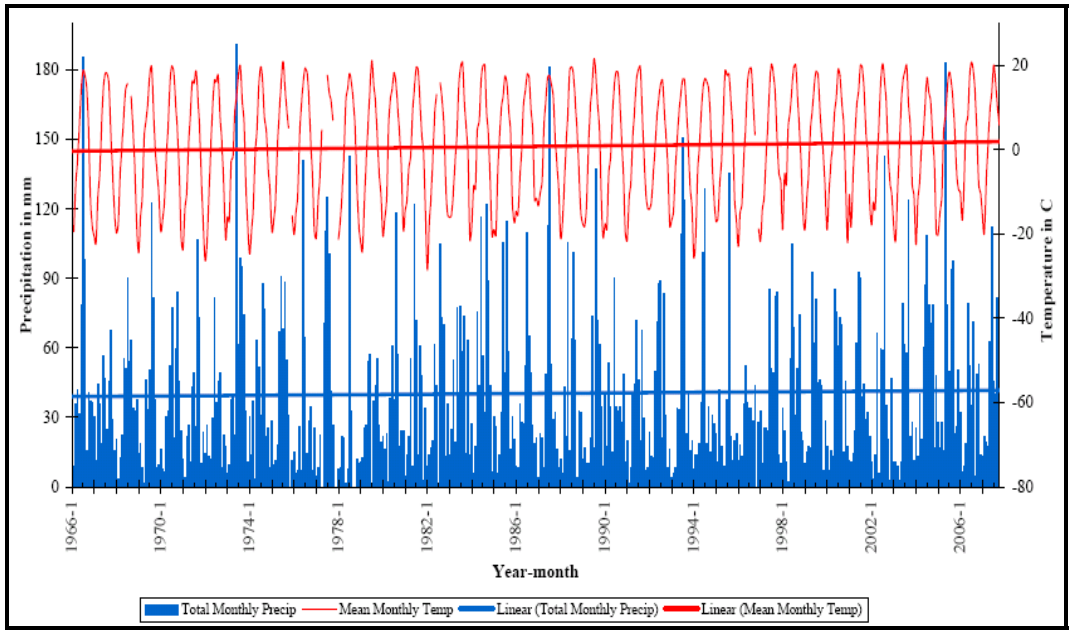
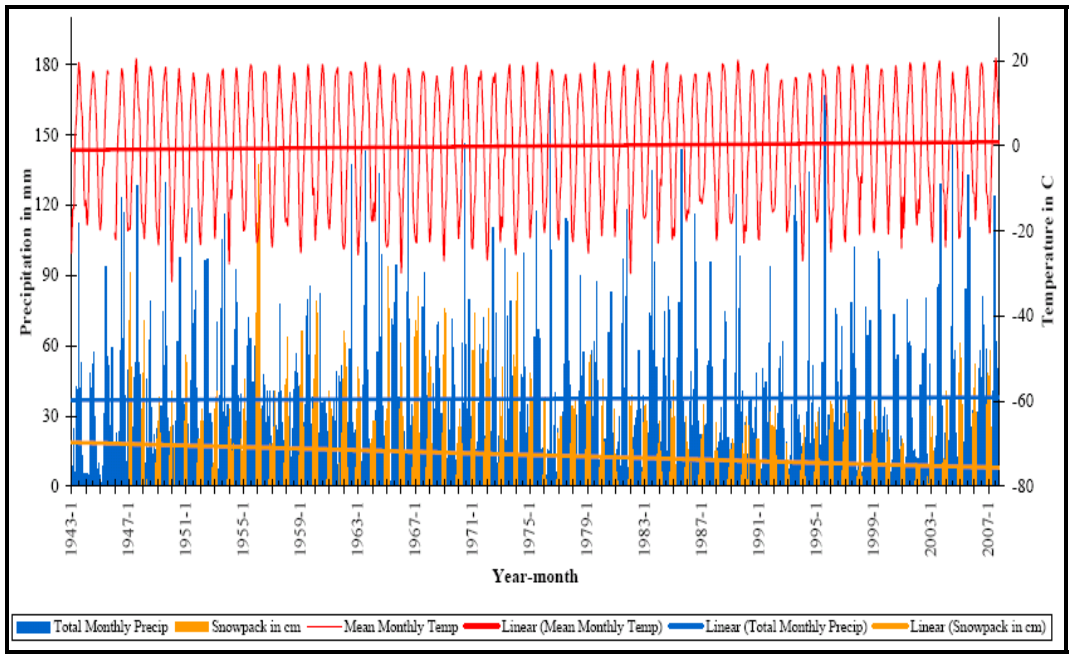


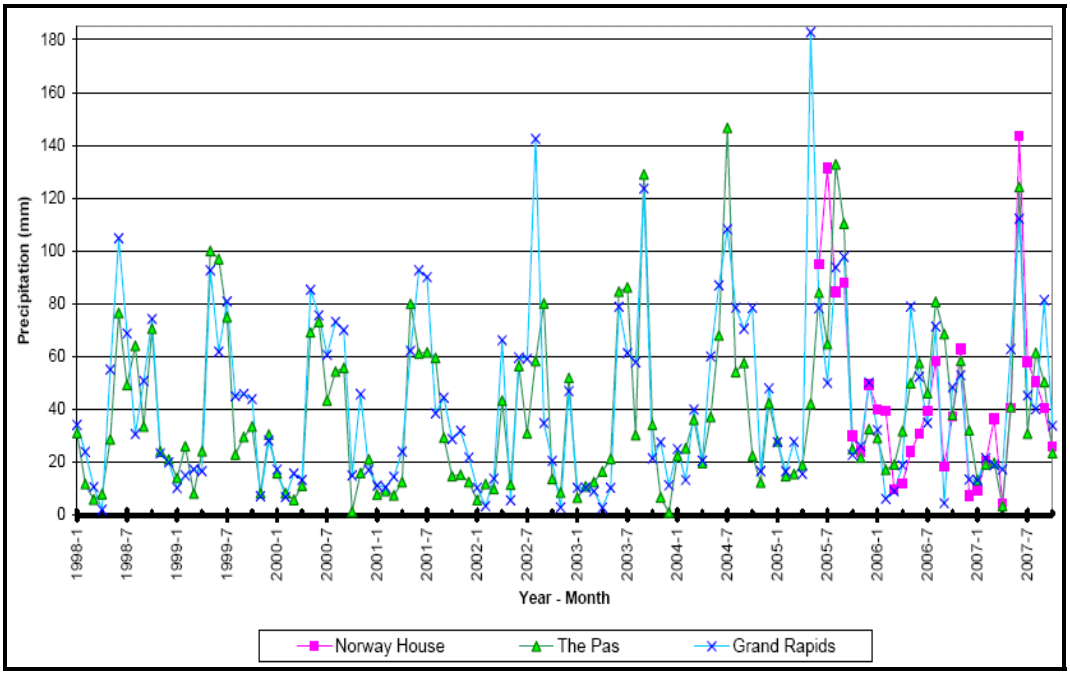

**Figure 1.7 Monthly Total Precipitation, Mean Air Temperature, and Snowpack at The Pas between 1943 and 2007**



The highest total monthly precipitation amounts for the record period were greater for Grand Rapids Hydro than for The Pas Airport. At Grand Rapids Hydro, the highest precipitation on record occurred in 1973 (191 mm); other high precipitation events were observed in 1966 (185.7 mm), 1987 (181.1 mm), and most recently in 2005 (182.8 mm). All of these events occurred in the late spring or summer months (May, June, or July). In more recent years, the three stations also show similar yearly precipitation cycles (Figure 1.8), with the exception that Grand Rapids Hydro had higher magnitude precipitation events, receiving approximately 21 mm more rain on average from 2003 to 2007 than The Pas Airport.

In general, the majority of rainfall occurs between June to September (62% of which occurred at both Grand Rapids and The Pas Airport between 2003 and 2007. The majority of the annual precipitation is rain (77% at Grand Rapids and 76% at The Pas). The majority of snowfall occurs from November to March (86% at Grand Rapids and 85% at The Pas). It is noteworthy that the freshet or breakup of the snowpack is also one of the driest periods of the year in terms of precipitation, suggesting that snowmelt is gradual and not accelerated by heavy rainfall.

**Figure 1.8 Monthly Total Precipitation between 1998 and 2007 for Norway House, The Pas, and Grand Rapid Stations**




The Project is located in a region historically exhibiting low seismicity and extensive evaluation extending beyond an examination of historic earthquakes is not considered necessary. The 2005 National Building Code seismic hazard calculation indicating the acceleration levels for given probabilities is presented in Table 1.4.

**Table 1.4 Minago Project Area Regional Seismicity**

| Probability of Exceedance per Annum | Probability of Exceedance In 50 Years (%) | Return Period (years) | Peak Ground Acceleration (*g*)* |
|---|---|---|---|
| 0.01 | 40 | 100 | 0.007 |
| 0.0021 | 10 | 475 | 0.021 |
| 0.001 | 5 | 1,000 | 0.035 |
| 0.000404 | 2 | 2,475 | 0.059 |

* *g* = acceleration due to gravity.

A return period of 475 years is identified as appropriate to be used for the structures of the site with the corresponding Peak Ground Acceleration (PGA) of 0.021 *g*. This value has been assumed to be applicable for the operation life of the mine. For the longer term (the post-closure phase) a return period of 2,475 years has been assumed with a corresponding PGA of 0.059 *g*.

The following design information is provided by the Meteorological Service of Canada, for a location defined as Grand Rapids/Wabowden Midpoint, which provides a summary of the climatic design data for the Minago location.

### ANNUAL PRECIPITATION

Annual Total Precipitation .....490 mm
Annual Rain.....350 mm
Rain 1/50 year return period 24 hours..... 84 mm
Rain 1/50 year return period 15 minutes ..... 16 mm

### TEMPERATURES

Winter Design Temperature:
January 2.5% ..... -36°C
January 1% ..... -38°C

Summer Design Temperature:
July Dry 2.5% ..... 28°C
July Wet 2.5% ..... 21°C

Degree Days less than 18°C ..... 6,900

Equipment will operate continuously over the following temperature ranges:

Indoor Equipment ..... +5°C to + 30°C
Underground Equipment ..... -4°C to +15°C

### WIND

Hourly wind pressure for:
1/10 year return period ..... 0.32 kPa
1/30 year return period ..... 0.40 kPa
1/50 year return period ..... 0.45 kPa
1/100 year return period ..... 0.51 kPa

Moisture Index ..... 0.61

### SEISMIC

2% probability of accidence in 50 years:
Sa (0.2) ..... 0.120
Sa (0.5) ..... 0.056
Sa (1.0) ..... 0.023
Sa (2.0) ..... 0.006
PGA ..... 0.059

### SNOW LOAD

Snow Load for a 1/30 year return period:
Ss ..... 2.2 kPa
Sr ..... 0.2 kPa

Snow Load for a 1/50 year return period:
Ss ..... 2.4 kPa
Sr ..... 0.2 kPa

# 2.0 GEOLOGY AND MINERAL RESOURCES

## 2.1 SUMMARY

Wardrop assembled the historic project geological data to establish a resource estimate that conforms to the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Mineral Resource and Mineral Reserves definitions, referred to in NI 43-101, Standards of Disclosure of Mineral Projects.

Wardrop conducted a mineral resource estimate of the sedimentary and intrusive rocks hosting nickel sulphide mineralization, and the Paleozoic Winnipeg Sandstone Formation immediately above. The estimation was completed for total nickel (%Ni), nickel sulphide (%NiS) and Frac Sand using data from historic and recent drilling.

For total nickel, Wardrop estimates that the Minago deposit contains a measured resource of 11 Mt, grading 0.56% Ni, above a cutoff grade of 0.25% Ni. The indicated resource in the deposit contains 43 Mt at 0.51% Ni above a 0.25% Ni cutoff grade. The Inferred Resource in the deposit has been estimated at 15 Mt at 0.53% Ni above a 0.25% Ni cutoff. The cutoff grade of 0.25% for total nickel will represent the cutoff value of 0.20% when considering nickel in sulphide as discussed below.

In order to better define the recovery potential on the nickel, Wardrop estimated the nickel sulphide resource within the total nickel resource. The nickel sulphide resource is not to be considered as incremental volume to the stated total nickel resource as it is not an additional resource. Nickel in sulphide is considered a more reliable method of determining the nickel content as only a single stage assessment is required. If a total nickel approach is adopted, an assessment of the nickel in silicate, for which the nickel cannot be released, is required. Wardrop estimates that the Minago deposit contains a measured resource of 9.1 Mt, grading 0.47% NiS, above a cutoff grade of 0.20% NiS. In addition, the deposit contains 35 Mt of Indicated Resource at 0.42% NiS above a 0.20% NiS cutoff grade. An Inferred Resource of 12 Mt at 0.44% NiS above a 0.20% NiS cutoff has also been estimated.

An indicated resource of 15 Mt of Frac Sand within the Winnipeg Sandstone Formation has also been identified. Approximately 10% to 20% of the Frac Sand will report to the 20/40 size fraction, while approximately 68% to 83% will report to the 40/140 size fraction.

The Minago deposit has demonstrated potential as a large tonnage low-grade nickel sulphide deposit amenable to open pit, and possibly to underground bulk tonnage mining methods. Significant parts of the deposit below a depth of 400 m require additional drilling to upgrade the resource class from inferred to indicated.

The sandstone layer must be removed to access the mineralization within the proposed open pit mine.

## 2.2 GEOLOGICAL SETTING

### 2.2.1 REGIONAL GEOLOGY

The regional geology comprises the eastern edge of the Phanerozoic sediments of the Western Canada Sedimentary Basin that unconformably overlie Precambrian crystalline basement rocks including the Thompson Nickel Belt. The Western Canada Sedimentary Basin tapers from a maximum thickness of about 6,000 m in Alberta to zero to the north and east where it is bounded by the Canadian Shield. The Property is located near the northeast corner of the Western Canada Sedimentary Basin. At the Minago site, Phanerozoic sediments are comprised of approximately 53 m of Ordovician dolomite underlain by approximately 7.5 m of Ordovician sandstone.

The Precambrian basement rocks of the Thompson Nickel Belt form a northeast southwest trending 10 to 35 km wide belt of variably reworked Archean age basement gneisses and Early Proterozoic age cover rocks along the northwest margin of the Superior Province. Lithotectonically the Thompson Nickel Belt is part of the Superior Boundary Zone. The Archean age rocks to the southeast of the Thompson Nickel Belt include low to medium grade metamorphosed granitic greenstone and gneiss terranes and the high grade metamorphosed Pikwitonei Granulite Belt. The Pikwitonei Granulite Belt is interpreted to represent exposed portions of deeper level equivalents of the low to medium grade metamorphosed granite greenstone and gneiss terranes. The Superior Province Archean age rocks are cut by mafic to ultramafic dikes of the Molson swarm dated approximately 1.9 million years ago. Dikes of the Molson swarm occur in the Thompson Nickel Belt, but not to the northwest in the Kisseynew domain. The early Proterozoic rocks to the northwest of the Thompson Nickel Belt comprise the Kisseynew domain that is interpreted to represent the metamorphosed remnants of a back arc or inter arc basin.

The variably reworked Archean age basement gneisses constitute the dominant portion, volumetrically, of the Thompson Nickel Belt. The Early Proterozoic rocks that occur along the western margin of the Thompson Nickel Belt are a geologically distinguishable stratigraphic sequence of rocks termed the Opswagan Group.

### 2.2.2 PROPERTY GEOLOGY

There is no outcrop on the Property. Bedrock geology is interpreted from geophysical data, diamond drill hole core, and regional structural and isopach trends.

### 2.2.3 SURFICIAL GEOLOGY

The surface cover typically comprises 1.0 to 2.1 m of muskeg and peat that is underlain by 1.5 to 10.7 m of impermeable compacted glacial lacustrine clays. The clays are dark brown to grey and carbonate rich.

### 2.2.4 ORDOVICIAN STRATIGRAPHY

The Phanerozoic geology comprises the north-eastern edge of the sediments of the Western Canada Sedimentary Basin that unconformably overlie Precambrian crystalline basement rocks, which includes the Thompson Nickel Belt. The Western Canada Sedimentary Basin tapers from a maximum thickness of about 6,000 m in Alberta to zero to the north and east where it is bounded by the Canadian Shield. The Williston Basin strata, in Manitoba, forms a basinward-thickening, southwesterly-sloping wedge, with the strata reaching a thickness of 2.3 km in the extreme southwestern corner of the province.

Underlying the surficial cover are flat lying Ordovician dolomite and sandstone. The dolomite is fine grained, massive to stratified and varies in colour from creamy white to tan brown to bluish grey. Dolomite thicknesses range from 42 to 62 m with the thickness increasing southward. The upper 24 m of the formation is stratified with horizontal clay/organic beds 1 to 5 mm in thickness, spaced at intervals ranging from millimetres to one metre. A stratified zone of dolomite breccia and microfracturing characterized by dolomite clasts in a carbonate clay matrix and varying in thickness from 0.3 to 3.0 m is located 15 m to 21 m below the surface of the formation. Scattered throughout the dolomite are occasional soft clay seams ranging from 1 to 2 centimetres (cm) in thickness. The seams may contain dolomite fragments and sand grains and vary in orientation from semi-horizontal to semi-vertical.

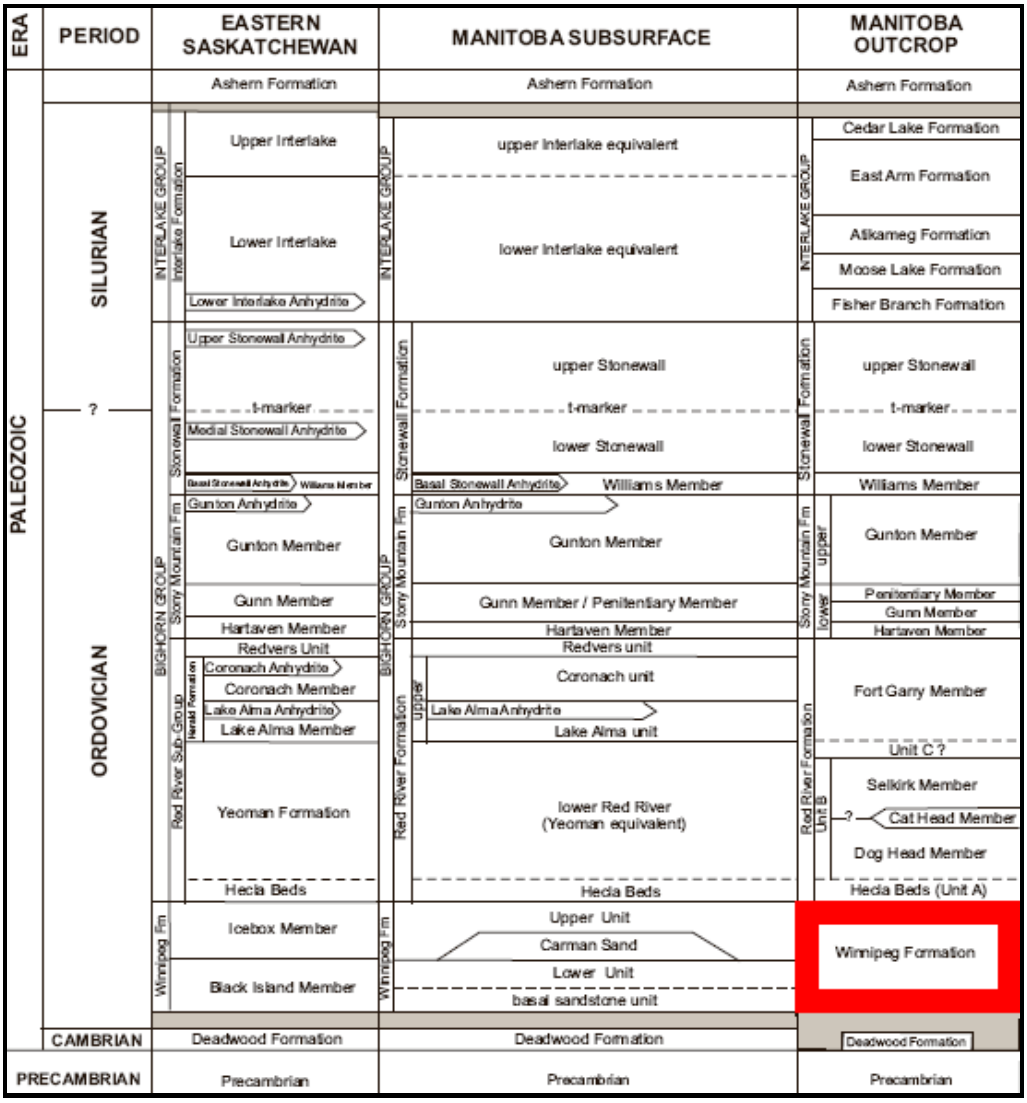
The Ordovician sandstone of the Winnipeg Formation occurs stratigraphically below the dolomite approximately 46 to 73 m below surface. The sandstone ranges in thickness from 5.1 to 15.9 m. Cohesiveness varies from consolidated and carbonate cemented to semi-consolidated, friable and clay/silt rich to unconsolidated sand. Clay/silt rich zones are brown grey in colour while white zones are carbonate cemented.

The deposition of the Winnipeg sand in the Williston Basin is thought to be controlled by tectonics in the Williston Basin to the south and the ancestral Sweetgrass Arch, located in Saskatchewan, to the west. The bulk of the sediments were derived from the erosion of the Cambrian Deadwood Formation sediments, present in the extreme southwestern portion of Manitoba and into Saskatchewan, and deposition occurred in marine beach to offshore bar environments. The sandstone is distinguished from all other sediments in the basin on the basis of being quartzose and well rounded with variable cementation. The quartz grains are thought to have undergone both fluvial and aeolian transport as they show distinctive frosting caused by wind transport. It has been suggested that these sediments may have been partially derived from the

Upper Proterozoic Athabasca Group in northern Saskatchewan (Paterson, 1971; Gent, 1993).

The Ordovician clastic and carbonate sequence in the Minago area was part of a large cratonic depositional platform that extended from the Hudson Platform in the northeast to New Mexico to the south (Norford, et al., 1994). The lowermost Paleozoic unit on the Property is the Ordovician Winnipeg Formation (Figure 2.1) which is composed of Lower and Upper units in the southern portion of the basin in Manitoba. The southern portion of the basin in Manitoba can be described as a lower continuous, poorly consolidated, quartz-rich sandstone sheet overlain by an upper unit of shale with interbedded sandstone.The Lower Unit was deposited in a marine beach to off-shore bar environment. Near-shore, high-energy, shallow-marine to shoreline conditions, possibly at times terrestrial, prevailed in the northern margin of the basin (McCabe, 1978). The northern edge probably approximates the average shoreline position during early Winnipeg time. The Lower Unit rapidly thins to a sandstone sheet to the northern portion of the basin, at the sacrifice of the upper shale unit. The shale is not present in the Minago Sandstone Deposit area.

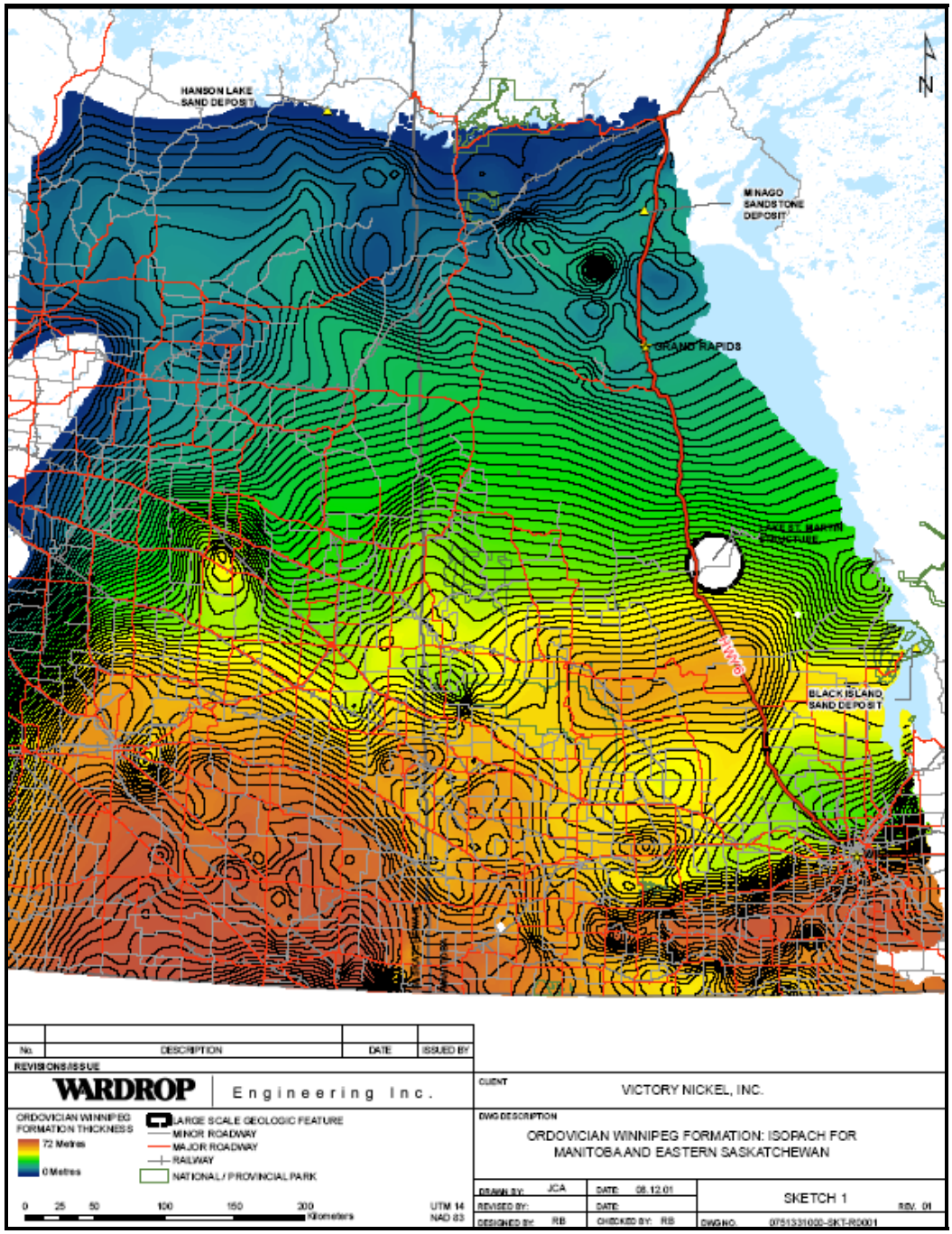
**Figure 2.1 Stratigraphic Column for Manitoba and Eastern Saskatchewan (from Nicolas and Barchyn, 2008) showing Winnipeg Formation**




The Winnipeg Formation varies in content from 90% sand to 90% shale. The formation has a maximum thickness of 68.6 m in southwestern Manitoba and thins to zero metres to the north, at a rate of least 17% per 100 km, with the sandstone content increasing relative to shale from south to north (Figure 2.2). The Winnipeg Formation sandstone that overlays the Minago deposit averages 8.9 m vertical thickness in the proposed pit area, occurring as highly cemented competent rock to loose and unconsolidated sand size grains.

The Ordovician Red River Formation dolomite conformably overlies the Winnipeg Formation in the Project area. There is some debate whether the contact between the Winnipeg and Red River formations is erosional (Norford, et al., 1994).

**Figure 2.2 Ordovician Winnipeg Formation Isopach for Manitoba and Eastern Saskatchewan (TGI Williston Basin Working Group, 2008)**



### 2.2.5 PRECAMBRIAN LITHOLOGIES

The following excerpt is taken from Wardrop, 2009:

*Below the Paleozoic sandstone the Precambrian rocks are intensely weathered typically over distances ranging from 0.6 to 32.8 m sometimes with complete obliteration of original textures. Alteration minerals include kaolin, sericite, chlorite, biotite and carbonate. The alteration is whitish green to bluish green in colour, soft, and can be semi consolidated, friable and/or unconsolidated. Weathering persists along zones of intense fracturing down to depths of 60 m below the Paleozoic-Precambrian interface. At depth the weathering is most apparent in granitic rocks where fracture cleavage is prominent resulting in alternating zones of altered fractured rock, and unaltered rock that vary in width from 0.15 m to greater than 3 m. The alteration varies from weak to intense with intensely altered rock being poorly consolidated.*

*The Precambrian basement comprises a variety of lithologies briefly described and listed below, in decreasing order of abundance.*

1. *Granitic rocks include granite, granitic gneiss (foliated granite) and pegmatite sills and dikes. Typically grey to pink, the granitic rocks range from almost white to almost red in colour. Grain size ranges from fine to coarse with medium to coarse grain size predominating. Textures vary from massive to strongly foliated. The granitic rocks are mostly potassium (K) feldspar rich, may contain up to 15% biotite and appear to intrude all other rock types.*
2. *The fine to coarse grained ultramafic rocks that host the nickel deposit include serpentinized dunite, peridotite (harzburgite, lherzolite, wehrlite) and pyroxenite (orthopyroxenite, websterite, clinopyroxenite). The ultramafic rocks dip vertical to near vertical with individual bodies having strike lengths up to 1,525 m and widths up to 457.2 m. Serpentinization varies from intense to weak and appears to decrease with depth, most markedly a change is observed at approximately 400 m below surface. Scoates (2008) attributes the change in serpentinization to a change from retrograde metamorphism (serpentine-talc-tremolite-calcite) in the upper part of the ultramafic to prograde metamorphism (tremolite-hornblende-phlogopite) at depth. Zoned contact alteration on a centimetre to metre scale occurs adjacent to granite and some fractures. From most intense (adjacent to granite or fracture) to least intense (furthest from granite or fracture) the alteration typically comprises biotite/phlogopite-chlorite-tremolite. Varying abundances (<1% to >50%) of fine to coarse grain pseudomorphs of olivine, orthopyroxene and clinopyroxene occur over core intervals ranging from several centimetres to several tens of metres. Magnetite concentrations up to 50% occur locally. Sulphide tenor is usually <15%.*
3. *Metavolcanic rocks, interpreted to be Bah Lake Formation, include chlorite-biotite schist and amphibolite. Amphibolite is dark green to black, fine to medium grained, foliated and lineated.*

4. *Metasedimentary rocks, interpreted to be Pipe Formation, comprise sillimanite paragneiss, siliceous sediments, skarn, iron formation, graphitic sediments, semi pelite and calc silicate. Distinctive minerals include graphite, sillimanite, garnet, diopside, carbonate, muscovite and very fine grain quartz. Sulphide facies iron formation comprises semi-massive to massive pyrite and pyrrhotite, sometimes nodular, and associated with detrital metasediments often containing siliceous fragments and includes sulphide breccia in zones of cataclastic deformation.*
5. *Molson dikes and sills that are olivene rich.*

*The Precambrian lithologies have undergone complex multiphase ductile and brittle deformation. Interpretations of magnetic data suggest that the ultramafic rocks containing the Minago deposit have undergone dextral strike slip fault movement which resulted in a large Z shaped drag fold and that the deposit flanks the axial plane of an eastern limb. Vertical longitudinals of the mineralized zones indicate that the folded limb plunges steeply towards the southeast.*

*Observations of the mineralized lenses indicate lateral/vertical displacement resulting in the development of drag folds and boudins. In some cases, the mineralization appears to have been folded creating ore zones with true widths over 24.4 m or has been folded and pulled apart creating two parallel zones of the same lens.*

*Cataclastic deformation with lateral and vertical displacement is indicated by fault gouge and fault breccia zones in both ultramafic rocks and granitic rocks. These zones range in width from 1 mm to 10 cm, are subvertical to vertical, and parallel the trend of the ultramafic rocks. Fault gouge is characterized by clay rich seams with or without fragments. Fault breccia is characterized by angular fragments in a matrix of serpentine, carbonate and clay minerals.*

*Cataclastic zones in serpentinized ultramafic rocks are grey in colour, soft, and associated with massive and fine grained units, whereas in granitic rocks they are red to brown in colour and associated with fracture cleavage. Cataclastic deformation confined to relatively fresh ultramafic rocks has a ground appearance, is brittle and poorly consolidated. Mylonite has an aphanitic to vitreous texture and is light to dark in colour. Mylonitization in granitic rocks is proximal to contacts between the granitic rocks and serpentinized ultramafic rocks.*

*Fracture cleavage occurs adjacent to zones of cataclastic deformation and folding. More readily observed in granitic rocks, the fractures also occur in serpentinites as open fractures and minor shears that are schistose and contain talc, chlorite, phlogopite and biotite. Two fracture cleavage orientations are indicated: parallel to foliation; and acute to approximately perpendicular to foliation. Fractures filled with carbonate and serpentine are cohesive. Fractures filled with sericite and clay minerals lack cohesion and possess slickensides.*

*Sedimentary and intrusive rock hosted nickel sulphide mineralization are recognized as two distinct and economically important deposit types in the Thompson Nickel Belt. Often intimately spatially related due to interaction of sedimentary, magmatic,*

*metamorphic and deformational processes the deposit types can be distinguished on the basis of field observations, structural, textural, mineralogical and chemical criteria.*

*Sulphide enrichment also occurs in pegmatites and breccias derived from existing sedimentary or magmatic sulphides*.

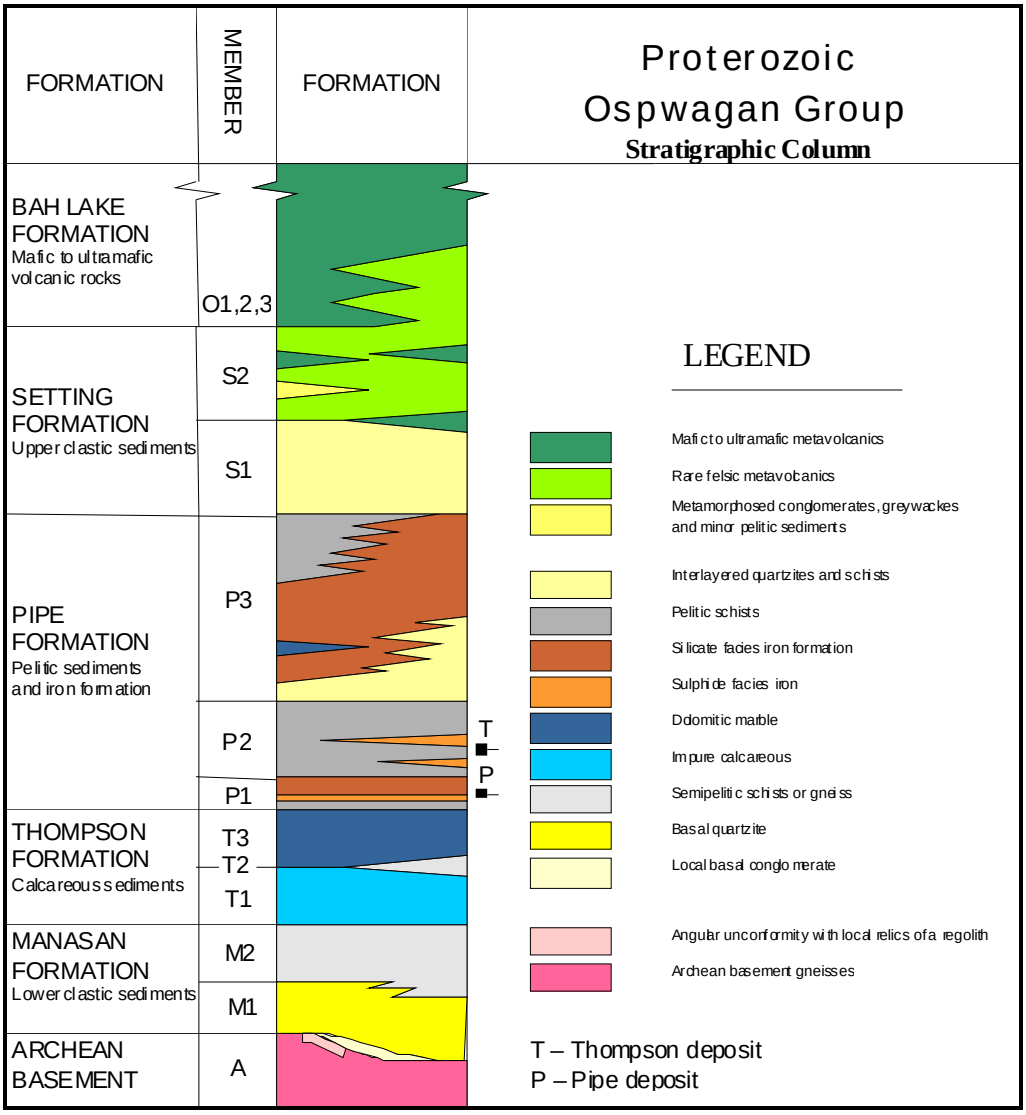
The Ospawagan Group hosts the nickel deposits of the Thompson Nickel Belt. Within the Ospawagan Group almost all of the nickel deposits of the Thompson Nickel Belt are found within lower Pipe Formation.

Bleeker and Macek (1990) proposed a stratigraphic nomenclature for the Proterozoic rocks within the Thompson Nickel Belt that is summarized in the stratigraphic column shown in Figure 2.3.

The rocks of the Thompson Nickel Belt have been complexly folded. Three major periods of folding are commonly recognized. The earliest structures due to compressional tectonism are isoclinal F1 folds that may be of regional extent. F1 preceded the emplacement of Molson dikes. The metamorphic regime during F1 is unknown. F1 is overprinted by F2 isoclinal folds that developed under high temperature and caused folding of the Molson dikes. The thermal peak of regional metamorphism overprinted F2. At least 30 million years later and at much lower temperatures intense sinistral transgression produced high amplitude, nearly upright, doubly plunging F3 folds that transposed the pre existing recumbent fold pile into a steep gneiss and schist belt.

The main phase of mylonitization occurred late during or overprints F3 and is confined to shear zones that tend to be parallel to the steeply dipping limbs of the upright F3 folds.

**Figure 2.3 Stratigraphic Column**



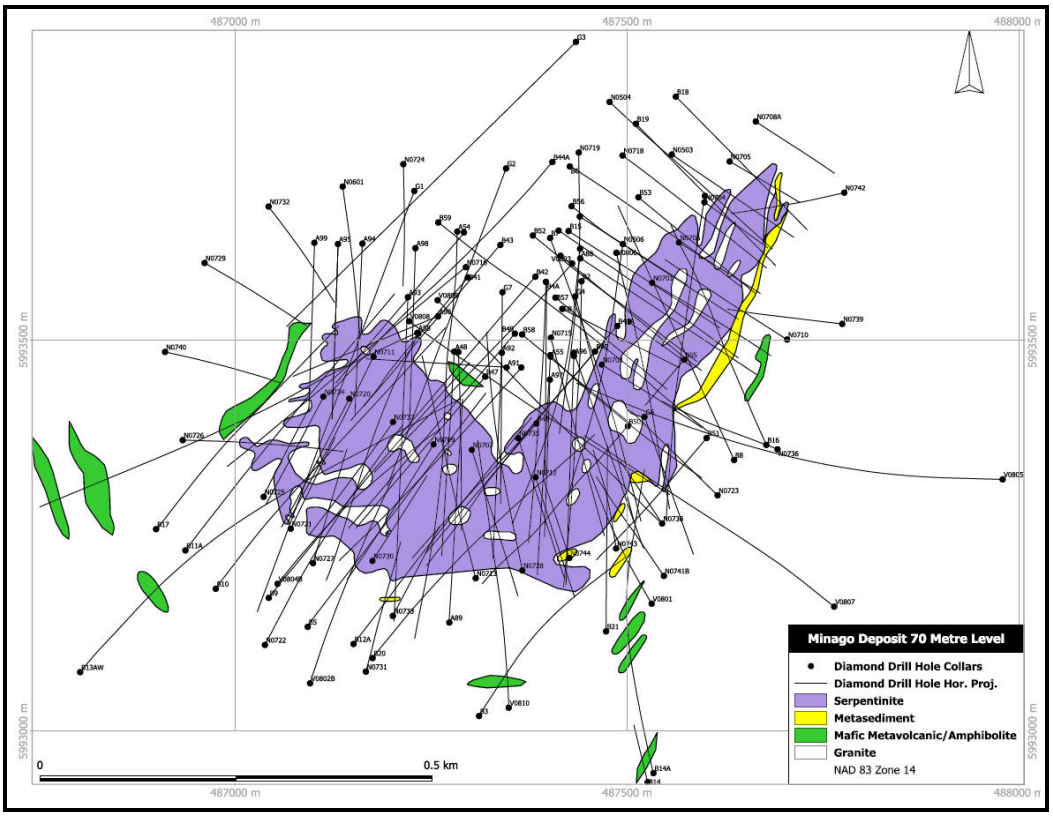

## 2.2.6 SEDIMENTARY SULPHIDE MINERALIZATION

Sedimentary sulphides may be barren or enriched in nickel. Barren sulphides characterized by nickel concentrations below 500 parts per million (ppm) occur beyond the immediate vicinity of significant nickel enriched zones. Sedimentary sulphides enriched in nickel by later magmatic processes are visually indistinguishable from barren sedimentary sulphides but occur in close proximity to more significant nickel enriched zones.

The dominant geological feature of economic interest underlying the Property is a series of boudinaged nickeliferous ultramafic bodies folded in a large Z shaped pattern. The ultramafic bodies contain intraparental magmatic nickel sulphide

mineralization, and intrude mafic metavolcanic and metasedimentary rocks interpreted to be lower Pipe Formation stratigraphy (Figure 2.4).

**Figure 2.4 Minago Deposit Drill Hole Compilation (Wardrop, 2009)**




From Wardrop, 2009:

*Within the ultramafic rocks, the nickel sulphides are concentrated in several tabular lenses that parallel the trend of the ultramafic bodies (see Figure 2.5 and Figure 2.6). Lower grade nickel occurs between and adjacent to the higher grade lenses. Typically sulphides are fine grained varying in size from <0.5 to 4 mm (generally 1 to 2 mm) and range in volume from 2 to 15% (generally 2 to 7%). The sulphides predominantly occur as disseminated crystals, small aggregates (<5mm) and occasionally are net textured. The dominant sulphide species are nickel bearing pentlandite with lessor violarite and millerite. Minor amounts of pyrite, pyrrhotite and chalcopyrite are present.*

**Figure 2.5 Minago Deposit at 160m Below Surface Showing Mineralization >0.4% NiS (red) in Lower Grade Envelope (Wardrop, 2009)**

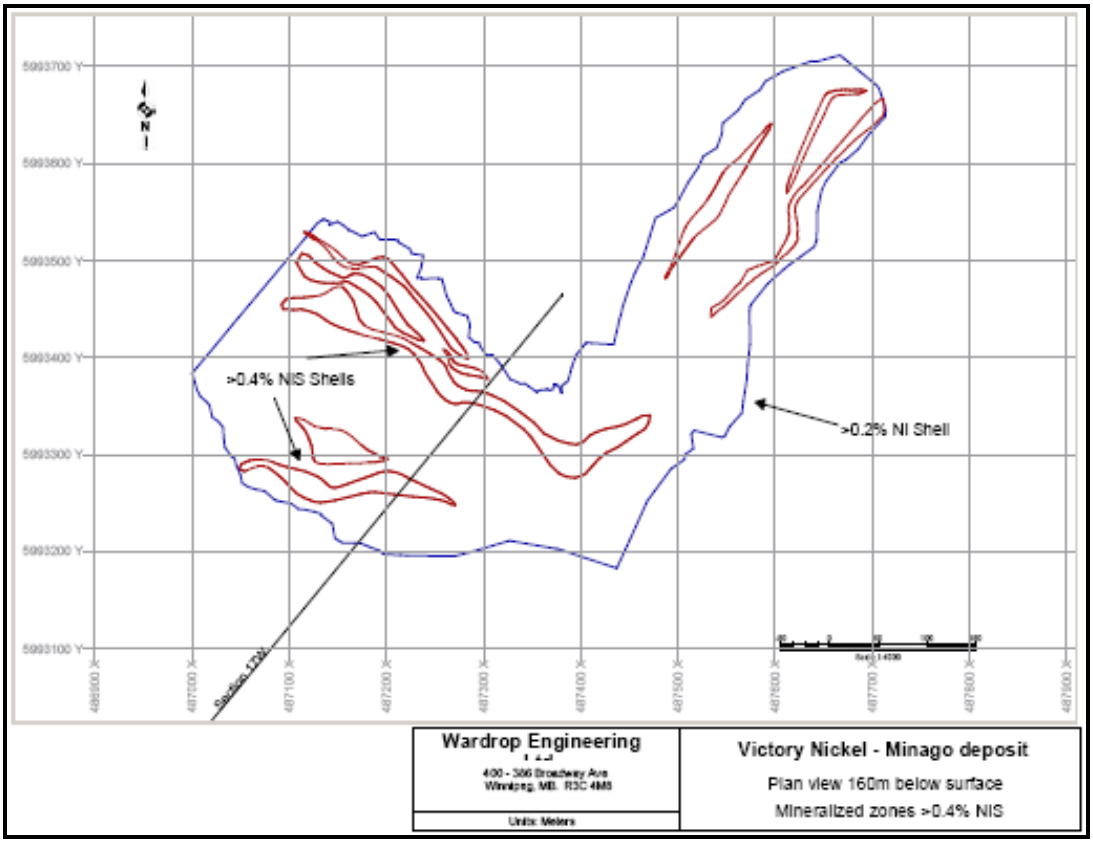
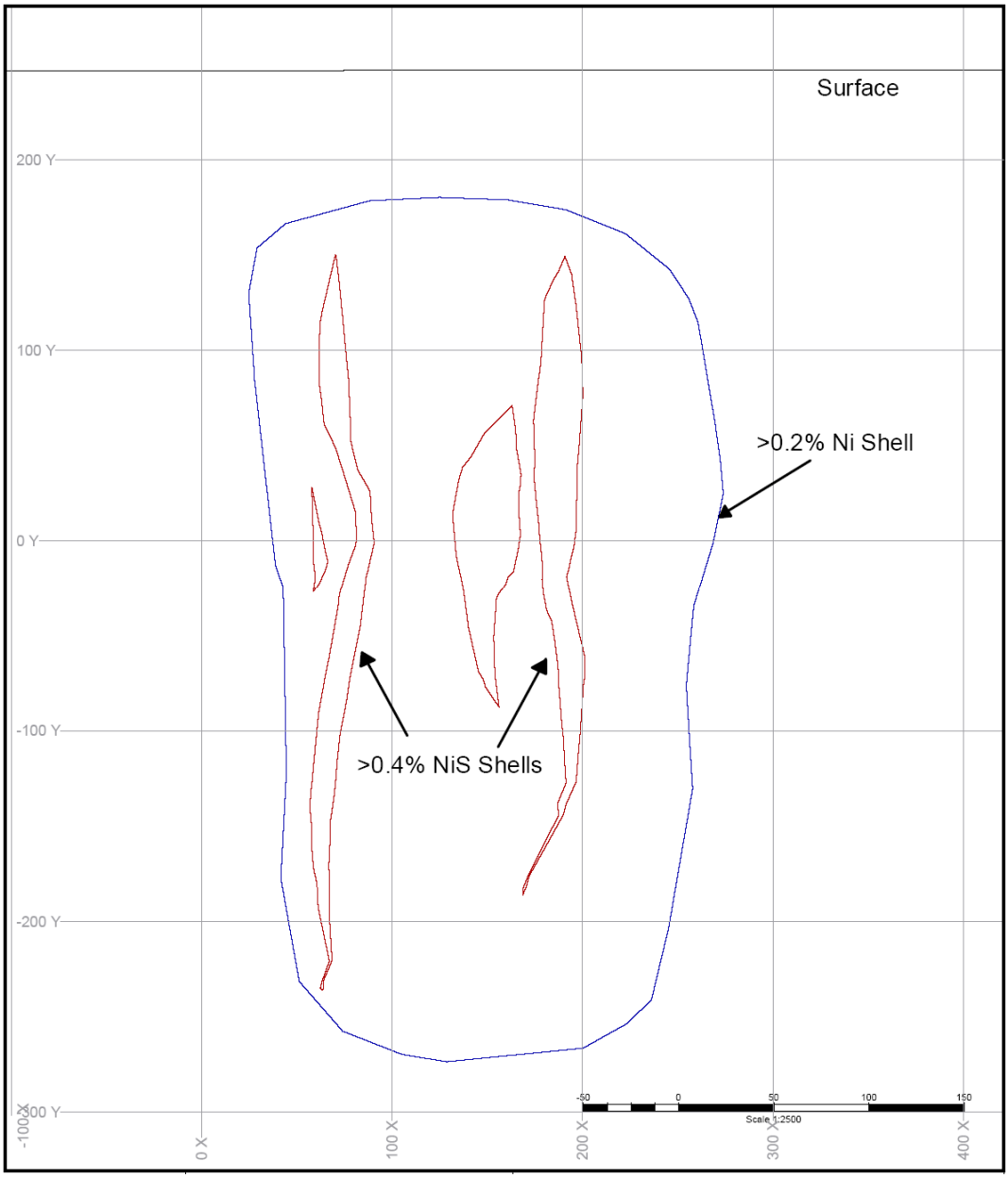


**Figure 2.6 Section 17W Showing Mineralization >0.4% NiS (red) in Lower Grade Envelope (Wardrop, 2009)**

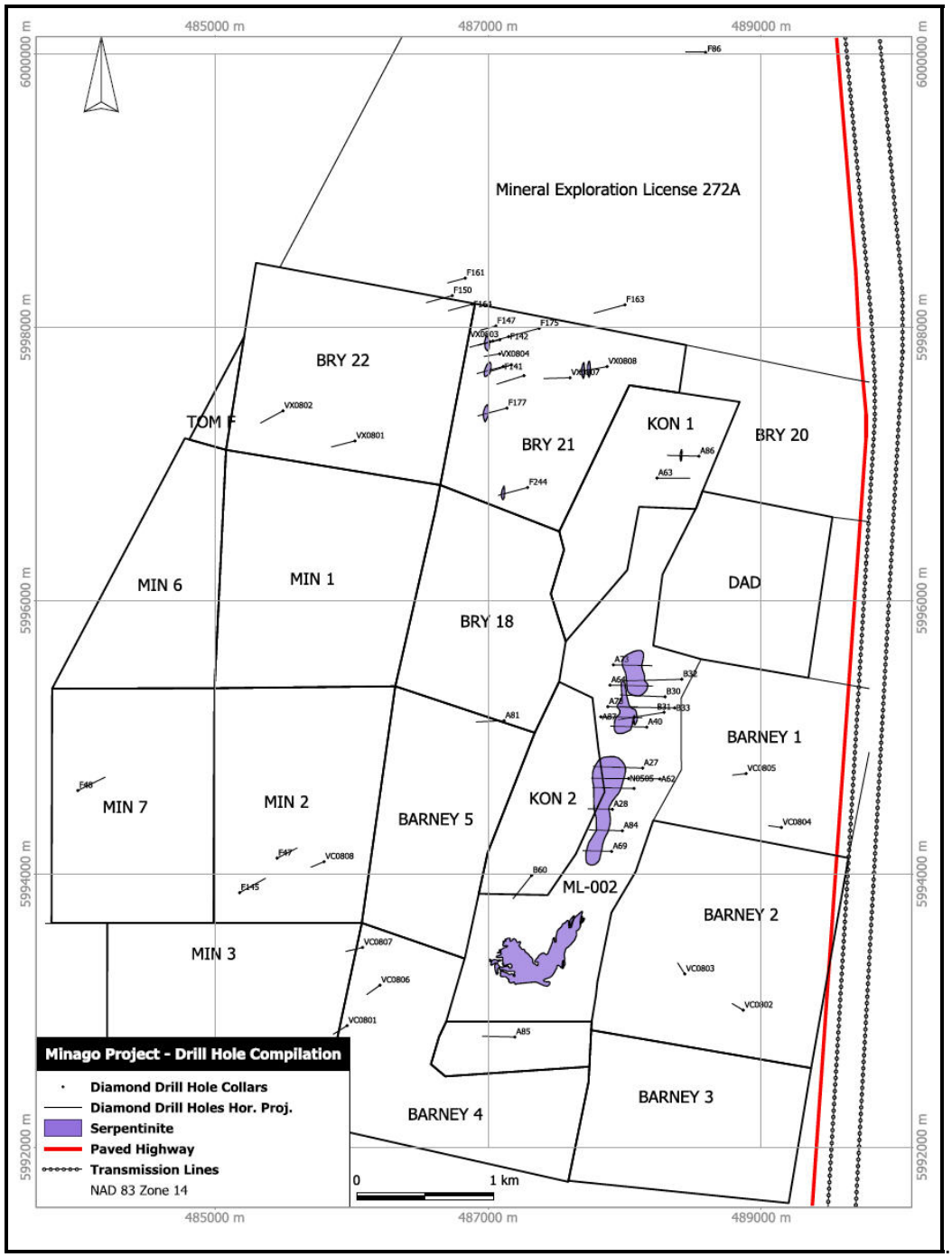



At the Minago deposit, the nickel sulphides are known to be more concentrated in several tabular lenses that are steeply dipping and parallel the trend of the ultramafic bodies. Scattered nickel sulphide assays of the same type of mineralization are located between and adjacent to the higher grade lenses.

Graphitic, coarse grained and sometimes nodular sedimentary and extraparental nickeliferous sulphide mineralization occurs sporadically along the southeast margin of the Minago deposit.

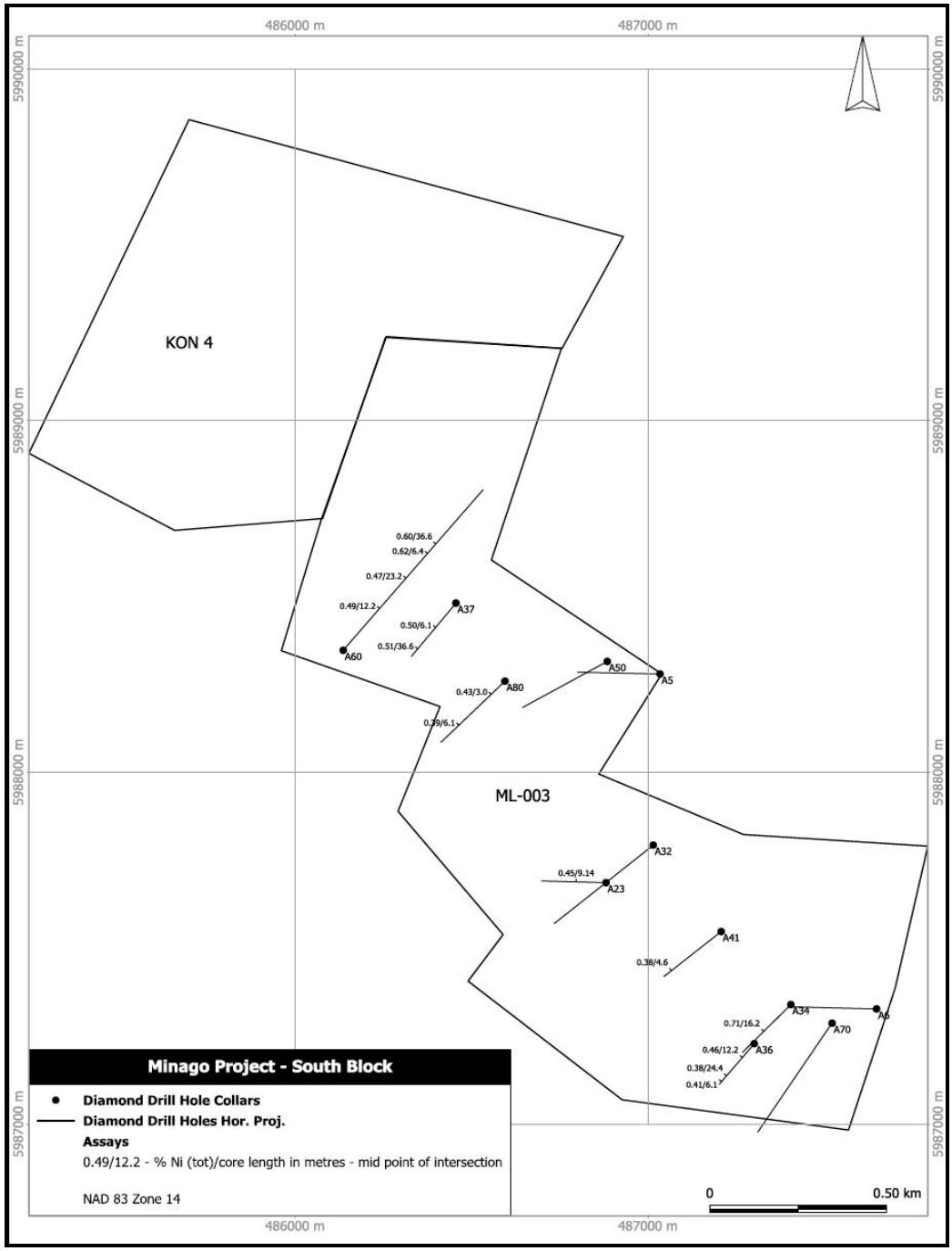
Limited shallower diamond drilling in the North Limb has intersected a number of boudinaged ultramafic bodies that contain nickel mineralization similar to that at the Minago deposit (Figure 2.7)

**Figure 2.7 North Limb (from Victory Nickel) (Wardrop, 2009)**



The south part of the claim block has not had any work done on it since 1972. A number of intersections of nickel bearing ultramafic rock have been encountered (Figure 2.8). Based on the limited available information, the nickeliferous ultramafic rocks appear to be irregularly distributed.

**Figure 2.8 South Block Nickel Intersections (from Victory Nickel) (Wardrop, 2009)**



### 2.2.7 MAGMATIC SULPHIDE MINERALIZATION

Magmatic nickel sulphide mineralization can be intraparental or extraparental based on whether it occurs within or external to the ultramafic parent rocks. Typically massive, extraparental mineralization occurs as pods and lenses of variable size within host pelitic schist adjacent to ultramafic boudins. The interpretation of the magmatic affinity of the extraparental mineralization is based on certain shared chemical characteristics with the intraparental mineralization. Intraparental mineralization occurs as lower abundances of interstitial sulphide and semi-massive to massive concentrations of sulphide in veins and breccias all within ultramafic rocks.

## 2.3 EXPLORATION HISTORY

Geophysical Reservation 34 (GR 34) covering an area of 19.2 km by 38.4 km was granted to Amax Potash Ltd. (Amax) on November 1, 1966 for a period of two years and extended in 1968 to April 30, 1969 (reference to Amax in this report includes the subsidiaries and successor companies of Amax Potash Limited, namely Amax of Canada Limited, 121991 Canada Limited and Canamax Resources Inc.).

In March 1969, Amax converted the most prospective area of GR 34 to 844 contiguous claims; in April of 1969, an additional 18 claims were staked. In 1973, the claims covering ground deemed to have the most potential for economically viable nickel mineralization were taken to lease status as Explored Area Lease 3 (North Block) and Explored Area Lease 4 (South Block). In an agreement dated December 12, 1973, Granges Exploration Aktiebolag (Granges) was granted an option on the Explored Area Leases. Reference to Granges in this report includes the subsidiaries and successor companies of Granges Exploration Aktiebolag namely Granges Exploration Ltd. and Granges International Ltd. In 1977 Granges became a passive partner with a 25% interest and a 0.5% NSR royalty in the leases. On May 18, 1989 Black Hawk Mining Inc. (Black Hawk) purchased the Amax interest in the explored area leases. On August 2, 1989 Black Hawk purchased the Granges interest and NSR royalty in the explored area leases. On April 1, 1992 Explored Area Lease 3 and Explored Area Lease 4 were converted to Mineral Lease 002 and Mineral Lease 003 respectively. On March 18, 1994 a portion of Mineral Lease 002 was converted to mineral claims KON 1, KON 2 and KON 3, also on March 18, 1994 a portion of Mineral Lease 003 was converted to mineral claim KON 4. On November 3, 1999 Nuinsco Resources Ltd. (Nuinsco) purchased the Black Hawk interest in the Property subject to a graduated NSR royalty based on nickel prices. In 2008, Victory Nickel acquired Independent Nickel and effectively eliminated the royalty.

### AMAX EXPLORATION WORK 1966 TO 1972

Amax conducted a regional scale exploration program on the southern extension of the Thompson Nickel Belt, and concluded that the corporate threshold for deposit

size justifying production would not be achieved on the Property. A brief summary of work conducted on the Property by Amax follows:

- an AFMAG airborne survey with nominal 1,609 m line spacing
- a helicopter airborne magnetic survey with nominal 402 m line spacing
- a Turair electromagnetic survey
- linecutting at 305 m line spacing with ground geophysical surveys including; magnetic (Askania magnetometer), electromagnetic (Radem VLEM), dipole-dipole induced polarization (McPhar) and gravity surveys
- drilling of eighteen holes plus one wedged hole were diamond drilled at the deposit
- drilling of fourteen holes elsewhere on the North Block (Figure 2.7)
- diamond drilling of twelve holes on the South Block (Figure 2.8).

#### GRANGES EXPLORATION WORK 1973 TO 1976

Granges focused their efforts on the Minago Nickel deposit conducting resource estimates, mining, metallurgical and milling studies. Eight holes were diamond-drilled at the Minago Nickel Deposit; limited in-hole surveys were conducted.

Granges concluded that the deposit was sufficiently confirmed and that further delineation and exploration should be conducted from underground workings.

#### BLACK HAWK EXPLORATION WORK 1989 TO 1991

Black Hawk conducted a deep penetrating ground electromagnetic survey, resource estimates, mining, metallurgical and milling studies. A helicopter-borne electromagnetic and magnetic survey covering the Property was obtained from Falconbridge Limited and interpreted.

Forty holes were drilled in the vicinity of the deposit. Collars were surveyed for location and in-hole orientation surveys were conducted on most holes using an ABEM fotobor. Five holes were diamond drilled elsewhere on the North Block.

### *2.3.1 HISTORICAL RESOURCE ESTIMATES*

**The historical mineral resource estimates cited herein do not conform to NI 43-101 Standards on Mineral Resources and Reserves, August 20, 2000, but are reported to document the level of work performed by the various parties and their observations. The estimates are reported for historical completeness only. The estimates are of unknown reliability and should not be relied upon as they are superceded by the resource estimate provided on Table 2.33 in Section 2.7.9 of this report.**

The following is taken from Wardrop, 2009:

*AMAX*

*Amax performed an order of magnitude preliminary estimate of the mineral resource of the Minago River Nickel Deposit to determine if it had the potential to meet the company's minimum grade and tonnage criteria for production.*

*Details about the procedures used in the estimates calculation are not available. The following general description is taken from a discussion of the results shown on Table 2.1 (Danley, 1972).*

*The resource estimates were based on a maximum of 18 drill holes over a strike length of 426.7 m, to a maximum depth of approximately 300 m below surface. Most of the available data was between 121.9 m and 213.4 m below surface. The mineralization was interpreted to be contained within a main zone with eight ancillary lenses. Interpretations are depicted on 2,400 scale sections and plans. Amax expressed concern about the continuity of mineralization and whether the available data is statistically significant. The specific gravity used in the estimations appears to be 2.40, which is the average of 6 determinations. The resource estimates are considered generous, as some of the mineralized intersections included are narrower than minimum mining widths. The estimate does not use resource classification as defined in NI 43-101.* ***The estimate is presented in this report for historical completeness and should not be relied upon as it is no longer relevant and has been superceded by more recent estimates****.*

**Table 2.1 Amax Resource Estimates (67.0 m to 371.9 m below surface)**

| | Cut-off 1.5% Ni | | Cut-off 1.0% Ni | | Cut-off 0.70% Ni | | Cut-off Mineralization | |
|---|---|---|---|---|---|---|---|---|
| | Tonnes | % Ni | Tonnes | %Ni | Tonnes | %Ni | Tonnes | %Ni |
| Main Zone | 1,464,805 | 1.64 | 4,081,500 | 1.36 | 6,530,400 | 1.13 | 12,788,700 | 0.77 |
| B Lens | | | 92,514 | 1.39 | 362,800 | 1.02 | 312,915 | 0.92 |
| C Lens | | | 816,300 | 1.09 | 936,020 | 1.07 | 1,345,700 | 0.89 |
| D Lens | 387,289 | 1.63 | 842,603 | 1.31 | 1,651,647 | 1.10 | 1,457,549 | 0.77 |
| E Lens | 31,745 | 2.05 | 291,147 | 1.55 | 206,796 | 1.55 | 672,994 | 0.95 |
| F Lens | | | | | | | | |
| G Lens | | | | | 58,048 | 0.89 | 168,702 | 0.57 |
| H Lens | 142,399 | 1.63 | 485,245 | 1.40 | 439,944 | 1.30 | 1,230,799 | 0.91 |
| | | | | | 206,819 | 0.85 | | |
| I Lens | | | | | 112,000 | 0.72 | 297,496 | 0.57 |

### GRANGES

*Granges conducted two mineral resource estimates on the Minago River Nickel Deposit based on Amax's 18 drill holes and the 8 holes drilled by Granges. One hole by Granges, G3, did not reach the deposit. As the estimate does not utilize resource classifications as defined in NI 43-101,the Granges estimate is presented here for historical completeness only, and should not be relied upon. The estimate is no longer relevant as it is superceded by more recent estimates.*

*A January 25, 1977 report mentioned a main zone undiluted resource estimate incorporating data to May 15, 1976, based on a 0.70% Ni cutoff comprising 12.5 Mt grading 1% Ni. There is no description of any other criteria used in the resource estimate.*

*The principal subject of the January 25, 1977 report is a main zone undiluted resource estimate of 5.1 Mt grading 1.31% Ni at a 1.0% Ni cutoff grade. Thicknesses of less than two metres were excluded from the resource estimate. Specific gravities used in the estimates are not stated. The reserve estimate was made on 1000 scale plans drawn at 100 m intervals and extends from 100 m below surface to 550 m below surface.*

*The mineralization in the main zone was interpreted to be continuous with pinching and swelling from 2 m to 20 m in thickness.*

## 2.3.2 BLACK HAWK

*During Black Hawk's ownership of the Minago deposit, five different mineral resource estimates were conducted between May 1989 and December 16, 1991. The different mineral resource estimates were based on a changing data base due to ongoing drilling and varying geological interpretations and resource estimate parameters.*

*On May 30, 1989, Dr. J. A. McGregor, P. Eng., made an independent estimate of the mineralization and calculated the undiluted tonnages and grades reported in*

*Table 2.2, based on the Amax and Granges diamond drilling. The estimate does not use resource classifications as defined in NI 43-101. The estimate is presented here only for historical completeness and should not be relied upon. The estimate is no longer relevant as it is superseded by more recent estimates.*

**Table 2.2 McGregor Undiluted Estimates, 1989**

| Cut-off 0.60% Nickel | | | |
|---|---|---|---|
| | **Depth** | **Tonnes** | **Grade (%Ni)** |
| Main Zone | 76.2 m to 487.7 m | 8,521,429 | 0.99 |
| South Zone | 76.2 m to 548.6 m | 1,972,321 | 0.93 |
| South Zone (2) | 76.2 m to 548.6 m | 1,328,571 | 0.97 |
| Northern Zone | 76.2 m to 213.4 m | 225,893 | 1.06 |
| **Cut-off 1.0% Nickel** | | | |
| Main Zone | 76.2 m to 365.8 m | 3,589,285 | 1.28 |

*Dr. McGregor performed the estimates by determining the horizontal widths of mineralization (minimum horizontal width of 3.05 m) from interpretations on plan while the strike lengths and vertical extent of mineralization were derived from vertical longitudinal projections. A density of 2.31 was used in the calculations. Grades were estimated by conventional weighted average methods.*

*Dr. McGregor reported that:*

- *The drill holes were widely spaced, up to 229 m vertically and up to 137 m horizontally.*
- *There is a high degree of confidence in the presence of the gross tonnage of mineralization at a cutoff of 0.60% Ni in the Main Zone.*

### *STRATHCONA MINERAL SERVICE LIMITED*

*On July 16, 1990, Strathcona Mineral Service Ltd., (Strathcona) reported to Sherritt Gordon Limited an undiluted mineral inventory based on geological interpretations that outlined a Main Zone and South Zone, at no particular cut-off grade (Table 2.3). The estimate does not use resource classifications as defined in NI 43-101. The estimate is presented here only for historical completeness and should not be relied upon. The estimate is no longer relevant as it is superseded by more recent estimates.*

*Strathcona conducted the estimates using the Amax and Granges diamond drill hole database, plus the data from 22 holes diamond drilled by Black Hawk. The undiluted mineral inventory was calculated on longitudinal cross-section. Pierce points of drill holes passing through the mineral zones were plotted on longitudinal cross-section, one for each zone. Simple blocks filling the entire mineralized zone were drawn around the pierce points and the volume of each block was calculated based on the strike length, horizontal width and height of the block. Nickel grades were assigned to each block based on the weighted average grade of the mineralized intersection represented by the pierce point. A density of 2.8 t/m$^3$ was used in the estimates.*

**Table 2.3 Strathcona Undiluted Mineral Inventory, 1990**

| | tonnes per vertical metre | tonnes (t) | Grade (%Ni) | Horizontal Width |
|---|---|---|---|---|
| Main Zone 130 m to 300 m | 23,800 | 4,600,000 | 0.83 | 29 m |
| Main Zone 300 m to 500 m | 35,700 | 7,400,000 | 0.76 | 35 m |
| South Zone 105 m to 356 m | 15,000 | 4,400,000 | 0.86 | 34 m |

*Strathcona's report stated that:*

- *Both the Main and South Zones exhibited good continuity along strike and down dip, except in the area of section 103+00 E.*
- *There was a large distance between pierce points (60 m to 80 m), leading to a relatively large degree of uncertainty with the estimate. Additional drilling would not significantly affect the nickel grade but would increase the level of confidence in interpretations.*
- *Correlation of higher grade intercepts could not be substantiated leading to the conclusion that the deposit would be more amenable to bulk mining methods.*

### *ROSCOE POSTLE ASSOCIATES INC.*

*Roscoe Postle Associates Inc. (RPA) performed geological reserve estimates in 1990 and 1991. The estimate does not use resource classifications as defined in NI 43-101. The estimate is presented here only for historical completeness and should not be relied upon. The estimate is no longer relevant as it is superseded by more recent estimates.*

*On July 27, 1990, RPA reported an independent preliminary estimate of undiluted geological reserves on behalf of Black Hawk (Table 2.4). RPA conducted the estimates using the Amax and Granges diamond drill hole data base plus the data from 21 holes diamond drilled by Black Hawk. The estimates were made with a cut-off grade of 1.0% Ni, a minimum horizontal width of 3.05 m and a specific gravity of 2.82. RPA conducted the estimates by a contouring method as follows: metal values (grade x thickness) and horizontal widths measured from vertical cross-sections are plotted at the diamond drill hole pierce points on longitudinal cross-section; the values are contoured to represent the variability of metal values and thicknesses; areas of each contour interval are measured, multiplied by the average thickness of the contour interval and converted to tonnes as per the specific gravity. Grades were similarly estimated by measuring the area of each grade x thickness interval, multiplying by the measured area by the average grade x thickness of the contour interval, summing to obtain the total metal content and dividing by the total volume to obtain the average grade.*

**Table 2.4 RPA Preliminary Estimate of Undiluted Geological Reserves, 1990**

| | Probable Reserves | | Possible Reserves | |
|---|---|---|---|---|
| | Tonnes | Grade (%Ni) | Tonnes | Grade (%Ni) |
| Main Zone | 1,952,986 | 1.20 | 6,180,979 | 1.27 |
| South Zone | 582,358 | 1.14 | 1,177,416 | 1.13 |
| Northeast Zone | | | 969,690 | 1.37 |
| Miscellaneous Blocks | | | 996,903 | 1.17 |
| Total | 2,535,344 | 1.19 | 9,324,988 | 1.26 |

*On March 28, 1991, RPA reported an updated resource estimate based on the same methodology and parameters used in 1990, but with the benefit of an additional 19 holes diamond drilled by Black Hawk. The results, briefly summarized in Table 2.5, did not significantly change the overall tonnage or grade of the previous estimate but did confirm previous interpretations and enabled upgrading of a significant portion of the estimate from the possible to probable category.*

**Table 2.5 RPA Preliminary Estimate of Undiluted Geological Reserves, 1991**

| | Probable Reserves | | Possible Reserves | |
|---|---|---|---|---|
| | Tonnes | Grade (%Ni) | Tonnes | Grade (%Ni) |
| Main Zone | 4,214,387 | 1.18 | 2,156,177 | 1.21 |
| South Zone | 517,954 | 1.15 | 1,838,692 | 1.22 |
| Northeast Zone | 703,003 | 1.17 | 555,145 | 1.11 |
| Miscellaneous Blocks | | | 605,943 | 1.23 |
| Total | 5,435,344 | 1.17 | 5,155,957 | 1.21 |

### ROCKWORTH CONSULTING LTD.

*On December 16, 1991, Rockworth Consulting Ltd. reported an undiluted geological reserve estimate using the Amax, Granges and Black Hawk diamond drill data and is comprised of 70 holes. The estimate is summarized in*

*Table* 2.6. *The estimate does not use resource classifications as defined in NI 43-101, the estimate is presented here only for historical completeness and should not be relied upon. The estimate is no longer relevant as it has been superceded by more recent estimates.*

*The estimates were based on a cutoff grade of 0.60% Ni, a minimum thickness of 3.05 m and a specific gravity of 2.82. Drill hole spacing ranged from 30.5 m to 167.6 m between pierce points on vertical longitudinal cross-section. The estimates were calculated using the same contour method employed by RPA described above.*

**Table 2.6 Rockworth Estimate of Undiluted Geological Reserves, 1991**

| | Lens | Tonnes | Grade (%Ni) | Vertical Depth (m) |
|---|---|---|---|---|
| Main Zone | A1 | 7,445,477 | 1.09 | 61.0 to 655.0 |
| | A2 | 5,799,997 | 0.97 | 53.3 to 693.4 |
| South Zone | B1 | 2,606,098 | 1.00 | 91.4 to 524.3 |
| | B2 | 1,312,573 | 1.10 | 144.8 to 510.5 |
| Northeast Zone | D1 | 2,030,090 | 0.93 | 68.6 to 442.0 |
| | D2 | 1,357,022 | 0.91 | 137.2 to 274.3 |
| Total | | 20,551,257 | 1.02 | |

### 2.3.3 *MINERAL RESOURCE ESTIMATES - 2006*

From Wardrop, 2009

*An NI 43-101 compliant mineral resource estimate for the Minago deposit was conducted by P. Vasak, P.Eng. of Mirarco. The Mirarco procedures and results are contained in a report titled "Resource Modelling of the Mineralized Zone of the Minago Nickel Deposit", December 24, 2004. The Mirarco resource estimates were undertaken on behalf of and supervised by independent Qualified Person P.J. Chornoby, P.Geo., and P. Jones, P. Geo., Vice President of Exploration, Victory Nickel. The resource model is for all mineralized zones in the Minago Deposit to a depth of 944.88 m below surface and provides resource classification and block models for deposit evaluation purposes. The primary scope was to build a resource block model based on a 0.2% Ni cut-off resource wireframe. The mineral resource estimates were optimised to evaluate resources mineable using open pit techniques to a depth of 411.5 m below surface based on the analysis of a qualified mining engineer. The model utilizes a block size of 7.6 m x 7.6 m x 7.6 m.*

*The geostatistical grade model was based on an ordinary kriging grade interpolation, however, both nearest neighbour and inverse power models were used to determine the declustered statistics and resource model validation, respectively. Variography and interpolation of nickel grades and rock densities were performed in an unfolded version of the model. The final block model is presented in the folded space of the deposit.*

*Resource classification based on the CIM standards on mineral resources and reserves (CIM, 2000) was applied using the search ellipsoid derived from the variogram model ranges. A combined model incorporating the resource model, overburden, Paleozoic sedimentary units and basement rocks was created to facilitate pit optimisation.*

*The resource model is based on the geology and mineralization interpreted in three dimensions from the diamond drill hole data utilizing the virtual reality facility at Mirarco.*

## 2.4 DRILLING

Nuinsco and its successor company Victory Nickel, conducted four consecutive diamond drill programs on the Property from 2005 to 2008 inclusive. Major Drilling Group International Inc. (Major Drilling) from Flin Flon, Manitoba performed all of the drilling.

Records for 271 drill holes exist for the Minago property. Included in these records are 132 holes used to estimate the nickel resource and 141 holes that have sandstone intersections. There are 90 shallow holes in the overburden. The remaining holes are distal to the deposit and were not used for estimation purposes.

### *2.4.1 NUINSCO 2005*

#### DIAMOND DRILLING

Between mid-January, early April 2005, 3,027.78 m were drilled in 6 holes (N-1 to N-6). All holes, except N-5, were drilled to verify earlier diamond drill results, provide infill data and extend previously intersected mineralizaton. Hole N-5 was drilled 900 m northeast of the Minago deposit to explore the North Limb.

The holes were collared with NW casing that was drilled through the overburden to the limestone. Thereafter the hole was drilled with NQ size rods through the dolomite, sandstone and into the Precambian basement at which point the hole was reduced to BQ size and drilled to the required depth. During the BQ drilling phase, the NQ rods were left in the hole to act as casing and thereby prevent the unconsolidated sandstone flowing into the hole. Upon completion of the hole, both the BQ and NQ rods were removed but the NW casing was left in place, capped with an aluminum plug stamped with the hole number. A BQ size safety plug was installed below the Ordovician-Precambrian unconformity and an NQ safety plug was installed in the dolomite above the sandstone. The only exception to this procedure occurred in hole N-6A where all casing and drill rods were removed and the hole was abandoned when the rods became stuck in sandstone at a depth of 80 m.

#### IN-HOLE SURVEYS

In-hole surveys were performed by Major Drilling and Reflex Instrument North America.

During the drilling of each hole, Major Drilling collected Reflex EZ-Shot data approximately every 50 m down the hole. Reflex EZ-Shot measures six parameters in one single shot; azimuth, inclination, magnetic tool face angle, gravity roll angle, magnetic field strength and temperature. The azimuth data are not reliable due to the magnetic properties of the rocks.

Reflex Instrument North America personnel traveled to the property on three occasions to conduct surveys using the Reflex Maxibor. The Reflex Maxibor calculates the spatial coordinates every three metres along the drill hole path based on optical measurements of dip and direction changes. All holes except N-3 were surveyed. Holes were not surveyed in their entirety due to considerable difficulty in getting the instrument down the hole (inside the BQ rods).

#### COLLAR LOCATION SURVEYS

Drill hole collars from N-1 to N-6 were surveyed for location, azimuth and dip by Pollock and Wright, Land Surveyors utilizing a Trimble RTK5700 dual frequency GPS survey instrument. The survey was performed in NAD 83 UTM co-ordinates (Zone 14N) and converted to both geodetic and local grid co-ordinates. Dip values for the drill holes are not valid due to droop in the survey rod however, location co-ordinates and azimuths are considered reliable.

#### CORE LOGGING, SPLITTING, HANDLING AND SHIPPING

Drill supervision, core logging and sample selection was performed by a qualified person hired on a contract basis by Nuinsco.

Upon completion of each hole, all of the drill core except for hole N-6A was transported by Nuinsco personnel to the company's facility near Black Hawk, in northwest Ontario, where the core was logged, split and stored. Hole N-6A was examined but not logged and is stored on the Property. Each hole was logged for rock quality designation (RQD). Samples were shipped by commercial trucking to the ALS Chemex laboratory to Thunder Bay, Ontario for sample preparation; thereafter the pulps were shipped by ALS Chemex to their laboratory for analysis.

### *2.4.2 NUINSCO 2006*

#### DIAMOND DRILLING

Two holes totalling 1,533.57 m were drilled from March 4 to April 21, 2006. The drilling was undertaken in order to confirm and upgrade the resource estimates of deposit, enable geotechnical observations and measurements required to revise preliminary open pit shell designs, and provide additional material for metallurgical testing.

Drill holes were collared with NW casing that was drilled through the overburden to the dolomite. Thereafter the holes were drilled with NQ size rods through the dolomite, sandstone and into the Precambian basement at which point drill rods were reduced to BQ size and drilled to the required depth. During the BQ drilling phase, the NQ rods were left in the hole to act as casing and thereby prevent the unconsolidated sandstone collapsing into the hole. Upon completion of the hole the

BQ and NQ rods were removed but the NW casing was left in place, capped with an aluminum plug stamped with the hole number. A BQ-size safety plug was installed below the Ordovician-Precambrian unconformity and an NQ safety plug was installed in the limestone above the sandstone.

### IN-HOLE SURVEYS

In-hole surveys were performed by Major Drilling personnel utilizing a Reflex EZ-Shot instrument. During the drilling of each hole the drill crew collected Reflex EZ-Shot data approximately every 50 m down the hole. Reflex EZ-Shot measures six parameters in one single shot; azimuth, inclination, magnetic tool face angle, gravity roll angle, magnetic field strength and temperature. The azimuth data are not reliable due to the magnetic properties of the rocks.

A BGO-01 probe and operating software, a down-hole gyroscopic survey system, was utilized to obtain a continuous record of drill hole dip and azimuth orientation. The down-hole surveys were performed by the project geologist.

Drill hole NM0601 was surveyed with the BGO-01 probe. A malfunction of the probe during the surveying of NM0602 rendered the survey data meaningless. It will be necessary to resurvey NM0602 in order to ascertain the exact path of the hole.

The Reflex EZ-Shot data for hole NM0602 indicate that inclination of the hole decreased less than one degree over the length drilled, perhaps indicating that the azimuth of the hole also varied minimally from top to bottom.

### COLLAR LOCATION SURVEYS

Drill hole collars were surveyed for location, azimuth and dip by Pollock and Wright, Land Surveyors, with a Trimble RTK5700 dual frequency GPS survey instrument. The survey was performed in NAD 83 UTM co-ordinates (Zone 14N) and converted to both geodetic and local grid co-ordinates. Dip values for the drill holes are not valid due to droop in the survey rod however location co-ordinates and azimuths are considered reliable.

### CORE LOGGING

Drill project supervision and core logging and assay interval selection were conducted by the project geologist. Geotechnical parameters recorded included; RQD values, core recovery, fracture pattern orientations, abundance, nature (open or filled), type of fill, marginal alteration, cohesiveness, wetness, and strength estimates utilizing the R0-R6 scale wherein R0 represents extremely weak rock, and R6 represents extremely strong rock.

An industry-standard point load test apparatus manufactured by Rokworth Corporation was employed for unconfined compressive strength testing that was

routinely undertaken every 3.0 m for all drill core recovered. The lithology tested was recorded as well as the failure point in pounds per square inch. Diametral and less frequent axial tests were recorded for each lithology.

### 2.4.3 VICTORY NICKEL 2007

Victory Nickel carried out a diamond drill program on the property commenced by Nuinsco in January and completed by Victory Nickel in May 2007. Major Drilling was contracted to perform the drilling. The 2007 drill program was designed to upgrade inferred resource estimates above the pit bottom used in the PEA study. Mirarco and Victory designed 29 holes for this purpose. Five holes were drilled to provide material for metallurgical testing. Wardrop designed 10 holes to collect rock mechanics data for the final pit wall.

All ultramafic lithologies encountered were sampled and assayed except for some composited material required for crushing and grinding testwork.

#### DIAMOND DRILLING

Forty-four holes were drilled in 2007 for a total of 13,239.5 m. The drill holes were collared with HW casing and drilled to the top of the Precambrian with HQ size rods. The HQ drill rods were left in place to act as a temporary casing, and the drill hole size was reduced to NQ to drill in the Precambrian. Occasionally, as needed, the hole size was further reduced to BQ. Upon completion, all the drill rods were removed from the hole, and the HW casing was left in place and capped. Safety plugs were installed in competent ground above and below the sandstone and the interval between the plugs was filled with cement.

#### SURVEYING

Drill hole collars were surveyed for location by Pollock and Wright of Winnipeg. Ongoing in-hole surveys were performed by Major Drilling personnel every 50 metres in all holes using a Reflex Easy Shot instrument. In addition, holes greater than 200 m long were in-hole surveyed by Victory contractors/employees using a Reflex Maxibor II instrument. A total of 3,752 measurements were taken.

#### CORE LOGGING, SPLITTING AND HANDLING

As the holes were being drilled, the core was transported to Victory's core room in Grand Rapids, Manitoba and securely stored indoors for processing. The core was photographed and logged initially for geotechnical data. The core was subsequently logged for lithology, alteration and mineralization. Sample intervals were selected and the core was split using a water cooled saw with a diamond impregnated blade. The water used in the saws was changed frequently to reduce the possibility of contamination. Each sample was uniquely identified with a sample number and

placed in a plastic sample bag that was stapled shut. The samples were placed in large, addressed fabrene bags that were wired shut and palletized for shipment.

Drill supervision, lithologic core logging and sample selection was performed by qualified persons hired on a contract basis by Victory Nickel.

The five holes drilled for metallurgical test work were logged for geology, sample intervals were selected and tagged but the core was not split. After logging, lids were placed on the core boxes that were then palletized, strapped and shipped to SGS Lakefield in Lakefield, Ontario, where the core was whole-sampled, crushed and riffle split prior to assaying.

Wardrop designed ten of the holes specifically to examine final pit wall stability and logged a total of 24 holes for comprehensive geotechnical data complete with point load testing. Orientated core measurements were performed on portions of two holes.

Transportation of core from the drill site to Grand Rapids and core splitting was performed by residents of Grand Rapids who were hired by Victory on a casual basis.

Samples were shipped by Gardewine Transport truck to TSL Laboratories (TSL) in Saskatoon, Saskatchewan for analysis.

### 2.4.4 VICTORY NICKEL 2008

Victory Nickel conducted a diamond drill program including 26 holes on the property between January and May 2008. Major Drilling was again contracted to perform the drilling. The 2008 drill program was designed to upgrade inferred resource estimates below the pit bottom used in the PEA study. Ten holes were designed by Wardrop for this purpose.

The program was also designed to provide material for metallurgical testing, especially as the serpentinization appears to decrease with depth and there may be an accompanying change in the metallurgical response.

Victory Nickel planned eight holes to explore the property where Wardrop proposed future mine construction, and eight holes to satisfy the expenditure requirement of at least $500,000 for the Xstrata option on claims BRY 18, BRY 20, BRY 21, BRY 22, TOM F and DAD.

#### DIAMOND DRILLING

Twenty six holes totalling 11,748 metres were drilled in 2008. Ten holes totalling 7,505 m were targeted on the known Minago mineralized zone. 2,517 m were drilled to satisfy the requirements of the Xstrata option. The remaining 1,726 m were drilled for property exploration.

The drill holes were collared with HW casing and drilled with HQ size rods to the top of the Precambrian. The HQ drill rods were left in place to act as a temporary casing, and the drill hole size was reduced to NQ to drill in the Precambrian. Occasionally, as needed, the hole size was further reduced to BQ. Upon completion, all the drill rods were removed from the hole, and the HW casing was left in place, and capped. Safety plugs were installed in competent ground above and below the sandstone and the interval between the plugs was filled with cement.

### SURVEYING

Drill hole collars were surveyed for location by Pollock and Wright of Winnipeg. Ongoing in-hole surveys were performed by Major Drilling personnel every 50 m in all holes using a Reflex Easy Shot instrument. In addition, holes greater than 200 metres long were in-hole surveyed by Victory contractors/employees using a Reflex Maxibor II instrument. A total of 2,109 measurements were taken.

### CORE LOGGING, SPLITTING AND HANDLING

As the holes were being drilled, the core was transported to Victory's core room in Grand Rapids, Manitoba and securely stored indoors for processing. The core was photographed and logged initially for geotechnical data, then the core was subsequently logged for lithology, alteration and mineralization. Sample intervals were selected and the core was split using a water cooled saw with a diamond impregnated blade. The water used in the saws was changed frequently to reduce the possibility of contamination. Each sample was uniquely identified with a sample number and placed in a plastic sample bag that was stapled shut. The samples were placed in large, addressed fabrene bags that were wired shut and palletized for shipment.

Drill supervision, lithologic core logging and sample selection was performed by a qualified person hired on a contract basis by Victory.

Wardrop performed and/or supervised detailed geotechnical logging on all of the holes including point load testing. Portions of the core from nine holes were orientated. Samples were selected for off-site materials testing.

Transportation of core from the drill site to Grand Rapids and core splitting was performed by residents of Grand Rapids who were hired by Victory on a casual basis.

Samples were shipped by Gardewine Transport truck to TSL for analysis.

## 2.5 SAMPLING

All distances in this section refer to core length, unless otherwise stated.

### 2.5.1 AMAX

Amax drilled both AQ and BQ size core. Sample intervals were selected by the geologist logging the core based on the following stated criteria:

- Amax sampling program was for total nickel only
- The maximum core interval for any sample was usually 6.1 m.
- In serpentinite samples, intervals were selected on the basis of texture, rock type, rock colour and extent of mineralization.

After June 1971, Amax reduced the maximum sample length of visibly barren serpentinite to 3.0 m and mineralized serpentinite to 1.5 m. Amax collected 1,294 samples from 3,558.3 m of core. The sample lengths range from 0.15 to 14.2 m with 73% of the sample lengths equal to or less than 3.0 m.

Amax employees sampled core by filleting, a process that involved grinding off approximately 3% of the core using a diamond impregnated disk, over the length of the sample interval. Filleting heterogeneous core may result in a sample that is biased. Amax examined the reliability of the filleting method by both filleting and ½ splitting diamond drill holes MXB 71-89 and MXB 71-92 to MXB-71-98 inclusive. Crushing and pulverising sample preparation procedures are not described.

Amax reported that assays of filleted core samples are 5 to 10% higher than the equivalent ½ split core samples and that assay values vary by more than 10% in 20% to 25% of the intervals.

An examination of the ½ split core assays relative to the filleted core assays of the same intervals for drill hole MXB-71-89, the only hole for which such data was found, indicate that split core assays trend slightly higher than filleted core assays for values greater than 0.75% Ni and slightly lower for values less than 0.75% Ni (Figure 2.9).

Ninety percent of the sample pairs have relative differences of 25.0% or less indicating acceptable levels of variation for sample level check assays (typically set at 90% of the sample pairs having relative differences of 30% or less, Wakefield, 2005). The cumulative relative difference plot is presented in Figure 2.10.

**Figure 2.9 Amax Filleted Core Assays Compared to ½ Split Core Assays**

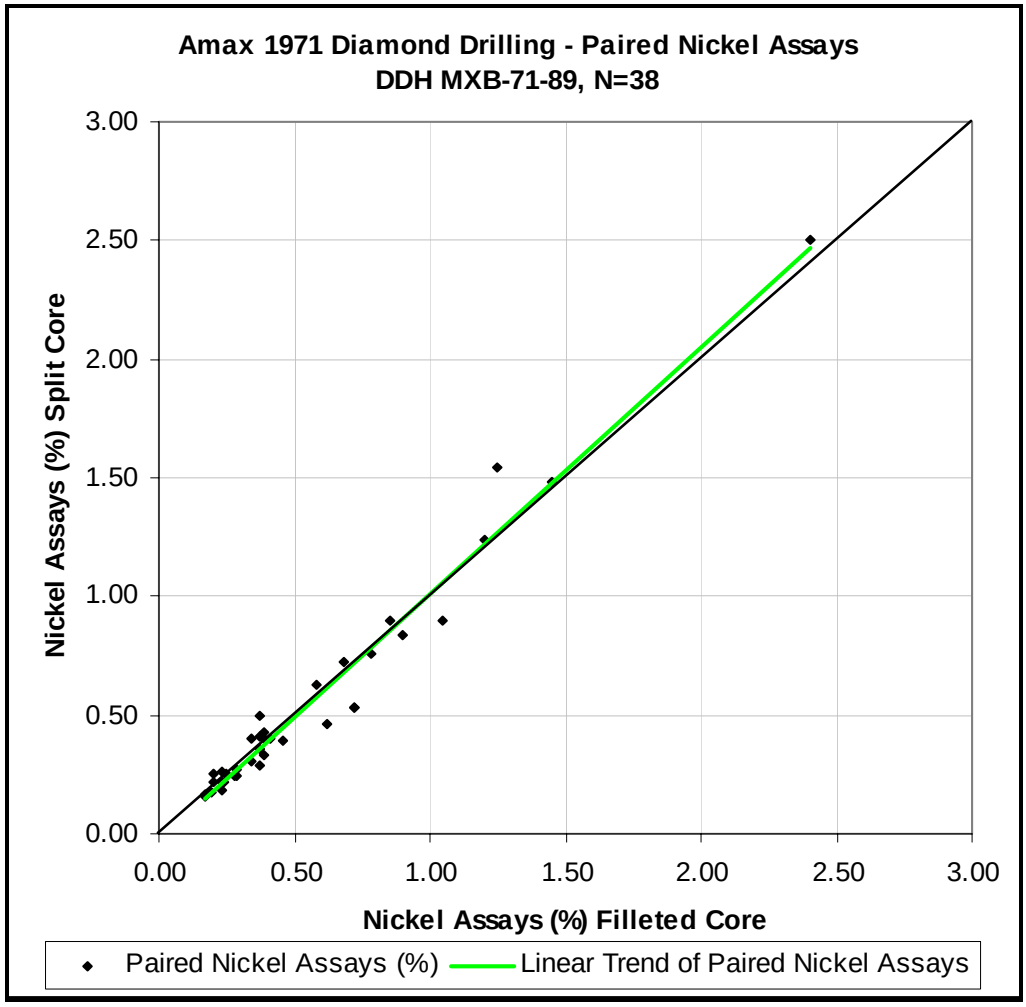
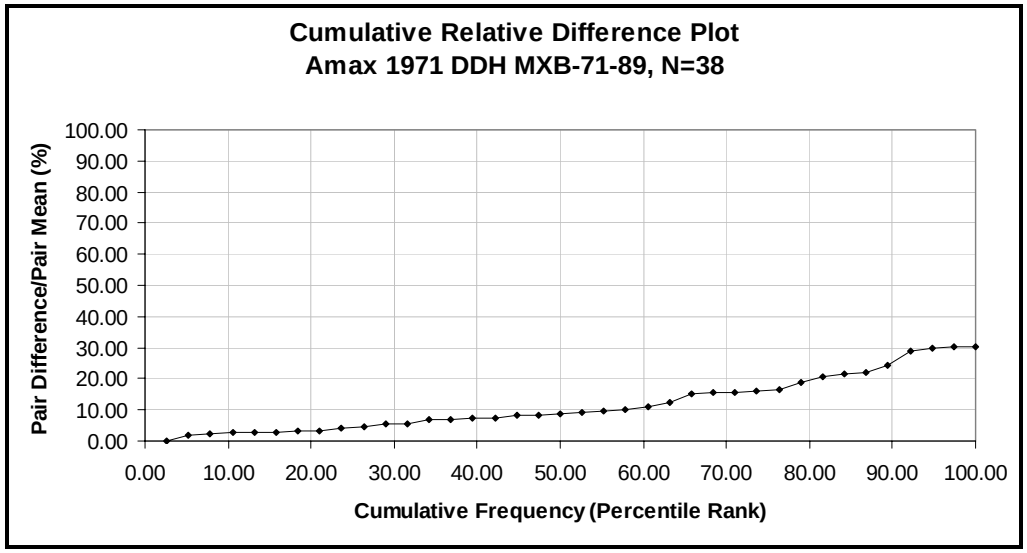


**Figure 2.10 Filleted Core and Split Core Assays – Amax 1971 DDH MXB-71-89**




Nickel assays were performed in an Amax laboratory at Wabowden, Manitoba utilizing an atomic absorption spectrometer with sample digestion by hot perchloric acid, nitric acid, hydrofluoric acid and hydrochloric acid. External nickel standards were not used prior to the summer of 1971.

Routine check assays of the pulps were made by sending every 20th sample and also samples with greater than 0.3% Ni to XRAL in Toronto and one sample in 10 to the Amax laboratory in Denver for repeat analysis. Samples were typically analyzed for total Ni, NiS and Cu.

Amax reported that Wabowden Ni assay results agreed with those from the other labs within 5% for most holes, but were 12% to 15% more conservative in holes 48 and 54, and 5% to 15% more conservative in holes 93 to 98 inclusive. Nickel standards, analyzed by six Canadian laboratories in 1971 including at Wabowden, XRAL and the Amax laboratory in Denver are in close agreement. The Wabowden laboratory was the most conservative, in testing of eight standards ranging from 0.5% to 3.2% Ni, being on average 2.76% lower then the other laboratories.

A comparison of filleted core Ni assays performed at Wabowden and XRAL is presented in Figure 2.11. The XRAL Ni values trend slightly higher then the Amax assays.

Ninety percent of the sample pairs have relative differences of 16.0% or less indicating acceptable levels of variation for same pulp level check assays (typically set at 90% of the sample pairs having relative differences of 10 to 20% or less, Wakefield, 2005). The cumulative relative difference plot is presented in Figure 2.12.

**Figure 2.11 Amax Check Assays – Paired Nickel – Wabowden Compared to XRAL**

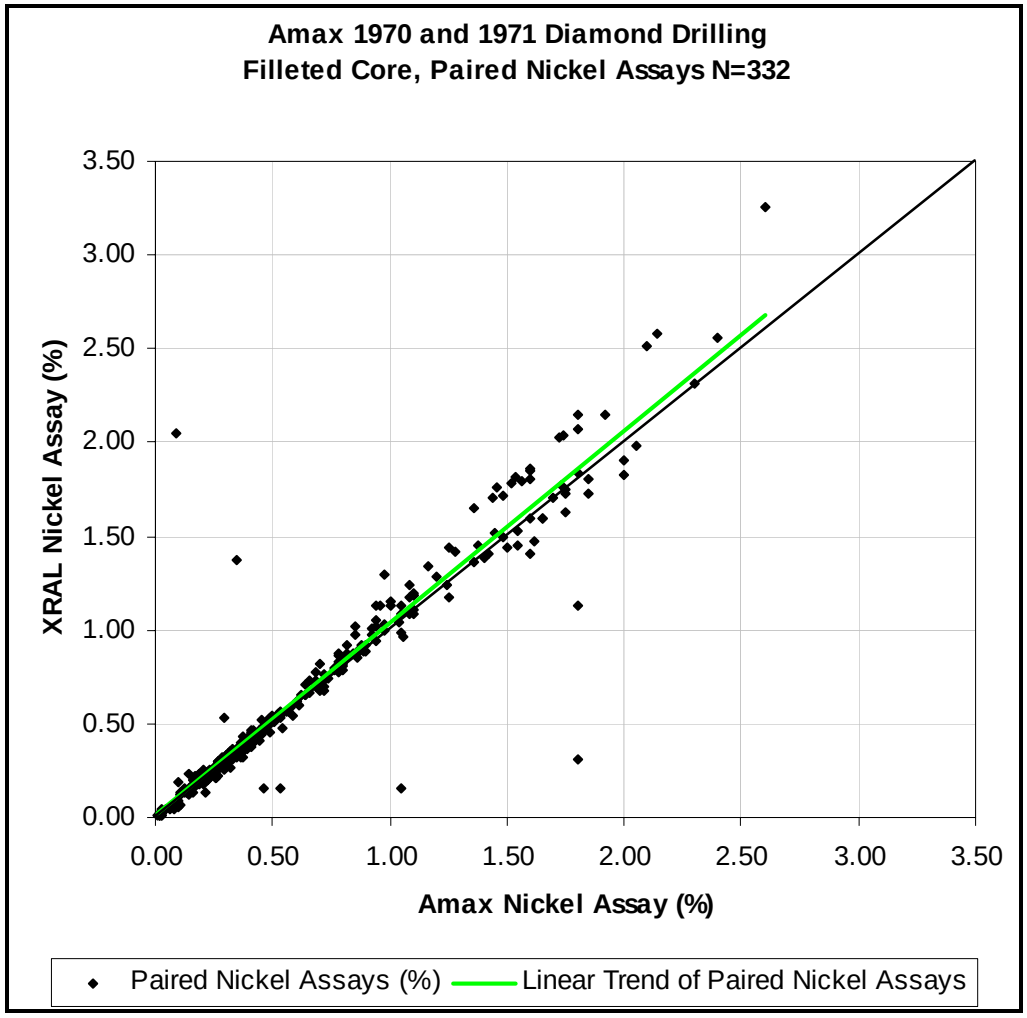
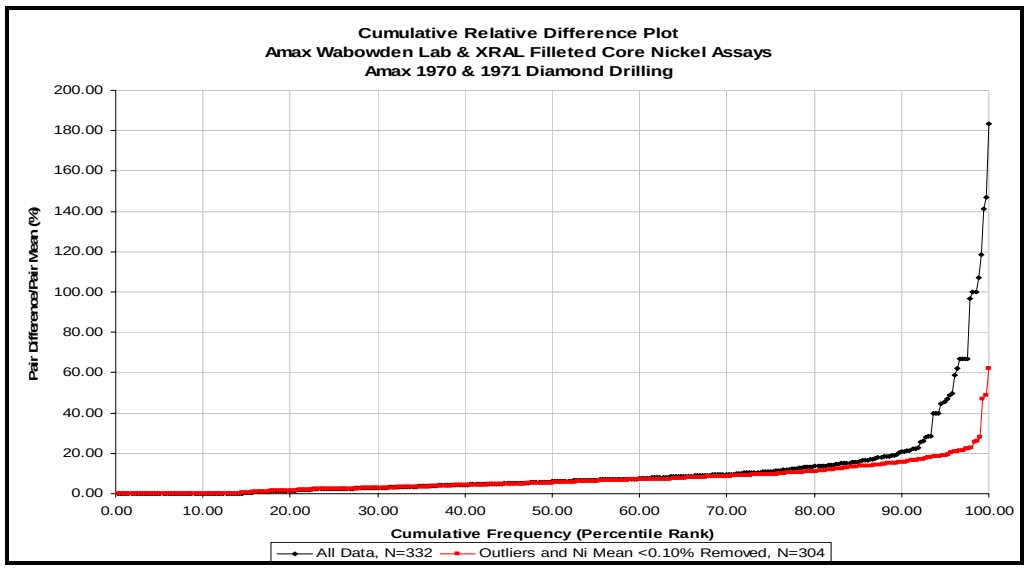


**Figure 2.12 Amax Check Assays – Cumulative Frequency – Amax 1970-1971 Drilling**




## 2.5.2 GRANGES

Granges did not describe their sampling method or approach. The following is inferred from the Granges drill logs and miscellaneous documents.

The Granges sampling program was for total nickel only. The BQ size core was sampled with focus on ultramafic units. Sample intervals were selected based on rock type, alteration, texture, colour and sulphide type and abundance. A total of 791 samples were selected from 1,461.2 m of core. Sample lengths ranged from 0.21 to 6.22 m with 95.1% of the samples less than or equal to 3.0 m. Core recovery of Precambrian basement rocks averaged 94.2%.

The samples are deemed representative and unbiased.

## 2.5.3 BLACK HAWK

Black Hawk drilled BQ size core with only very minor intervals of NQ size core. Sampling was conducted only for total nickel on all visibly mineralized ultramafic units. The standard sample interval was 1.5 m. In zones of mixed granite and ultramafic rocks the two rock units were sampled separately. An attempt was made to sample 3.0 to 4.5 m of the granitic wall rocks and poorly mineralized ultramafic units.

A total of 5,632.2 m of core was split and 3,891 samples were assayed. Sample intervals ranged from 0.09 to 5.39 m with 99.8% of the sample intervals being less than or equal to 3.0 m.

Assaying of the core from the 1989-1990 diamond drilling was performed by LynnGold Resources Inc. (LynnGold) in Lynn Lake, Manitoba, check assays were performed by Bondar Clegg in Ottawa, Ontario.

There is no documentation from LynnGold describing sample preparation or analytical procedures and the laboratory no longer exists. As the former exploration manager of LynnGold, P.J. Chornoby, P.Geo., is familiar with the procedures employed at the laboratory and through discussions with the former senior assayer in August, 2006 has determined that the following procedures were utilized. Samples were prepared by crushing and riffle splitting to obtain a sample size ranging from 300 to 500 grams (g) that was then pulverized using a mild steel pulverizer to 80% passing 75 microns. The sample preparation equipment was routinely cleaned with compressed air after each sample. A four acid digestion (perchloric-nitric-hydrofluoric-hydrochloric) was used on varying sample sizes of 0.50 g, 1.0 g and 2.0 g depending on whether trace element or ore grade determinations were required. Results are reported in weight percent.

Through its predecessor company Sherritt Gordon Mines Ltd., the LynnGold assay laboratory was a founding member (1969) of and conformed to the quality assurance manual published by the Canadian Mineral Analysts. Internal laboratory generated standards and CANMET standards were used routinely to ensure quality control.

Rockworth Consulting Ltd. reported that check assays of the same pulp by Bondar Clegg, Ottawa averaged 5% higher than LynnGold assays.

The samples are considered representative and unbiased.

### 2.5.4 NUINSCO 2004 – SAMPLING OF 1990-1991 BLACK HAWK CORE

Nuinsco collected and assayed 2,128 samples for total nickel. These samples represented 2,979.6 m of predominantly BQ and minor amounts of NQ size core from 14 randomly selected Black Hawk diamond drill holes from the 1990-1991 program. The re-sampling of the core was done to determine the nickel content of ultramafic rock that Black Hawk had not assayed and to verify earlier assays performed at X-Ray Assay Laboratories (XRAL), Toronto. The core had been stored in walled and roofed sheds at the Minago property and was for the most part well preserved. Metal core box labels and footage markers were in place, and only rarely did it appear that a few small pieces may have been lost during handling and transport.

The substantial intervals of ultramafic core that had not been split were in very good shape exhibiting only minor surface oxidation. Sample intervals were selected by the geologist supervising the program based on rock type, alteration (type and intensity) and sulphide content (type and abundance).

Approximately 25% of the samples were ¼ splits of previously assayed intervals. The portions of holes which had been previously split by Blackhawk were generally

well ordered, with only some of the footage markers and occasionally a segment of split core bounced loose and shifted somewhat during transport. Splitting during the Black Hawk era rendered some sections of well fractured, fissile rock types into chips and slivers. Some rock types such as mica or talc schist that are susceptible to physical degradation by seasonal temperature and humidity variations were reduced to sand size particles.

Black Hawk typically sampled 1.5 m intervals within rock types. Nuinsco duplicated 159 Black Hawk sample intervals where there was geological agreement or where there were instances that the previously sampled core was in order, or where chalk marks were evident to show the previous sample divisions. In cases where the finer material had been displaced in the core boxes during transport, it was not possible to replicate individual sample intervals to match those from the Black Hawk assay records.

Partial oxidation of the core had occurred in some of the more nickel-rich intervals that were more granular and friable causing local formation of “nickel bloom” (the hydrous nickel arsenate mineral, annabergite). Where annabergite was present, care was taken to avoid contaminating adjacent samples. Each sample was placed in a plastic bag along with a tag with a unique identifying number and stapled shut. The plastic bags were packed in plastic pails with lids for shipment. The samples were transported by Nuinsco personnel from Black Hawk to Fort Francis, Ontario and shipped by commercial trucking company to the ALS Chemex sample preparation laboratory in Thunder Bay, Ontario.

Nuinsco inserted 27 samples of drill core obtained from local granodiorite into the sample stream. The granodiorite samples were assumed to be blanks. The blanks returned results within the range expected except that four samples assayed greater than 0.10% Ni. Consequently a series of 31 samples was re-assayed to verify the reproducibility of the analysis. The second series of analysis compared favourably with the initial set of data indicating that the analysis was correct. Either the assumption that all of the blanks contained no nickel was incorrect or the four blanks containing appreciable nickel were contaminated.

A plot of paired nickel assays indicates that the XRAL assays are biased slightly lower than the ALS Chemex assays (Figure 2.13).

Ninety percent of the sample pairs have relative differences of 28% or less indicating acceptable levels of variation for sample level check assays (typically set at 90% of the sample pairs having relative differences of 30% or less, Wakefield, 2005) (Figure 2.14).

The samples are considered representative and unbiased.

**Figure 2.13 Nuinsco Check Assays – Paired Nickel – Black Hawk 1990-1991 Drilling**

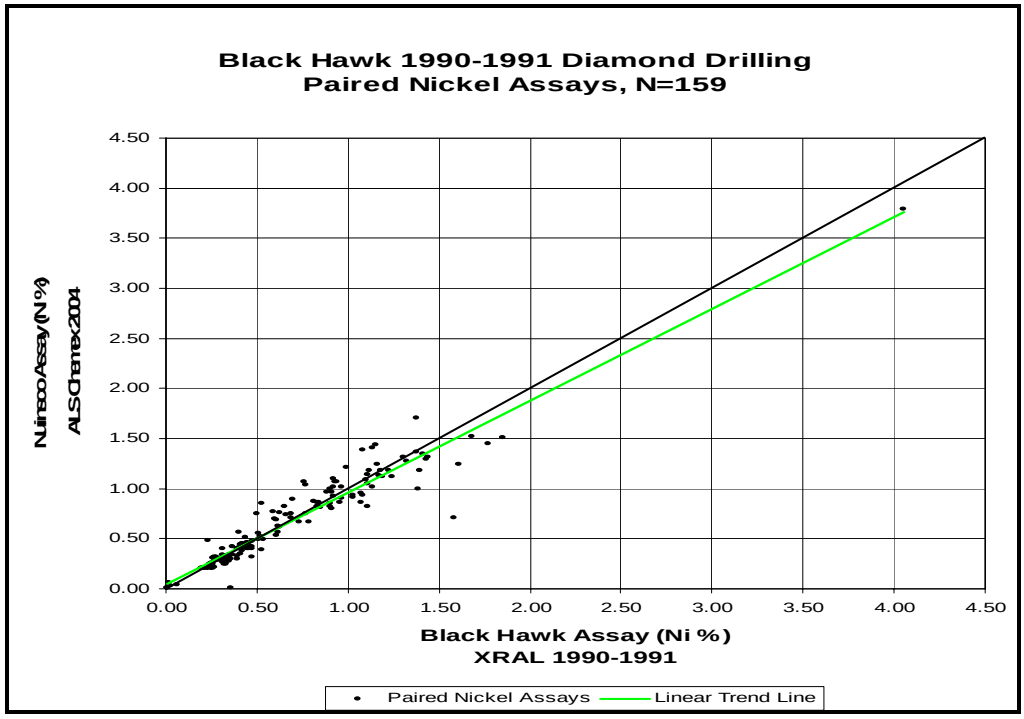
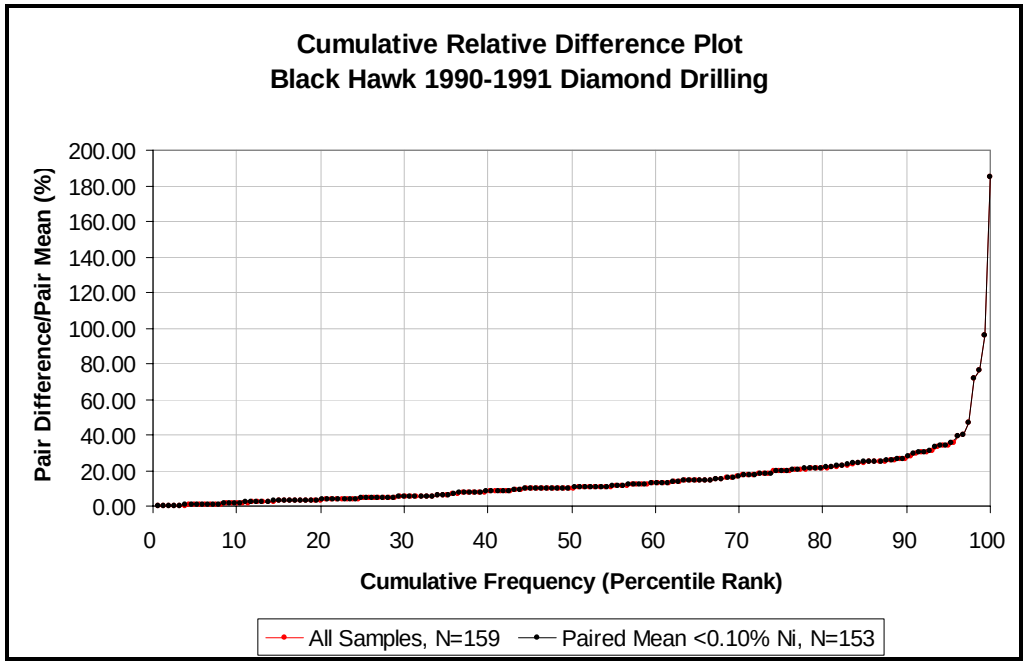


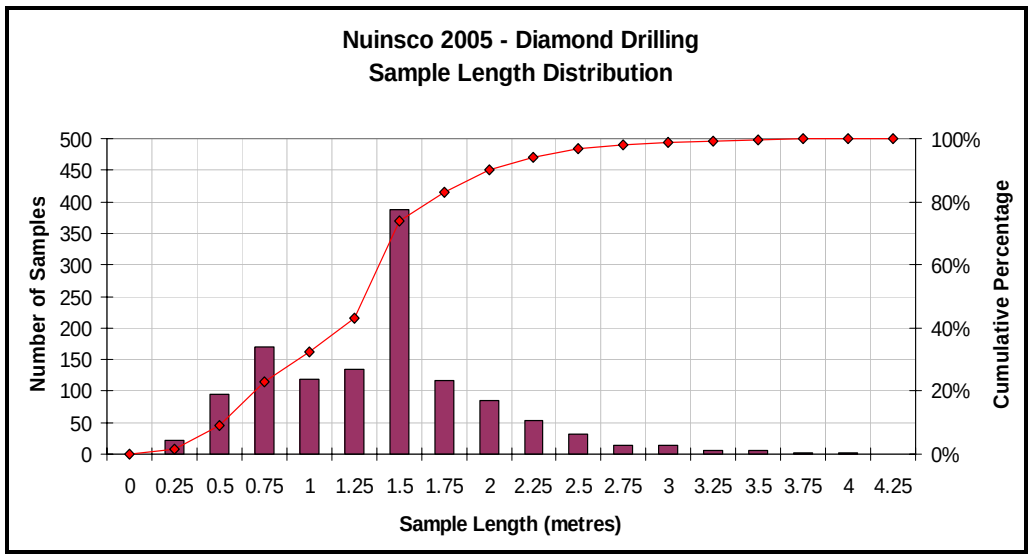

**Figure 2.14 Nuinsco Check Assays – Cumulative Frequency – Black Hawk 1990-1991 Drilling**



### 2.5.5 NUINSCO 2005 DIAMOND DRILLING

A total of 1,254 total nickel samples representing an aggregate of 1,628.85 m of BQ size core were selected for assay. Sample intervals were determined by the geologist during core logging. Sample lengths are graphically displayed in Figure 2.15.

**Figure 2.15 Nuinsco 2005 Diamond Drilling – Nickel Sample Lengths**




As per industry norms, each hole was logged and sample intervals based on the following hierarchy:

- rock type
- alteration (style and intensity)
- sulphide content (type and abundance).

All of the ultramafic rock intersected in each drill hole was sampled as was adjacent barren and included barren rock. Core recoveries from the Precambrian were generally 95% to 100% for each 3.0 m run with only rare intervals of lost core ranging up to 1.5 m noted.

Nuinsco took possession of the core at the drill site. At various times during the drilling program the core was transported under cover using a pickup truck or flat bed trailer, to the Nuinsco core logging facility in Black Hawk, Ontario.

The drill core was logged and sampled at Black Hawk, Ontario, by ½ splitting. Six samples from DDH N-1 were quarter split due to a mix-up in sample footages. The core was split by sawing or knife splitting each sample interval lengthwise and taking continuous samples for the footage specified by the geologist. Intervals of core not suitable for sawing were knife split or alternatively in cases of highly broken core a

representative number of pieces of core were selected from that interval for assay. Each sample was placed in a plastic bag along with a tag with a unique identifying number and stapled shut. The plastic bags were packed in plastic pails with lids for shipment. The samples were transported by Nuinsco personnel from Black Hawk, Ontario, to Fort Francis, Ontario, and shipped by commercial trucking company to the ALS Chemex sample preparation laboratory in Thunder Bay, Ontario.

The pulps for 126 of the samples assayed by ALS Chemex were sent first to Activation Laboratories and then to SGS for check assaying; see Table 2.7 for statistical description of results. The ALS Chemex assays are higher compared to assays by Activation Laboratories. The trend becomes more pronounced as nickel content increases (Figure 2.16). ALS Chemex assays compare favourably with SGS assays (Figure 2.17). SGS assays are lower compared to Activation Laboratories assays (Figure 2.18). Duplicate analysis of the same sample provided by SGS indicate virtually no difference (Table 2.8).

Ninety percent of the sample pairs have relative differences of 16% or less, indicating acceptable levels of variation for same pulp check assays (typically set at 90% of the sample pairs having relative differences of 10 to 20% or less, Wakefield, 2005) (Figure 2.19).

The samples are considered representative and unbiased.

**Table 2.7 Statistical Description of Assays**

| | Ni% ALS Chemex | Ni% Act Laboratories | Ni% SGS |
|---|---|---|---|
| N | 126 | 126 | 126 |
| Minimum | 0.001 | 0.001 | 0.001 |
| Maximum | 1.47 | 1.38 | 1.44 |
| Median | 0.242 | 0.229 | 0.25 |
| Mean | 0.296 | 0.271 | 0.301 |
| Standard Deviation | 0.292 | 0.259 | 0.288 |
| Variance | 0.085 | 0.067 | 0.083 |

**Table 2.8 SGS Repeat Assays**

| Sample Numbers | Original Ni Assay (%) | Duplicate Ni Assay (%) |
|---|---|---|
| 48688 A05-1580-20 | 0.33 | 0.33 |
| 48926 A05-1580-40 | 0.37 | 0.38 |
| B028941 A05-1580-60 | 0.22 | 0.21 |
| B029141 A05-1580-80 | 0.006 | 0.006 |
| B029341 A05-1580-100 | 0.32 | 0.32 |
| B029631 A05-1560-120 | 0.44 | 0.45 |
| Mean | 0.281 | 0.283 |
| Median | 0.325 | 0.325 |

**Figure 2.16 ALS Chemex vs. Act Labs**

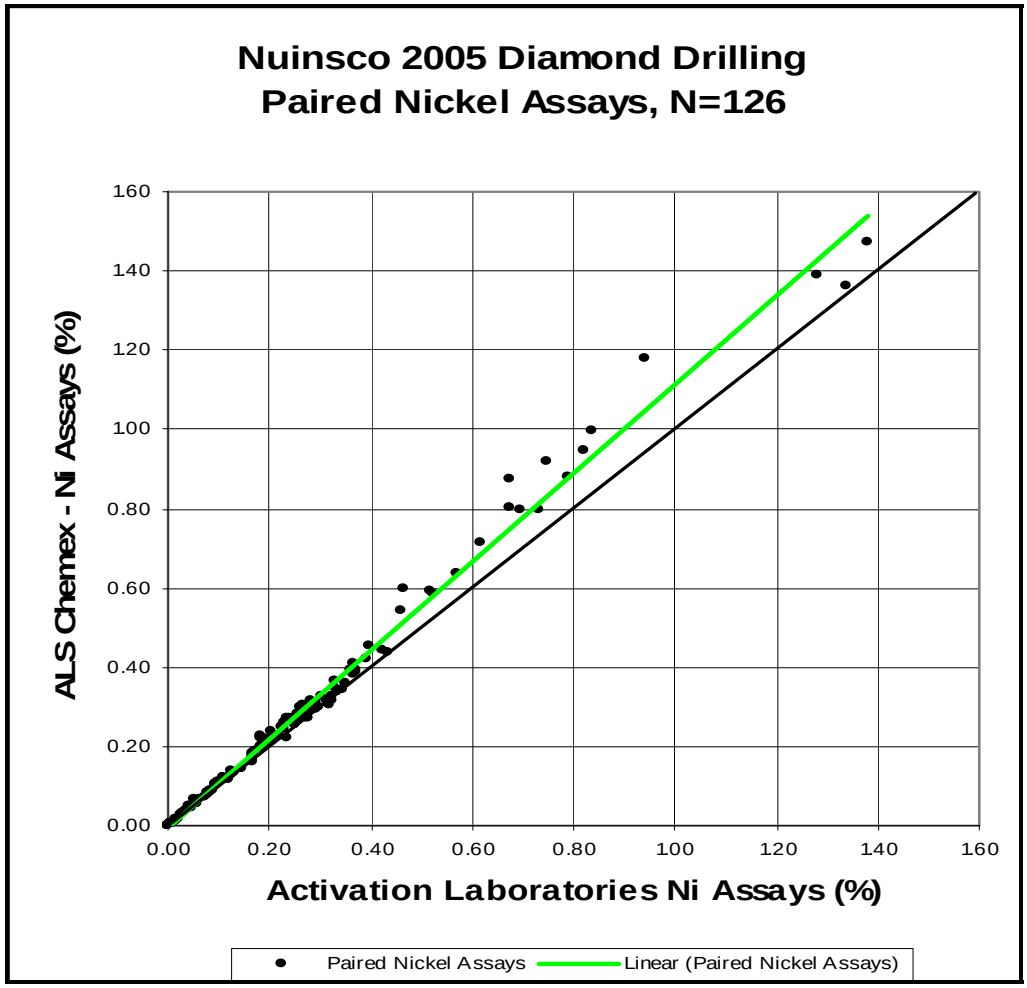


**Figure 2.17 ALS Chemex vs. SGS**

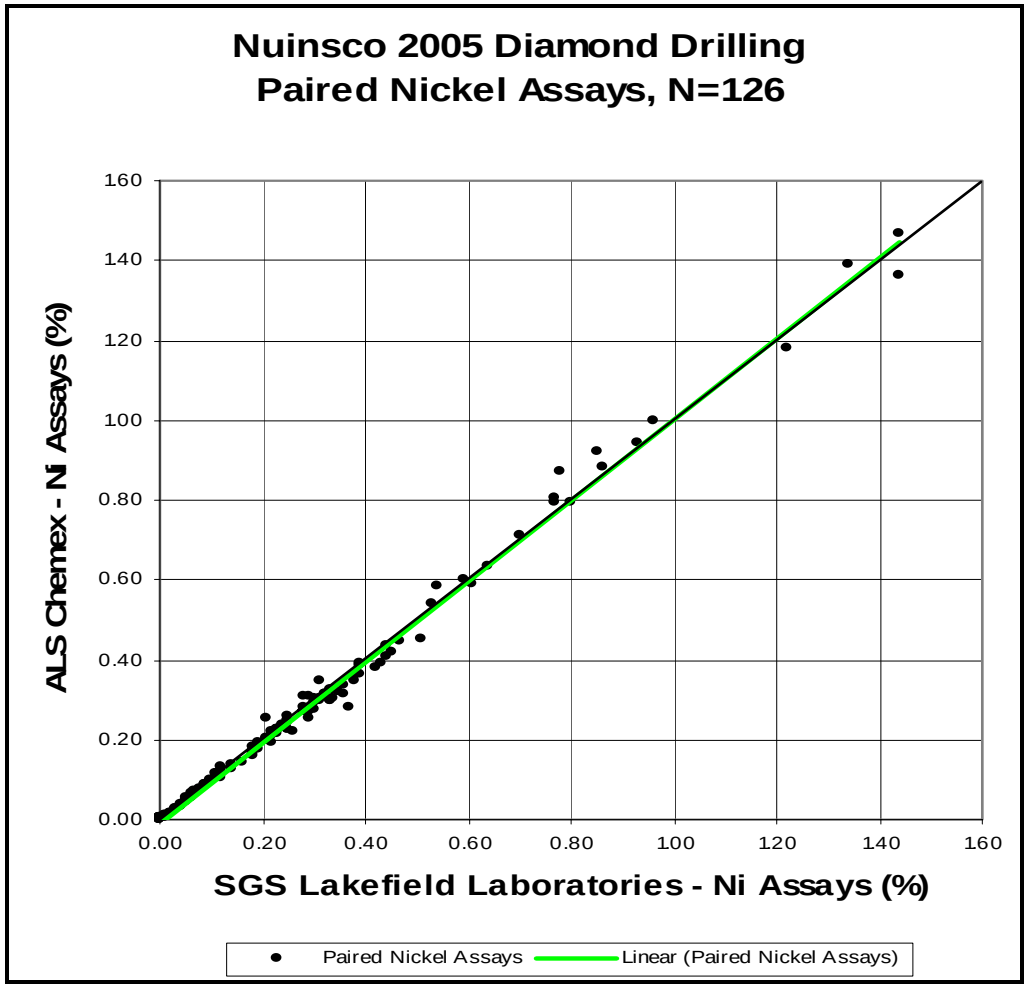


**Figure 2.18 SGS vs. Act Labs**

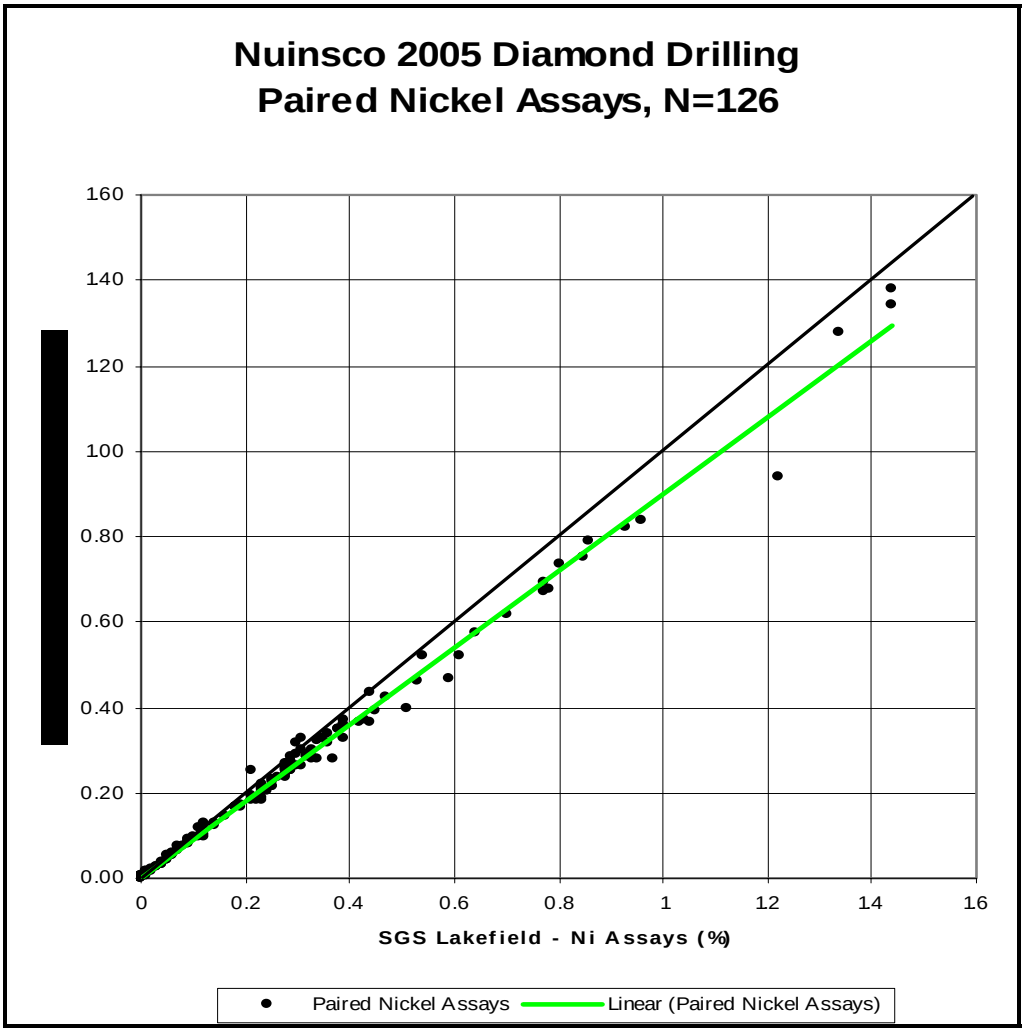
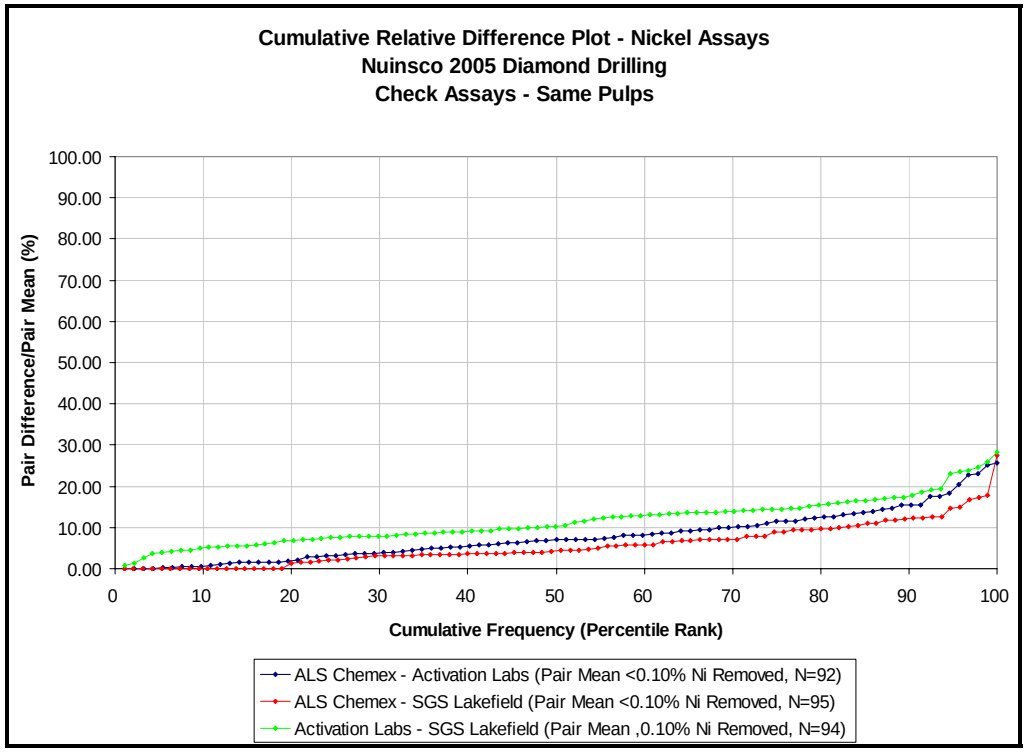


**Figure 2.19 Nuinsco Check Assays – Cumulative Frequency – Nuinsco 2005 Drilling**




## 2.5.6 NUINSCO 2005 – SAMPLING OF 1989-1990 BLACK HAWK CORE

129 total nickel samples representing 191.7 m of BQ size core, drilled by Black Hawk in 1989 and 1990, were selected from drill holes B-8, B-12A, B-19, and B-21. The purpose of the sampling was to verify nickel assays performed at the LynnGold Resources Ltd. assay laboratory in Lynn Lake, Manitoba.

The condition of the core was similar to that described for the sampling conducted in 2004.

Only core judged to be in very good to excellent condition was selected and each sample represented the exact same core interval that Black Hawk had previously sampled as indicated by: the drill logs, footage markers, old sample tags, and chalk marks on the core and core boxes.

In cases where fine material was being sampled or annabergite was present, care was taken to avoid contaminating adjacent samples.

The Nuinsco samples are of such a quality as to be considered equivalent to the corresponding Black Hawk samples (Figure 2.20 and Figure 2.21).

**Figure 2.20 Nuinsco Check Assays – Paired Nickel – Black Hawk 1989-1990 Drilling**

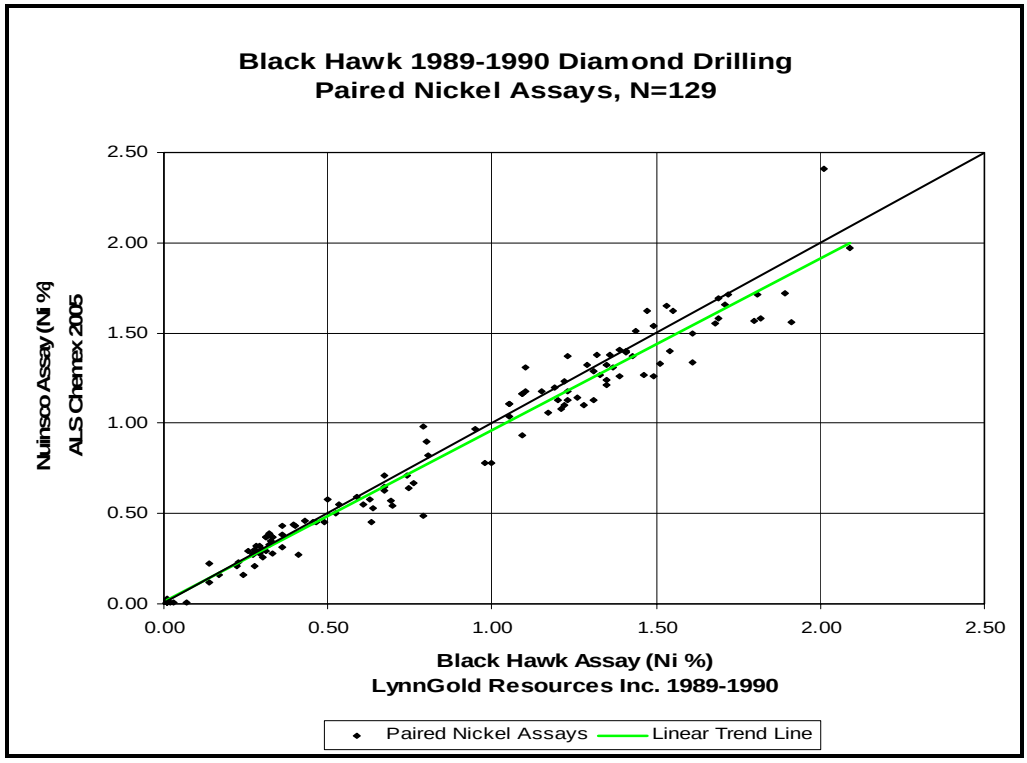
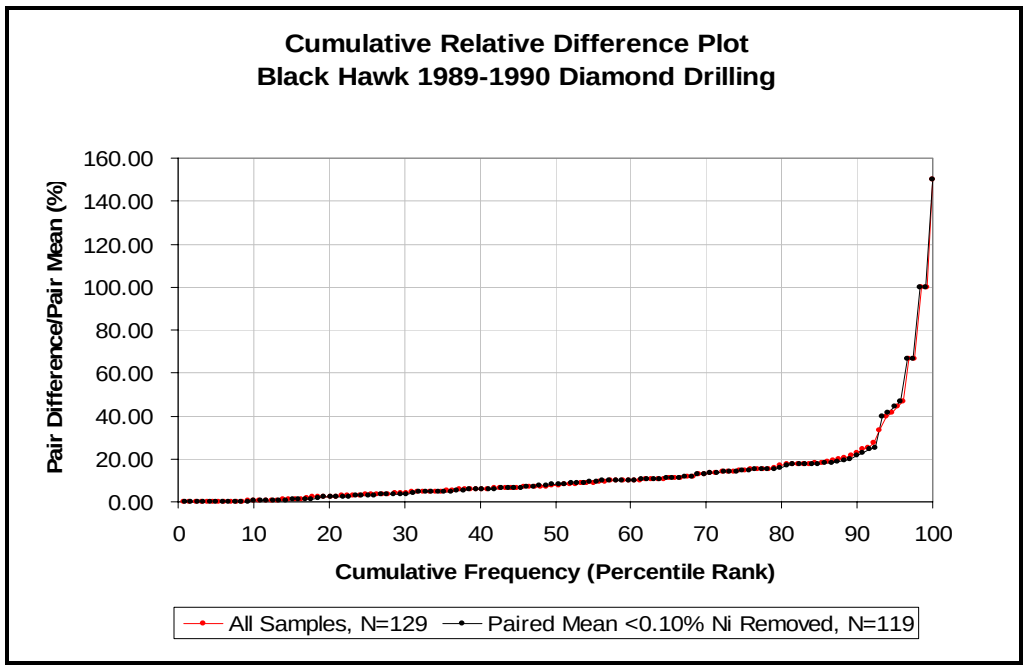



**Figure 2.21 Nuinsco Check Assays – Cumulative Frequency – Black Hawk 1989-1990 Drilling**



### 2.5.7 NUINSCO 2006 DIAMOND DRILLING

It was necessary during the drilling of the Minago Deposit to employ NQ size rods to drill through the Ordovician strata and into the upper Precambrian basement. The remainder of the drill holes were reduced to BQ rod size. Due to the drill hole lengths required to cut a section through the sand deposit, changing the drill bit midway through each hole was necessary. If it were not for the reduction in rod size shortly below the unconformity, removal of the NQ rods from the hole to change a bit would have invariably resulted in collapse of unconsolidated Winnipeg Formation sand into the hole, and the near certain loss of the hole below the unconformity (Wagg, 2006).

Based on observations on the two drill holes for the 2006 drilling program, the Winnipeg Formation sandstone represents a water saturated aquifer of regional extent. However, no rapid outflows of groundwater were encountered by the drill crew when the unit was encountered and the horizon does not appear to be significantly pressurized.

The core was picked up at the drill site by the project geologist and transported by pickup truck to a rented core logging facility in Grand Rapids, Manitoba. There, the core was securely stored indoors, logged and ½ split by sawing. Splitting was performed by residents of Grand Rapids hired by Nuinsco on a casual basis. The water for the core saw was changed once for every 6 to 10 core boxes cut. Sample material was rinsed with clean water prior to being bagged for analysis. Each sample was placed in a plastic bag along with a tag with a unique identifying number and stapled shut. Samples were shipped by bus to the ALS sample preparation laboratory in Thunder Bay, Ontario.

CANMET Canadian Certified Reference Material, standard WPR-1, was inserted into the sample stream five times. The standard is certified for Au, Cu, iron oxide (Fe2O3), iridium (Ir), potassium oxide (K2O), manganese oxide (MnO), Pd, Pt, rhodium (Rh), ruthenium (Ru), and titanium dioxide (TiO2). The certified mean concentration of copper for WPR-1 is 0.164% with a 95% confidence limit of ± 0.008%. The provisional mean concentration of nickel for WPR-1 is 0.29% with a 95% confidence limit of ± 0.02%. The five determinations performed by ALS Chemex for copper and nickel on standard WPR-1 are within acceptable limits (see Table 2.9).

A total of 28 blanks were inserted into the sample stream for drill hole NM0602. The blanks were obtained from the central part of a long granitic interval in drill hole NM0601 that was chosen for its uniformity and absence of sulphide mineralization, fracturing and infillings. In addition 52 samples of in situ granitic or gneissic material from within NM0602 were deemed blanks by the project geologist for quality control purposes.

**Table 2.9 ALS Chemex Assays of Standard WPR 1**

| Determination | Nuinsco Sample Number | Cu (%) | Ni (%) |
|---|---|---|---|
| 1 | B762750 | 0.16 | 0.28 |
| 2 | B762805 | 0.17 | 0.30 |
| 3 | B762888 | 0.17 | 0.31 |
| 4 | B763016 | 0.16 | 0.30 |
| 5 | B757652 | 0.16 | 0.31 |
| Average | | 0.16 | 0.30 |
| Standard Deviation | | 0.005784 | 0.011841 |
| 95% Confidence Limit | | 0.000162 | 0.000332 |

The 28 blanks from MN0601 that were inserted into the sample stream all returned values of 0.01% Ni or less except for one sample that assayed 0.31% Ni. The 52 samples that were deemed blanks all returned values of 0.06% Ni or less except for one sample that assayed 0.24% Ni. The source of the nickel in the two blanks that assayed anomalously high for nickel is unknown.

Sampling, sample preparation, security and analytical procedures described herein were conducted using accepted industry standard practices at the time that the work was performed. Shortfalls in documentation and procedures relating to the earliest exploration programs are noted but it is also observed that check assays and analysis, where possible, indicate that the data is within acceptable limits.

There were 498 total nickel samples representing 645.5 m of core selected from drill hole NM0602. The sample intervals were determined by the geologist during core logging. Sample lengths are graphically displayed in Figure 2.22.

As per industry norms each hole was logged and sample intervals based on the following hierarchy:

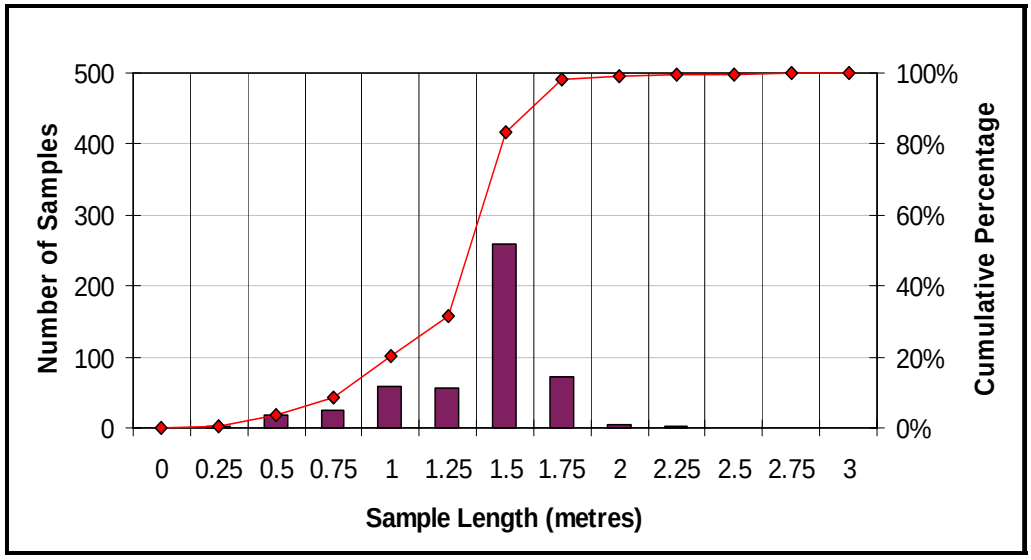
- rock type
- alteration (style and intensity)
- sulphide content (type and abundance).

All of the ultramafic rock intersected in drill hole NM0602 was sampled as was adjacent barren and included barren rock.

Core recoveries in the Precambrian were generally 95% to 100% for each 3.0 m run with only rare intervals of lost core ranging up to 1.5 m noted.

The samples are considered representative and unbiased.

**Figure 2.22 Nuinsco 2006 Diamond Drilling – Nickel Sample Lengths**




## 2.5.8 VICTORY NICKEL 2007 DRILLING

Five sandstone samples were submitted for frac sand quality analysis. An additional 25 sandstone samples were identified and submitted for density measurement. A total of 7,260 nickel samples representing 13,217 m of NQ core were selected from the 44 holes drilled in 2007. The sample intervals were determined by the geologist during core logging.

As per industry norms each hole was logged, with sample intervals based on the following hierarchy:

- rock type
- alteration (style and intensity)
- sulphide content (type and abundance).

All of the ultramafic rock intersected in each drill hole was sampled as was the immediately adjacent barren and included barren rock. Nickel samples varied in length from 0.13 m to a maximum of 3.45 m with a mean sample length of 1.21 m. Core recoveries in the Precambrian were generally 95% to 100% for each 3.0 m run with only rare intervals of lost core. Sandstone quality samples varied in length from 7.86m to 13.41m, and were limited to drill holes with >90% recovery.

The core was picked up at the drill site by the project geologist and transported by pickup truck to a rented core logging facility in Grand Rapids, Manitoba. There, the core was securely stored indoors, logged and the core was sawn in half, with one half sent for assay, and the other half retained in Grand Rapids. The water for the core saw was changed once every 6 to 10 core boxes cut. Samples sent for assay

were rinsed with clean water prior to being bagged. Each sample was placed in a plastic bag along with a uniquely numbered tag.

CANMET Canadian Certified Reference Material, standard WPR-1, was inserted into the sample stream every 20 samples. The standard is certified for Au, Cu, Fe2O3, Ir, K2O, MnO, Pd, Pt, Rh, Ru, and TiO2. The certified mean concentration of copper for WPR-1 is 0.164% with a 95% confidence limit of ±0.008%. The provisional mean concentration of nickel for WPR-1 is 0.29% with a 95% confidence limit of ±0.02%.

Blanks were inserted into the sample stream once every 20 samples. The blanks were obtained from the dolomite horizon above the Minago deposit. Dolomite that was used for blanks was chosen for its uniformity and absence of sulphide mineralization, fracturing and infillings.

Sampling, sample preparation, security and analytical procedures described herein were conducted using accepted industry standard practices. TSL is a nationally accredited assay laboratory that uses widely accepted quality control procedures. Wardrop believes the sample data collected to be fair and unbiased, and adequate for resource estimation.

Wardrop compared the size fractions from the four samples submitted to Loring. The grain size distribution is similar, as shown in Figure 2.23. The similarity between the samples supports the depositional model and suggests that there will be little variability within the sand unit. Table 2.10 present the amount (%) of usable product from Loring's screen analysis used to construct Figure 2.24. Fractions coarser than 6 mesh and finer than 140 mesh are not recognized.

**Table 2.10 Usable Product Meeting API Standards for Screen Analysis from Loring**

| Usable Product | Sample Number | | | |
|---|---|---|---|---|
| | 924078 (%) | 924079 (%) | 924080 (%) | 924081 (%) |
| % 20/40 | 10.34 | 14.71 | 12.09 | 11.88 |
| %40/140 | 72.46 | 72.46 | 71.98 | 68.25 |
| Total Usable | 82.80 | 87.17 | 84.07 | 80.13 |

Table 2.11 outlines the results from the roundness, sphericity and crush resistance tests for the samples at Loring. The crush resistance tests were applied in three different procedures. For trial #1, a standard jaw crusher and plate impactor are used to obtain the unacceptable 30 to 40% of fines. This is a standard procedure for testing the crush resistance of the sand. In order to decrease the percentage of fines to 14%, the maximum allowed by the API, two trials were preformed, where attrition scrubbing and an acid bath are introduced in order to remove the calcium, which is the weaker component. With this, the crush resistance improved significantly to the level of the API standards but about half of the useful product was lost.

**Table 2.11 Roundness, Sphericity and Crush Resistance (20/40 sand fraction)**

| Usable Product | Sample Number | | | |
|---|---|---|---|---|
| | 924078 | 924079 | 924080 | 924081 |
| Trail # 1 – Jaw Crush + Plate Impactor | | | | |
| Roundness | 0.63 | 0.60 | 0.60 | 0.62 |
| Sphericity | 0.64 | 0.71 | 0.69 | 0.73 |
| Crush Resistance | 39.7% | 31.2% | 29.7% | 30.0% |
| Trail #2 – Jaw Crush + Plate Impactor + 2 Hours Attrition | | | | |
| Roundness | 0.68 | - | - | - |
| Sphericity | 0.69 | - | - | - |
| Crush Resistance | 25.0% | - | - | 15.3% |
| Trail #3 – Jaw Crush + Plate Impactor + 2 Hours Attrition + Acid Bath | | | | |
| Crush Resistance | - | - | - | 13.8% |

**Figure 2.23 Loring Sample Particle Size Comparison**

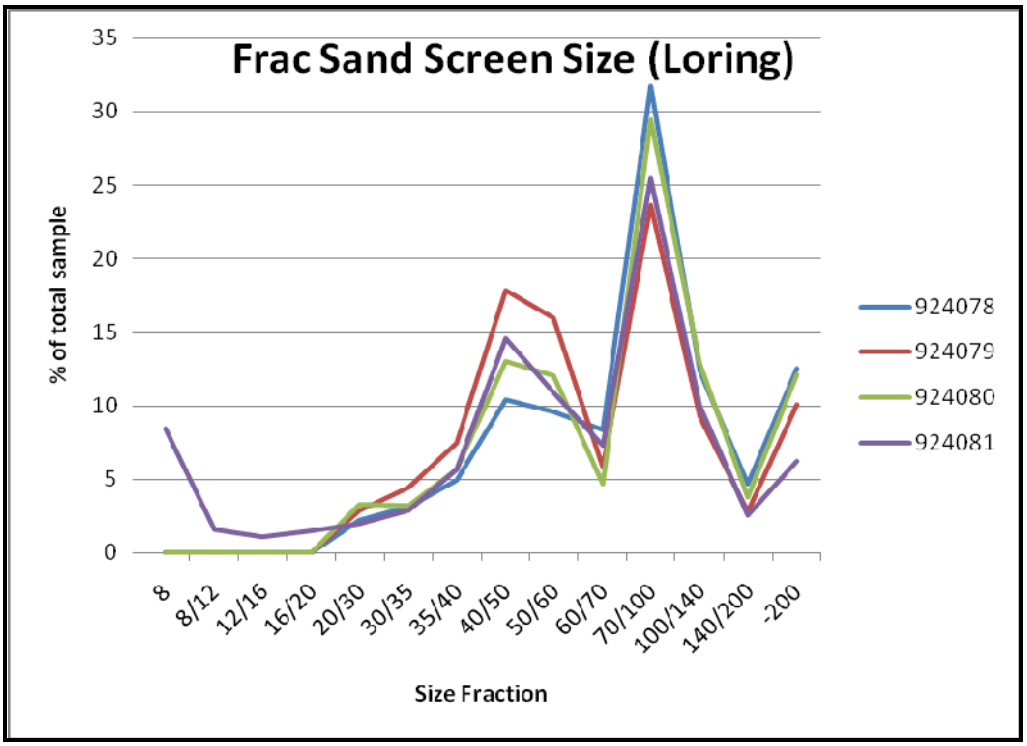
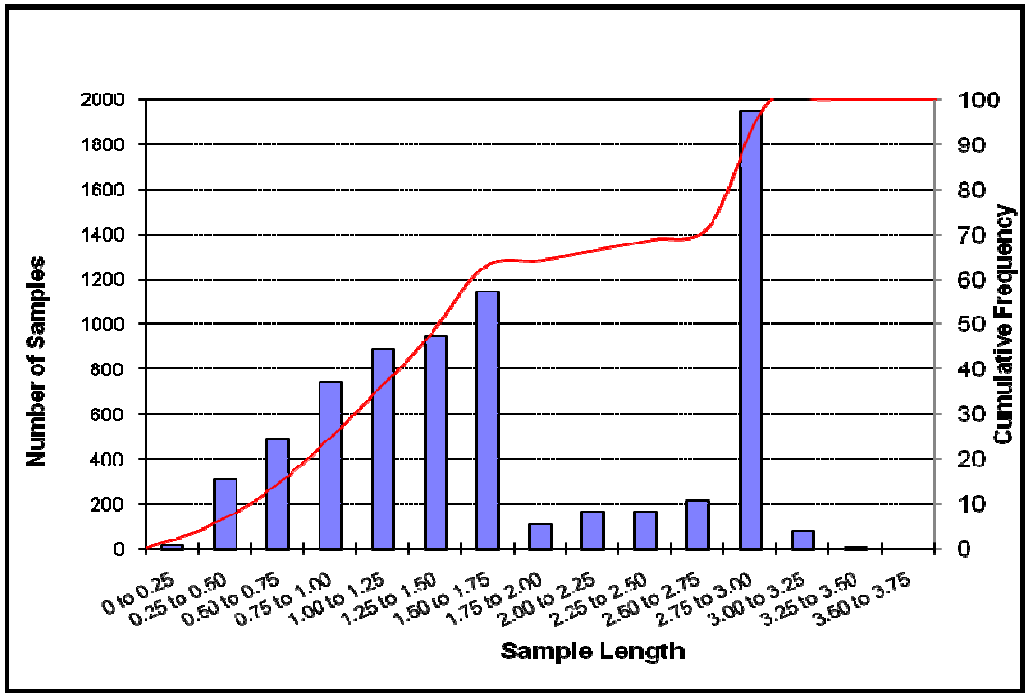


**Figure 2.24 Victory Nickel 2007 Diamond Drilling – Nickel Sample Lengths**




## 2.5.9 VICTORY NICKEL 2008 DRILLING

A total of 2,106 nickel samples representing 2,783.6 m of NQ core were selected from the 10 holes drilled in 2008 (Figure 2.25). The sample intervals were determined by the geologist during core logging. Twenty one sandstone samples were collected for density measurements.

As per industry norms each hole was logged, with sample intervals based on the following hierarchy:

- rock type
- alteration (style and intensity)
- sulphide content (type and abundance)

All of the ultramafic rock intersected in each drill hole was sampled as was the immediately adjacent barren and included barren rock. Core recoveries in the Precambrian were generally 95% to 100% for each 3.0 m run with only rare intervals of lost core. Samples varied in length from 0.14 m to a maximum of 4.4 m, with a mean sample length of 1.32 m.

The core was picked up at the drill site by the project geologist and transported by pickup truck to a rented core logging facility in Grand Rapids, Manitoba. There, the core was securely stored indoors, logged and the core was sawn in half, with one

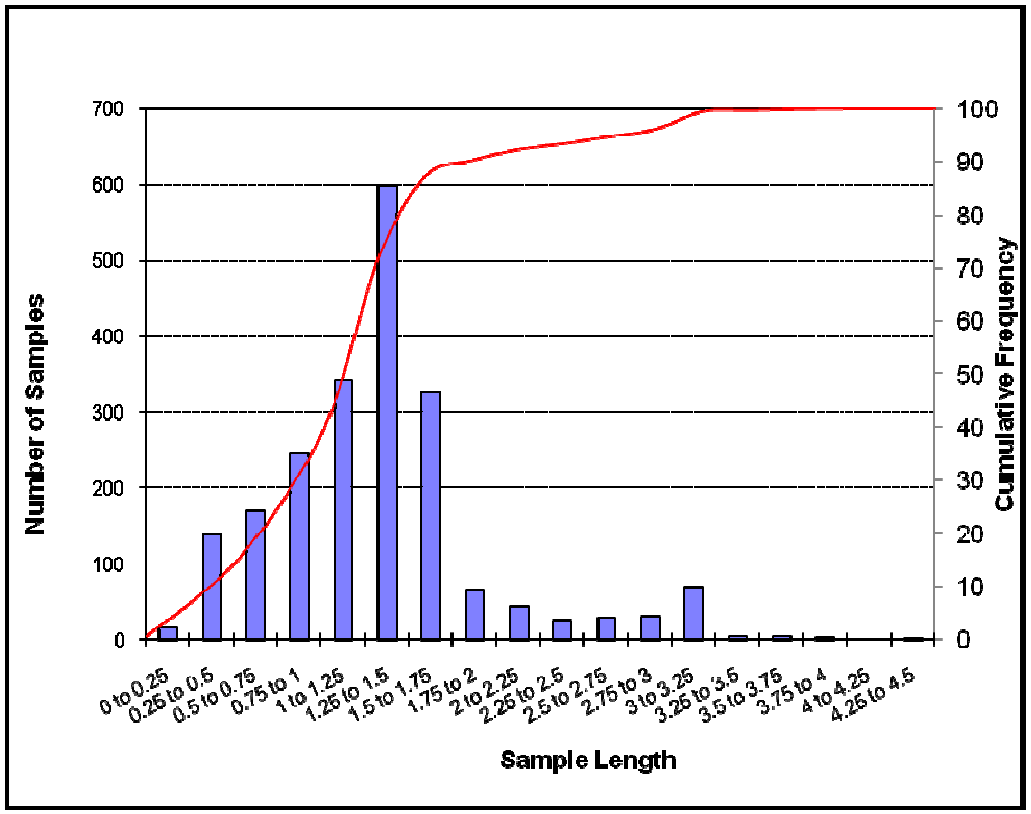
half sent for assay, and the other half retained in Grand Rapids. The water for the core saw was changed once every 6 to 10 core boxes cut. Samples sent for assay were rinsed with clean water prior to being bagged. Each sample was placed in a plastic bag along with a uniquely numbered tag.

CANMET Canadian Certified Reference Material, standard WPR-1, was inserted into the sample stream every 20 samples. The standard is certified for Au, Cu, Fe2O3, Ir, K2O, MnO, Pd, Pt, Rh, Ru, and TiO2. The certified mean concentration of copper for WPR-1 is 0.164% with a 95% confidence limit of ±0.008%. The provisional mean concentration of nickel for WPR-1 is 0.29% with a 95% confidence limit of ±0.02%.

Blanks were inserted into the sample stream once every 20 samples. The blanks were obtained from the dolomite horizon above the Minago deposit. Dolomite that was used for blanks was chosen for its uniformity and absence of sulphide mineralization, fracturing and infillings.

Sampling, sample preparation, security and analytical procedures described herein were conducted using accepted industry standard practices. TSL is a nationally accredited assay laboratory that uses widely accepted quality control procedures. Wardrop believes the sample data collected to be fair and unbiased, and adequate for resource estimation.

**Figure 2.25 Victory Nickel 2008 Diamond Drilling – Nickel Sample Lengths**



## 2.6 RESOURCE DATABASE PREPARATION AND VERIFICATION

Verification for Victory Nickel, of the historical sampling and analytical data collected by Black Hawk was conducted in part by Mr. Chornoby, as detailed in Section 3.5 of this report. Similarly, verification of Victory Nickel's more recent sampling and analytical data were conducted by Wardrop. There are no records of verification procedures followed by Granges.

The Amax and Granges sampling and analytical data has not been verified during the course of this study because the small amount of core remaining from those drilling campaigns is stored for geological purposes in the Manitoba government core library and was not available for re-splitting. Attempts to verify by re-drilling some of the Amax and Granges nickel intersections have only been partially successful due to hole wandering.

Wardrop has conducted field verification of mineral disposition and 23 diamond drill hole locations on the Property, using a hand held GPS.

The data base used to generate the Minago deposit geological model and resource estimates has undergone extensive visual and computer aided verification by numerous workers including Wardrop. Discrepancies, resulting largely from transcription of hard copy to digital format, have been corrected by referencing the source data.

### *2.6.1 DATA VERIFICATION*

Wardrop conducted an internal validation from the original drillhole logs against the drill hole database. Data verification was completed on collar co-ordinates, length of hole, down-the-hole survey measurements including azimuth and dip, from and to footage measurements of geology and assay sampling intervals, lithological units and Nickel and Nickel Sulphide percentages as compiled from assay certificates merged into a database.

#### DATABASE

Wardrop carried out a comparison of the entire assay data by all the companies involved which were Amax, Granges, Blackhawk, Nuinsco and Victory.

The previous resource estimate generated by Mirarco had used different lithology units than what was used in the current model (Table 2.12).

**Table 2.12 Old Mirarco and New Wardrop Lithology Units and Codes**

| Litho Name | Abbreviation | Mirarco Rock Code | Comment | Wardrop Rock Code |
|---|---|---|---|---|
| Overburden | OVB | 1 | Includes peat and clay | 10 |
| Dolomite | DOL | 2 | | 20 |
| Sandstone | SS | 3 | | 30 |
| Serpentinite | SPT | 4 | | 40 |
| Granite | GT | 5 | | 50 |
| Amphibolite | AMP | 6 | | 60 |
| Pyroxenite | PYX | 7 | Re-group under Serpentinite Code 4 | n/a |
| Peridotite | PER | 8 | | n/a |
| Schist | SCH | 9 | No longer required with the re-log | n/a |
| Unknown | UND | 10 | No longer required with the re-log | n/a |
| Mafic Dyke | MD | n/a | | 70 |
| Metasediment | MSD | n/a | | 80 |
| Mafic Volcanic | MMV | n/a | | 90 |
| Lost Core | LC | n/a | | 100 |
| Regolith | R | n/a | Highly altered/weathered Granite | 110 |
| Dunite/Peridotite/ Pyroxenite | DPP | n/a | | 130 |

After the 2007 winter drilling program was completed, Mr. Chornoby standardized all the lithology codes from different drill campaigns. He reviewed the pre-2007 drill logs and made the appropriate adjustments.

In a personal communication, Mr. Chornoby explained why this step was necessary:

*"A quick examination of the old coding revealed a number of errors, i.e. serpentinite coded as granite and vice versa as well some footage errors.*

*The rock codes have been modified slightly as a result of the 2007 and 2008 drilling. Consequently, the pre 2007 coding had to be adjusted to maintain consistency.*

*The old lithology coding obscured/overlooked many intervals of granite and serpentinite. Initial coding appears to have only coded the major lithology divisions and not coded the lithologic subdivisions embedded in the textual descriptions of the major lithology subdivisions. All intervals equal to or greater than 1.5 metres in core length that were identified by previous loggers have now been identified as lithologic units. Similarly a few intervals less than 1.5 metres have been removed by incorporating them into adjacent intervals."*

This work provided better insight into the distribution of granite and serpentinite within the resource wireframe and some of the enclosing rock units and provided improved geological interpretation of the nickel mineralization and resolution of dilution. Lithological data from Amax, Granges, Blackhawk, Nuinsco and Victory drilling use a common standardized codification system for all lithological units.

The Property has been drilled by a total of 271 drillholes where 132 drill holes intersected notable nickel mineralization and were used in estimating the resource. The database consists of four tables: Collar, Survey, Assay and Lithology. These four tables were imported for the resource estimation. The collar and survey tables were verified by Wardrop technicians and had less than 1% errors. As mentioned above, the lithology table was completely re-coded by Jim Chornoby.

Wardrop verified the database files. This required careful checks against lithology and assay intervals since there may have been samples at lithological contacts and part of the sample fall in one unit and part of it in another.

Amax assay data was compiled into one spreadsheet and statistical comparison were made to determine which set of assays to use in the resource estimate. Table 2.13 below summarizes multiple results of same samples from different laboratories.

**Table 2.13 Summary of Amax Assays**

| | Amax Ni (Original W) | XRAL Ni (Total) | XRAL Ni (Sulphide) | Ni Sulphide (Denver) | Amax Ni (Wabowden) | Amax Ni (Denver) | Amax Ni (Split W) |
|---|---|---|---|---|---|---|---|
| Count | 1229 | 741 | 741 | 401 | 10 | 426 | 259 |
| Minimum | 0.0000 | 0.0000 | 0.0000 | 0.0030 | 0.1200 | 0.0050 | 0.0001 |
| Maximum | 2.6000 | 3.2600 | 2.9400 | 2.8000 | 2.4000 | 2.8000 | 2.2600 |
| Mean | 0.4965 | 0.7620 | 0.5532 | 0.7068 | 0.5990 | 0.7882 | 0.8610 |

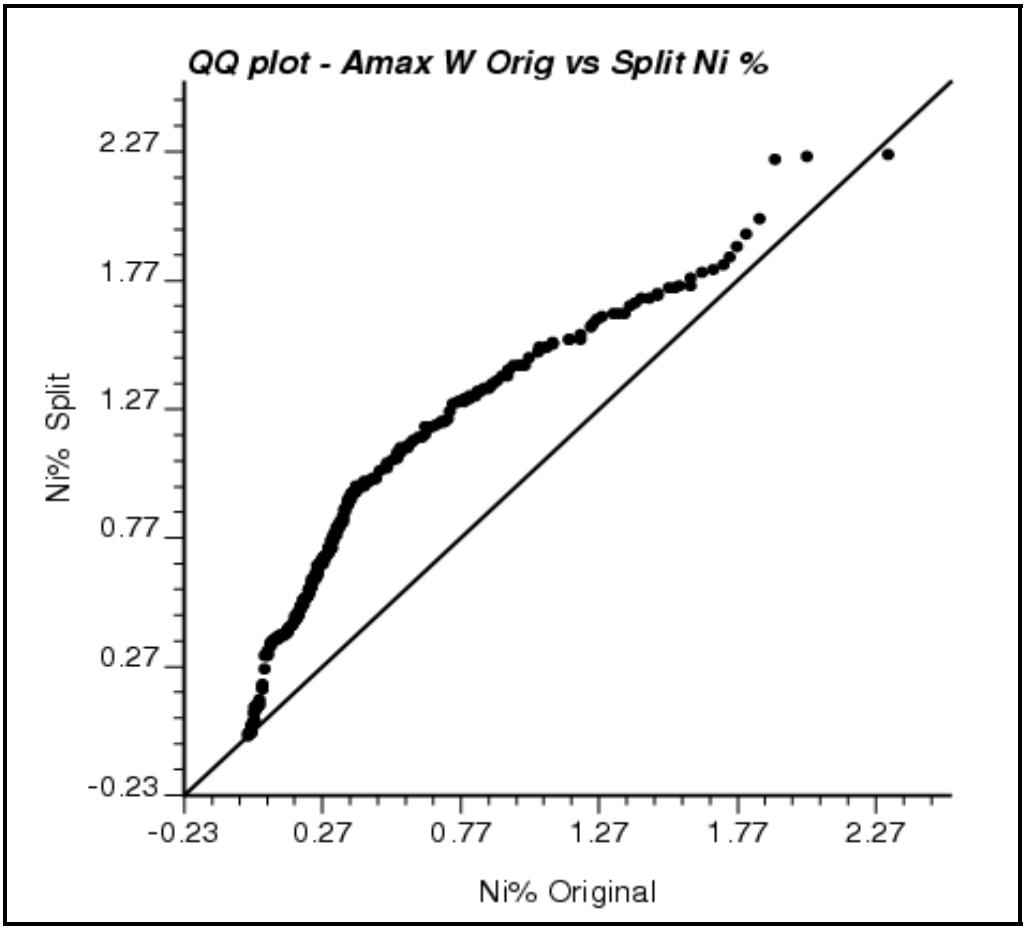
Wardrop plotted Quantile-Quantile (Q-Q) plots to determine differences between Amax data sets. A Q-Q plot is used to see if a given set of data follows some specified distribution. It should be approximately linear if the specified distribution is the correct model. The Q-Q plot is constructed using the theoretical cumulative distribution function of the specified model.

Differences between the data sets may indicate different sampling campaigns or different assaying methodologies. It may also indicate a laboratory problem. With respect to the campaign, if the focus was on high grade intersections instead of a representative program, then this could be reflected in the Q-Q plot as part of the statistical evaluation. Wardrop plotted Q-Q plots and compared Amax, Black Hawk, Granges and Victory Nickel data sets.

In Figure 2.26, Q-Q plot shows that split core has higher Ni grades than the Wabowden original assays. Split core is a representative sample since it

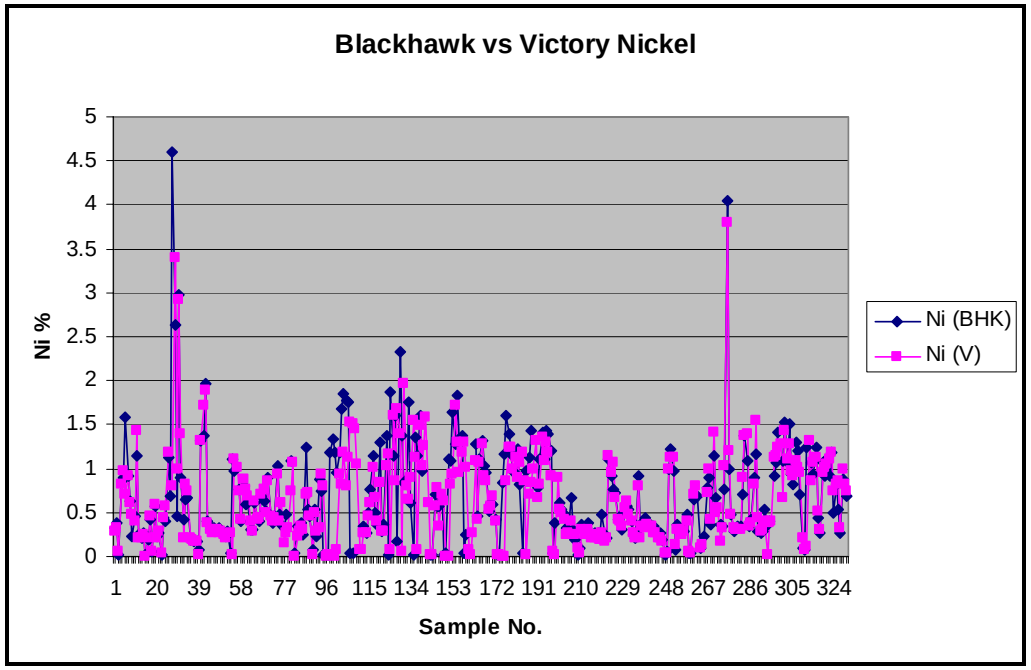
incorporates 50% of the core, whereas the Wabowden original was a 5-10% shaved slice from the core referred to as “filleted core” and may not be representative due to smaller sample size. Therefore, Wardrop elected to replace the original Wabowden data with the split core assay results.

**Figure 2.26 Amax Wabowden Original vs. Amax Split Core Ni% Assays**




In 2004, Victory Nickel (then Nuinsco) conducted check assaying and additional re-assaying of Black Hawk core. Figure 2.27 shows a comparison of Black Hawk versus Victory Nickel Ni assays. Generally, the Ni assays show some scattered values (outliers) but overall the data seems to be distributed relatively evenly on either side of the line with some of the higher grade Black Hawk assays pulling the curve down. Blackhawk assays were analyzed at XRAL laboratories in 1990-91 whereas Nuinsco’s assays were analyzed at ALS Chemex in 2004. Mr. Chornoby prepared a detailed description of the Black Hawk drill core assays sampling status.

**Figure 2.27 Comparison of Blackhawk vs. Victory Nickel Ni Assays**




In 2007, Wardrop sampled additional core that was available at the Core Library in Thompson, Manitoba. A total of 273 samples were collected from the following 5 drillholes: B-16-89, B-7-89, G-1-74, G-2-75 and MXB-71-93. These samples were analyzed for total Ni and NiS %.

Wardrop checked 2007 Ni assays in drill logs against original assay certificates against digital files obtained from the laboratory. Six batches were checked and no errors were found in the database.

For assays below the detection limits, a value of half the detection limit was assigned. Non-assayed intervals were assigned a value of zero and are included with the assayed values.

Collar coordinates and lengths of holes in the database were checked against the survey collar coordinate with no errors found.

Downhole survey data in the database did not have any errors against the downhole data on the drill logs.

No significant discrepancies existed with the database and it is believed to be accurate.

### 2.6.2 SITE VISIT

Shahé Naccashian, P.Geo, visited Victory's Minago deposit near Grand Rapids, Manitoba from May 7 to 10, 2007. He met with Jim Chornoby, P.Geo. and performed core review and visited the Minago Property. Cliff Duke, P. Eng. performed a site visit on July 21 and 22, 2008, to review the data previously assembled. This visit was intended to fulfil the NI 43-101 requirement of a site visit by a Qualified Person.

#### CORE REVIEW

The 2007 Minago diamond drill core is stored at the core shack in Grand Rapids, outside the building cross-piled on wood palets in the yard. All core boxes are clearly labelled with aluminum tags.

The core diameter is HQ in size starting from overburden down to the base of the Dolomite unit. The core diameter is reduced in size to NQ below Dolomite.

There are still some historic core boxes at the Minago site near the original core shack. Unfortunately the racks have collapsed and Victory has salvaged whatever was possible.

Wardrop carried a complete geological core review on lithology, mineralization and sampling, checking against drill logs and assay database for the holes shown in Table 2.14.

**Table 2.14 Drill Holes Reviewed**

| Drillhole | Type | Size | Drilling Campaign |
|---|---|---|---|
| N-07-19 | Geotech | HQ/NQ | Winter 2007 |
| N-07-10 | Resource | HQ/NQ | Winter 2007 |
| N-07-31 | Geotech | HQ/NQ | Winter 2007 |
| N-07-09 | Resource | HQ/NQ | Winter 2007 |
| N-07-12 | Resource | HQ/NQ | Winter 2007 |
| N-07-40 | Geotech | HQ/NQ | Winter 2007 |
| N-07-23 | Resource | HQ/NQ | Winter 2007 |
| N-07-04 | Resource | HQ/NQ | Winter 2007 |
| N-07-07 | Resource | HQ/NQ | Winter 2007 |
| N-07-43A | Resource | HQ/NQ | Winter 2007 |

The mineralized zones are composed of disseminated sulphide zones with millerite, pentlandite, pyrite, pyrrhotite, chalcopyrite and magnetite. The geologist sampled all the mineralized zones and the entire mineralized interval was sawn by a diamond blade with half the core left in the box for permanent record. There is a core splitting room in the yard, outside the core shack. The remainder half was shipped for analysis to TSL Laboratory in Saskatoon, Saskatchewan. The core recovery was

good and boxes were clearly labeled. Meterage tags were in correct locations down the hole. Standards and Blanks were inserted every 10 samples at the core shack. Dolomite was used as blank sample. Standard Reference Material (SRM) was used from international accredited laboratories: Geostats Pty Ltd, Australia, Brammer Standard Co, USA, and CANMET, Canada. Core trays have sample tags stapled or inserted depending on the type of sample. The geologist marked down on the sample if a blank or SRM was to be inserted. One sample tag remained in the core tray, the second tag was inserted in the sample bag and the third tag was kept as a permanent record in the sample tag book. During core review no notable discrepancies were revealed.

Quality Assurance/Quality Control (QA/QC) for the Minago Project was prepared by Jim Franklin, P.Geo., and reviewed by Wardrop. Wardrop agrees with the report, and found it to be an excellent review of Victory's QA/QC procedure. Mr. Franklin found Victory Nickel's QA/QC to be generally acceptable, but noted that there was some difference between the higher grade assays provided by SGS and TSL Laboratory. The difference is not specifically identified, but may be related to the standard sample, as replicates of the pulps fared better in a comparison between the labs.

### COLLAR POSITIONS

During the site visit, a total of 11 drillhole collars and several control points were checked via a handheld Global Positioning System (GPS). The collar positions recorded were compared with collars in the database. The majority of the easting and northing positions show very little difference and the elevation positions show acceptable differences averaging 6.6 metres. Table 2.15 includes the collar differences of those that were verified by labeling.

The overall average distance from the model versus the GPS reading is equal to:

$$\text{Distance} = \text{SQRT}\ (0.92 + 1.22 + 6.62\ ) = 6.71\ \text{m}$$

**Table 2.15 Comparison of Database Collar Positions to GPS Readings**

| BHID | Datamine Model | | | GPS Reading | | | Absolute Difference (m) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Easting | Northing | Elevation | Easting | Northing | Elevation | Easting | Northing | Elevation |
| BHK-47-R7-90 | 487319 | 5993453 | 246 | 487319 | 5993455 | 25.2 | 0.2 | 2.0 | 5.5 |
| BHK-49-R9-90 | 487357 | 5993508 | 246 | 487355 | 5993508 | 25.6 | 1.6 | 0.0 | 9.4 |
| BHK-50-90 | 487500 | 5993390 | 246 | 487499 | 5993393 | 252 | 1.2 | 3.5 | 6.2 |
| BHK-57-91 | 487409 | 5993554 | 247 | 487410 | 5993554 | 244 | 0.8 | 0.5 | 2.8 |
| MXB-70-48 | 487279 | 5993486 | 246 | 487287 | 5993485 | 256 | 1.1 | 0.5 | 9.4 |
| N-05-01 | 487285 | 5993485 | 246 | 487285 | 5993485 | 251 | 0.5 | 0.5 | 4.9 |
| N-07-02 | 487502 | 5993523 | 247 | 457503 | 5993522 | 256 | 1.3 | 1.0 | 9.5 |
| N-07-09 | 487253 | 5993367 | 247 | 487253 | 5993367 | 252 | 0.1 | 0.5 | 4.9 |
| N-07-11 | 487176 | 5993479 | 247 | 487175 | 5993479 | 254 | 1.5 | 0.0 | 7.2 |
| N-07-12 | 487383 | 5993325 | 247 | 487383 | 5993328 | 253 | 0.2 | 3.5 | 6.8 |
| N-07-20 | 487145 | 5993425 | 247 | 487147 | 5993424 | 253 | 1.9 | 1.0 | 5.6 |
| Average | | | | | | | 0.9 | 1.2 | 6.6 |

### 2.6.3 CHECK SAMPLING

There was no check sampling program carried out on the sandstone samples. A check on the sampled assays from six drill holes, which intersected the Ni mineralization on the Minago property were re-assayed by Wardrop as part of a due diligence program. Wardrop collected 12 core samples. Wardrop located and identified sample numbers of interest to be re-assayed from Victory Nickel's core logs. With the help of Victory Nickel's technician, Wardrop's geologist collected 12 quarter split samples. The original sample number with TSL's sample ticket were removed and the quarter split core were dropped in plastic bags and were renumbered with Wardrop's new sample tags numbered 11201 to 11212. One Wardrop label was inserted inside the plastic bag and another one was stapled on the outside as a back up sample tag. The 12 pulps were shipped to Actlabs in Ancaster, Ontario and were analyzed for Cu% and Ni% by Sodium Peroxide Fusion AAS analytical method. The lab also performed an internal quality control check by applying two SRM, one blank and one repeat samples.

Figure 2.28 demonstrates the correlation between original and check assays. From this comparison it is concluded that 88 percent of the pulps are within ±4 percent of the database.

Table 2.16 shows sample numbers, original TSL assay, new Actlabs check assay and percent difference.

**Figure 2.28 Correlation between Original vs. Check Assays**

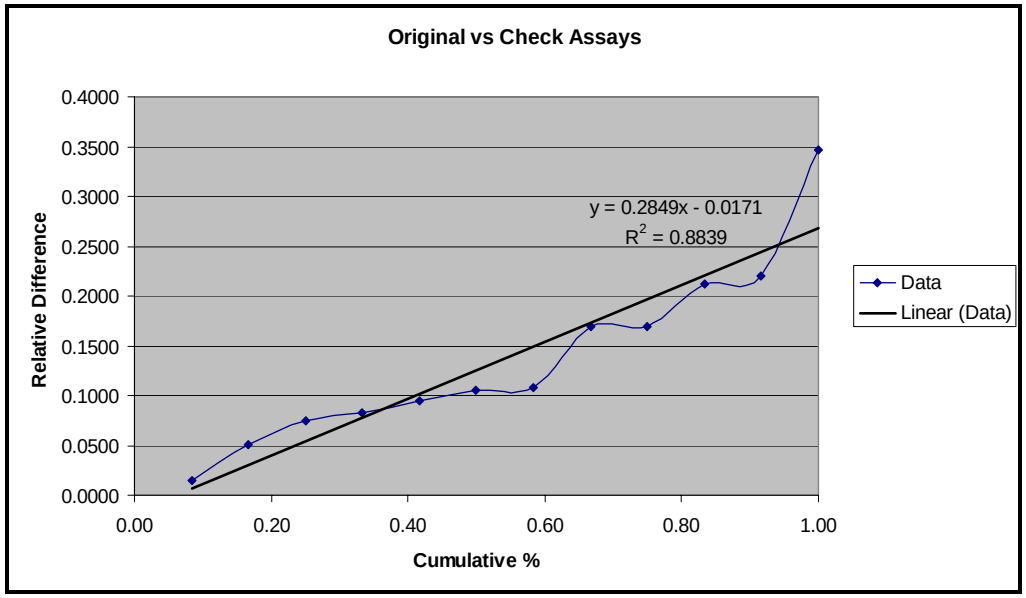


**Table 2.16 Original vs. Check Sampling Comparison**

| Wardrop Sample # | Victory Nickel Sample # | DDH # | From | To | Original Assay (Ni%) | Check Assay (Ni%) | % Relative Change from Original Assay | Relative Difference from Original Assay |
|---|---|---|---|---|---|---|---|---|
| 11201 | 926012 | N-07-19 | 506.13 | 507.55 | 1.2800 | 1.0800 | +16 | 0.0153 |
| 11202 | 925590 | N-07-09 | 265.30 | 266.75 | 2.5800 | 3.6600 | - 42 | 0.0507 |
| 11203 | 925865 | N-07-12 | 224.00 | 225.50 | 0.7500 | 0.6730 | +10 | 0.0741 |
| 11204 | 925832 | N-07-12 | 185.00 | 186.50 | 0.9100 | 1.0000 | -10 | 0.0822 |
| 11205 | 929339 | N-07-23 | 182.00 | 182.65 | 1.2600 | 1.1700 | + 7 | 0.0942 |
| 11206 | 929372 | N-07-23 | 188.00 | 188.70 | 0.5100 | 0.6040 | - 18 | 0.1053 |
| 11207 | 924503 | N-07-04 | 96.80 | 97.80 | 0.7000 | 0.6300 | + 10 | 0.1082 |
| 11208 | 924505 | N-07-04 | 98.60 | 99.60 | 0.9500 | 0.7680 | + 19 | 0.1688 |
| 11209 | 924690 | N-07-07 | 215.00 | 216.50 | 0.5100 | 0.4090 | + 20 | 0.1695 |
| 11210 | 924611 | N-07-07 | 128.00 | 129.50 | 1.8200 | 1.7300 | + 5 | 0.2119 |
| 11211 | 924625 | N-07-07 | 142.20 | 143.60 | 1.0500 | 1.1400 | - 9 | 0.2198 |
| 11212 | 924626 | N-07-07 | 143.60 | 145.10 | 1.3200 | 1.3000 | + 2 | 0.3462 |
| | | | | Average | 1.1367 | 1.1803 | - 4 | |

### 2.6.4 2008 DATA VERIFICATION

Wardrop carried out an internal verification from the original assay and the drillhole database on 3 of the 13 drillholes in the total database or 23%. Wardrop verified the dataset by comparing the original drillhole logs against the digital dataset and comparing the assay values against signed assay certificates. In total, 318 samples were checked. Data verification was completed on copper, nickel, and specific gravity values and was checked against the values in the validation sample in the database. No errors were present. Details of the verification are set out in Table 2.17. Overall, the data verification had less than 1% of errors and based on this Wardrop proceeded with a resource estimate.

**Table 2.17 Validation of the 2008 Digital Database**

| Database Portion | Total Records | Error Records | % of Records with Errors |
|---|---|---|---|
| Copper | 318 | 0 | 0.00% |
| Nickel | 318 | 0 | 0.00% |
| Specific Gravity | 318 | 0 | 0.00% |
| Total | 954 | 0 | 0.00% |

## 2.7 MINERAL RESOURCE ESTIMATE

### 2.7.1 INTRODUCTION

Wardrop conducted a mineral resource estimate of the frac sand and the nickel sulphide mineralization at the Property. The estimation was completed for total Ni%, NiS% and frac sand quality using data from historic and recent drilling.

Gemcom version 6.1.3 was used for the resource estimate involving wireframing and block modeling. SAGE 2001 was employed for the variography for the block modelling. WinStat software was used to identify the regression curves for grade-density and NiS-Ni relationships. Historically, total nickel analysis was carried out on the core. Additional analysis for nickel sulphide was requested by Wardrop, so that the recoverable portion of the nickel could be estimated. Traces of Cu, Pt and Pd are also present at Minago. The Cu model was estimated using the same parameters as the NiS model. Cu grades are very low, but may become part of a smelter credit. Although the Cu resource was estimated, it has not been included in this report. Only 172 Pt and Pd assays were available at the time of this report. Models for these elements were estimated, but due to the limited data available, have not been included in this report. The frac sand resource was estimated using all the available data. The size and continuity of the Winnipeg sandstone were well established by 141 drill holes in and around the proposed pit shell. Frac sand quality data, and metallurgical testing data were available for 5 of the holes.

Victory Nickel provided the data in digital files. The first batch was delivered in March 2007 from Mirarco Mining Innovation (Mirarco) and Victory Nickel personnel. This batch consisted of a drillhole database including the 2006 drillholes, a wireframe (grade shell) of the mineralized zone, sedimentary surfaces, and a block model. The pre-2007 data was in imperial units and the mine grid coordinate system. A second batch was obtained in phases between April and August 2007. This batch consisted of the drilling data from the 2007 winter drill program and a topography file. The results from the 2008 drilling program were added between April and September of 2008. All the new data is in metric units and the Universal Transverse Mercator (UTM) coordinate system.

### 2.7.2 TOTAL NICKEL

#### DATABASE

There were 78 drillholes from the historical dataset that were used for the resource estimation. An additional 44 drillholes from the 2006-07 winter drill campaign and 10 holes from the 2008 program were added. A total of 132 drillholes in the vicinity of the sulphide mineralization were used for the resource estimation. The drillhole database comprised of collar, survey, lithology and assay information as summarized in Table 2.18.

**Table 2.18 Total Records in Database**

| | Drillholes | Coordinates | Survey | Lithology | Assays |
|---|---|---|---|---|---|
| Records | 132 | 132 | 8,334 | 3,620 | 19,875 |

#### EXPLORATORY DATA ANALYSIS

Exploratory data analysis (EDA) is the application of statistical tools to clarify characteristics of the data, such as the shape of the relative frequency distribution and cumulative frequency distributions, as shown on histograms and probability plots and statistics such as the mean, standard deviation and coefficient of variation.

The coefficient of variation (CV) is the standard deviation divided by the mean. This is a useful tool to measure the relative dispersion of a distribution. A CV, which is less than one, generally depicts syngenetic deposits. Coefficients of variation of one to two are typical of hydrothermal processes. The presence of "bonanza" high-grade shoots or veins may cause the CV to reach three. Where the CV is greater than three, the mixture of two or more distinct ore-forming processes (or mineralization) can often be identified.

In polymetallic deposits, scatterplots can be useful in demonstrating correlations (positive and negative) between the assays.

Identification of the spatial continuity by means of variography is an EDA tool, which is later used to perform kriging. Variography is used as part of the kriging parameters allowing the software to assign weights to the sample points. Kriging weights are estimated based on spatial autocorrelation between sample points. Kriging is typically used for spatial prediction where the data are expected to follow a trend varying in both mean (expected value) and variance by location.

In general, EDA is done on composite-sized volumes, which are nominally of equal length. This is because the variance of a distribution is inversely proportional to the volume of sample used. Use of unequal length composites can distort the frequency distributions and make variography very noisy.

*Assays*

A total of 19,875 assay intervals from 132 drillholes were selected and defined the zone of mineralization on the deposit. The statistics for Ni grade from the assay samples is shown in Table 2.19. Data analysis was conducted by creating probability and histogram plots of the data (Figure 2.29). The probability plot seems to exhibit a non-lognormal population. Two populations are seen in the plot which may be consistent with the serpentinite/granite mix. Figure 2.30 shows a boxplot of nickel assays by rock type inside the selected mineralized zone (wireframe). Non-assayed intervals were assigned a value of zero and are included with the assayed values.

**Table 2.19 Ni% Assay Statistics**

| | Ni% |
|---|---|
| Minimum | 0.000 |
| Mean | 0.280 |
| Median | 0.130 |
| Maximum | 5.860 |
| N | 19,875 |

**Figure 2.29 Histogram and Probability Plot Ni% Assay Data**

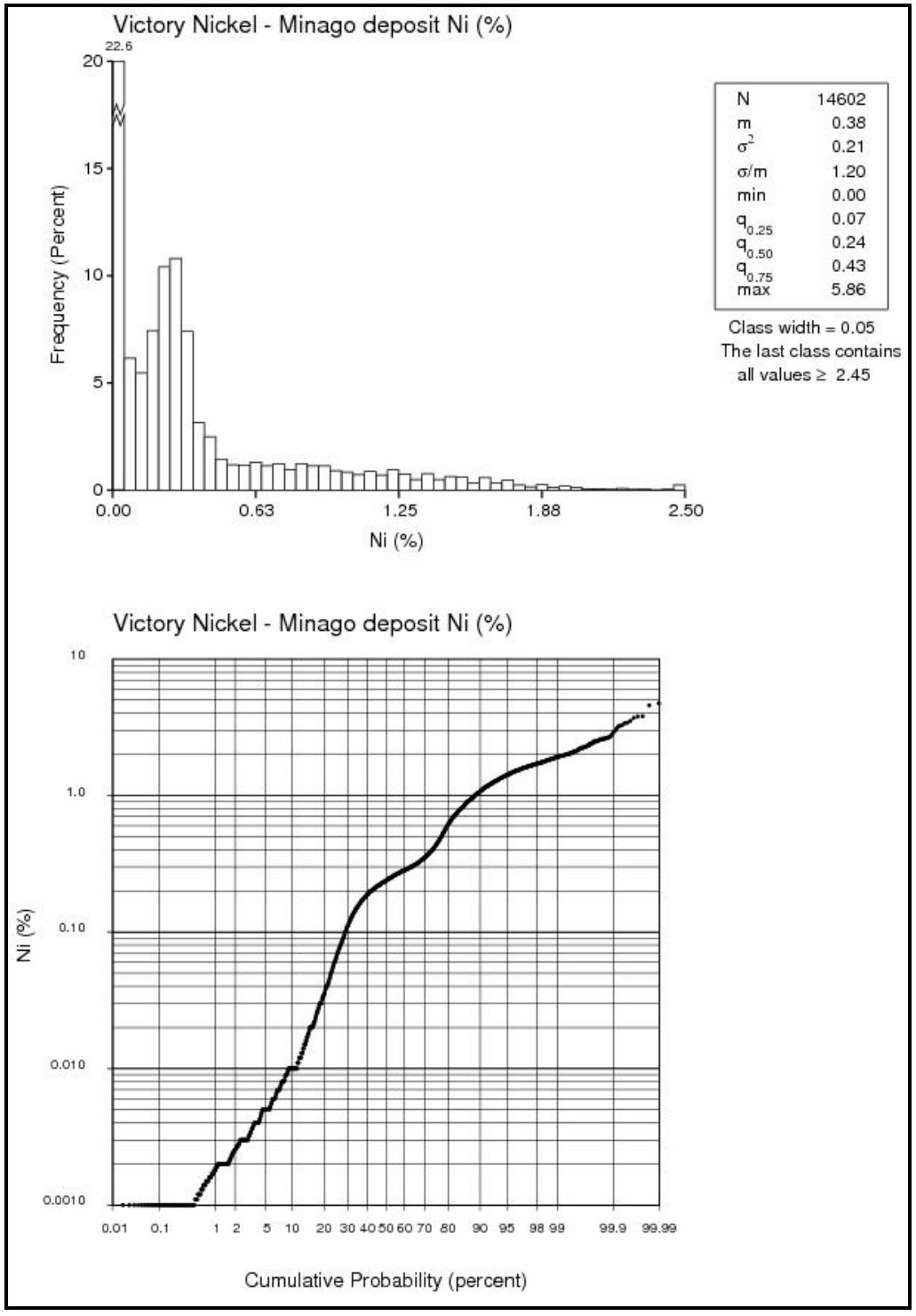
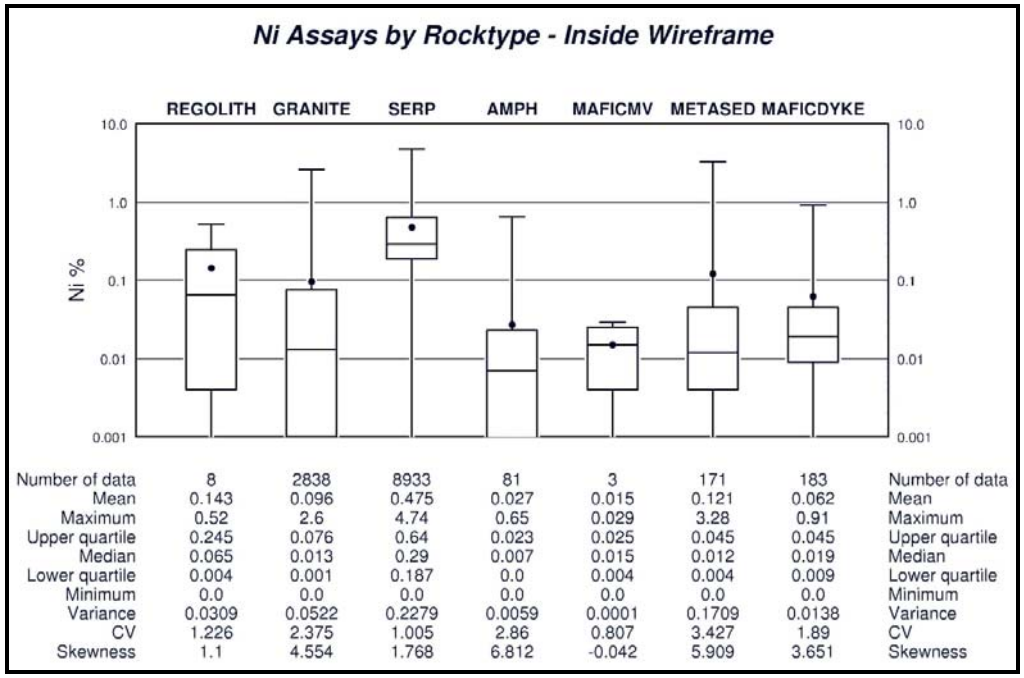


**Figure 2.30 Boxplot of Assay Data by Rock Type**




| | REGOLITH | GRANITE | SERP | AMPH | MAFICMV | METASED | MAFICDYKE | |
|---|---|---|---|---|---|---|---|---|
| Number of data | 8 | 2838 | 8933 | 81 | 3 | 171 | 183 | Number of data |
| Mean | 0.143 | 0.096 | 0.475 | 0.027 | 0.015 | 0.121 | 0.062 | Mean |
| Maximum | 0.52 | 2.6 | 4.74 | 0.65 | 0.029 | 3.28 | 0.91 | Maximum |
| Upper quartile | 0.245 | 0.076 | 0.64 | 0.023 | 0.025 | 0.045 | 0.045 | Upper quartile |
| Median | 0.065 | 0.013 | 0.29 | 0.007 | 0.015 | 0.012 | 0.019 | Median |
| Lower quartile | 0.004 | 0.001 | 0.187 | 0.0 | 0.004 | 0.004 | 0.009 | Lower quartile |
| Minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Minimum |
| Variance | 0.0309 | 0.0522 | 0.2279 | 0.0059 | 0.0001 | 0.1709 | 0.0138 | Variance |
| CV | 1.226 | 2.375 | 1.005 | 2.86 | 0.807 | 3.427 | 1.89 | CV |
| Skewness | 1.1 | 4.554 | 1.768 | 6.812 | -0.042 | 5.909 | 3.651 | Skewness |

*Contact Plots*

Contact plots show the difference in mean grade with respect to distance from domain boundaries. Where there is marked discontinuity of the grade profile at the boundary, a strong lithological control on the grade is probably present and data selected for interpolation should not come from across the boundary with respect to the domain in which a block resides. Such boundaries are referred to as “hard” boundaries. Where the change in grade is relatively slight going across a boundary, no limitation on the domain in selecting samples for interpolation is indicated and the boundary is referred to as “soft”. In some cases, the change in grade occurs over an interval of a few tens of metres; such boundaries are termed “firm”. During interpolation, samples from a limited distance across a boundary may be selected.

Wardrop examined in detail the contact relationship between the individual lithologies. The software calculates the average grade of an element over a distance from a boundary between two lithologies, two units/domains or two indicator values.

The results from the analysis with accompanying plots are shown in the following figures. The expected hard boundary between the serpentinite and the granite units is clearly visible in Figure 2.31, with no grade enrichment at the contact of these lithology units.

Figure 2.32 shows the grade distribution inside and outside the wireframe. A very sharp contact exists at the boundary where the grade decreases significantly.

Figure 2.33 displays grade distribution inside and outside the wireframe by rock type. On the left hand side exists all rock types including granite and on the right hand side of the contact exists the granite unit outside the wireframe. Once again, it is evident that there is a sharp boundary indicating that the wireframe captured most of the mineralization above 0.2% Ni.

Figure 2.34 displays the serpentinite and granite grade distribution inside the wireframe. A very sharp or hard boundary exists between the two lithologies. At Minago, the serpentinite is mixed with the granite at various proportions within the wireframe. Due to the complex nature of the granite/serpentinite mix, it was impossible to reliably separate the two.

A very thorough grade control program has to be implemented before mining commences in order to separate weakly or non-mineralized units from the mineralized serpentinite.

**Figure 2.31 Contact Plots by Rock Type**

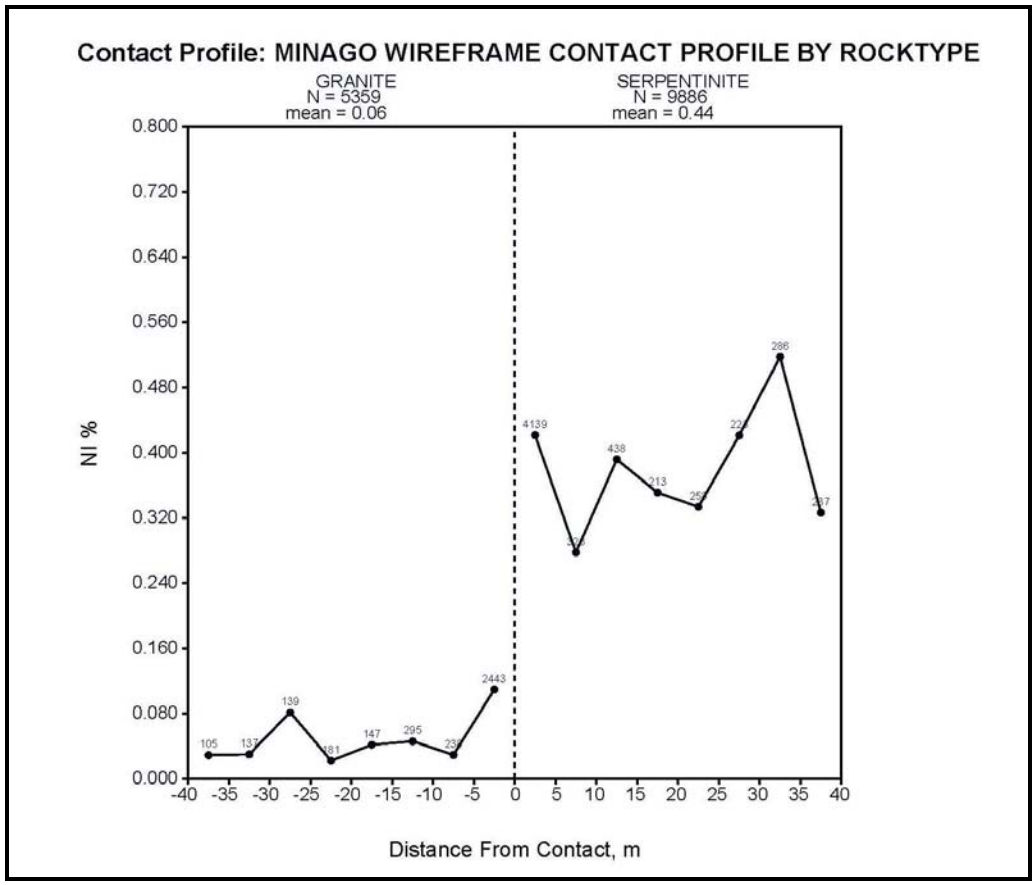


**Figure 2.32 Contact Plot by Grade**

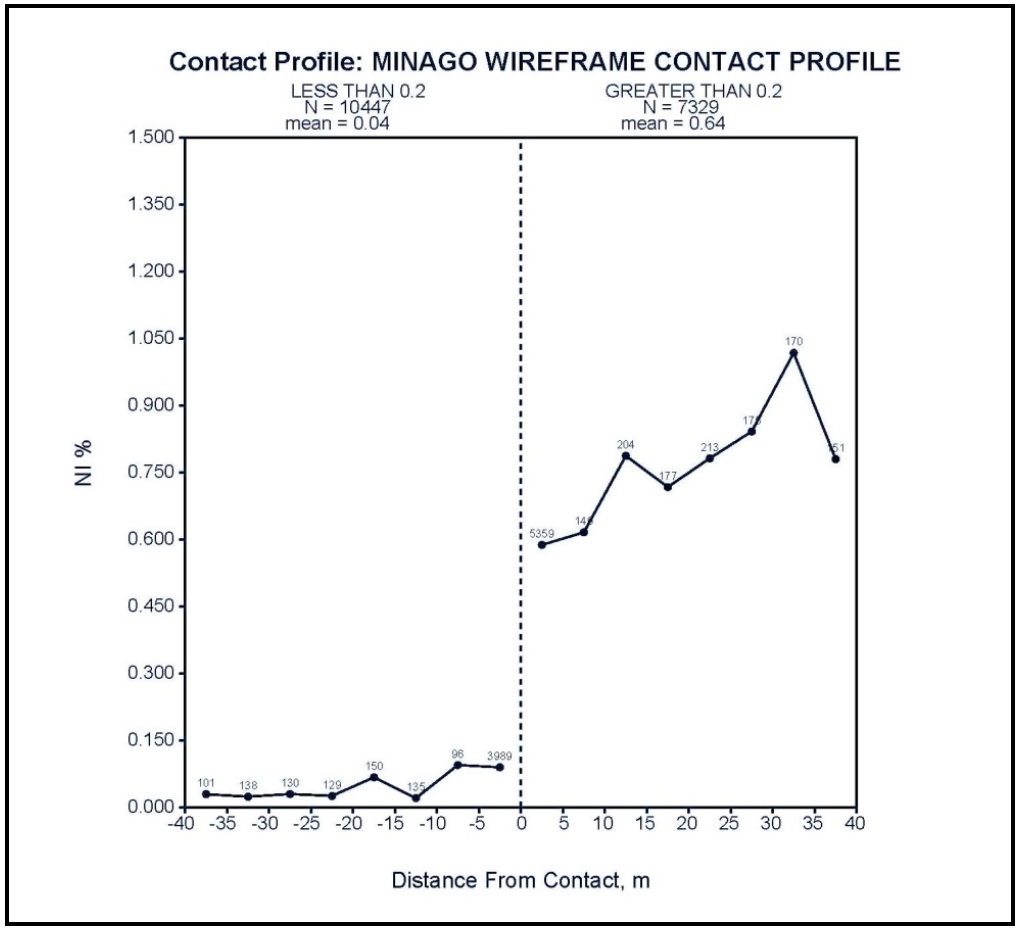


**Figure 2.33 Contact Plot Inside and Outside Wireframe**

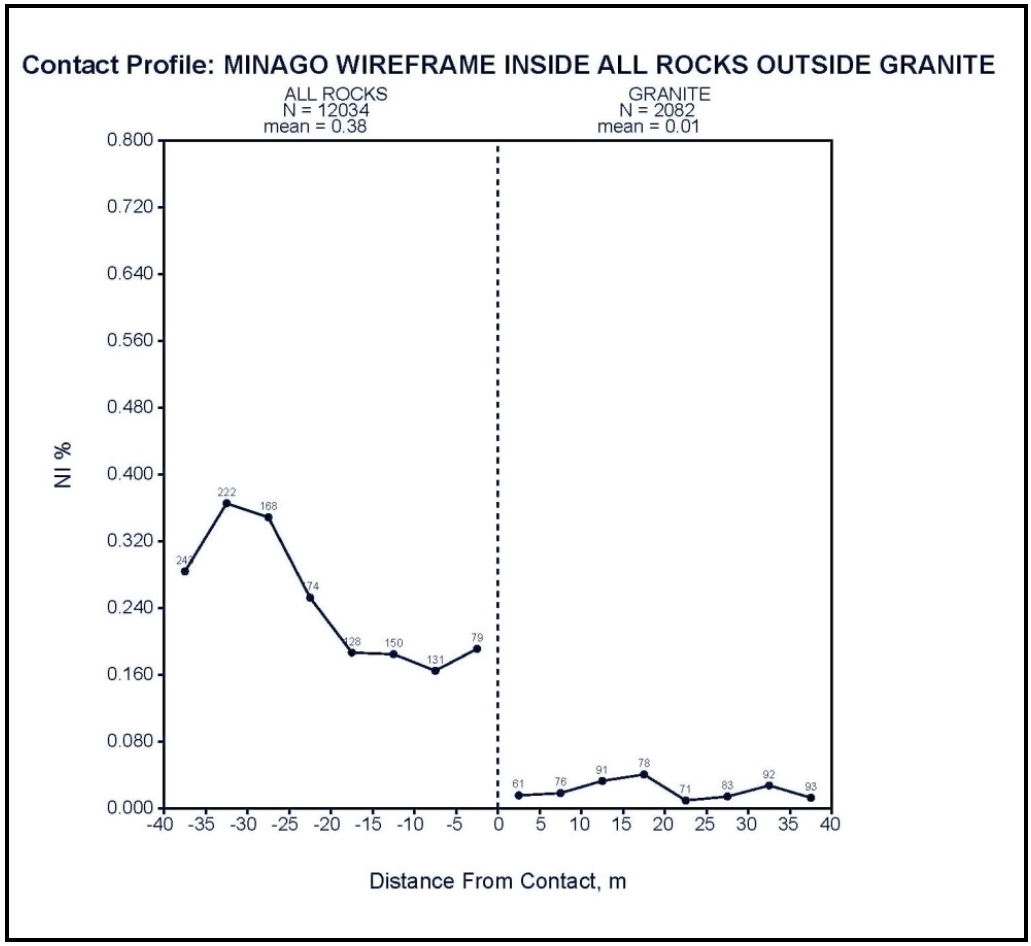
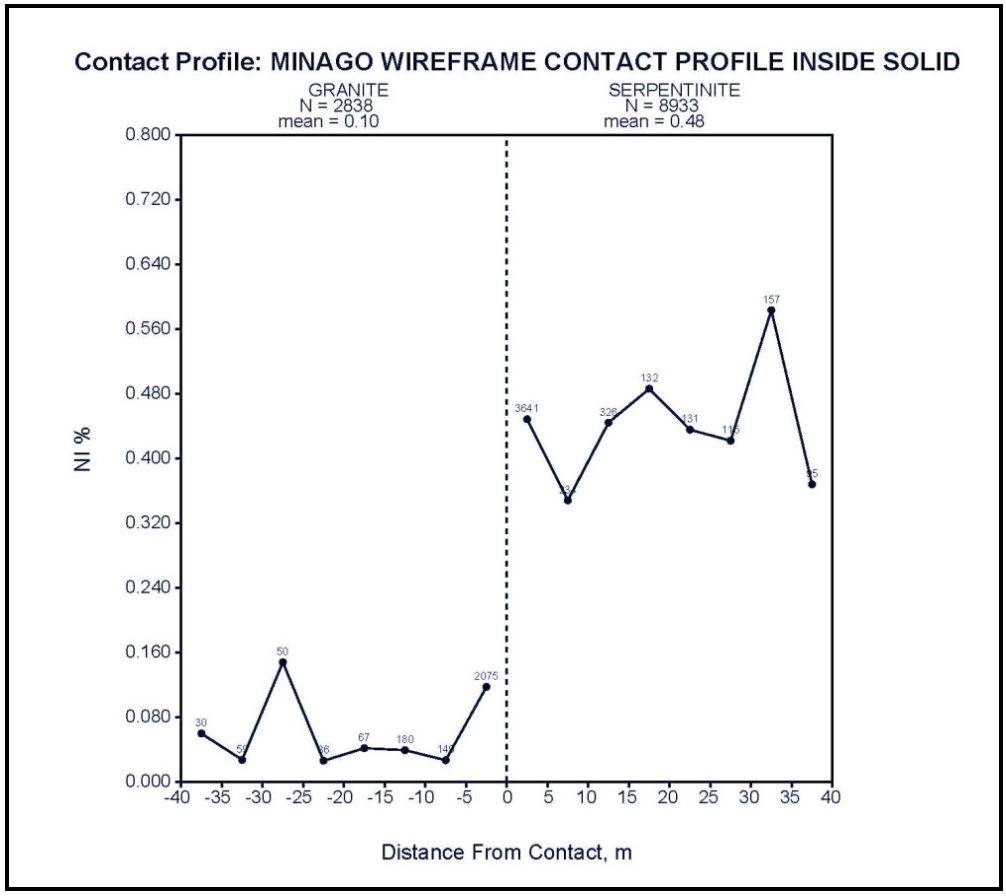


**Figure 2.34 Contact Plot Inside Wireframe**




*Capping*

When frequency distributions are skewed, a very small number or proportion of samples may represent a large amount of the contained metal in the resource. Frequently these samples may be scattered through the deposit and not restricted to spatially identifiable or continuous zones. In some instances, small clusters of high-grade mineralization may be present and may or may not be possible or practical to restrict their influence. Other times, the very high-grade samples may be the result of laboratory errors or pulps which sometimes segregate high specific gravity materials like electrum or pyrite. This segregation in pulps may produce biased results if the pulps are not re-homogenized prior to aliquot selection for analysis.

Even when the assays are valid, linear interpolation or weighted average grade estimation methods can be adversely affected. When these methods are used, the inclusion of a high-grade sample will have a greater influence on the estimate than a lower grade sample. This can lead to undue projection (or smearing) of the effect of high-grade material into areas for which there is no evidence in hand that the high-grade material continues to occur. Under such circumstances, restriction of the influence of the higher grade material is mandatory.

Wardrop carried out a decile analysis of the data. From the decile analysis, typically, capping is warranted if any of these situations arise:

- the last decile has more than 40% of the metal
- the last decile contains more than 2.3 times the metal quantity contained in the prior decile
- the last centile contains more than 10% of metal
- the last centile contains more than 1.75 times the metal quantity contained in the prior centile

On the basis of a review of probability and histogram plots, and the results of decile analysis, it was concluded that there is no reasonable justification for capping the nickel values and all high grade samples were used at face value.

Table 2.20 shows the distribution of the un-capped data by deciles and centiles.

**Table 2.20 Summary of Uncapped Data**

| Quantile %From | Quantile %To | Number of Samples | Mean | Minimum | Maximum | Metal | Metal % |
|---|---|---|---|---|---|---|---|
| 0 | 10 | 1225 | 0.000 | 0.000 | 0.001 | 0.01 | 0.00 |
| 10 | 20 | 1226 | 0.008 | 0.001 | 0.018 | 9.23 | 0.20 |
| 20 | 30 | 1225 | 0.042 | 0.018 | 0.081 | 51.33 | 1.13 |
| 30 | 40 | 1226 | 0.133 | 0.081 | 0.177 | 162.70 | 3.57 |
| 40 | 50 | 1225 | 0.207 | 0.177 | 0.232 | 253.13 | 5.55 |
| 50 | 60 | 1226 | 0.258 | 0.232 | 0.280 | 316.66 | 6.95 |
| 60 | 70 | 1225 | 0.312 | 0.280 | 0.350 | 381.79 | 8.38 |
| 70 | 80 | 1226 | 0.448 | 0.350 | 0.610 | 549.75 | 12.06 |
| 80 | 90 | 1225 | 0.824 | 0.610 | 1.070 | 1009.51 | 22.15 |
| 90 | 100 | 1226 | 1.487 | 1.070 | 4.740 | 1823.03 | 40.00 |
| 90 | 91 | 122 | 1.101 | 1.070 | 1.130 | 134.28 | 2.95 |
| 91 | 92 | 123 | 1.164 | 1.130 | 1.190 | 143.12 | 3.14 |
| 92 | 93 | 122 | 1.222 | 1.190 | 1.260 | 149.07 | 3.27 |
| 93 | 94 | 123 | 1.292 | 1.260 | 1.330 | 158.87 | 3.49 |
| 94 | 95 | 123 | 1.371 | 1.330 | 1.410 | 168.68 | 3.70 |
| 95 | 96 | 122 | 1.455 | 1.410 | 1.500 | 177.46 | 3.89 |
| 96 | 97 | 123 | 1.549 | 1.500 | 1.600 | 190.54 | 4.18 |
| 97 | 98 | 122 | 1.649 | 1.600 | 1.700 | 201.15 | 4.41 |
| 98 | 99 | 123 | 1.790 | 1.710 | 1.900 | 220.20 | 4.83 |
| 99 | 100 | 123 | 2.274 | 1.900 | 4.740 | 279.66 | 6.14 |
| 0 | 100 | 12536 | 0.370 | 0.000 | 4.740 | 4557.13 | 100.00 |

*Composites*

Core length statistics indicate that the average sampling interval is 1.84 metres. Based on this information two, three and four metre composite files were created. Summary statistics shows that the mean Ni% was the same for all three composite files. Based on that information a 2-m composite length was selected. This length allowed for a few samples of greater length to be broken, without affecting the variance and shorter samples to be combined to produce a sample of proper support. Table 2.21 summarizes composite data by Ni% and composite length.

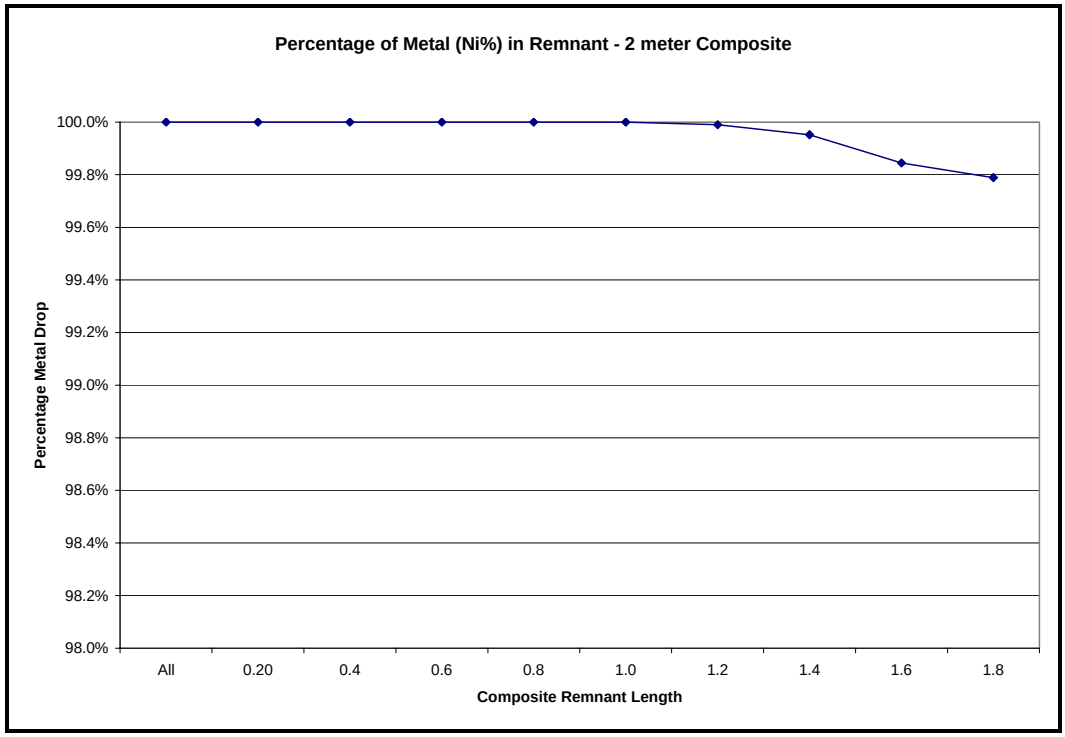
**Table 2.21 Summary of Composite Data by Grade and Length**

| | Ni% | Length ( m) |
|---|---|---|
| Number | 11,508 | 11,508 |
| Mean | 0.29 | 1.95 |
| Minimum | 0.00 | 1.00 |
| Maximum | 2.88 | 2.00 |
| First Quartile | 0.04 | 2.00 |
| Median | 0.17 | 2.00 |
| Third Quartile | 0.35 | 2.00 |

Assays were composited into two metre downhole lengths honouring the interpreted geological solids. No composites were generated outside the 3D wireframe. Zero grades were composited if the intervals within the solids were not sampled.

Commonly the compositing of downhole assays results in a fractional length for the last sample in a given hole. Composite remnants, which are composites less than two metres in length, are unavoidable if the hard geological boundaries are to be honoured. Wardrop examined the metal distribution in the composite remnants. The analysis revealed that composites less than one metre could safely be deleted from the database without introducing a bias (Figure 2.35).

**Figure 2.35 Composite Remnants**




## 2.7.3 FRAC SAND

Assay data used to evaluate the frac sand deposit was obtained from test results performed by Loring, SRC, and TSL Laboratories Inc. (TSL). Comparison of the sand particle size distribution between the different samples submitted to Loring shows little variation across the area of the proposed pit (Figure 2.23). The size fraction data was combined into a coarse fraction (20/40) and fine fraction (40/140) for resource estimation purposes. Quality of the sand was shown to be affected by the testing method, so actual quality values will ultimately be determined by the recovery process.

The samples that were submitted for testing were selected from drill holes that had good recovery (>90%) and represented the entire thickness of the sand unit. No compositing or capping of the samples was attempted.

## 2.7.4 BULK DENSITY

During the 2006-07 and 2008 drill programs, TSL Laboratories (TSL) of Saskatoon conducted the bulk density determination as instructed by Nuinsco/Victory Nickel personnel.

Below is the summary of the density determination conducted by TSL:

- total sample weighted dry
- sample weighted underneath balance in water
- calculation as in spreadsheet, where density = dry weight/dry-wet weight
- every 20th sample collected as per the client's request
- quality control is a solid rock that is used for all density work to ensure no drift during sets of samples.

Table 2.22 is a compilation of the 2,050 samples that are used for density test work, out of which 779 samples are serpentinite.

Historically, the density for serpentinite, reported by Danley in a 1972 report, indicated a mean of 2.40 with a minimum value of 2.18 and a maximum value of 2.48 grams per cubic centimetre ($g/cm^3$).

**Table 2.22 Summary of 2007 Density Data**

| Lithology code | Number of Samples | Mean | Minimum | Maximum |
|---|---|---|---|---|
| Amphibolite (60) | 493 | 3.01 | 2.41 | 3.57 |
| Dolomite (20) | 9 | 2.64 | 2.61 | 2.68 |
| Granite (50) | 361 | 2.67 | 2.32 | 3.26 |
| Mafic Metavolcanic (90) | 44 | 2.89 | 2.60 | 3.11 |
| Metasediment (80) | 57 | 2.86 | 2.63 | 3.43 |
| Serpentinite (40) | 779 | 2.58 | 2.16 | 3.86 |

Mirarco 2006 used a grade-density relationship in their resource estimation based on a total of 20 determinations. The relationship derived was a single linear regression with the following formula:

Density (tonnes/cubic foot) = 0.045 * NI% + 0.068

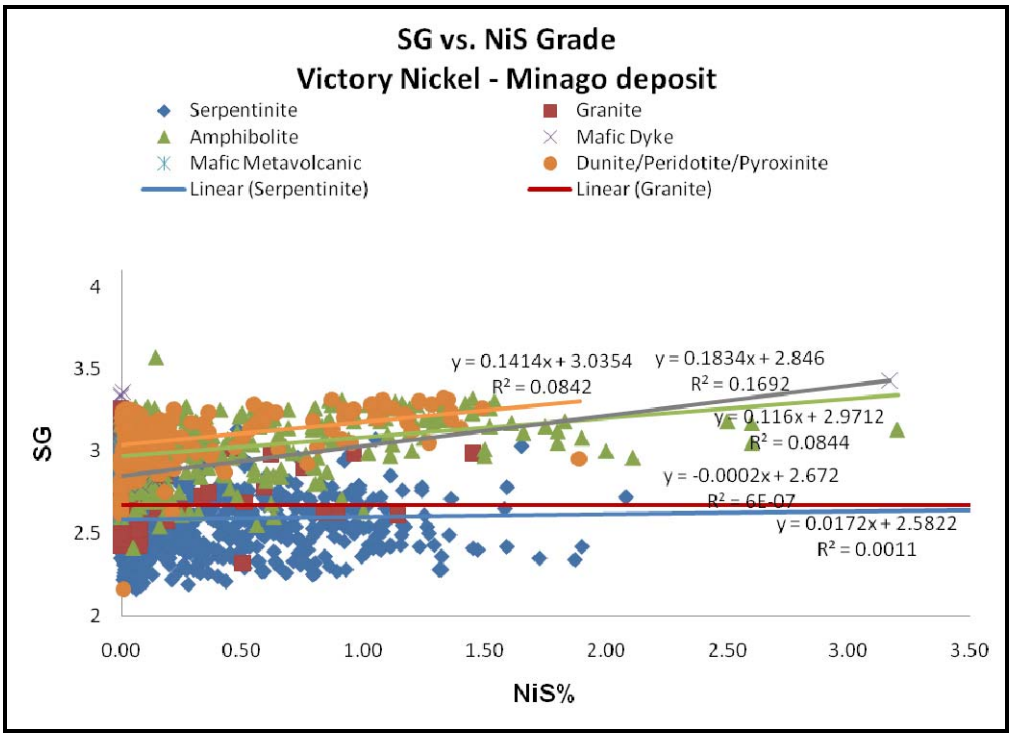
The slope of the regression is quite steep and heavily weighted on four samples above 0.5 Ni% which Wardrop considered insufficient for establishing a proper correlation.

Wardrop plotted all the available density data and conducted statistical analysis. Figure 2.36 shows that there is little correlation between grade and density in the major rock types.

The density values fall into two general categories, lower density Granite and Serpentinite, and higher density Amphibolite, Mafic Metavolcanic, and Dunite/Peridotite/Pyroxenite. The Granite-Serpentinite rocks have densities in the 2.6 to 2.7 range and are independent of grade. The Amphibolite Mafic Metavolcanic

and Dunite/Peridotite/Pyroxenite rocks have densities of about 3.0, and increase slightly with grade, up to 1.5% NiS. The very poor correlation between grade and density for any of the rock types does not support using a grade based density model. As a result, Wardrop elected to assign density based on a lithology model. The lithology of any particular block was determined from the nearest drill hole, and the density was assigned to that block from the mean values listed in Table 2.19. Since the regolith unit was not analyzed at TSL, the average density of granite was used instead.

**Figure 2.36 Density-Grade Relationship for Different Rock Types**



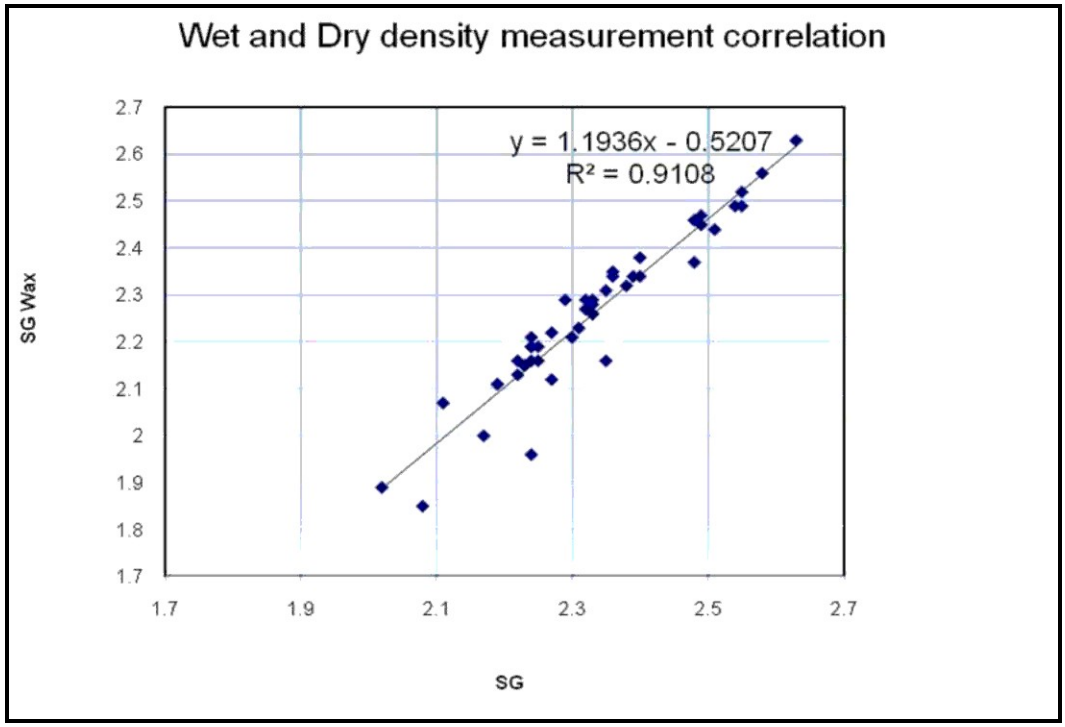

Bulk density of the sandstone unit was estimated from 46 measurements taken from samples collected by Victory Nickel. The measurements were made by TSL, using both wet and dry (wax coat) methods. Summary statistics of the data are provided in Table 2.23.

**Table 2.23 Comparison of Density Measurements**

| | "Wet" SG | "Dry" SG Wax |
|---|---|---|
| Minimum | 2.02 | 1.85 |
| Mean | 2.33 | 2.26 |
| Median | 2.32 | 2.26 |
| Maximum | 2.63 | 2.63 |

There was excellent correlation between the two sets of measurements, with the wax coat method suggesting a lower density (Figure 2.37). This is to be expected, as the air trapped within the pore space of the samples would contribute to a lower apparent density. Ultimately, the dry density will more accurately reflect the final product produced.

**Figure 2.37 Correlation Between Wet and Dry Density Measurements**




The sample population appears slightly skewed by the 2.1 to 2.2 bin, shown in Figure 2.38. There are two samples measured at 2.11 g/cm$^3$, just above the lower bin limit of 2.10 g/cm$^3$.

Shifting the bin limits of the histogram slightly will create a population distribution that is more normally distributed (Figure 2.39).

**Figure 2.38 Distribution of Density Measurements**

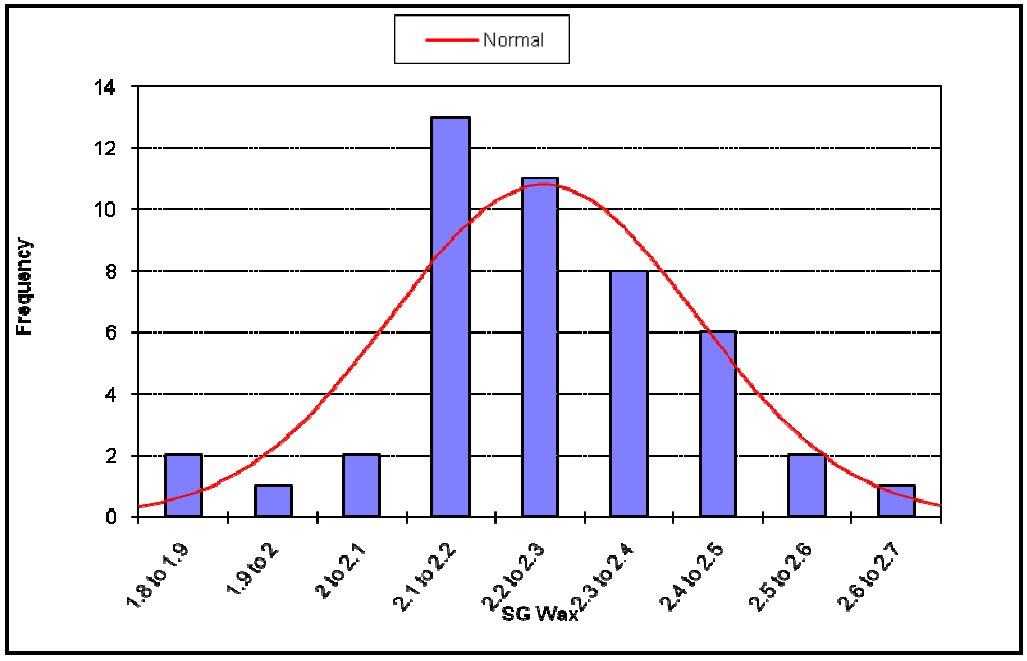
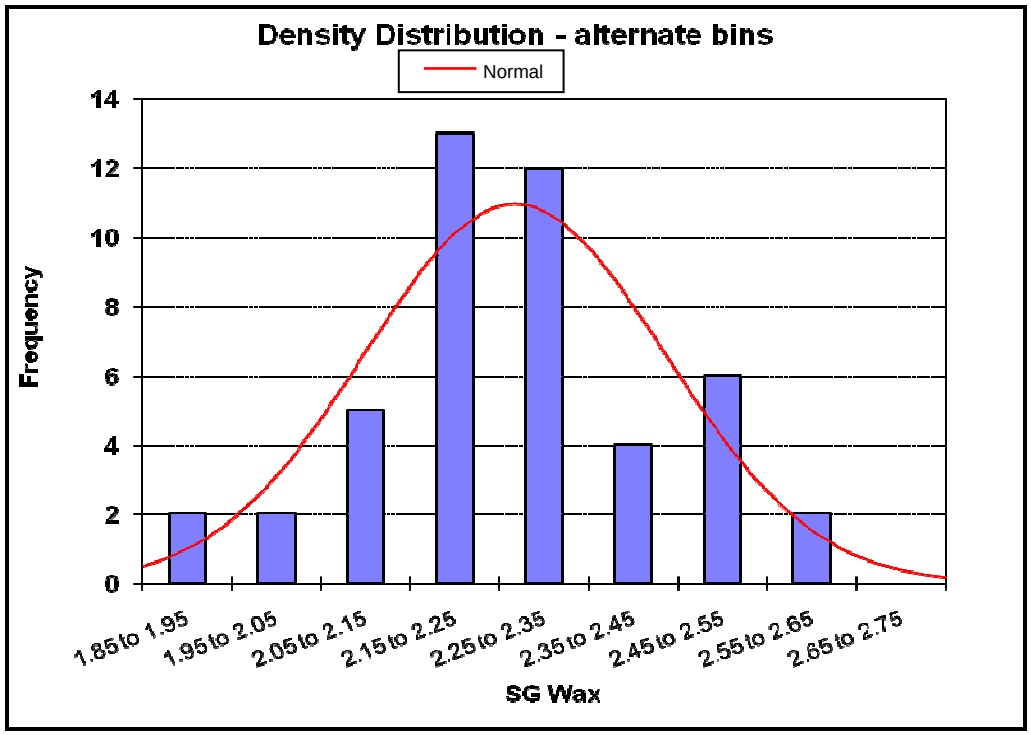



**Figure 2.39 Distribution of Density Measurements – Alternate**



### 2.7.5 GEOLOGICAL INTERPRETATION

The geological interpretation of the Minago deposit was conducted by Mr. Jim Chornoby, P.Geo. and Shahé Naccashian, P.Geo. The model was subsequently updated by Cliff Duke, P. Eng. Gemcom 6.1.3 software was used to build the surfaces and the solids.

The Minago deposit digital data set consists of several wireframe surfaces and solids.

#### SURFACES

The surfaces represent mainly the Paleozoic sedimentary surfaces from top to bottom in the following order:

- topography
- overburden (OVB)
- dolomite (DOL)
- sandstone (SS)
- regolith (R).

The peat and clay units were only logged in the geotechnical drillhole program. The geotechnical holes were stopped once they hit top of the dolomite unit.

Figure 2.40 displays Paleozoic sedimentary surfaces from surface to bottom, moving down into the Precambrian ultramafic bedrock rocks. Drillholes are colour coded by lithology units which can be seen in the legend.

Drill core was logged by grouping all the overburden units as one, then dolomite was logged and then sandstone was logged, although sandstone had poor recovery due to its poorly cemented nature. Regolith was not recognized historically as a separate unit therefore, where available in the drill log, regolith was digitized and coded. Due to its intense alteration and weathering the regolith surface is very irregular and when the regolith was missing, then the bottom of the sandstone unit was digitized and coded in lieu of regolith.

The sand model was defined by the “from” and “to” points of the sandstone unit, as recorded in the drill logs. Laterally, the sandstone extends far off of Victory Nickel’s quarry leases, but no attempt was made to model the lateral extents. Instead, a proposed pit shell, designed for the underlying nickel mineralization, was used as a lateral constraint. The top surface was created from all the “from” points, and a lower surface was created from the “to” points. In total, 141 points were used to define each surface. Wardrop created a table listing the drill hole intersections with the sandstone model, in order to validate the continuity of the model. There were six drill holes in the database that intersected the sandstone model that did not have any

sandstone reported in the lithology. These are reported in Table 2.24, along with explanations for the missing sandstone.

**Figure 2.40 Vertical Section Showing Sedimentary Surfaces**

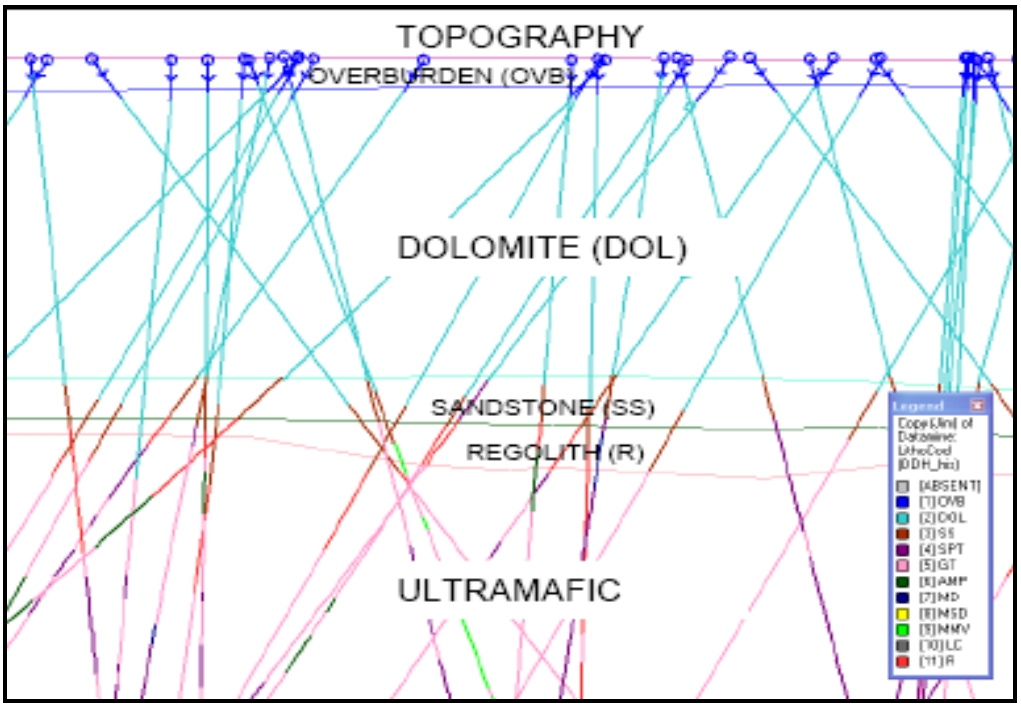



**Table 2.24 Diamond Drill Holes Missing Sandstone Intersections**

| Hole ID | From | To | Explanation |
|---|---|---|---|
| G-1-W1-74 | 66.367 | 78.385 | Wedge off of G-1-74 started below sandstone |
| G-1-W2-74 | 66.538 | 78.621 | Wedge off of G-1-74 started below sandstone |
| G-2-75 | 63.496 | 73.042 | Upper part of hole not logged - litho starts 491.64m down hole. |
| G-4-W1-76 | 66.061 | 78.713 | Wedge off of G-4-76 started below sandstone |
| G-4-W3-76 | 66.061 | 78.713 | Wedge off of G-4-76 started below sandstone |
| MXB-70-48 | 75.458 | 83.650 | No sandstone logged (dolomite) |

Hole MXB-70-48 is the only drill hole that passes through the sandstone model, that does not have sandstone reported in the log. This is probably an oversight on the part of the geologist that logged the hole and should be reviewed.

## SOLIDS

Mr. Chornoby standardized all the lithology codes from different drill campaigns. Lithological data from Amax, Granges, Blackhawk, Nuinsco, and Victory Nickel 2007 drilling now uses a common standardized codification system for all lithological units. Table 2.25 summarizes lithologies and their codes used in the model.

Mr. Chornoby and Mr. Naccashian, along with Eric Harkonen, P.Eng. and Chris Sharpe, P.Eng. met in Winnipeg in September 2007 to discussed the approach for the geological interpretation. To build the wireframe, the group agreed that two main criteria were to be used:

- Ni grade of 0.2% to be used as cut-off
- serpentinite and granite contacts are to be used.

All of the mineralized serpentinite were included in the solid regardless of the grade. The internal granite lenses could not be separated in the "serpentinite model" as there was not enough continuity of the lithology between drill sections. Sectional interpretations were digitized and these interpretations were linked with tie lines and triangulated to build three dimensional solids.

**Table 2.25 Lithology Units and Rock Codes**

| Lithocode | | Rock Code |
|---|---|---|
| Overburden | OVB | 10 |
| Dolomite | DOL | 20 |
| Sandstone | SS | 30 |
| Serpentinite | SPT | 40 |
| Granite | GT | 50 |
| Amphibolite | AMP | 60 |
| Mafic Dyke | MD | 70 |
| Metasediment | MSD | 80 |
| Mafic Metavolcanic | MMV | 90 |
| Lost Core | LC | 100 |
| Regolith | R | 110 |
| Dunite/Peridotite/Pyroxenite | DPP | 130 |

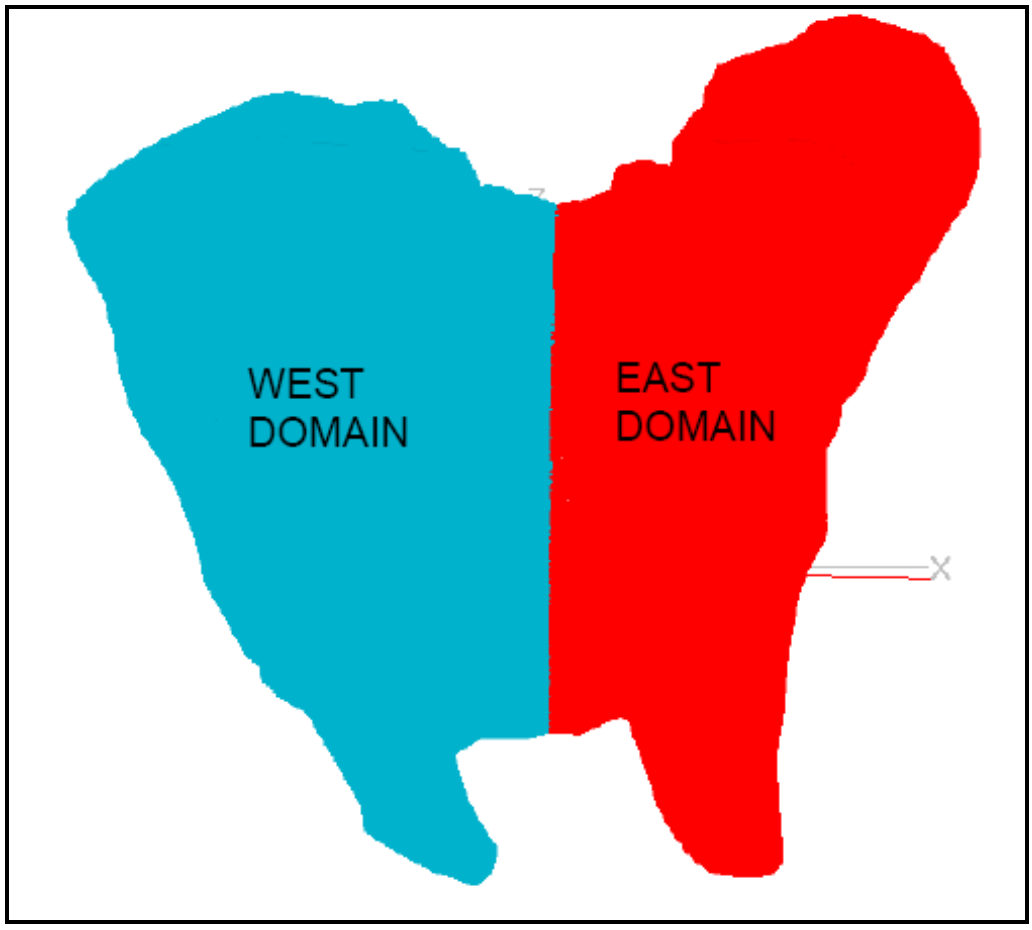
The boundaries of these solids were then compared and validated against the composited assay values. The solids were validated and verified and no errors were found.

Wardrop visually verified the triangulation against the drilling information using 2D vertical sections and level plans. In addition, box plots, contact plots and assay statistics, including areas outside the 3D solids, were compiled. Wardrop found that in general the 3D solid adequately modeled the nickel mineralization, incorporating low grade areas as well as virtually all high grade nickel-rich areas with relatively few exceptions.

The mineralization at Minago was considered as west and east domains based on the shape of the deposit. The deposit appears to be two limbs of a folded structure, with the apparent fold nose roughly located at UTM 487,350 East. The west domain

was coded as 4010 and the east domain was coded as 4030. Figure 2.41 shows the 3D solid by domains split at the fold nose.

**Figure 2.41 Three Dimensional Solid by Domain**



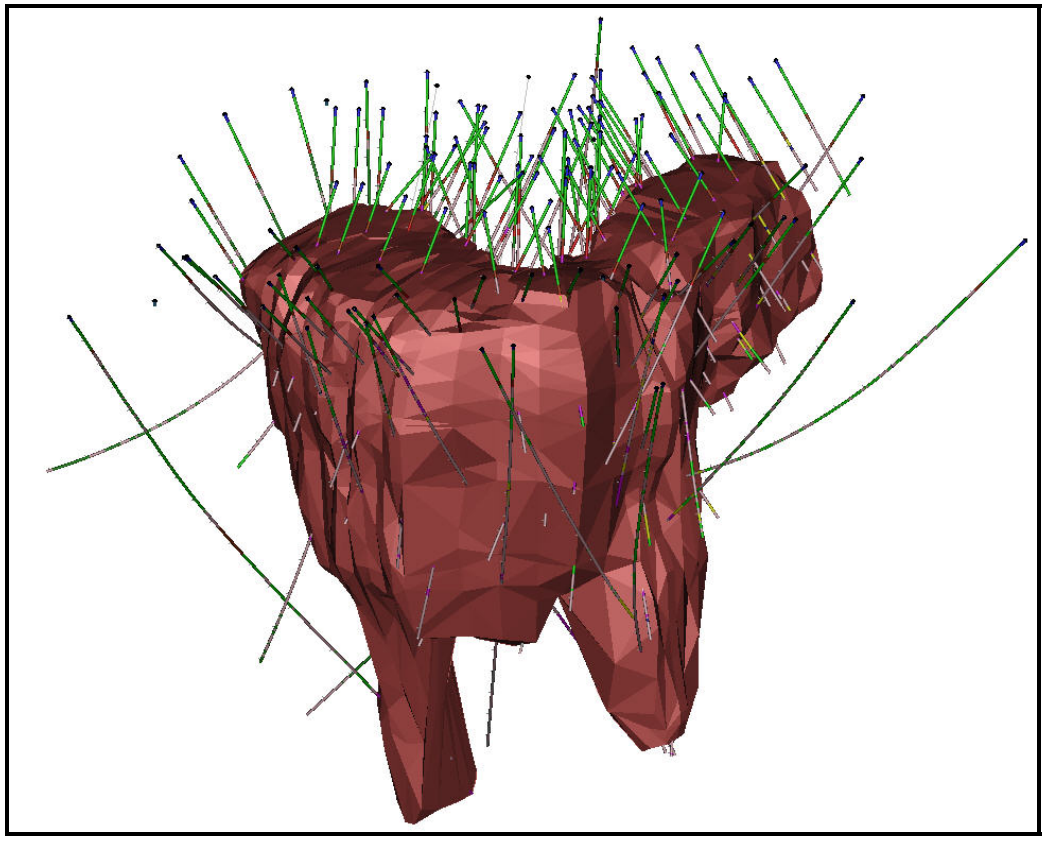

The total volume of the wireframe compares very well with the block model volume. The difference between the geological solids and the block model is 0.04%. Table 2.26 tabulates the wireframe and the associated volume.

**Table 2.26 Summary of Wireframe Volumes**

| Volume ($m^3$) | | Volume Difference | Percent Difference |
|---|---|---|---|
| Wireframe | Model within Block | | |
| 61,162,848 | 61,140,634 | 22,215 | 0.04% |

Figure 2.42 displays the geological solid at Minago. Using all drilling information, the current geological interpretation was completed and the overall mineralization continuity is maintained.

**Figure 2.42 Minago Deposit 3D Wireframe with Drill holes**



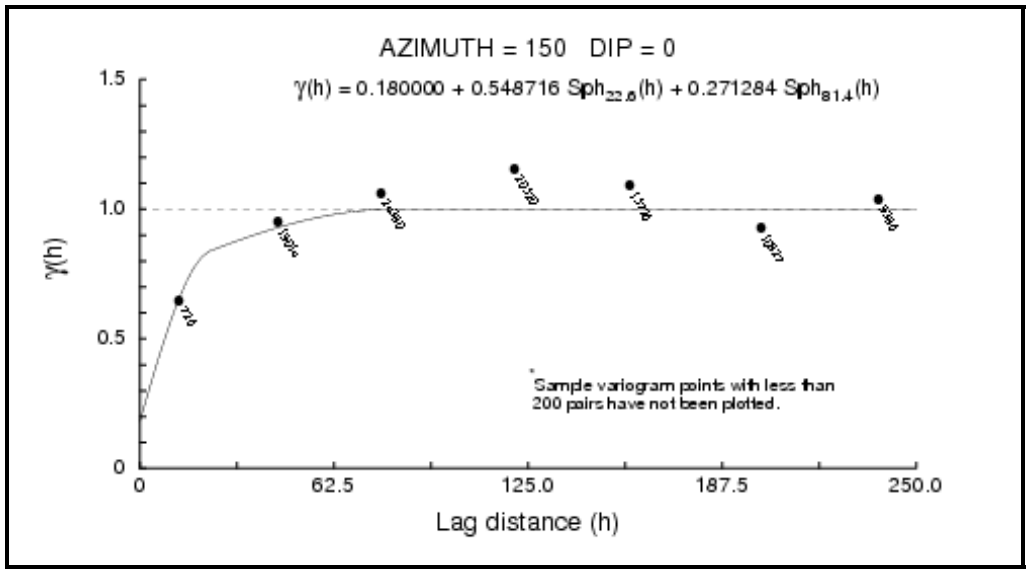
Variography, using Sage 2001 software, was completed on the Minago deposit for nickel in both domains west and east. A downhole variogram was created to determine the nugget effect and the correlograms were modeled to determine spatial continuity of the composited mineralization. Table 2.27 summarizes the results of the variography.

**Table 2.27 Minago Deposit Variography**

| Domain | Component | Increment | Ellipse Rotation (RRR Rule) | | | Ellipse Range (m) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Z | Y | Z | X | Y | Z |
| WEST Code 4010 | Nugget $C_0$ | 0.16 | | | | | | |
| | Spherical $C_1$ | 0.552 | -76 | 72 | 51 | 43.5 | 15.2 | 36.5 |
| | Spherical $C_2$ | 0.285 | -5 | -13 | 62 | 45.3 | 119.2 | 550.2 |
| EAST Code 4030 | Nugget $C_0$ | 0.13 | | | | | | |
| | Spherical $C_1$ | 0.587 | -10 | 89 | -22 | 39.9 | 26.0 | 14.6 |
| | Spherical $C_2$ | 0.28 | 24 | -13 | 105 | 47.2 | 90.8 | 791.2 |

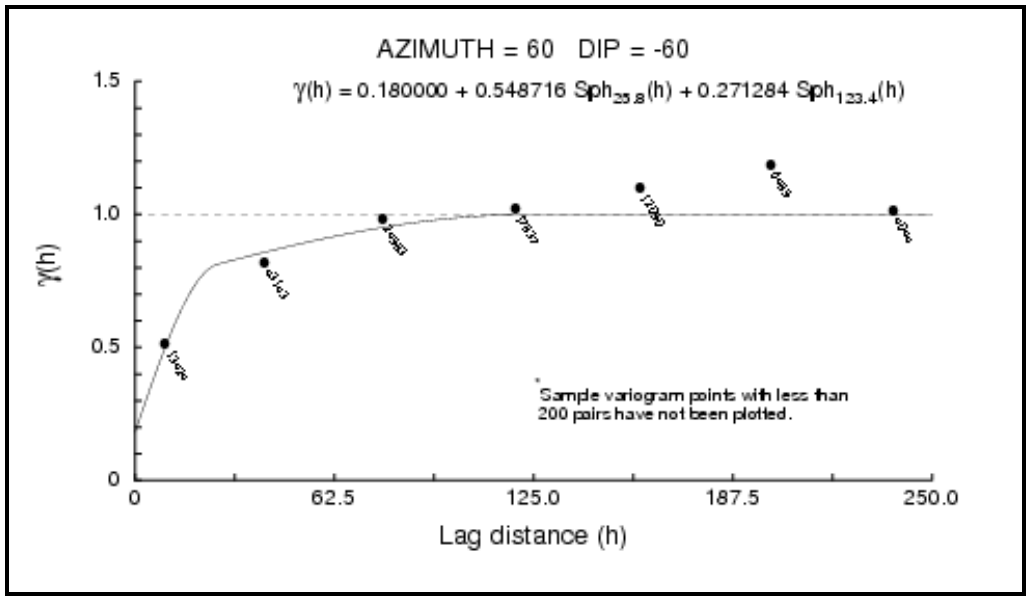
Generally, ranges for the nickel correlogram in the west domain grade shell reach about 60 metres at approximately 95% of the 1.0 sill level in the main strike direction as shown in Figure 2.43.

**Figure 2.43 Nickel Correlogram for West Domain – Strike Direction**




In the down dip direction, the range is longer reaching, about 100 metres at 95% of the 1.0 sill value as shown in Figure 2.44.

**Figure 2.44 Nickel Correlogram for West Domain – Dip Direction**




Generally, ranges for the nickel correlogram in the east domain grade shell are shorter in the strike direction and longer in the dip direction.

Very little data was available to define the quality of the sand. The data that was provided was from large samples taken at widely spaced points. Density data was widely spaced and showed a normal distribution. No variography was carried out either on the quality or density data.

### 2.7.6 BLOCK MODEL

The resource block model was created using Gemcom version 6.1.3. Table 2.28 summarizes the block model limits. The block model was not rotated.

**Table 2.28 Block Model Matrix**

| Coordinate | Model Origin | Number of Blocks | Block Size (m) | Model Extent (m) |
|---|---|---|---|---|
| X | 486,522 | 276 | 6 | 1,656 |
| Y | 5,992,620 | 260 | 6 | 1,560 |
| Z | 248 | 151 | 6 | 906 |

A 6 m x 6 m x 6 m block size was selected.

The block model matrix was defined using the UTM NAD 83 coordinate system.

### 2.7.7 INTERPOLATION PLAN

The interpolation plan of the Minago deposit nickel resource estimation was completed using ordinary kriging (OK) with nearest neighbour (NN) and inverse distance squared (ID) check models used for block model validation. The frac sand resource was estimated separately using a nearest neighbour method. The overall variability of the sand quality seems quite low, so this method was deemed adequate for the frac sand.

The nickel estimations were designed as a three pass system per each domain. The first pass estimated a block only if a minimum of two drillholes and six data points were found within the restrictive search ellipsoid. The second pass allowed a block to be interpolated if it was not interpolated during the first pass, and if a minimum of two drillholes and four data points were found within the larger sample search ellipsoid. The third pass allowed a block to be interpolated if it was not interpolated during the second pass, and if a minimum of two data points were found within the larger sample search ellipsoid. Table 2.29 and Table 2.30 below summarize search distances and right hand rotations for estimating a block as well as minimum and maximum number of composites required.

**Table 2.29 Search Ellipse and Angle Parameters**

| Domain | Pass Number | Ellipsoid Dimensions (m) | | | Search Angle (Rotation) | | |
|---|---|---|---|---|---|---|---|
| | | X | Y | Z | Z | X | Z |
| West | Pass 1 | 20 | 40 | 20 | -29.6 | 89.0 | -15.8 |
| | Pass 2 | 40 | 80 | 40 | -29.6 | 89.0 | -15.8 |
| | Pass 3 | 100 | 200 | 100 | -29.6 | 89.0 | -15.8 |
| East | Pass 1 | 20 | 40 | 20 | -140 | -85.2 | -1.5 |
| | Pass 2 | 40 | 80 | 40 | -140 | -85.2 | -1.5 |
| | Pass 3 | 100 | 200 | 100 | -140 | -85.2 | -1.5 |

**Table 2.30 Sample Search Parameters**

| Domain | Pass Number | Number of Composites Used | | | |
|---|---|---|---|---|---|
| | | Minimum | Maximum | Max per Drillhole | Comment |
| West | Pass 1 | 6 | 15 | 5 | Minimum 2 drillholes required |
| | Pass 2 | 4 | 15 | 3 | Minimum 2 drillholes required |
| | Pass 3 | 2 | 15 | 2 | Minimum 1 drillhole required |
| East | Pass 1 | 6 | 15 | 5 | Minimum 2 drillholes required |
| | Pass 2 | 4 | 15 | 3 | Minimum 2 drillholes required |
| | Pass 3 | 2 | 15 | 2 | Minimum 1 drillhole required |

Figure 2.45 and Figure 2.46 below show an isometric view of the Minago deposit with the west and east domain search ellipses. It can be noted that the ellipses are aligned with the overall azimuth and dip direction of the domains.

Search ranges were based on the density of diamond drilling and the two domain correlograms. For the OK model estimation the variography model parameters used were the same dimensions and angles as outlined in Table 2.29.

The nickel density model was populated based on a lithology model, created from lithologies recorded in the diamond drill logs. The density model was first initialized to 2.65, a typical value for the granitic rocks that host the Minago deposit. The lithology model was populated by kriging the lithology codes, and assigning lithology using a nearest neighbour method. A script was used to populate the density model, using average lithology densities, based on the lithology model.

Density measurements within the sandstone were widely distributed. Wardrop estimated the sand density using an inverse distance squared (ID2) method. This method searched for sample results using a search radius of 1,000 m horizontally, and 20 m vertically. A minimum of two samples, up to a maximum of five samples, was required to estimate any single block.

**Figure 2.45 Isometric View of the Minago Deposit with Eastern Search Ellipse**

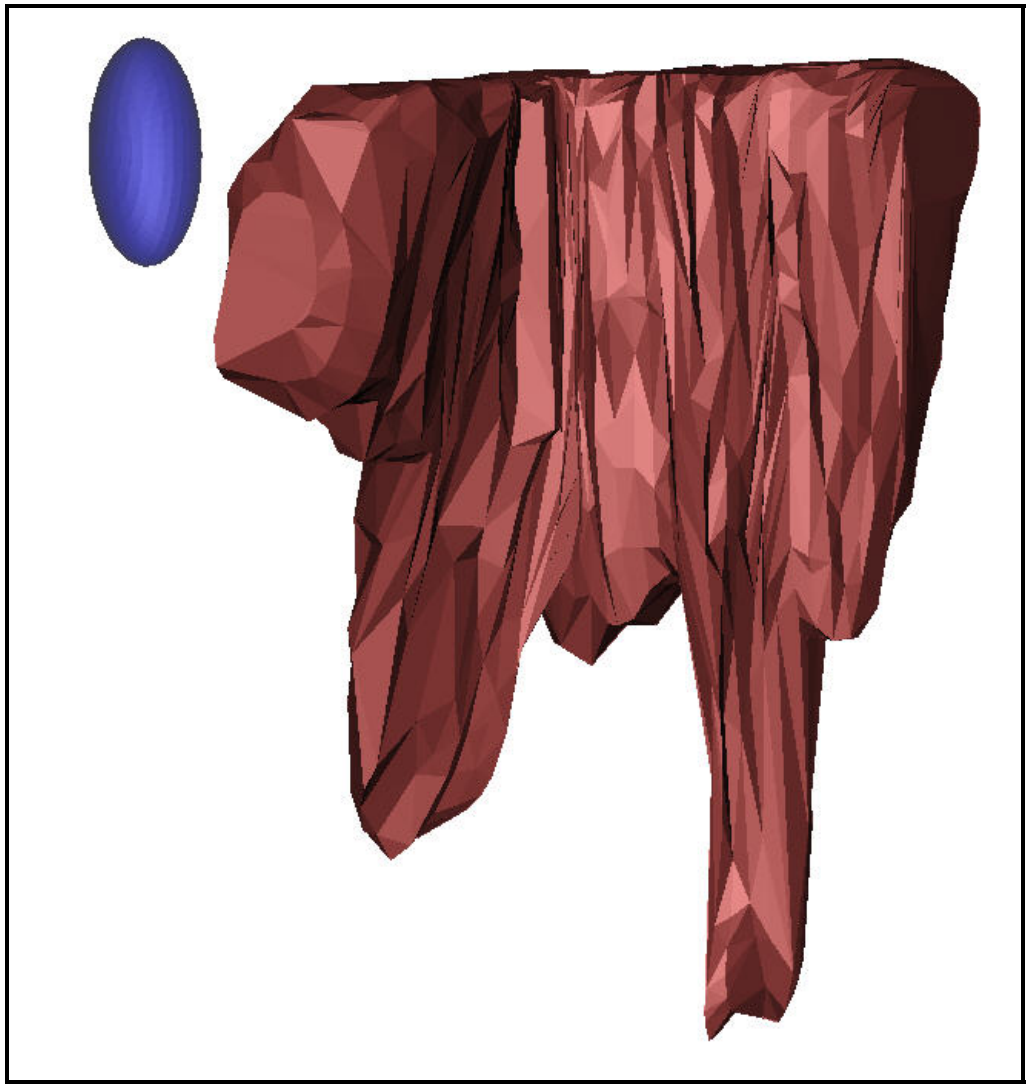
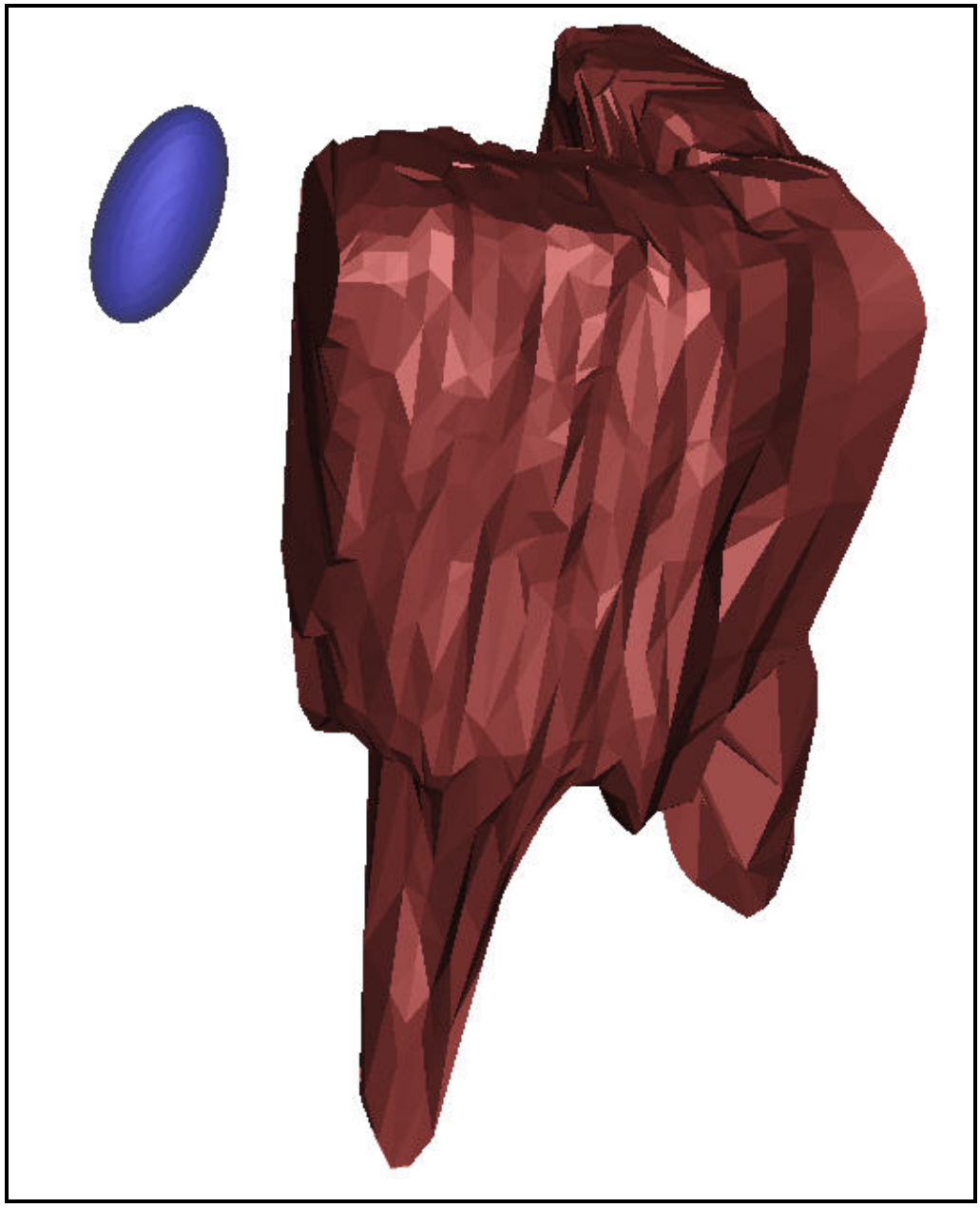


**Figure 2.46 Isometric View of the Minago Deposit with Western Search Ellipse**



## 2.7.8 RESOURCE CLASSIFICATION

Several factors were used to determine the mineral resource classification:

- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) requirements and guidelines
- experience with similar deposits
- spatial continuity of mineralization.

No known environmental, permitting, legal, title, taxation, socio-economic, marketing or other relevant issues are known to the authors that may affect the estimate of the mineral resource. Three confidence categories exist in the block model. The usual CIM guidelines of Measured, Indicated and Inferred classes are coded 1, 2 and 3 respectively.

Wardrop has classified the Minago sandstone as an indicated resource. The lateral extent of the sandstone unit has been outlined on a regional basis. On a local basis, within the proposed pit shell, the size, shape and density of the sand are well documented. The sand quality has been tested and shows little variation between samples.

Typically, confidence level for a grade in the block model is reduced with the increase in the search ellipsoid size, along with the diminishing restriction on the number of samples used for the grade interpolation. This is essentially controlled via a pass number of the interpolation plan described in the previous section. A common technique is to categorize a model based on the pass number and distance to the closest sample.

Using the pass number, a category model was created. Table 2.31 summarizes criteria required for the nickel resource Measured, Indicated and Inferred categories.

**Table 2.31 Resource Classification Criteria**

| Measured | Indicated | Inferred |
|---|---|---|
| *Pass 1 interpolation criteria:<br>- Ellipsoid dimensions and search angles.<br>- Minimum of two drill holes required.<br>- Minimum of six composites required.<br>- Maximum of five composites per drill hole. | *Pass 2 interpolation criteria:<br>- Ellipsoid dimensions and search angles.<br>- Minimum of two drill holes required.<br>- Minimum of four composites required.<br>- Maximum of three composites per drill hole. | *Pass 3 interpolation criteria:<br>- Ellipsoid dimensions and search angles.<br>- Minimum of one drill hole required.<br>- Minimum of two composites required.<br>- Maximum of two composites per drill hole. |

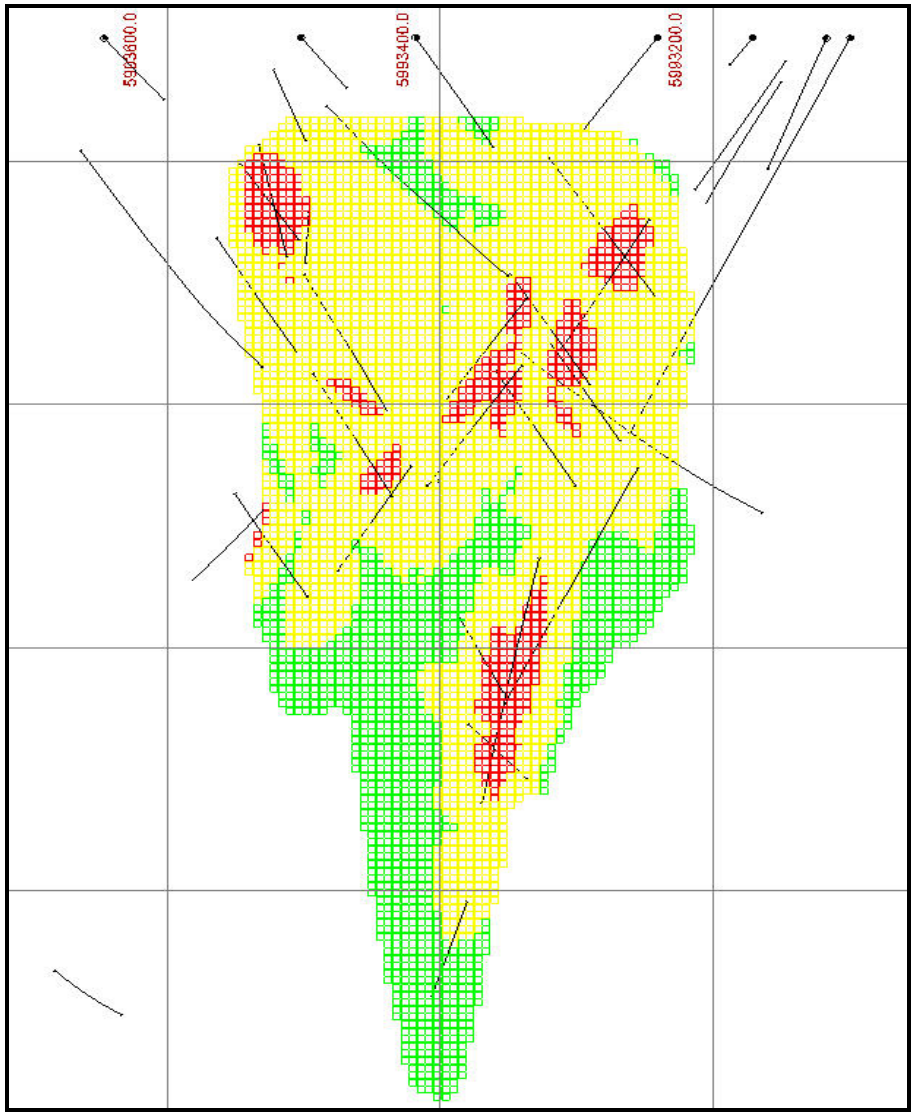
On the basis of the criteria outlined in Table 2.31, approximately 76.8% of the blocks in the Minago model are estimated as Measured or Indicated Resources (as shown in Table 2.32).

**Table 2.32 Category Model Tabulation**

| Category | Number of Blocks | Percentage |
|---|---|---|
| Measured | 44,587 | 14.7% |
| Indicated | 188,385 | 62.1% |
| Inferred | 70,590 | 23.2% |

Figure 2.47 represents a typical section of the category model of the Minago deposit, where red blocks represent Measured, yellow blocks represent Indicated and green blocks represent Inferred resources. The solid black lines are drill hole traces within 25 m of the section.

**Figure 2.47 Nickel Resource Classification Model with Drill holes**



### 2.7.9 RESOURCE TABULATION

The nickel mineral resource estimation at Minago is tabulated in Table 2.33 for the Measured, Indicated and Inferred resources respectively. Ordinary kriging interpolation is used for the nickel resource tabulation for the Minago deposit.

The resource numbers tabulated below are for the entire deposit. Cutoff grade used to define the bins is in Ni%.

**Table 2.33 Cumulative Resource Greater than Specified Nickel Cut-off**

| Resource Classification | Cut off Grade (Ni%) | Volume ($m^3$ x 1,000) | Density ($t/m^3$) | Tonnes (x 1,000) | Ni (%) | NiS (%) |
|---|---|---|---|---|---|---|
| Measured | > 1.0% | 333 | 2.62 | 874 | 1.19 | 0.96 |
| | > 0.9% | 528 | 2.62 | 1,385 | 1.10 | 0.88 |
| | > 0.8% | 791 | 2.62 | 2,075 | 1.02 | 0.81 |
| | >0.7% | 1,118 | 2.62 | 2,929 | 0.94 | 0.74 |
| | >0.6% | 1,521 | 2.62 | 3,985 | 0.86 | 0.67 |
| | >0.5% | 2,044 | 2.62 | 5,354 | 0.78 | 0.60 |
| | >0.4% | 2,710 | 2.62 | 7,101 | 0.70 | 0.53 |
| | >0.3% | 3,581 | 2.62 | 9,386 | 0.61 | 0.46 |
| | >0.25% | 4,215 | 2.62 | 11,051 | 0.56 | 0.41 |
| | >0.2% | 5,128 | 2.62 | 13,454 | 0.50 | 0.36 |
| Indicated | > 1.0% | 713 | 2.66 | 1,896 | 1.18 | 0.93 |
| | >0.9% | 1,136 | 2.65 | 3,011 | 1.09 | 0.85 |
| | >0.8% | 1,836 | 2.65 | 4,856 | 1.00 | 0.78 |
| | >0.7% | 2,891 | 2.64 | 7,634 | 0.91 | 0.70 |
| | >0.6% | 4,447 | 2.64 | 11,726 | 0.82 | 0.62 |
| | >0.5% | 6,647 | 2.63 | 17,513 | 0.73 | 0.55 |
| | >0.4% | 9,602 | 2.63 | 25,298 | 0.64 | 0.48 |
| | >0.3% | 13,570 | 2.63 | 35,752 | 0.56 | 0.41 |
| | >0.25% | 16,346 | 2.63 | 43,063 | 0.51 | 0.37 |
| | >0.2% | 20,304 | 2.64 | 53,512 | 0.45 | 0.32 |
| Inferred | > 1.0% | 338 | 2.67 | 903 | 1.17 | 0.91 |
| | >0.9% | 564 | 2.67 | 1,505 | 1.08 | 0.83 |
| | >0.8% | 909 | 2.67 | 2,424 | 0.99 | 0.75 |
| | >0.7% | 1,294 | 2.67 | 3,450 | 0.92 | 0.69 |
| | >0.6% | 1,706 | 2.67 | 4,554 | 0.86 | 0.64 |
| | >0.5% | 2,267 | 2.67 | 6,046 | 0.78 | 0.58 |
| | >0.4% | 3,171 | 2.67 | 8,463 | 0.68 | 0.51 |
| | >0.3% | 4,495 | 2.67 | 12,006 | 0.59 | 0.43 |
| | >0.25% | 5,461 | 2.67 | 14,585 | 0.53 | 0.38 |
| | >0.2% | 6,883 | 2.67 | 18,389 | 0.47 | 0.33 |

Wardrop constrained the lateral extents of the frac sand resource with the proposed pit shell for the nickel deposit. Wardrop estimates that the proposed pit shell contains 15 million tonnes of sand. Of this, 13% will report to the 20/40 size fraction, and 71% will report to the 40/140 size fraction.

### 2.7.10 MODEL VALIDATION

Wardrop used a nearest neighbour approach for the quality validation, and an ID2 approach for the density validation of the sandstone. A visual comparison of the block values with the estimation variables was conducted and the estimation appeared reasonable.

The nickel resource estimation was validated by:

- comparing contained metal differences on NN, ID and OK estimation methods
- visually comparing colour-coded block grades and drillhole composite for the three estimation methods of NN, ID and OK
- swath plot comparisons of estimated methods of NN, ID and OK
- a block model comparison with the previous resource estimate.

#### GLOBAL COMPARISON

The global block model estimation of the OK method was compared to that of the global estimation of the model values. Table 2.34 shows the comparisons for the three estimation methods using all blocks. The contained metal differences between the methods were very similar between NN, ID and OK.

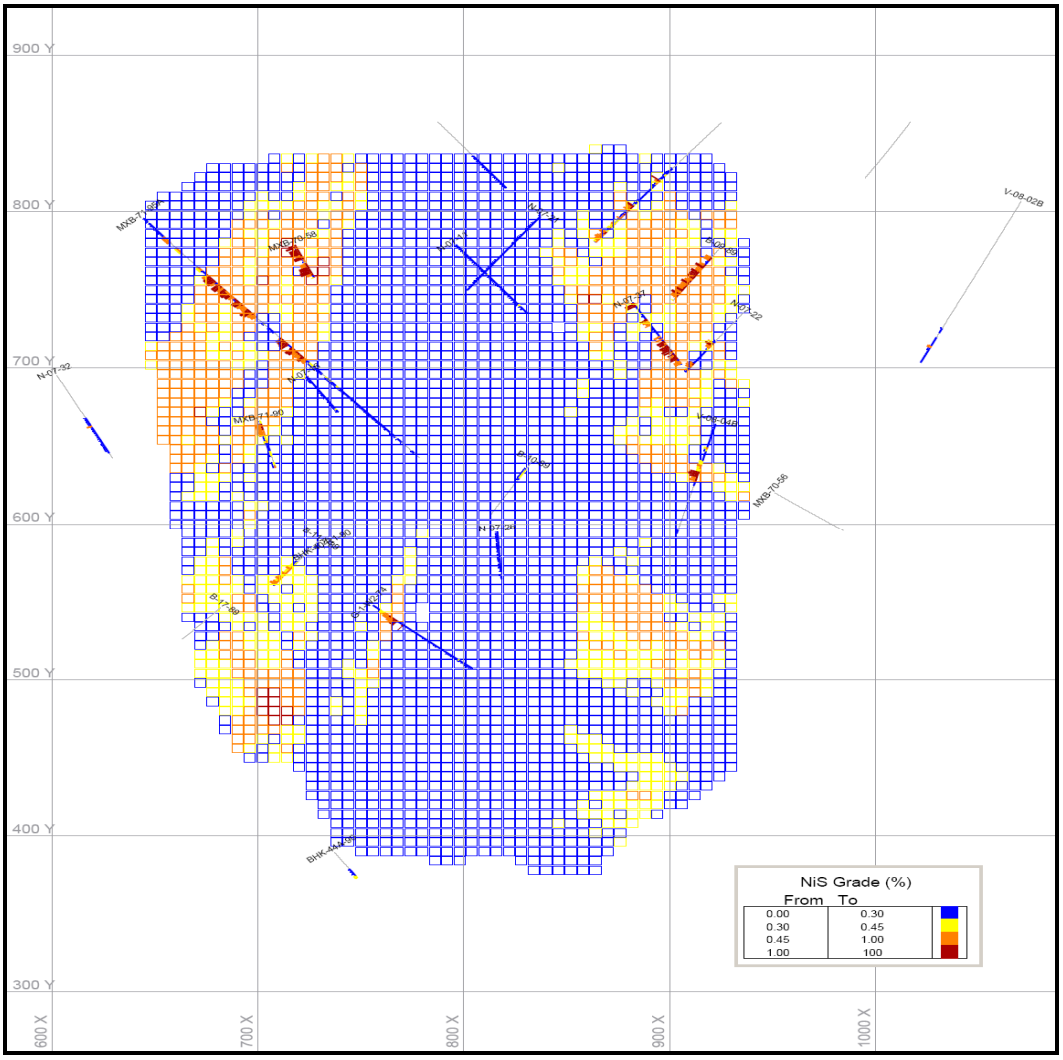
**Table 2.34 Global Comparison by Estimation Method**

| Estimation Method | Change |
|---|---|
| | metal (%) |
| Ordinary Kriging | 0.0% |
| Inverse Distance Squared | 1.1% |
| Nearest Neighbour | -1.0% |

#### VISUAL COMPARISON

The visual comparison of block model grades against composite NiS grades display a reasonable correlation between the values (Figure 2.48). No significant discrepancies were apparent between the sections. A visual check of the Frac Sand quality model showed that the blocks had been assigned the values of the nearest sample.

**Figure 2.48 Visual Comparison of Block Grades with Drill Hole Assays**




## SWATH PLOT COMPARISON

A swath plot comparison is shown through Figure 2.49, Figure 2.50 and Figure 2.51.

**Figure 2.49 Minago Deposit Comparison of NN, ID, OK grades and Tonnes by Easting**

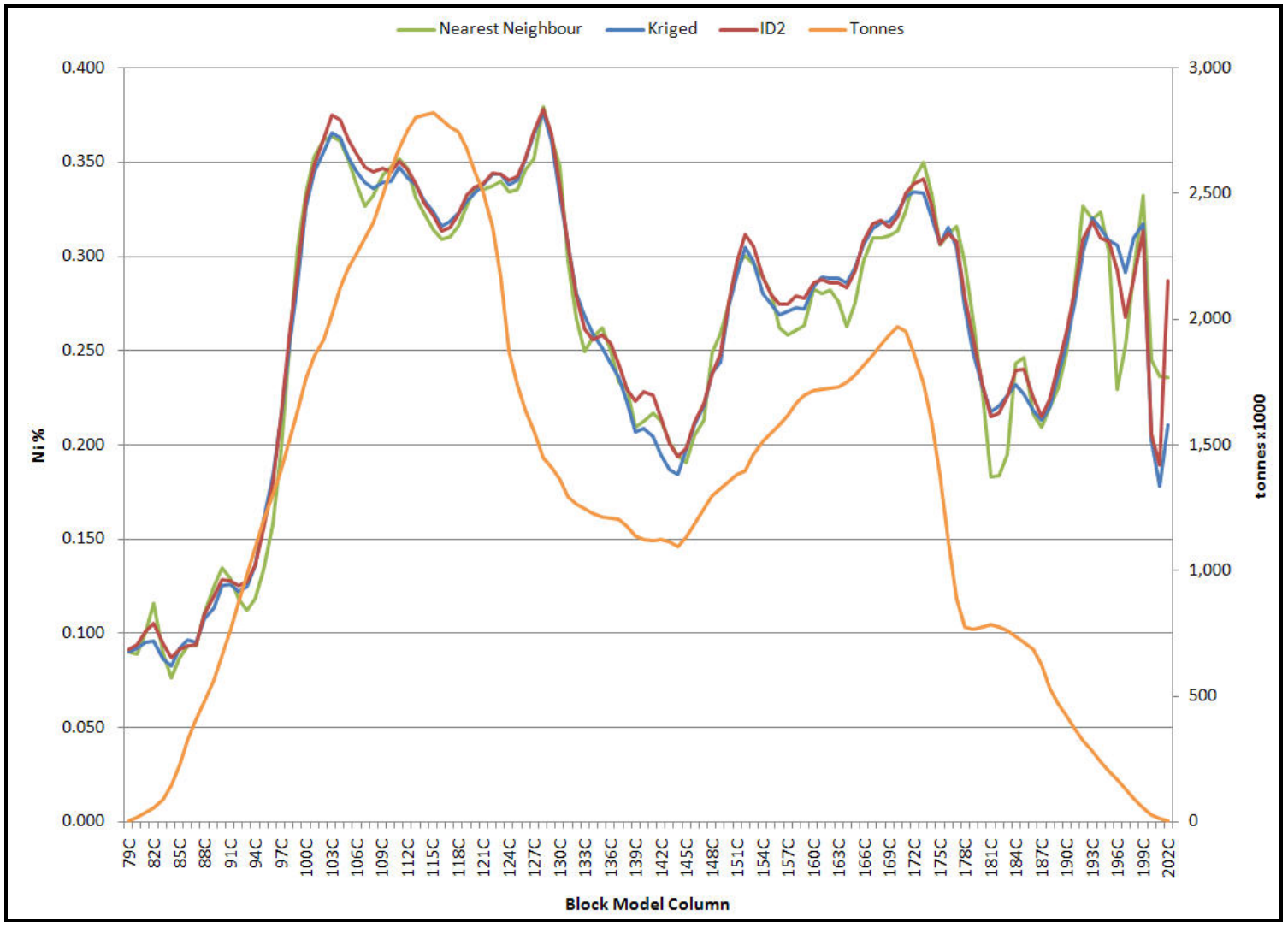


**Figure 2.50 Minago Deposit Comparison of NN, ID, OK grades and Tonnes by Northing**

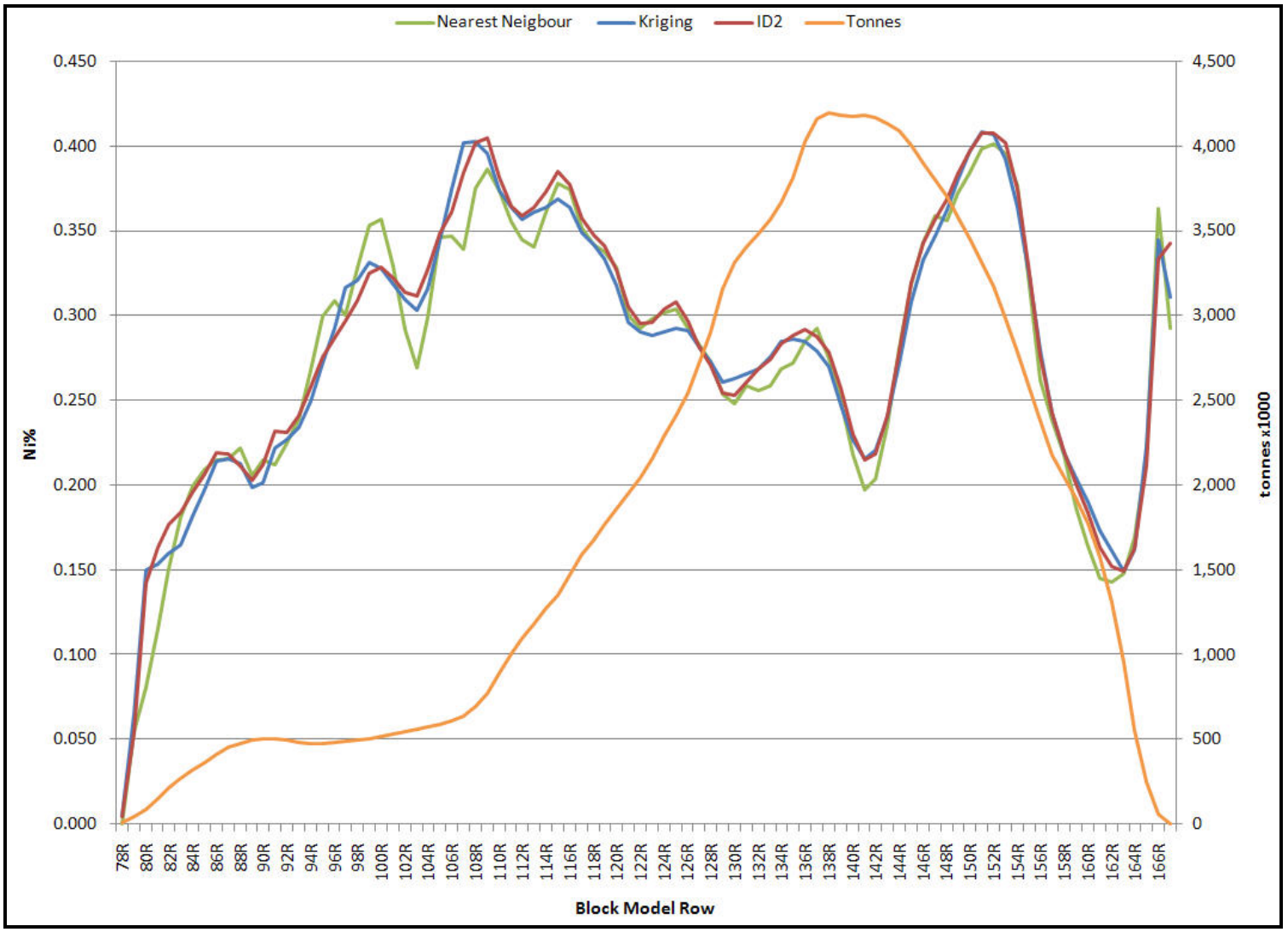
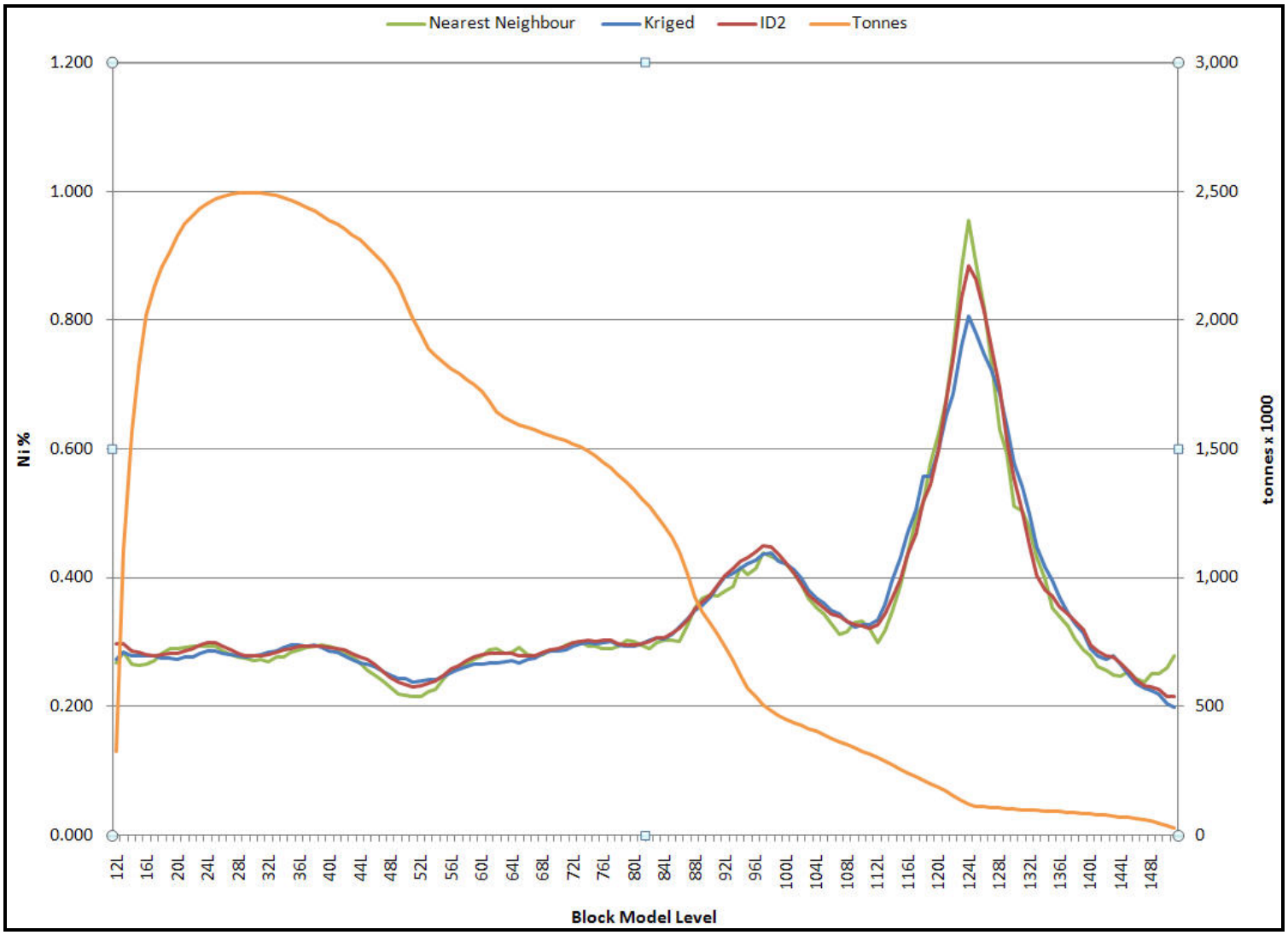


**Figure 2.51 Minago Deposit Comparison of NN, ID, OK grades and Tonnes by Elevation**



## PREVIOUS RESOURCE COMPARISON

No previous resource estimates have been made of the frac sand at the Minago deposit. Wardrop's 2008 nickel resource estimate was compared with Mirarco's August 2006 resource estimate and Wardrop's November 2006 PEA report. The basis for the PEA report resource numbers have been based on Mirarco's model, and the two are accordingly grouped together in the comparison table (Table 2.35).

**Table 2.35 Wardrop-Mirarco Resource Estimate Comparison**

| Mirarco - Wardrop | | % Change | | |
|---|---|---|---|---|
| | Ni % (Cut off) | Ni (Grade) | Tonnes | Metal (Tonnes) |
| Measured Resource | 0.25 | -5% | 8% | 2% |
| | 0.3 | -5% | 6% | 1% |
| | 0.4 | -4% | 2% | -1% |
| | 0.5 | -3% | -1% | -4% |
| | 0.6 | -2% | -4% | -6% |
| | 0.7 | -2% | -6% | -8% |
| | 0.8 | -2% | -8% | -10% |
| | 0.9 | -1% | -14% | -15% |
| Indicated Resource | 0.25 | 2% | 11% | 14% |
| | 0.3 | 2% | 12% | 14% |
| | 0.4 | 2% | 15% | 16% |
| | 0.5 | 2% | 15% | 17% |
| | 0.6 | 2% | 15% | 17% |
| | 0.7 | 3% | 17% | 20% |
| | 0.8 | 4% | 19% | 24% |
| | 0.9 | 4% | 32% | 36% |
| Inferred Resource | 0.25 | 0% | -67% | -67% |
| | 0.3 | 1% | -67% | -67% |
| | 0.4 | 3% | -68% | -67% |
| | 0.5 | 3% | -69% | -67% |
| | 0.6 | 2% | -67% | -66% |
| | 0.7 | 2% | -66% | -65% |
| | 0.8 | 1% | -64% | -64% |
| | 0.9 | 1% | -63% | -63% |

Results shown in Table 2.35 indicate that there has been an overall increase in confidence in the resource estimate. Inferred tonnages have been significantly reduced in all grade ranges. Within the Indicated resources, there has been a general increase in tonnes and grade. Measured resources show an increase in the lower grade ranges, and a corresponding decrease in the upper grade ranges. The

net effect is an increase in the metal content of the Measured and Indicated resources, and a decrease in metal content of the Inferred resource.

The differences lie in volume, density, and how missing assays were treated. The volume difference is mainly due to changes in the geological interpretation that have resulted from additional diamond drill information. A small part of the tonnage difference is due to changes in the density model, that resulted from additional data and the method used to create the current model. Wardrop assigned a grade of 0% Ni and 0% NiS to all missing assays when creating the composites. Mirarco used 0.2% Ni for missing assays. This procedure would have expanded the volume of the inferred resource considerably, especially in the lower grade ranges.

### 2.7.11 NICKEL SULPHIDE

The NiS% database consists of 4,557 assays and is summarized in Table 2.36.

**Table 2.36 NiS% Database**

| Company | Drillhole Number | Number of Assays |
|---|---|---|
| Amax Exploration | MXB-70-48 | 657 |
| | MXB-70-54 TO MXB-70-58 | |
| | MXB-71-88 TO MXB-71-99 | |
| Thompson Core | B-16-89 | 273 |
| | B-7-89 | |
| | G-1-74 | |
| | G-2-75 | |
| | MXB-71-93 | |
| Victory Nickel | N-07-01 TO N-07-04 | 2,368 |
| | N-07-06 TO N-07-07 | |
| | N-07-09 TO N-07-23 | |
| | N-07-25 TO N-07-28 | |
| | N-07-30 TO N-07-39 | |
| | N-07-41 TO N-07-44 | |
| Victory Nickel | V-08-01 TO V-08-10 | 1,259 |

#### ASSAYS

A total of 4,557 NiS% assays were available compared to 14,829 Ni% assays. Data analysis was conducted by creating probability and histogram plots of the data (Figure 2.52). The probability plot seems to exhibit a non-lognormal population. Probably two populations are seen in the plot, as this may tie in with the serpentinite/granite mix. Figure 2.53 shows a boxplot of NiS% assays by rock type, where 3,071 out of 3,298 NiS% assays were in the serpentinite unit.

**Figure 2.52 Histogram and Probability Plots of NiS% Assay Data**

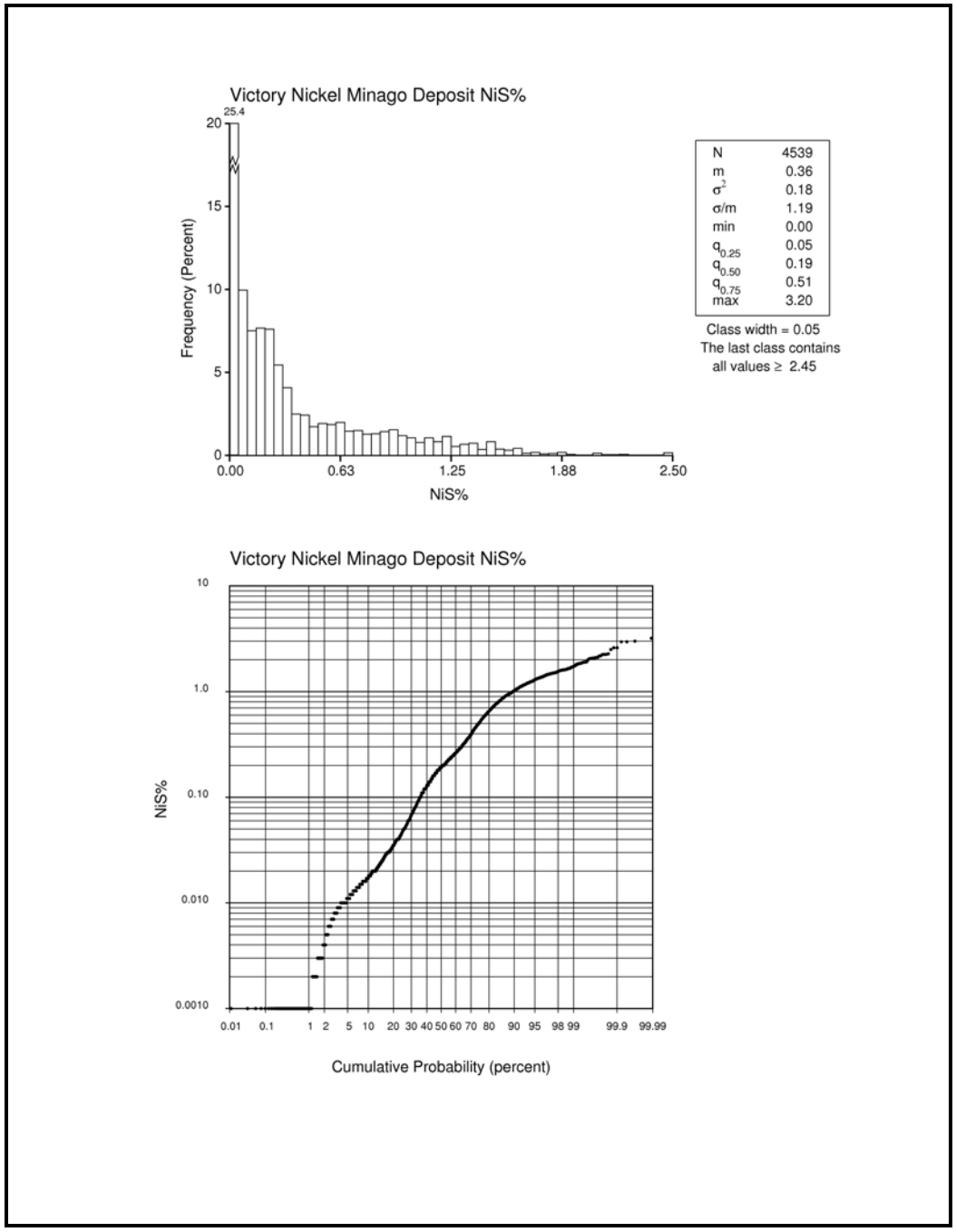
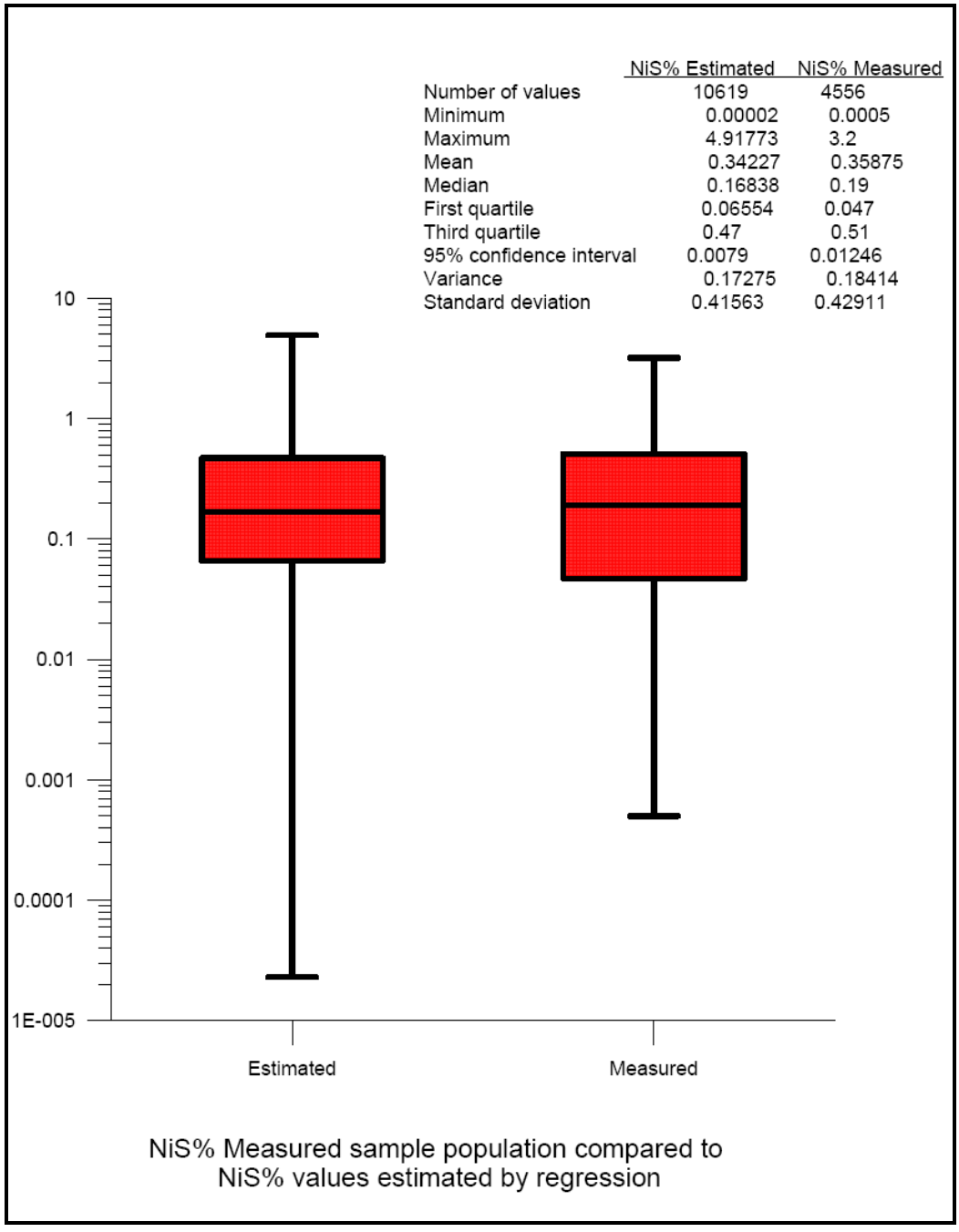


**Figure 2.53 NiS Assays**

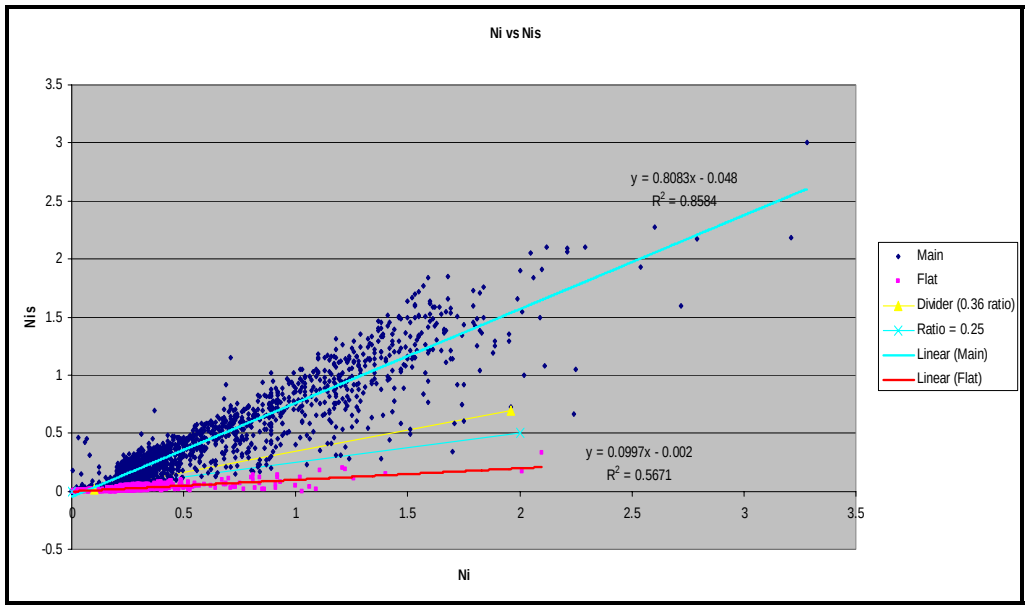



## SCATTER AND CONTACT PLOTS

Wardrop examined in detail the relationship between the individual NiS to Ni assays. The Ni to NiS scattered plots were created and two populations were visible: a weak, flat population indicating a low Ni/NiS ratio and a steep, strong population

representing a high NiS/Ni ratio. The data was processed using GeoDA™ version 0.9.5-i5 and the data indicated that a low NiS/Ni ratio near the top of the model appears to exist. The NiS/Ni ratios were separated as much as possible into two populations and the 3,298 NiS assays and their Ni pair were plotted in a scatter plot for the ratio selection criteria. Two regressions were plotted for each of the populations: one flat and the other one steep (Figure 2.54). The flat regression represents a low NiS and high in Ni silicate. The steep regression is high in NiS and low in Ni silicate.

**Figure 2.54 NiS vs. Ni Ratio Selection Criteria**




Using this regression information the NiS/Ni ratio was subdivided into three groups:

- low NiS/Ni ratio <0.25
- middle NiS/Ni ratio >0.25 and <0.5
- high NiS/Ni ratio >0.5

Contact plots were generated to insure that the data was captured properly.

Figure 2.55 represents the contact plot where on the left hand side of the graph is the <0.25 NiS/Ni ratio and on the right hand side is >0.25 and <0.5 NiS/Ni ratio. A sharp boundary exists between the two populations.

Figure 2.56 represents the contact plot where on the left hand side is >0.25 and <0.5 NiS/Ni ratio and on the right hand side is the >0.5 NiS/Ni ratio. A moderately sharp boundary exists between the two populations.

Figure 2.57 represents the contact plot where on the left hand side of the graph is the <0.25 NiS/Ni ratio and on the right hand side is >0.5 NiS/Ni ratio. A very sharp boundary exists between the two populations.

The results from the ratio analysis with accompanying contact plots were used to identify spatially where the low versus high ratio lies. The drillholes were plotted with the NiS/Ni ratio. After reviewing sections in 3D, it became evident that the low NiS/Ni ratio is present consistently at the top of the deposit.

**Figure 2.55 Low to Middle NiS/Ni Ratio**

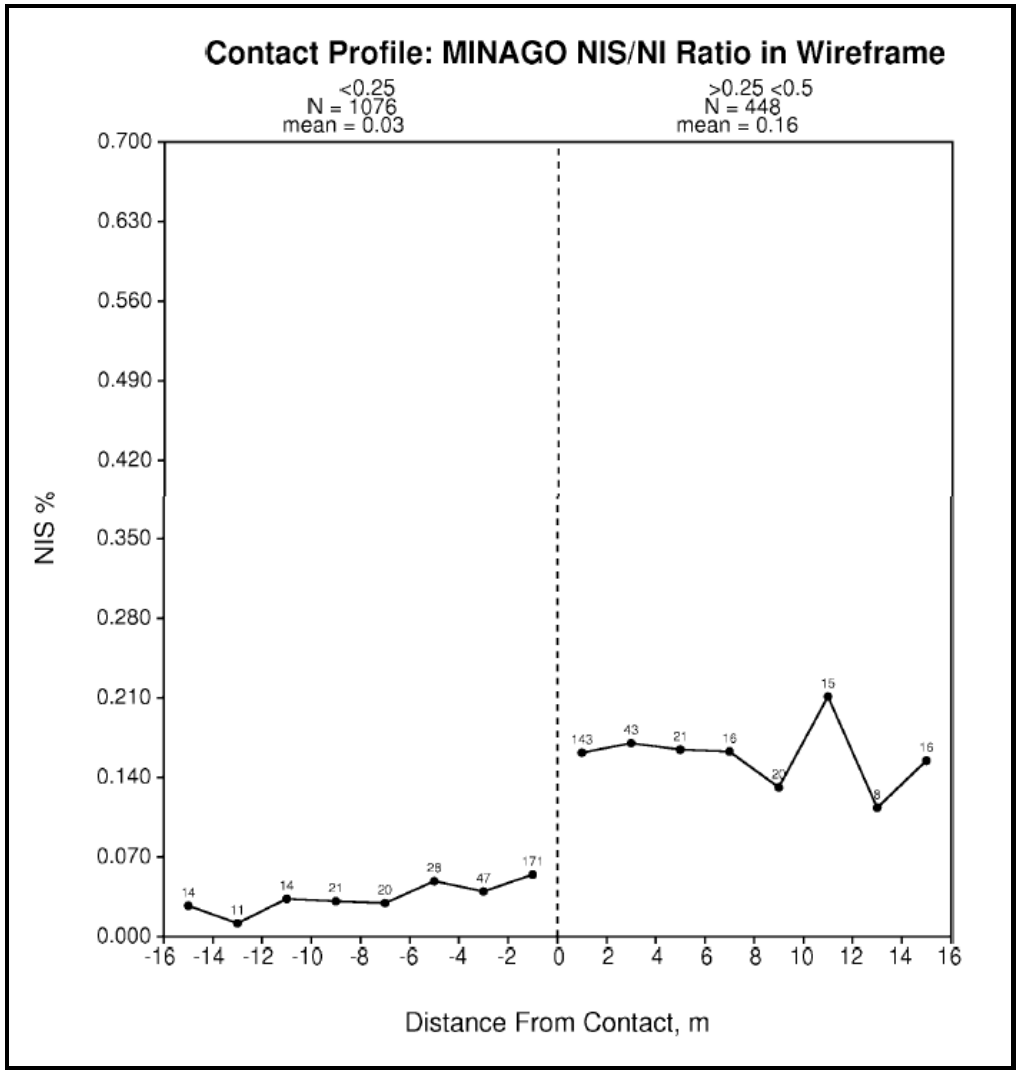


**Figure 2.56 Middle to High NiS/Ni Ratio**

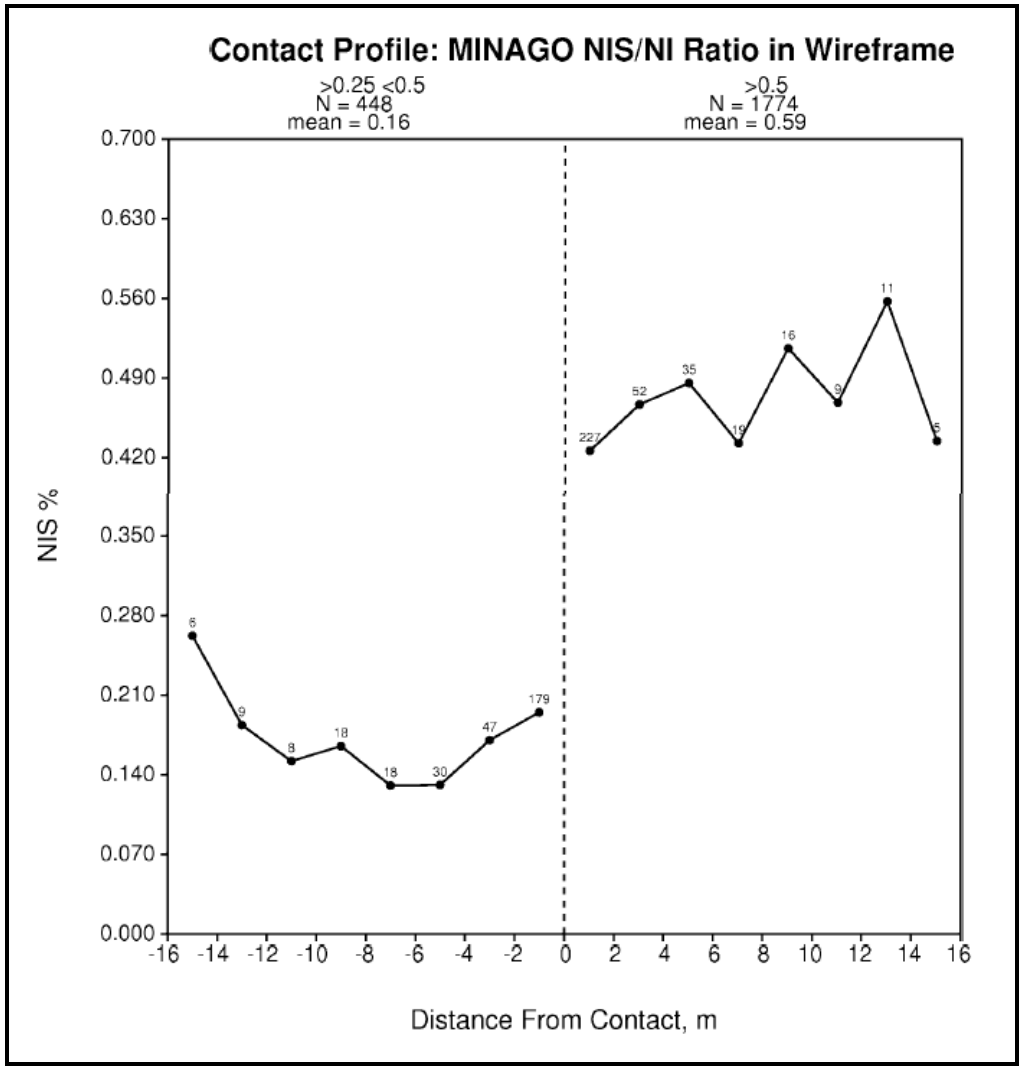
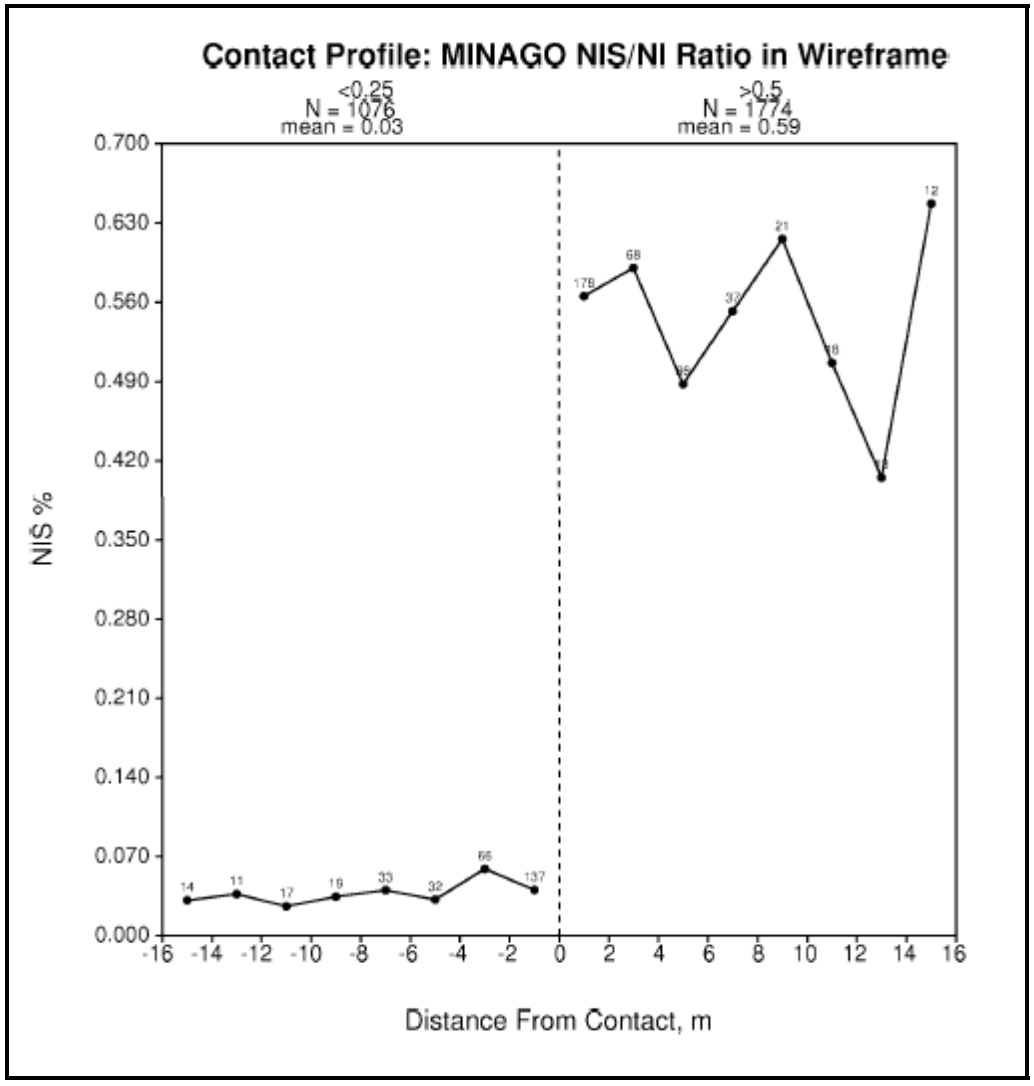


**Figure 2.57 Low to High NiS/Ni Ratio**



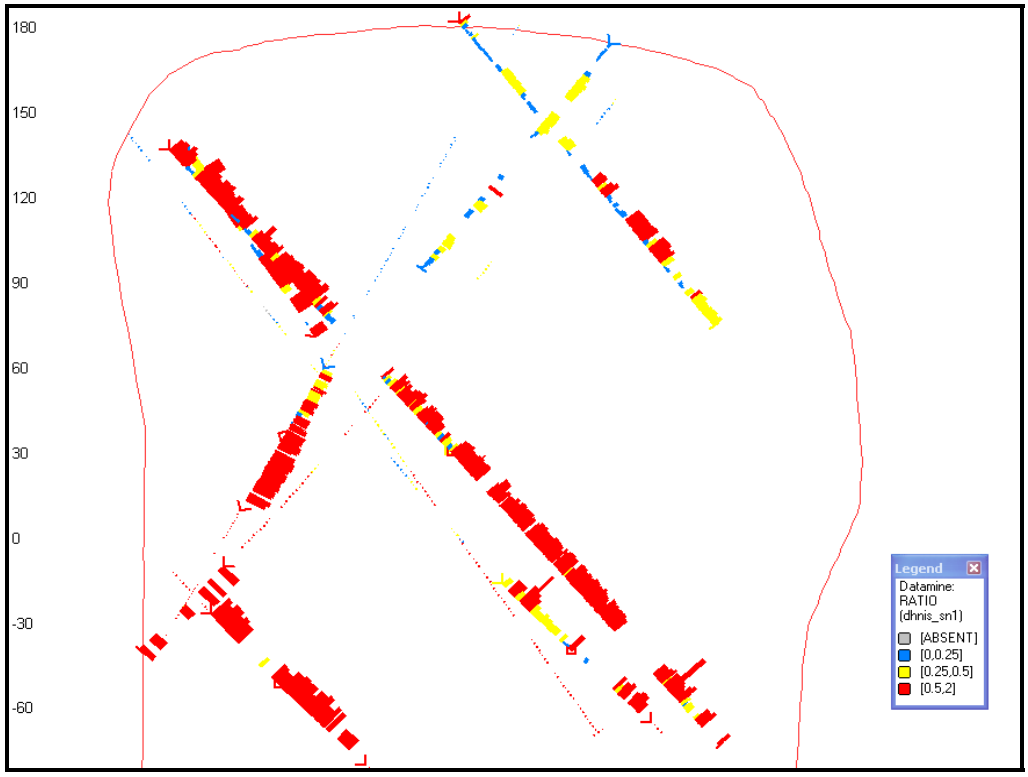

## 2.7.12 INTERPRETATION

Using the same sectional interpretation that was used during the geological interpretation, strings were digitized on screen separating the low NiS/Ni from high NiS/Ni ratios. While digitizing, the areas represented by the middle ratio were either included in the upper or lower ratio depending on their location.

Figure 2.58 displays a vertical section where drillholes are plotted with NiS/Ni ratio using the three groups. As discussed earlier, the low NiS/Ni ratio is at the top of the deposit (see legend at the bottom right corner of for colour and ratio ranges). It is unclear what kind of geological controls govern this, however moving from west to east, the low NiS/Ni ratio can be traced. On the west limb the low NiS/Ni ratio is on the south side, whereas on the east limb the low ratio is in the middle. Except around the fold nose where the low NiS/Ni ratio is almost non-existent. This is

probably due to the fact that higher Ni samples with high NiS content exist around the fold nose, therefore having a higher NiS/Ni ratio. Further investigation is warranted to understand the relationship of the geological controls with the low and high NiS/Ni ratios. Wardrop recommends that Victory Nickel conduct further work on this topic.

**Figure 2.58 Vertical Section of the Wireframe and Drill holes with NiS/Ni Ratio**




Once the sections were digitized then a 3D wireframe was built. Figure 2.59 shows two solids: yellow inside the large red solid. The yellow is the low NiS/Ni ratio, whereas the red is the orebody wireframe. Transparent wireframes were plotted so that both can be visible.

Subsequently, the drillholes were back tagged (flagged) with the ratio domain code (3 or 4), then the drillhole database was exported including Ni, NiS, domain and ratio codes for the regression analysis. The domain and ratio codes were added together and called DomRatio code (see Table 2.37).

**Figure 2.59 Low Ratio Solid Inside Orebody Wireframe**

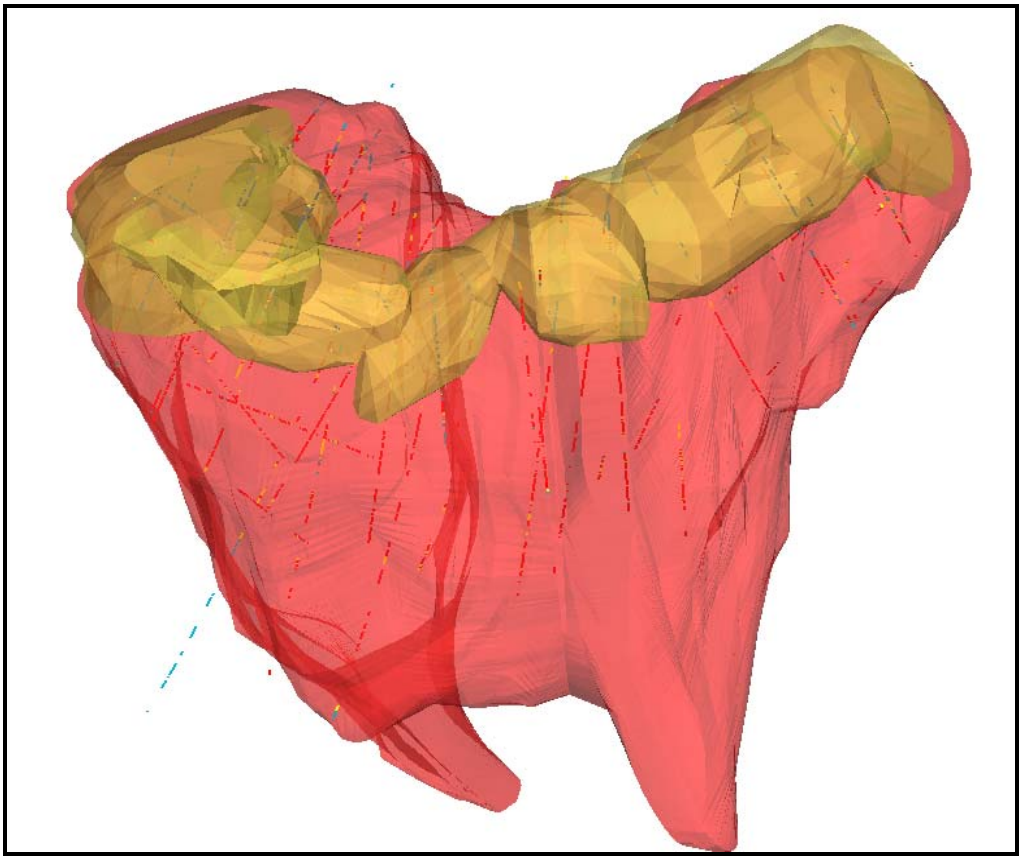


**Table 2.37 Geology Domain and NiS/Ni Ratio Domain Coding**

| Domain Code | + | Ratio Code | = | DomRatio |
|---|---|---|---|---|
| West (100) | | Low (3) | | 103 |
| West (100) | | High (4) | | 104 |
| East (200) | | Low (3) | | 203 |
| East (200) | | High (4) | | 204 |

For the 4,557 NiS/Ni available pairs, a regression was created for each DomRatio code and is summarized in Figure 2.60, Figure 2.61, Figure 2.62, and Figure 2.63 respectively. The R square value was 0.75 or above for all domains except for DomRatio 203, where R square value was 0.62.

A NiS grade was calculated for the Ni assays missing a NiS value using the four regression formulas. The formulas are a simple linear regression expressed by the following formula:

NiS = A + B x Ni(%)

**Figure 2.60 West Domain Low Ratio (DomRatio = 103)**

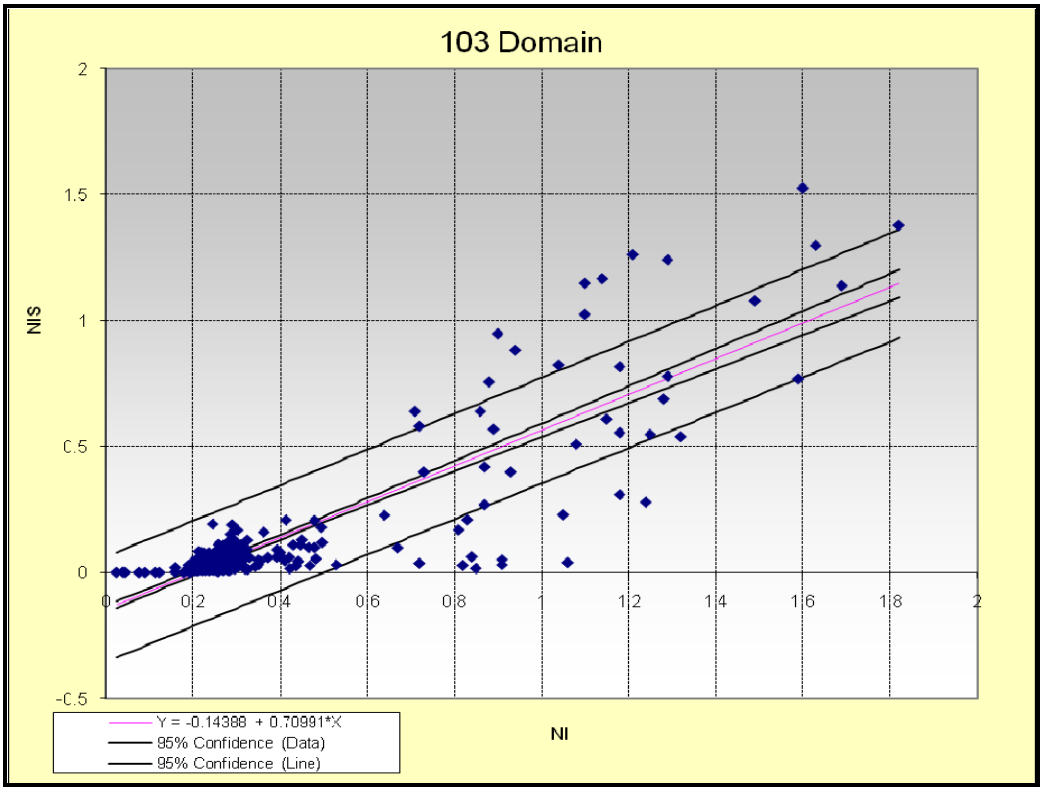



**Figure 2.61 West Domain High Ratio (DomRation = 104)**

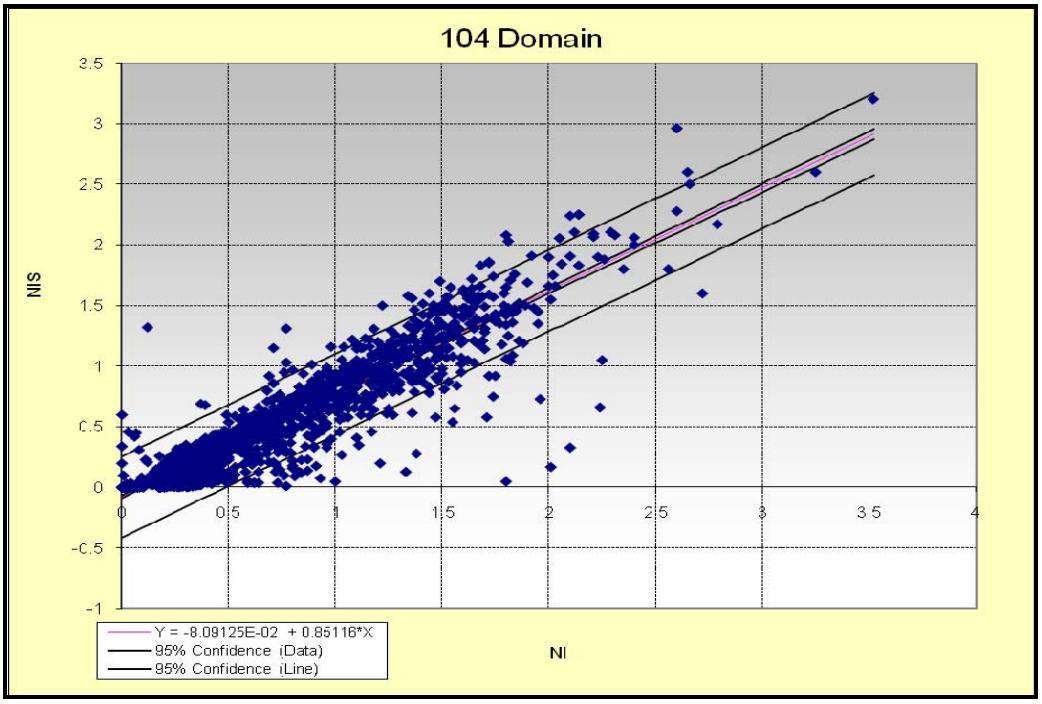


**Figure 2.62 East Domain Low Ratio (DomRatio = 203)**

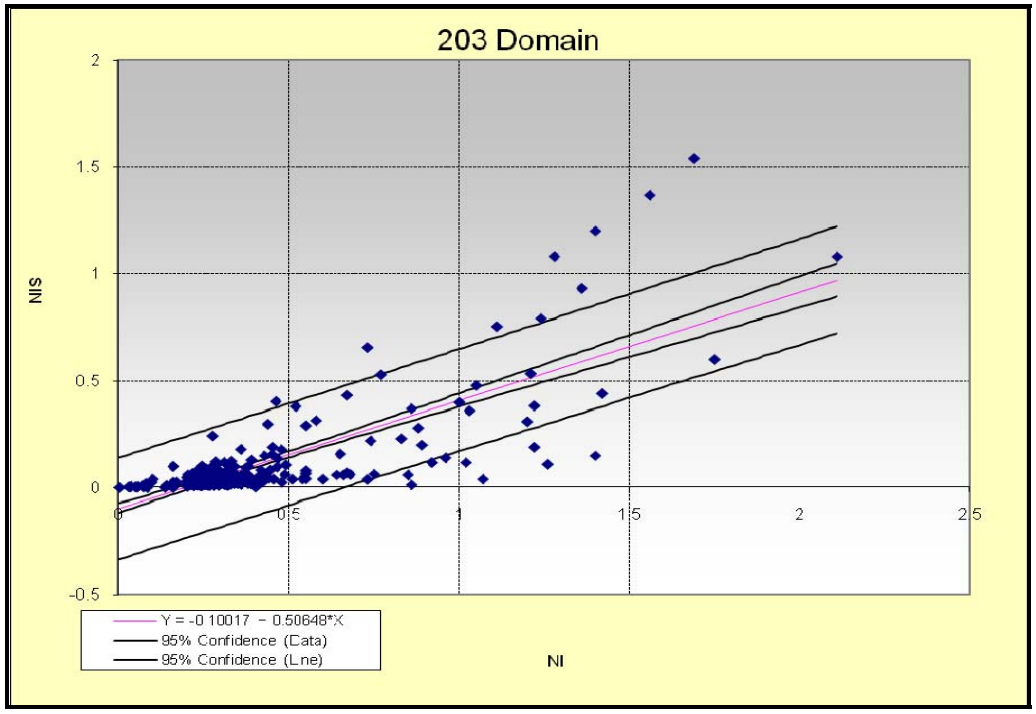
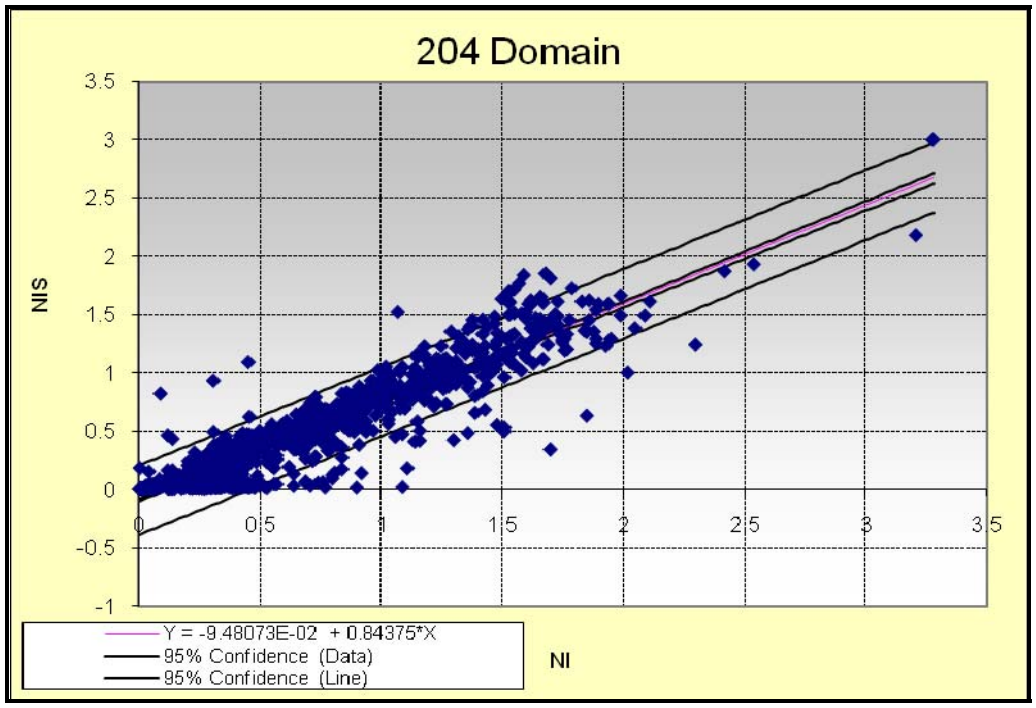



**Figure 2.63 East Domain High Ratio (DomRatio = 204)**



The A and B values for the four DomRatio Domains are summarized in Table 2.38

**Table 2.38 DomRatio Regression Formulas**

| Regression | R Square | A | B |
|---|---|---|---|
| DomRatio 103 | 0.7613 | -0.1439 | 0.7099 |
| DomRatio 104 | 0.8644 | -0.0809 | 0.8512 |
| DomRatio 203 | 0.6217 | -0.1002 | 0.5065 |
| DomRatio 204 | 0.8721 | -0.0948 | 0.8438 |

A complete database of NiS assays was obtained, where approximately 42% of the values were assayed and 58% were calculated using the regression formulas.

The selected NiS assay information was composited into two metre downhole lengths while honouring DomRatio codes. Table 2.39 summarizes the NiS composite data.

**Table 2.39 Summary of NiS Composite Data**

| | NiS% |
|---|---|
| Number | 8,925 |
| Mean | 0.29 |
| Minimum | 0.00 |
| Maximum | 3.79 |

### 2.7.13 NiS Calculated Risk Assessment

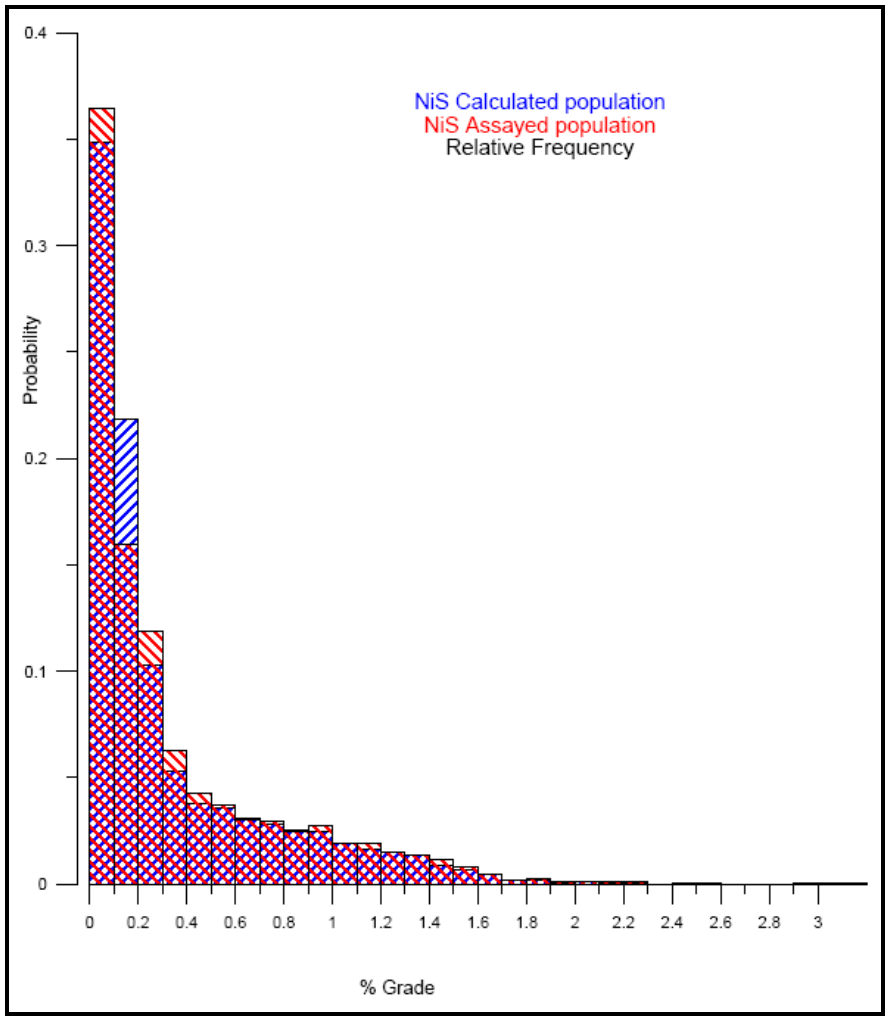
There were a total of 4,557 NiS% assays available out of a total population of 14,829 Ni% assays. The regression formulae used to estimate the missing NiS% assays were spatially adjusted to reflect some of the local variations within the deposit. Comparing the two sample populations shows that the calculated values have a slightly smoother distribution than the assays (Table 2.40).

**Table 2.40 Statistical Comparison of Measured NiS Assays and Calculated NiS Values**

| | NIS | NIS_CALC |
|---|---|---|
| Min | 0.001 | 0.001 |
| Mean | 0.361 | 0.343 |
| Median | 0.190 | 0.168 |
| Max | 4.92 | 4.920 |
| Variance | 0.210 | 0.184 |

Figure 2.64 shows a comparison of the two sample populations using a common probability scale. Again, the populations appear to be similar, with some smoothing of the calculated values. In Wardrop's opinion, the calculated NiS% values fairly represent actual NiS% values on a global basis.

**Figure 2.64 Relative Frequency of NiS Assay Population and NiS Calculated Population**




## 2.7.14 BLOCK MODEL

The NiS block model was interpolated with the same kriging parameters as the Ni block model. The reader can refer to density, variography and interpolation plan sections which were already discussed in the Ni model section.

### 2.7.15 RESOURCE TABULATION

The NiS resource estimation at Minago is tabulated in Table 2.41. Ordinary kriging interpolation is used for the resource tabulation for the Minago deposit.

**Table 2.41 NiS Resource**

| Resource Classification | Cut off grade (NiS%) | Volume ($m^3$x1,000) | Density ($t/m^3$) | Tonnes x1,000 | NiS (%) | Metal (NiS% x tonnes) |
|---|---|---|---|---|---|---|
| Measured | > 1.0 | 113 | 2.61 | 296 | 1.15 | 3,414 |
| | > 0.9 | 208 | 2.61 | 544 | 1.06 | 5,758 |
| | > 0.8 | 352 | 2.62 | 921 | 0.97 | 8,942 |
| | > 0.7 | 568 | 2.62 | 1,489 | 0.89 | 13,193 |
| | > 0.6 | 879 | 2.62 | 2,304 | 0.80 | 18,467 |
| | > 0.5 | 1,282 | 2.62 | 3,361 | 0.72 | 24,244 |
| | > 0.4 | 1,809 | 2.62 | 4,741 | 0.64 | 30,420 |
| | > 0.3 | 2,508 | 2.62 | 6,576 | 0.56 | 36,790 |
| | > 0.25 | 2,944 | 2.62 | 7,719 | 0.52 | 39,928 |
| | > 0.2 | 3,452 | 2.62 | 9,053 | 0.47 | 42,918 |
| Indicated | > 1.0 | 191 | 2.67 | 511 | 1.12 | 5,732 |
| | > 0.9 | 388 | 2.66 | 1,031 | 1.03 | 10,661 |
| | > 0.8 | 692 | 2.65 | 1,833 | 0.95 | 17,434 |
| | > 0.7 | 1,195 | 2.65 | 3,163 | 0.86 | 27,344 |
| | > 0.6 | 2,054 | 2.64 | 5,426 | 0.77 | 41,978 |
| | > 0.5 | 3,417 | 2.64 | 9,016 | 0.68 | 61,569 |
| | > 0.4 | 5,604 | 2.64 | 14,772 | 0.59 | 87,280 |
| | > 0.3 | 8,837 | 2.64 | 23,290 | 0.50 | 116,887 |
| | > 0.25 | 10,932 | 2.64 | 28,814 | 0.46 | 132,041 |
| | > 0.2 | 13,406 | 2.64 | 35,333 | 0.42 | 146,654 |
| Inferred | > 1.0 | 123 | 2.70 | 332 | 1.18 | 3,912 |
| | > 0.9 | 216 | 2.68 | 579 | 1.08 | 6,246 |
| | > 0.8 | 370 | 2.68 | 991 | 0.98 | 9,739 |
| | > 0.7 | 573 | 2.68 | 1,533 | 0.90 | 13,785 |
| | > 0.6 | 880 | 2.67 | 2,350 | 0.81 | 19,072 |
| | > 0.5 | 1,436 | 2.66 | 3,825 | 0.71 | 27,170 |
| | > 0.4 | 2,048 | 2.66 | 5,453 | 0.63 | 34,480 |
| | > 0.3 | 2,959 | 2.66 | 7,876 | 0.54 | 42,853 |
| | > 0.25 | 3,571 | 2.66 | 9,506 | 0.50 | 47,301 |
| | > 0.2 | 4,435 | 2.66 | 11,812 | 0.44 | 52,444 |

### 2.7.16 BLOCK MODEL COMPARISON

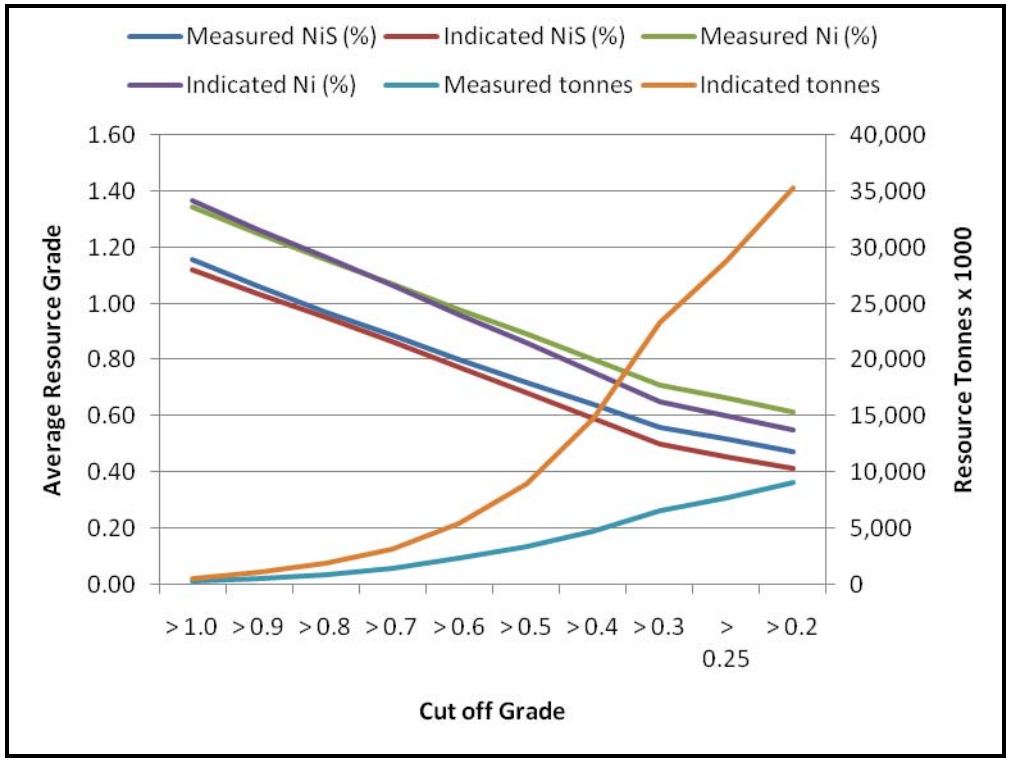
Table 2.42 illustrates the Ni resource grades and the NiS grades for the same cut-off. The NiS values estimated in the model are about 0.14% below the Ni estimate in the lower grade ranges, climbing to 0.22% in the upper grade ranges.

**Table 2.42 Ni vs. NiS Block Model Comparison Above -120 m Elevation**

| Resource Classification | Cut off Grade (NiS%) | Tonnes (x1,000) | Ni (%) | NiS (%) | Ratio (NiS/Ni) |
|---|---|---|---|---|---|
| Measured | > 1.0 | 296 | 1.34 | 1.15 | 0.86 |
| | > 0.9 | 544 | 1.25 | 1.06 | 0.85 |
| | > 0.8 | 921 | 1.16 | 0.97 | 0.84 |
| | > 0.7 | 1,489 | 1.07 | 0.89 | 0.83 |
| | > 0.6 | 2,304 | 0.98 | 0.80 | 0.82 |
| | > 0.5 | 3,361 | 0.89 | 0.72 | 0.81 |
| | > 0.4 | 4,741 | 0.80 | 0.64 | 0.80 |
| | > 0.3 | 6,576 | 0.71 | 0.56 | 0.79 |
| | > 0.25 | 7,719 | 0.67 | 0.52 | 0.78 |
| | > 0.2 | 9,053 | 0.62 | 0.47 | 0.77 |
| Indicated | > 1.0 | 511 | 1.37 | 1.12 | 0.82 |
| | > 0.9 | 1,031 | 1.26 | 1.03 | 0.82 |
| | > 0.8 | 1,833 | 1.17 | 0.95 | 0.82 |
| | > 0.7 | 3,163 | 1.07 | 0.86 | 0.81 |
| | > 0.6 | 5,426 | 0.96 | 0.77 | 0.80 |
| | > 0.5 | 9,016 | 0.86 | 0.68 | 0.80 |
| | > 0.4 | 14,772 | 0.75 | 0.59 | 0.78 |
| | > 0.3 | 23,290 | 0.65 | 0.50 | 0.77 |
| | > 0.25 | 28,814 | 0.60 | 0.46 | 0.76 |
| | > 0.2 | 35,333 | 0.55 | 0.42 | 0.75 |
| Inferred | > 1.0 | 332 | 1.19 | 1.18 | 0.99 |
| | > 0.9 | 579 | 1.13 | 1.08 | 0.95 |
| | > 0.8 | 991 | 1.06 | 0.98 | 0.93 |
| | > 0.7 | 1,533 | 1.00 | 0.90 | 0.90 |
| | > 0.6 | 2,350 | 0.94 | 0.81 | 0.86 |
| | > 0.5 | 3,825 | 0.86 | 0.71 | 0.83 |
| | > 0.4 | 5,453 | 0.78 | 0.63 | 0.81 |
| | > 0.3 | 7,876 | 0.69 | 0.54 | 0.79 |
| | > 0.25 | 9,506 | 0.64 | 0.50 | 0.78 |
| | > 0.2 | 11,812 | 0.58 | 0.44 | 0.77 |

Figure 2.65 show a graphical comparison of the Ni and NiS resource estimates.

**Figure 2.65 Visual Comparison of Resource Estimates**




## 2.8 INTERPRETATION AND CONCLUSIONS

The resource estimate and geological interpretations indicate that the upper portion of the Minago deposit (down to 400 m below surface) may be reasonably perceived as a large tonnage low grade nickel deposit. A significant part of the lower portion of the deposit remains incompletely delineated as evidenced by the considerable tonnage of resource estimates in the Inferred category. Wardrop estimates that the Minago deposit contains a Measured resource of 9.1 Mt, grading 0.47% NiS, above a cutoff grade of 0.2% NiS. In addition, the deposit contains 35 Mt of Indicated resource at 0.42% NiS above a 0.2% NiS cutoff grade. An Inferred resource of 12 Mt at 0.44% NiS above a 0.2% NiS cutoff has also been estimated.

Nickel Sulphide (NiS%) represents the recoverable part of the nickel. Unfortunately, all the samples were not analyzed for NiS, and grades for the missing assay values had to be interpolated using regression analysis from total nickel assays. For a significant part of the database, Wardrop's estimate of the missing NiS% assays is based on the relationship of NiS to Ni. The population distribution of the calculated NiS values is similar to that of the assayed NiS values.

Rock density values appear to be more dependent on rock type than on grade. The change in detailed lithology records between drill holes precludes the creation of an

accurate detailed lithology model at this time. Rock density was assigned according to rock type, but the rock type model was populated using kriging. Globally, this will provide a fair representation of the rock density, but locally there will be some variance.

Widely spaced single tier diamond drilling north of the Minago deposit and in the south block has intersected nickel mineralization similar to that found in the Minago deposit indicating exploration potential. This additional resource is not included in this study.

A pit shell proposed to recover the nickel at Minago has been used to laterally constrain the frac sand resource. Wardrop estimates that the proposed pit shell contains 15 Mt of sand. Of this, approximately 10% to 20% will report to the 20/40 size fraction and approximately 68% to 83% will report to the 40/140 size fraction.

Based on the depositional model of the Winnipeg Formation sandstone, Wardrop expects the frac sand quality of the sandstone within the confines of the proposed pit shell to be fairly uniform. The size distribution of the sand particles that have been sampled is consistent across the area of the proposed pit shell. Initial testing of a sample composite indicates that a viable frac sand product can be produced from the resource. Drill hole intersections and density measurements have been sufficient to establish the tonnage of the deposit with a reasonable degree of accuracy.

# 3.0 OPEN PIT MINING

## 3.1 OVERVIEW

The open pit was designed using a two-stage approach. The first stage identified an optimum pit shell using the Lerchs-Grossman pit optimization method. In the second stage, the selected pit shell was refined to a more detailed pit design that included catch berms and haulroads. Subsequently, mine development and production schedules were developed, equipment selections were performed and the capital and operating costs estimated.

For this Study, Wardrop determined that the mining operation was amenable to a conventional open pit mining method. The mine will provide mill feed of sulphide ore at a rate of 10,000 tonnes/day (t/d) for a total of 25.2 Mt of ore grading at 0.43%, over a period of approximately 8 years.

In addition, the open pit will provide sand feed to a frac sand processing facility at a rate of about 4,100 t/d of sand, for a total of 14.9 Mt of frac sand over a period of about 10 years. Although the sand will be mined over a period of 3 years at the start of the mining operations, and then stockpiled, the throughput of the sand plant will be maximized to match the ore processing schedule.

Previous work completed in December 2008 by Wardrop indicated that, at that time, the economic recovery of underground resource was not feasible due to insufficient diamond drilling density at depth. For this reason, the mine optimisation was based on an “open pit only” option and did not take into account the effect of breakeven open pit and underground costs. Wardrop recommends an additional drilling program in order to reclassify some of the resources from the inferred category to measured and indicated categories.

The overall stripping ratios (waste-to-ore ratio tonne/tonne, t/t) to mine both the nickel sulphide ore and frac sand is outlined in Table 3.1 below.

**Table 3.1 Open Pit Design 14 Stripping Ratios**

| Case | SR (t/t) (No Overburden) | SR (t/t) (With Overburden) |
|---|---|---|
| Frac Sand Only | 7.48 | 8.23 |
| Nickel Ore Only | 11.27 | 11.71 |
| Nickel Ore and Frac Sand | 6.72 | 7.00 |

The overall mining sequence was developed in three phases: one initial pit phase and two pushback phases. Each phase corresponds to a designed open pit that is mined in sequence. The mine development for the ore and the waste will progress using 12 m high benches.

Mine development will commence with the removal of trees and roots, and then the dredging removal of the muskeg and clay overlying the dolomitic limestone. For this initial stage of the mining operation, the work will be performed using contractors as part of capital expenditures. Mechanical removal using excavators for removal, trucks for transportation and dumping is difficult because of the soft clays. Given the challenges and costs associated with the mechanical removal of the overburden, a dredging method has been selected to remove the muskeg and clay.

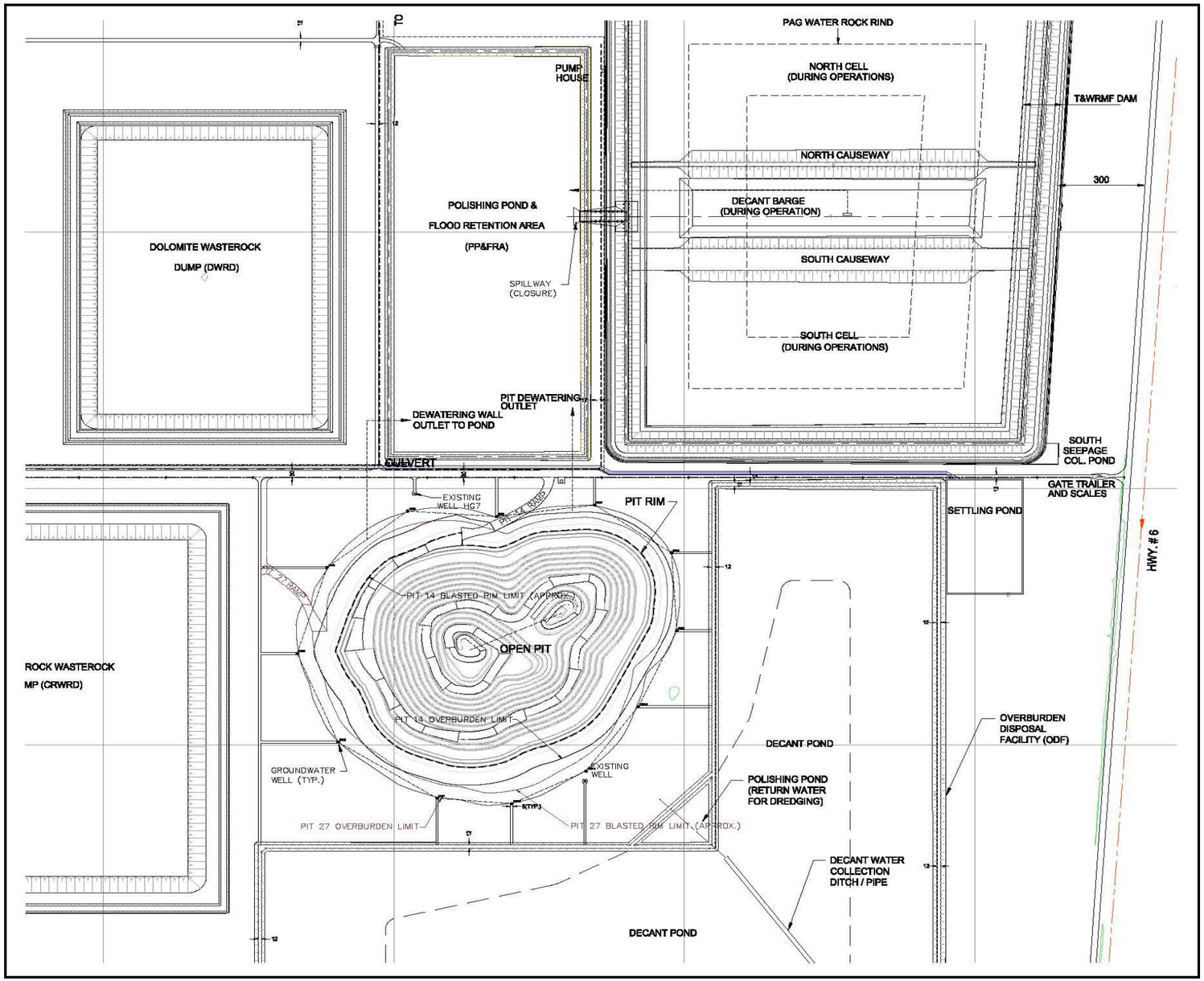
This operation is scheduled to commence in the spring of “Year -3” (2011) to prepare for dolomite removal starting at the beginning of “Year -2” (2012) The removal of the dolomite will take approximately 2 years with frac sand being available at the beginning of “Year -1” (2013). A further year later at the start of “Year 1” (2014), the nickel ore will be available for processing.

The general arrangement drawing for the Mine Complex which is shown in Figure 1.1 as part of Section 1.0, Project Overview is shown below as Figure 3.1 in slightly more detail. The particular features of the layout which are pertinent to the operation of the open pit mine are summarised as:

- Proximity of the Containment Cells to the open pit to minimise the pumping distances for dredging.
- Proximity of the Dolomite and Country Rock Dumps to the open pit to minimise the haul distances for waste.
- Proximity of the TMF to the open pit to minimise the haul distances involved in moving and placing the dolomite for the dam construction.
- The relationship between the facilities that service the mining fleet, the mill and the camp that services staff to the haul road.

Wardrop completed a 3D geological block model named “LG Final Model 07 Oct 08” which incorporated the available information from the diamond drill holes on the Minago Property. This geologic model for which more information is given in Section 2.0 - Geology and Mineral Resources was the basis for the pit design.

**Figure 3.1 Sketch of General Arrangement of Mine Layout**



## 3.2 GEOTECHNICAL DATA

A full discussion of the Geotechnical Data for the Open Pit design is given in Appendix C-1 “Minago Open Pit Geotechnical Design” (Doc No. 0751330601-REP-R0001-03) where a more comprehensive appraisal is given.

Within the Geotechnical Report the following Domains have been identified:

From rock mass and overburden properties and from pit geometry, the Minago pit was divided into seven geotechnical domains as shown below in Table 3.2:

**Table 3.2 Geotechnical Rock Domain Types**

| Domain | Type | Lithology | Thickness (m) | Intersects Pit Wall |
|---|---|---|---|---|
| I | Overburden | Peat | 2 | Yes |
| II | Overburden | Clay | 13-15 | Yes |
| III | Sedimentary Rock | Dolomite | 51-56 | Yes |
| IV | Sedimentary Rock | Sandstone | 6-10 | Yes |
| V | Unconformity | Regolith | 0-6 | Yes |
| VI | Igneous Rock | Host1 | Varies3 | Yes4 |
| VII | Igneous Rock | Country2 | Varies3 | Yes |
| 1 Host rock – is primarily composed of ultramafic rock | | | | |
| 2 Country rock – primarily composed of granite, but also contains amphibolite, and ultramafic rock. Due to the heterogeneous nature of country rock these sub-units were all grouped together until further data collection becomes available during construction. | | | | |
| 3 The host intrusive body has a near vertical contact with the country rock. The thickness varies with the intersection of the pit wall with the body. | | | | |
| 4 Intersects pit wall at the toe of the slope. | | | | |

The clay lithology, domain II is further brocken down into domains IIa and IIb to represent the hard and the soft clays respectively.

### *3.2.1 DATA COLLECTION*

The geotechnical data required for the stability assessment of the Minago open pit includes:

- Strength parameters.
- Influence of groundwater.
- Earthquake potential.

For the overburden domains, the above properties were estimated from the following:

- Unconsolidated unconfined compressive strength tests.
- Plasticity indices.
- Standard penetration tests (SPT).

For the rock domains, these properties were obtained from analysis of drill core during a field investigation in the winter of 2007 using the following procedures:

- Rock mass classification procedures by Bieniawski (Bieniawski, 1989).
- Point load index testing.
- Laboratory tests for uniaxial compressive strength.

Additional properties for earthquake potential were estimated using Natural Resources Canada, 2006.

### 3.2.2 FIELD INVESTIGATION

A field investigation including a bore hole drilling program to investigate the soil conditions was performed in February, 2007.

A total of four holes were drilled in the area of the Minago pit. These holes were used to derive the strength parameters of the peat and clay domains. Table 3.3 and Table 3.6 give descriptions of overburden and rock properties by lithology, respectively.

**Table 3.3 Overburden Lithology**

| Domain | I | IIa | IIb |
|---|---|---|---|
| Lithology | Peat | Upper Clay | Lower Clay |
| Thickness Range (m) | 1.5 – 2.5 (2) | 1.5 – 2.5 (2.5) | 7 – 10 (8) |
| Moisture Content (%) | 400 – 600 (510) | 17.3 – 38.3 (24.0) | 22.0 – 59.4 (35.5) |
| Composition | Tree roots, fibrous material | 42% clay, 7% silt, trace sand | 50% clay, 5% silt, trace sand |
| Liquid Limit (%) | n/a | 33.7 – 62.5 (43.3) | 45.7 – 56.5 (49.5) |
| Plasticity Index (%) | n/a | 18.7 – 39.3 (25.3) | 27.6 – 33.0 (30.7) |

Note: The ranges shown above are typical values which have been averages in the “brackets”.

### 3.2.3 LABORATORY TESTING

Select soil samples were collected and assessed for density, unconsolidated unconfined compressive tests (U-U), and plasticity indices.

### 3.2.4 STRENGTH PROPERTIES

For the purpose of the numerical modeling stability analysis, properties of the cohesive clay soil above the dolomite were designated as domains IIa and IIb. The

strength properties used for the overburden domains for numerical modeling is given below in Table 3.4.

**Table 3.4 Strength Properties Used for Numerical Modeling**

| Domain | Lithology | Unit Wt. (kN/m$^3$) | C (kM/m$^2$) | Φ (°) |
|---|---|---|---|---|
| I | Peat | 12 | 12 | 0 |
| IIa | Upper Clay | 18 | 70 | 0 |
| IIb | Lower Clay | 17 | 25 | 0 |

### *3.2.5 ROCK DOMAINS*

#### DEFORMATION AND STRENGTH PROPERTIES

A total of 2,234 point load index tests were performed in the field on drill core samples. Additionally, nine samples were selected for uniaxial compressive strength (UCS) tests in a laboratory setting. A correlation factor was established between the uniaxial compressive strength tests and the point load index tests. This factor was applied to the point load index tests to correlate these to the lab testing results.

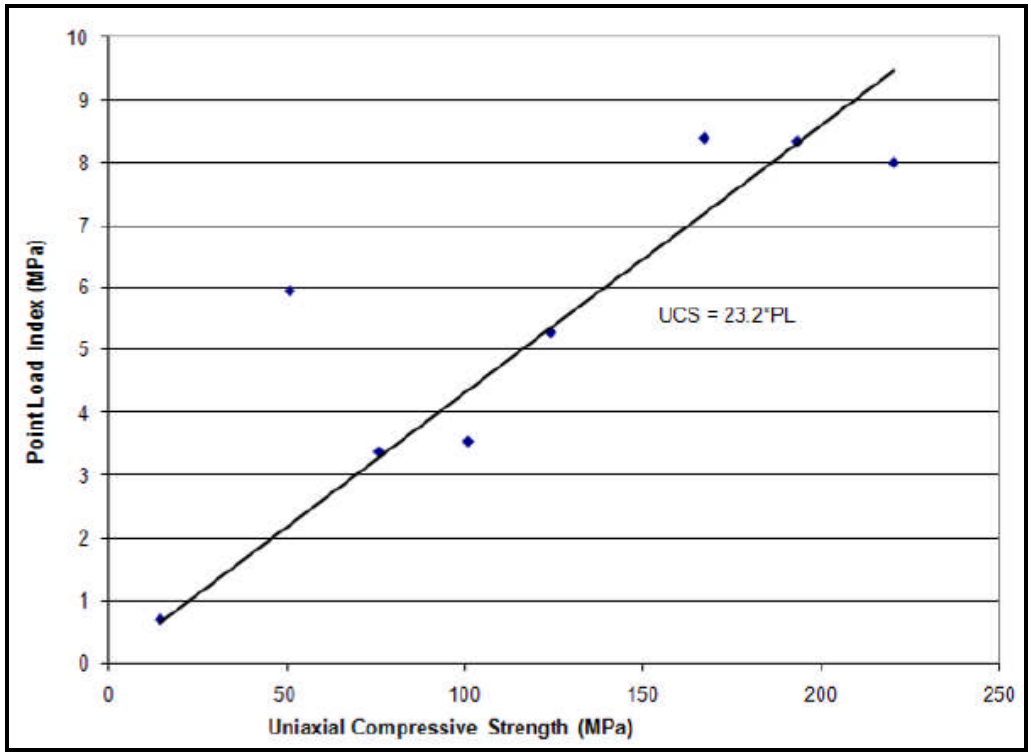
A plot of the point load index versus uniaxial compressive strength from lab testing can be seen in Figure 3.2. The correlation factor between the point load test results and the laboratory testing was found to be 23.2. These load index results are further broken out to give compressive strengths by domain type in Table 3.5 below.

**Table 3.5 Equivalent Compressive Strengths from Point Load Tests**

| UCS (MPa) | Domain III | Domain IV | Domain V | Domain VI | Domain VII |
|---|---|---|---|---|---|
| Average | 102.1 | <5 | 16.9 | 68.7 | 129.6 |
| Stdev | 32.4 | 4.1 | 15.3 | 66.3 | 58.2 |
| Max | 195.2 | 59.9 | 62.5 | 271.7 | 239.5 |
| Min | 5.0 | <5* | <5* | <5* | <5* |
| Relative Min | 69.7 | <5* | <5* | <5* | 71.4 |
| Count | 767 | 89 | 44 | 1,131 | 579 |

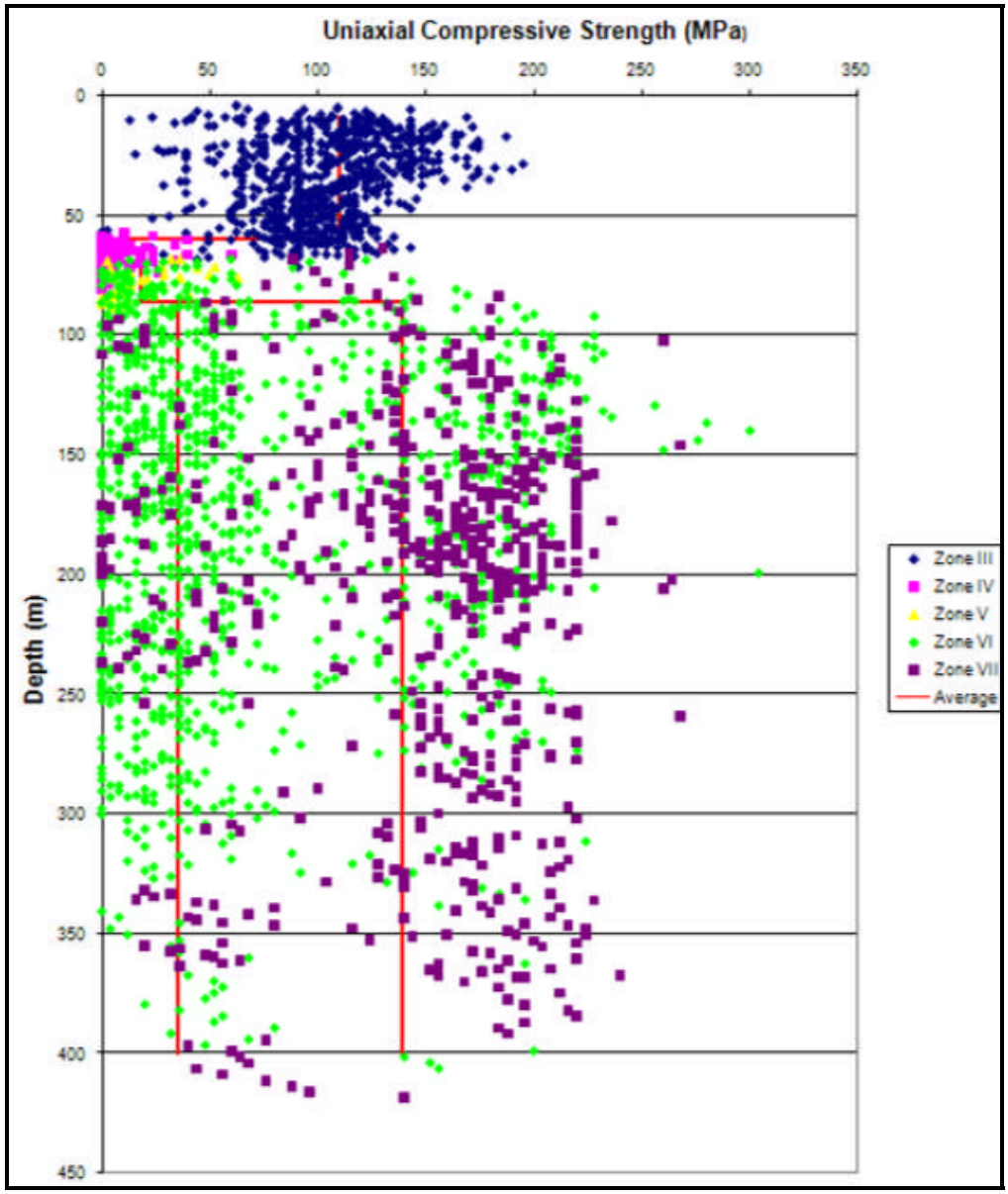
*Point load tests considered inaccurate for strength below 5 MPa (after Bieniawski, 1989)

**Figure 3.2 Load Index vs. Uniaxial Compressive Strength**




The point load data includes over 2,234 readings which vary from geotechnical domain to domain. Using this data, a plot of equivalent UCS versus depth shows the presence of two distinct weak zones is shown in Figure 3.3. One weak zone is within the regolith and sandstone units in the unconformity, and the other is below the unconformity where there are two distinct trends within the conpresive strengths (UCS). The first is the second weak zone which appears to be primarily composed of the ultramafic body. The second trend is within the granite and amphibolites bodies. Sections through the pit give a more accurate depiction of where the pit walls intersect the lower strength ultramafic bodies (domain VI), and where they remain in the higher strength granite bodies (domain VII).

**Figure 3.3 UCS vs. Depth for all Point Load Index Tests**




### 3.2.6 *ROCK MASS CLASSIFICATION (RMR)*

On site rock mass classification was conducted on available drill core by Wardrop using Rock Mass Rating, $RMR_{89}$ (Bieniawski, 1989). Based on the properties assessed, Rock Mass Rating, $RMR_{76}$ (Bieniawski, 1976) could be established. The rock mass classification included physical assessments of the following:

- Rock Mass Strength (RMS).
- Rock Quality Designation (RQD).

- Joint spacing.
- Joint conditions.
- Influence of groundwater.

The assesmnet of accuracy of each input into the rock mass classification will depend upon the configuration of the test with regard to the diamond drill core. For physical assessments that may be reliably estimated from drill core, a less conservative approach was applied for input into the RMR. For assessments that may become potentially inaccurate due to the one dimensional nature of the drill core, a more conservative approach was applied for input into the RMR.

The less conservative approach to assess RMR used a weighted average value established by weighting each value according to its length in the drill core. For assessments where a more conservative value was needed, the relative minimum was established as the average less one standard deviation.

### ROCK MASS RATING (1989)

Rock mass strength was estimated using the point load index testing, and laboratory testing values accompanying the investigations. On the other hand, the RQD is an assessment of how broken up the rock mass when assessed from two equations.

**Equation 1: (Deere, 1989)**

$$RQD = \frac{length > 10cm}{Total}$$

Where:

| | |
|---|---|
| Length >10 centimetres (cm): | The summed length of all core pieces greater than 10 cm long. |
| Total: | The total length of core that was used for the assessment. |

**Equation 2: (Priest and Hudson, 1981)**

$$RQD = 100(1 + 0.1\lambda)e^{-0.1\lambda}$$

Where: λ : Fracture frequency.

The RQD has a tendency to be under-estimated in drill core as opposed to the actual rock mass due to drilling induced fracturing and the inability to discern discontinuous structure from continuous structure. Thus, a less conservative approach was taken for inputting RQD values into rock mass classification.

The joint spacing is often difficult to estimate in drill core since the drill hole could potentially miss the pattern of jointing. Recognising this principal a more conservative approach was used when inputting joint spacing values into rock mass classification.

The joint condition was estimated using Bieniawski's 1989 procedure and was further broken down into the physical assessment:

- Joint Persistence – representing discontinuity length.

  As this assessment may be over estimated or under estimated, the average value of the classification system was used for input into rock mass classification and the property was not assessed in drill core.

- Joint Opening – representing joint opening thickness

  As this property should be representative in drill core provided the discontinuities are intersected by the drill core, the average value was used for input into the rock mass classification.

- Joint Roughness – representing joint opening roughness.

  As small scale joint roughness assessments were made on the drill core., the classification of joint roughness was not measured. Since the drill core is small measurement with a profile cone or equivalent measuring tools is not practical. Assessments of joint roughness is disfferentiated between domains where surfaces appeared slicken sided or had soft gouge and surfaces that did not. As these properties were estimated from drill core, a less conservative approach was used for input into rock mass classification.

- Joint Infilling – represents the material present in the joint openings.

  This property should be representative in drill core provided the discontinuities are intersected by the drill core and the drilling fluid didn't wash material away. The average value was used for input into the rock mass classification.

- Joint Alteration – represents degree of mineral alteration within discontinuity.

As this assessment is easily attainable on drill core, the average valuea were input into the rock mass classification.

The influence of groundwater was not assessed during core logging as core was not logged directly from the drill and dry conditions were assumed for rock mass classification. A summary of the physical properties used in the $RMR_{89}$ rock mass classification is shown in Table 3.6.

**Table 3.6 Summary of Rock Mass Rating (1989)**

| Ratings | Domain III | Domain IV | Domain V | Domain VI | Domain VII |
|---|---|---|---|---|---|
| | Dolomite | Sandstone | Regolith | Host Rock | Country Rock |
| Strength | 12 | 1 | 2 | 7 | 12 |
| RQD | 17 | 9 | 13 | 7 | 8 |
| Spacing | 8 | 5 | 6 | 8 | 9 |
| Joint Condition | 19 | 11 | 8 | 9 | 15 |
| Groundwater | 15 | 15 | 15 | 15 | 15 |
| $RMR_{89}$ | 71 | 41 | 44 | 46 | 59 |
| Strength (MPa) | 100-250 | <5 | 5-25 | 25-50 | 100-250 |
| RQD (%) | 75-90 | 25-50 | 50-75 | 50-75 | 50-75 |
| Spacing (mm) | 60-200 | <60 | <60 | 60-200 | 60-200 |
| Joint Condition | III | IV | V | VI | VII |
| Groundwater | Dry | Dry | Dry | Dry | Dry |

III Unaltered, Slightly rough opening 0.1 to 1 mm, hard infilling <5 mm infilling, 1 to 3 m long
IV Unaltered, Soft gouge >5 mm, 1 to 3 m long
V Strong alteration, slickenside, opening 105 mm, soft infilling <5 mm, 3 to 10 m long
VI Strong alteration, slickenside, opening 1 to 5 mm, soft infilling <5 mm, 1 to 3 m long
VII Slight to moderate alteration, slightly rough, opening 1 to 5 mm, soft infilling <5 mm, 1 to 3 m long

### ROCK MASS RATING (1976)

$RMR_{76}$ has similar input parameters as $RMR_{89}$ with some minor differences. Specifically, the assessment for rock mass strength, rock mass quality, joint spacing, and groundwater influence have different weighting levels, but will be treated with the same conservative or non-conservative approach in Rock Mass Rating (1989).

A summary of the physical properties used in the $RMR_{76}$ rock mass classification is shown in Table 3.7.

**Table 3.7 Summary of Rock Mass Rating (1976)**

| Ratings | Domain III | Domain IV | Domain V | Domain VI | Domain VII |
|---|---|---|---|---|---|
| Strength | 12 | 1 | 2 | 4 | 12 |
| RQD | 17 | 8 | 13 | 13 | 13 |
| Spacing | 10 | 5 | 5 | 10 | 10 |
| Joint Condition | 20 | 10 | 6 | 6 | 12 |
| Groundwater | 10 | 10 | 10 | 10 | 10 |
| $RMR_{76}$ | 69 | 34 | 36 | 43 | 57 |
| Strength (MPa) | 100-200 | <5 | 5-25 | 25-50 | 100-200 |
| RQD (%) | 75-90 | 25-50 | 50-75 | 50-75 | 50-75 |
| Spacing (mm) | 50-300 | <50 | <50 | 50-300 | 50-300 |
| Joint Condition | III | IV/V | V | VI | VII |
| Groundwater | Dry | Dry | Dry | Dry | Dry |

III Slightly rough surface, continuous, <1 mm separation, hard joint wall rock
IV Soft gouge .5 mm thick or open >5 mm
V Slickensided or gouge, continuous <5 mm wide
VI Slickensided or gouge, continuous <5 mm wide
VII Slickensided or gouge, continuous <5 mm wide

### 3.2.7 *EMPIRICAL ROCK MASS STRENGTH*

Two major strength criterions were used for establishing rock mass strength:

- Mohr-Coulomb criterion (After Wyllie et al, 2003).
- Generalized Hoek-Brown strength criterion (After Wyllie et al, 2003).

#### MOHR-COULOMB CRITERION

Mohr-Coulomb Criterion establishes a rock mass strength in terms of its major principal stresses using the following equation:

$$\sigma_1 = \frac{2c\cos\phi}{1-\sin\phi} + \frac{1+\sin\phi}{1-\sin\phi}\sigma_3$$

Where:

$\sigma_1$ is: the major principal stress for a given confining stress.
$\sigma_3$ is: the minor principal stress or confining stress.
$\Phi$ is: is the rock mass friction.
$c$ is: is the rock mass cohesion.

Rock mass friction ($\Phi$), cohesion ($c$) can be empirically derived using a linear approximation of established rock mass classification procedures outlined by Bieniawski (Bieniawksi, 1989).

Rock mass cohesion can be estimated using the following equation:

$$c = 5 * RMR_{89} \text{ (kPa)}$$

### GENERALIZED HOEK-BROWN STRENGTH CRITERION

Generalized Hoek-Brown Strength Criterion establishes a rock mass strength in terms of its major principal stresses using the following equation:

$$\sigma_1 = \sigma_3 + \sqrt{m\sigma_c\sigma_3 + s\sigma_c^2}$$

Where:

$\sigma_1$ is: the major principal stress for a given confining stress.
$\sigma_3$ is: the minor principal stress or confining stress.
$\sigma_c$ is: the compressive strength of the material.
*m* is: a material constant of the rock mass.
*s* is: a material constant for the rock mass.

The material constants (*m, s*) can be estimated using the following:

$$m / mi = \exp\left(\frac{RMR_{76} - 100}{28}\right)$$

$$s = \exp\left(\frac{RMR_{76} - 100}{9}\right)$$

The established material properties for both Mohr-Coulomb and Hoek-Brown are summarised below in Table 3.8.

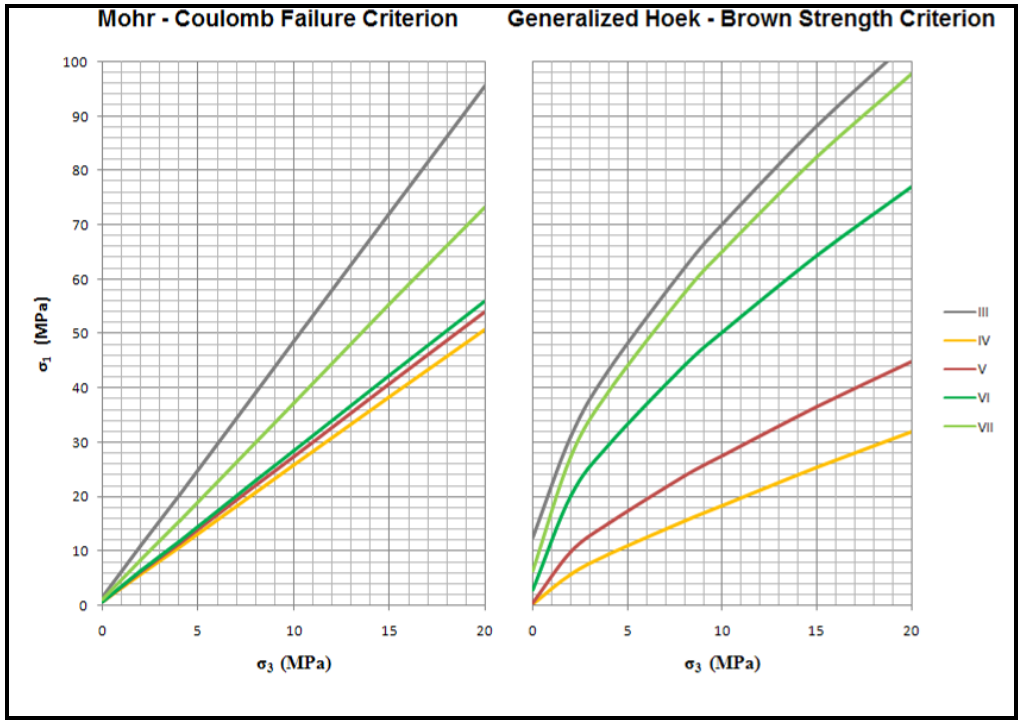
**Table 3.8 Empirically Derived Rock Mass Properties**

| | Domain III | Domain IV | Domain V | Domain VI | Domain VII |
|---|---|---|---|---|---|
| **Mohr Coulomb** | | | | | |
| Φ (°) | 41 | 26 | 27 | 28 | 35 |
| Crm (kPa) | 355 | 205 | 220 | 230 | 295 |
| **Hoek Brown** | | | | | |
| Mi | 15 | 15 | 18 | 18 | 20 |
| m/mi | 0.33 | 0.09 | 1.10 | 0.13 | 0.22 |
| m | 5.0 | 1.4 | 1.8 | 2.4 | 4.3 |
| s | 0.0319 | 0.0007 | 0.0008 | 0.0018 | 0.0084 |

Using the strength criterion of each system the major principal stress was calculated for different confining stresses. The major principal stress for each system was then plotted in Figure 3.4. The plot shows that both the Hoek-Brown and Mohr-Coulomb vary from each other slightly at lower confining stresses and appear to be closer to equal at higher confining stresses. In domains IV and V the Hoek-Brown values tend to be lower than expected under higher confining stresses when compared to the Mohr-Coulomb. This discrepancy is likely due to the low strength UCS values not taken into account as much in the Mohr-Coulomb system.

The correlation between these two systems shows the rock mass classification between Rock Mass Rating (1976) and Rock Mass Rating (1989) showed no inherent bias.

**Figure 3.4 Comparison of Hoek-Brown and Mohr-Coulomb Strength Criterion**




## 3.3 INFLUENCE OF GROUNDWATER

The influence of groundwater is a necessary aspect of any geotechnical stability assessment. A hydro-geological study was conducted to decide whether dewatering would be necessary at the Minago pit The conclusions of this study as they relate to the geotechnical study are as follows:

- Standing water levels at the Minago pit are one meter below ground level.
- The sandstone layer is highly conductive of groundwater.

- Water inflows in the layers below the unconformity were not attained.

Two major groundwater situations could exist at the Minago pit. The first situation would represent a perched water table above the Precambrian basement rocks. The second situation is the groundwater being present through the basement rocks. Additionally with dewatering, the groundwater could be depleted from the site, although probably the sandstone layer will remain saturated even with dewatering.

Hoek and Bray originally suggested that there are five different water table profiles when dealing with slopes (After Hoek and Bray, 1977). Figure 3.5 shows typical groundwater flow conditions for most slopes. With much of the groundwater flow being along fractures and geological structure the third water profile was assumed to represent the Minago pit. This situation indicates that water table will resume its original conditions at a distance of four times the height of the slope. Additionally, water pressure build-up within the geological structure could also be present in the low permeability country rocks which have a hydraulic conductivity of 9.0 E-8 m/day (Wardrop, 2007). Draining of this unit would be quite difficult if it was saturated, and water pressure could build up behind the pit wall. This situation has not been addressed for this report.

To summarize, the influence of groundwater was implemented in the stability model in the following four differing groundwater conditions:

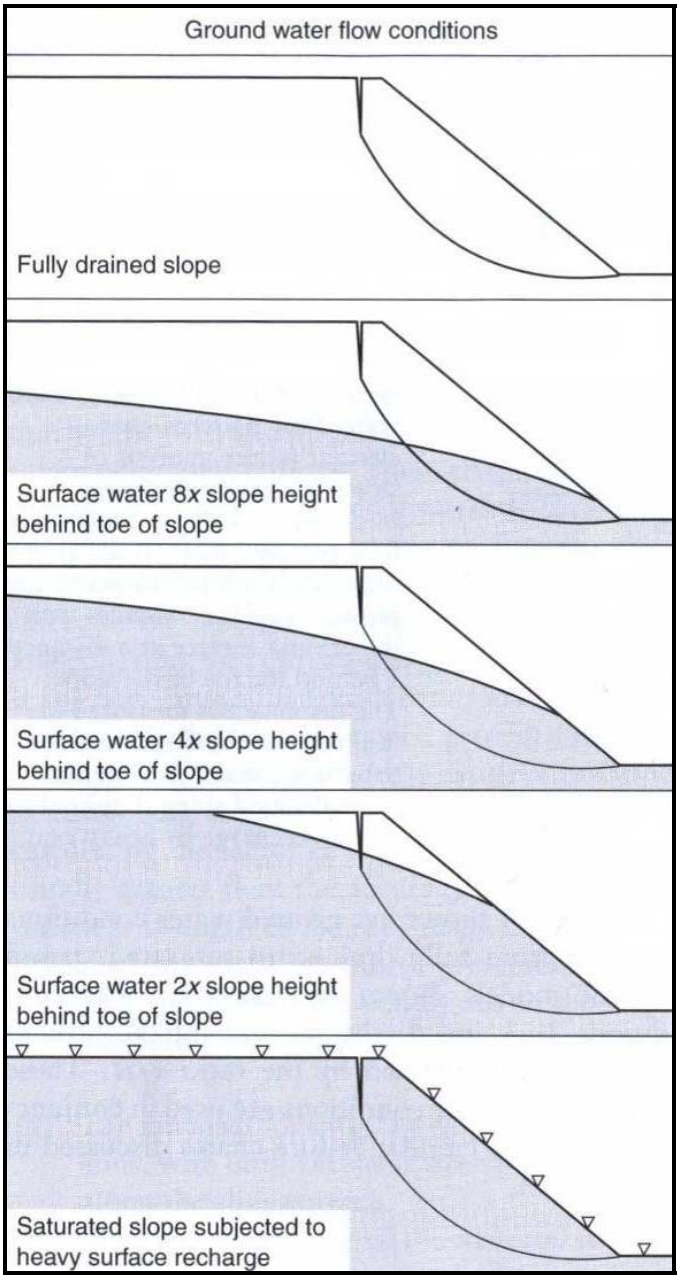
1. The Minago pit was successfully dewatered and dry.

2. The Minago pit is dewatered with sandstone saturated.

3. The Minago pit has a perched water table above the basement rocks. The shape of the ground water profile is parabolic and resumes the original height at a distance of four times the height of sandstone, limestone, and overburden units.

4. The Minago pit is completely saturated through the basement rocks. The shape of the groundwater profile is parabolic and resumes the original height at a distance of four times the height of the slope.

**Figure 3.5 Typical Groundwater Profiles for Slopes (after Wyllie, 2004)**

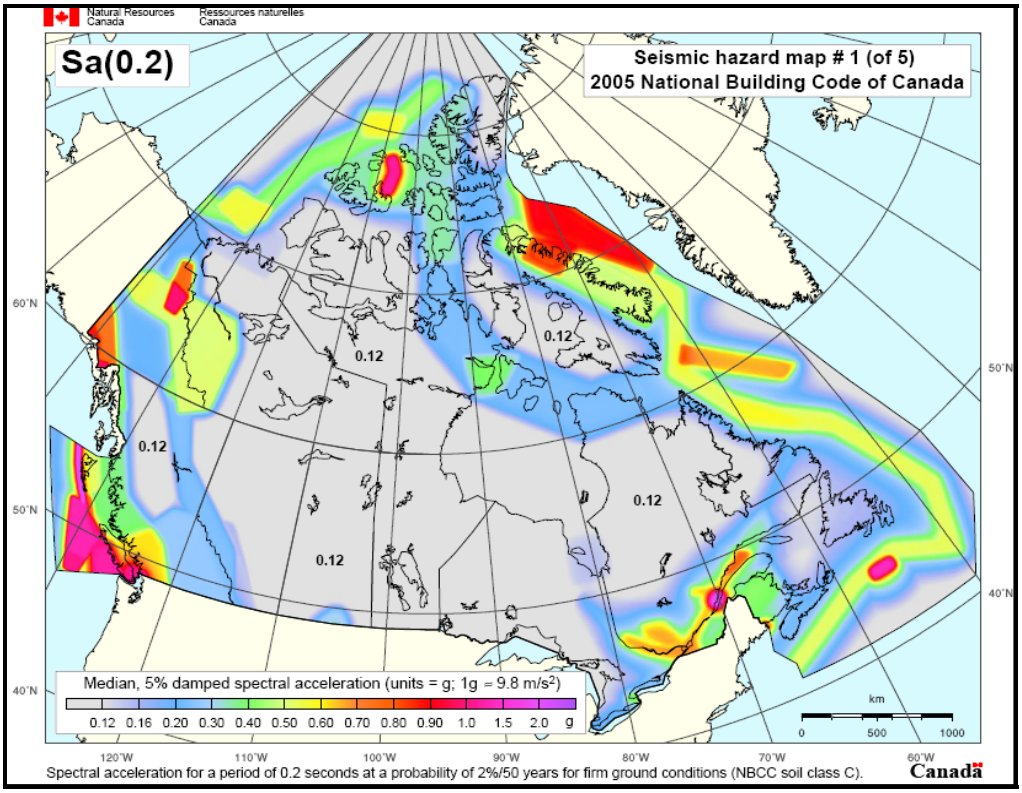



## 3.4 EARTHQUAKE POTENTIAL

The Minago project is located in an inactive earthquake zone. Figure 3.6 shows a seismic hazard map for Canada. The map shows that for a period of 0.2 seconds and a 2% chance of exceedance in the next 50 years, the Minago pit will not experience a seismic event greater than 0.12 g. This is the lowest seismic hazard

rating for North America, as a consequence the earthquake potential for the Minago project is considered to be negligible.

**Figure 3.6 Seismic Hazard Map**




## 3.5 SLOPE STABILITY EVALUATION

### *3.5.1 GEOTECHNICAL EVALUATION*

In July 2008 a draft of the Minago Open Pit Geotechnical Design Report was submitted to an independent consultant, Steve Eriksen of Salt Lake City for review. His comments sumerized below were incorporated into the final document, Minago Open Pit Geotechnical Design, Appendix C-1 issued on August 25, 2008.

- Four design sectors are sufficiently representative of the pit geometry and sub-surface geology. However, as more structural data is available, additional design sectors may be required.
- The wall orientation within a design sector should not vary by more than 20° as fracture orientation, length and spacing distributions control the hard rock slope stability, introducing new failure modes as wall orientation changes.
- As design parameters include the bench height, bench angle and catchment bench width, change because of variation of geotechnical properties, in

different design sectors, specific pit design parameters will be required for each design sector.

- Bench height in an open pit is a function of operating equipment working range. Wardrop determined that 24 m high double benches in proper geotechnical domains and design sectors as preferable. The option to mine a 6 m or 12 m high single bench is available for tighter grade control where overall slope angles do not change.
- There is insufficient geologic structural data to determine with certainty that all bench face development would be parallel to a pervasive joint set. The lack of joint continuity data means that the regularity or continuity of bench faces cannot be estimated at this time. In this situation, the consultant recommended defaulting to a bench face angle of 65° to 67° that is more typical for moderately to highly fractured rock.
- The operating range bucket digging profile of excavation equipment promotes the development of 65° to 67° bench face angle in rock which is not strongly joint-controlled.
- An empirical criteria originating from a study of rock falls in road cuts and natural slopes (Richie, 1963) is used to design catch bench widths. Based on Richie's work, the consultant recommended the following equation to calculate the minimum catch bench width for hard rock slopes with bench face angles of 55° to 80°:

  *Minimum bench width = 0.2 * bench height + 4.5*

- The recommended inter-ramp slope angle should change with bench height (BH) as the rock fall run out distance and minimum catch bench width does not increase linearly with BH. One of the principal advantages of double benching is that the required catch bench width beneath a double bench is not double the width required beneath a single bench. The inter-ramp slope angle is actually less for shallower single bench heights due to increased cumulative catch bench width requirements.

Following the review by Steve Ericksen, the Minago Open Pit Geotechnical Design Report was updated and issued as a final document on August 25, 2008.

The analysis was based upon geotechnical information, field mapping programs, an auger drilling program, site visit, and previous geotechnical studies. For the analysis of the pit wall design, the proposed pit was broken down into seven geotechnical domains on the basis of similar rock types with similar geotechnical data.

### 3.5.2 GEOTECHNICAL PARAMETERS BY DOMAIN AND SECTOR.

Geotechnical domains relate to the stratigraphy of the rock from a consideration of rock type and structure. Sectors are zones defined by the angular difference of the

pit walls with respect to the orientation of major structure. When considering stability the pit is separated into sectors on plan each sector containing various domains

Table 3.9 below summarizes the Geotechnical Parameters by sector that are to be applied for the optimzation of the Open Pit. For the detail design of the Open Pit the values have been refined to the values in Table 3.10. Figure 3.8 shows a general plan view of the Open Pit and the geometry within each sector for the detail design.

**Table 3.9 Geotechnical Parameters for Pit Optimization by Sector**

| Design Sectors | Geotech Domains | Typical Thickness of Domains (m) | Intersect With Pit | Open Pit Design Parameters | | | |
|---|---|---|---|---|---|---|---|
| | | | | BFA (°) | BH (m) | CBW (m) | ISA (°) |
| A | **I, II** | 14 | Yes | 12 | 12 | 20.0 | 8.9 |
| | **III** | 54 | Yes | 66 | 24 | 9.3 | 50.2 |
| | **IV, V** | 12 | Yes | 66 | 12 | 35.0 | 12.9 |
| | **VI** | >300 | At pit toe | 66 | 24 | 17.9 | 40.0 |
| | **VII** | >300 | Yes | 66 | 24 | 12.5 | 46.0 |
| B | **I, II** | 14 | Yes | 12 | 12 | 20.0 | 8.9 |
| | **III** | 54 | Yes | 66 | 24 | 9.3 | 50.2 |
| | **IV, V** | 12 | Yes | 66 | 12 | 35.0 | 12.9 |
| | **VI** | >300 | At pit toe | 66 | 24 | 17.9 | 40.0 |
| | **VII** | >300 | Yes | 66 | 24 | 13.3 | 45.0 |
| C | **I, II** | 14 | Yes | 12 | 12 | 20.0 | 8.9 |
| | **III** | 54 | Yes | 66 | 24 | 9.3 | 50.2 |
| | **IV, V** | 12 | Yes | 66 | 12 | 35.0 | 12.9 |
| | **VI** | >300 | At pit toe | 66 | 24 | 17.9 | 40.0 |
| | **VII** | >300 | Yes | 66 | 24 | 16.0 | 42.0 |
| D | **I, II** | 14 | Yes | 12 | 12 | 20.0 | 8.9 |
| | **III** | 54 | Yes | 66 | 24 | 9.3 | 50.2 |
| | **IV, V** | 12 | Yes | 66 | 12 | 35.0 | 12.9 |
| | **VI** | >300 | At pit toe | 66 | 24 | 17.0 | 40.0 |
| | **VII** | >300 | Yes | 66 | 66 | 9.3 | 50.2 |

Note:
BFA – Bench Face Angle
BH – Bench Height
CBW – Catch Bench Width
ISA – Inter-ramp Slope Angle/ overall slope angle

As noted above, the detail design inter-ramp angles for the rock domains in the open pit are summarized in Table 3.10 by Sector and by Domain. These were assessed from a consideration of the stability of the pit walls as described in the Geotechnical Report. As the overburden domains I and II will sit at an inter-ramp angle of 12° based upon Figure 3.7 a berm of 20 m has been provided between the edge of the open pit and the toe of the overburden.

**Figure 3.7 Generalized Section through the Pit**

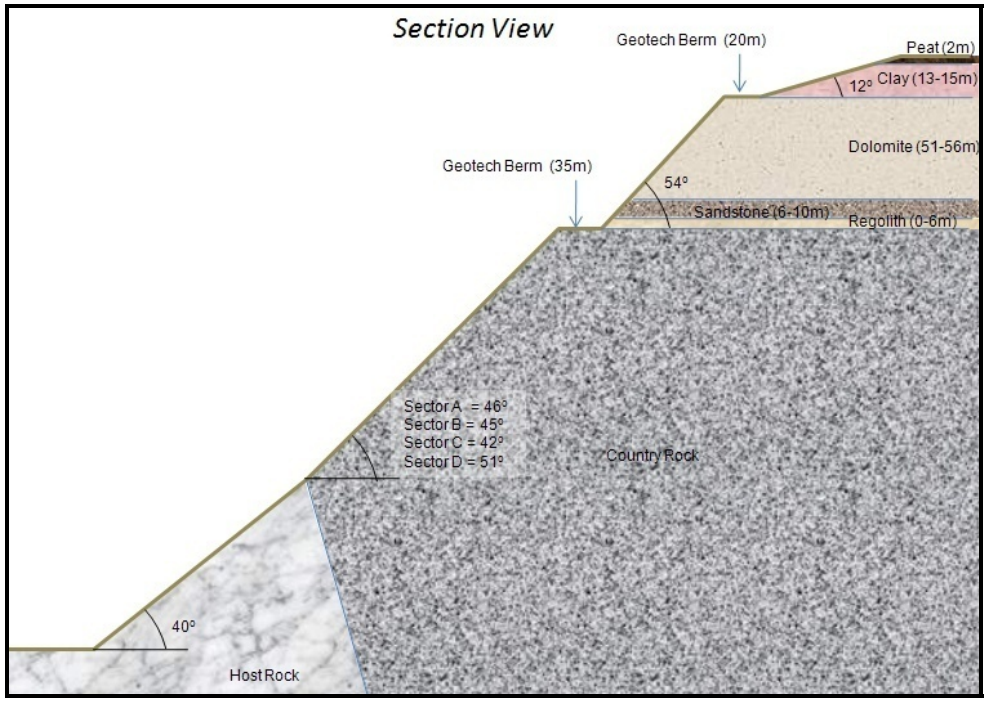



**Table 3.10 Geotechnical Parameters for Final Pit Design by Sector**

| Design Sector | Geotechnical Domain | Interamp Angle (°) | Bench Face Angle (°) | Bench Height (m) | CBW (m) |
|---|---|---|---|---|---|
| A | I, II | 8.9 | 12.0 | 12 | 20 |
| | III | 54.0 | 80.0 | 24 | 10 |
| | IV, V | 12.9 | 80.0 | 12 | 35 |
| | VI | 40.0 | 70.0 | 24 | 12 |
| | VII | 46.0 | 70.0 | 24 | 12 |
| B | I, II | 8.9 | 12.0 | 12 | 20 |
| | III | 54.0 | 80.0 | 24 | 10 |
| | IV, V | 12.9 | 80.0 | 12 | 35 |
| | VI | 40.0 | 70.0 | 24 | 12 |
| | VII | 45.0 | 70.0 | 24 | 12 |
| C | I, II | 8.9 | 12.0 | 12 | 20 |
| | III | 54.0 | 80.0 | 24 | 10 |
| | IV,V | 12.9 | 80.0 | 12 | 35 |
| | VI | 40.0 | 70.0 | 24 | 12 |
| | VII | 42.0 | 70.0 | 24 | 12 |
| D | I, II | 8.9 | 12.0 | 12 | 20 |
| | III | 54.0 | 80.0 | 24 | 10 |
| | IV,V | 12.9 | 80.0 | 12 | 35 |
| | VI | 40.0 | 70.0 | 24 | 12 |
| | VII | 51.0 | 70.0 | 24 | 12 |

### 3.5.3 PIT SLOPE STABILITY ANALYSIS

Initially, Open Pit Stability has been maintained by managing the following two major rock strength principles:

1. That when assessing a rock slope on a large scale, a rock mass behaves as a homogeneous material with limited strength, within geological domains.
2. That the geological structure within the rock mass may provide major planes of weakness that can produce both large and small scale failures.

Based upon the geotechnical concepts developed, using the optimized pit sections, overall pit slope plan, sections and geometry shown in Figures 3.8 was developed.

For the final pit design the pit was sub divided into the four main design sectors with each design sector is composed of the geotechnical domains I through VII described in Table 3.10 above.

For Open Pit design a factor of safety of 1.20 for slope stability is generally considered to be acceptable. In the analysis, the factors of factors were calculated from numerical modeling for various conditions. The approach to this analysis and the various conditions analysed is described more fully in Appendix C-1

The following four conditions as described above under Influence of Groundwater were analysed:

*Condition 1.* The pit is dewatered and dry.
*Condition 2.* The pit is dewatered, but the sandstone remains saturated.
*Condition 3.* The pit has a perched water table above the basement rocks.
*Condition 4.* The pit is completely saturated through the basement rocks.

The analysis of the final pit demonstrates a range of factors of safety from 1.15 to 1.97 for the various conditions 1 to 4. The factors of safety for the different design sectors, geotechnical domains, and groundwater conditions are provided in Table 3.11. Except for condition 4, these factors of safety are within the allowable limits which are described in Appendix C-1. However, condition 4 is not likely to occur in any practical situation as the pit walls will drained towards the free surface.

**Table 3.11 Safety Factors for all Domains**

| Safety Factor | Domains I, II | Domains I, II, III, IV, V | | | All Domains | |
|---|---|---|---|---|---|---|
| Groundwater | Condition 1 | Con 1 | Con 2 | Con 3 | Con 2 | Con 4 |
| Section A | 1.28 | 1.72 | 1.28 | 1.42 | 1.37 | 1.17 |
| Section B | 1.67 | 1.97 | 1.64 | 1.85 | 1.39 | 1.19 |
| Section C | 1.81 | 1.39 | 1.15 | 1.20 | 1.33 | 1.16 |
| Section D | 1.90 | 1.74 | 1.21 | 1.33 | 1.40 | 1.21 |

For the purposes of this study Wardrop has assumed that the planned dewatering program is in place and the pit is successfully dewatered. The normal design condition would be Condition 3 with the pit is being dewatered with calculated factors of safety will be greater or equal to 1.2. Wardrop supports the recommendations provided by Golder Associates Ltd., suggesting further hydro-geological analysis (Golders, 2008).

An additional geotechnical berm with a width of 35 m is required in the sandstone and regolith to catch sloughing material in dolomite above. The weaker sandstone material would promote toppling-type failures of the dolomite along critical jointing. A geotechnical berm was recommended to provide catchment for the material toppling from the dolomite domain. Since the amount of material toppling from the dolomite cannot be predicted accurately, a worst-case scenario assuming the entire height of the dolomite domain toppling was selected as the criteria for design. The material is assumed to fall on to the geotechnical berm and sit at the rock's internal angle of repose of 38°.

Further optimization of bench geometry could be completed as more structural information becomes available.

The following recommendations are made with respect to final pit stability analysis:

- Construct a geotechnical berm of 35 m in width at base of Domains IV and V to catch sloughing within those domains and debris from domains above.
- Construct a drainage ditch at the base of Domains IV and V within the geotechnical berm to divert groundwater infiltration from the highly conductive sandstone unit, with a hydraulic conductivity of $7x10^{-3}$ cm/s.
- Collect further geological structural data to assist further optimize bench geometry.
- Assess the influence of groundwater on the stability of the open pit by addressing pressure build up within geological structure.
- Reflect groundwater levels from the hydro-geological investigation into the finite element modelling.

### 3.5.4 PIT SLOPE GEOMETRY

***Bench Height:*** The bench height in an open pit is a function of the working range of production operating equipment. For the purpose of this analysis, Wardrop assumed that mining would be conducted in 12 m benches.

***Bench Angle:*** The bench angle is highly dependent on the influence of geological structure in the pit, since minor planes of weakness are more likely to influence the bench stability than the internal rock strength. This is because the bench is a relatively small-scale slope within a large-scale open pit.

For the detail design, the bench face angles were estimated from available information on the geological structure. Since the basement rocks did not have surface exposure, geotechnical Domains VI and VII were given estimated values based on experience. The bench face angles found from the influence of geological structure are shown in Table 3.10, Inter-Ramp Angles for Rock Domains by Sector.

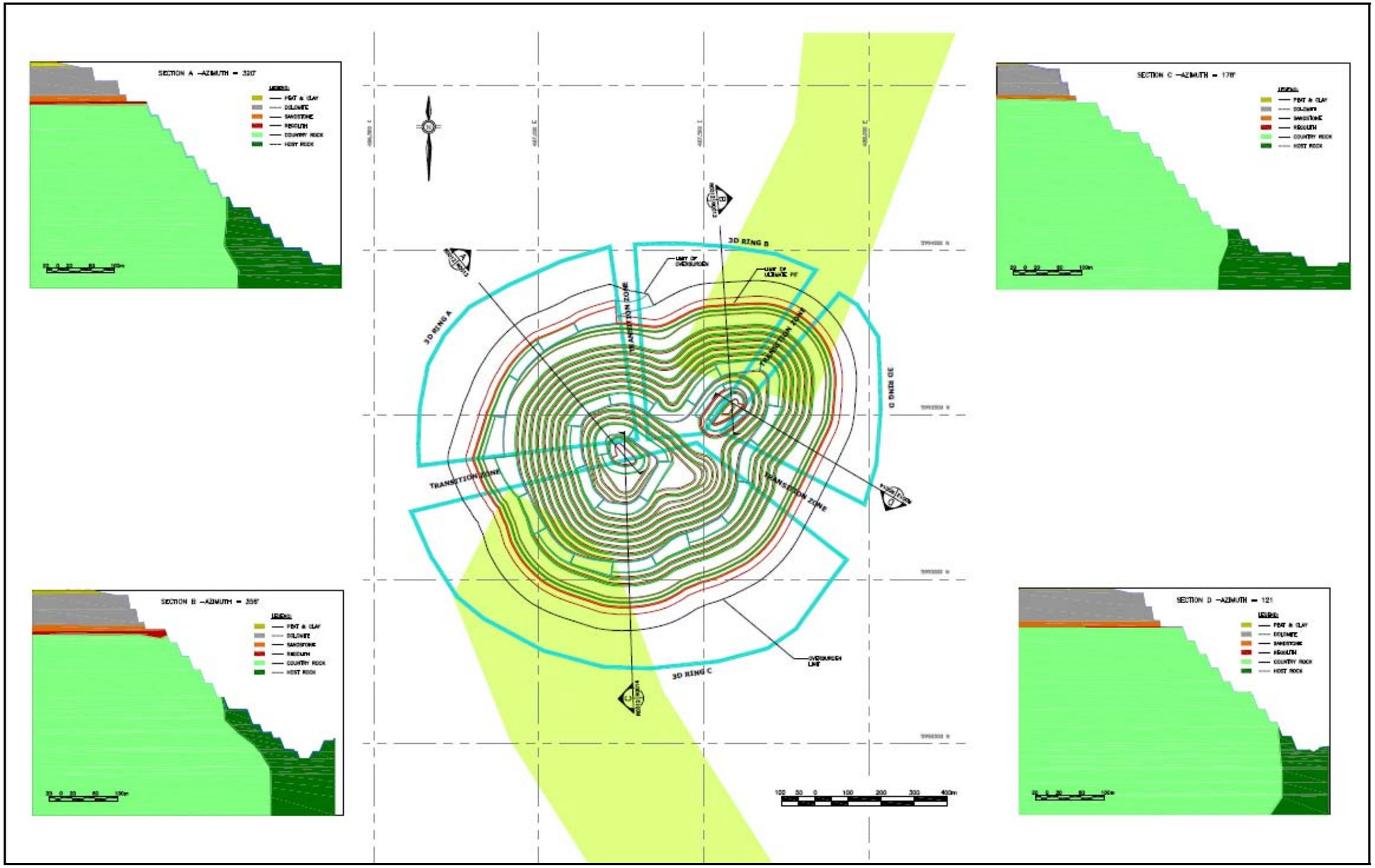
In Domain III, the jointing appears to be near vertical, with an average dip of 83°. Since the potential for toppling failure is present for all bench angles between 70° and 90°, the bench angle would be designed for planar and wedge failure to help minimize small-scale instability. A bench angle of 80° could be used for Domain III because the average dip of jointing in this domain is steeper than 80°, and therefore most joints do not emerge with in the bench angle.

For Domains VI, and VII, a bench angle of 70° will be used. With the geological data currently available a conservative estimate of 70° bench angle is certainly possible. As the benches are excavated the bench face would slope at an angle corresponding to a critical failure plane (i.e. toppling, wedge, or planar failure). Preliminary data shows that shallow planar, wedge, and toppling failures are present for most valid bench face angles. A steeper planar failure is possible at a minimum angle of 70° and thus makes the bench face angle assumption of 70° adequate for this investigation. This bench angle represents a conservative estimate that could be further optimized as more structural data becomes available.

As stated above, the contacts between the granite and ultramafic are assumed to be near vertical; toppling-type failure could therefore be a potential instability issue in the ultramafic. Further structural data would help optimize bench geometry in this zone by approximating the amount of instability present.

The selected overall slope angle was based on the pit design including ramp and takeoffs for benches. For domain III, a minimum 10m bench width instead of the 9.300 shown for Table 3.9.has been used for a 12m height. In Figure 3.8, Generalized Plan View of Pit Domains, the above recommendations for the various Domains have been illustrated graphically.

**Figure 3.8 Generalized Plan View and Sections of Sectors and Pit Domains**



## 3.6 PIT OPTIMIZATION

### *3.6.1 PIT OPTIMIZATION PROCEDURES*

Pit optimization is performed to determine the optimum pit limits and produce economically mineable ore reserves at a maximum present value (PV). Wardrop used Lerchs-Grossman (LG) algorithm from Gemcom Software International Inc., supplemented by GEMS™ mine planning software, to perform the pit optimization for the project.

A 3D geological block model and other required economic and operational variables were added to the LG algorithm. These variables included rock classification, mining and milling parameters, product grades and other inputs including costs, metal prices, and smelter terms. The LG algorithm progressively identifies blocks that are economic when mining ore and waste stripping are taken into account for specified variable pit slopes. The resulting pit outline includes all the blocks that may be economically mined within the open pit shell.

Wardrop conducted the following design steps to complete pit optimization:

- a geotechnical review
- initial optimization
- preliminary schedule based on best case, worst case and specified case
- apply preliminary economics to the schedule
- Select pit shell that represents highest PV for specified case

Using the geotechnical study which was completed in August 2008 (Appendix C-1), the final pit was sub-divided into four main design sectors with similar rock types and geotechnical data. The block dimensions for the Lerchs-Grossman algorithm were determined for each sector of the geotechnical domains.

### *3.6.2 PIT OPTIMIZATION PARAMETERS*

For the initial optimization the required parameters were selected by Wardrop to evaluate the most economic open pit profile. Although these parameters are not necessarily final since the analysis is ongoing, a reasonable degree of accuracy is required. The economic and operating parameters used in the initial optimization are given in Table 3.12. The breakeven plant feed cut-off head grade for the open pit optimization is calculated at 0.2% Ni(S).

**Table 3.12 Economic Parameters for Pit Optimization**

| Items | | Units | Value |
|---|---|---|---|
| Exchange Rate | | Cdn $:US$ | 1.122 |
| Discount Rate | | % | 8.00 |
| Metal Price (Market)) | Nickel (7.40$US/lb) | Cdn $/lb | 8.30 |
| | Payable (95%) | Cdn $/lb | 7.89 |
| | Gain from Cu, PGMs | Cdn $/lb | 0.39 |
| Frac Sand Price | Sand product | Cdn $/t | 58.78 |
| Metal & Sand Recovery | Milling (Nickel Sulphide) | % | Varies see Sec.5.3.4 |
| | Processing (Frac Sand) | % | 68.8 |
| | Concentrate Transit Loss | % | 0.3 |
| Concentrate Transportation | Landing Freight | Cdn $/wet tonne | 20.34 |
| | Landing Freight | Cdn $/lb FOB Mine | 0.036 |
| Smelter & Refinery Charge | Smelter charge | Cdn $/lb FOB Mine | 0.329 |
| | Refining Charge Nickel | Cdn $/lb FOB Mine | 0.424 |
| | Refining Charge Cu, PGMs | Cdn $/lb FOB Mine | 0.016 |
| | MgO and SiO Penalty | Cdn $/lb FOB Mine | 0.073 |
| Operating Cost | Mining (Ore or Waste) | Cdn $/t mined | 1.55 |
| | Stockpile Rehandle (Ore) | Cdn $/t mined | 0.55 |
| | Milling (Ore) | Cdn $/t milled | 10.03 |
| | Processing (Frac Sand) | Cdn $/t mined | 8.51 |
| | G&A + time cost | Cdn $/t milled | 1.18 |
| Inter-Ramp overall Pit Slope Angle | Overburden | Degree | 8.9 |
| | Limestone | Degree | 50.2 |
| | Sandstone (with Regolith) | Degree | 16.6 |
| | Country Rock | Degree | Sector A: 46.0<br>Sector B: 45.0<br>Sector C: 42.0<br>Sector D: 50.2 |
| | Host Rock (Minerals) | Degree | 40.0 |

### 3.6.3 PIT OPTIMIZATION RESULTS

A series of nested pit shells are generated by varying the revenue using the preliminary schedule developed to generate present value for each pit shell. Figure 3.9 graphs the relationship between ore reserves and the present value for each of the pit shells. For comparison, Figure 3.9 shows the Present Value for the best, worst and specified cases by pit shell.

Table 3.13 shows the Present Value for each pit shell for the specified case. The specified case represents the most practical scenario and incorporates the minimum bench width of 65m leaving room for efficient blast design and a productive mining shovel operation.

The following features are noted:

- Pit #14 generates the highest discounted cash flow (Present Value) at $461 million for the selected case option. The Ni(S) grade is predicted to be 0.388%. Estimated ore tonnage mined is 29.4 Mt
- For pits larger than Pit #14 there is a significant increase in waste for a relatively small increase in ore tonnage. However, the present value decreases only slightly for larger pit numbers up to Pit 27 when the present value experiences a significant decrease.
- Pits larger than Pit #14 may require incrementally more capital for replacement of mining equipment which will further enhance the relative value of Pit #14 relative to larger pits.
- Pit #27 generates a pit with 36.4 Mt at a grade of 0.379% Ni(S).

### 3.6.4 OBSERVATIONS FROM THE OPTIMIZATION PROCESS

The following observations are made based on the optimization process.

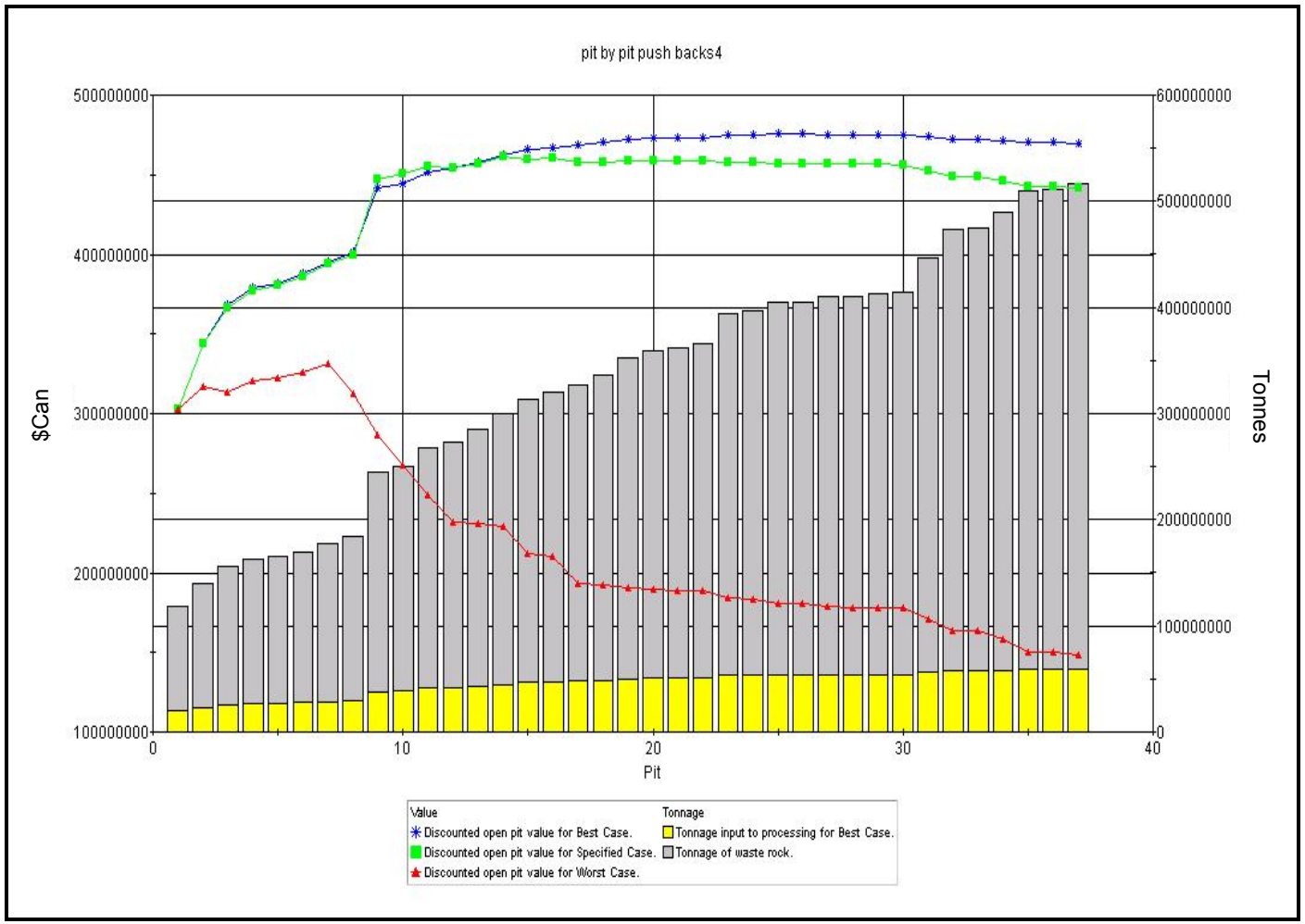
- The detailed pit design should be based on Pit #14 to maximize present value based on the current geologic model.
- Exploration drill hole density between the bottom of Pit #14 and the base of Pit #27 is such that the inferred resource may not be converted to measured or indicated. Additional further drilling to move this resource from the inferred to the measured or indicated category is recommended by Wardrop.
- Pending additional drilling results, surface facilities such as roads, spoil piles and water drainage holes are positioned to accommodate Pit #27 at some point in the future when drill density and metal prices permit.

The tonnes and grades reported through the initial optimization do not reflect the detailed design. For the detailed design, catchberms and ramps are included and a higher cut off grade of 0.2% Ni(S) is used instead of 0.17% Ni(S).

**Table 3.13 Optimization Results (M tonnes) – Specified Case**

| Pit Number | Present Value (Mt) | Ore Mined (Mt) | Ore Grade (%Ni(S)) | Sand Mined (Mt) |
|---|---|---|---|---|
| 1 | 302.8 | 14.5 | 0.415 | 5.5 |
| 2 | 343.5 | 16.7 | 0.415 | 6.6 |
| 3 | 366.7 | 18.3 | 0.414 | 7.3 |
| 4 | 377.5 | 19.1 | 0.412 | 7.6 |
| 5 | 380.6 | 19.2 | 0.412 | 7.8 |
| 6 | 386.3 | 19.8 | 0.411 | 7.9 |
| 7 | 393.8 | 20.5 | 0.409 | 8.4 |
| 8 | 399.9 | 21.1 | 0.407 | 8.8 |
| 9 | 447.5 | 26.3 | 0.395 | 11.7 |
| 10 | 450.8 | 26.4 | 0.395 | 12.3 |
| 11 | 455.3 | 27.2 | 0.394 | 13.9 |
| 12 | 454.0 | 27.3 | 0.393 | 14.5 |
| 13 | 457.4 | 28.2 | 0.391 | 15.1 |
| 14 | 461.2 | 29.4 | 0.388 | 15.6 |
| 15 | 460.1 | 30.2 | 0.387 | 16.2 |
| 16 | 460.6 | 30.5 | 0.387 | 16.6 |
| 17 | 457.6 | 30.9 | 0.386 | 17.1 |
| 18 | 458.1 | 31.5 | 0.385 | 17.3 |
| 19 | 458.9 | 32.7 | 0.383 | 17.5 |
| 20 | 459.1 | 33.2 | 0.382 | 17.5 |
| 21 | 459.1 | 33.3 | 0.382 | 17.6 |
| 22 | 459.0 | 33.6 | 0.382 | 17.6 |
| 23 | 457.6 | 35.5 | 0.379 | 17.7 |
| 24 | 457.5 | 35.7 | 0.379 | 17.7 |
| 25 | 457.2 | 36.1 | 0.379 | 17.7 |
| 26 | 457.2 | 36.1 | 0.379 | 17.7 |
| 27 | 456.8 | 36.4 | 0.379 | 17.8 |
| 28 | 456.8 | 36.4 | 0.379 | 17.8 |
| 29 | 456.7 | 36.5 | 0.379 | 17.8 |
| 30 | 456.5 | 36.6 | 0.379 | 17.8 |
| 31 | 452.4 | 38.3 | 0.377 | 17.8 |
| 32 | 448.7 | 39.6 | 0.376 | 17.8 |
| 33 | 448.6 | 39.6 | 0.376 | 17.8 |
| 34 | 446.3 | 40.2 | 0.376 | 17.9 |
| 35 | 442.6 | 41.1 | 0.376 | 17.9 |
| 36 | 442.5 | 41.2 | 0.376 | 17.9 |
| 37 | 441.4 | 41.4 | 0.376 | 17.9 |

**Figure 3.9 Ore Tonnage and Pit NPV**



### 3.6.5 ORE DILUTION

The dilution for the model was not calculated on every block since an average dilution factor would significantly over-estimate the ore dilution in this type of deposit. Based on the reserve estimations of the nickel model and dilution nickel model, the average nickel grade dilution is 2.1% within the detailed design. This is based on the detailed pit design using the GEMs software.

- In order to calculate ore dilution the following criteria were incorporated:
- Blocks that have a 100% ore fraction would not encounter dilution. These would typically be blocks that do not contact waste.
- Blocks with less than a 50% waste fraction were assumed to be mined as ore. Dilution would be the waste fraction on the block.
- If the waste dilution in a block reduced the ore grade below the cut-off of 0.2% Ni(S), the block would be classified as waste.

### 3.6.6 MINING MINERAL RESERVES

The ultimate pit design contains the mining reserves as listed in Table 3.14.The mining reserve represents ore contained within the ultimate detailed pit design and includes mining dilution, ramps, and berms. The values shown in Table 3.14 represent concentrator feed in terms of Nickel (Ni(S)) values will be subject to a 71.3% concentrator recovery at the 0.430% Ni(S) feed grade.

**Table 3.14 Selected Pit (#14) Mining Reserves**

| Classification | Tonnes (millions) | Grade (%Ni(S)) | Nickel (millions of pounds |
|---|---|---|---|
| Proven | 6.6 | 0.487 | 70.5 |
| Probable | 18.6 | 0.410 | 167.5 |
| Total Proven and Probable | 25.2 | 0.430 | 238.0 |

The values shown in Table 3.15 represent overall Frac Sand feed to the Frac Sand plant, over a period of approximately 10 years.

**Table 3.15 Selected Pit Frac Sand Reserves**

| Classification | Tonnes (millions) | Grade |
|---|---|---|
| Proven | 0.0 | n/a* |
| Probable | 14.8 | n/a |
| Total Proven and Probable | 14.8 | n/a |

*n/a – not applicable

### 3.6.7 PIT DESIGN DEVELOPMENT AND SCHEDULING

Pre-production work would begin with an earthmoving contractor commencing work three years prior to production, assumed to be in “Year 1” (2013), which is the designated start up year for the frac sand plant. The contractor will strip about 11.2 Mt of overburden by dredging in “Year -2” (2011) in preparation for the owner to start stripping 42.7 Mt dolomite/limestone waste rock at the beginning of “Year -1” (2012).

The development of the mine will be predicated on a number of push-backs, or phases, designed to meet the following objectives;

- Enable the accelerated removal of limestone rock for use in construction of roads to the waste dumps, tailings dam, and site facilities.
- Hasten access to the Frac Sand zone, in order to generate short-term revenues to pay for stripping.
- Mine and stockpile the nickel sulphide ore in time for the operation of the mill in “Year 2” (2014).
- Provide a balance in the haul truck fleet.

In the case of the Minago Mine, the three phases have been identified to develop the ultimate pit. Wardrop designed the three mineable phases based on the measured and indicated mineral resources and the selected optimized pit.

#### PHASE I

Phase I is the first pit that was designed from the initial economic shells generated by the WhittleTM optimization run. The initial economic shells prioritize the high grade ore mining at the top portion of the ore body, and at the lowest amount of waste stripping. The objective of this prioritizing is to maximize cash flow and speed the capital recovery during the initial years. Phase I would mine 2.5 Mt of frac sand, 1.7 Mt of NiS ore at 0.387% Ni(S) and total material is about 44.8 Mt.

#### PHASE II

Phase II geometry was expanded in all directions from Phase I to mine the next high grade blocks of the orebody. The final highwalls were reached in the west and southwest side of the ultimate pit shell to achieve the required minimum mining width. Phase II would mine 4.9 Mt of frac sand, 9.4 Mt of NiS ore at 0.438% Ni(S) for a total material of about 93.6 Mt.

#### PHASE III

Phase III would mine the remaining ore inside the ultimate pit shell to achieve the final highwalls. Phase III would mine 7.47 Mt of frac sand, 14.03 Mt of NiS ore at 0.429% Ni(S) for a total material of about 105 Mt.

## ULTIMATE PIT

Overall, the ultimate pit contains 14.8 Mt of frac sand, 25.17 Mt of Ni(S) ore at 0.430 % Ni(S) for a total with waste of about 308.7 Mt.

Table 3.18 shows the Overall Pit Mining Schedule, Table 3.19 the General Pit Statistics, and Figure 3.13 the Ultimate Pit Design.

The mine would start delivering frac sand ore in the year just prior to Frac Sand production at the start of “Year 1” (2013). The delivery of nickel sulphide ore would begin in late “Year 1” (2013) in preparation for Ore Processing at the start of “Year 2” (2014) and will continue until “Year 8” (2021). The mine production would peak at 51.2 Mt in “Year 1” (2013) because of the high proportion of waste rock.

The delivery and placement of overburden, limestone, and basement rock would closely follow the geotechnical parameters governing the construction of waste dumps, tailings dams, and overburden containment areas.

Each phase or pushback is designed at a mining width of about 65 m to accommodate mining equipment that will operate on a bench. The mining width allows for 35 m of double-sided loading if, for example, a Komatsu PD4000 electric hydraulic shovel was used. The road width of 30 m is designed to accommodate safety berms and two lanes of typical 240-ton haul trucks.

Tables 3.16 and 3.17, and Figures 3.10 and 3.11, show materials mined by phase by year and Figure 3.12 gives overall tonnes by grade by year.

**Table 3.16 Total Material Mined by Phase by Year**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Minago Phase 1 (kt) | 17062 | 17062 | 9003 | 1643 | | | | | | | |
| Minago Phase 2 (kt) | 12796 | 25593 | 25213 | 15274 | 12340 | 2392 | | | | | |
| Minago Phase 3 (kt) | 12796 | 8531 | 14890 | 30129 | 32639 | 31400 | 17766 | 11570 | 9728 | 881 | |

**Figure 3.10 Waste and Ore Mined by Phase by Year**

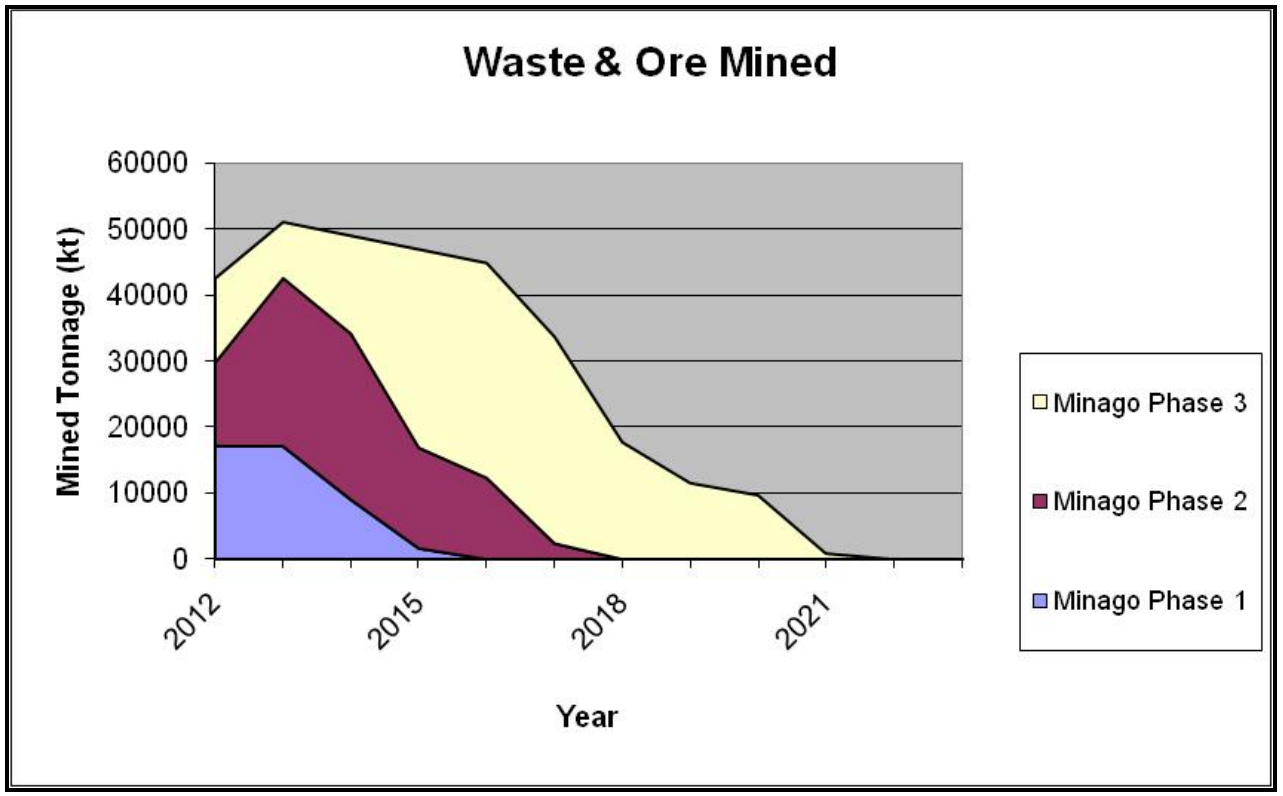


**Table 3.17 Mined Ore Tonnage by Grade by Period**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ore Tonnes (kt) | | 112 | 3000 | 3600 | 3600 | 3600 | 3600 | 3600 | 3600 | 453 | | |
| Grade (% Ni(S)) | | 0.37 | 0.42 | 0.43 | 0.43 | 0.41 | 0.44 | 0.43 | 0.45 | 0.47 | | |

**Figure 3.11 Mined Ore Tonnage by Phase**

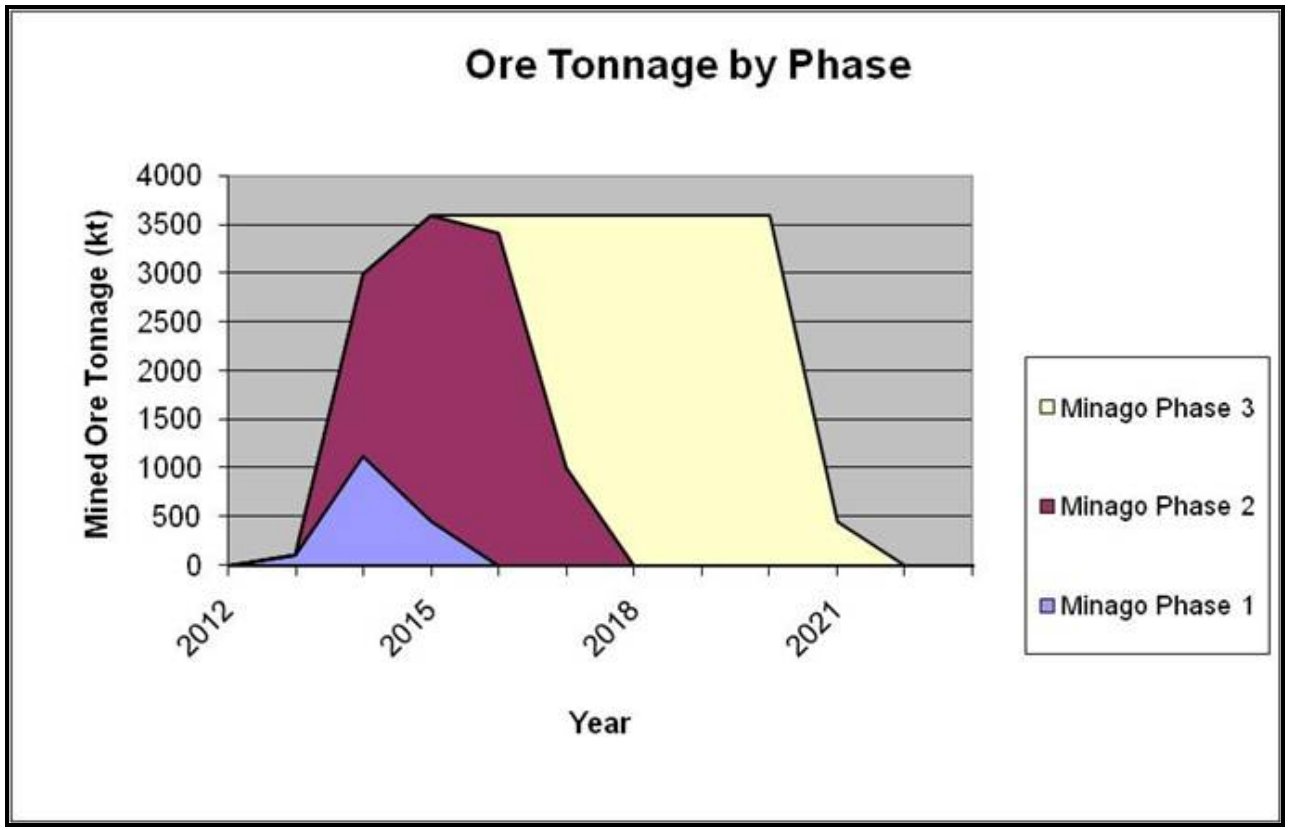


**Figure 3.12 Mined Ore Tonnage & Grade by Period**

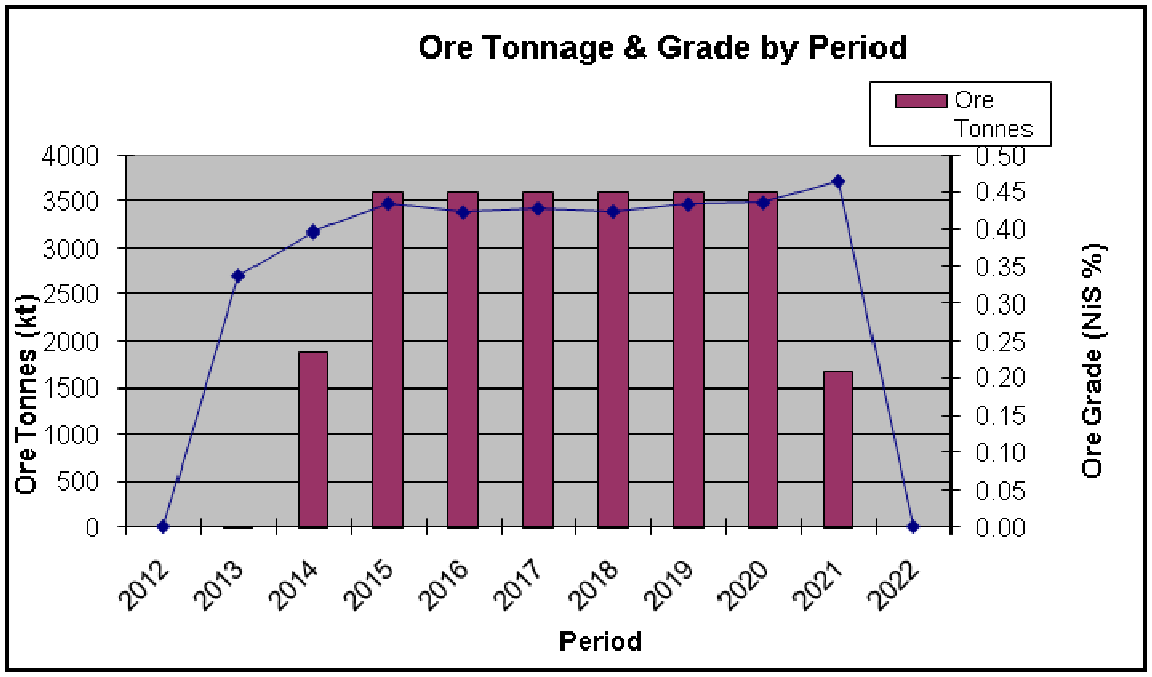



**Table 3.18 Overall Pit Mining Schedule**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dolomite (kt) | 42655 | 43179 | 15183 | 10015 | 0 | 0 | 0 | 0 | 0 | 0 | Dolomite | 111032 |
| Granite (kt) | 0 | 1744 | 20890 | 20440 | 35711 | 24459 | 9784 | 4944 | 3832 | 199 | Granite | 122005 |
| Ultramafic (kt) | 0 | 861 | 7941 | 5524 | 5667 | 5732 | 4382 | 3026 | 2297 | 229 | Ultramafic | 35659 |
| Sand (kt) | 0 | 5289 | 2092 | 7466 | 0 | 0 | 0 | 0 | 0 | 0 | Sand | 14847 |
| Total Ore (kt) | 0 | 112 | 3000 | 3600 | 3600 | 3600 | 3600 | 3600 | 3600 | 453 | Ore | 25166 |
| Grade Ore (%) | 0.000 | 0.374 | 0.419 | 0.429 | 0.430 | 0.413 | 0.436 | 0.431 | 0.447 | 0.468 | Grade | 0.430 |
| Total Tonnage (kt) | 42655 | 51186 | 49105 | 47045 | 44979 | 33792 | 17766 | 11570 | 9728 | 881 | | |

**Figure 3.5 Ultimate Pit Design**

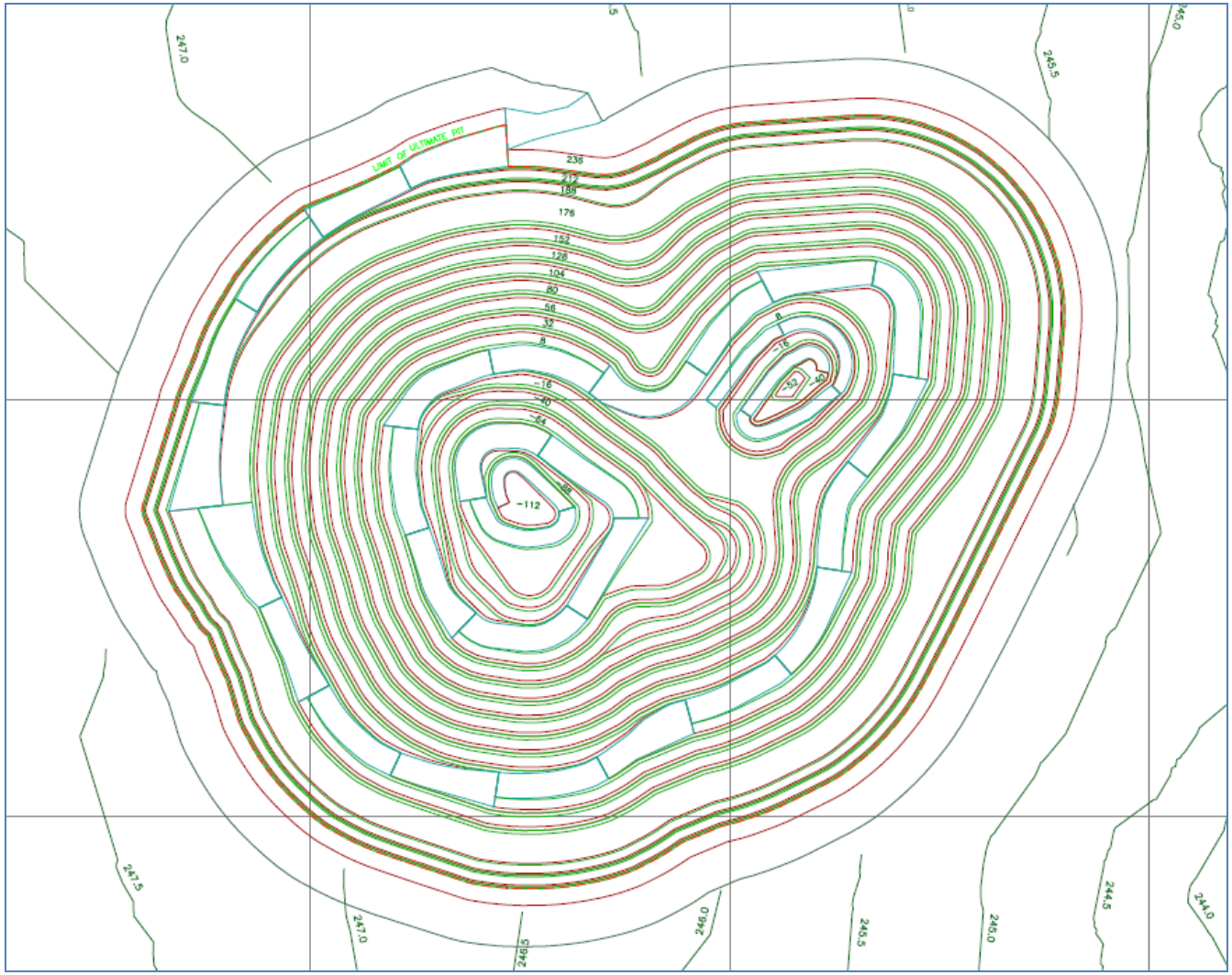


**Table 3.19 General Pit Statistics**

| Item | Size |
|---|---|
| Pit Top Elevation | Approx. 247 m |
| Pit Bottom Elevation | -112 m |
| Pit Depth | . 359 m |
| Volume of Pit | 156.7 million $m^3$ |
| Area of Pit Top | 1.0 million $m^2$ |
| Perimeter at the Top of the Pit | 3.7 km |
| Length from East to West | 1.2 km |
| Length from North to South | 1.1 km |

### 3.6.8 FRAC SAND PROCESSING PLANT

The sand would be processed at a feed rate of 1.50 Mt/a to produce different grades of frac sand at the rate of 1.1 Mt/a of marketable sand. The product would consist of 0.6 Mt of frac sand capable of meeting the American Petroleum Institute API grade specifications, and 0.5 Mt of non-API frac sands to be sold into other markets.

The frac sand process plant is projected to be commissioned at the start of “Year 1” (2013). 2.47 Mt of frac sand is expected to be mined; a portion for immediate processing with the remainder stored for subsequent processing.

Wardrop estimates a best-case scenario of 16 months to complete the Frac Sand Processing Plant. This estimate includes the detailed design, procurement, construction and commissioning under a turnkey contract.

### 3.6.9 NICKEL SULPHIDE ORE PROCESSING PLANT

The open pit was designed to feed the mineral processing plant at a nominal rate of 10,000 t/d, for a total of 3.6 Mt/a. The Run of Mine nickel sulphide ore from the open pit would be hauled to a 1.067 m x 1.651 m primary gyratory crusher facility by 240-ton haul trucks. A hydraulic rock breaker would be utilized to break oversize rocks to obtain a feed size below 1,000 mm

Wardrop assumed that construction of the plant will start in early “Year -1” (2012), approximately 20 months before the Ore Processing Plant start up. In preparation for the plant start-up at the beginning of “Year 2” (2014),108 kt of nickel ore will be stockpiled in “Year 1” (2013).

### 3.6.10 WASTE MATERIAL MANAGEMENT

During the operation of the open pit, a total of 275.17 Mt of waste material consisting of peat, clay, limestone, granite and ultramafic rocks will be mined. These material types, including waste rock, are to be stored in the following locations;

- Tailings and Waste Rock Management Facility (TWRMF) – ultramafics co-disposed with mill tails
- Overburden Dump Cells (peat and clay) – includes settling pond
- Crusher Pad, site prep (limestone)
- Roads and containment berms (limestone)
- Dolomite Limestone Dump
- Country Rock Dump
- Settling pond

Dolomitic limestone will be used for site preparation, including roads. Locations are outlined in Figure 3.1.

A yearly waste placement schedule is shown in Table 3.20.

**Table 3.20 Waste Placement by Year Excluding Overburden**

| Product | Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| Dolomite (Limestone) (kt) | 42,655 | 43,179 | 15,183 | 10,015 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite (kt) | 0 | 1,744 | 20,890 | 20,440 | 35,711 | 24,459 | 9,784 | 4,944 | 3,832 | 199 |
| Ultramafic (kt) | 0 | 861 | 7,941 | 5,524 | 5,667 | 5,732 | 4,382 | 3,026 | 2,297 | 229 |
| Sand (kt) | 0 | 5,289 | 2,092 | 7,466 | 0 | 0 | 0 | 0 | 0 | 0 |

### *3.6.11 OVERBURDEN/ WASTE ROCK / PIT WATER*

#### OVERBURDEN

A total of 11.2 Mt of overburden comprising peat and clay is to be placed in containment cells located southeast of the pit, over a 1 year period. These cells were considered the ideal location for this low-strength material since it is above an area with thick, low-strength clays. Segregation of overburden material from the rest of the materials would facilitate overburden reclamation. The proposed methodology is hydraulic dredging which is described in Section 4.0, Geotechnical.

#### DOLOMITE/ LIMESTONE

A total of 111.0 Mt of dolomite/ limestone from the pit would be stored in a dolomitic dump. In addition to building the tailings management facility, the pit limestone would also be used to build remaining roads to future dumps and a basement layer

for waste dumping areas. After these have been completed, the limestone would be used to build up the crusher and ore stockpile pad (18.7 Mt ) and the remainder will be stored in the Dolomite Dump.

### BASEMENT OR COUNTRY ROCK

157.7 Mt of basement waste is to be stripped over a 7-year period. Basement rock was split into 2 types. The Granite is considered non-acid generating (NAG) and the Ultramafic rock is considered potentially acid-generating (PAG) and Selenium bearing. The Ultramafic rock will be co-disposed with the tailings in the TWRMF, located north of the pit and the Granite placed in the Country Rock Dump, located west of the pit. Separating the granite and limestone will facilitate the potential use of dolomitic limestone in the future.

### PIT WATER HANDLING

The progressive development of the open pit will result in increased water infiltration from precipitation and groundwater inflows. As the pit deepens and increases in footprint, it will be necessary to control water inflow through the construction of in-pit dewatering systems such as drainage ditches, sumps, pipelines and pumps.

To minimize groundwater infiltration and surface run-off, a ring road and berm complete with drainage ditches would be constructed to divert water away from the pit. Although dewatering wells would be installed at the perimeter of the open pit, a worst case allowance of 20% of the dewatering pump flow has been assumed to seep into the open pit.

In the pit, dewatering sumps are to be utilized to contain groundwater and storm water run-off which would be pumped directly to the polishing pond. The in-pit pumping requirements will vary on an annual basis and will increase as the catchment area increases with successive pushbacks heading towards the ultimate highwalls.

Storm water from the tailings pond and in-pit dewatering as well as from dewatering wells would be channelled into the polishing pond. This water containment would ensure that quality standards are met prior to discharge. The uncontaminated stormwater from the site will flow by gravity to the Oakley Creek water shed through the ditch at Highway 6.

## 3.7 MINE EQUIPMENT SELECTION

A Project Economic Analysis Section 17.0 was performed to evaluate and determine the optimum size and configuration of the truck and shovel fleet. Various sizes, brands of haul trucks, shovels, loaders and electric drill were evaluated. Given the close availability, and relatively low cost, of electric power, electric cable shovels

were compared with diesel or electric-powered hydraulic shovels and electric drills were compared with diesel-powered blasthole drills.

Due to the changing production requirements of the mine over the schedule, varying numbers of key production equipment will be required. The annual requirements for trucks, shovels, and loaders are shown in Table 3.27.

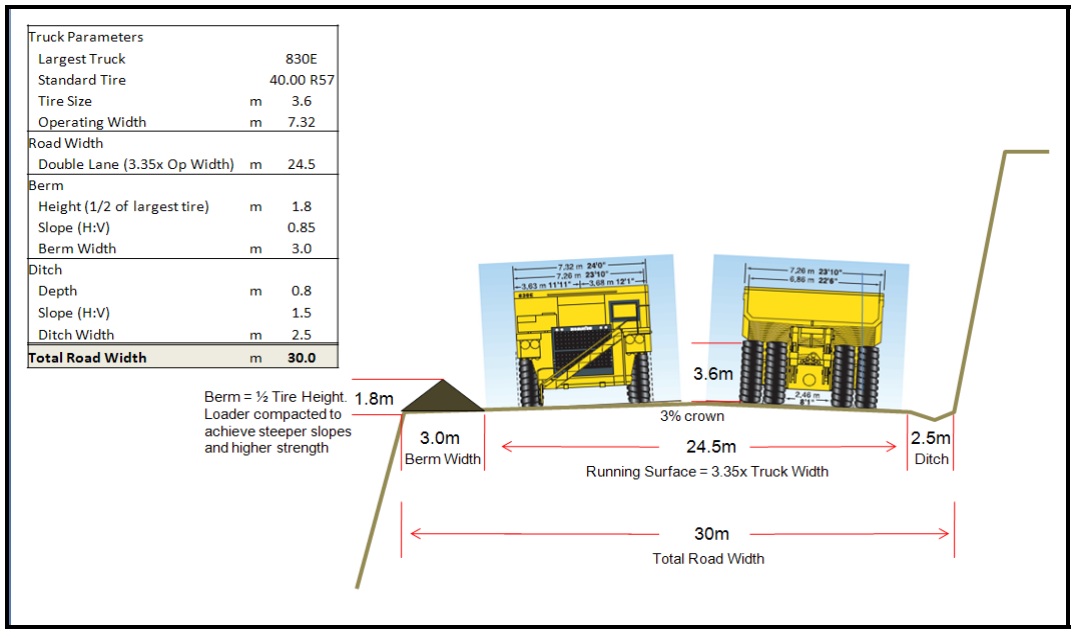
Due to the relatively short mine life and the low capital cost of electric-hydraulic shovels a fleet consisting of 22 $m^3$ electric hydraulic shovels, 20 $m^3$ loaders and 218-tonne trucks was determined to be the most economic choice. Also, Wardrop selected 270 mm (10 5/8″) blasthole drills, supplemented by auxiliary equipment such as tracked dozers, rubber-tired dozers, graders and other minor support equipment.

## 3.7.1 GEOMETRIC REQUIREMENTS

### ROAD WIDTH

In-pit ramps are designed with an overall width of 30 m with a maximum gradient of 10%. On the outside a 3.0 m wide and 1.8 m high berm will be provided and internally a 2.5 m ditch for two lane traffic to accommodate 218-tonne Komatsu 830E haul trucks, as shown in Figure 3.14.

**Figure 3.6 Road Width Design - Concept**



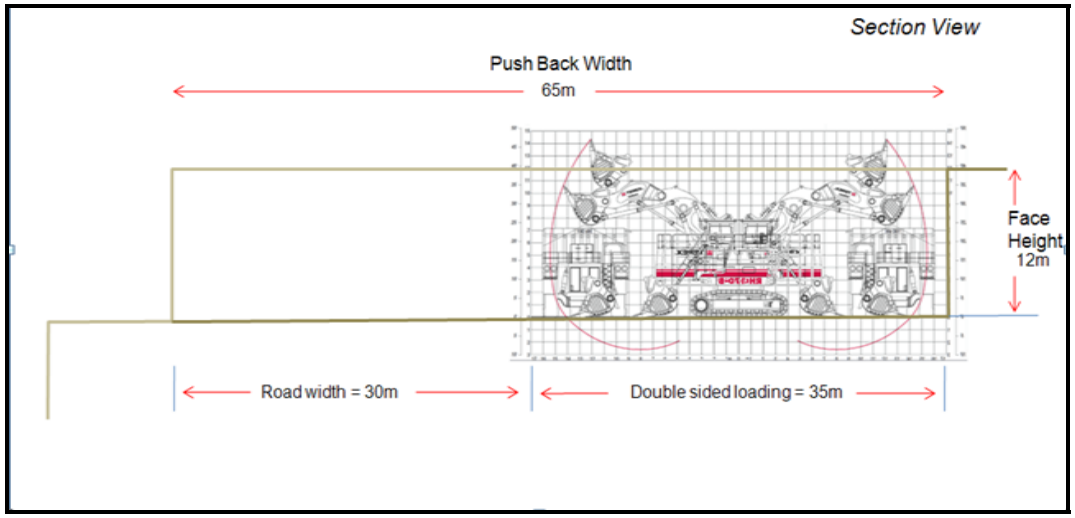

### PUSHBACK WIDTHS

An approximate pushback width was determined based on:

- Equipment selection of a Komatsu PC4000, as the electric hydraulic shovel, loading a Komatsu 830E haul truck;
- a minimum double-side loading width of an electric hydraulic shovel at 35.0 m, which will accommodate a turning width of 28.4 m for the Komatsu 830E haul truck;
- a 30 m haul road width;
- The proposed minimum pushback width is the sum of the minimum double-side loading radius at 35 m, and the haul road width at 30 m, for a total width of 65 m.

Figure 3.15 shows the proposed pushback width to be used in the design of the mining phases.

**Figure 3.7 Pushback Width Showing Shovel**




## 3.7.2 DRILLING

### DRILLING REQUIREMENT

The initial drill requirements would consist of two electric blasthole drills capable of drilling 269 mm (10 5/8 “) diameter blastholes. An 8.4 m x 8.4 m pattern has been selected for waste, and a 8.0 m x 8.0 m pattern for ore. See Table 3.21 gives the Yearly Drill Net Operating Hours Available per Unit.

**Table 3.21 Yearly Drill Net Operating Hours Available per Unit**

| Drills | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Time | hrs/unit | | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 |
| Availability | % | | 85.00% | 82.00% | 79.00% | 76.00% | 73.00% | 70.00% | 70.00% | 70.00% | 70.00% | 70.00% |
| Down Time | hrs/unit | | 1,296 | 1,555 | 1,814 | 2,074 | 2,333 | 2,592 | 2,592 | 2,592 | 2,592 | 2,592 |
| Available Time | hrs/unit | | 7,344 | 7,085 | 6,826 | 6,566 | 6,307 | 6,048 | 6,048 | 6,048 | 6,048 | 6,048 |
| Standby Time | hrs/unit | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gross Operating Hours | hrs/unit | | 7,344 | 7,085 | 6,826 | 6,566 | 6,307 | 6,048 | 6,048 | 6,048 | 6,048 | 6,048 |
| Operating Delays | hrs/unit | | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 |
| Net Operating Hours | hrs/unit | | **6,240** | **5,981** | **5,722** | **5,462** | **5,203** | **4,944** | **4,944** | **4,944** | **4,944** | **4,944** |

### DRILLING PRODUCTIVITY

Tables 3.22 and 3.23 show penetration and drilling rates for a variety of drill hole parameters. A diesel-powered hydraulic percussion track drill is to be used for secondary blasting of oversize material, sinking cut drilling, pre-shearing, etc.

**Table 3.22 Penetration Rate and Drilling Rate**

| | Units | Rock | | |
|---|---|---|---|---|
| | | Dolomite | Basement Waste | Ore |
| Hole Depth | m | 13.7 | 13.7 | 13.6 |
| Penetration Rate | cm/min | 100 | 65 | 65 |
| Grade control sampling time | min | 2.0 | 2.0 | 2.0 |
| Move and Align Time | min | 3.0 | 3.0 | 3.0 |
| Total Time Per Hole | min | 18.18 | 25.55 | 25.42 |
| Holes Per Hour | holes | 3.30 | 2.35 | 2.36 |
| Average Drilling Rate | m/h | 45 | 32 | 32 |

**Table 3.23 Blasthole Drill Productivity and Blasting Parameters**

| Blast Hole Drill Productivity | Units | Rock | | |
|---|---|---|---|---|
| | | Dolomite | Basement Waste | Ore |
| Hole Diameter | cm | 26.9 | 26.9 | 26.9 |
| Bench Height | M | 12.0 | 12.0 | 12.0 |
| Sub grade | M | 1.7 | 1.7 | 1.6 |
| Powder Factor | Kg/t | 0.21 | 0.21 | 0.24 |
| Bank Density | $t/m^3$ | 2.70 | 2.70 | 2.61 |
| Rock Mass per Hole | T | 2,286 | 2,286 | 2,006 |
| Spacing and Burden | M | 8.4 | 8.4 | 8.0 |
| Drilling Rate | m/h | 45 | 32 | 32 |

## *3.7.3 BLASTING*

Overall explosive consumption was based on using a 70% ANFO and 30% emulsion mix product. Some blasting parameters may be seen in Table 3.23. Drillhole liners are to be used in wet holes where practical.

The selected explosive supplier is to erect a plant and storage facility on site. Under the supervision of the mine blasting foreman, the supplier will be contracted to supply, deliver, and load explosives into the blastholes. The drill blast foreman will oversee the contractor blasting crew who will prime, stem, and tie-in blastholes.

#### FINAL PIT WALL BLASTING

The preservation of rock mass integrity is to allow for the development of the steepest wall slope by applying careful blasting methods. A buffer blasting practice will be implemented adjacent to the final pit walls to minimize damage to the final pit walls due to blasting.

### *3.7.4 LOADING*

#### GENERAL LOADING CONDITIONS

The initial loading fleet is to consist of three 22 m3 electric cable shovels and one 20 m3 front end loader. The shovel size has been matched with 218 tonne trucks to provide a swing cycle of 37 seconds and total truck load time of 3.9 minutes. The loader has been matched with 218 tonne trucks to enable loading in eight passes for handling rock and overburden and a digging cycle of 47 seconds for each type of material. Operating production times are presented in Table 3.24.

**Table 3.24 Yearly Shovel Net Operating Hours Available per Unit**

| Shovel PC4000 | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Time | hrs/unit | | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 |
| Phys. Availability | % | | 92% | 92% | 89% | 86% | 83% | 80% | 77% | 74% | 74% | 74% |
| Down Time | hrs/unit | | 691 | 691 | 950 | 1,210 | 1,469 | 1,728 | 1,987 | 2,246 | 2,246 | 2,246 |
| Available Time | hrs/unit | | 7,949 | 7,949 | 7,690 | 7,430 | 7,171 | 6,912 | 6,653 | 6,394 | 6,394 | 6,394 |
| Standby Time | hrs/unit | | 238 | 238 | 231 | 223 | 215 | 207 | 200 | 192 | 192 | 192 |
| Gross Operating Hours | hrs/unit | | 7,710 | 7,710 | 7,459 | 7,207 | 6,956 | 6,705 | 6,453 | 6,202 | 6,202 | 6,202 |
| Operating Delays | hrs/unit | | 1,524 | 1,524 | 1,524 | 1,524 | 1,524 | 1,524 | 1,524 | 1,524 | 1,524 | 1,524 |
| Net Operating Hours | hrs/unit | | **6,186** | **6,186** | **5,935** | **5,683** | **5,432** | **5,181** | **4,929** | **4,678** | **4,678** | **4,678** |

SHOVEL AND LOADER PRODUCTIVITY

Shovel/Loader base productivities were calculated using the following sample parameters: Table 3.25 shows the parameters.

**Table 3.25 Sample Shovel Productivity Calculation**

| | | PC 4000E Shovel | L1350 Loader |
|---|---|---|---|
| Bucket Capacity (heaped) | $m^3$ | 21.0 | 20.0 |
| Material Weight | dmt /bcm | 2.57 | 2.57 |
| Bulk Factor | | 1.3 | 1.3 |
| Material Weight | dmt /lcm | 1.98 | 1.98 |
| Moisture | % | 3% | 3% |
| Material Weight | wmt /lcm | 2.04 | 2.04 |
| Fill Factor | % | 95% | 95% |
| Effective Bucket Capacity | $m^3$ | 20.0 | 19.0 |
| Tonnes/Pass | wmt | 40.7 | 38.7 |
| Truck Size Capacity | wmt | 223.4 | 223.4 |
| Ave # Passes | Passes | 5.5 | 5.8 |
| Truck Spot Time | Sec | 30 | 30 |
| First Bucket Cycle Time | Sec | 37 | 47 |
| Subsequent Bucket Cycle Time | Sec | 37 | 47 |
| Load Time per Truck | Min | 3.9 | 5.0 |
| Maximum Productivity | trks /hr | 15.4 | 12.0 |
| | wmt /hr | 3,447 | 2,671 |
| Truck Availability to Shovel | % | 80% | 80% |
| Producing Hours | hrs/year | 4,133 | 4,133 |
| Annual wet Tonnes | wmt /year | 14,246,575 | 11,036,558 |
| Base Productivity | wmt /NOH | 2,758 | 2,136 |

The material weight in the sample calculation is the average for all materials with a range of 1.90 t/bank $m^3$ to 2.70 t/bank $m^3$ with. The Base Productivity was used under normal ideal loading condition. Productivity for both ore and sandstone materials were reduced to 90% of the base productivity as the benches would be mined at half the height of normal conditions (6 m) to improve selectivity, resulting in increased shovel delays.

## *3.7.5 HAULAGE*

GENERAL HAULING CONDITIONS

The 218-tonne hauler was selected to match the 22 $m^3$ electric hydraulic shovels and 20 $m^3$ front end loaders in determining the number of trucks required for each

operating year. Cycle times were based on measured haulage profiles from pit sources by mining phase to destinations based on material types.

Net Productive Operating Time: The yearly breakdown for the net productive truck operating times is shown in Table 3.26.

**Table 3.26 Yearly Truck Net Operation Hours Available per Unit**

| Trucks | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Time | hrs/unit | | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 | 8,640 |
| Availability | % | | 95.00% | 92.78% | 89.90% | 87.12% | 84.45% | 81.87% | 79.38% | 76.98% | 75.00% | 75.00% |
| Down Time | hrs/unit | | 432 | 688 | 934 | 1,172 | 1,401 | 1,622 | 1,835 | 2,040 | 2,160 | 2,160 |
| Available Time | hrs/unit | | 8,208 | 7,952 | 7,706 | 7,468 | 7,239 | 7,018 | 6,805 | 6,600 | 6,480 | 6,480 |
| Gross Operating Hours | hrs/unit | | 8,208 | 7,952 | 7,706 | 7,468 | 7,239 | 7,018 | 6,805 | 6,600 | 6,480 | 6,480 |
| Operating Delays | hrs/unit | | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 | 1,104 |
| Net Operating Hours | hrs/unit | | **7,104** | **6,848** | **6,602** | **6,364** | **6,135** | **5,914** | **5,701** | **5,496** | **5,376** | **5,376** |

### HAUL TRUCK PRODUCTIVITY

Truck productivities were based on expected operating conditions, haulage profiles, production cycle times. Cycle times were calculated using Caterpillar Inc's Fleet, Production and Cost (FPC) software. Each bench for each phase was assigned a specific cycle time according to its final destination. A table of all the cycle times given in Appendix C-2. All cycle times include an average loading time of 3.9 min (a loader exchange of 0.3 min, and a dump time of 0.5 min. A rolling resistance of 3% was used on most roads but the first 200 m in-pit and the last 200 m on the dump were increased to 5% to simulate rougher conditions. All ramps were assigned a grade of 10% in the pit and on the dumps. A maximum speed of 40 km/h was used in most conditions but was reduced to 30 km/h when on the main ramp in the pit for safety.

The pit perimeter dewatering program would be critical for haulage productivity when mining the peat and clay overburden materials. Even if well-drained, the overburden is expected to have a low strength which would cause sloughing at the mine face and reduce truck fill factors. To eliminate this problem, it was decided to use dredging to remove peat and overburden material.

## *3.7.6 SHOVEL AND TRUCK REQUIREMENTS*

In order to meet a production rate of 10 kt/d of ore, ten 218-tonne trucks, three 22 $m^3$ bucket shovels, and one 20 $m^3$ loader will initially be required. This will ramp up to 19 trucks in "Year 3" (2016), 15 owned, 4 rented/ leased. The yearly equipment requirements are shown in Table 3.27.

**Table 3.27 Truck, Shovel and Loader Requirements by Year**

| Equipment | 2011 Contractor | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trucks** | | | | | | | | | | | |
| Phys. Avail. | | 95.00% | 92.04% | 89.19% | 86.44% | 83.78% | 81.23% | 78.76% | 76.39% | 75.00% | 75.00% |
| Utilization | | 82.2% | 79.3% | 76.4% | 73.7% | 71.0% | 68.5% | 66.0% | 63.6% | 62.2% | 62.2% |
| Productivity (BCM/hr) | | 606 | 528 | 460 | 440 | 397 | 364 | 333 | 311 | 289 | 267 |
| Number Req'd | | 10.0 | 15.0 | 17.0 | 17.0 | 19.0 | 16.0 | 10.0 | 7.0 | 7.0 | 1.0 |
| **Shovels** | | | | | | | | | | | |
| Phys. Avail. | | 92.00% | 92.00% | 89.00% | 86.00% | 83.00% | 80.00% | 77.00% | 74.00% | 74.00% | 74.00% |
| Utilization | | 71.6% | 71.6% | 68.7% | 65.8% | 62.9% | 60.0% | 57.1% | 54.1% | 54.1% | 54.1% |
| Productivity (BCM/hr) | | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 | 2,758 |
| Number Req'd | | 2.5 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 |
| **Loaders** | | | | | | | | | | | |
| Availability | | 90.00% | 90.00% | 90.00% | 89.38% | 88.66% | 87.94% | 87.22% | 86.50% | 85.78% | 85.06% |
| Utilization | | 85.0% | 85.0% | 84.5% | 84.0% | 83.5% | 82.0% | 81.5% | 81.0% | 80.5% | 80.0% |
| Productivity (BCM/hr) | | 1,495 | 1,495 | 1,486 | 1,478 | 1,469 | 1,442 | 1,434 | 1,425 | 1,416 | 1,407 |
| Number Req'd | | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## 3.8 OPERATING AND CAPITAL COSTS

A discussion on the operating and capital costs for the Minago project is provided in Sections 15.0,16.0,and 17.0.

# 4.0 GEOTECHNICAL CONSIDERATIONS

## 4.1 OVERVIEW

### *4.1.1 INTRODUCTION*

The Minago site is located in low, perennially flooded peat terrain. Wardrop conducted geotechnical site investigations during the winters of 2007 and 2008, for the purpose of carrying out the feasibility level design of the various components of the project. The results of the investigations were used to define the characteristics of the overburden soils, the upper dolomite bedrock, and groundwater conditions across the site.

The geotechnical input for the Feasibility Study includes the feasibility level design of the Tailings and Waste Rock Management Facility (TWRMF), mine Waste Rock dumps, Overburden Disposal Facility (ODF) and related other components. The disposal of tailings, waste rock and overburden has been studied from a number of different perspectives and the containment selection was made on the basis of factors discussed further in this report. The selected alternative for tailings and Potentially Acid Generating (PAG) Waste Rock disposal is total containment behind a lined rock fill embankment dam.

The work of this section as detailed in 4.1.2 relates directly with the other key components of the study. The mine development and the mining schedules relate directly to the development and the operation of the waste rock dump and the tailings facilities. Similarly, the waste streams from the operation of the ore processing plant and the frac sand processing plant interact directly with these facilities. This section interfaces with storm water management and closure issues discussed separately in the Infrastructure and Closure Plan Sections. The stability and the dewatering of the Open Pit Mine are covered separately within the Open Pit Mining, Infrastructure and Environmental Concerns Sections.

In the case of the TWRMF dam, waste rock dumps (WRD), and ODF, the designs are controlled to a significant extent by the presence of weak peat and clay foundation soils. Other factors include environmental constraints governing water quality and the separation of the dam from Highway 6. The TWRMF dam, waste rock dumps and ODF locations were selected during early design stages and were influenced by the evaluation of the subsurface conditions.

The designs presented herein are based on criteria developed progressively subsequent to the Prefeasibility Study, the interpretation of the geotechnical data and other relevant multi-disciplinary inputs available. Further optimizations involving

possible modifications of the current layout and design are envisaged during the detailed design stage. An additional geotechnical investigation, to better define current designs and to encompass additional site areas within the recently expanded property limits, are envisaged for future optimizations. As with the other sections of this study, the level of engineering is appropriate for a study at the feasibility level.

The design and construction of access and haul roads are influenced to a significant extent by the presence of peat. The construction works will be based on experience which generally involves using rock fill to displace the peat to the clay. In selective cases, construction on the peat will involve geogrid reinforcement or other expedients to facilitate initial access by construction equipment.

The design and construction of access and haul roads are influenced to a significant extent by the presence of peat. The construction works will be based on experience which generally involves using rock fill to displace the peat to the clay. In selective cases, construction on the peat will involve geogrid reinforcement or other expedients to facilitate initial access by construction equipment. Further details of the proposed approaches for road construction are presented in Section 8.0, Infrastructure.

### 4.1.2 SCOPE OF WORK

The scope of the work for this Section includes the following:

- factual data and laboratory testing
- site, materials, and tailings characterization
- study of options for the TWRMF
- engineering analyses – seepage, stability and settlement
- geotechnical design of TWRMF, WRD, and ODF
- water handling and balance for the TWRMF and ODF as a part of the overall site water balance and management
- conceptual tailings, waste rock and overburden deposition plans
- construction considerations
- borrow sources
- performance monitoring
- geotechnical closure issues
- potential future optimizations
- Design Basis and Design Criteria
- Related scope of work items covered in other Sections of this report which have a bearing on the work of this Section include:

- Geotechnical Studies for the Open Pit Slope Stability (Section 3.0)
- Hydrogeological studies for the Open Pit De-Watering (Section 12.0)

## 4.2 SITE CHARACTERIZATION

### *4.2.1 ENGINEERING GEOLOGY*

Regional geology at the site is described in Section 3.0 of this study. From a geotechnical standpoint, relevant units of the stratigraphic column shown in Figure 3.3 in Section 3.2 are the upper Ordovician dolomite and the Quaternary surface cover. These units are depicted briefly in this Section.

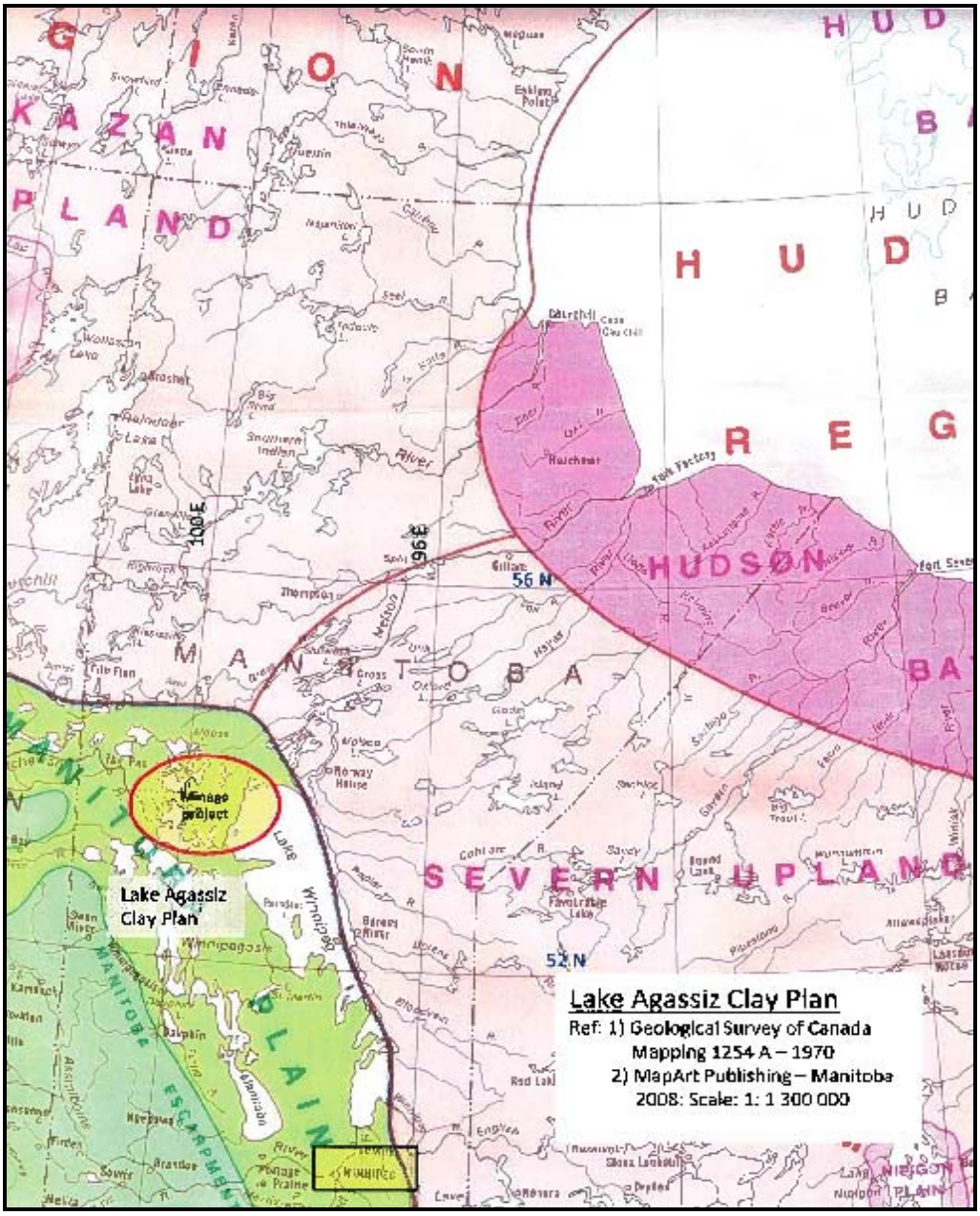
The dolomite is fine-grained, massive-to-stratified and varies in colour from creamy white to tan brown to bluish grey. The thickness of this unit ranges from 42 to 62 m from north to south, respectively. The uppermost 24 m is stratified and contains horizontal clay/organic beds of approximately 1 to 5 mm in thickness and occurring at intervals ranging from few millimetres to a metre.

The Quaternary surface cover typically comprises up to 4 m of peat that is generally underlain by up to 20 m of low permeability glacial lacustrine clays. The clays are dark brown to grey and carbonate rich. Muskeg is formed by an accumulation of sphagnum moss, leaves, and decayed matter.

The underlying clay and sporadic till was deposited from former glacial Lake Agassiz. Lake Agassiz once stretched across portions of Saskatchewan, Manitoba and western Ontario, impounded by retreating and transgressing Laurentian ice sheets. Lake Agassiz finally drained into the Arctic Ocean about 7400 BP found locally below the clay.

Figure 4.1 the current extent of clays deposited in Lake Agassiz is shown in green which create artesian pressures at the site. The deposit contains silt and some sand and gravel with glacial till found locally below the clay.

**Figure 4.1 Lake Agassiz Clay Plain* Showing Minago Site**




## 4.2.2 CLIMATIC FACTORS

Climatic conditions at the site include seasonal air temperature cycles, precipitations, wind pressures and snow loads. These parameters which are used in the subject designs are described in Section 1.0.

### 4.2.3 HYDROLOGY

The project site is located within the Nelson River sub-basin, which drains northeast into the southern end of the Hudson Bay. The sub-basin contains the Minago River, Hargrave River and William River with the Oakley Creek tributaries. The catchments of these three rivers are within the Lake Winnipeg basin, which drain northward into the Nelson River sub-basin.

Hydrologic monitoring was conducted by URS and data was collected at different times between May and October 2007 and results reported in Section 12.0.

### 4.2.4 DRAINAGE

Small-to-medium size lakes are present to the southwest and northeast, along with Limestone Bay on the north-eastern edge of Lake Winnipeg, all within a radius of about 30 kilometres. The Minago site is situated in topographically low, water-logged muskeg/peat terrain with some forested (low trees) areas. This low area extends for a significant distance to the north and east. A limestone ridge confines the lowland approximately 7-20 kilometres south and west of the site, respectively.

Site drainage occurs within Oakley Creek and Minago River watersheds. The majority of the local surface water flow in the central and southern areas is predominantly easterly reporting to Oakley Creek. Minor drainage from the northern site area reports to the Minago River.

### 4.2.5 SEISMICITY

As the Minago project is located in a region historically exhibiting low seismicity an extensive evaluation extending beyond an examination of historic earthquakes is not considered necessary. The 2005 National Building Code seismic hazard calculation indicating the acceleration levels for given probabilities is presented in Table 4.1.

**Table 4.1 Minago Project Area Regional Seismicity**

| Probability of Exceedance per Annum | Probability of Exceedance in 50 Years (%) | Return Period (years) | Peak Ground Acceleration (PGA) g |
|---|---|---|---|
| 0.01 | 40 | 100 | 0.007 |
| 0.0021 | 10 | 475 | 0.021 |
| 0.001 | 5 | 1,000 | 0.035 |
| 0.000404 | 2 | 2,475 | 0.059 |

A return period of 475 years is identified for use in design of structures at the site with a corresponding Peak Ground Acceleration (PGA) of 0.021 g. This design value has been assumed to be applicable for the operational life of the mine. For the longer

term post-closure phase a return period of 2,475 years has been assumed with a corresponding PGA of 0.059 g.

### 4.2.6 GEOTECHNICAL INVESTIGATION AND SOIL SAMPLING PROGRAM

The subsurface conditions at the site were investigated during the winter months of 2007 and 2008 by drilling a total of 90 boreholes and 8 test pits. The locations of the boreholes and test pits are shown on Drawing 0951330400-T0002.

The borehole survey was conducted by Pollock and Wright contracted directly by Victory Nickel in May 2008, approximately one month after completion of the field investigation program. A list of as-drilled boreholes, including their coordinates, elevations, and other pertinent information such as thickness and depth to the surface of the individual soil strata encountered, total drilled depths in overburden and bedrock is provided in Appendix D-1.

The bedrock was drilled with additional boreholes without sampling the overburden just beside Boreholes CR1, CR2, CR3, CR4, CR5, MB1, MB2, MB3, SP2, SP3, SP5, WD1, WD3, WD7, WD8, RR2, RR6, TD2, TD4, TD6, TD10, TD12, TD13 and TD14. Details about the subsurface conditions are provided in the Borehole and Test Pit Logs in Appendix D-2 and D-3, respectively.

The drilling was progressed using an Acker Soil Sentry track-mounted hydraulic rig equipped with a 125 mm diameter solid/hollow stem continuous flights auger operated by Paddock Drilling Ltd. of Winnipeg, Manitoba. Samples from the upper 3.5 m of soils were recovered at 0.76 m intervals using a 50 mm O.D. split-spoon sampler by conducting Standard Penetration Tests (SPT) in accordance with the procedures outlined in the ASTM Specification D1586. Below this depth the soil samples were recovered at 1.52 m intervals until refusal to auguring.

Thin-walled Shelby tubes were used to extract undisturbed soil samples from the clay overburden. The Shelby tube samples were obtained from the upper firm clay unit in 2007 and from the lower soft to firm clay unit in 2008. Pocket Penetrometer (PP) tests were carried out on recovered cohesive soil samples to obtain undrained shear strength values.

A total of six Nilcon Vane Tests and eight Standard Vane Tests were conducted in soft/firm soils to determine the in-situ Undrained Shear Strength of the soils. The Standard Vane tests were carried out by means of a Heavy Field Inspection Vane tester, model H-70. This instrument is capable of measuring separately the shear strength of the soils and the friction developed by the drilling rods. However, because the vane wings penetrated only generally 0.3 m into the undisturbed soils, in the evaluation of the test results the rod friction had not been taken into account.

Soil samples obtained from the boreholes were logged and placed in labeled plastic bags. The undisturbed thin walled Shelby tube samples were sealed by paraffin and

placed in insulated boxes. These samples were shipped to geotechnical laboratories upon completion of drilling. MDH Engineered Solutions' Saskatoon laboratory and Golder Associate's Mississauga laboratory conducted the soil laboratory testing in 2007 and 2008, respectively.

Field identification of the soil strata was based on visual and tactile examination of the samples obtained from the split spoon sampler, a few auger samples and from the bottom of thin-walled Shelby tube samples. The recovered soil samples were then re-examined and inspected subsequently by Wardrop's representatives in Golder Associate's laboratory in July, 2008.

A total of twenty-four boreholes were drilled into the bedrock where the overburden thickness was minimal using HQ size wireline equipment which allowed recovery of 63.5 mm diameter rock cores. The recovered cores were placed in core boxes, logged and photographed and then shipped and stored at Victory's core shack in Grand Rapids, Manitoba. Total Core Recovery (TCR), Solid Core Recovery (SCR), Rock Quality Designation (RQD) values and Fracture Indices (FI) were recorded by Wardrop's representative at the site. These parameters were recorded in accordance with the conventions used by the International Society for Rock Mechanics (ISRM). Selected rock core samples were shipped to Queen's University for Uniaxial Compressive Strength (UCS) and dynamic shear modulus tests. In-situ single packer tests were conducted in the lower 3 m of explored bedrock in selected boreholes to determine the permeability ("k" value) of the Ordovician dolomite. A total of 13 packer tests were carried out in the winter of 2008.

The fieldwork was supervised on a full time basis by Wardrop's field representatives who witnessed drilling, sampling and in-situ testing procedures.

A total of seventy-two 50 mm diameter observation wells were installed in the clay overburden across the project site to monitor piezometric heads. An additional twenty-four 50 mm diameter observation wells were installed at the bottom of the boreholes drilled into the bedrock in order to monitor the piezometric heads originating in bedrock. The observation wells were designed with a screened portion at the bottom of a PVC pipe with an above-grade extension of approximately one meter. Well gravel was placed in the annular space between the borehole and the PVC pipe up to 50 mm above the screen segment. A mixture of granular bentonite and soil cuttings was used for sealing the wells above the screen.

Details of the observation well installations are provided on the borehole logs in Appendix D-2.

## 4.3 MATERIALS CHARACTERIZATION

A summary of the geotechnical conditions encountered at the site is provided in the next sections.

### 4.3.1 GEOTECHNICAL PROFILE

The project site was divided into four sectors in plan for the ease of reference as listed below.

- Zone A:.TWRMF
- Zone B: ODF
- Zone C: Polishing Pond (PP)/TWRMF
- Zone D: Waste Rock Dumps
- Zone E: North West Sector of the site

The locations of the selected Zones, the general mine layout, and the overburden thicknesses are shown on Drawing 0951330400-T0003. Although Zone E was identified as a possible site early in the design process, this area was not incorporated and is redundant for the purpose of this report. Geotechnical profiles A-A through I-I are shown on Drawings D-1 to D-9 (Appendix D-6). The thickness and distribution of soil strata vary across the project site, and some of them were not encountered in all site zones. In general, Zone A exhibits relatively thin overburden , within 3 m below the ground surface, while Zone B and D exhibit relatively thick overburden ranging from 6 m to 15 m below the ground surface. One deep overburden pocket (21 m) was encountered within Zone B. The overburden in Zone C varies between 3 m and 10 m. Details of overburden thickness distribution are shown on Drawing 0951330400-T0003.

A total of five main soil strata were identified within the overburden on the site comprising:

- peat
- low plasticity clay (CL)
- intermediate plasticity clay (CI)
- high plasticity clay (CH)
- glacial till.

The overburden is underlain by a dolomite bedrock.

In order to provide a comprehensive general view about the subsoil conditions at the site are shown on Figure 4.2, Figure 4.3, and Figure 4.4. These figures show variations by Zones and by depth of the natural moisture content, recorded SPT N-values and Undrained Shear Strength (pocket penetrometer).

Figure 4.5 shows a compilation of the geotechnical properties for the entire site. On the upper part of Figure 4.6 the variation of the undrained shear strength obtained

from the Nilcon and Standard field vane tests and unconsolidated undrained triaxial tests are shown against depth. The lower part of Figure 4.6 shows the plot of normalized undrained shear strengths vs. depth.

**Figure 4.2 Variation of Natural Moisture Contents with Depth by Zones**

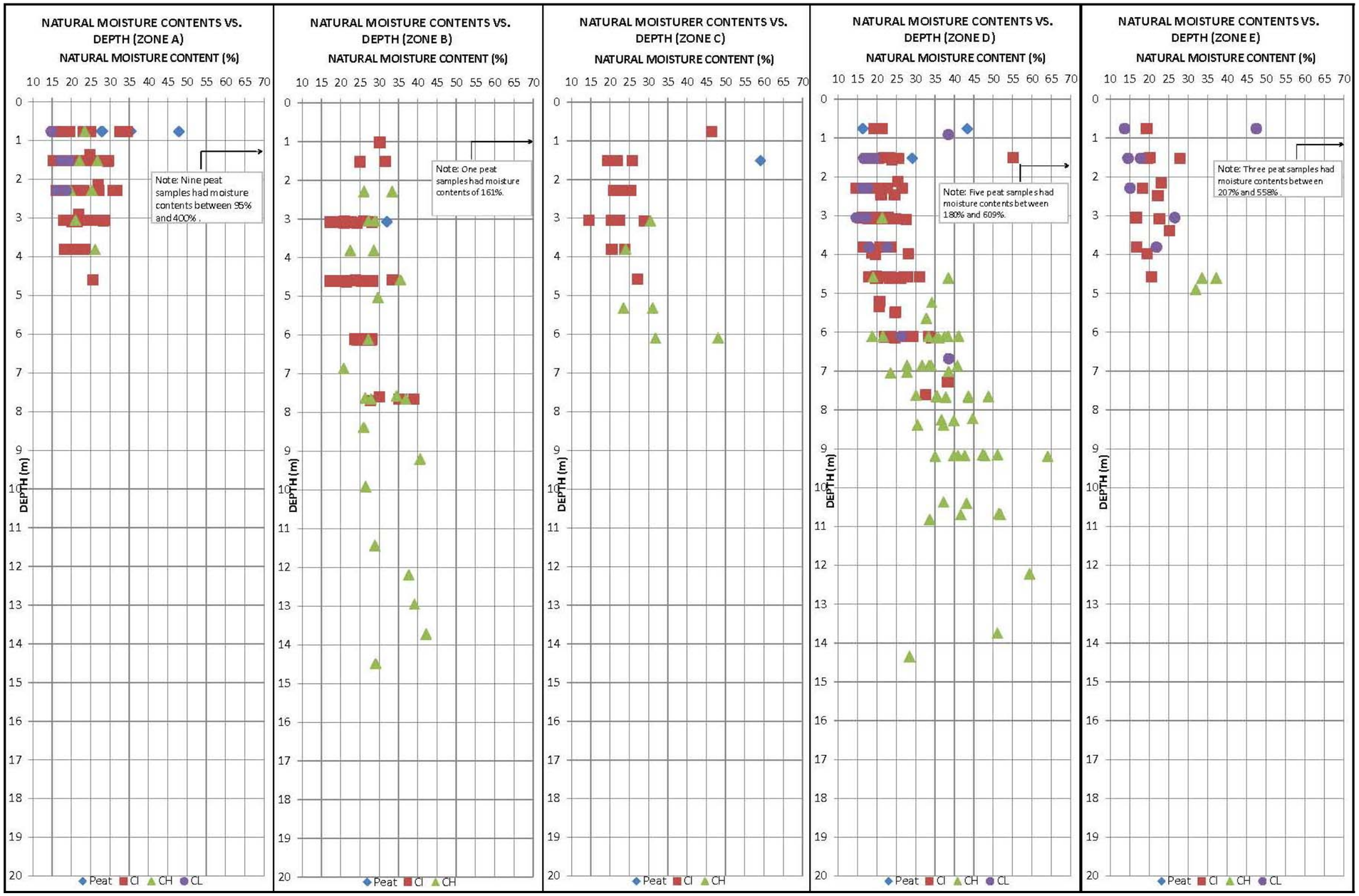


**Figure 4.3 Variation of SPT "N" Values with Depth in the Clay by Zones**

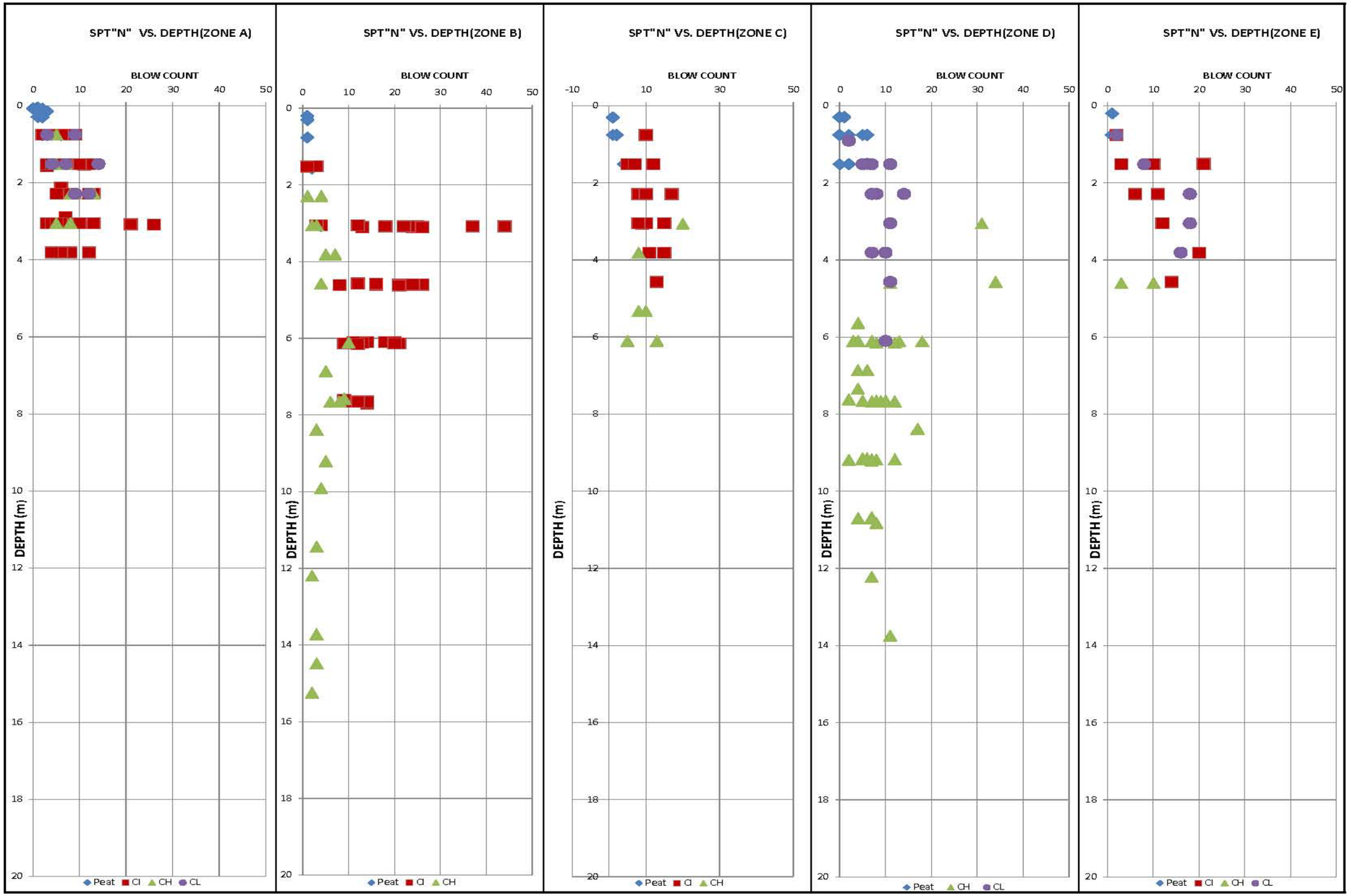


**Figure 4.4 Variation of Undrained Shear Strengths of the Clay with Depth by Zones**

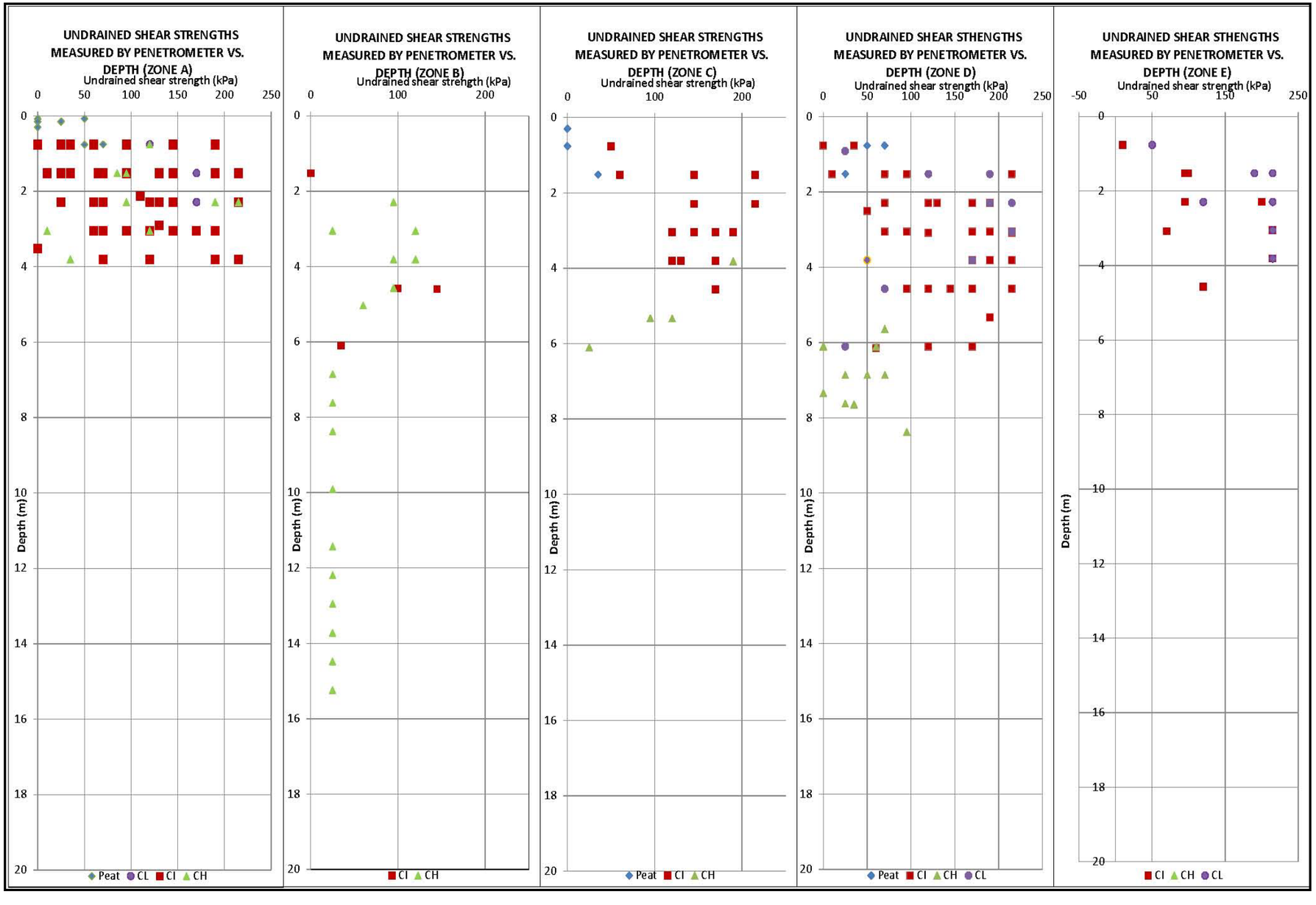


**Figure 4.5 Variation of Measured Moisture Contents, SPT "N"-Values and Undrained Shear Strengths with Depth in the Clay**

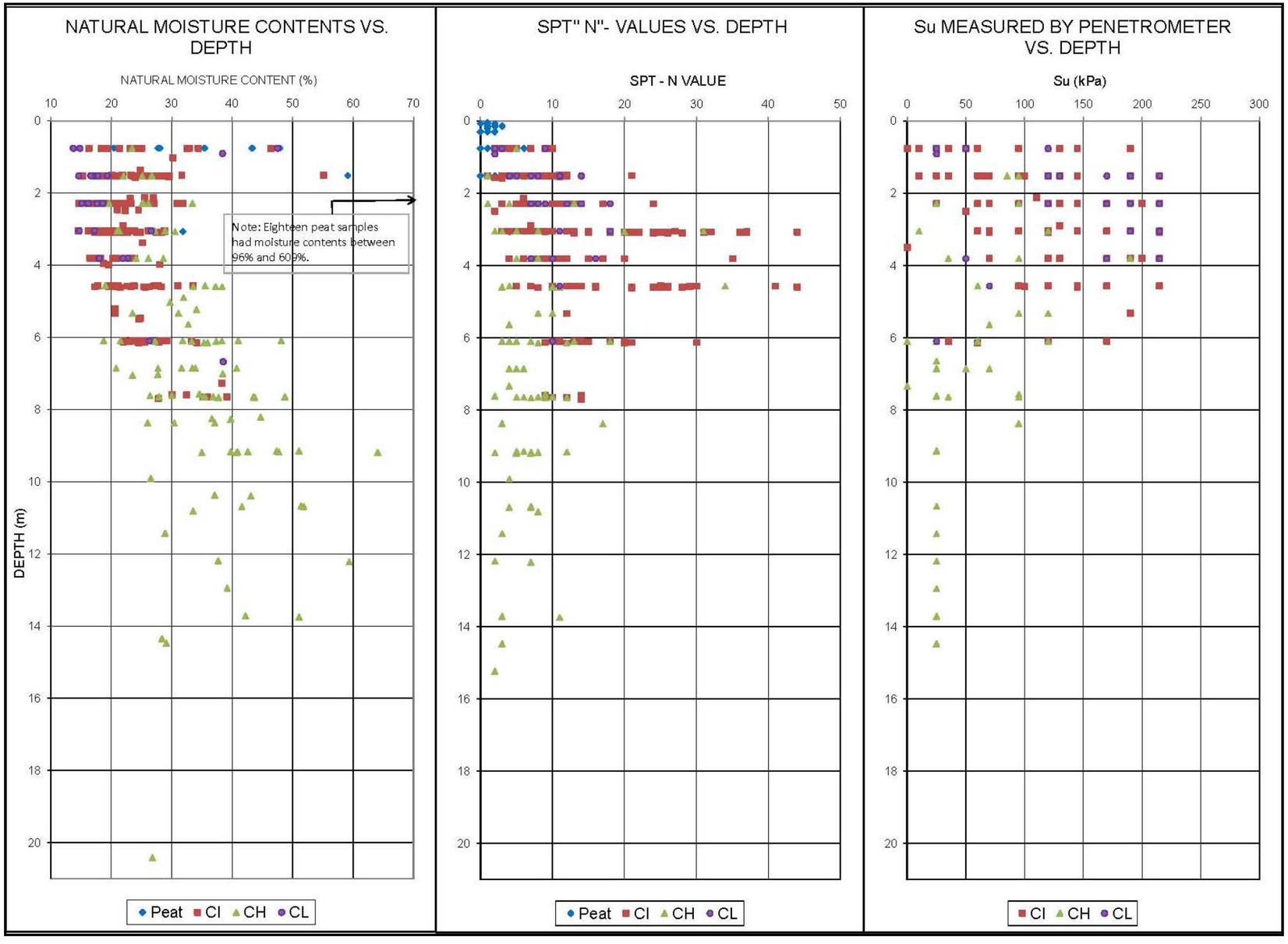
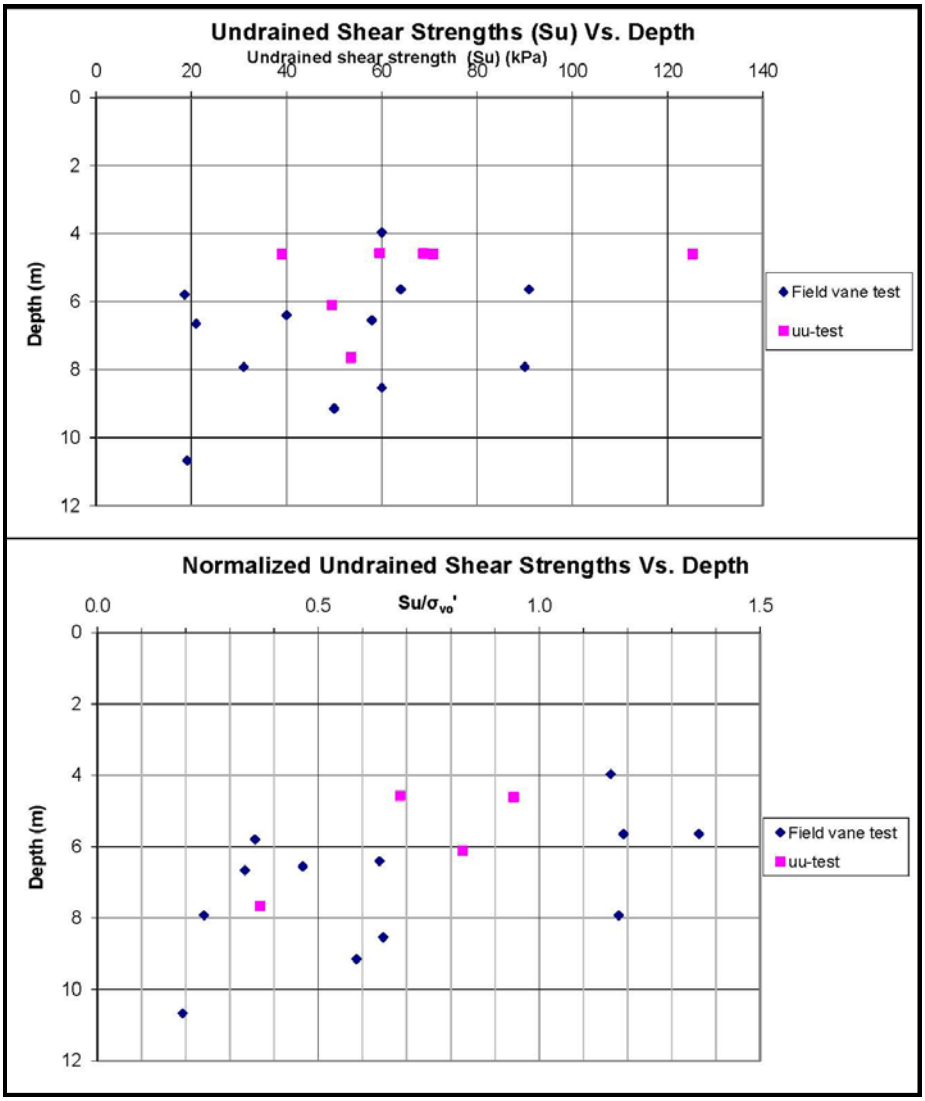


**Figure 4.6 Variation of Undrained Shear Strengths with Depth**




Although a summary geotechnical profile is presented in the following paragraphs, detailed back-up information is provided in Borehole Logs (Appendix D-2), Test Pit Logs (Appendix D-3), Rock Core Photographs (Appendix D-4), Laboratory Test Results (Appendix D-5), and Geotechnical Profiles A-A to I-I, Figures D-1 to D-9 (Appendix D-6).

## PEAT

Peat cover occurs over the entire site and extends to depths ranging from 0.5 of to 4.0 m with an average thickness of approximately 1.6 m. Drawing 0951330400-T0001 shows the interpreted peat isopachs across the site. The site is situated within a topographically low area of water-saturated peat and forest terrain, consisting of sparse black spruce and tamarack.

The peat is fine to coarse and exhibits fibrous structure. Moisture contents are generally high, ranging from 16% to 609%, with an average value of 178%. SPT 'N' values of between 0 blows per 0.3 m (i.e. drilling rod sunk by own weight) to 6 blows per 0.3 m, with an average value of approximately 3 blows per 0.3 m were generally recorded within this stratum suggesting very soft to firm, but generally soft consistency. Liquid limit, plastic limit and plasticity index 54%, 20% and 34%, respectively. During the fieldwork, the peat was generally frozen to a depth of approximately 0.5 m.

### LOW PLASTICITY CLAY (CL)

Low plasticity clay unit was encountered in places underlying the peat. The thickness of the stratum varied from1.8 m to 4.0 m, averaging 3.0 m. Based on the results of the particle size analyses, this deposit is composed of 48 to 68% of clay, 28 to 44% silt and 4% to 8% sand. Trace of gravel was encountered in places within this clay deposit. The stratum was generally brown to grey and moist to wet.

The natural moisture contents of tested samples obtained from this deposit were between 14% and 48%, averaging 21%. Based on an Atterberg limits test, its liquid limit, plastic limit and plasticity index are 35%, 16% and 19%, respectively. SPT 'N' values of 2 blows per 0.3 m were generally recorded at the surface of this deposit suggesting a very soft consistency. This soft layer is normally within 1 m below peat. Further down, clay formation becomes firm to stiff with an average N-value of approximately 12 blows per 0.3 m. The unit weight of this clay is 18.1 kN/m$^3$.

The undrained shear strength (Su) measured by Pocket Penetrometer (PP) testing ranged from less than 25 kPa to greater than 215 kPa and averaging about 158 kPa. A nilcon vane test conducted at a depth below the ground surface of 7.9 m in Borehole TD3 yielded an undrained shear strength of 31 kPa.

### INTERMEDIATE PLASTICITY CLAY (CI)

Intermediate Plasticity Clay was encountered extensively across the site. This unit was found either immediately underlying the peat or below the low plasticity clay described in the preceding section. Based on the results of particle size analyses, this deposit is composed of 38 to 58% clay, 38 to 47% silt and 4% to 15% sand. Trace of gravel within this clay deposit was encountered in places. This clay was generally brown to grey and moist to wet. The thickness of the stratum varied from 0.5 m to 7.0 m, averaging approximately 3.4 m.

The natural moisture contents ranged between 14% and 55%, averaging 23%. Liquid limits, plastic limits and plasticity indices in this deposit range from 33% to 54%, 15% to 22% and 18% to 32%, respectively. SPT 'N' values ranging between 1 and 54 blows per 0.3 m with an average N-value of 13 blows per 0.3 m, indicating very soft to hard but generally stiff consistency. Low N-values (i.e. 1 to 2 blows per 0.3 m) indicating very soft consistency were recorded directly underneath the peat.

The undrained shear strength (Su) inferred from Pocket Penetrometer (PP) testing ranged from 0 to greater than 215 kPa, averaging approximately 117 kPa. A nilcon vane test and a standard vane test conducted in Borehole TD4 yielded undrained shear strengths of 58 and 60 kPa respectively. Based on the results of the standard vane test carried out in Borehole TD4 the sensitivity, which is the ratio of the undisturbed to remolded shear strengths, of this type of clay is 2.1. The results of unit weight tests averages 19.6 kN/m³.

Consolidated Undrained (CU) Triaxial tests with pore pressure measurements were carried out on undisturbed (Shelby tube) samples recovered from BH7, BH11 and BH29. Three samples were trimmed from each Shelby tube and tested under different confining pressures. Each specimen was saturated using the backpressure technique, consolidated and then subjected to compressive loading. The results of the tests, including gradation characteristics, initial and final state parameters (moisture contents, unit weights, void ratios, etc.) as well as the relevant compression shear test charts (e.g. stress-strain charts, stress paths, failure envelopes, etc.) are provided in Appendix D-5. The interpreted effective stress strength parameters are summarized in Table 4.2.

**Table 4.2 Results of Consolidated Undrained Triaxial Testing on CI Clay Samples**

| Borehole-Sample | Effective Cohesion c'(kPa) | Effective Internal Friction Angle φ' (o) |
|---|---|---|
| BH7-2 | 11 | 26 |
| BH11-2 | 18 | 27 |
| BH29-2 | 35 | 26 |

Unconfined Compression tests were conducted on selected undisturbed Shelby tube samples taken from Boreholes BH8, BH9, BH21, BH25, and BH35. The test results are summarized in Table 4.3.

**Table 4.3 Results of Unconfined Compression Tests on CI Clay Samples**

| Borehole Sample | Su (kPa) |
|---|---|
| BH8-2 | 65 |
| BH9-3 | 147 |
| BH21-3 | 55 |
| BH25-3 | 50 |
| BH35-2 | 59 |
| BH39-3 | 39 |

One-dimensional odometer consolidation tests were conducted on 5 undisturbed Shelby tube samples taken from Boreholes BH7, BH11, BH22, BH29 and TD4. The samples were subjected to increments of constant stress at 5 kPa, 10 kPa, 20 kPa, 40 kPa, 80 kPa, 160 kPa, 320 kPa, 640 kPa, 1,280 kPa, and 2560 kPa, and

unloading was performed at 400 kPa, 100 kPa, and 25 kPa. The interpreted consolidation parameters are summarized in Table 4.4.

**Table 4.4 Results of Consolidation Tests on CI Clay Samples**

| Borehole Sample | Existing Effective Overburden Pressure σ' (kPa) | Reconsolidation Pressure σ'p (kPa) | Over Consolidation Ratio | Recompression Index, Cr (at Existing Overburden Pressures σ') | Compression Index for Pressures > σ'p CC |
|---|---|---|---|---|---|
| BH7-2 | 50 | 150 | 3.0 | 0.03 | 0.12 |
| BH11-2 | 100 | 150 | 1.5 | 0.06 | 0.14 |
| BH22-2 | 30 | 40 | 1.3 | 0.07 | 0.11 |
| BH29-2 | 50 | 200 | 4.0 | 0.04 | 0.15 |
| TD4-ST | 70 | 75 | 1.1 | 0.09 | 0.14 |

Based on the above test results, the intermediate plasticity clay unit is considered to be in an over-consolidated state. The average over-consolidation ratio is 2.2. The average recompression index (Cr) and compression index (Cc) is 0.06 and 0.13 respectively.

Hydraulic conductivity (HC) tests were carried out on undisturbed Shelby tube samples taken from BH9, BH10, and BH15. The tests were conducted under a pressure of 50 kPa applied to the samples. The results of HC tests are summarized in Table 4.5.

**Table 4.5 Results of Hydraulic Conductivity Tests on Undisturbed CI Clay Samples**

| Borehole - Sample | k (cm/s) |
|---|---|
| BH9-3 | $6.0 \times 10^{-9}$ |
| BH10-2 | $5.0 \times 10^{-7}$ |
| BH15-2 | $2.0 \times 10^{-6}$ |

HC permeability tests were also conducted on disturbed sample taken from BH40, a combined sample from Boreholes TD4/TD6/TD10/TDA9, a combined sample from Boreholes TD1/TD2/TD13 and a combined sample from Boreholes SL4/SL5/SL6. Prior to the HC test, these samples were compacted to 95% of their Standard Proctor Maximum Dry Density (SPMDD). The results of the permeability tests are summarized in Table 4.6.

**Table 4.6 Results of Hydraulic Conductivity Tests on Compacted CI Clay Samples**

| Borehole – Sample` | k (cm/s) |
|---|---|
| BH40-2 | $7.0x10^{-9}$ |
| Combined TD4/TD6/TD10/TDA9 | $1.1x10^{-8}$ |
| Combined TD1/TD2/TD13 | $1.4x10^{-8}$ |
| Combined SL4/SL5/SL6 | $1.6x10^{-7}$ |

The results of the HC tests show that this type of clay in compacted condition is somewhat less permeable than in its natural state.

### HIGH PLASTICITY CLAY (CH)

High Plasticity Clay is also present extensively across the site. This stratum was found either immediately underlying the peat or below the CL & CI clay deposits described in the preceding paragraphs. The presence of high plasticity clay appears to be dependent upon the overburden thickness. This unit is generally absent in areas where the overburden is less than 3 m thick. Its thickness increases proportionally with the increased overburden depth reaching a maximum of 9 m in Borehole BH10, where the total overburden was found to be 15 m thick. In a particular case, i.e. Borehole WD8 (sinkhole), the CH unit reaches 19 m in thickness. The average thickness of the stratum is approximately 3.5 m.

Based on the results of the particle size analyses, the high plasticity clay is composed of 50 to 70% clay, 15% to 40 silt and 5% to 10% sand and gravel. Based on gradation characteristics, CH can be described as clay to clay and silt, with traces of sand and gravel.

The natural moisture content of the tested samples obtained from this deposit varied from 19% to 64%, averaging 32%. Liquid limits, plastic limits and plasticity indices in this stratum range from 44% to 63%, 16% to 24% and 28% to 40%, respectively. SPT ‘N’ values between 1 and 34 blows per 0.3 m were recorded in this deposit indicating very soft to hard but generally stiff consistency. The average N-value was found to be 8 blows per 0.3 m. Similar to CL and CI units, a soft layer, with up to 1 m in thickness, was found directly underneath the peat. The undrained shear strength (Su) inferred from Pocket Penetrometer (PP) testing ranged from 0 kPa to 215 kPa, averaging 67 kPa. The results of unit weight tests averages 18.6 kN/m³.

Field nilcon vane tests and standard vane tests carried out at selected locations during site investigation indicate that the Undrained Shear Strength for this unit ranges from 19 kPa to 58 kPa and from 40 to 90 kPa, respectively, averaging 50 kPa. Based on the results of six standard vane tests carried out in Boreholes TD4, TD6, WD8 and RR2, the sensitivity, which is the ratio of the undisturbed to remoulded shear strengths, of this type of clay varies from 1.8 to 2.9. Unconfined Compression test conducted on a Shelby tube sample obtained from Borehole BH8

yielded an undrained shear strength of 53 kPa. The results of these tests are summarized in Table 4.7.

**Table 4.7 Results of Undrained Shear Strength on CH Clay Samples**

| Borehole | Depth (m) | Su (kPa) | Test Method |
|---|---|---|---|
| BH8 | 8 | 53 | Unconfined Compression |
| TD2 | 6.6 | 58 | Nilcon Vane |
| TD4 | 8.5 | 60 | Standard Vane |
| TD6 | 6.4 | 40 | Standard Vane |
| TD6 | 7.9 | 90 | Standard Vane |
| WD7 | 5.8 | 19 | Nilcon Vane |
| WD8 | 5.6 | 64 | Standard Vane |
| WD8 | 6.7 | 21 | Nilcon Vane |
| WD8 | 9.1 | 50 | Standard Vane |
| WD8 | 10.7 | 19 | Nilcon Vane |
| RR2 | 5.5 | 75 | Standard Vane |

Consolidated undrained (CU) triaxial tests were conducted on undisturbed Shelby tube samples obtained from Boreholes RR5, TD1, TD6, and WD8. The interpreted results are summarized in Table 4.8.

**Table 4.8 Results of the Unconsolidated Undrained Triaxial Test on CH Clay Samples**

| Borehole -Sample | Effective Cohesion c' kPa) | Effective Internal Friction Angle φ' ($^o$) |
|---|---|---|
| RR5-ST1 | 15 | 27 |
| TD1-ST1 | 7 | 22 |
| TD6-ST | 18 | 23 |
| WD8-ST3 | 14 | 25 |

Consolidation tests (one-dimensional odometer test) were carried out on 2 undisturbed Shelby tube sample taken from Boreholes TD1 and TD6. The interpreted consolidation parameters are summarized in Table 4.9.

**Table 4.9 Results of Consolidation Test on CH Clay Samples**

| Sample | Existing Effective Overburden Pressure σ' (kPa) | Pre-consolidation pressure $\sigma'_p$ (kPa) | Over-consolidation ratio | Recompression Index, Cr (at Existing Overburden Pressures σ') | Compression Index for Pressures > $\sigma'_p$ $C_C$ |
|---|---|---|---|---|---|
| TD1-ST | 90 | 90 | 1.0 | 0.11 | 0.32 |
| TD6-ST | 75 | 80 | 1.1 | 0.12 | 0.20 |

Based on the test results above, the CH clay unit is considered to be normally consolidated. The tests suggest that the clay has relatively high compressibility (average recompression and compression indices of about 0.11 and 0.26 respectively).

HC tests were conducted on 3 selected undisturbed Shelby tube samples taken from Boreholes SL5, TD6, and TD13. The tests were conducted under pressures of 80 kPa, 140 kPa and 140 kPa applied to the samples respectively. The results of HC tests are summarized in Table 4.10.

**Table 4.10 Results of Hydraulic Conductivity Tests on CH Clay Samples**

| Borehole – Sample | k (cm/s) |
|---|---|
| SL5-ST | $7.0 \times 10^{-9}$ |
| TD6-ST | $3.8 \times 10^{-9}$ |
| TD13-ST1 | $6.8 \times 10^{-9}$ |

### GLACIAL TILL

Localized glacial till unit was found between the clay and the limestone bedrock in the proposed crusher area. The thickness of the stratum was approximately 1.1 m. This unit is broadly graded and is generally composed of 12 to 30% clay, 23 to 35% silt, 33 to 35% sand and 27% to 30% of gravel. SPT-N values recorded in the till were generally greater than 8 blows per 0.3 m.

### DOLOMITE BEDROCK

Dolomite bedrock was encountered at variable depths across the site. The greatest depth to the limestone bedrock surface was encountered at the southeast portion of the site where it lies at approximately 23 m below the ground surface. This area is a suspected sinkhole or an area of deeper bedrock scouring during the glacial retreat. Presence of similar features in bedrock topography at other locations is probable.

An elongated dolomite ridge (subcrop/outcrop) with generally south-north orientation is present at the northwest site limit (Drawing 09513304-T002). The dolomite encountered in drill cores was generally fine grained with some shell fossils. In some boreholes the bedrock was found highly weathered from its surface to depths of about 1.2 m. Elsewhere the Rock Quality Designation (RQD) was generally between 50% and 100%, averaging 83%, indicating fair to excellent, but generally good quality bedrock.

Packer tests were carried out at sections between 3 m and 6 m below the bedrock surface in 13 boreholes. In Boreholes TD6 and TD10, however, the tests could not be completed due to frost in the water meter. The hydraulic conductivity (secondary permeability) calculated from the packer tests ranged from $10^{-3}$ cm/s to $10^{-4}$ cm/s,

indicating relatively permeable characteristics of the bedrock. The measured hydraulic conductivities (k values) are summarized inTable 4.11.

**Table 4.11 Summary of Packer Tests**

| Borehole | Depth (m) | | k (cm/s) |
|---|---|---|---|
| | From | To | |
| SP2 | 11.4 | 14.4 | $9.\ 7x10^{-4}$ |
| SP3 | 10.5 | 13.5 | $1.3x10^{-3}$ |
| SP5 | 11.7 | 14.7 | $1.3x10^{-3}$ |
| TD12 | 10.4 | 13.4 | $7.7x10^{-4}$ |
| TD13 | 7.5 | 10.5 | $1.0x10^{-3}$ |
| TD14 | 8.4 | 11.4 | $3.9x10^{-4}$ |
| TD2 | 6.6 | 9.6 | $1.4x10^{-4}$ |
| TD4 | 21.0 | 24.0 | $1.3x10^{-4}$ |
| WD1 | 6.6 | 9.6 | $8.2x10^{-4}$ |
| WD3 | 6.3 | 9.3 | $4.1x10^{-4}$ |
| WD8 | 6.0 | 9.0 | $3.6x10^{-4}$ |

Uniaxial Compressive Strength (UCS) tests and Dynamic Shear Modulus tests were conducted on selected dolomite core samples. The samples tested were obtained from the proposed former Crusher, Ore Stockpile and Mill Building areas currently within TWRMF footprint. The tests were completed at Queen's University Mining Engineering Rock Mechanics Laboratory in July and August 2008. The test results are summarized in Table 4.12 and Table 4.13.

**Table 4.12 Uniaxial Compressive Strength Tests in Dolomite**

| Borehole | Depth (m) | Density ($T/m^3$) | UCS (MPa) | Young's Modulus (GPa) | Poisson's Ratio |
|---|---|---|---|---|---|
| CR1 | 7.1 | 2.67 | 108 | 36.49 | 0.20 |
| CR2 | 6.3 | 2.62 | 87 | 38.48 | 0.21 |
| CR3 | 6.9 | 2.66 | 118 | 39.88 | 0.21 |
| CR4 | 6.8 | 2.66 | 88 | 31.88 | 0.15 |
| CR5 | 7.7 | 2.66 | 105 | 41.72 | 0.17 |
| MB1 | 5.5 | 2.54 | 78 | 34.11 | 0.24 |
| MB2 | 5.3 | 2.57 | 129 | 38.05 | 0.23 |
| MB3 | 6.3 | 2.62 | 83 | 34.21 | 0.22 |
| SP2 | 3.4 | 2.57 | 72 | 34.16 | 0.19 |
| SP3 | 6.2 | 2.64 | 116 | 39.44 | 0.18 |
| SP5 | 4.6 | 2.59 | 103 | 41.07 | 0.18 |

**Table 4.13 Dynamic Shear Modulus Tests in Dolomite**

| Borehole | Depth (m) | Solids Density (T/m³) | Shear Velocity (km/s) | Dynamic Shear Modulus (GPa) |
|---|---|---|---|---|
| SP2 | 4.9 | 2.56 | 3.32 | 28.29 |
| SP3 | 5.0 | 2.6 | 3.24 | 27.20 |
| SP5 | 7.9 | 2.66 | 3.59 | 34.21 |
| MB1 | 3.9 | 2.66 | 2.99 | 23.81 |
| MB2 | 4.1 | 2.57 | 3.09 | 24.49 |
| MB3 | 6.9 | 2.41 | 3.00 | 21.68 |
| CR1 | 6.8 | 2.41 | 3.47 | 28.99 |
| CR2 | 7.3 | 2.66 | 3.39 | 30.62 |

### 4.3.2 GROUNDWATER CONDITIONS

A total of 96 groundwater observation wells were installed as part of the geotechnical investigation. Seventy-two wells were installed in the overburden and 24 in the bedrock. The groundwater levels in the monitoring wells were measured between 1 day and in more than 2 weeks after completion of the boreholes. Because of the short period of observation and the relatively low permeability of the soils, the recorded water levels may not represent the stabilized static ground water table. The results of the ground water observations are listed in Table 4.14 and Table 4.15.

General representation of groundwater conditions for different zones at the site is shown in Figure 4.7. A histogram of average piezometric levels originating from overburden and bedrock is presented on Figure 4.8.

As shown in Figure 4.7, piezometric levels in the wells with screen in the overburden were generally found within 1.0 m below the ground surface across the site. However, in some wells installed in boreholes in Zone D (BH8, BH13, BH19, and TD3) the groundwater levels were recorded at significantly greater depths. i.e. ranging from 5.7 m to 8.6 m. This is also reflected in Figure 4.8 showing the average groundwater levels.

The piezometric heads recorded in the wells with screen in the dolomite bedrock indicate a confined aquifer with the exclusion of bedrock outcrop in Sector E. These records are in general compliance with the interpretations presented in the Golder 2008 Report. The heads in general reached within the uppermost 1.5 meters from the ground surface and in most cases were somewhat higher (up to 0.5 m) than the ones measured in overburden clays. This is clearly depicted in Figure 4.8. Artesian conditions were measured in Boreholes WD-7 and WD-8 where the piezometric heads reached 0.5 m above the ground surface. Zone E is generally characterized with piezometric levels being lower in the bedrock than in the overburden as presented in Figure 4.8.

**Table 4.14 Groundwater Level Measurements in Overburden**

| Zone A | | | Zone B | | | Zone C | | | Zone D | | | Zone E | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) |
| BH39 | 2/29/2007 | 0.1 | BH25 | 2/29/2007 | 0.5 | BH23 | 2/29/2007 | 0.6 | BH10 | 2/29/2007 | 0.2 | BH1 | 2/29/2007 | 0.8 |
| BH41 | 2/29/2007 | 0.1 | BH29 | 2/29/2007 | 0.3 | BH24 | 2/29/2007 | 2.9 | BH11 | 2/29/2007 | 0.1 | BH3 | 2/29/2007 | 0.0 |
| BH42 | 2/29/2007 | 0.6 | BH30 | 2/29/2007 | 0.4 | RR2 | 3/6/2008 | 0.3 | BH12 | 2/29/2007 | 2.6 | BH7 | 2/29/2007 | 0.8 |
| BH43 | 2/29/2007 | 0.0 | BH32 | 2/29/2007 | 0.1 | RR6 | 3/6/2008 | 1.2 | BH13 | 2/29/2007 | 8.6 | TD-10 | 4/13/2008 | 1.4 |
| CR1 | 3/6/2008 | 0.6 | BH35 | 2/29/2007 | 0.1 | RR7 | 4/13/2008 | 1.0 | BH14 | 2/29/2007 | 4.2 | TD-12 | 4/13/2008 | 0.6 |
| CR2 | 3/6/2008 | 0.6 | BH38 | 2/29/2007 | 1.0 | WD-3 | 4/13/2008 | 0.8 | BH15 | 2/29/2007 | 0.3 | | | |
| CR3 | 3/6/2008 | 0.6 | BH40 | 2/29/2007 | 0.2 | | | | BH16 | 2/29/2007 | 2.7 | | | |
| CR4 | 3/6/2008 | 0.6 | WD-7 | 3/6/2008 | -0.3 | | | | BH17 | 2/29/2007 | 0.3 | | | |
| CR5 | 3/6/2008 | 0.6 | WD-8 | 3/6/2008 | 0.3 | | | | BH19 | 2/29/2007 | 6.4 | | | |
| DP | 3/6/2008 | 1.9 | | | | | | | BH21 | 2/29/2007 | 0.1 | | | |
| MB1 | 3/6/2008 | 1.1 | | | | | | | BH22 | 2/29/2007 | 0.2 | | | |
| MB2 | 3/6/2008 | 0.9 | | | | | | | BH4 | 2/29/2007 | 3.7 | | | |
| MB3 | 3/6/2008 | FROZEN | | | | | | | BH5 | 2/29/2007 | 0.3 | | | |
| MB6 | 3/6/2008 | 1.2 | | | | | | | BH8 | 2/29/2007 | 7.8 | | | |
| MB7 | 3/6/2008 | 0.3 | | | | | | | BH9 | 2/29/2007 | 0.3 | | | |
| MB8 | 3/6/2008 | 2.2 | | | | | | | RR5 | 4/13/2008 | 1.7 | | | |
| MB9 | 3/6/2008 | 1.2 | | | | | | | TD-1 | 4/13/2008 | 1.9 | | | |
| PSP-1 | 3/6/2008 | 1.0 | | | | | | | TD-13 | 4/13/2008 | 0.9 | | | |
| PSP-2 | 3/6/2008 | 1.0 | | | | | | | TD-2 | 4/13/2008 | FROZEN | | | |
| RSS1 | 3/6/2008 | 2.7 | | | | | | | TD-3 | 4/13/2008 | 5.7 | | | |
| RSS2 | 3/6/2008 | 2.9 | | | | | | | TD-4 | 4/13/2008 | 1.6 | | | |
| SL-5 | 4/13/2008 | 2.9 | | | | | | | TD-5 | 3/27/2008 | 4.3 | | | |
| SL-6 | 4/13/2008 | 1.0 | | | | | | | TD-6 | 4/13/2008 | 0.5 | | | |
| SP2 | 3/6/2008 | FROZEN | | | | | | | WD-1 | 4/13/2008 | 0.5 | | | |
| SP3 | 3/6/2008 | FROZEN | | | | | | | | | | | | |
| SP5 | 3/6/2008 | FROZEN | | | | | | | | | | | | |
| TS2 | 4/13/2008 | 1.2 | | | | | | | | | | | | |
| WP | 3/6/2008 | 0.9 | | | | | | | | | | | | |
| Highest GW Level | | 0.0 | | | -0.3 | | | 0.3 | | | 0.1 | | | 0.0 |
| Lowest GW Level | | 2.9 | | | 1.0 | | | 2.9 | | | 8.6 | | | 1.4 |
| Average depth | | 1.1 | | | 0.3 | | | 1.1 | | | 2.4 | | | 0.7 |

**Table 4.15 Groundwater Level Measurements in Bedrock**

| Zone A | | | Zone B | | | Zone C | | | Zone D | | | Zone E | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) | BH | Date | Depth to the Water Level Below Grade (m) |
| CR1 | 3/6/2008 | 0.2 | WD-7 | 3/6/2008 | -0.5 | RR2 | 3/6/2008 | 0.6 | TD-13 | 4/3/2008 | 2.2 | TD-10 | 4/3/2008 | 2.4 |
| CR2 | 3/6/2008 | 0.2 | WD-8 | 3/06/2008 | -0.2 | RR6 | 3/6/2008 | 1.8 | TD-2 | 4/3/2008 | 1.3 | TD-12 | 4/3/2008 | 0.5 |
| CR3 | 3/6/2008 | 0.2 | | | | WD-3 | 4/3/2008 | 0.2 | TD-4 | 4/3/2008 | 1.6 | TD-14 | 4/3/2008 | 1.3 |
| CR4 | 3/6/2008 | 0.2 | | | | | | | TD-6 | 4/3/2008 | 0.3 | | | |
| CR5 | 3/6/2008 | 0.2 | | | | | | | WD-1 | 4/3/2008 | 0.6 | | | |
| MB1 | 3/6/2008 | 1.1 | | | | | | | | | | | | |
| MB2 | 3/6/2008 | 0.9 | | | | | | | | | | | | |
| MB3 | 3/6/2008 | 0.9 | | | | | | | | | | | | |
| SP2 | 3/6/2007 | 1.0 | | | | | | | | | | | | |
| SP3 | 3/6/2008 | 1.0 | | | | | | | | | | | | |
| SP5 | 3/6/2008 | 0.9 | | | | | | | | | | | | |
| Highest GW Level | | 0.2 | | | -0.5 | | | 0.2 | | | 0.3 | | | 0.5 |
| Lowest GW Level | | 1.1 | | | -0.2 | | | 1.8 | | | 2.2 | | | 2.4 |
| Average depth | | 0.6 | | | -0.4 | | | 0.9 | | | 1.2 | | | 1.4 |

**Figure 4.7 Groundwater Levels by Zones**

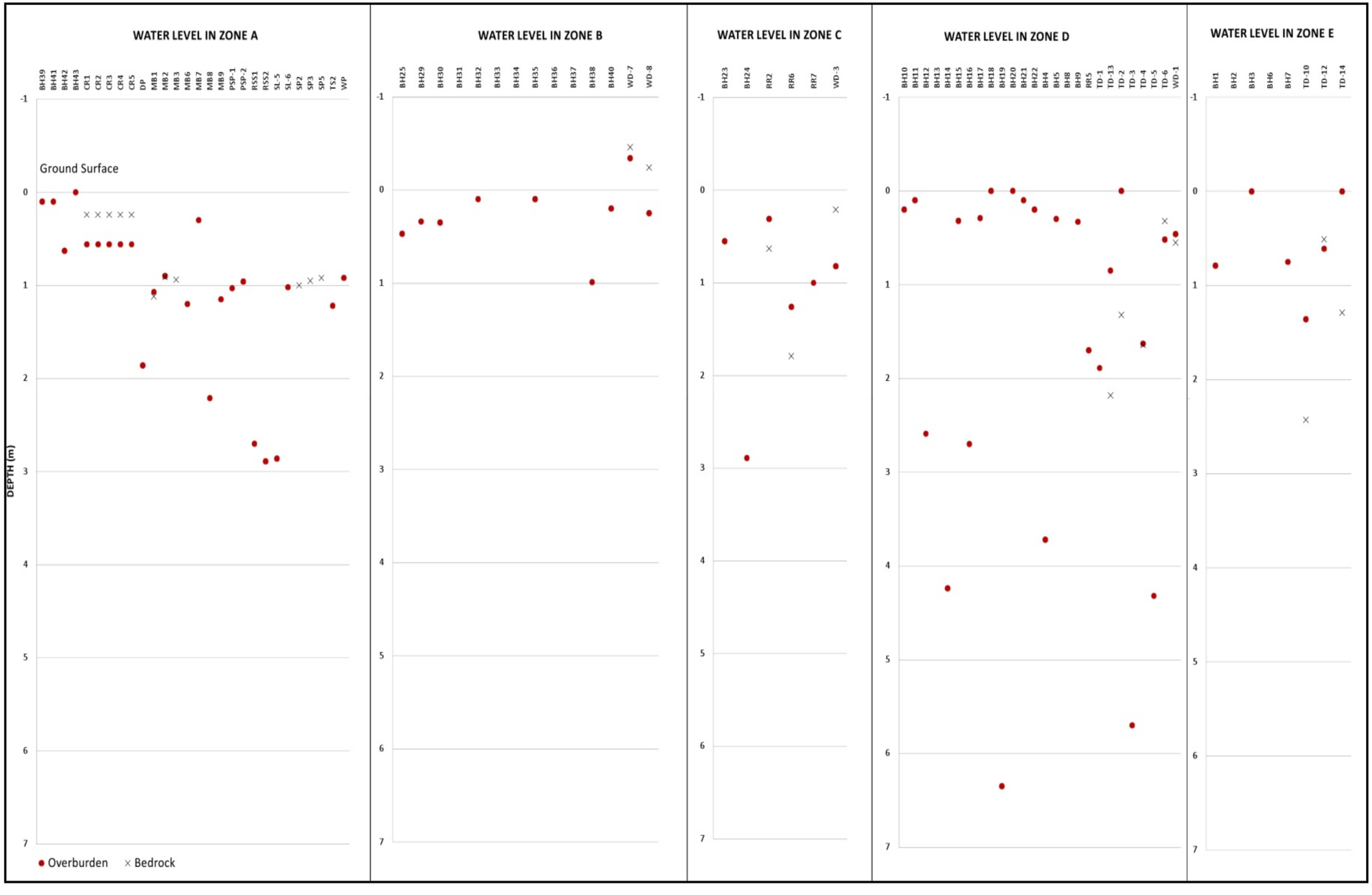
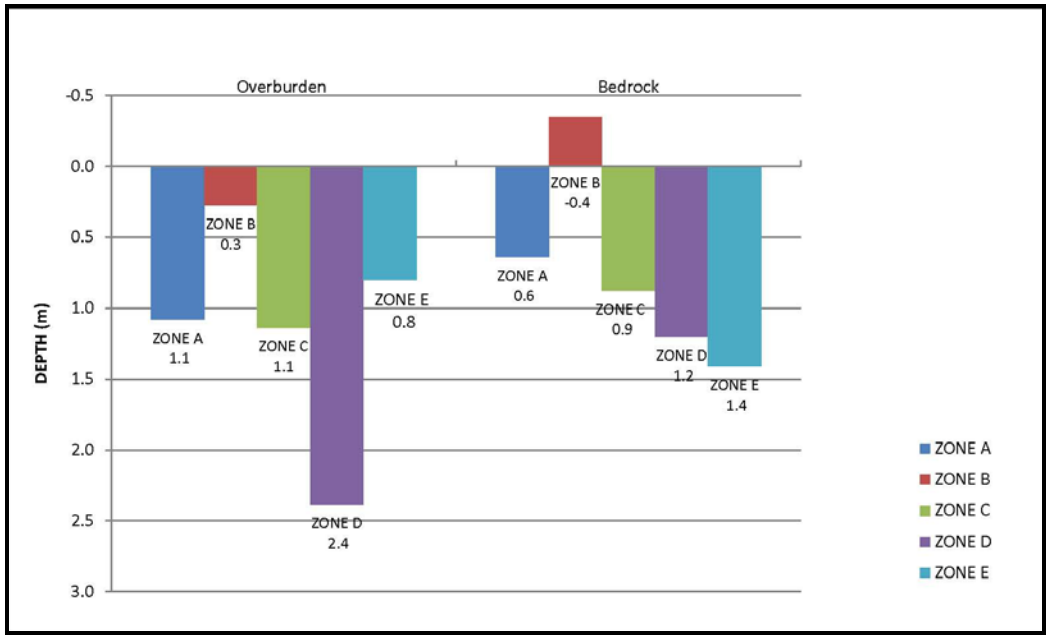


**Figure 4.8 Average Measured Groundwater Levels in Overburden and Bedrock**




### 4.3.3 TAILINGS CHARACTERISTICS

Geotechnical characterization of tailings was conducted at SGS Lakefield laboratory in Peterborough, Ontario. The tailings sample was generated from the lock cycle test, one of several metallurgical programs set up for the Minago Project.

The tailings sample obtained from the lock cycle testing had solids content of 45% by weight. Additional testing included settling tests, sieve and hydrometer analysis, specific gravity test, atterberg limits, standard proctor compaction test, hydraulic conductivity test, consolidated undrained triaxial test and an air drying test.

Settling tests were conducted for both undrained and drained conditions. The settled sample in the drained settling test was further subjected to a constant head hydraulic conductivity test. Hydraulic conductivity tests were carried out on compacted samples using a flexible wall permeameter. Specific gravity, sieve and hydrometer tests were conducted as per ASTM requirements. The column drying test was conducted as per generic mining method rather than ASTM.

The grain size distribution test showed that the tailings sample was relatively fine grained, containing 5% clay, 77% silt and 18% fine sand. Atterberg limits test gave a liquid limit of 42%, a plastic limit of 28% and a plasticity index of 14%. A standard Proctor test resulted in a maximum dry density of 1,697 kg/m$^3$ at an optimum moisture content of 16.6%. The initial pulp density for both, drained and undrained conditions was 1.39 t/m$^3$. When the test was completed nine days later, the density in drained and undrained conditions increased to 1.66 T/m$^3$ and 1.54 T/m$^3$, respectively. The laboratory test results are attached in Appendix D-5.

Hydraulic conductivity tests on two combined tailings samples (i.e. on initially dry specimen and on slurried sample) were carried out by SGS Minerals Services in Lakefield, ON (SGS) using falling head testing method. Prior to conducting the tests, both samples were saturated. Based on the test results, the coefficients of permeability "k" were 8.2 x 10-6 cm/s and 2.0 x 10-5 cm/s for the initially dry and slurried samples, respectively.

The air drying test was carried out by SGS on a combined tailings sample. The test results show that the bulk of the volume reduction at average room temperature with relative humidity varying between 20 and 50% occurs during the first 800 hours. Details of the test results are shown in the SGS report attached in Appendix D-5.

## 4.4 CONSTRUCTION MATERIALS

The project site has a scarcity of suitable natural granular borrow materials, such as sand and gravel materials within a reasonable haul distance. However, frac sand waste has some potential value as a construction material and further examination during the detailed design phase is recommended. Those construction materials which have been identified in the designs are discussed below.

### OVERBURDEN

The in-situ peat is un-suitable for construction purposes but it may have some potential for use for site reclamation. If pre-loaded, the peat may be used as foundation material for structures that are not sensitive to settlements, such as rock dumps and downstream side of tailings containment structure. Pre-loading tests on the peat were not carried out for determination of consolidation characteristics and this is recommended for the Detailed Design engineering stage.

### CLAY OVERBURDEN

The construction of water containment structures and dykes across the site will require low permeability materials. Site clays were assessed during the pre-feasibility and feasibility geotechnical investigations and the results of laboratory tests on selected clay samples are summarized as follows:

- Optimum moisture content at standard Proctor maximum dry density (SPMDD) between 1,600 and 1,752 kg/m$^3$ ranged from 16.3% to 18.6%.
- As shown in Figure 4.5, the natural moisture content of the clay was generally found to be higher than 20%, exhibiting values in excess of 50% in the lower zones of the geotechnical profile.
- The clay characterized by natural moisture content close to the optimum may be found within some clay zones in the upper 5 m.
- Site areas with shallow thickness of overburden contain stiff clays that exhibit natural moisture contents close to optimum.

- The site features and geotechnical profile pose limitations on borrow sources within the site limits in their natural state at the time of excavation based on the following:
    - As the muskeg/peat is water logged, recovery of clays from perennially flooded terrain would face formidable logistical challenges. More specifically, these areas will require that the muskeg/peat be bermed off so that the upper stiff clay could be excavated in “dry” conditions.
    - As shown in Figure 4.5, clay material with natural moisture contents reasonably close to the optimum may be found within the uppermost 5 m of the deposit. The moisture content of the clays is well above the optimum at depths greater than 5 m.
    - In general, clays suitable for construction are more likely to be found in site areas with thin overburden. Furthermore, the clays would experience moisture uptake during excavation even if the borrow areas are bermed off.
    - Clay properties are generally not favorable for conventional rolled fill applications without additives such as lime and this will be factored in the designs. The use of such additives is cost prohibitive.
    - The site layout is fairly compact and the vacant areas have not been geotechnically investigated and this is planned to be undertaken at the detailed design stage.

### DREDGED MATERIAL

For reasons discussed elsewhere, dredging was selected as an economic option for the removal of overburden peat and clay within the open pit area. The dredged material from the open pit will be placed in a surface facility where consolidation will occur over time to produce a material marginally suitable as a low permeability barrier.

### DOLOMITIC LIMESTONE/DOLOMITE

The dolomitic limestone outcrop at the west site limit as outlined is identified as a source of suitable rock fill for early stages of the project development until waste rock from the open pit becomes available. In addition to the dolomitic limestone outcrop, a total of three potential off-site quarries within a distance of 5 km from the project site have been identified. However, these have not been taken into consideration because of the additional cost of imported materials. The dolomite waste rock from the open pit operation is a significant resource of granular materials, either as rock fill for dam shell construction or after crushing for granular filters and road surfacing.

The laboratory test results presented in Section 4.3.1 on aggregate samples are based on a limited number of samples taken from exploration boreholes. These are only an indication of the quality of dolomite within the open pit.

Los Angeles abrasion tests in accordance with CSA A23.3-16A standard were carried out on limestone samples obtained from the site. This test determines the degradation of the material when subjected to abrasion, attrition, impact and grinding. The sample is placed in a drum along with a hardened steel abrasive charge. After rotating the drum for a specific number of times, the sample is removed and examined for wear.

The “hardness” of aggregate is measured as its resistance to abrasion. A low aggregate abrasion resistance (AAR) number indicates a low percentage of abrasion and thus a hard rock. A value of 20 is required for high impact pavements such as airport runways, whereas for Highway 6 the contractor has indicated that an AAR value of 34 would be acceptable.

Wardrop commissioned Trade-off Study 2 “Limestone (2007)” in which three HQ (63.5 mm) dolomite samples were crushed to 20 mm at the National Testing Laboratory in Winnipeg. Two samples were from the upper portion of the sedimentary strata to check for variance and a third sample was from the centre of the strata to determine whether weathering would affecting the use of the dolomite.

The three results show little variation and no bias based on depth: the two upper samples averaged 26.5% and the lower least weathered had a value of 28% A grade material. This data is consistent with visual observations of a fresh/slightly weathered dolomite that is well bonded by fine-grained carbonate cement.

### FRAC SAND

The principal properties of the frac sand are described in Section 7.0.

## 4.5 GEOCHEMICAL CHARACTERIZATION

The geochemical characterization programme undertaken by URS in 2007 as referenced in Section 12.0 from which the key findings are summarized below.

### OVERBURDEN

The overburden is considered to be non-acid generating or metal leaching in the natural state. In the disturbed state over time, the geochemical properties of the peat and clay are not expected to differ from baseline conditions.

### WASTE ROCK

As per results of the geochemical characterization program undertaken by URS in 2007, the overburden, Ordovician dolomite, and Ordovician sandstone overlying the altered Precambrian basement and Precambrian basement lithologies are considered non-acid generating NAG material and have minor metal leaching potential. The altered Precambrian basement and the Precambrian basement

lithologies amphibolite and mafic dike also are considered to be NAG. Although the Precambrian granite is typically considered to be non-PAG, localized areas with moderate to high sulphide sulphur and negligible carbonate content may create PAG granite. Precambrian serpentinite is considered to be NAG, primarily due to an abundance of carbonate content.

Precambrian mafic metavolcanic material is considered to be PAG based on the presence of sulphide content and negligible carbonate content. Precambrian metasedimentary material is considered to be PAG due to low to high variability sulphide sulphur content and low carbonate content. The Minago Project will produce three types of waste rock, namely, country rock which is predominantly granitic, dolomite and ultramafic rock. The overall tonnage for granitic country rock and PAG ultramafics waste rock are 122 and 36 million, respectively.

URS recommended that an operational program for static testing on blast hole cutting be based on a geologic block model. The program will be communicated to mine operators, and PAG and NAG waste rock will be segregated. The PAG ultramafic material will be co-disposed with tailings in the Tailings and Waste Rock Management Facility (TWRMF) to mitigate the acid generation problem. URS also recommended that a preliminary neutralization potential ratio of 1.7 should be used for segregation of PAG from NAG materials based on carbonate molar ratios derived from the kinetic tests.

The humidity cell test results suggested that when dolomite is mixed with altered Precambrian basement and Precambrian basement would be effective in providing excess acid neutralization capacity to compensate secondary sulphide oxidation products on a micro-scale or meso-scale in-situ.

### TAILINGS

Static and laboratory kinetic subaqueous column test results indicate that potential tailings material is NAG, due to very low sulphide sulphur content and moderate carbonate mineral content. Based on URS 2008, static and kinetic subaqueous column test results indicate NAG tailings due to very low sulphide sulphur content and moderate carbonate cement. Based on their geochemical characteristics, concurrent disposal of tailings and PAG waste rock would minimize ARD/ML issues associated with ultramafic waste and eventually providing an encapsulation of the PAG waste rock by creating a combination of tailings and water cover to minimize sulphide oxidation and/or metal leaching.

## 4.6 GEOTECHNICAL DESIGNS

The geotechnical design requirements, considerations, design basis and design criteria used for the feasibility study are summarized in the following paragraphs.

### 4.6.1 GEOTECHNICAL DESIGN DEVELOPMENT

The initial stages of the site layout development were based mainly on conventional practice and considered:

- Tailings Management Facility (TMF) as a standalone repository in a site zone characterized with relatively weak foundation conditions.
- Waste rock dumps occupying large footprints over site areas exhibiting poor foundation conditions that will require pre-consolidation imposing limitations on the waste production schedule
- Separation of the PAG and potential metal leaching waste rock into a separate dump required collection and treatment of the effluent leading to potential post-closure treatment in perpetuity.
- Open pit overburden removal by mechanical means posing significant logistical challenges for a successful operation within the time limits of the mine development plan.
- The ODF and PP require a large amount of costly pre-mining rock fill for the construction of containment structures with a significant impact on CAPEX.

By significant re-arrangement of the facilities, the site layout was re-configured to better utilize the site geotechnical profile and mine operation parameters. The optimization reconciled the environmental requirements and reduced the CAPEX, OPEX and closure costs.

More specifically these could be described as follows:

- Tailings Management Facility was relocated to an area where the geotechnical profile permitted a much higher containment structure within a smaller footprint. This arrangement allowed for construction staging in accordance with the mine production schedule.
- The TMF was redesigned into a Tailings and Waste Rock Management Facility (TWRMF) with the same structure containing concurrent disposal of PAG/ML waste rock and tailings. The new site for the TWRMF was selected at the former processing and camp facilities.
- The disposal scheme utilizes the geotechnical characteristics of tailings in conjunction with provision of total containment achieved by placement of clay liner on the upstream side of the containment structure, and eventually water cover, to minimize potential metal leaching and improve ultimate effluent water quality to regulatory levels.
- Open pit overburden removal by hydraulic dredging was adopted to meet the mine development schedule requirements and alleviate the logistical challenges related to mechanical excavation. The dredged material will be placed in the ODF located adjacent to the pit.

- The make-up water for the dredging will be pumped from the open pit de-watering wells at the initial stage of the mine development plan and throughout the dredging period. The carriage water from the dredging will be recycled through the ODF Polishing Pond.
- The water level in the dredging pit will be drawn down at the end of the dredging period to effect the de-watering of the dolomite. As a contingency, an additional wellfield and/or tapping into local water courses will be considered.
- Dolomite and country rock dumps occupy minimal footprints in close proximity to the open pit to improve the project economics. Staging of the waste dump construction which is governed by the geotechnical foundation conditions is developed in general compliance with the mine Waste Rock production schedule.
- The major processing and camp facilities will be constructed on the limestone bluff to minimize foundation problems (e.g., extensive excavation and dewatering). The limestone bluff will be excavated out to a nominal El. 254 m at the start of construction to obtain the necessary pre-mining rock fill requirements.
- The above re-arrangement of the site layout was based on a reasonable degree of confidence in understanding geotechnical conditions across the site. However, the rearranged site layout warrants further more detailed investigation of subsurface conditions during the detailed engineering design and construction stages.

The design basis and design criteria presented herein are based upon:

- planned mining operations.
- current level of understanding of geotechnical conditions.
- availability of construction materials.
- water management.
- environmental requirements.
- potential closure alternatives.
- legislative requirements.
- best practices.

### 4.6.2 GEOTECHNICAL DESIGN PARAMETERS

The geotechnical design considerations for this feasibility study are summarized below:

- The limestone excavated for the initial development of the ODF/PP dykes and TWRMF dam and site roads will create the level areas required for the Plant and Camp Facilities.
- The upper part of the overburden clay below the peat may provide the initial clay borrow material for low permeability zones in geotechnical structures.
- Subsequently, the dredged material from the ODF may be selectively used for the construction of low permeability barriers of geotechnical structures.
- The low permeability of the tailings will minimize the seepage flux in the development of the TWRMF.
- The materials from the open pit mining operation will be crushed and screened to provide the zones of NAG-rock fill required for the TWRMF dam cross section.
- The pit will be dewatered by deep wells to draw the water table to bedrock during operations at average pumping rate of approximately 40,000$m^3$/day.
- Pit dewatering at the completion of dredging will need to be gradual to avoid destabilizing the final dredged overburden slopes from a rapid drawdown condition.
- The water in the pit at the completion of the dredging would report to the PP.
- The pit dewatering will provide effective under-drainage to the overburden clays.

### 4.6.3 BLAST GENERATED VIBRATIONS

Open Pit Mine blasts and earthquakes do not have the same effects on the pit slopes or structures. The frequency of open pit blast vibrations is very high compared with earthquake vibrations as the higher frequency vibrations attenuate quickly.

The following frequency ranges are quoted for reference:

- The frequency of ground vibrations from earthquakes typically range from 0.1 to 10Hz.
- The frequency of vibrations from large-scale surface mine blasts typically range from 10 to 40 Hz.
- A typical range of ground vibrations from construction blasting is 40 to 200Hz but are occasionally as high as 2,000Hz and possibly as high as 20,000Hz.

Parameters for site specific seismic hazard calculation in accordance with the 2005 National Building Code are given in this section.

The potential for distress caused by blasting in the open pit depends on the characteristics of the blasts and should be determined by the designers of the pit

mining operation. The ground accelerations set up by blasting in the open pit will impact the design of the earthworks in three different ways:

- in assessing the dynamic stability of the open pit slopes where excavated in the clay overburden;
- in assessing the potential for flow of the clay and peat overburden in disposal areas adjacent to the open pit; and
- Blast-generated vibrations on other components of the project.

Using the fact that acceleration is proportional to the square of the frequency of vibration, the following characteristics apply:

- Small changes in vibration frequency may make a large difference in acceleration but not necessarily increase the damage potential.
- Low frequency vibrations have long wavelengths which tend to move a structure or slope as a single unit, whereas the short waves of high frequency vibrations travel as pulses through these materials.
- High-frequency short-wavelength vibrations are less damaging because acceleration is especially sensitive to frequency.
- Acceleration is not an appropriate tool for rating or comparing the damage potential of vibrations with different frequencies.
- Frequency, duration, particle velocity and displacement are more appropriate for comparing the effects of different vibration frequencies.

Open pit trim blasting which minimizes borehole confinement, loading confinement, and charge weight per delay produces ground vibrations resembling construction blasting. Although a low-frequency earthquake with an acceleration of 1.0g might be considered highly destructive, an acceleration of 1.0g for a high-frequency blast vibration is ordinarily of little concern. Small-scale close-in blasting i.e., controlled blasting, may generate ground accelerations of hundreds or even thousands of g's without causing damage.

For the feasibility study, provisions such as geotechnical berms or flatter slopes of earth structures to prevent the open pit from potential mudflow from the ODF neighbouring the pit are considered to be sufficient. In the detail design phase further review of these provisions should be undertaken to mitigate potential consequences of overburden slope failure and liquefaction due to blasting techniques involved.

### 4.6.4 ENVIRONMENTAL CONSIDERATIONS

The following environmental considerations were taken into account in the geotechnical design aspects of the feasibility study:

- Victory Nickel advised no restriction on the design heights and limits on reclamation slopes for the waste rock dumps, TWRMF dam, ODF and PP dykes as long as the structures are geotechnically stable.
- Concurrent disposal of tailings and the PAG/ML ultramafic Waste Rock in a stand-alone facility to mitigate ARD/ML issues and ensure regulatory compliance with Metal Mining Effluent Regulations (MMER) discharge criteria.
- Rock dumps, ODF and TWRMF should not encroach within a 300 m wide zone from Highway 6 and Oakley Creek.

### 4.6.5 *MINING AND PROCESSING OPERATIONS*

The following aspects regarding mining and processing operations were considered in the geotechnical component of the feasibility study:

- Site preparation and early construction such as dredging to be started approximately 1 year prior to the actual open pit mine development.
- Overburden removal by dredging would start in “Year -2” (2011) and will be completed during 8 months operation when the ODF will be filled.
- The open pit will be advanced as per the breakdown of waste rock material production quantities and schedule shown on Table 4.16.
- Initially, a quarrying operation within the limestone bluff at the west site limit will provide the necessary rock fill for construction.
- Tailings from the Frac Sand Plant will be available in “Year 1” (2013” and from the Ore Processing Plant in “Year 2” (2014) as presented in Table 4.16.

**Table 4.16 Tailings and Waste Rock Production Schedule (t)***

| Unit (tonne) | Overburden | Dolomite Waste Rock | Country Rock Waste Rock | Mill (Ni) Production | Frac Sand Plant Production | Mill (Ni) Tailings to TWRMF | Frac Sand Tailings to TWRMF | Frac Sand Tailings to Pit | Ultramafic (PAG) Waste Rock | Total Tailings to TWRMF |
|---|---|---|---|---|---|---|---|---|---|---|
| Year - 3 | 11,200,000 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Year - 2 | | 25,593,000 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Year - 1 | | 46,948,000 | 648,000 | 0 | 1,200,000 | 0 | 285,756 | 0 | 218,000 | 285,756 |
| Year 1 | | 21,250,000 | 15,841,000 | 1,829,459 | 1,200,000 | 1,806,364 | 285,756 | 0 | 6,107,000 | 2,092,120 |
| Year 2 | | 17,241,000 | 12,765,000 | 3,600,000 | 1,200,000 | 3,554,554 | 285,756 | 0 | 6,034,000 | 3,840,310 |
| Year 3 | | 0 | 35,696,000 | 3,600,000 | 1,200,000 | 3,554,554 | 285,756 | 0 | 5,643,000 | 3,840,310 |
| Year 4 | | 0 | 33,329,000 | 3,600,000 | 1,200,000 | 3,554,554 | 285,756 | 0 | 5,981,000 | 3,840,310 |
| Year 5 | | 0 | 12,009,000 | 3,600,000 | 1,200,000 | 3,554,554 | 285,756 | 0 | 4,784,000 | 3,840,310 |
| Year 6 | | 0 | 6,347,000 | 3,600,000 | 1,200,000 | 3,554,554 | 285,756 | 0 | 3,469,000 | 3,840,310 |
| Year 7 | | 0 | 3,824,000 | 3,600,000 | 1,200,000 | 3,554,554 | 285,756 | 0 | 2,415,000 | 3,840,310 |
| Year 8 | | 0 | 1,546,000 | 1,736,120 | 1,200,000 | 1,714,203 | 285,756 | 0 | 1,009,000 | 1,999,959 |
| Year 9 | | 0 | | 0 | 1,200,000 | 0 | 0 | 285,756 | 0 | 0 |
| Year 10 | | 0 | | 0 | 1,200,000 | 0 | 0 | 285,756 | 0 | 0 |
| Year 11 | | 0 | | 0 | 1,200,000 | 0 | 0 | 285,756 | 0 | 0 |
| Year 12 | | 0 | | 0 | 446,557 | 0 | 0 | 106,339 | 0 | 0 |
| Total | 11,200,000 | 111,032,000 | 122,005,000 | 25,165,579 | 14,846,557 | 24,847,889 | 2,571,804 | 963,607 | 35,660,000 | 27,419,693 |

* Material quantities and schedule presented in Table 4.16 differ from the ones provided in the Mining section (Section 3.0) and represent an earlier iteration. However, the difference will not impact the feasibility level geotechnical designs presented in this section.

# 4.7 TAILINGS AND WASTE ROCK MANAGEMENT FACILITY (TWRMF)

## *4.7.1 DESIGN OBJECTIVES AND CONSIDERATIONS*

The key objective is to initially induce invasion of tailings into the voids of end-dumped PAG/MLWaste Rock from the open pit and subsequently to encapsulate the PAG Waste Rock in tailings. The ultimate goal of providing acceptable water quality in seepage from the combined waste rock/tailings repository.

The extent to which the objectives can be met will depend on a variety of technical, practical, and environmental considerations as follows:

- permitting requirements
- meet water quality by utilizing tailings for PAG waste rock encapsulation and clay
- facilitate closure without long-term treatment (based on Victory Nickel achieving a seepage in the order of 250 $m^3$/day
- significantly lower CAPEX/OPEX and closure cost.

The design will require compliance with the permitting requirements and water quality guidelines. In turn, these requirements will depend upon the effectiveness of seepage control which has been set at 250 $m^3$/day. The location of the TWRMF was selected to take into account factors such as the exclusion zones, the distance from the open pit and the favourable subsurface conditions at the site. Areas with shallower soft clay overburden are more suitable for the TWRMF dam site.

The following specific design considerations are relevant to meeting the design objectives.

### PAG/MLWASTE ROCK

The size characteristics of the ultramafic rock fill waste from the open pit will be the mining operations controlled by blasting, materials handling, etc. For optimal filling of voids by hydraulically placed tailings, filling is most effective with large, uniform size rock with large voids. As the mining will produce a wide range of rock fill sizes there will be a need to selectively borrow the open pit Waste Rock. The loads of larger, “fines free” rock would be handled separately from the smaller size, "quarry waste" with the two deposited in separate fills within the TWRMF.

When rock fill is end-dumped in lifts, segregation will occur at the dumping face with larger stones rolling to the bottom of the face and the smaller rock staying on top. For fills advanced in embankment fashion the tailings ingress should be preceded by construction expedients such as ripping the upper rock fill surface.

There are case histories of penetration of saturated sand tailings into un-filtered coarse rock fill under the effects of static liquefaction. This suggests that the flow of tailings into rock fill would be triggered by blasting-induced liquefaction for which there is precedent for tailings densification. This particular application is expected to allow for more efficient lateral invasion of tailings into the rock fill void space.

The degree to which the rock fill voids would be filled in practice where the rock fill is not of uniform medium to large size is not well defined at present. Based on engineering judgment a base-case will involve a filling efficiency for a maximum of "fines free" larger rock of 0.2 m and larger, and 50% for sizes 0.2 m and smaller.

These parameters are dependent to an important extent on operational factors as well as the properties of the rock fills. It is important therefore, that flexibility and verification testing be incorporated into tailings disposal strategy to ensure design objectives are met.

Any voids pockets that are not filled will be filled with water within the encapsulated rock fill mass. From an environmental standpoint this mimics the concept that saturation of tailings prevents oxidation, acid production, and metal leaching from sulphidic pyrite and pyrhotite minerals in waste rock (James and Aubertin 2009). Saturated conditions below the phreatic surface will control or limit geochemical conditions that often prevail in typical waste rock piles.

### TAILINGS PROPERTIES.

From an engineering standpoint, the tailings are predominantly fine-grained and will be discharged hydraulically. A higher-than-conventional water-to-solids ratio to enhance transport into and through the rock fill is proposed. A hydraulic head across the rock fill is essential for deposition planning.

### SAFETY

Careful planning is needed to ensure safety of personnel and equipment operating on the rock fills within the Repository. Vibratory loads from haul trucks and dozers may cause liquefaction of the rock fill with voids filled with saturated tailings. Precautions during blasting to create blast induced liquefaction are similarly involving PAG/ML mine Waste Rock and required.

### PERTINENT PRECEDENTS

Based on Wardrop's knowledge, there is no direct long term precedent for a combined waste rock and tailings disposal for geographic and climatic conditions similar to Minago. However, from experience some components that are specific to the project have precedent.

The importance of a lack of directly-related precedent for the concurrent disposal scheme tailings in a single repository must be recognized. The Geochemical,

Environmental and Permitting issues associated with the concurrent disposal scheme will be mitigated through the incorporation the combined experience from the variety of operations listed below.

- Algoma Ore Properties, Wawa, ON (Tailings transport into unfiltered rock fill by through flow)
- Mines Gaspe Ltd., Murdochville, Que. (Tailings transfer into unfiltered rock fill by static liquefaction)
- Vale Inco Limited, Sudbury, ON (Densification of tailings by blasting)
- Falcondo, Dom. Republic (Silt transport into voids of slag fill dam by through flow)
- Syncrude Canada, AB (Dredging experiments using tailings fines as the dredging fluid)
- Pamour Mines, Timmins, ON (Dismantling of tailings dams by hydraulic monitors, for reprocessing; induced static liquefaction).
- Giant Mine, Yellowknife, NT (Tailings transport into unfiltered rock fill by through flow)

### TWRMF DAM CLASSIFICATION

Dam classification in accordance with the Canadian Dam Association Dam Safety Guidelines 2007 (CDA) was based on the evaluation of the consequences of dam failure in terms of risk to population, loss of life, and environmental, cultural, and economic losses. The TWRMF dam can be classified as “Significant Dam Class” and the selection of the hydrology, hydrotechnical and seismic design criteria presented in previous sections were selected accordance with the CDA criteria considering the following:

- The dam will be located in an unpopulated area of Manitoba, relatively far away from urban settlements.
- During the life of the mine only personnel required for the operation of the mine will be temporarily resident near the mine.
- The temporary housing to accommodate the personnel of the mine and the infrastructure for the processing of the ore will be located at a distance of approximately 2 km upstream of the TWRMF dam.
- Concurrent disposal of rock fill and tailings provides additional reinforcement of the dam structure which minimizes potential of a dam breach resulting in uncontrolled discharge of tailings towards to the open pit (to the southwest) or Highway 6 (to the east) of the repository.

### 4.7.2 DESIGN CRITERIA

The TWRMF must accommodate a total of 26 Mt of nickel and frac sand tailings and 36 Mt PAG-waste rock over the course of 9 years and provide secure storage for the long-term. The Design Basis and Basic Engineering Design Parameters are summarized in Table 4.17 and Table 4.18, respectively.

**Table 4.17 Design Basis for the TWRMF**

| Item | Value |
|---|---|
| Life of TWRMF | 9 years |
| Total Nickel Tailings (Tonnes) | 24,847,889 |
| Total Sand Tailings (Tonnes) | 2,571,804 |
| Total Combined Tailings to TWRMF (Tonnes) | 27,419,693 |
| Total PAG Waste Rock (tonnes) | 35,660,000 |
| Tailings Specific Gravity (Nickel) | 2.6 |
| Initial Tailings Void Ratio (Nickel) | 1.0 |
| Initial Tailings Density (Nickel) | 1.3 t/m³ |
| Average Final Tailings Density (Nickel) | 1.5 t/m³ |
| Tailings Pulp Density (solid weight) (Nickel)[1] | 45% |
| Water in Tailings Voids (Nickel) | 22% |
| Average Initial Tailings Density (Sand) | 1.4 t/m³ |
| Average Final Tailings Density (Sand) | 1.6 t/m³ |
| Tailings Pulp Density (solid weight) (Sand) | 20% |
| Ultramafic Waste Specific Gravity | 2.59 |
| Ultramafic Waste Swelling | 30% |
| Void Space in PAG Waste Rock | 4,130,502 m³ |
| Void Space in Coarse PAG Waste Rock | 3,304,402 m³ |
| Void Space in Fine PAG Waste rock | 826,100 m³ |
| Total Volume of Ni Tailings | 16,565,259 m³ |
| Total Volume of Sand Tailings | 1,607,378 m³ |
| Total Combined Tailings Volume | 18,172,637m³ |
| Total PAG Waste Rock (solids and voids) | 17,898,842 m³ |
| Total Ni-Tailings Ingress into Voids of Coarse Ultramafic Waste Rock (at initial tailings density)[2] | 2,478,301 m³ |
| Total Ni&Frac-Sand Tailings ingress into Voids of Fine Ultramafic Waste Rock (at initial tailings density)[3] | 413,050 m³ |
| Total Ni-Tailings Between the Ultramafic Waste Rock Rind and Central Causeway (at final tailings density) | 15,376,725 m³ |
| Required TWRMF Storage | 33,275,567 m³ |
| Required TWRMF Storage (with 15% contingency included) | 38,300,000 m³ |

Notes:

1. A 45% solids density is used in the feasibility study water balance. However, higher water-to-solids ratios to enhance transport into and through the rock fill are recommended for consideration in detailed engineering.

2. Coarse ultramafic waste rock, represented by fractions larger than 0.2 m, is estimated to be 80% of total ultramafic waste rock. Infilling of voids within coarse ultramafic waste rock with tailings is estimated to be 75%. Ingressed tailings are assumed to remain at their initial density due to the relative incompressibility of the waste rock matrix.

3. Fine ultramafic waste, represented by fractions finer than 0.2 m, is estimated at 20% of total ultramafic waste. Infilling of voids within fine ultramafic waste rock with tailings is estimated to be on the order of 50%. Ingressed tailings are assumed to remain at their initial density due to the relative incompressibility of the waste rock matrix.

**Table 4.18 Basic Engineering Design Parameters for the TWRMF**

| Item | Target | Comments |
|---|---|---|
| 1. Geotechnical Slope Stability | | |
| • Construction (in stages) | • Static F.O.S. 1.3, pseudo static F.O.S 1.05 . | |
| • Normal Operating | • Same as above. | |
| • Closure | • Static F.O.S. 1.5, pseudo static F.O.S 1.05. | |
| 2. Seepage | • Limit on Contaminants of Concern (CoC) concentrations | • Analyses using SEEP/W targeting a total estimated seepage volume less than 250 $m^3$/day.<br>• Low permeability barrier to be provided on the upstream face of the containment structure to reduce seepage through ultramafic waste rock – tailings composite.<br>• Seepage from the TWRMF to be collected via collection ditches and ponds |
| 3. Hydro technical | | |
| • Construction Diversion Peak Flow | • 1:20 yr - 24 hr rainfall | • All peak flows are estimated from catchment time of concentration and storm. Seepage to be collected via collection ditches reporting to the overall water management system |
| • Operation peak flow | • 1:200 yr – 24 hr rainfall | |
| • Closure Spillway and Diversion peak flow | • 1:1000 yr – 24 hr rainfall | • Determine wave run-up in the freeboard |
| • Freeboard | • 1.0 m on the top of Closure Spillway wet section for 1:200 year runoff | |
| • Closure Flood | • 1:1000 yr – 24 hr rainfall | |
| • Runoff Coefficient | • 1 | |

*table continues…*

| Item | Target | Comments |
|---|---|---|
| 4. Decant System (if applicable) | | |
| Water Storage | • Minimum five days retention or 1.5 m of water level at all times , whichever is higher | |
| 5. Closure Cover | A minimum of 0.5 m of water on the top of final tailings at the containment structure. at all times. | Runoff (dry year), seepage, infiltration and evaporation to ensure a minimum thickness water cover. |
| 6. Seismicity | | |
| • Operating Design Basis Earthquake | • 1: 475 year return | |
| • Closure Earthquake | • 1:2,475yrar return | |

## ADDITIONAL CRITERIA

- The following are additional criteria:
- The rate for the construction of successive stages of the TWRMF Dam should be governed by foundation strength and consolidation characteristics as well as the mine waste production schedule.
- The cone of depression created by pit dewatering predicted to extend laterally in the dolomite to a distance of approximately 5,000 m to 6,000 m from the proposed open pit. The cone for depression will provide under drainage for the overburden clays and should be factored in geotechnical analyses for TWRMF dam.
- The designated decant pond should be located between the causeways.
- tailings deposition plan should ensure minimal exposure of PAG Waste Rock to atmospheric conditions during operations.
- The configuration of PAG Waste Rock retaining structure should allow for 2 m tailings cover at the end of the deposition.
- The following construction expedients should be considered to enhance invasion of tailings into PAG rock fill void space:
- Ripping upper surfaces of disposed rock fill to enhance tailings ingress.
- Using partially consolidated clay from the ODF selectively.
- Blasting of tailings to induce liquefaction and enhance invasion of tailings into waste rock voids
- Adding clay to tailings stream to increase fluidity and decrease permeability

- Based on experience, tailings deposition slopes of 0.5% sub-aerial and 2% sub aqueous should be assumed in the design.
- Geotechnical monitoring program should be considered at early stages of the construction of the TWRMF dam in order to confirm design assumptions currently defining the rate of construction as well as environmental performance.

### 4.7.3 TWRMF DAM OPTIONS AND SELECTION

Various strategies for TWRMF were considered to satisfy the foundation, layout, construction materials, and construction requirements of the site which include:

- thickening or paste (Kidd Creek Mine)
- upstream construction compacted outer shell (Vale Inco Operations, Syncrude Operations)
- cyclone tailings (Brenda Mine)
- filtered tailings (Raglan Mine)
- blast densification (Vale Inco Operations)
- joint disposal within dams formed by rock dumps (Barrick Goldstrike Mine)
- tailings concurrent disposal with waste rock (under research for Algoma)
- conventional wet tailings placement
- total containment behind retaining dams

The post closure environmental considerations and costs for water treatment in perpetuity required an un-conventional concurrent disposal of PAG/ML Waste Rock and tailings in a single repository. Concurrent disposal of tailings and PAG-Waste Rock will be fully contained behind a perimeter dam to be constructed as a part of a robust operation involving placement of dolomite rock fill which is readily available from the open pit operation.

### 4.7.4 TWRMF DAM SECTION DESIGN

The dam will be located in an area where the geotechnical profile lends itself to a higher containment structure within a smaller footprint. In addition, the geotechnical profile will allow for construction staging to meet the mine production schedule. To bound uncertainties related to extrapolation of confirmed shallow overburden in the south east part of the TWRMF, a more conservative deeper overburden was assumed for the geotechnical analyses. Final confirmation of the TWRMF foundation will be part of the detailed design geotechnical investigation.

The plan and profile of the TWRMF is shown on Drawing 0951330400-T0004 with typical dam sections illustrated on Drawing 095330100-T0005.

The TWRMF dam is designed as an earth/rock fill structure varying in settled height from approximately 19 m to 21 m above the local topography. Peat will remain in place within the upstream part of the dam foundation and removed along with a 1.0 m of soft underlying clay within the downstream part. The upstream and downstream dam slopes of the rock fill dam will be 2.5H:1V and 2H:1V, respectively.

Based on the results of stability analyses presented in Section 4.7.6 the dam will be constructed in four (4) stages to meet the consolidation requirements. The dump construction schedule should be planned so that the end of previous stage coincides with the start of the subsequent stage. The dam fill heights will be up to 4.5 m and 6 m for Stages 1 and 2 and Stages 3 and 4, respectively. A 4.5 m high and 15 m wide downstream and upstream stabilizing berms will be required prior to the start of Stage 2 lift.

The construction of the dam will take two years from the start of “2012” (Year -1) with completion at the end “2013” (Year +1). Frac sand tailings (Zone 10B) deposition will commence in early “2013” (Year +1) prior to completion of the dam. The dam shell will be constructed of coarse rock fill (Zone 1) comprising an estimated 800 mm minus dolomite Waste Rock originating from the open pit. The upstream side of this zone will support a 0.5 m thick zone of fine rock fill (Zone 2) comprised of minus 75 mm dolomite waste rock (Zone 2) and finally a 0.5 m sand and gravel zone (Zone 2A). The dam will have an upstream clay lining with a nominal thickness of 1 m placed over Zone 2A in four sequences as shown on 0951330400-T0005 and briefly described below.

***Sequence 1:*** The clay liner will extend through peat to be keyed in the native clay. The clay liner (Zone 3) will be provided in a feather-edge like gap between the top of Zone 2A on the dam upstream slope and Zone 1 within the upstream stabilizing berm. This will coincide with the completion of about 1.2 m thick lifts within the upstream stabilizing berm constructed ahead of the start of the Stage 2 lift within the main dam structure.

**Sequence 2:** The clay liner (Zone 3) will be provided in a feather-edge like gap as depicted on Detail 1 between the top of Zone 2A on the dam upstream slope and Zone 10A within PAG-waste rock fill retaining structure. This will coincide with the completion of about 50% of yearly lift thicknesses within Zone 10A (PAG-Waste Rock retaining structure).

**Sequence 3:** A 1.0 m clay (Zone 3) liner above the PAG rock fill rind will be placed over Zone 2A at the dam upstream slope ahead of tailings discharge.

**Sequence 4:** Extension of the clay (Zone 3) liner to the dam crest will be placed ahead of the water cover implementation. The thickness of the Zone 3 in this last stage will increase as dictated by a 3:1 upstream slope. The clay liner in this uppermost zone will be protected with a 0.5 thick fine rock fill (Zone 2), which in turn will be covered by a 1.0 m of rip rap (Zone 11) to protect the dam crest from ice scour action.

During the initial stages of construction Zone 3 will be obtained from local borrow pits within stiff clays. Subsequently Zone 2 material will be obtained from the ODF.

A 0.3 m thick pavement surface composed of Zone 2 will be provided on the dam crest. Appropriate safety berms composed of Zone 2 will also be provided on the crest.

### 4.7.5 TWRMF ASSOCIATED FACILITIES

#### RUNOFF DIVERSION BERM

Surface water runoff will be diverted around the area of the TWRMF by the construction of a runoff diversion berm along its west and east sides. Diverting surface water will decrease the amount of water entering the system. The diversion berm will direct outside surface flows along applicable length of the Facility. The diversion berm will be constructed using peat and clay from the excavation of the runoff collection system.

#### RUNOFF COLLECTION SYSTEM

The runoff collection system will collect water from seepage and precipitation that falls on and near the TWRMF dam. Runoff will be collected in ditches built around the entire perimeter of the dyke and directed to two existing ponds to the northeast and southeast of the dam. Water reporting to the ponds will be pumped back to the TWRMF. Drawing 0951330400-T004 shows the plan view of ditches and ponds that make up the runoff collection system.

The west and east sides TWRMF will have ditch inverts sloped at 0.10%. The flow divide will be at the midpoint of west and east sides from where the water will be diverted south and north. The north and south ditches will slope at 0.15% slope and report to south and north collection ponds.

The base of east and west ditches will be 1.5 m wide and this will increase to 2.5 m for north and south ditches. Ditches will have side slopes of 2.5H:1V and 4H:1V in native clays and peat, respectively. There will be a 0.5 m setback at the peat clay interface. All the ditches are designed to have freeboard within peat without erosion protection for the design ditch invert slopes.

### 4.7.6 DAM STABILITY AND SETTLEMENT ANALYSES

#### GENERAL

Dam stability and settlement analyses that satisfy the design criteria outlined in Table 4.17 and Table 4.18 are presented Section 4.7.4.

## METHODS OF ANALYSIS

The clay seal will be constructed in stages with advanced Waste Rock deposition and the muskeg and/or natural clay forming the base of the Repository.

Coupled analyses using Sigma/W and Slope/W, components of GeoStudio 2007 were used in the analysis. Sigma/W uses the finite element methods to solve both stress-deformation and seepage dissipation equations simultaneously. Pore water pressures generated during lift placement were calculated in Sigma/W and then incorporated into Slope/W for stability analysis. Slope/W located failures with the least factor of safety within defined search limits.

Initial pore pressure conditions were specified with an initial water table at the ground surface. Zero pressure boundary conditions are applied to the bottom of the bedrock to model dewatering wells pumping water out of the bedrock layer. The cross section was modeled assuming that the first lift is placed on the first day, and then an additional six (6) months were allowed for consolidation. Slope stability analysis was performed 10 days after the lift was placed and at the end of the 182 days. All four lifts were modeled assuming no waste rock or tailings were placed on the upstream side of the TWRMF until construction was completed. Another analysis was performed six months after the completion of the facility, assuming the waste rock and the tailings were placed at the same time. The total estimated construction time of the facility is two (2) years.

A small buttress with a 4.5 m height and 15 m width is placed on both the upstream and the downstream side of the TWRMF coinciding with the time of placement Stage 2 lift for stability performance.

Pseudo static analyses were completed to simulate earthquake conditions using 0.03 g, a 50% of the PGA for a 1:2,475-year return period which is consistent with generally accepted practices adopted by the United States Army Corps of Engineers (Hynes-Griffin and Franklin, 1984).

## MATERIAL PROPERTIES

The foundation material properties (CL, CH and bedrock) were based on field and laboratory data. The properties of the waste rock (dolomite and PAG/ML (ultramafic), coarse and fine rock fill material were estimated based on previous experience and professional judgment.

Tables 4.19 and 4.20 show material properties used in Sigma/W and Slope/W.

**Table 4.19 Sigma/W Input Material Properties**

| Materials | Material Category | Material Model | Poisson's Ratio | Young's Modulus (kPa) | Hydraulic Conductivity (cm/s) |
|---|---|---|---|---|---|
| Dolomite Waste Rock | Effective Parameters w/PWP Change | Linear Elastic | 0.35 | 50000 | 1.00E-01 |
| Ultramafic Waste Rock | Effective Parameters w/PWP Change | Linear Elastic | 0.35 | 50000 | 1.00E-01 |
| Coarse Rock Fill | Effective Drained Parameters | Linear Elastic | 0.33 | 50000 | - |
| Fine Rock Fill | Effective Drained Parameters | Linear Elastic | 0.33 | 7000 | - |
| Sand and Gravel | Effective Drained Parameters | Linear Elastic | 0.35 | 8000 | - |
| Peat | Effective Parameters w/PWP Change | Linear Elastic | 0.35 | 2000 | 1.00E-01 |
| Soft Clay (CL) | Effective Parameters w/PWP Change | Soft Clay (MCC) | 0.36 | - | 1.36E-08 |
| Soft Clay (CH) | Effective Parameters w/PWP Change | Soft Clay (MCC) | 0.37 | - | 4.97E-09 |
| Bedrock | Effective Parameters w/PWP Change | Linear Elastic | 0.49 | 100000 | 6.89E-04 |

**Table 4.20 Slope/W input material properties**

| Materials | Model | Unit Weight (kN/m$^3$) | Cohesion (kPa) | Phi (º) |
|---|---|---|---|---|
| Dolomite Waste Rock | Mohr-Coulomb | 18 | 0 | 40 |
| Ultramafic Waste Rock | Mohr-Coulomb | 18 | 0 | 40 |
| Coarse Rock Fill | Mohr-Coulomb | 19 | 0 | 40 |
| Fine Rock Fill | Mohr-Coulomb | 22 | 0 | 38 |
| Sand and Gravel | Mohr-Coulomb | 22 | 0 | 35 |
| Peat | Mohr-Coulomb | 13 | 18 | 0 |
| Soft Clay (CL) | Mohr-Coulomb | 21 | 20 | 29 |
| Soft Clay (CH) | Mohr-Coulomb | 18 | 10 | 25 |
| Bedrock | Bedrock (Impenetrable) | | | |

## RESULTS

Table 4.21 presents the slope stability results after each lift is placed and when the TWRMF is filled with PAG-Waste Rock and tailings. Except for a very short time following the completion of Stage 1 lift (see bolded number in Table 4.21), the slope stability results show that the TWRMF dam satisfies the minimum requirements for static and pseudo static conditions during operations and at closure. Because of a very short duration and relatively fast increase beyond the specified factor of safety,

this is considered acceptable. The slope stability results are presented in Figures D-10 through D-39 in Appendix D-6.

**Table 4.21 Slope Stability Results**

| Case | Time (days[1]) | Downstream | | Upstream | |
|---|---|---|---|---|---|
| | | Static Required/ Computed | Pseudo static Required/Computed | Static Required/ Computed | Pseudo static Required/Computed |
| Lift 1 | 10 | 1.3/1.11 | - | 1.31.48 | - |
| | 182 | 1.3/1.59 | 1.05/1.46 | 1.3/1.56 | 1.05/1.42 |
| Lift 2 | 192 | 1.3/1.32 | - | 1.3/1.49 | - |
| | 364 | 1.3/1.77 | 1.05/1.58 | 1.3/1.59 | 1.05/1.38 |
| Lift 3 | 374 | 1.3/1.60 | - | 1.3/1.52 | - |
| | 546 | 1.3/1.65 | 1.05/1.46 | 1.3/1.58 | 1.05/1.39 |
| Lift 4 | 556 | 1.3/1.51 | - | 1.3/1.65 | - |
| | 728 | 1.3/1.56 | 1.05/1.40 | 1.3/1.69 | 1.05/1.52 |
| Full of Tailings and towards Closure | 738 | 1.5/1.46 | - | - | - |
| | 910 | 1.5/1.55 | 1.05/1.37 | - | - |
| | 2577 | 1.5/1.94 | 1.05/1.75 | - | - |

Note: 1. After placement of Stage 1 lift

Figures 4.9 through 4.12 below show the effective stress vs. time, and pore water pressure versus. time for the short and long term as computed in the foundation soils below the centerline of the dam. From Figures 4.9 and 4.11 it can be observed how the effective stress increases after placement of each lift and then stabilizes at a later time. Figures 4.10 and 4.12 show estimates of pore water pressure build up after placement of each lift for dam construction Stages 1 through 4 and the corresponding dissipation over time. The results presented in these Figures indicate a 12.5 year time window for the pore water pressures to dissipate.

**Figure 4.9 Short Term Mean Effective Stress vs. Time**

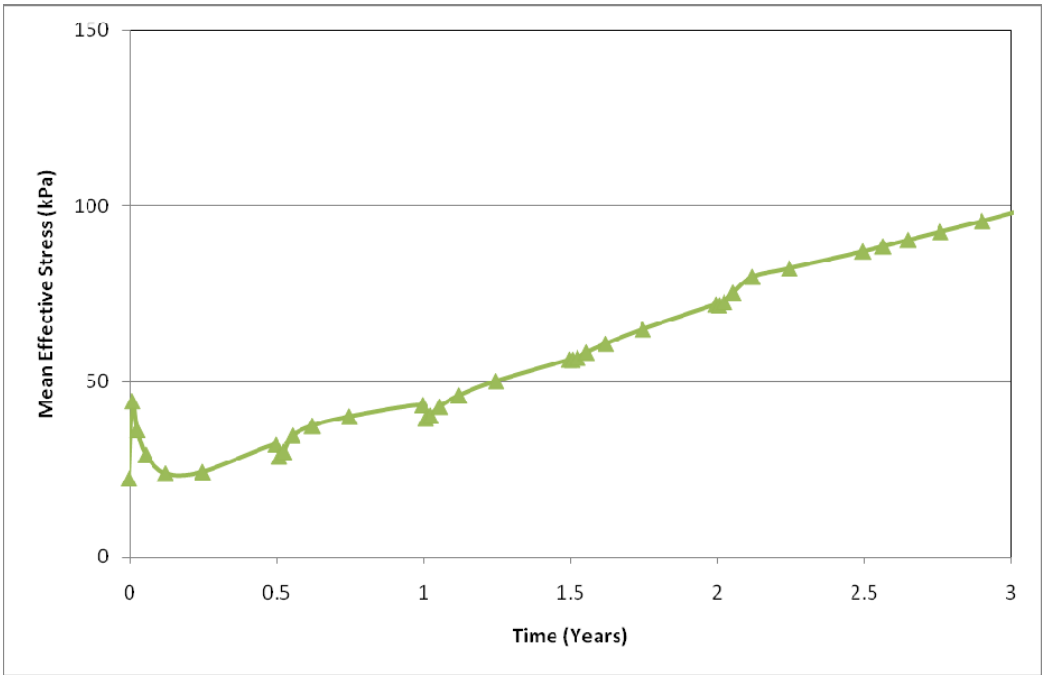



**Figure 4.10 Short Term Pore Water Pressure vs. Time**

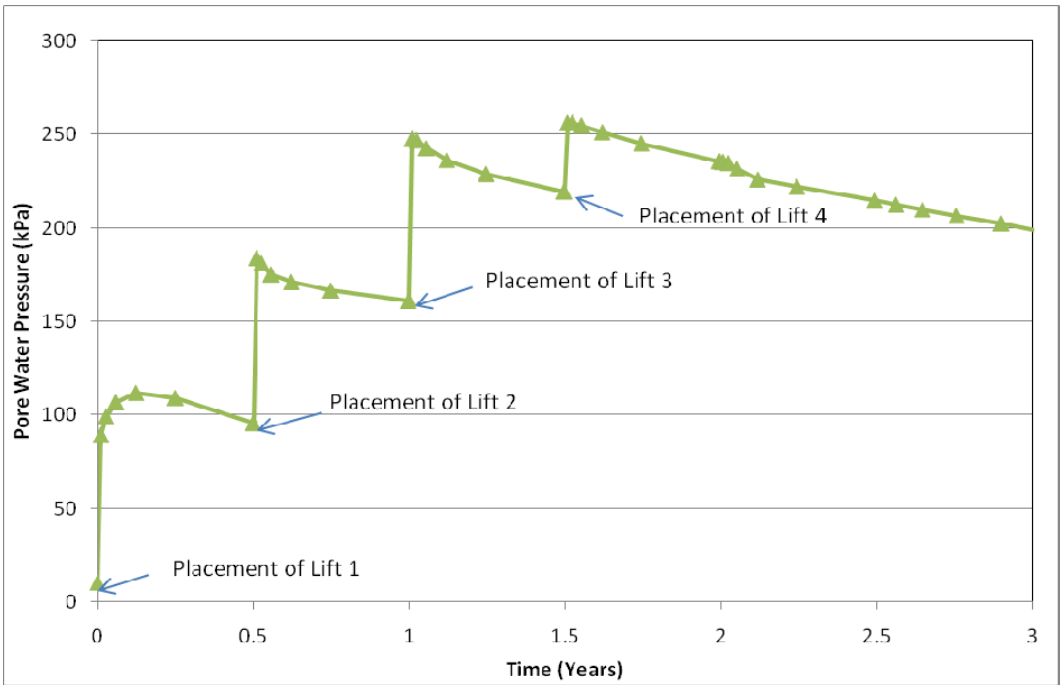


**Figure 4.11 Long term mean Effective Stress vs. Time**

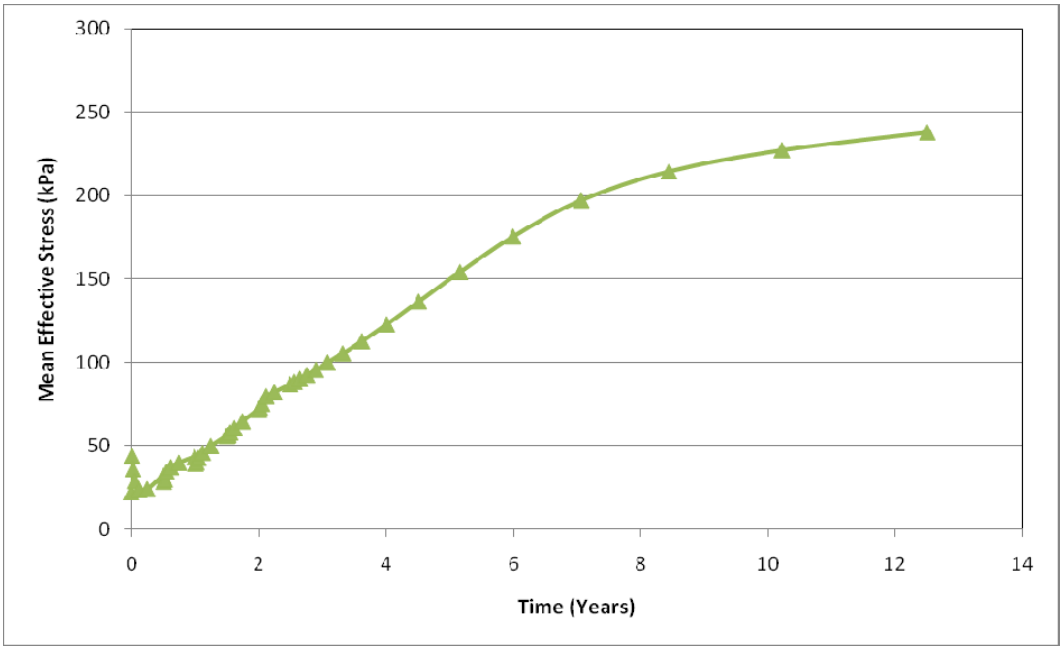


**Figure 4.12 Long Term Pore Water Pressure vs. Time**

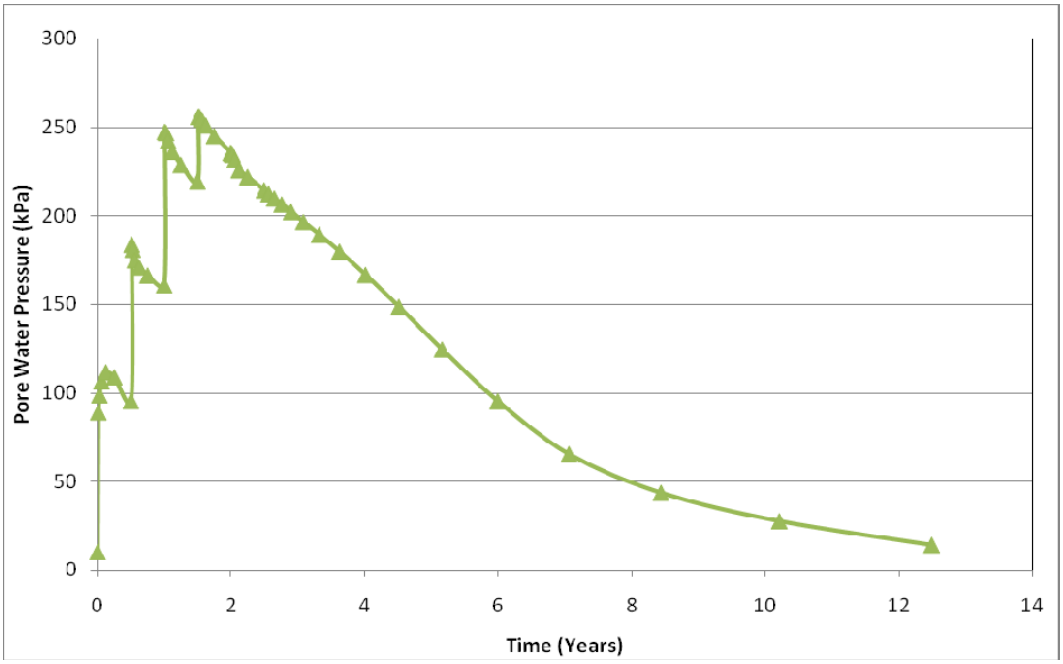
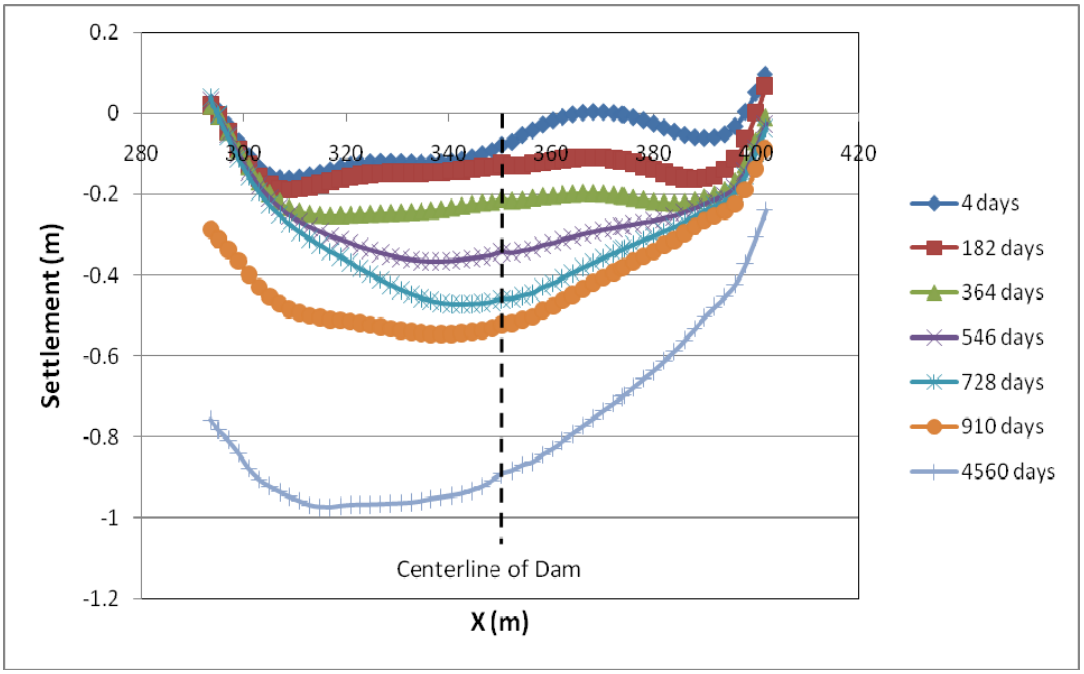



Figure 4.13 shows the settlement along the base of the TWRMF with time. Total settlement of the facility is approximately 1 m.

**Figure 4.13 Settlement along the Base of the TWRMF Dam**



## 4.7.7 SEEPAGE ANALYSES

### GENERAL

Seepage analyses were critical in determining potential advantages from an environmental standpoint in that PAG/ML-Waste Rock void space would be initially invaded to the extent practicable by inert Ni-tailings and eventually encapsulated by the tailings on closure. The intent was that this would occur to the extent that any seepage from the combined mass of PAG/ML and tailings and through the containment structure would meet water quality standards based on environmental concentrations and geochemistry of the seepage water determined by an allowable volume of seepage of 250 $m^3$/day specified in the design TWRMF design criteria.

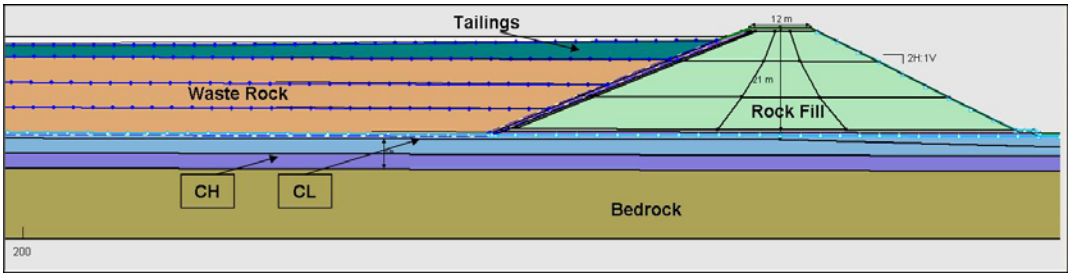
In order to determine these advantages and produce methodology for concurrent disposal and work back final configuration of the containment structure the following two scenarios were modelled:

1. Dam structure comprising a gravel filter zone (Zone 2A) between the rock fill shell and combined mass of PAG/ML-Waste Rock and Ni-tailings. This scenario relies on attenuation of the seepage flux through a combined mass of PAG/ML-Waste Rock and Ni-tailings.

2. Dam structure allowing for full containment combined mass of PAG/ML-Waste Rock and Ni-tailings by placing a variable thickness of clay (Zone 3) over the sand and gravel filter (Zone 2A). This scenario uses the low permeability barrier to achieve better seepage control than Scenario 1.

Figure 4.14 presents the configuration the TWRMF used in subject modeling.

**Figure 4.14 Tailings Storage Facility Layout**




### SEEPAGE MODEL

The seepage modeling was completed using SEEP/W (GEO-SLOPE, 2007), a two dimensional finite-element model. The modeling which was completed in steady state was limited to the closure conditions of the facility. The available field and laboratory and data were used to estimate the hydraulic conductivity values for tailings, native clays and bedrock. The hydraulic conductivities for TWRMF dam

zones and combined PAG/ML-Waste Rock were estimated based on previous experience and professional judgment. Table4.22 presents a summary of the anticipated material properties and the model parameters assigned to simulate them.

**Table 4.22 Material Properties**

| Material Type | Estimated Hydraulic Conductivity (cm/sec) | Used in Model | | |
|---|---|---|---|---|
| | | Parameter Name | Saturated Hydraulic Conductivity (m/sec) | Saturated Volumetric Water Content (m3/m3) |
| Soft Clay (CL) | 1e-8 | CL | 1.36e-10 | 0.385 |
| Soft Clay (CH) | 1e-9 | CH | 6.75e-11 | 0.3 |
| Bedrock | 1e-3 to 1e-4 | Bedrock | 6.90e-06 | 0.3 |
| Fine Rock Fill | 1e-05 | Fine Sand | 4.30e-06 | 0.35 |
| Coarse Rock Fill | 1e-2 to 1e-3 | Uniform Sand | 1.00e-05 | 0.3 |
| Tailings | 2e-5 to 8.2e-6 | Sandy Silty Clay | 1.4e-7 | 0.41 |
| Clay | 1e-8 | CL/Well Graded High Clay | 1.36e-10 | 0.35 |
| Combined Waste Rock and Tailings[1] | 2e-5 | Glacial Till (compacted) | 1.00e-07 | 0.23 |

Note:

1. 75% of void space assumed to be invaded by Ni-tailings as per design criteria (Table 4.17)

RESULTS

The computed seepage volume reporting to the collection system immediately downstream of the 5 km long structure for Scenario 1 (leaky dam) is approximately 2,920 $m^3$/day. The seepage rates for Scenario 2 are 250 $m^3$/day and 100 $m^3$/day for a 1 m and 2 m thick clay zone (Zone 3), respectively.

The 1 m clay low permeability clay zone is would satisfy the requirement to limit seepage subject to final selection and laboratory and in-situ testing of material. This was applied to the dam design section described in Section 4.7.4.

## 4.8 MINE WASTE ROCK DUMPS

### *4.8.1 DESIGN OBJECTIVES AND CONSIDERATIONS*

The open pit operation will result in the removal of 233 Mt. of dolomite and country Waste Rock. As this Waste Rock is inert, no special environmental protection measures are necessary. Although some of dolomite waste rock will be consumed for the construction of various mine facilities mainly the TWRMF dam, PAG Waste Rock platform and miscellaneous roads/dykes, etc. the balance will be disposed in the Dolomite Waste Rock Dump (DWRD). The entire volume of country rock coming

out the open pit will be disposed of in the Country Rock Waste Rock Dump (CRWRD).

The key design objective is to construct non-reactive waste rock dumps in the proximity of the open pit within compact footprints to the maximum heights governed by geotechnical analyses to minimize operation costs.

### 4.8.2 DESIGN CRITERIA

Table 4.23 and Table 4.24 summarize the basic design criteria and parameters adopted for the waste rock dumps.

**Table 4.23 Design Basis for Rock Dumps**

| Item | Value |
|---|---|
| Life of Open Pit mine | 10 years |
| Total Waste Rock | 268,696,000 t |
| Total Dolomite Waste Rock | 111,032,000 t |
| Total Country Rock Waste Rock | 122,005,000 t |
| Country Rock Waste Rock Specific Gravity | 2.702 t/m³ |
| Dolomite Waste Rock Specific Gravity | 2.79 t/m³ |
| Swelling | 30% |
| Total Required Volume for Country Rock Waste Rock Dump | 59,000,000~ m³ |
| Total Required Dolomite Requirements for Construction of Mine Infrastructure (TWRMF, roads, dykes, etc.) | 10,743,600 m³ |
| Total Required Volume for Dolomite Waste Rock Dump | 41,000,000m³ |

**Table 4.24 Basic Engineering Design Parameters for Rock Dumps**

| Item | Target | Comments |
|---|---|---|
| 1. Geotechnical Slope Stability | | |
| • Waste Dump | | |
| • Construction (in stages) | • Static F.O.S 1.3, pseudo static F.O.S 1.05 | |
| • Normal Operation | • Same as above | |
| • Closure | • Static F.O.S. 1.3, pseudo static F.O.S 1.05 | |
| 4. Seismicity | | |
| • Operating Design Basis Earthquake | • 1: 475 yr return | |
| • Closure Earthquake | • 1: 2,475 yr return | |
| 6. Max Dump Height | • Dependent on the results of engineering analyses in support of staged construction. | |

The cone for depression will provide under drainage for the overburden clays. This should be factored in geotechnical analyses for the waste rock dumps.

### 4.8.3 WASTE ROCK DUMP DESIGNS

#### GENERAL

Initially, because of environmental constraints the PAG/ML-ultramafic Waste Rock dump was separated from the NAG granite country rock dump. The dolomite was consigned to a separate site creating a total of three waste rock dumps. With the re-arrangement of the site, the option to separate the dolomite dump from the country rock dump was maintained but the PAG ultramafic was to be disposed concurrently with tailings in the TWRMF. The three dumps TWRMF, Dolomite and Country Rock were located close to the open pit to minimize haulage costs and to optimise utilization of the site. In this section, the dolomite and country rock dumps are addressed with the TWRMF being covered previously.

Having selected the locations (Drawing 0951330400-T0002), the design focused on minimizing dump footprints and maximizing their heights through staged construction and in accordance with the results of engineering analyses and the waste production schedule. The locations of Country Rock Waste Rock Dump (CRWRD) and Dolomite Waste Rock Dump (DWRD) were selected on the muskeg/peat covered weak overburden clay characterized with average thicknesses of 15 m and 10 m, respectively. With both dumps comprising NAG waste rock there will not be a need for a seepage collection system and the storm water can report directly to the natural environment.

Plan and sectional details of the waste rock dumps are shown on Drawings 0951330400-T00010 and 0951330400-T00011.

#### COUNTRY ROCK WASTE ROCK DUMP( CRWRD)

The Country Rock Waste Dump (CRWRD) is designed for storing 59 $Mm^3$ of inert granitic waste rock. The dump is founded on existing overburden comprised of muskeg/peat and clay averaging approximately 15 m in thickness. This dump measures 1,596 m by 1,240 m in plan and is staged in ten (10) lifts 4 m for a total height of 40 m. The dump configuration includes a 20m and 43m setbacks for toes of Stage 2 and 3 lifts with subsequent lifts set-back to give a 2 H to 1 V slope for an ultimate dump height of 40 m.

To allow for sufficient time for consolidation of the soft clay layer successive lifts of this rock dumps will be sequenced with sufficient time for consolidation. Assuming 4 m lifts and a repetitive placement operation, any subsequent lift may only be started after the current lift has been in place for sufficient time for consolidation to be effective. Stages 2 to 8 may be sequenced 6 months after the previous stage, Stage 9, 11 months after, and stage 10, 15 months.

### DOLOMITE WASTE ROCK DUMP(DWRD)

The Dolomitic Waste Rock Dump is designed for storing 41 $Mm^3$ of inert dolomite rock. This dump will be founded on existing overburden comprised of muskeg/peat and clay averaging approximately 10 m in thickness. The dump measures 1,303 m by 974 m in plan and will be staged in ten (10) lifts for a maximum height of 40 m. The dump configuration will be formed with overall slopes of 2H:1V and setbacks of 8m, 23m and 6m for will be required for toes of Stage 2, Stage 3 and Stage 4 lifts, respectively.

As with the Country Rock Dump, to allow for sufficient time for consolidation of the soft clay layer successive lifts of this rock dumps will be sequenced with a set period of time. Assuming 4 m lifts and a repetitive placement operation, all subsequent lift may only be started after the 6 month consolidation period.

## *4.8.4 WASTE ROCK DUMPS STABILITY ANALYSES*

### GENERAL

Stability and settlement analyses were carried out in support of developing dump design sections that satisfy the design criteria presented in Section 4.8.2.

### METHODS OF ANALYSIS

The same methodology as used for the TWRMF dam involving coupled analyses in the Sigma/W and Slope/W components of GeoStudio 2007 by Geo-Slope International, Ltd were used.

CWRD and DWRD are modelled as underlain by 15 and 10 m of overburden, respectively. The overburden is divided into peat, and, upper (CI) and lower (CH) clay horizons. Both clay horizons were modeled using the non-linear Modified Cam-Clay (MCC) constitutive relationship.

Initial pore pressure conditions were defined with an initial water table at the ground surface in the peat material. Zero pressure boundary conditions were applied to the bottom of the bedrock to model dewatering wells pumping water out of the bedrock layer. The duration between placements of each lift is 6 months. Stage 9 and 10 lifts of the Dolomite Waste Rock Dump (DWRD) will have longer time interval allowances between placements of successive lifts, 11 to 15 months respectively. For lifts 1 through 8, each lift is placed on the first day, and then an additional 182 days are allowed for consolidation prior to placement of the next lift. The stability analyses presented were performed immediately after placement of each lift.

Pseudo static analysis was performed to simulate an earthquake condition of 0.03 g to demonstrate that the design was satisfactory..

## MATERIAL PROPERTIES

Soft clays (CL and CH) and bedrock material properties were based on laboratory data; whereas peat and waste rock material properties were based on professional judgment and previous experience. Tables 4.25 and 4.26 present the material properties used in Sigma/W and Slope/W models, respectively.

**Table 4.25 Sigma/W Material Properties**

| Materials | Material Category | Material Model | Poisson's Ratio | Young's Modulus (kPa) | Hydraulic Conductivity (cm/s) |
|---|---|---|---|---|---|
| Waste Rock | Effective Drained Parameters | Linear Elastic | 0.35 | 70000 | - |
| Peat | Effective Parameters w/PWP Change | Linear Elastic | 0.35 | 2000 | 1.00E-01 |
| Soft Clay (CL) | Effective Parameters w/PWP Change | Soft Clay (MCC) | 0.36 | - | 1.36E-08 |
| Soft Clay (CH) | Effective Parameters w/PWP Change | Soft Clay (MCC) | 0.37 | - | 4.97E-09 |
| Bedrock | Effective Parameters w/PWP Change | Linear Elastic | 0.49 | 100000 | 6.89E-04 |

**Table 4.26 Slope/W Material Properties**

| Materials | Model | Unit Weight (kN/m$^3$) | Cohesion (kPa) | Phi (º) |
|---|---|---|---|---|
| Waste Rock | Mohr-Coulomb | 20 | 0 | 40 |
| Peat | Mohr-Coulomb | 13 | 18 | 0 |
| Soft Clay (CL) | Mohr-Coulomb | 21 | 20 | 29 |
| Soft Clay (CH) | Mohr-Coulomb | 18 | 10 | 25 |
| Bedrock | Bedrock (Impenetrable) | | | |

## RESULTS

Slope stability Figures D-39 through D-68 and Figures D-69 through 98 in Appendix D-6 present results for CRWRD and DWRD respectively. In addition, a summary of the stability analyses results are presented in Table 4.27. Except for the short times following completion of some lifts in the CRWRD bolded numbers in Table 4.29, the results satisfy the minimum factor of safety requirements for static and pseudo static conditions. For these cases, because of their very short duration and their relatively fast increase beyond the specified factor of safety, those short duration lower factors

of safety are considered acceptable. For the CRWRD, lifts 9 and 10 reach a factor of safety of 1.3 after 11 and 15 months of placement of the last lift, respectively.

**able 4.27 Slope Stability Results**

| Lift No. | Country Rock Waste Rock Dump (CRWRD) | | | Dolomite Waste Rock Dump (DWRD) | | |
|---|---|---|---|---|---|---|
| | Static (10 day) Required/ Computed | Static (6 months) Required/ Computed | Pseudo static (6 months) Required/ Computed | Static (10 day) Require/ Computed | Static (6 months) Required/ Computed | Pseudo static (6 months) Required/ Computed |
| 1 | 1.30/**1.15** | 1.30/1.69 | 1.05/1.53 | 1.30/1.90 | 1.30/2.04 | 1.05/1.87 |
| 2 | 1.30/**1.28** | 1.30/1.46 | 1.05/1.20 | 1.30/1.34 | 1.30/1.33 | 1.05/1.18 |
| 3 | 1.30/1.67 | 1.30/1.93 | 1.05/1.45 | 1.30/1.37 | 1.30/1.31 | 1.05/1.20 |
| 4 | 1.30/1.75 | 1.30/1.89 | 1.05/1.47 | 1.30/1.37 | 1.30/1.46 | 1.05/1.23 |
| 5 | 1.30/1.77 | 1.30/1.75 | 1.05/1.46 | 1.30/1.36 | 1.30/1.45 | 1.05/1.24 |
| 6 | 1.30/1.53 | 1.30/1.58 | 1.05/1.36 | 1.30/1.37 | 1.30/1.46 | 1.05/1.26 |
| 7 | 1.30/1.35 | 1.30/1.38 | 1.05/1.31 | 1.30/1.38 | 1.30/1.44 | 1.05/1.27 |
| 8 | 1.30/1.26 | 1.30/1.32 | 1.05/1.22 | 1.30/1.39 | 1.30/1.44 | 1.05/1.28 |
| 9 | 1.30/1.22 | 1.30/1.30* | 1.051.20* | 1.30/1.40 | 1.30/1.45 | 1.05/1.29 |
| 10 | 1.30/1.23 | 1.30/1.30** | 1.05/1.18** | 1.30/1.40 | 1.30/1.44 | 1.05/1.29 |

Notes:
* 11 months after lift placement.
** 15 months after lift placement.

In order to achieve design heights of 40 m, the configuration of the dumps must include setbacks as summarized in Table 4.31.

**Table 4.28 Required Setbacks**

| Lift No. | Country Rock Waste Rock Dump Setback (m) | Dolomite Waste Rock Dump Setback (m) |
|---|---|---|
| Stage 1 | 20 | 8 |
| Stage 2 | 43 | 23 |
| Stage 3 | 0 | 6 |

Figures 4.15 through 4.22 below show the effective stress versus time, and pore water pressure versus time for the short and long term conditions as computed in the foundation soils underneath the DWRD and Country Rock WRD.

From Figures 4.15, 4.17, 4.19 and 4.21 it can be observed how the effective stress increases after placement of each lift and then stabilizes at a later time. Figures 4.16, 4.18, 4.20 and 4.22 show the pore water pressure generation after placing each lift

and its dissipation over time. After approximately 31 years for the pore water pressures to dissipate for the CRWRD and 16 years for the DWRD.

**Figure 4.15 CRWRD Short Term Mean Effective Stress vs. Time**

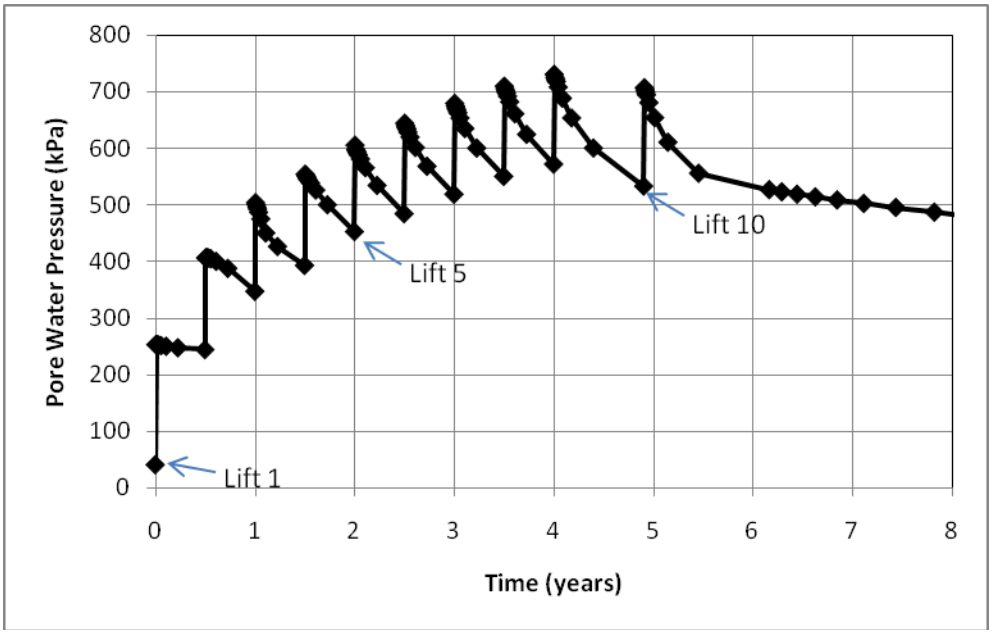



**Figure 4.16 CRWRD Short Term Pore Water Pressure vs. Time**

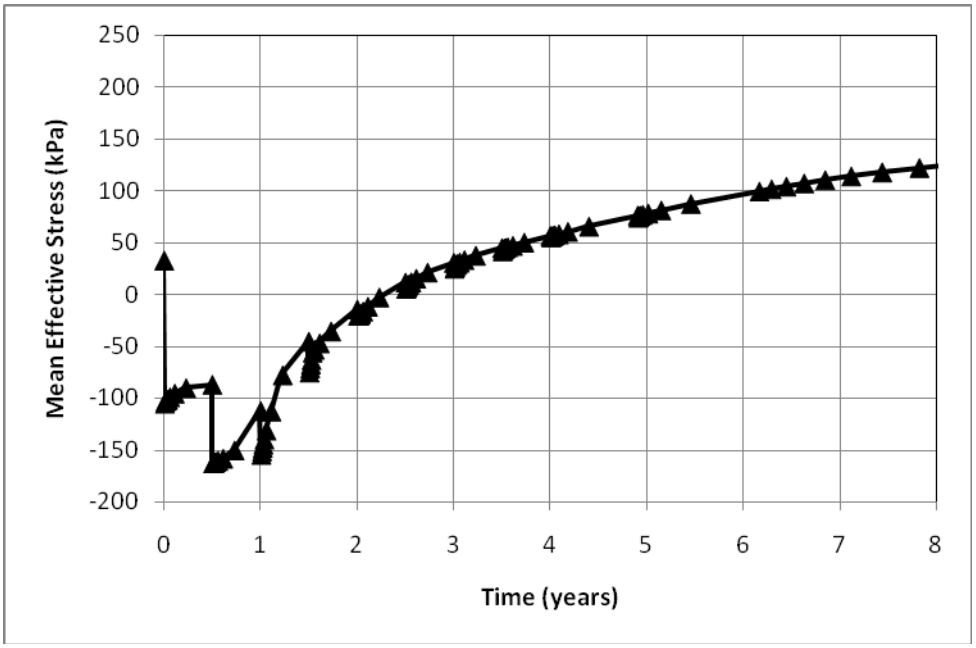


**Figure 4.17 CRWRD Long Term Mean Effective Stress vs. Time**

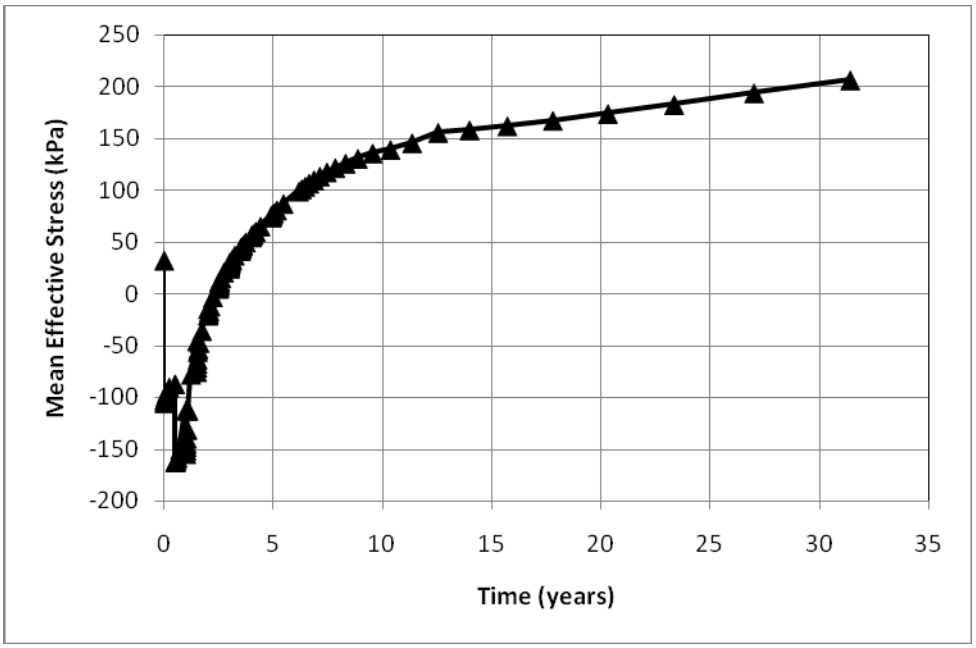



**Figure 4.18 CRWRD Long Term Pore Water Pressure vs. Time**

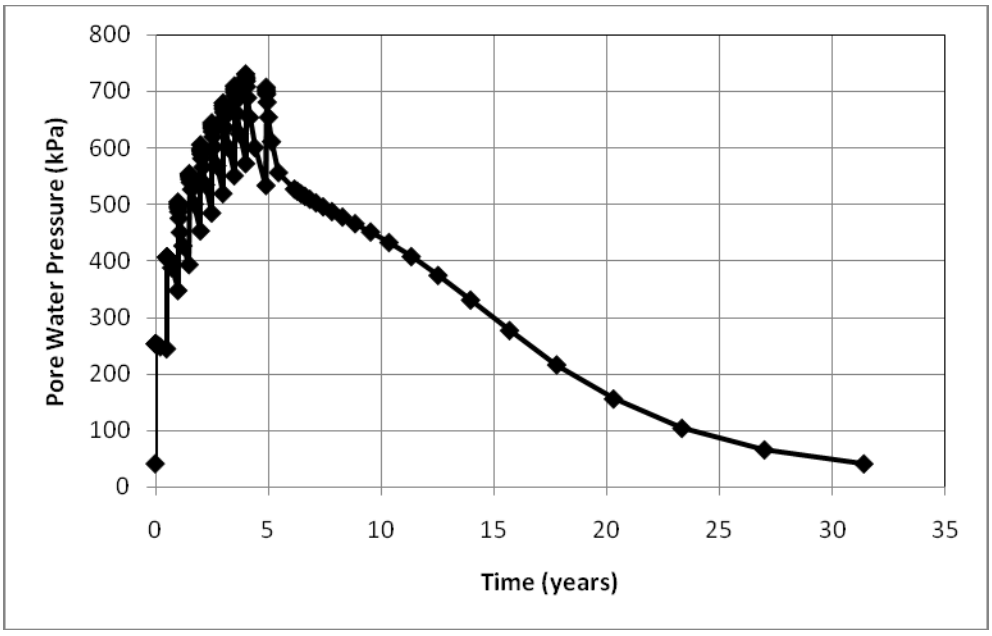


**Figure 4.19 DWRD Short Term Mean Effective Stress vs. Time**

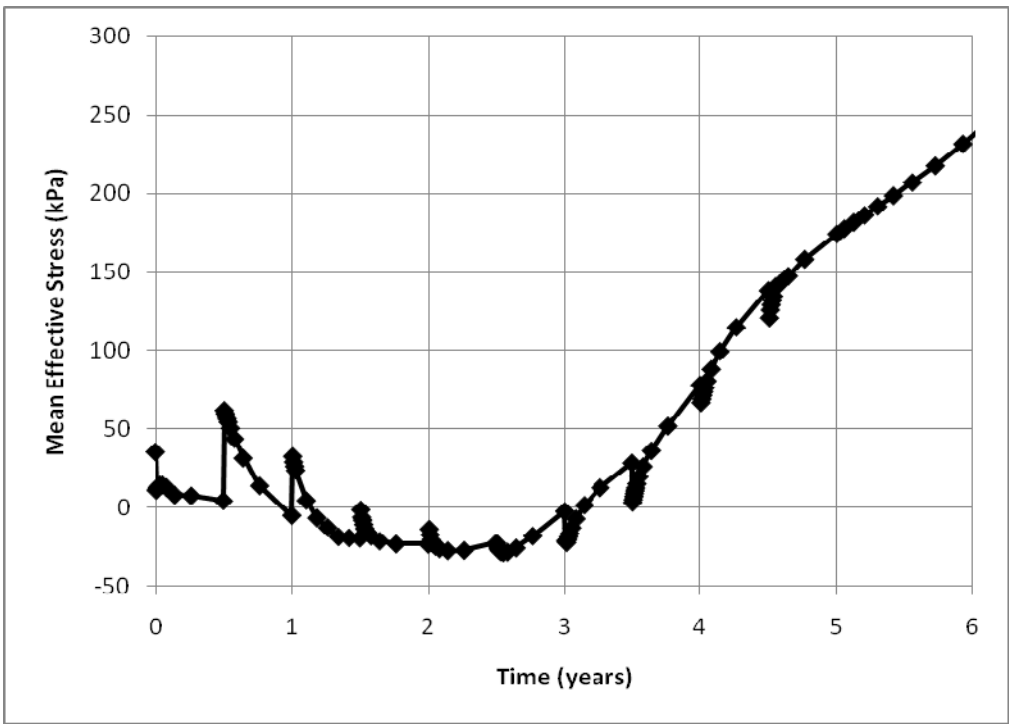



**Figure 4.20 DWRD Short Term Pore Water Pressure vs. Time**

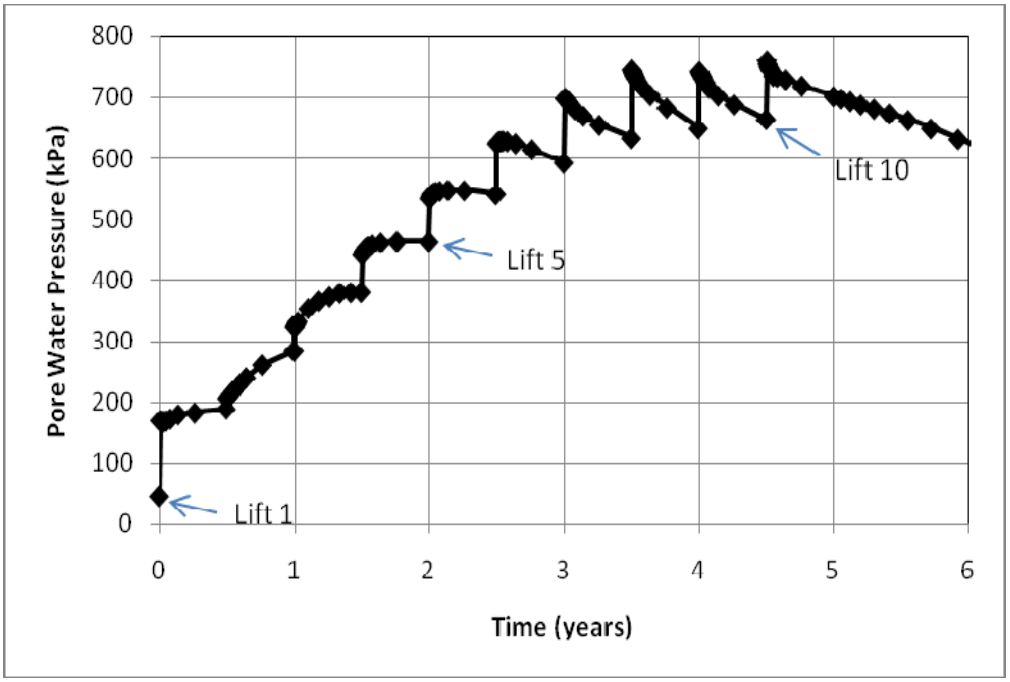


**Figure 4.21 DWRD Long Term Mean Effective Stress vs. Time**

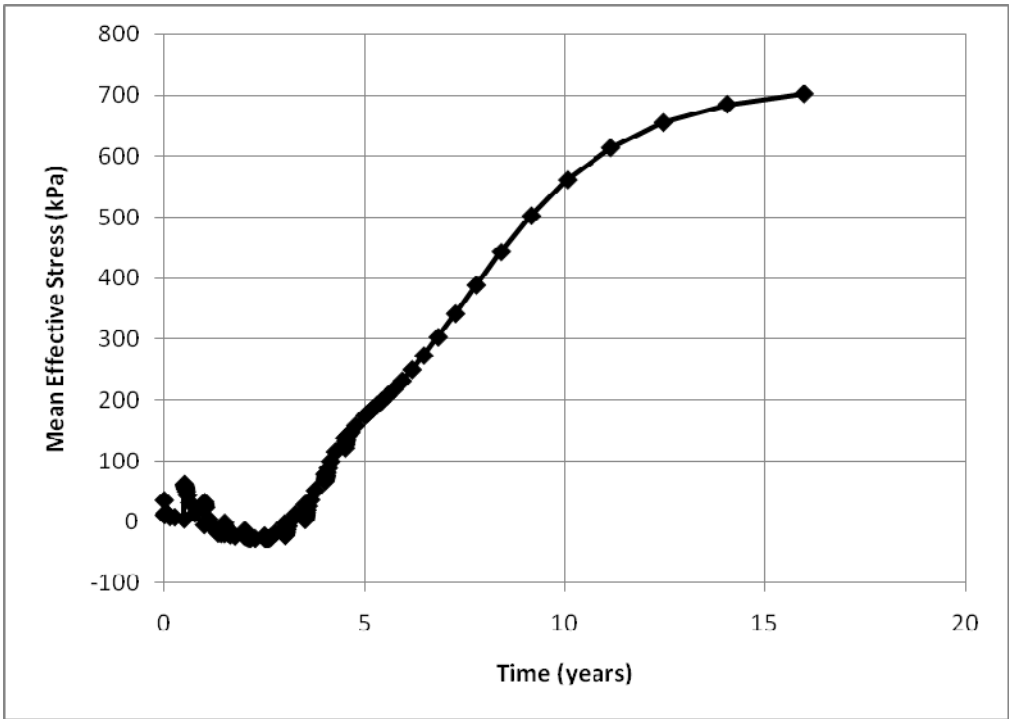
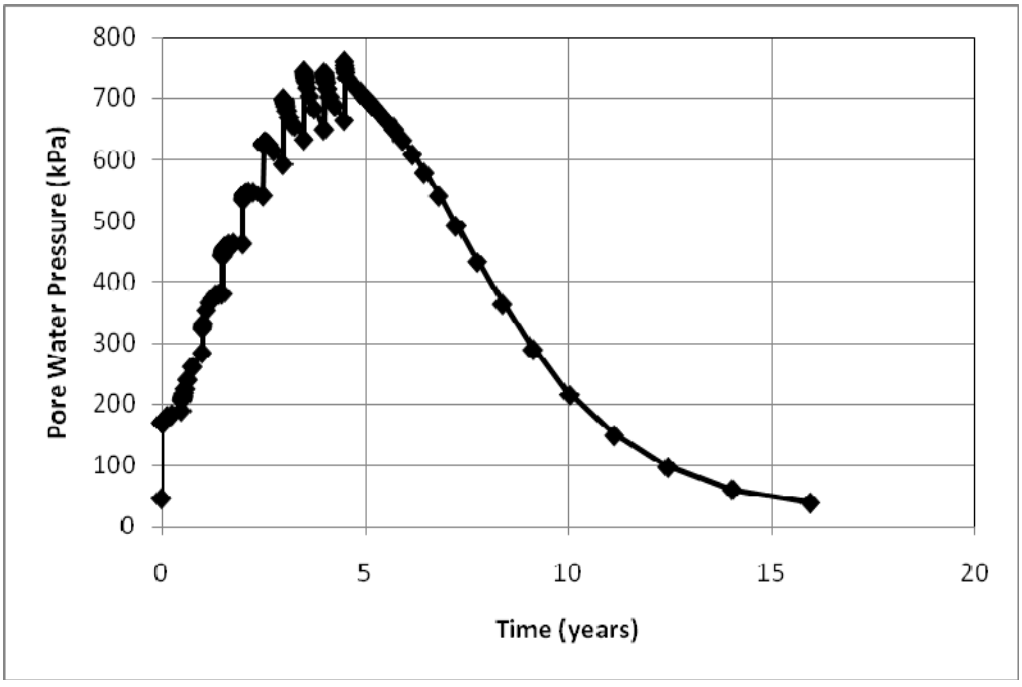



**Figure 4.22 DWRD Long Term Pore Water Pressure vs. Time**



# 4.9 OVERBURDEN DISPOSAL FACILITY

## *4.9.1 DESIGN OBJECTIVES AND CONSIDERATIONS*

The Overburden Disposal Facility (ODF) must be capable of retaining a total of 11.2 Mt of overburden discharged into the Facility during an 8 month period from April to November “2011” (Year -2). Also the facility must provide secure long-term storage for overburden materials some of which will be removed for the site development work. An ODF capable of storing the dredged material may be located immediately south and east of the open pit as shown on Drawing 0951330400-T0012.

Because of logistical challenges, schedule issues and capital and operational costs related to safe disposal of mechanically excavated overburden, dredging was selected as an option for this feasibility study. Dredging will provide more economic overburden removal scheme with a tighter mine development schedule. As a significant component of the dredging cost, the design of the ODF must be cost effective.

The facility will initially receive 11.2 Mt of combined peat/clay and water originating from the open pit dredging operations. A further 1.6 Mt of swelled peat and soft clay from the downstream side of the TWRMF dam foundation and runoff and seepage collection ditches will be added in “2012” (Year -1)

### DESIGN CRITERIA

The insitu material quantities that are used as the design basis for the ODF are listed in Table 4.29.

**Table 4.29 In-situ Overburden Material Quantities**

| Item | Value |
|---|---|
| Effective Unit Weight | 1.86 t/m³ |
| Effective Moisture Content | 52 % |
| Total Overburden Weight | 11,200,000 t |
| Total Overburden Volume | 6,021,000 m³ |
| Effective Solids Content (By Weight) | 66% |
| Effective Water Content (By Weight) | 34% |

The estimated total mass and volume of solids and water upon deposition in the ODF are presented in Table 4.30.

Table 4.30 ODF Design Basis Criteria

| Item | Value |
|---|---|
| Insitu Solids Weight | |
| Insitu Water Weight | |
| Solids Weight (50%) | 7,347,000 t |
| Water Weight (50%) | 7,347,000 t |
| Total Weight | 14,694,000 t |
| Solids Volume | 6,022,000 $m^3$ |
| Water Volume | 7,347,000 $m^3$ |
| Total Volume | 13,369,000 $m^3$ |

The engineering l design criteria used for the development of the ODF concept are presented in Table 4.31.

**Table 4.30 Basic Engineering Design Parameters for ODF**

| Item | Target | Comments |
|---|---|---|
| 1. Geotechnical Slope Stability | | |
| • Construction (in stages) | • Static F.O.S. 1.3,pseudo static F.O.S 1.05 | |
| • Normal Operating | • Same as above. | |
| • Closure | • Static F.O.S. 1.3, pseudo static F.O.S 1.05. | |
| 2. Seismicity | | |
| • Operating Design Basis Earthquake | • 1: 475 year return | |
| Seismicity induced by pit blasting | • | • Input will be required for the detailed design |
| Closure Earthquake | 1:2,475 | |

## ADDITIONAL CRITERIA

- The creation of the cone of depression will coincide with the dredging operation in 2011 (Year -2). The water pumped from the pit dewatering wells will be used for dredging operations. Additional well field and/or using water from local water courses should be considered as contingency.
- The design of the pit slopes in overburden should consider the effects of the drawdown rate proposed for the dredging (Section 4.11.1) to be developed at the detailed design stage.
- During detail design of the dredging scheme, the stability of the overburden will require to be checked for a rapid drawdown condition when the water level in the dredging pit is lowered.

### 4.9.2 GEOTECHNICAL DESIGN OF OVERBURDEN DISPOSAL FACILITY

#### GENERAL SITE SELECTION

A combination of economic and mine schedule constraints has resulted in selection dredging as an option for the overburden removal within the open pit area. ODF) capable of storing the dredged material and is located immediately south and east of the open pit as shown on Drawing 0951330400-T0012.

A number of aspects relating to design, construction and operation of the open pit have geotechnical implications. They include pit dewatering and surface water management, pit slope stability in overburden and in bedrock, deformation of the pit slopes as excavation progresses, and waste material management. Matters relating to design of pit dewatering system are addressed in the Golder 2008 Report.

#### OVERBURDEN REMOVAL OPERATION

Geotechnical considerations include pit dewatering, surface water management, pit slope stability in overburden, deformation of the pit slopes with overburden removal and waste material management. The peat and clay soils will be removed using a hydraulic dredging process utilizing a boom mounted rotating cutter attached to barge. The boom will have sufficient length and flexibility to cut the overburden material to vertically and horizontally control the cutter to accurately remove the overburden materials to the desired plan and profile.

The selection of the cutter head size and number of dredge units will be identified in the detailed design. Final selection of the dredge equipment and number of units will be provided in the final design with input from the dredge contactor.

However discussions with the dredging contractor suggested that two 1 m diameter cutter units may be required for this project. Water will be added at the cutter head to facilitate the conveyance of the solids to the ODF. The water and solids slurry will be pumped through a pipeline system by booster pumps to the ODF and discharged within the operating cell of the ODF.

During the dredging operation the slurry is expected to be 20% solid and 80% water by weight. For the planned 8 month dredging period, the estimated insitu overburden dredging production will be approximately 25,000 $m^3$/day.

### 4.9.3 OVERBURDEN DISPOSAL FACILITY DESIGN

#### GENERAL

The design of the Overburden Disposal Facility to store 11.2 Mt of overburden materials is shown in Drawing 097513304-00 T0013 .

The design basis for the ODF assumes that an deposition the overburden materials will be comprised of 50% solids and 50% water by weight. The change in solids mass from 70% prior to the dredging to 50% at the point of disposal is a result of the mixing and pumping of the slurry. After deposition a certain portion of the initial water content is released to bring the longer –term ratio to 65% solids and 35% water. The estimated total mass and volume of solids and water upon deposition in the ODF are presented in Table 4.30.

#### OVERBURDEN DISPOSAL FACILITY DYKE DESIGN SECTION

Surround the ODF, containing the overburden material, will be a perimeter dyke built approximately 4.5 m above local topography. Peat will be left in place in the dyke foundation. Carriage water used to transport the solids will be released from the ODF though a series of stop log weirs constructed in the perimeter dyke at the central apex of the ODF. The weirs will pass the water into the triangular collection pond contained by another dyke. The collected carriage water will then be reused for dredging operations. In addition, a 0.3 m perforated HDPE or ADS pipe will be installed in the ODF apex to enhance carriage water collection efficiency during and post dredging operations.

Plan view and section of the ODF dyke is shown on Drawing 0951330400-T0012. Polishing pond plan view, dyke design section and stop log structure section and detail of stop log weir are illustrated on Drawing 09513304-T0013. A brief description of dam design sections is presented in the following paragraphs.

The ODF dyke will be constructed of coarse rock fill (Zone 1) comprising of estimated 800 mm minus dolomite Waste Rock originating from the limestone outcrop located approximately 3 km northwest of the Facility. The upstream side of this zone will support a 0.5 m thick zone of fine rock fill (Zone 2) comprised of minus 75 mm dolomite waste rock (Zone 2). A geotextile layer will be placed on the upstream side over the top of Zone 2. The dyke crest is 12 m wide and both upstream and downstream slopes will be 3H:1V.

The polishing pond dyke will also be constructed of coarse rock fill (Zone 1) and a 0.5 m thick fine rock fill (Zone 2) on the upstream side. Both upstream and downstream slopes will be 3H:1V. A 0.5 m clay liner will be provided on the upstream side of Zone 2. A total of three DMP pipes 1.3 m in diameter and sloped at 0.5% will be installed within the dyke. These pipes will have vertical perforated intakes immediately upstream of the dyke

### *4.9.4 OVERBURDEN DISPOSAL FACILITY DYKE STABILITY AND SEEPAGE ANALYSES*

#### GENERAL

Seepage and slope stability analyses were performed on the ODF dyke Sections D1 and D2 on Drawing 0951330400-T0012. These sections represent identical dyke

design configurations as described in Section 4.9.4 placed over different overburden thicknesses interpreted as follows:

- Section D1 assumes: 2.5m of peat, over 3.0m upper clay (CL), over 12.5m of lower clay (CH)
- Section D2 assumes: 2.5m of peat, over 3.0m upper clay (CL), over 3.0m of lower clay (CH)

### METHODS OF ANALYSIS

The same methodology as used for the TWRMF dam and Waste Rock dumps involving coupled analyses in the Sigma/W and Slope/W components of GeoStudio 2007 were used for the ODF dykes. Sections D1 and D2 were modeled assuming the embankment were placed in a single lift on the first day, and then additional 20 days were allowed for consolidation. Slope stability analysis was performed 4 days after the embankment was placed and then again at the end of 20 days.

The slope stability analysis was performed on the upstream and downstream sides of the ODF dyke. Another analysis was performed 30 days after the completion of the facility, assuming the disposed peat and clay material were placed at once on the upstream side. Then, a seepage analysis was performed under steady state conditions to calculate the seepage through the ODF dyke.

Pseudo static analysis on the dyke was performed to simulate earthquake conditions using 0.03 g.

### MATERIAL PROPERTIES

Foundation material properties (CL, CH and bedrock) were based on field and laboratory data. Peat, coarse and fine rock fill, and disposed peat and clay material properties were based on previous experience and professional judgment. Tables 4.32 and 4.33 show material properties used in Sigma/W, Seep/W and Slope/W.

**Table 4.31 Sigma/W Input Material Properties**

| Materials | Material Category | Material Model | Poisson's Ratio | Young's Modulus (kPa) | Hydraulic Conductivity (cm/s)* |
|---|---|---|---|---|---|
| Disposed Peat and Clay | Effective Parameters w/PWP Change | Linear Elastic | 0.33 | 2000 | 8.64E-03 |
| Coarse Rock Fill | Effective Parameters w/PWP Change | Linear Elastic | 0.33 | 50000 | 8.64E-01 |
| Fine Rock Fill | Effective Parameters w/PWP Change | Linear Elastic | 0.33 | 7000 | 8.64E-03 |
| Sand and Gravel | Effective Drained Parameters | Linear Elastic | 0.35 | 8000 | |
| Peat | Effective Parameters w/PWP Change | Linear Elastic | 0.35 | 2000 | 1.00E-01 |
| Soft Clay (CL) | Effective Parameters w/PWP Change | Soft Clay (MCC) | 0.36 | | 1.36E-08 |
| Soft Clay (CH) | Effective Parameters w/PWP Change | Soft Clay (MCC) | 0.37 | | 4.97E-09 |
| Bedrock | Effective Parameters w/PWP Change | Linear Elastic | 0.49 | 100000 | 6.89E-04 |

Note: *Used in Seep/W.

**Table 4.32 Slope/W Input Material Properties**

| Materials | Model | Unit Weight (kN/m$^3$) | Cohesion (kPa) | Phi (º) |
|---|---|---|---|---|
| Disposed Peat and Clay | Mohr-Coulomb | 16 | 18 | 0 |
| Coarse Rock Fill | Mohr-Coulomb | 19 | 0 | 40 |
| Fine Rock Fill | Mohr-Coulomb | 22 | 0 | 38 |
| Sand and Gravel | Mohr-Coulomb | 22 | 0 | 35 |
| Peat | Mohr-Coulomb | 13 | 18 | 0 |
| Soft Clay (CL) | Mohr-Coulomb | 21 | 20 | 29 |
| Soft Clay (CH) | Mohr-Coulomb | 18 | 10 | 25 |
| Bedrock | Bedrock (Impenetrable) | | | |

## RESULTS

Table 4.34 presents the slope stability results 4 days and 20 days after the placement of the facility, and 10 days after the ODF has been filled with disposed

peat and clay material. The slope stability results show that the OCS satisfies the minimum requirements for static and pseudo static conditions. Slope stability results are for Sections D1 and D2 are presented on Figures D-99 through D-106 and D-107 through D-114, respectively (Appendix D-6).

**Table 4.33 Slope Stability Results**

| Section | Elapsed Time (days) | Upstream | | Downstream | |
|---|---|---|---|---|---|
| | | Static | Pseudo static | Static | Pseudo static |
| D1 | 4 | 1.3/1.32 | | 1.30/1.23 | |
| | 20 | 1.3/1.47 | 1.05/1.32 | 1.30/1.45 | 1.05/1.32 |
| | 30* | | | 1.30/1.51 | 1.05/1.36 |
| D2 | 4 | 1.3 | | 1.32 | |
| | 20 | 1.39 | 1.25 | 1.36 | 1.25 |
| | 30* | | | 1.48 | 1.34 |

*Assumed disposed peat and clay material is placed on the upstream side of the embankment.

Figures 4.23 and 4.24 show effective stress vs. time, and pore water pressure vs. time measured in the foundation soils below the centerline of the dam.

From Figure 4.23 shows how the effective stress increases after placing the embankment and the stabilizes over time. Figures 4.24 show the pore water pressure build-up upon the dyke construction and dissipation over time. Full pore pressure dissipation is estimated to occur in approximately 15 years.

**Figure 4.23 Mean Effective Stress vs. Time**

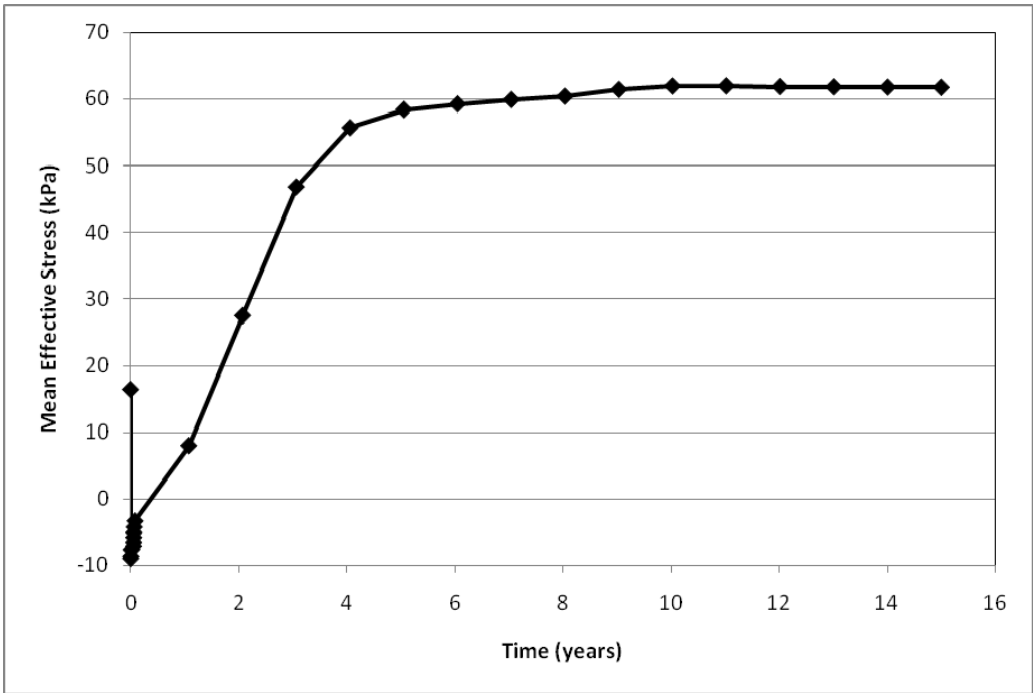
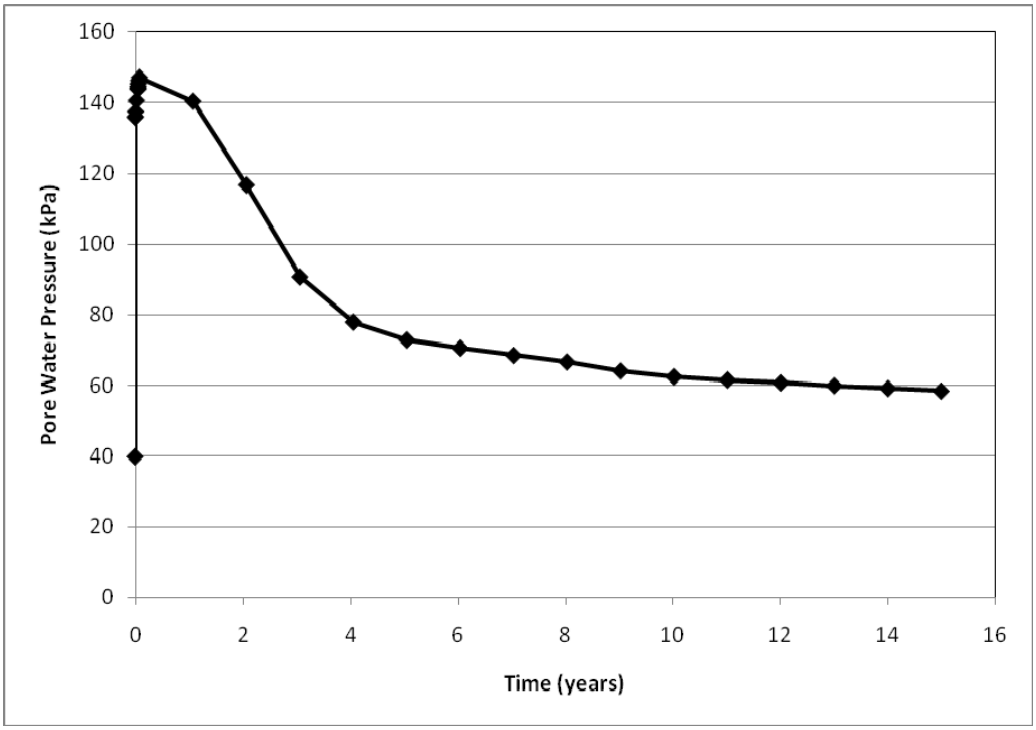



**Figure 4.24 Pore Water Pressure vs. Time**



Seepage through the embankment was estimated using Seep/W for a one meter wide slice or rock fill material against the upstream perimeter of the dam. The computed seepage quantities for sections D1 and D2 are approximately 50 $m^3$/day. The Initial seepage rate is expected to be much higher until a seal is created by discharged peat and clay.

## 4.10 POLISHING POND AND FLOOD RETENTION AREA DYKE

A PP will be contained by a perimeter dyke. The plan view, section and detail of the PP dyke are shown on drawing 0951330400-T0014. Brief description of dyke design section

- The dyke is designed as an earth/rock fill structure varying in height from 4.0 m to 6.0 m above local topography. Upstream and downstream embankment slopes will be 3H:1V and 1.2H:1V, respectively. The dyke is scheduled to be raised in 2011 prior to the end of dredging operations to receive water form open pit dewatering coinciding with the last phases of dredging operations
- The main rock fill zone (Zone1) will be composed of 800 mm minus coarse rock, supporting a 0.5 m thick zone of 75 mm minus fine rock fill, which in turn, supports Geotextile 1200R and Bentofix liner. A 0.5m clay cover over the Bentofix is provided for confinement and frost protection. Geotextile at the base of the dyke along with rock fill of fine rock fill is designed to prevent migration of fines from the foundation soils into coarse rock fill. A 0.3 m thick pavement surface composed of fine rock fill will be provided over the crest of the embankment.
- An anchor trench around the upstream toe will be extended approximately 0.5 m into the native clay to ensure full containment of the stored water. The Bentofix liner will be anchored into the trench and backfilled with locally available clay. Dewatering of the cut-off trench may be required to facilitate installation of the Bentofix liner in dry conditions.
- The dyke embankment will be constructed using rock fill originating from the neighboring limestone bluff located about 2 km west of the PP.

## 4.11 WATER HANDLING AND BALANCE

A general storm water management plan for the overall site is presented in Section 8.0 (Infrastructure).

### *4.11.1 DESIGN CONSIDERATIONS AND CRITERIA FOR TWRMF AND ODF*

- The results of hydrogeological study for the Open Pit dewatering are provided in Golder Associates' Report (Golder, 2008). The primary focus of this study is

sizing of the dewatering well system that is required for safe Open Pit operation.

- Based on Golder Associates' (Golder, 2008) hydrogeological model, 12 dewatering wells have been proposed. The wells will be located at a distance of approximately 300 m to 400 m along the crest of the ultimate pit limits in plan, and will pump simultaneously from the dolomite and sandstone units. The total pumping rate for the well field is expected to be approximately 40,000 $m^3$/d (7,300 gpm), and the average pumping rate for an individual well is estimated to be about 3,300 $m^3$/d (600 gpm).
- The associated drawdown cone, defined using a 1 m drawdown contour, is predicted to extend laterally in the limestone to a distance of approximately 5,000 m to 6,000 m from the proposed open pit. The creation of the cone of depression will coincide with the dredging operation in 2011. The water pumped from the pit dewatering wells will be used for dredging operations. The cone for depression will provide under drainage for the overburden clays. This should be factored in geotechnical analyses for major site earth/rock fill structures.
- Dredging will be carried out over an 8 month period from April to November 2011.
- Constructing the TWRMF containment structure will take place in Years 2011 (Year -2) and 2012 (Year -1).
- Make up water is required as a return from the ODF after having been passed through decant and polishing ponds to sustain dredging operations.
- The dredging operation will be carried out over an 8 month period from April to November in "2011" (Year -2).
- Some 5.0 $Mm^3$ of water will be pumped from the Open Pit to the PP end of September "2011" (Year -2).
- Some 1.6 Mm3 of water will have to be pumped to PPFRA at 80 $m^3$/min. at the end of November "2011" (Year -2) to finally drain down the Open Pit.
- Water management within the TWRMF should account for saturated conditions for PAG-Waste Rock and provision of a hydraulic gradient allowing for more efficient Ni-tailings invasion in of the PAG-Waste Rock void space.
- Decant pond is to be formed separating the Facility into north and south cells during operations. Decant pond is to be filled in with PAG-Waste Rock in the last two years (2018 and 2019) of waste rock production.
- The use of decant pipes is unacceptable due to soft ground conditions within the TWRMF pond and dam foundation. Consequently, pumping from a barge is selected in appreciation of site conditions. Alternatively, decant towers within rock fill in PAG-Waste Rock causeways could be considered during the detailed design stage.

- A minimum of 1.5 m of water will be required on the top of PAG Waste Rock at all times to facilitate free flow and prevent potential ice blockage.
- Return water to process plant is to be passed through the PP. The PP overflow is to be discharged to Minago River and Oakley Creek.
- A 0.5 m of water cover is required following the end of the Ni-tailings deposition in TWRMF.
- Seepage and runoff should be collected downstream of the TWRMF dam in collection ditches reporting to collection ponds and pumped back to the TWRMF.
- On closure the ODF should be reshaped and vegetated and runoff stored in the decant pond and overflow directed to the Oakley Creek. .
- A single overflow/emergency spillway structure is required for the TWRMF to prevent overtopping caused by a closure design rainfall. Water discharged through this spillway will be released to the environment through the PP.

### 4.11.2 TWRMF WATER BALANCE

The development of the TWRMF water balance involved:

- TWRMF water inflow volume (trapped in tailings pore space, supernatant, and from other foreign sources).
- TWRMF water outflow volume reporting to the Process Plant after being passed through the Polishing Pond
- The balance of TWRMF water volume outflow reporting to the PP for eventual discharge into the Minago River and Oakley Creek.

The TWRMF water balance is based on the following design assumptions:

- A portion of water volume from different sources (supernatant, TWRMF footprint runoff, Frac Sand Process Plant Clarifier, Sewage Treatment Plant) temporarily residing in the TWRMF basin will be reporting to the Polishing Pond, with the balance (minimum normal operating volume) in the order of 500,000 $m^3$ residing within the TWRMF Decant Pond at all times during the mine operation.
- The summer (June to October) water volume contained in the TWRMF basin, expanded by inflows from foreign sources, will be trapped for the duration of winter months (November to April) due to freezing conditions. At the time of spring break up in the month of May, this trapped water volume, increased by the volume reporting to the TWRMF pond in May and reduced by the TWRMF minimum operating water volume, will be discharged into the Polishing Pond by the end of May (over the 31 day period).

- The water from the PP will be discharged to the Process Plant at a rate of 11,520 $m^3$/day all year round; the remaining water will be discharged to the Minago River (70%) and Oakley Creek (30%) in summer months and in May. During the winter months (November to April), 100% of the excess water in the PP will be discharged into the Minago River.

The open pit mining operation and ore processing will produce tailings discharged to the TWRMF for a total of nine years starting from Year -1 of operation (year 2011). The TWRMF is divided into two cells (north and south). The tailings will be discharged into the cells in alternating fashion. The TWRMF dam will be constructed in four stages prior to the start of alternating deposition.

The assumed usage of the TWRMF cells after start-up of the mining operation is shown in Drawing 095133-T008 and details of the deposition plan are presented in Section 6.12.1. The TWRMF water balance was developed in accordance with this schedule.

The TWRMF basin was not separated into south and north cells for ease of water balance computations. The water balance was computed monthly, but most discharges were characterized by two distinct discharge periods:

- From June to October (summer condition)
- From November to May (discharged in May as spring freshet).

The climate information on rainfall, snow fall, and evaporation used in the water balance model is based on the following assumptions:

- The average annual precipitation for the project area is 474 mm, from which 355 mm falls as rain and 119 mm falls as snow. All precipitation falling in November through April was assumed to be snow.
- Rainfall in May is 44 mm and the remaining 312 mm of rainfall fell from June through October, with a maximum monthly rainfall of 78 mm in June and a minimum of 39 mm in October.
- Sublimation was assumed to consume 39% of the total snowfall, thus leaving a water equivalent remaining in spring of 72 mm. Net snow (less sublimation losses) was accumulated in the water balance each month.
- The annual evaporation from the site was assumed to be equal to the lake evaporation of 546 mm
- Evaporation in May is 112 mm and the remaining 434 mm was equally distributed on a daily basis for the other months (June to October). Therefore, the calculated daily evaporation is 2.84 mm.
- For the “dry” year, used to evaluate water cover requirements, precipitation (rain and snow) was reduced by 20%, and evaporation was increased by 20%.

### INPUTS

Contribution of different water sources (other than rainfall) reporting to the TWRMF is summarized in Table 4.34. Direct runoff from snowfall and rain was computed for the TWRMF (enclosed area approximately 2,430,000 $m^2$), as well as for the perimeter area. The run-off volume for the TWRMF perimeter (embankment out slopes and seepage collection system) (an area of approximately 243,576 $m^2$) was calculated based on the precipitation amount (both rainfall plus snow fall minus sublimation) for the above discharging periods.

The combined seepage and run-off volumes from the TWRMF structure will be collected by the perimeter drainage system and pumped back to the TWRMF basin. A separate water balance was computed to assess evaporation losses within the seepage collection ponds, with the remaining water returned to the TWRMF water balance.

**Table 4.34 Water Inputs to the TWRMF Area excluding direct precipitation)**

| Period | Source | Amount ($m^3$/day) |
|---|---|---|
| Jun-Oct | Water From Mill tailings | 11,903 |
| | Water from Clarifier of FSP[1] | 149 |
| | Water from FSP1 tailings | 3,132 |
| | Return water from seepage collection system | Varies |
| | Water from Sewage Treatment Plant | 120 |
| Nov-Apr | Water From Mill tailings | 11,903 |
| | Water from Clarifier of FSP[1] | 149 |
| | Water from FSP[1] tailings | 3,132 |
| | Return water from seepage collection system | No discharge |
| | Water from Sewage Treatment Plant | 120 |
| May | Water From Mill tailings | 11,903 |
| | Water from Clarifier of FSP[1] | 149 |
| | Water from FSP[1] tailings | 3,132 |
| | Return water from seepage collection system | Varies |
| | Water from Sewage Treatment Plant | 120 |

Note: FSP – Frac Sand Facility

### OUTPUTS

The overall passive water losses from the TWRMF are evaporation, seepage through the rock fill, and water retained in tailings voids. Water remaining after these abstractions accumulates as supernatant, and is decanted to the polishing pond for use in mill processes. The monthly evaporation estimates are given above in this section. The water retained within the tailings voids varies from 39% to 50% by volume (19% to 28% by weight) in accordance with the design basis for the TWRMF.

The calculated total water output from the TWRMF varies from 250 $m^3$/day (seepage only) during freezing conditions, to as much as approximately 133,000 $m^3$/day (average, during May freshet).

#### WATER DISCHARGE RATES

As discussed in preceding paragraphs, two distinct discharge periods were analysed. The first scenario corresponds to the summer months (June to October) and the second scenario is the spring freshet in May which includes the winter months (November to April) frozen water inputs in the TWRMF. In addition to the current water input during the month of May, the frozen water will melt and will be discharged during the 31 days of May. For any given time there will be approximately 500,000 $m^3$ of water retained in the TWRMF pond for decant purposes and for operating the barge. The discharged water from the TWRMF will report to the polishing pond where water from the dewatering wells and the open pit area will also be added. Water stored in the PPFRA will feed the mill Process Plant at a rate of approximately 11,520 $m^3$/day and the balance will be directed to the Minago River (70%) and Oakley Creek (30%).This will not apply to the period between November to April, when there will be no discharge to Oakley Creek, and therefore, the excess water in the Polishing Pond after discharging to the Process Plant will be directed into the Minago River.

TWRMF monthly water balance for average and dry year conditions are provided in Appendices E-1 and E-2, respectively. The water balance indicates a substantial increase in pumping rate in May. The pumps and associated equipment should be sized to handle approximately 5,200 $m^3$/hr in this case. There is a potential for a reduction of the typical May discharge rate if pumping continues during the winter months through holes opened through the ice. Water discharge from the TWRMF to the PPFRA will be no greater than 192 $m^3$/h during summer months (June – October) in order to maintain a minimum operating pool and water cover (during an average year). Dry years can be mitigated during operations by pumping additional excess groundwater into the TWRMF.

### 4.11.3 OVERBURDEN DISPOSAL FACILITY WATER BALANCE

- In order to maintain efficient dredging operations, approximately 29 $Mm^3$ water will be needed to achieve a 20% solids 80% water slurry composition over the 8 month dredging period. Table 4.35 lists the water balance estimates required for the dredging operations.

**Table 4.35 Overburden Management Water Balance**

| Item | Value |
|---|---|
| Effective insitu Moisture Content | 52% |
| Slurry Water Requirement (20%solids by weight) | 29,400,000 m³ |
| Return Water from ODF | 22.042,000 m³ |
| Make-Up Water | 7,358,000 m³ |
| Make-Up Water Daily Demand (including 15% loss) | 35,000 m³/day |

Decant water from the dredging operations will be collected in the decant water collection pond as shown on Drawing 0951330400-T0013. The separation dike between the pond and the ODF will be constructed of permeable coarse limestone rock fill.

Carriage water from the dredge slurry will be released into the collection pond via the weir structures and through the permeable dyke. The outboard pond dyke will be approximately 4 m high, also constructed of coarse limestone rock fill but in addition having 0.5 m of fine limestone rock fill on the upstream side and a 0.3 m thick inboard clay liner to increase holding capacity (reduce water loss).

To effectively manage water release and to support continued dredging operations, a total of 31.2 m in diameter corrugated metal pipe (CMP) will run through dyke (laterals) and these are connected to perforated standpipes installed within the pond. It is estimated that approximately 22 $m^3$ of water will be released from the ODF over then eight month operating period.

This water will be returned to the dredging operations for continued dredge water demand. It is estimated that over the eight month dredging period, approximately 7.4M $m^3$ of make-up water will be required. To support the dredging operations and assuming a 15 percent water loss, the estimate make-up water demand is approximately 35,000 $m^3$/day. Details or ODF water balance in support of dredging operations and ODF containment design are presented in Appendix E-3. More detailed water balance as a part of deposition planning for disposal of dredged material will be will be carried out during the detailed design stage.

## 4.12 DEPOSITION STRATEGY

The site will have the following major mine waste disposal areas:

- TWRMF(deposition strategy provided in this section)
- ODF (depositing strategy provided in this section)
- DWRD (elements of deposition strategy provided in Section 4.8.3)
- CRWRD(elements of deposition strategy provided in Section 4.8.3)

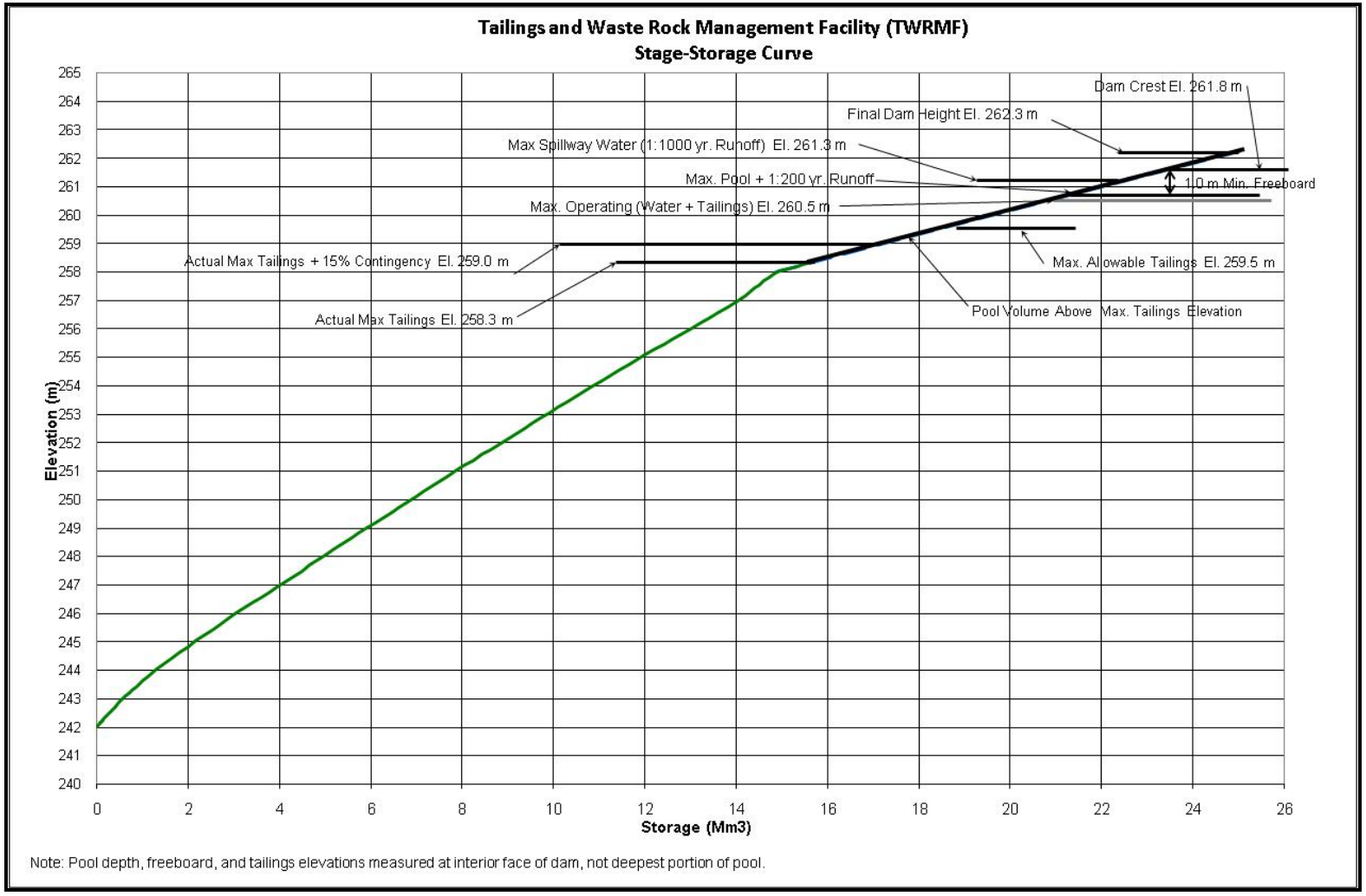
### 4.12.1 TWRMF CONCEPTUAL DEPOSITION PLAN

- Construction of the TWRMF dam will take place in Years 2011 and 2012. Key elements of the tailings and PAG-Waste Rock concurrent disposal in TWRMF is illustrated on Drawing 095133040-T0008 and the deposition strategy is briefly described in the following paragraphs.
- The frac sand deposition will commence during last stages of the dam construction in 2013. In order for the frac sand deposition to start and subsequently to support initial phases of Ni-tailings deposition in 2014 a dolomite Waste Rock base will be constructed underneath the coarse PAG-Waste Rock rind and both north and south causeways. The construction of the dolomite Waste Rock base will be completed during last stages of the dam construction in 2012.
- The coarse PAG-Waste Rock (estimated at 80% of total PAG-Waste Rock production) will be deposited in the rind constructed immediately upstream of the dam. The retaining structure construction will be carried out in lifts corresponding to yearly PAG-Waste Rock production. A 1 m clay liner will be provided between the rind and upstream face of the dam as depicted on Drawings 0951330400-T0004 and 0951330400-T0005.
- The fine PAG-Waste Rock (estimated at 20% of total PAG-Waste Rock production) will be disposed of in north and south causeways. North causeway will have a clay cutoff trench built in stages, also in accordance with yearly Waste Rock production schedule.
- The clay liner on in between the waste rock retaining structure and the dam will ensure full containment by minimizing seepage reporting to the downstream environment as per design criteria (Table 4.18).
- The clay cutoff trench within the north causeway will facilitate intermittent flooding and dewatering in north and south cells. Maximizing PAG Waste Rock saturation during Waste Rock placement will minimize oxidation and reduce ARD/ML potential.
- PAG-Waste Rock will be placed simultaneously in both the north and south cells. Flooding will closely follow advancement of the PAG-Waste Rock placement. Dewatering of the north cell will take place prior to the start of tailings deposition in order promote hydraulic gradients and thereby increase invasion of Ni-tailings into the void space of PAG-Waste Rock. Tailings deposition in the north cell will take 6 months. Dewatering of the south cell will precede Ni-tailings placement and it will take another 6 months to complete the deposition in the south cell.
- The frac sand tailings deposition will be carried out from the top of causeways. Ni-Tailings deposition will be carried out from the dam crest by running feeder pipes from the main tailings supply pipe at the dam crest and down the upstream dam slope. The feeder pipes would eventually distribute tailings over the rock fill through perforated spreader pipes. Ripping of the uppermost PAG-

Waste Rock surface will be required as an expedient to open up the uppermost finer waste rock in order to promote tailings ingress into the Waste Rock void space.

- PAG-Waste Rock placement and tailings deposition will alternate in the same fashion for 6 years. During this time decant pond will be created between north and south causeways and form here the water will be pumped to the PP.
- In 2019 (Year 7) and 2020 (Year 8), Coarse PAG-Waste Rock will be deposited in an area between the north and south causeways. A minimum of 1.5 m of decant water above the Waste Rock will be maintained to facilitate free flow and prevent potential blockage during operations of barge mounted pumps. An alternative arrangement may be sought in pumping from perforated decant towers installed within the rock fill placed in causeways. This alternative will be examined more closely in the detailed design stage.
- In year 2019 and 2020 the PAG-waste rock in the rind will receive a minimum of 2 m of Ni-tailings cover by peripheral discharging form the dam crest. A 0.3% and 2% slopes are estimated for the tailings beaches and subaqueous conditions, respectively. A minimum of 0.5 m of water cover will be provided on the top of the tailings cover. The tailings and water covers will ensure total encapsulation of PAG-Waste Rock on closure. Figure 4.25 shows stage storage curve with critical design elevations for the TWRMF based on inputs from the water balance presented herein.

**Figure 4.25 TWRMF Stage Storage Curve**




Note: Pool depth, freeboard, and tailings elevations measured at interior face of dam, not deepest portion of pool.

### 4.12.2 OVERBURDEN DISPOSAL FACILITY – CONCEPTUAL DEPOSITION PLAN

The overburden facility plan view and sections is presented on Drawing 0951330400-T0012. The ODF design capacity is 15 $Mm^3$. The facility will initially receive 13.4 $Mm^3$ of combined peat/clay and water originating from the open pit dredging operations. The deposition will take place over an 8 month period. Additional 1.6 $Mm^3$ (swelled volume) of overburden originating from peat and soft clay excavation form the downstream side of the TWRMF dam foundation and runoff and seepage collection ditches will report to the ODF in 2012.

The discharge of dredged peat and clay slurry will be through a number of discharge pipes spaced out along the ODF dyke crest. The ODF dyke crest width of 12 m is selected to accommodate construction traffic and facilitate feeder and discharge pipes.

The disposal strategy will involve perimeter discharge of dredged peat and clay slurry starting along the west side of the south leg of the ODF and continuing in parallel along the north and south sides. Tailings beach thus formed divert decant water towards pervious dyke section with a number of weirs reporting to the polishing pond. The same strategy will apply to the east ODF leg where the deposition will start at the north side continuing along west and east side with the decant pond pushed towards the southeast collection area.

The dredged material is estimated to form a beach at a 0.3 % slope with subaqueous slopes formed at 2%. More detailed deposition plan will be developed during detailed design stage, also involving inputs form the dredging contractors

## 4.13 GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

### 4.13.1 TAILINGS AND WASTE ROCK MANAGEMENT FACILITY

All peat/muskeg and the soft clay layer underneath the peat must be removed from the downstream part TWRMF dam foundation and the runoff/seepage collection ditch. The muskeg peat removal will require prior excavation of a system of drainage ditches reporting to the collection ditch that will coincide with the future runoff/seepage collection ditch located immediately east of the east side of the future TWRMF dam. Following the construction of the Stage 1 TWRMF dam the ditch will collect runoff and seepage.

Winter excavation of both the system of drainage ditches and the muskeg/peat and soft clay is preferred as the frozen top of the muskeg would facilitate movement of construction equipment. The rate/depth of frost penetration can be accelerated by snow removal in the construction area as well as construction traffic frequency. The muskeg/peat excavated from the downstream part of the TWRMF dam foundation will be disposed of in the ODF.

Preliminary rock fill gradations for fine and coarse rock fill are as follows:

### COARSE ROCK FILL (ZONE 1)

The source of dolomite Waste Rock from the open pit mine excavation will be the source of coarse rock fill for the construction of the TWRMF dam and dolomite rock fill base for the PAG-Waste Rock rind and north and south causeways construction. Assumed gradation for the coarse rock material is shown in Table 4.35.

**Table 4.35 Gradation Requirements – Coarse Rock Fill (Zone 1)**

| Dimension or U.S. Standard Sieve Size (mm) | % Passing by Weight |
|---|---|
| 810 | 100 |
| 450 | 60-100 |
| 200 | 37-100 |
| 130 | 25-60 |
| 75 | 10-45 |
| 25 | 0-15 |
| #4 | 0 |

### FINE ROCK FILL (ZONE 2)

Fine rock fill gradation presented in Table 4.36 was arrived at following filter criteria based on the assumed gradation of the coarse rock fill.

**Table 4.36 Gradation Requirements – Fine Rock Fill (Zone2)**

| Dimension or U.S. Standard Sieve Size (mm) | % Passing by Weight |
|---|---|
| 75 | 100 |
| 50 | 90-100 |
| 30 | 60-100 |
| 25 | 54-100 |
| 19 | 46-60 |
| #4 | 10-22 |
| #8 | 0-7 |
| #16 | 0 |

Zone 2 material will be obtained by primary and secondary crushing of Zone 1 dolomite Waste Rock.

### SAND & GRAVEL (ZONE 2A)

There are no known natural sources of sand and gravel within economic distances for the site and Zone 2A materials will have to be obtained by further crushing of Zone 2A dolomite rock fill.

### CLAY (ZONE3)

Clay to be used in the upstream TWRMF dam liner and in cut-off trench will be initially obtained from local borrow sources within uppermost “drier” clay. This will subsequently be replaced with consolidated clay in the ODF including also the clay originating from the TWRMF dam foundation.

## *4.13.2 WASTE ROCK DUMPS*

The dolomite and country rock Waste Rock dumps foundations will require grubbing of small trees. The main construction issue in relation to the dumps muskeg/peat is foundation preparation by pre-loading. This will be achieved by placing 2 consecutive 2 m thick waste rock lifts as a part of Stage 1 lift. The start of the second lift will have to coincide with the end of the first lift placement, separated by 3 months. The second lift will have to be completed by the end of 6 months. Spreading of these lifts should be progressive over the entire dump area in advance of the Stage 2 lift placement.

From a construction standpoint, it is preferable to proceed with the preloading during the winter season. It is estimated that the preloading will need to remain for at least 90 days (~3 months). The estimate can be confirmed by test fills during the detailed design stage. The placement of the Stage 2 lift in both dumps should proceed by slow gradual advancement of another 4 m of Waste Rock over larger areas to promote finalization of consolidation of muskeg/peat and gradual load transfer into underlying clays in accordance with the staged construction discussed in Section 4.8.4.

# 4.14 GEOTECHNICAL MONITORING

The site conditions are complex and the feasibility designs are based on interpretation of the geotechnical data. The extrapolations and assumptions used in the designs are best confirmed using an observational method which is a common practice in geotechnical engineering. Geotechnical performance monitoring should be tailored to confirm the feasibility design assumptions. The results of monitoring and their assessment will provide advance warning against potential problems and will allow sufficient time to implement preventative actions if required (e.g., establishment of alert levels and necessary actions). Also, the monitoring results could be potentially used in optimizing the design if the design assumptions prove to be too conservative.

Initial monitoring involving instrumented test fills and large scale dewatering experiments is recommended during the detailed design geotechnical investigation. Test fills are of particular importance in gaining greater confidence in assumptions on engineering performance of site muskeg/peat under the DWRD and CRWRD. Also, detailed design stage opens a possibility for large scale muskeg/peat dewatering experiments to be used in preparation for site dewatering required for foundation excavation for major site facilities (TWRMF dam, PP dyke).

The balance of instrumentation installation and monitoring is recommended during construction/operation/closure. Stage 1 construction of the TWRMF dam and both Waste Rock dumps are of particular importance. The same instrumentation program will be incorporated into subsequent stages.

Presented in Table 4.37 are the minimum instrumentation requirements.

**Table 4.37 Recommended Geotechnical Instrumentation**

| Instrument Type | Area Needed | Purpose |
|---|---|---|
| Piezometers (pneumatic, vibrating wire, etc) | Dam foundation | Monitor pore pressure build-up and dissipation during staged construction |
| Inclinometer Casings | TWRMF Dam | Monitor lateral deformation of dam crest and slopes |
| Optical Survey Targets | TWRMF Dam | Monitor deformations and movements |
| Settlement plates | TWRMF Dam foundation | Monitor ground settlement and heave |
| Stage / discharge measurement devices | Spillways (TWRMF dam, ODF dyke; runoff/seepage collection ditches; TWRMF decant pond, PP, etc. | Monitor contribution of TWRMF to the overall site water balance. |
| Thermistors | TWRMF dam foundation and rock fill shell | Measurement of frost penetration to be analysed together with settlement monitoring data; thermal performance of rock fill shell while the TWRMF dam is covered with snow and impacts of this on winter runoff/seepage. |

Test fills are recommended to verify practical aspects of initial preloading of the peat at Waste Rock dump locations, and also the consolidation characteristics of the peat

Wardrop recommend that vibrations caused by blasting or by operation of heavy construction equipment near earth slopes be monitored to verify that they are of significance, or otherwise, to the stability of pit slope in overburden.

The geotechnical instrumentation program should be established and implemented in close co-ordination with other monitoring programs involved such as those required for open pit dewatering, water management and environmental purposes.

Further consideration should be given to checking on the potential existence of karstic features in the limestone and their possible implications to design of foundations and earthworks (e.g. the Plant Facilities and the TWRMF Dam, ODF dyke, and PP dyke).

## 4.15 FUTURE OPTIMIZATIONS

A number of potential optimizations of the feasibility study designs warrant further considerations as more geotechnical information becomes available during the detailed design stage. These include:

- Further geotechnical investigations to characterize ground conditions within TWRMF, ODF, PP, both waste rock dumps (CRWRD and DWRD).
- Further layout modifications may be possible by geotechnical investigation in expanded property limits (e.g., north and east sides of dolomite outcrop where shallow overburden conditions are inferred). The investigation would involve ground geophysics followed by geotechnical drilling.
- Further borrow search for low permeability and granular soil through additional geotechnical investigation involving vacant site area north of DWRD and potential off-site landforms (e.g., eskers) containing granular soil.
- Site trials for improvement of site clays for use in low permeability barriers (e.g., moisture conditioning or clay/lime admixtures)
- Modification of the clay from borrows areas to provide more favorable characteristics as rolled fill (in view of the scarcity of low permeability material locally with favorable engineering properties of permeability and compaction).
- Site trials, in accordance with good practice, to firm up practical procedures for:
    - preloading the peat in advance of construction of fills on it (instrumented test fills),
    - drainage and excavation of muskeg/peat (large scale dewatering experiment, and
    - possible reduction of the 11 and 15 months pre-consolidation time for Stages 9 and 10 lifts within the CRWRD or adjustment in the design if the schedule does not permit waiting for 11 and 15 months.
- Review available pertinent precedent for:
    - practical aspects of cold regions construction (muskeg/ peat dewatering and excavation)

- traffic movements on the clay under summer and winter conditions,
- excavation of the clay under summer and winter conditions,
- details of hydraulic dredging for the Open Pit overburden excavation as carried out at Vale Inco's Thompson mine in Manitoba, and open pits at Steep Rock Iron Mines and the Griffith Mine in Ontario, as well as other pertinent precedents, to optimize current overburden disposal scheme.

- Additional testing on the dolomite for further evaluation as construction material (both as rock fill and concrete aggregate).
- Possible relocation of TWRMF to an area within expanded property limits (north and northwest of the dolomite outcrop/subcrop).
- The above data is needed on a priority basis given the presently envisaged schedule.

## 4.16 CLOSURE

Details of the overall site closure plan for the TWRMF, Waste rock Dumps ODF are provided in Section 13.0. The following comments reflect the geotechnical aspects of the project in relation with the closure plan.

### *4.16.1 TAILINGS AND WASTE ROCK MANAGEMENT FACILITY*

The post closure environmental considerations and costs related to water treatment in perpetuity governed the selection of un-conventional concurrent disposal of PAG/ML-waste rock and tailings in a single repository. Dam structure allowing for full containment combined mass of PAG/ML-waste rock and Ni-tailings by placing a1 m thick clay liner between the TWRMF dam and the PAG-waste rock retaining structure. Incorporation of the low permeability barrier allows for "full lateral containment" of PAG-waste rock. PAG-waste rock encapsulation is provided by placement of minimum of 2 m of tailings cover on the top of reactive waste rock and a minimum of 0.5 m of water cover on the top of tailings.

The current TWRMF design has provisions towards ensuring that water quality standards can be based on environmental concentrations and geochemistry of the seepage water as determined by an allowable volume of seepage of 250 $m^3$/day, as determined by Victory Nickel and incorporated in the subject design criteria. However the whole matter needs to be carefully reviewed in the detailed design and the provisions reconsidered and contingency plans identified by means of supporting analyses and their limitations.

#### TWRMF CLOSURE SPILLWAY

The purpose of the overflow/emergency spillway structure is to prevent overtopping caused by a design rainfall after the closure of the TWRMF while maintaining water

cover on the repository. The spillway will be located at the approximate center of the west side of the dam, in between the two causeways. The causeway tops will be submerged by tailings and the water cover before closure, yielding a single water pool, continuous across the former causeway top and decant pool. The location and section of the spillway are shown on Drawing No. 0951330400 –T0009. Water released through the spillway will report to the PPFRA and further to the natural environment.

The invert of the spillway has been established at elevation 260.9 m. The depth of water flow through the spillway has been assumed to be 0.2 m. In accordance with the design basis established for the TWRMF, the design of the spillway is based on 1 in 1000 year 24 hour rainfall. Because the 1000-yr, 24-hr rainfall depth is only 125mm, and the facility only receives runoff from its enclosed area, actual operating head for a closure spillway of any width will be minimal (less than 0.2m), and the spillway design is controlled by the need to avoid clogging by ice formation or beaver activity in the spillway entrance.

Given a settled embankment crest elevation of 262.3m, and a maximum post-closure water elevation of 260.6 (average conditions) / 259.8 (dry conditions), the spillway invert elevation of 260.9 would ensure the ability to maintain an adequate water cover, while providing ample excess freeboard (2.4m above the spillway invert and 2.2m above the spillway wet section) to accommodate ice formation. A 5m width would be the minimum recommended section, to accommodate ice formation and ensure constructability. The side slopes of the spillway were selected to be 2H: 1V and the spillway channel will consist of rock fill lined with a bituminous geomembrane.

To dissipate the energy of the spilled water and minimize erosion at the base of the discharge channel, a rip-rap apron is provided with average rock fragment size of approximately 300 mm. The spillway location was selected so that the released water can be dispersed into the surrounding muskeg/peat without any man made obstructions in the flow path.

Post closure monitoring to ensure that the design water depth as always maintained, and to ensure proper functioning of spillway will be required and maintenance provided if required.

### LONG TERM TWRMF DAM CREST PROTECTION AGAINST ICE BUILD UP AND FLOATING ICE

As shown on drawing 0951330400-T0005 in, the uppermost widened section of TWRMF dam clay lining containing the closure water cover will be provided with protection against damage caused by the ice build-up under winter conditions and floating ice impacts during spring break up periods. The clay will be placed at an upstream slope of 3:H:1V being finished upstream sand and gravel face. The clay liner will be will be covered with 0.5 m of fine rock fill (Zone 2) followed by a 1 m liner of coarse rock fill (Zone 1).

### 4.16.2 WASTE ROCK DUMPS

According to closure plan presented in Section 13.0 there will be no soil cover requirements for any of the dumps.

### 4.16.3 OVERBURDEN DISPOSAL FACILITY (ODF)

ODF will be re-shaped and subsequently vegetated on closure and once the growth of grasses and bushes is established, there will be no TSS issues in relation to runoff. The runoff will be released through an engineered swale established by breaching the ODF dyke at one or more locations along the southeast corner of the containment dyke. The released runoff will naturally gravitate to Oakley Creek.

## 4.17 CONCLUSIONS AND RECOMMENDATIONS

The followings conclusions and recommendations are made in relation to the geotechnical component of this feasibility study design report:

### 4.17.1 CONCLUSIONS

- The site is gently sloping, perennially flooded and underlain by muskeg/peat, over clay followed by dolomite bedrock with dolomite outcrop at west of site. The muskeg/peat is saturated and represents a body of water contained on the top of the clay aquitard. The dolomite aquifer is mainly confined by clay overburden with piezometric heads above the ground surface, indicating artesian conditions in some areas.
- Piezometric heads originating from clay are different and generally lower than the ones originating from the dolomite. The 2008 site investigation revealed the presence of a deep depression in the bedrock topography. The overburden filling the depression exhibits very low strength and artesian water conditions are evidenced in this general area. This anomaly is inferred as a sinkhole and may occur at other locations within the site that have not been intercepted by the 2007 and 2008 site investigations.
- Borrow searches have not identified local sources of granular materials to date. The use of site clay has to be selective due to variability of natural moisture contents and mostly confined to uppermost clay exhibiting lower moisture contents. Subject geotechnical designs involve contingencies to factor in limitations in relation to the quality of native clays with respect to their use in low permeability barriers. Logistical challenges related to extraction of native clays are envisaged.
- The presence of the dolomite outcrop at the western site margin was selected as a source of initial rock fill for the construction of the mine infrastructure required for start up of the open pit operation (ODF dyke, PP dyke , and miscellaneous berms/roads), .

- Following this initial phase, the balance of mine infrastructure will be constructed from dolomite Waste Rock originating from the open pit. Geotechnical designs will require crushing and processing of dolomite waste rock.
- Open pit overburden removal by dredging alleviated logistical challenges related to mechanical excavation all the while being in accordance with the mine development plan. At the time the overburden has been dredged out the creation of the cone of depression will allow for the start of hard rock mining within the dolomite unit. The water from the open pit dewatering will be used for sustained dredging.
- TWRMF facility is situated in an area where the geotechnical profile lends itself for a much higher containment structure within a smaller footprint also allowing construction staging in accordance with the mine production schedule.
- The same containment structure hosts PAG/ML waster rock (ultramafic) by utilizing geotechnical characteristics of tailings to minimize potential ARD/ML and improve ultimate effluent water quality. The combined mass of PAG/ML Waste Rock will be encapsulated by native clays within the TWRMF footprint, clay lining on the upstream side of the containment structure, and eventually, tailing and water covers.
- The ODF is located adjacent to the pit and its water management will provide the majority of water required for sustained dredging. Some make up water may be obtained from local water courses or by creating an additional well field.
- Inert Waste Rock (dolomite and country rock) dumps were designed with minimized footprints in the proximity of the open pit and thus improved the project economics. Staging of the construction of the waste dumps as governed by the geotechnical foundation conditions was developed in general compliance with the mine Waste Rock production schedule.
- The post closure environmental considerations and costs related to water treatment in perpetuity governed the selection of un-conventional concurrent disposal of PAG/ML-Waste Rock and tailings in a single repository. The current TWRMF design has provisions led by numerical modeling both operational and closure water quality standards can be met based on environmental concentrations and geochemistry of the seepage water as determined by an allowable volume of seepage of 250 $m^3$/day,
- ODF will be re-shaped and vegetated on closure and once the growth of grasses and bushes is established, there will be no TSS issues in relation to runoff. The runoff will be released through an engineered swale. The released runoff will naturally gravitate to Oakley Creek.

### 4.17.2 RECOMMENDATIONS

The following main recommendations, from a geotechnical perspective, are made for this feasibility study:

- Further geotechnical investigations during the detailed design stage to characterize ground conditions, qualify feasibility designs, and develop a more efficient design. This is envisaged to be completed in 2 steps. Step 1 will involve geophysical survey that would allow for better understanding of bedrock topography and potentially indentify any other deep overburden areas as these could have a significant impact on the stability of geotechnical structures (deep very low strength overburden). Once the results of the geophysical survey become available a carefully tailored drilling program will be tailored to suit.

- Detailed design site investigation should encompass the expanded lease area to facilitate other options for the location of key facilities such as the TWRMF, the rock dumps and the PP.

- Additional areas that are proposed for detailed design geotechnical investigation are within expanded property limits in suspected shallow overburden flanking north, northwest and west side of the dolomitic limestone outcrop. These are candidate areas for alternative location of TWRMF. The testing program should include additional geotechnical laboratory testing and site trials for improvement of site clays in low permeability barriers and drainage, excavations and preloading of peat.

- Site trials for improvement of site clays for use in low permeability barriers (e.g., moisture conditioning or clay/lime admixtures).

- Site trials, in accordance with good practice, to firm up practical procedures for:

- preloading the peat in advance of construction of fills on it (instrumented test fills during detailed design stage);

- drainage and excavation of muskeg/peat (large scale dewatering experiments during detailed design stage); and,

- The balance of instrumentation installation and monitoring is recommended during construction/operation/closure. Stage 1 construction of the TWRMF dam and both Waste Rock dumps are of particular importance. Results of deformation monitoring in the CRWRD Dump foundation should be looked into for reduction of the pre-loading time required for Stage 9 and Stage 10 lifts.

- Construction using the local clays for low permeability liner purposes to verify that hydraulic conductivity values assumed, can be realistically met in practice.

- . During Detailed Design stage, the following precedent should be reviewed:
- practical aspects of cold regions type construction (muskeg/peat dewatering and excavation)
- trafficability on the clay under summer and winter conditions,
- excavation of the clay under summer and winter conditions (e.g., open pit bulk excavation),
- Precedents for hydraulic dredging and disposal of dredge material in a comparable site setting.
- In concurrent disposal of PAG/ML Waste Rock and tailings it should not be assumed that all of the voids in the rock fill will be filled with tailings. This has important implications from a number of standpoints including operational issues, as well as geochemical, environmental and permitting. Although it is believed that a scheme could be developed which would result in capture of tailings in some of the voids of the rock fill, to an important extent what is achieved in practice will depend on experimentation as the work progresses. Studies at this stage must recognize this and the need for flexibility.
- Field test assuming different configurations (varying thicknesses of clay lining should be set up as a part of construction in order to measure actual seepage and effluent quality.

# 5.0 METALLURGY

## 5.1 SUMMARY

SGS Lakefield Research Ltd. (SGS) was contracted, on Wardrop's recommendation, to conduct a full metallurgical feasibility test program of the open pit ore. Five metallurgical drill holes were dedicated to collect representative testing samples. The five holes were drilled in early 2007 and were distributed evenly along the strike of the Minago deposit. The intervals from these drill holes were sent to SGS for nickel analysis and metallurgical testing. The key objectives of the testing program were to obtain enough reliable information to develop the design criteria of the mining and mill operations, and to conduct project economics and risk assessments. This section summarizes the major testwork and results of this program, as well as some historical data. Refer to the Metallurgical Test Program, Final Report, June 2008 prepared by Wardrop (0751330604-REP-P0001-01) (Wardrop, 2008) for a complete report on the feasibility open pit metallurgical test program.

The feasibility metallurgical test program began in early 2007 and was completed in October of 2008.. The program developed a sulphidic nickel head grade-recovery curve for the pit optimization, and an economic assessment of the open pit portion of the Minago deposit. To obtain mill design data, flotation development tests and locked cycle tests (LCT) were conducted on a master composite of the open pit ore samples based on the sulphidic nickel block model developed in the early stage of this study. The master composite contains 0.54% total Ni and 0.36% sulphidic Ni. The major nickel-bearing sulphides are pentlandite and millerite. The main gangue minerals in the composite are serpentine (34.7%), talc (30.2%), and phlogopite (11.2%). The metallurgical projections, from the LCT on the master composite, indicate that a nickel concentrate containing 22.27% Ni and 10.43% MgO will be produced with an equivalent sulphidic nickel recovery of 77.2% and a total nickel recovery of 52.3%.

The grindability testing samples have a median Semi-autogenous Grinding Power Index (SPI) of 27.4 minutes, a median Bond Rod Mill Work Index (RWI) of 9.6 kWh/t, and a median Bond Ball Mill Work Index (BWI) of 14.9 kWh/t. This data indicates that the grinding hardness of the samples is, on average, intermediate.

Flotation tests on the variability samples representing the first two years of open pit production show that this composite floated better than the Open Pit Master Composite No. 2, which also indicates that the metallurgical performance will be stable for the start-up and early operation of the plant. The overall variability testing results indicate that the risk of "metallurgical underperformance" for the project is low

if the mining cutoff grade is higher or close to 0.2% sulphidic nickel. The risk will increase as the mining cutoff grade decreases. More tests on variability samples containing less than 0.2% sulphidic nickel should be tested to get a more reliable statistic.

Dewatering tests on locked cycle flotation tails and concentrate indicated that a high rate thickener was better for the thickening of the tails, and that a pressure filter could achieve a moisture level of 8.5% in the concentrate filter cake.

The Minago ore samples have also been historically tested by Outokumpu Oy (Outokumpu), Lakefield Research Ltd. (now SGS), and Process Research Associates (PRA). The work carried out by Outokumpu in 1976 and SGS in 1990 used ore samples containing much higher nickel than the average ore grade based on the recent Preliminary Economic Assessment (PEA) finished by Wardrop. The testwork finished by PRA employed regrinding of rougher concentrate, which proved unsuccessful upon further study of Minago samples at Lakefield. The work was completed at SGS in 2006 to support the PEA and tested two composites, both of which were from a single drill hole due to the availability of the samples.

Wardrop developed a mill flowsheet based on data from the open pit metallurgical testing program and from an engineering exercise to optimize mill throughput. The proposed 10,000 t/d mill will consist of a coarse ore stockpile, a primary crushing plant comprising of a gyratory crusher, a SAG mill/ball mill grinding circuit, a rougher/scavenger/cleaner flotation circuit, a high-rate tailings thickener, a conventional concentrate thickener, and concentrate pressure filtration. The design uses only conventional and proven technologies that are common in the North American mineral processing industry.

The primary crushing process will reduce the run-of-mine ore from a maximum 1,000 mm feed size to a product 80% passing 130 mm. The SAG/ball mill grinding will further reduce the size of the feed to the flotation circuit to 80% passing 68 µm. The ball mill will operate in a closed circuit with a hydrocyclone cluster. The flotation circuit will produce a marketable grade nickel concentrate. The concentrate will be dewatered in a conventional thickener and pressure filtration to achieve a final concentrate product moisture content of approximately 9%. The concentrate will then be loaded in bulk for transport to the customer's smelting facility. The tailings will be subjected to dewatering by a high rate tailings thickener prior to disposal of the tailings in the tailings pond. The high rate tailings thickener will create a smaller footprint in the concentrator building.

To achieve desired nickel recovery and proper metallurgical accounting, the mill will operate mineral processing and assay laboratories, as well as on-line analysis.. On-line particle size analyzers will be utilized in the mill to ensure the grinding operation is run efficiently. This central laboratory will also handle environmental and exploration drill core.

The nickel concentrate production is estimated to be approximately 50,000 t/a, at a processing cost of Cdn$9.90/tonne of ore processed.

## 5.2 DESCRIPTION OF THE TESTING PROGRAM

The open pit metallurgical testing program began in March 2007 at SGS. This program was managed by Wardrop in consultation with Dr. Gord Bacon, P.Eng., who was chosen by Victory Nickel as its representative on metallurgical issues for the Project.

The main objectives of the program were to generate the design criteria required to determine process and operational parameters and design the flowsheet as well as the head grade-recovery curve. The head grade-recovery curve is based on the head grade of sulphidic nickel as opposed to the total nickel head grade. A significant portion of the nickel resource in the Minago deposit is in the form of nickel silicates, which are unrecoverable using normal flotation technology. Using the total nickel head grade in the head grade-recovery curve would be misleading since a portion of the total head grade is unrecoverable.

The major tasks for the metallurgical program were:

- sample preparation
- grindability tests and simulation studies to collect data for grinding circuit design
- mineralogical analyses to better understand the ores on the Minago Property and to improve the metallurgical performance
- flotation testing to optimize circuit design and nickel recovery used to develop the head grade-recovery curve, providing an accurate project economic analysis and optimized mining plan
- flotation products settling tests to collect data for design of the tailings disposal system and for sizing settling equipment for the concentrate and final tails
- concentrate pressure filtration testing to size the filtration equipment and to determine if a concentrate dryer would be required
- variability tests to gain a better understanding of the flotation performance of the samples from different sections of the deposit to minimize the risk to the project.

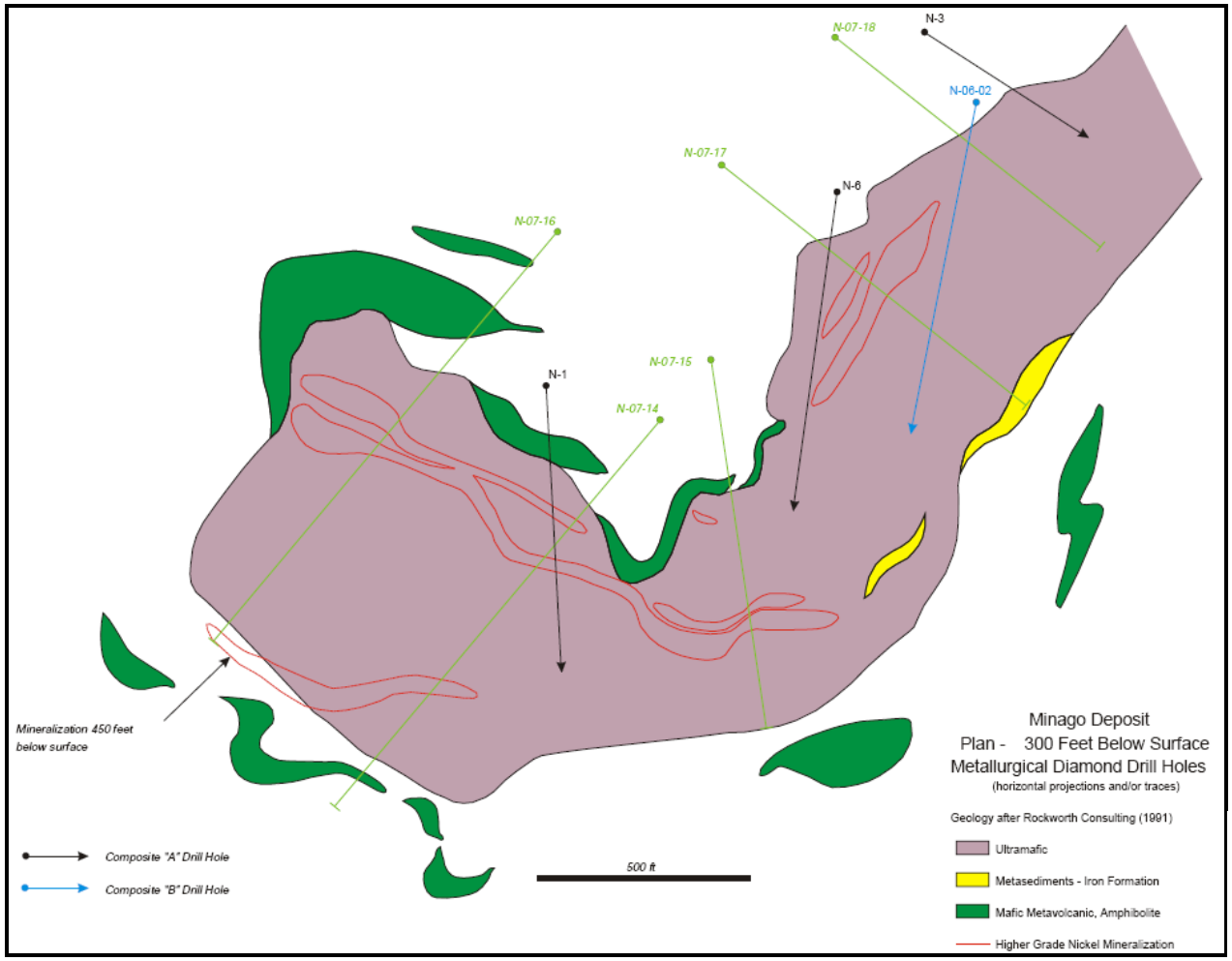
## 5.3 METALLURGICAL TEST PROGRAM

### *5.3.1 SAMPLE PREPARATION*

#### INTERVAL CRUSHING AND TOTAL NICKEL ASSAYING

Five new metallurgical drill holes numbered N-07-14, N-07-15, N-07-16, N-07-17, and N-07-18,were drilled in February 2007 to collect samples for the open pit metallurgy program. The holes were located roughly evenly along the strike of the deposit (Figure 5.1) to represent the ores from the entire open pit. A total of 1,117 drill core intervals selected and delivered to SGS for the grindability study and flotation testing. The total weight of the delivered drill core was 4,174 kg.

**Figure 5.1 Location of the Five Metallurgical Drill Holes**



The core intervals were inspected, weighed, and bagged separately and stored in SGS's onsite cold room. Samples for grindability tests were taken and the remaining intervals were then crushed in a jaw crusher to a nominal 25.4 mm (1"). The crushed interval was riffled in half with one half bagged and placed in storage, and the other crushed further in a cone crusher to a nominal 2 mm (10 mesh), bagged, and stored in the SGS's cold room. A sub-sample was taken for total nickel assaying before bagging.

## SULPHIDIC NICKEL ASSAYING

A comparison of the total nickel grade assays with the available sulphidic nickel assay recoveries from initial flotation work indicated that a portion of the nickel in the Minago deposit was unrecoverable. Further mineralogical analyses determined that a significant portion of the total nickel was in the form of nickel silicates, which are not recoverable by conventional froth flotation technology. Since a portion of the deposit was unrecoverable, the geological block model based on the total nickel assays would neither be a reliable means of defining the mineable sections of the deposit, nor would it be a reliable tool for economic analyses of the mine.

A new geological block model was based on sulphidic nickel assays of the drill core intervals. SGS provided the sulphidic nickel assays of the drill core intervals of the five metallurgical drill holes. Other drill hole intervals from the 2007 drill program were assayed for sulphidic nickel by SGS, and by ACME Analytical Laboratories Ltd. of Vancouver. Historical drill core samples stored at the Manitoba Geological Survey (Precambrian Division) were split and assayed for sulphidic nickel. Amax Exploration Inc. supplied further historical sulphidic nickel assays from the Minago deposit. All of the sulphidic nickel assays (a total of 3,298) were used to develop the geological nickel sulphide block model. This new block model provided more accurate accounting of the recoverable nickel, and was used for the mine model and mill design.

A full list of the drill holes used to take samples for testing is given in Appendix E-1.

## SAMPLE SELECTION AND PREPARATION

### *Grindability Testing Samples*

Mr. Jim Chornoby, P.Geo. a qualified person working on behalf of Victory Nickel selected the grindability samples based on the lithology types, sample locations, and distribution within the Minago deposit. These samples were selected from the three lithologies present, namely serpentinite, altered ultramafic/low granite, and high granite, to form representative samples for the grindability testwork. Representative samples were collected from each of the drill holes. A sub-sample was taken from the grindability samples for interval total nickel assaying.

*Drill Hole Composites*

Composite recipes for each individual drill hole were created. For the purpose of testing the flotation performance of each hole and therefore, the different ore zones of the deposit represented by each hole. Table 5.1 lists the results of the sulphidic nickel assay of the five drill hole composite samples.

The flotation testwork revealed that drill hole N-07-18 showed poor flotation performance and the total nickel and sulphidic nickel assaying indicated that the concentration of recoverable sulphidic nickel in this hole composite was very low. Further analysis of the interval sulphidic nickel assays from hole 18 led to the conclusion that this hole could not be considered ore. For this reason, hole 18 was not included in the compositing recipe for Open Pit Master Composite No. 1, which was formed from holes N-07-14, N-07-15, N-07-16, and N-07-17. This first master composite was based on the total nickel assay for the selected holes.

**Table 5.1 Total Nickel and Sulphidic Nickel Assay of the Five Metallurgical Drill Holes**

| Hole Composite | Ni Total (%) | Ni as Sulphide (%) | Ni as Non Sulphide (%) | Recoverable Ni in Sample (%) |
|---|---|---|---|---|
| 14 | 0.6 | 0.51 | 0.09 | 85.0 |
| 15 | 0.42 | 0.26 | 0.16 | 61.9 |
| 16 | 0.64 | 0.47 | 0.17 | 73.4 |
| 17 | 0.51 | 0.28 | 0.23 | 54.9 |
| 18* | 0.29 | 0.061 | 0.23 | 21.0 |

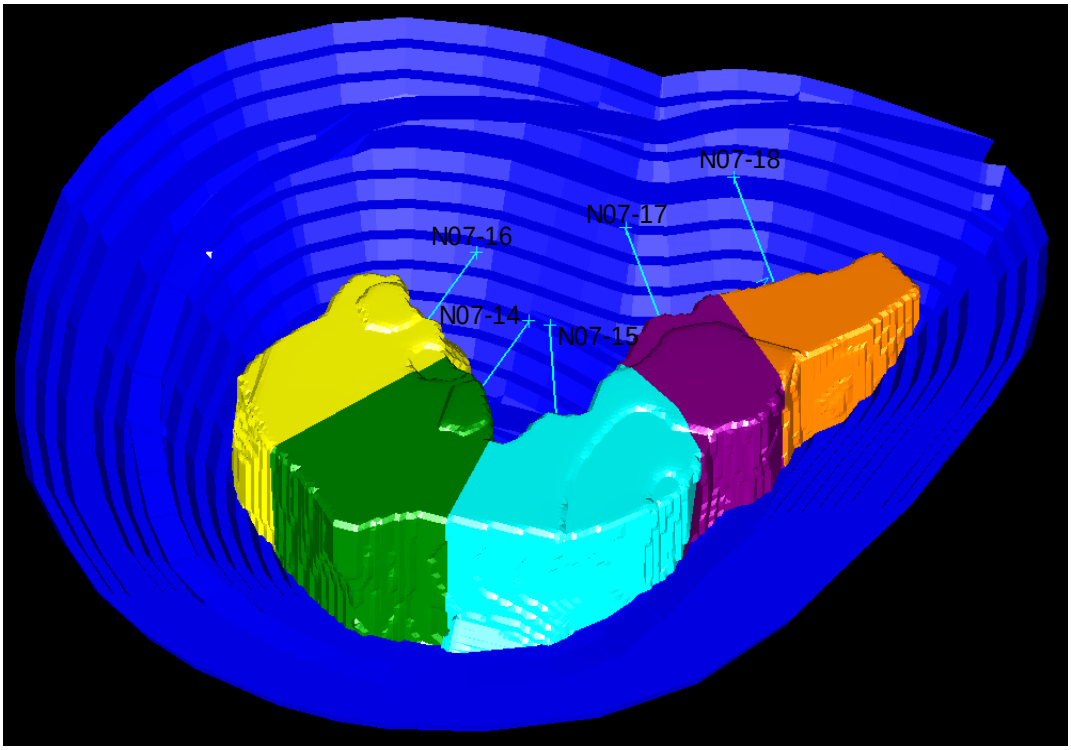
* Not included in the first master composite.

*Open Pit Master Composite No. 1*

The master composite is that composite which is representative of the entire deposit. Open Pit Master Composite No. 1 was based on the total nickel assays and the geological total nickel block model. This composite was used for the initial batch flotation tests undertaken to develop the process flowsheet.

The volume of influence of each drill hole on the blocks of ore surrounding it, and whether the blocks of ore were mineable or waste, was calculated from the geological total nickel block model and the designed open pit used in the PEA. This geological model and the volume of influence of the five metallurgical drill holes are illustrated in Figure 5.2. The quantity of sample required from a drill hole interval to form a portion of the master composite was derived from the volume of influence of each interval. Open Pit Master Composite No. 1 assayed 0.61% total Ni and 0.37% sulphidic Ni.

**Figure 5.2 Volume of Influence of the Five Metallurgical Drill Holes**




*Sulfidic Nickel Grade Composites*

By using the same volume of influence concept used in the master composite formation and the sulphidic nickel assays, five composites were formed - 0.20%, 0.30%, 0.50%, 0.80%, and 1.15% sulphidic Ni. Intervals that had sulphidic nickel assays within range of the targeted composite head grade were combined based on their volume of influence to form the individual grade composites. These composites were subjected to flotation tests in order to generate the head grade-recovery curve.

*Open Pit Master Composite No. 2*

The geological sulphidic nickel block model was used to form a second open pit master composite based on sulphidic nickel. The same volume of influence methodology was employed to create the recipe for this composite. Open Pit Master Composite No. 2 was used in the flowsheet development testing to collect data for mill design and project economic assessment.

*Variability Flotation Samples*

The samples for variability flotation testing were selected by Mr. Chornoby, P.Geo., based on rock type and location of the drill core intervals. The objectives for these

variability flotation tests were to investigate the robustness of the designed flowsheet and the effect of ore mineralogy on the flotation performance of the sample.

### 5.3.2 GRINDABILITY TESTS

Grindability samples were subjected to standard Bond BWI tests, Bond RWI tests, Bond Abrasion Work Index (AI) tests, and SPI tests. Three samples were subjected to JK Drop Weight (DW) tests. These tests were carried out at SGS, and generated the data used by SGS in JKSimMet and their Comminution Economic Evaluation Tool (CEET) grinding simulation studies.

#### GRINDABILITY TESTING RESULTS

The grindability test results indicate that the test samples were soft or in the easy to average range of grindability based on the SGS database of grinding operations (Table 5.2). Samples containing granite are above average in both SAG and ball mill grindability and are very abrasive. The RWIs indicated the test samples were close to the averages in the SGS database.

The CEET and JKSimMet grinding simulation studies were completed based on a throughput of 14,000 t/d. The CEET simulation indicated that a SAG mill with 2,681 kW power draw at shell and a ball mill with 6,069 kW power draw at shell will be required for processing the Minago ore at a mill throughput of 10,000 t/d. The JKSimMet study suggested a SAG mill with 2,749 kW power installation and a ball mill with 6,318 kW power installation for the same application.

**Table 5.2 Summary of Grindability Test Results**

| Sample Name | Specific Gravity | DW Parameters | | SPI (min) | RWI (kWh/t) | BWI (kWh/t) | | AI (g) | Lithology of Test Samples |
|---|---|---|---|---|---|---|---|---|---|
| | | A x b | DWI | | | 150 mesh | 200 mesh | | |
| DW 1 | 2.31 | 107 | 2.14 | 27.5 | 9.2 | 13.2 | 15.0 | 0.000 | Serpentinite with minor magnetite & granite |
| DW 2 | 2.57 | 67.4 | 3.81 | 59.9 | 11.6 | 19.7 | 19.6 | 0.192 | Granite with 45% serpentinite |
| DW 3 | 2.50 | 84.1 | 2.97 | 40.4 | 10.1 | 15.6 | 17.3 | 0.016 | Serpentinite + minor granite |
| G1 | - | - | - | 25.2 | 9.4 | 12.6 | - | 0.003 | Serpentinite, fine grain |
| G2 | - | - | - | 21.4 | 9.6 | 13.1 | - | 0.001 | Serpentinite, fine grain |
| G3 | - | - | - | 88.4 | 13.8 | 16.5 | - | 0.689 | Granite, relative fresh |
| G4 | - | - | - | 19.1 | 8.0 | 11.7 | - | 0.019 | Altered Ultramafic |
| G5 | - | - | - | 17.9 | 8.8 | 11.0 | - | 0.009 | Serpentinite, tremolite + talc up to 10% |
| G6 | - | - | - | 87.1 | 13.4 | 17.8 | - | 0.629 | Granite/granite gneiss |
| G7 | - | - | - | 78.3 | 12.9 | 17.9 | - | 0.511 | Granite, weakly to strongly hematized |
| G8 | - | - | - | 57.4 | 11.1 | 17.0 | - | 0.388 | Altered granite, 5-30% kaolin-chlorite |
| G9 | - | - | - | 34.3 | 9.6 | 14.9 | - | 0.095 | Mafic metabasalt/molson dyke |
| G10 | - | - | - | 27.4 | 10.2 | 18.7 | - | 0.002 | Serpentinite + minor granite |
| G11 | - | - | - | 10.2 | 5.7 | 11.7 | - | 0.002 | Serpentinite, Variable minor granite |
| G12 | - | - | - | 25.8 | 9.5 | 14.3 | - | 0.000 | Serpentinite |
| G13 | - | - | - | 28.5 | 9.1 | 11.1 | - | 0.036 | Serpentinite |
| G14 | - | - | - | 22.4 | 8.4 | 12.8 | - | 0.003 | Serpentinite |
| G15 | - | - | - | 26.9 | 9.5 | 16.1 | - | 0.005 | Serpentinite |
| G16 | - | - | - | 72.2 | 13.6 | 17.0 | - | 0.581 | Granite/granite gneiss |
| G17 | - | - | - | 46.6 | 11.3 | 18.9 | - | 0.083 | Altered Ultramafic |

## 5.3.3 MINERALOGICAL STUDY

### QEMSCAN® ANALYSIS ON THE HOLE COMPOSITE SAMPLES

SGS carried out various mineralogical analyses of different samples at its Advanced Mineralogy Facility over the course of the test program in order to:

- gather mineralogical knowledge of the flotation feed
- understand the flotation performance of the samples
- facilitate the flotation optimization.

A bulk modal analysis was conducted on the hole composite samples to quantify the minerals contained in those samples. The results of mineral abundances in the five drill hole composites are presented in Figure 5.3.

**Figure 5.3 Mineral Abundances of the Five Metallurgical Drill Hole Composites**

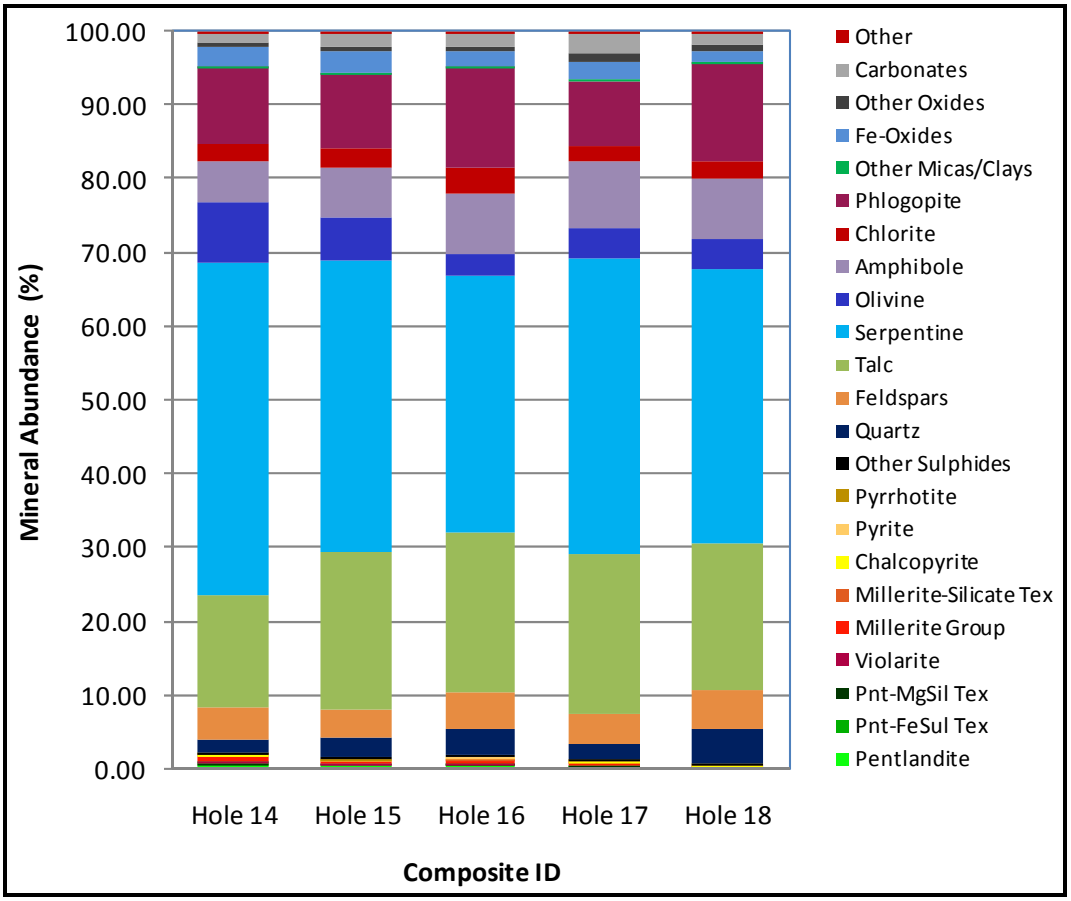


Figure 5.3 shows that the most abundant mineral in the Hole Composites is serpentine followed by talc and phlogopite. These three minerals account for 70% of the mass in each composite. The hole composites also contain percentages of feldspars, quartz, olivine and amphibole. The nickel sulfides in the composites are pentlandite and millerite with minor quantities of violarite.

## QEMSCAN® ANALYSIS ON OPEN PIT MASTER COMPOSITE NO. 2

SGS also conducted a bulk modal analysis on four fractions of Open Pit Master Composite No. 2. The results of mineral abundances in Open Pit Master Composite No. 2 are presented in Table 5.3. The elemental deportment of nickel is shown in Figure 5.4, and the nickel sulphide liberation data is shown in Figure 5.5.

The data in Table 5.3 shows that Open Pit Master Composite No. 2 contains 34.7% serpentine, 30.2% talc, 11.2% phlogopite, 5.8% amphibole, 4.9% feldspars, and other minor minerals.

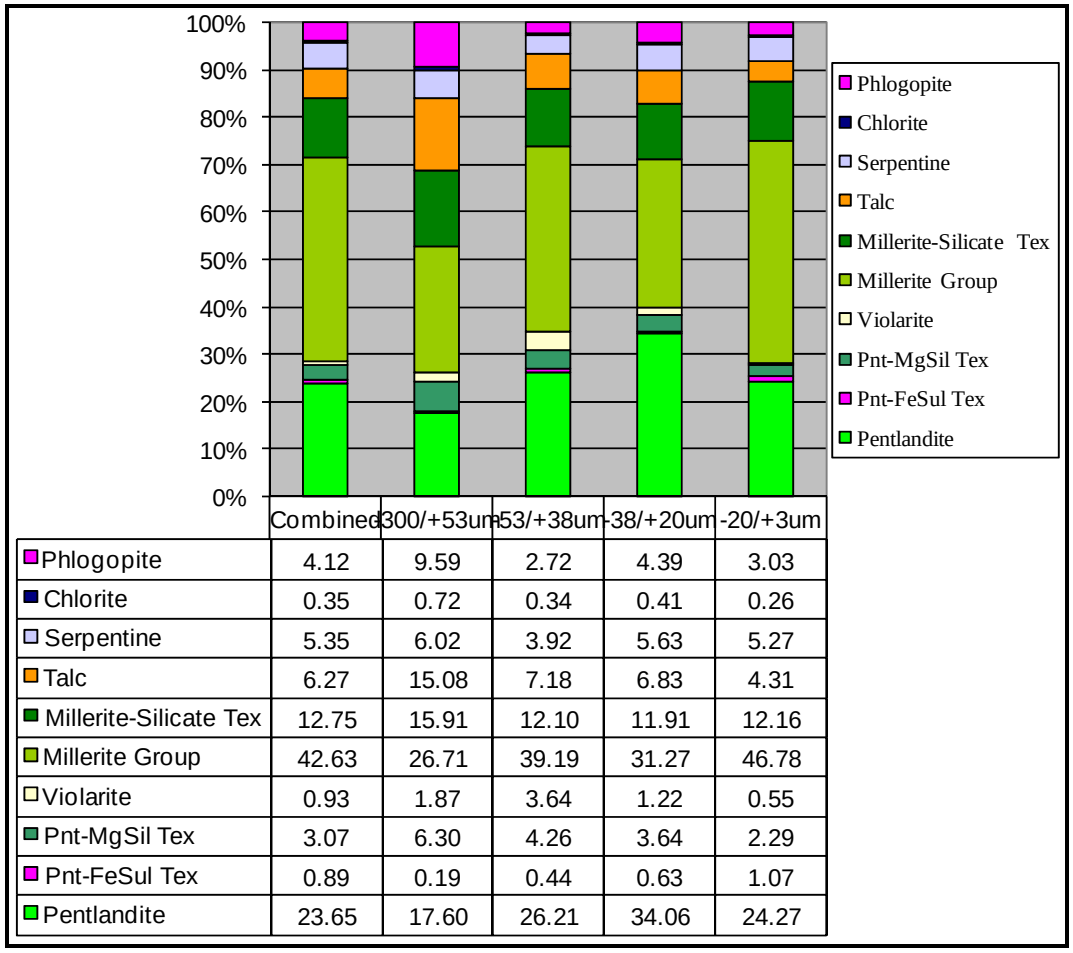
Figure 5.4 indicates that millerite, pentlandite, and violarite represent 55.4%, 27.6%, and 0.9% respectively of the nickel in the composite. The remaining nickel is contained in silicate minerals. The percentage of nickel content in sulphides (84%) determined by QEMSCAN® is significantly higher than the result (67%) obtained by chemical nickel sulphide assay using ammonium nitrate leach. It is believed that the results by chemical analysis are more reliable since it is very difficult to obtain accurate nickel contents in each mineral in the composite and this will in turn affect the reliability of nickel deportment in the QEMSCAN® results.

The liberation of nickel sulphides at a grind size of $P_{80}$ = 68 µm is 79% as shown in Figure 5.5.

**Table 5.3 Mineral Abundance in Open Pit Master Composite No. 2**

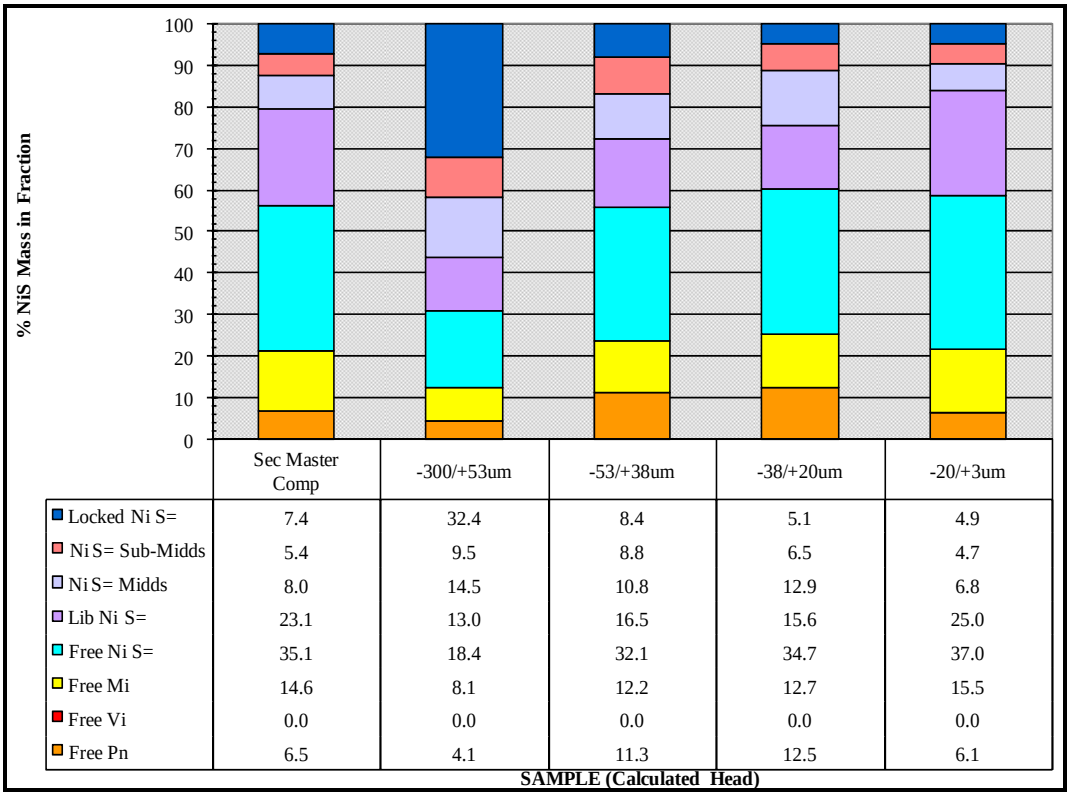
| Minerals | Combined Sample (%) | -300/+53 µm (%) | | -53/+38 µm (%) | | -38/+20 µm (%) | | -20/+3 µm (%) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sample | Fraction | Sample | Fraction | Sample | Fraction | Sample | Fraction |
| Pentlandite | 0.51 | 0.06 | 0.22 | 0.03 | 0.62 | 0.03 | 0.64 | 0.39 | 0.62 |
| Pentlandite-Iron Sulfides Texture | 0.03 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.02 | 0.04 |
| Pentlandite-Magnesium Silicates Texture | 0.09 | 0.03 | 0.11 | 0.01 | 0.14 | 0.00 | 0.09 | 0.05 | 0.08 |
| Violarite | 0.02 | 0.01 | 0.02 | 0.00 | 0.08 | 0.00 | 0.02 | 0.01 | 0.01 |
| Millerite Group | 0.48 | 0.05 | 0.18 | 0.02 | 0.49 | 0.01 | 0.31 | 0.40 | 0.63 |
| Millerite-Silicate Texture | 0.36 | 0.07 | 0.26 | 0.02 | 0.38 | 0.01 | 0.29 | 0.26 | 0.41 |
| Chalcopyrite | 0.11 | 0.01 | 0.03 | 0.00 | 0.07 | 0.00 | 0.07 | 0.09 | 0.15 |
| Pyrite | 0.30 | 0.05 | 0.19 | 0.01 | 0.30 | 0.02 | 0.44 | 0.22 | 0.34 |
| Pyrrhotite | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 |
| Other Sulphides | 0.03 | 0.01 | 0.02 | 0.00 | 0.08 | 0.00 | 0.03 | 0.02 | 0.03 |
| Quartz | 1.52 | 0.36 | 1.32 | 0.09 | 2.13 | 0.12 | 2.85 | 0.94 | 1.48 |
| Feldspars | 4.90 | 1.47 | 5.30 | 0.25 | 5.99 | 0.28 | 6.63 | 2.91 | 4.55 |
| Talc | 30.21 | 10.81 | 39.07 | 1.49 | 36.02 | 1.27 | 29.62 | 16.64 | 26.04 |
| Serpentine | 34.70 | 6.28 | 22.71 | 1.15 | 27.89 | 1.37 | 31.87 | 25.90 | 40.52 |
| Olivine | 2.03 | 1.00 | 3.61 | 0.13 | 3.08 | 0.10 | 2.32 | 0.81 | 1.26 |
| Amphibole | 5.84 | 1.59 | 5.77 | 0.25 | 6.15 | 0.29 | 6.71 | 3.71 | 5.80 |
| Chlorite | 2.41 | 0.81 | 2.92 | 0.11 | 2.57 | 0.11 | 2.48 | 1.39 | 2.18 |
| Phlogopite | 11.19 | 4.19 | 15.14 | 0.33 | 8.09 | 0.45 | 10.41 | 6.22 | 9.73 |
| Other Micas/Clays | 0.04 | 0.02 | 0.07 | 0.00 | 0.07 | 0.01 | 0.14 | 0.01 | 0.02 |
| Iron-Oxides | 2.56 | 0.26 | 0.95 | 0.10 | 2.40 | 0.08 | 1.97 | 2.11 | 3.31 |
| Other Oxides | 0.88 | 0.06 | 0.21 | 0.03 | 0.66 | 0.03 | 0.69 | 0.76 | 1.19 |
| Carbonates | 1.77 | 0.52 | 1.87 | 0.11 | 2.78 | 0.10 | 2.33 | 1.04 | 1.62 |
| Other | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.06 | 0.00 | 0.01 |
| **Total** | **100** | **27.66** | **100** | **4.13** | **100** | **4.29** | **100** | **63.92** | **100** |

**Figure 5.4 Elemental Deportment of Nickel in Open Pit Master Composite No. 2**




| | Combined | 300/+53um | 53/+38um | -38/+20um | -20/+3um |
|---|---|---|---|---|---|
| Phlogopite | 4.12 | 9.59 | 2.72 | 4.39 | 3.03 |
| Chlorite | 0.35 | 0.72 | 0.34 | 0.41 | 0.26 |
| Serpentine | 5.35 | 6.02 | 3.92 | 5.63 | 5.27 |
| Talc | 6.27 | 15.08 | 7.18 | 6.83 | 4.31 |
| Millerite-Silicate Tex | 12.75 | 15.91 | 12.10 | 11.91 | 12.16 |
| Millerite Group | 42.63 | 26.71 | 39.19 | 31.27 | 46.78 |
| Violarite | 0.93 | 1.87 | 3.64 | 1.22 | 0.55 |
| Pnt-MgSil Tex | 3.07 | 6.30 | 4.26 | 3.64 | 2.29 |
| Pnt-FeSul Tex | 0.89 | 0.19 | 0.44 | 0.63 | 1.07 |
| Pentlandite | 23.65 | 17.60 | 26.21 | 34.06 | 24.27 |

**Figure 5.5 Liberation of Nickel Sulphide Minerals**




| | Sec Master Comp | -300/+53um | -53/+38um | -38/+20um | -20/+3um |
|---|---|---|---|---|---|
| Locked Ni S= | 7.4 | 32.4 | 8.4 | 5.1 | 4.9 |
| Ni S= Sub-Midds | 5.4 | 9.5 | 8.8 | 6.5 | 4.7 |
| Ni S= Midds | 8.0 | 14.5 | 10.8 | 12.9 | 6.8 |
| Lib Ni S= | 23.1 | 13.0 | 16.5 | 15.6 | 25.0 |
| Free Ni S= | 35.1 | 18.4 | 32.1 | 34.7 | 37.0 |
| Free Mi | 14.6 | 8.1 | 12.2 | 12.7 | 15.5 |
| Free Vi | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Free Pn | 6.5 | 4.1 | 11.3 | 12.5 | 6.1 |

## QEMSCAN® ANALYSIS OF THE VARIABILITY AND FLOTATION TAILS SAMPLES

Bulk modal analysis was conducted on three variability samples — V6, V11, and V12, along with some flotation tails samples.

The mineral abundance analysis indicates that the gangue mineral compositions of the variability samples are quite similar. The sulphide mineral abundance and elemental nickel deportment results indicate that the compositions of nickel sulphides in the variability samples differ significantly. V11 dominantly contains millerite while V6 contains more millerite than pentlandite and V12 contains slightly more pentlandite.

In terms of nickel deportment, millerite is the most dominant mineral which contains the most significant portion of nickel as a single mineral in each variability sample. The liberation data from QEMSCAN® indicate that the nickel sulphide minerals are well liberated at the targeted grind ($P_{80}$ = 68 µm).

The elemental deportment of the tails from LCT-7 on the Open Pit Master Composite No. 2 indicates that 70% of the total nickel is in the form of nickel silicates. Liberation of the nickel sulphides in the tails is poor and only about 20% of the sulphides were liberated.

The mineralogical examination of the first cleaner tails and the rougher tails from LCT-2 on the 0.2% NiS Grade Composite indicate that nickel losses in the flotation tails can be attributed to the fineness of the nickel-bearing minerals and to the middling/locked occurrences with the non-sulphide gangue minerals and rimming of nickel sulphides by silicate minerals.

### 5.3.4 FLOTATION TESTS

#### METALLURGICAL DRILL HOLE COMPOSITE FLOTATION TESTS

The SGS testwork was carried out to determine the flotation performance of each individual drill hole. Based on the flotation performance, a decision could then be made whether to include the drill hole in a Composite or to exclude it. The results indicate that the floatability of the drill hole composite from N-07-18 were poor. Hole 18 was deemed to not represent mineable ore and, as discussed above, was not included in anycomposite.

#### FLOTATION TESTS ON OPEN PIT MASTER COMPOSITE NO. 1

The original objective of the flotation testwork on Open Pit Master Composite No. 1 was to optimize the nickel recovery through adjustments of flotation parameters and for the design criteria required engineering the concentrator. However, subsequent sulphidic nickel assays indicated that a portion of the nickel from the five metallurgical drill holes were present in an unrecoverable nickel silicate mineralization. Open Pit Master Composite No. 1 contained material which would be deemed waste and was therefore not representative of the ore from the open pit. After this discovery, the testwork on Open Pit Master Composite No. 1 focussed on developing an understanding of the composite's response to changes in flotation parameters and on optimizing them.

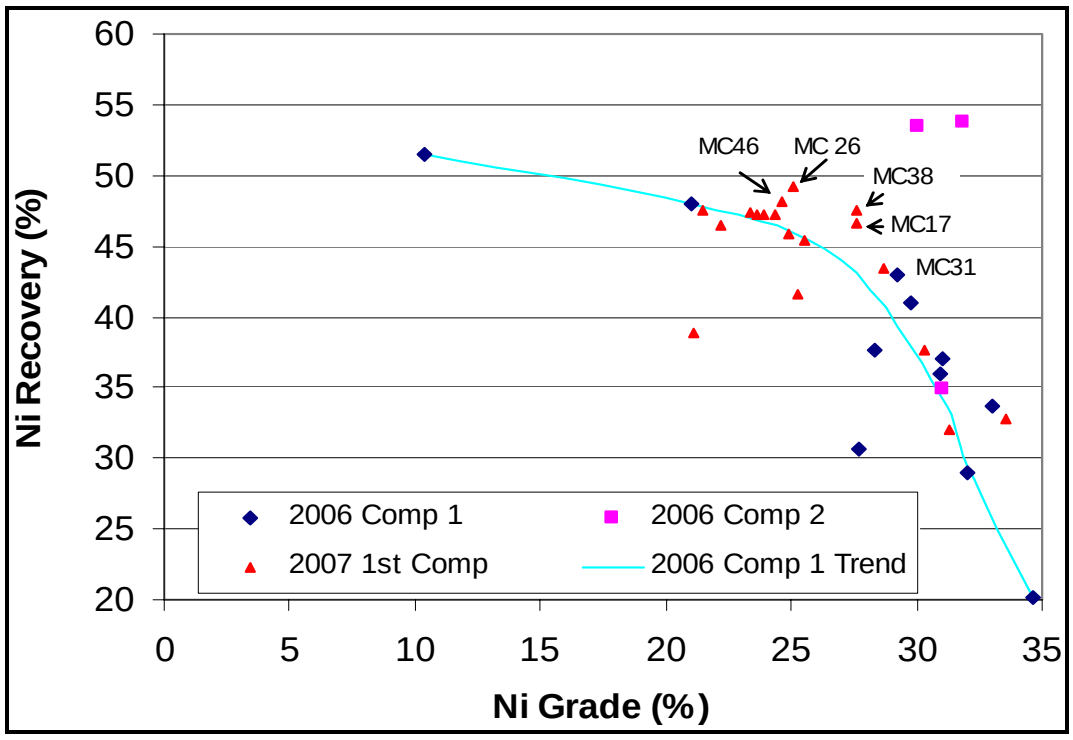
The flotation parameters investigated in the Open Pit Master Composite No. 1 test program and the conclusions drawn from the testing are listed below. All of the test records identified below are provided in Appendix E-2.

- Size does not have a significant impact on the nickel rougher recovery in the range tested. A finer grind resulted in a slightly lower nickel recovery in the final cleaner concentrate with lower magnesium oxide content (see test records MC1, 2, 3, 4, 5, 6, 7, 31, 32, 33).
- Regrind of the first cleaner concentrate had a negative impact on the final cleaner recovery (see test record MC44).
- The MF2 flowsheet did not improve the nickel rougher recovery (see test records MC1, 8).
- MF2 flowsheet with a short period of coarse primary grinding – (21 minutes vs. 30 minutes) did not improve the nickel rougher recovery (see test record MC15).

- The talc pre-float was unacceptable as it resulted in a 6.5% to 6.8% loss in nickel recovery (see test record MC29).
- Potassium Amyl Xanthate (PAX) was the preferred collector. Other collectors tested were Potassium Emyl Xanthate (PEX), AERO 407, and AERO 5100, none of which resulted in any better selectivity than PAX (see test records MC1, 9, 10, 11).
- Doubling the PAX dosage had a negative effect on the nickel rougher flotation recovery (see test record MC14).
- Adding PAX to the grind with or without carboxymethylcellulose (CMC) did not improve the final cleaner nickel recovery (see test records MC45, 46).
- Low dosages of CMC (i.e. 100 to 200 g/t) did not improve the rougher flotation selectivity (see test records MC41, 42, 43).
- Adding sodium hexametaphosphate (Calgon) in the grind with a small dosage of Depramin C (Dep. C) in the cleaner improves the flotation results (see test records MC38 vs. MC33).
- The addition of sodium silicate ($Na_2SiO_3$), and sodium hexametaphosphate $(NaPO_3)_6$ with or without soda ash improved the rougher flotation selectivity (see test records MC18, 19, 20, 21). Combining $Na_2SiO_3$, $Na_2CO_3$ and CMC should improve nickel selectivity in the cleaner (see test record MC26).
- The addition of soda ash with CMC did not improve the flotation selectivity (see test records MC34, 35 36).
- Reducing the slurry pH below 4 had a negative impact on the nickel sulphide flotation (see test records MC12, 13).
- Adjustment of the slurry pH close to neutral (pH = 7.5) with sulphuric and oxalic acid did not improve the flotation performance (see test records MC39, 40).
- An additional observation was that the rougher concentrate was cleaned relatively well even when the mass pull into the rougher concentrate was as high as 46.2% (see test records MC17).

Figure 5.6 compares the cleaner performance of the two composite samples from the 2006 testing program with that of Open Pit Master Composite No. 1 from the current testing program. The results indicate the flotation performance of Open Pit Master Composite No. 1 in the 2007 testing program was an improvement over the performance of Composite 1 from the 2006 test program, but not as good as Composite 2 of the 2006 test program.

**Figure 5.6 Performance of Cleaner Tests of Open Pit Master Composite No. 1 and Composites 1 and 2 from 2006**




## FLOTATION TESTS ON DRILL HOLE TOTAL NICKEL GRADE COMPOSITE

The primary objective of these tests was to determine how well the nickel recovery of each sample could be correlated to the total nickel grade and sulphidic nickel grade. The intention was to confirm that the nickel recovery of the samples will correlate to their sulphidic nickel assay better than the total nickel assay across the open pit.

Three samples from Hole 14 and three samples from Hole 17 with total nickel assays of ~0.3%, ~0.4%, and ~0.5% were selected for flotation tests to investigate the relationship between the nickel head grade and rougher tail nickel grade. These samples are referred to as Hole Grade Composites.

The results show that nickel rougher recovery is lower for lower head grades, especially for samples with low nickel sulphide content, such as samples GC2 and GC4. The concentrates from samples with low nickel sulphide content also have lower nickel grades. The results from these tests again confirm that nickel silicates in these samples are unrecoverable by froth flotation and cannot be correlated to the nickel recovery of a mining block based on the total nickel grade. The nickel recovery of a mining block must therefore be predicted from its sulphidic nickel grade.

## FLOTATION TESTS ON DRILL HOLE SULPHIDIC NICKEL GRADE COMPOSITES

Flotation tests were carried out to confirm that nickel recovery was similar for different metallurgical drill hole intervals across the deposit that have the same sulphidic nickel head grade, and that a single sulphidic nickel head grade-recovery curve could be applied across the deposit. The tests were also designed to produce sulphidic nickel grade composites that would be used in the testwork to create the sulphidic nickel head grade-recovery curve.

The target head grades chosen for these tests were 0.2%, 0.3%, 0.4%, and 0.5% sulphidic nickel. Materials for the 0.2%, 0.3%, and 0.5% test samples were chosen by randomly selecting the intervals from the 4 metallurgical drill holes (i.e. N-07-14, N-07-15, N-07-16, and N-07-17) which had a sulphidic nickel assay closest to the targeted sulphidic nickel head grade. There were 2 test samples generated in this manner for each of the 0.2%, 0.3%, and 0.5% target sulphidic nickel head grades. For the 0.4% target sulphidic nickel head grade, 4 test samples one from each of the four metallurgical drill holes, were generated by selecting the intervals that had sulphidic nickel assays closest to the target.

The results from these tests for different grind sizes are provided in Figure 5.7 to Figure 5.10. The recoveries from the composite samples with 0.2% and 0.3% sulphidic nickel are significant since these will affect both the economics of the mining operation and the classification of the blocks in the deposit as mineable ore or waste.

The flotation kinetic curves indicate that the kinetics of the two 0.3% samples are almost identical (Figure 5.8). The flotation kinetics of the two 0.5% samples are also very similar (Figure 5.10). There are some differences in the flotation kinetics of the two 0.2% samples (Figure 5.7), but the discrepancy could be explained by the difference in the grind size of the two samples.

At a given mass pull, the difference between the highest and lowest recovery of the 0.4% samples is approximately 11% (Figure 5.9), which is within an acceptable range. Averaging the metal recoveries of 0.4% sulphidic nickel blocks/intervals will not affect the classification of the blocks with respect to mineable ore or waste, and does not affect the economics of the project.

**Figure 5.7 Rougher Flotation Kinetics of the Two Composites Assaying 0.2% Ni and NiS**

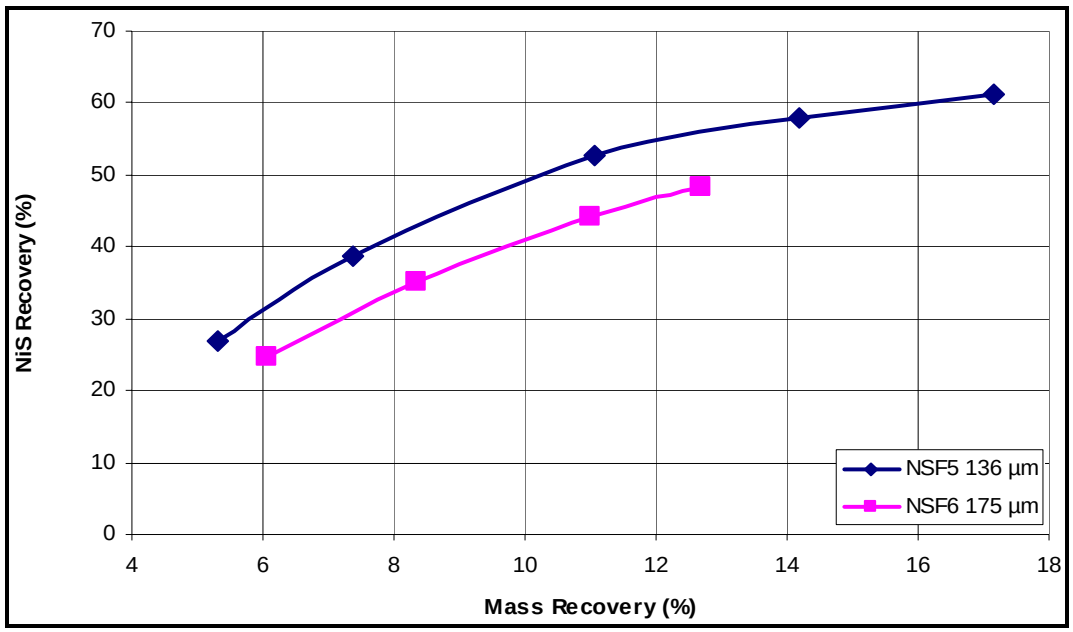



**Figure 5.8 Rougher Flotation Kinetics of the Two Composites Assaying 0.3% Ni as NiS**

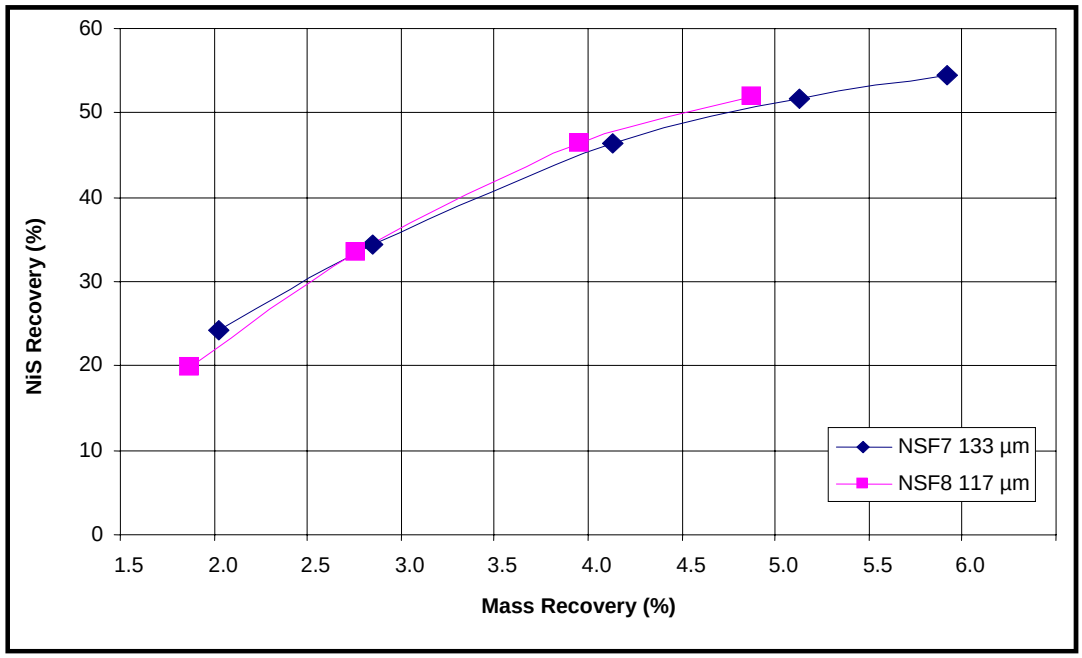


**Figure 5.9 Rougher Flotation Kinetics of the Four Composites Assaying 0.4% Ni as NiS**

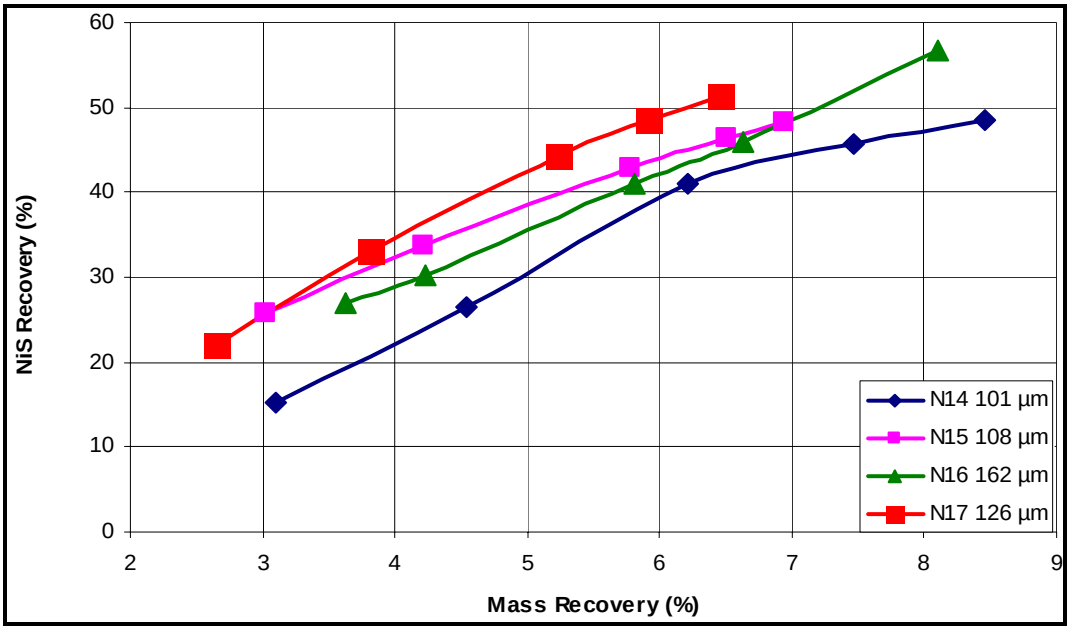
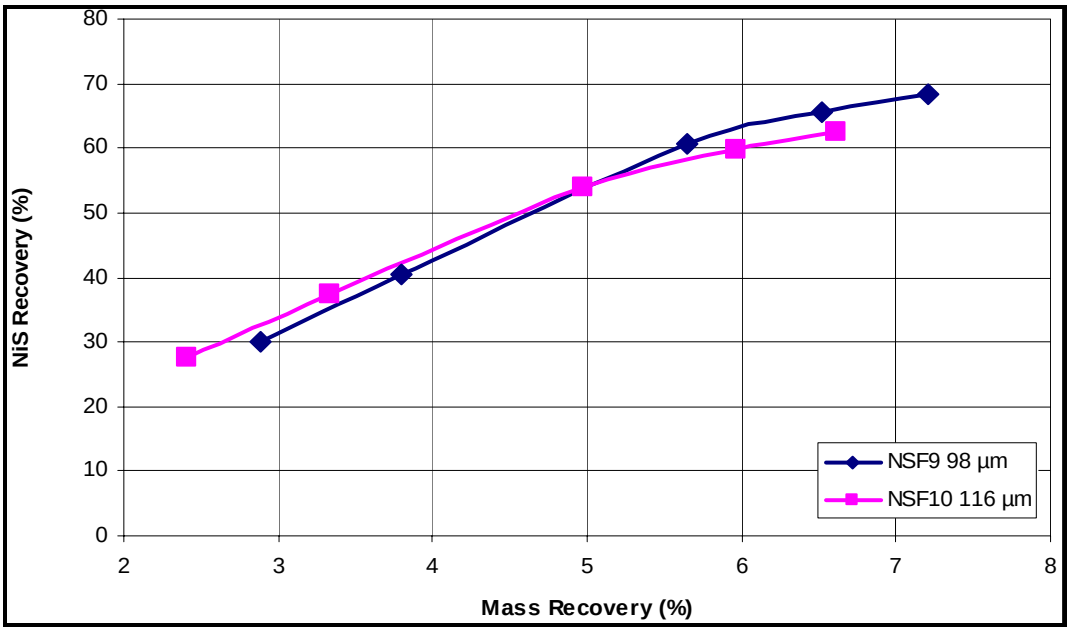



**Figure 5.10 Rougher Flotation Kinetics of the Two Composite Assaying 0.5% Ni as NiS**



Wardrop analyzed the test results and drew the following conclusions:

- A viable sulphidic nickel head grade–recovery curve can be used for mining design and economic assessment of the project.
- The composites required for the head grade–recovery generation can be formed from intervals containing similar sulphidic nickel head grades.
- The location of the interval within the deposit has little effect on the flotation performance of the composites.

## FLOTATION TESTS ON THE SULPHIDIC NICKEL HEAD GRADE COMPOSITES

The first step in generating the curve was to perform cleaner flotation tests to optimize and confirm the flotation parameters on the sulphidic nickel head grade composites. This testwork would also further the development of the flotation flowsheet. The final sulphidic nickel head grade-recovery curve would then be created from the results of LCTs performed on the composites utilizing the optimized process developed from the cleaner flotation tests.

### *Cleaner Tests*

The five sulphidic nickel head grade composites were first tested using the reagent regime developed from Open Pit Master Composite No. 1 testing. As indicated by the low nickel recoveries achieved through the testing, the reagent regime developed from Open Pit Master Composite No. 1 testwork was not suitable for the sulphidic nickel head grade composites.

Further development tests were required to optimize the reagent regime for these composites. The reagent options investigated were:

- a coarser primary grind
- regrind of the first cleaner concentrate
- addition of PAX to the grind
- addition of CMC in rougher flotation
- high intensity conditioning
- rougher flotation at a high pulp density
- acid wash of flotation feed
- the addition of sodium hexametaphosphate to the grind.

The test results indicate that the addition of PAX to the grind with the addition of CMC to rougher flotation significantly improved nickel recovery. As a result, the

nickel recovery increased above the baseline nickel recovery for the 0.3%, 0.5%, 0.8%, and 1.15% composites are 26.5%, 8.8%, 6.1%, and 23.8% respectively.

The addition of sodium hexametaphosphate to the rougher flotation as a substitute for CMC achieved slightly inferior results, but at a lower reagent cost.

Figure 5.11 and Figure 5.12 illustrate the improvement of nickel recovery for the 0.3% and 1.15% sulphidic nickel composites through optimization tests. The baseline tests on the grade/recovery composites were conducted under the reagent regime developed for Open Pit Master Composite No. 1. There was no addition of PAX in the grind or CMC addition to the roughers for the baseline tests.

**Figure 5.11 Cleaner Test Results of the 0.3% Sulphidic Nickel Head Grade Composite**

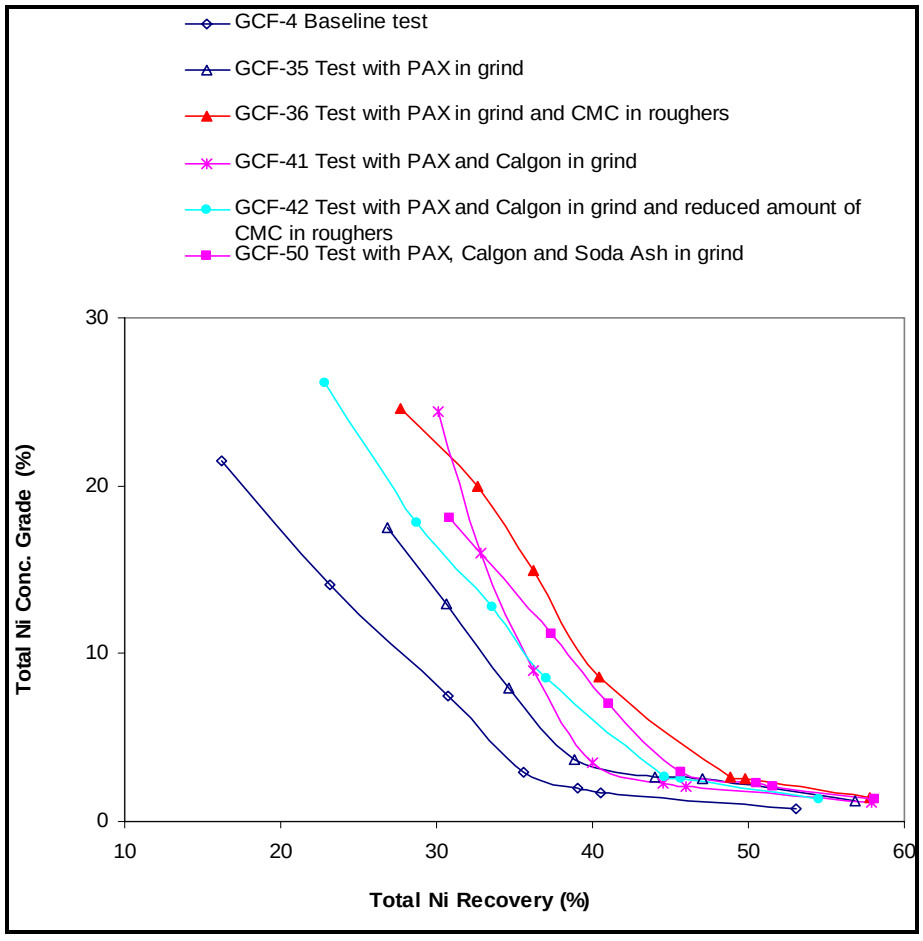
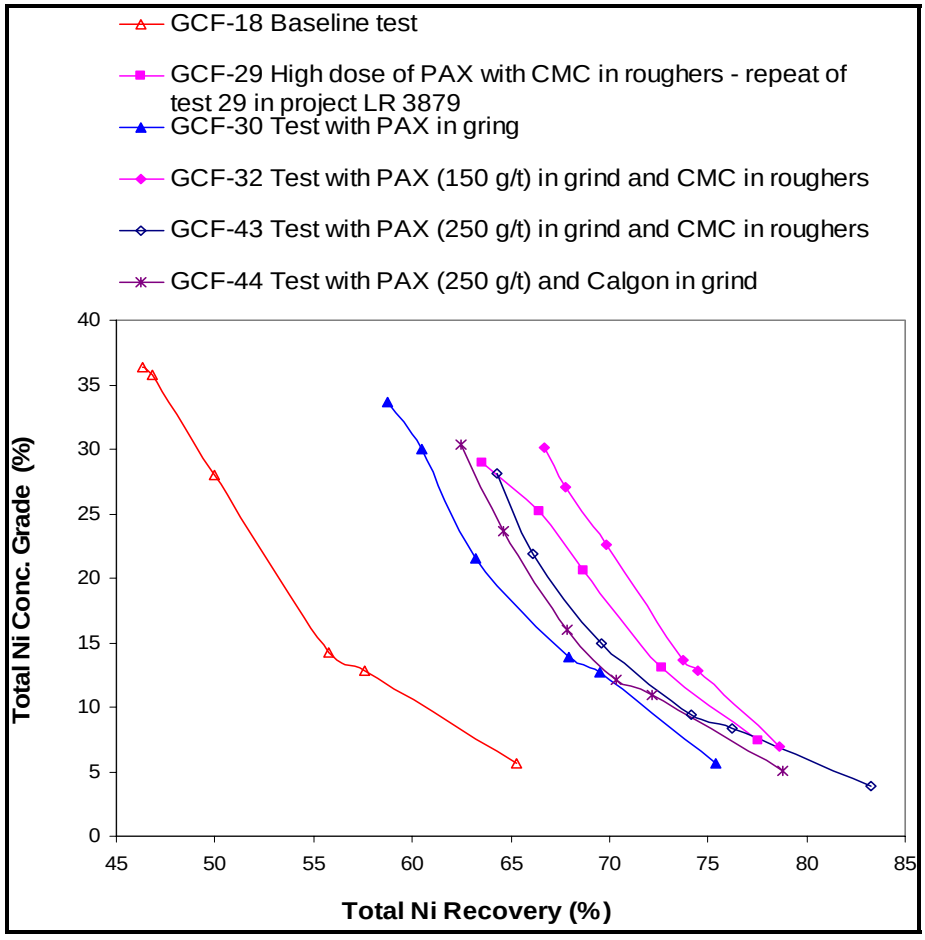


**Figure 5.12 Cleaner Test Results of the 1.15% Sulphidic Nickel Grade Composite**




*Locked Cycle Testing*

The final step in the creation of the sulphidic nickel head grade-recovery curve was the LCT. These tests utilized the optimized reagent regime developed in the cleaner test phase. Due to insufficient samples, the LCTs could only be performed on the 0.30%, 0.80%, and 1.15% target sulphidic nickel head grade composites.

Table 5.4 to Table 5.6 show the metallurgical projections from the LCTs. The tests performed on the 0.30% sulphidic nickel head grade composite achieved a concentrate with 19.89% Ni, 11.99% magnesium oxide, and a total nickel recovery of 40.28%. This is equivalent to a sulphidic nickel recovery of 58.6%.

The projected concentrate for the 0.8% sulphidic nickel head grade composite was 26.81% nickel, 9.78% magnesium oxide, with a total nickel recovery of 68.65% and 90.1% sulphidic nickel recovery. For the 1.15% composite, a concentrate assaying 28.83% nickel, 8.87% magnesium oxide, with a total nickel recovery of 68.77% and 86.1% sulphidic nickel recovery was projected.

**Table 5.4 Metallurgical Projection of the 0.3% Sulphidic Nickel Head Grade Composite (LCT-5)**

| Product | Weight (%) | Assays (%) | | | | Distribution (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ni | Ni (as NiS) | S | MgO | Ni | Ni (as NiS) | S | MgO |
| 5th Cleaner Concentrate | 0.88 | 19.89 | 15.89 | 21.23 | 11.99 | 40.28 | 47.32 | 54.76 | 0.31 |
| 1st Cleaner Scavenger Tail | 9.58 | 0.38 | 0.28 | 0.31 | 33.74 | 8.44 | 9.01 | 8.66 | 9.48 |
| Ro Tail | 89.54 | 0.25 | 0.14 | 0.14 | 34.36 | 51.28 | 43.67 | 36.57 | 90.21 |
| Combined Tail | 99.12 | 0.26 | 0.16 | 0.16 | 34.30 | 59.72 | 52.68 | 45.24 | 99.69 |
| Head (Calculated) | 100.00 | 0.44 | 0.30 | 0.34 | 34.10 | 100.00 | 100.00 | 100.00 | 100.00 |

**Table 5.5 Metallurgical Projection of the 0.8% Sulphidic Nickel Head Grade Composite (LCT-4)**

| Product | Weight (%) | Assays (%) | | | | Distribution (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ni | Ni (as NiS) | S | MgO | Ni | Ni (as NiS) | S | MgO |
| 5th Cleaner Concentrate | 2.79 | 26.81 | 22.55 | 23.75 | 9.78 | 68.65 | 69.62 | 73.52 | 0.85 |
| 1st Cleaner Scavenger Tail | 11.52 | 0.62 | 0.56 | 0.51 | 32.23 | 6.58 | 7.16 | 6.51 | 11.63 |
| Ro Tail | 85.69 | 0.32 | 0.24 | 0.21 | 32.59 | 24.77 | 23.23 | 19.97 | 87.52 |
| Combined Tail | 97.21 | 0.35 | 0.28 | 0.25 | 32.55 | 31.35 | 30.38 | 26.48 | 99.15 |
| Head (Calculated) | 100.00 | 1.09 | 0.90 | 0.90 | 31.92 | 100.00 | 100.00 | 100.00 | 100.00 |

**Table 5.6 Metallurgical Projection of the 1.15% Sulphidic Nickel Head Grade Composite (LCT-3)**

| Product | Weight (%) | Assays (%) | | | | Distribution (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ni | Ni (as NiS) | S | MgO | Ni | Ni (as NiS) | S | MgO |
| 4th Cleaner Concentrate | 3.44 | 28.83 | 21.50 | 25.07 | 8.87 | 68.77 | 69.92 | 75.84 | 0.95 |
| 1st Cleaner Scavenger Tail | 9.25 | 0.97 | 0.79 | 0.75 | 31.67 | 6.20 | 6.90 | 6.10 | 9.11 |
| Ro Tail | 87.31 | 0.41 | 0.28 | 0.23 | 33.12 | 25.03 | 23.18 | 18.07 | 89.94 |
| Combined Tail | 96.56 | 0.47 | 0.33 | 0.28 | 32.98 | 31.23 | 30.08 | 24.16 | 99.05 |
| Head (Calculated) | 100.00 | 1.44 | 1.06 | 1.14 | 32.15 | 100.00 | 100.00 | 100.00 | 100.00 |

*Sulphidic Nickel Head Grade-Recovery Curve*

The assay data from this test program indicated that the sulphidic nickel assays of the flotation concentrates were inaccurate. The sulphidic nickel assay was significantly lower than the total nickel assay in the concentrate, which is unlikely to be the case. The recovery calculated, based on the sulphidic nickel assay of a concentrate, is much lower than the true value due to assay error. The total nickel assay values were believed to be accurate since the assay technology has been widely used over a long period of time. Moreover, all the nickel recovered into the final concentrate would be saleable to a smelter.

For an accurate account of nickel recovery against sulfidic nickel grade in the flotation feed, an equivalent sulphidic nickel recovery was calculated according to the following formula:

*Equivalent sulphidic nickel recovery (percentage) = [concentrate mass yield (percentage) x concentrate total nickel assay (percentage)]/direct sulphidic nickel assay of feed (percentage).*

The equivalent sulphidic nickel recovery in the final concentrate of a successful LCT were considered as the final sulphidic nickel recovery of the sample tested and was used in building the sulphidic nickel head grade-recovery curve described in the remainder of this section.

The results of the cleaner and LCTs on the sulphidic nickel head grade composites have been compiled in Table 5.7 and represented graphically in Figure 5.13. Because of the lack of samples, a composite could not be formed for the 0.5% sulphidic nickel head grade LCT. The locked cycle nickel recovery was interpolated from the results of the 0.3% and 0.8% sulphidic nickel head grades. In order to create a smooth and reasonable head grade-recovery curve, the sulphidic nickel recoveries were modified as indicated in Table 5.7. The sulphidic nickel head grade-recovery based on the modified LCT recoveries is provided in Figure 5.14. The equation for the open pit sulphidic nickel head grade-recovery curve is:

***Nickel Recovery** = (61.375X3 - 198.87X2 + 218.02X + 9.435)%; for 0.1 ≤X ≤1.25*

***Nickel Recovery** = 91.1%; for X >1.25*

***Nickel Recovery** = 0%; for X<0.1*

***where** X = sulphidic nickel grade %.*

**Table 5.7 Sulphidic Nickel Head Grade Composite Cleaner and Locked Cycle Test Results**

| Feed Grade % Ni (as NiS) | Cleaner Test Results | | | Projected Metallurgy Based on LCTs | | | Modified LCTs Recovery % Ni (as NiS) |
|---|---|---|---|---|---|---|---|
| | Recovery % Ni (as NiS) | Conc. Grade % Ni (Total) | Conc. Grade (% MgO) | Recovery % Ni (as NiS) | Conc. Grade % Ni (Total) | Conc. Grade (% MgO) | |
| 0.3 | 48.2 | 20 | 11.1 | 58.6 | 19.9 | 12.0 | 58.6 |
| 0.5 | 66.4 | 23 | 12.4 | 76.4 | 23.0 | 12.4 | 76.4 |
| 0.8 | 81.9 | 27 | 9.5 | 90.1 | 26.8 | 9.8 | 88.0 |
| 1.15 | 85.2 | 27 | 8.9 | 88.0 | 27.0 | 9.5 | 90.5 |

**Figure 5.13 Head Grade Recovery Relationship for the Sulphidic Nickel Head Grade Composites**

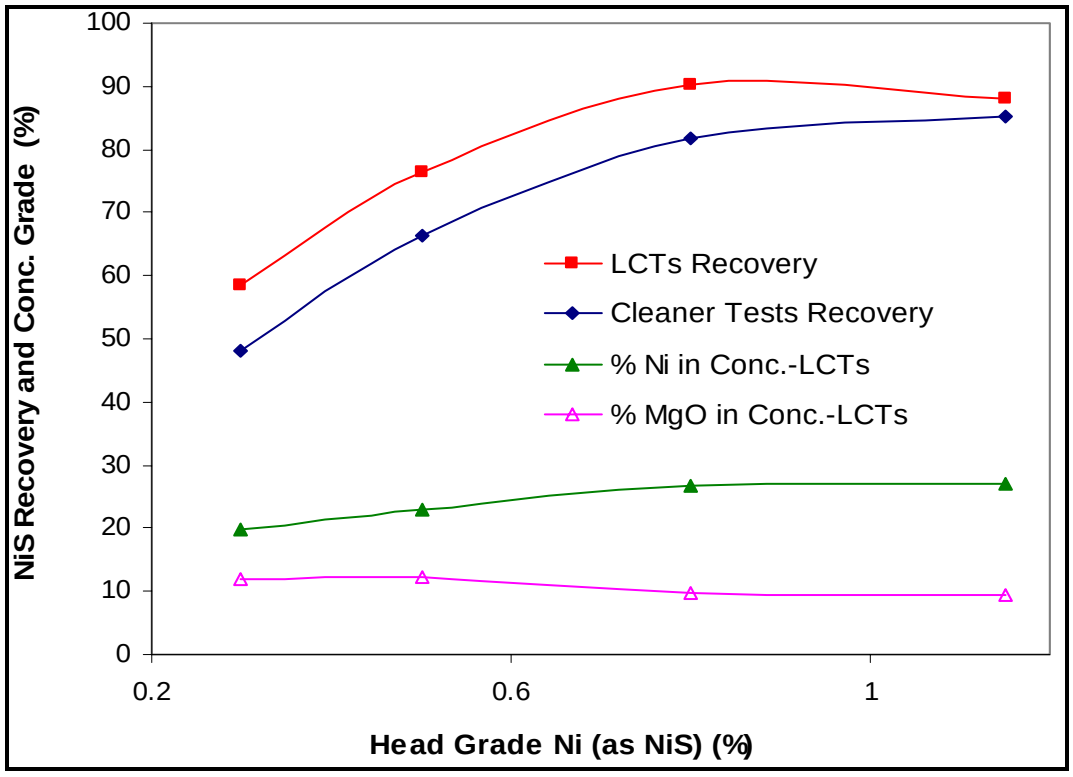
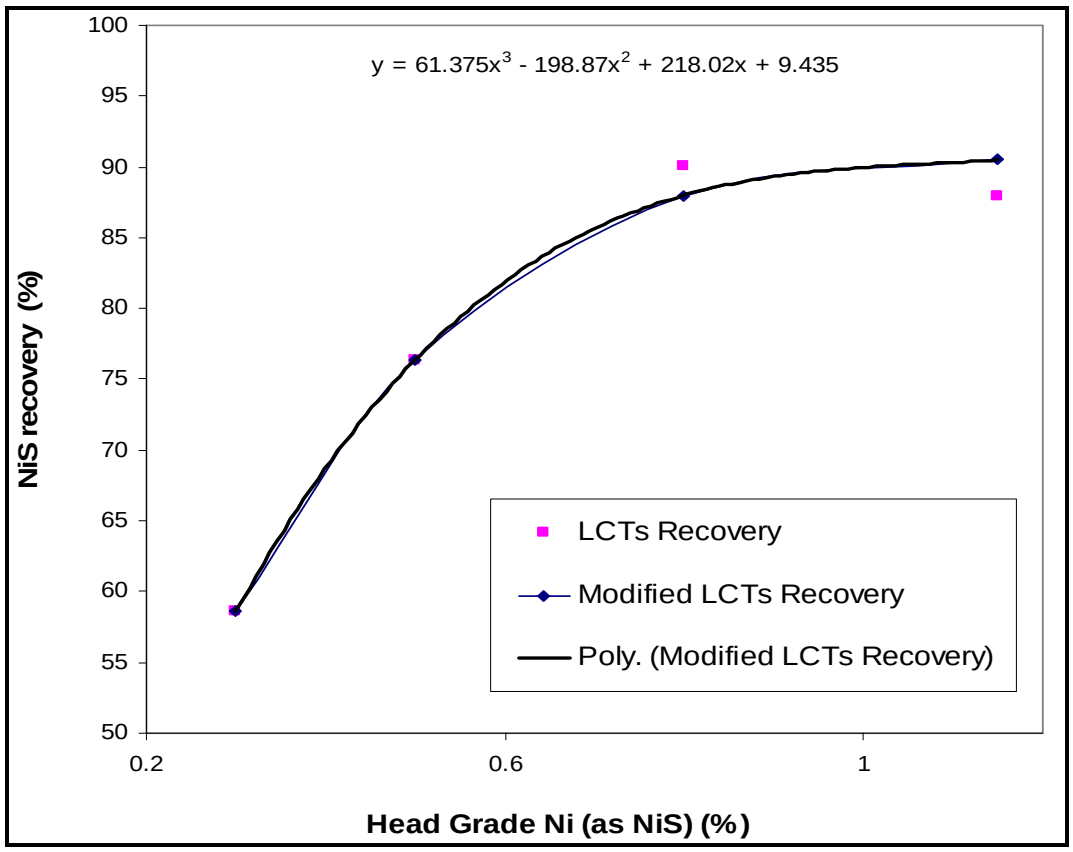


**Figure 5.14 Head Grade Recovery Curve Based on LCTs on the Sulphidic Nickel Head Grade Composites**




## FLOTATION TESTS ON OPEN PIT MASTER COMPOSITE NO. 2

These tests were conducted to develop the design criteria for the plant. Open Pit Master Composite No. 2 represents a more accurate reflection of the ore that would be produced by open pit mining, based on the sulphidic nickel block model. As described previously in this section, the composite was formed using the volume of influence concept for the viable metallurgical drill holes. Cleaner flotation tests were conducted to confirm and optimize the flotation parameters and LCTs were then completed to generate the material and water balance for the flowsheet. Any detrimental effects of recycling the process water were also tested.

### *Optimization of Flotation Parameters (Cleaner Flotation Tests)*

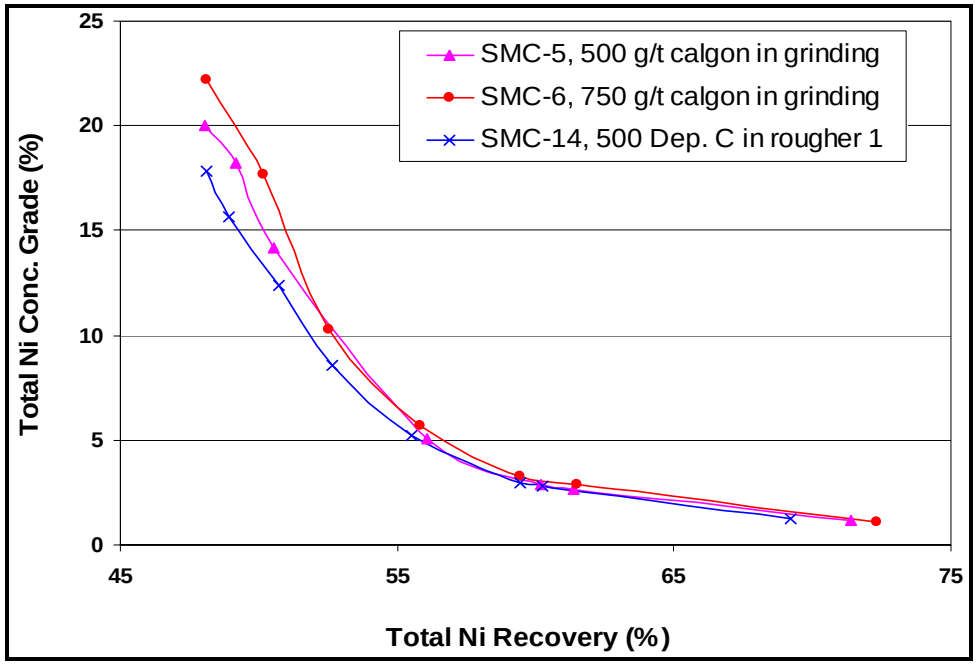
The flotation parameters that had been developed from the flotation work preceding Open Pit Master Composite No. 2 tests were further optimized. One rougher kinetic test (SMC-7) and 13 cleaner tests (SMC-1 to SMC-6 and SMC-8 to SMC-14) were completed.

The variables were investigated and conclusions were drawn from analysis of the test results as follows:

- The addition of PAX in the cleaning stage resulted in lower nickel and higher deleterious magnesium oxide assays in the final cleaner concentrate.
- The addition of sodium hexametaphosphate in grinding produced the best flotation results, with the concentrate assaying 22.2% total Ni, 11.8% MgO, and a sulphidic nickel equivalent recovery of 68%.
- The addition of Dep. C in grinding did not show any positive effect on the flotation of the composite sample. Dep. C addition in rougher flotation had little impact on the flotation.
- Acid washing did not improve the selectivity of the flotation process.
- A dosage higher than 100 g/t is required in each cleaning stage to achieve a concentrate with an acceptable nickel grade.

All of the flotation tests utilized the same collector addition regime with the exception of SMC-2, where collector was added to the first and second cleaner stages. The major variations to the flotation parameters were the type, dosage, and location for introducing the dispersants. Three tests that exhibited the best flotation performance are presented in Figure 5.15.

**Figure 5.15 Flotation Kinetics of the Three Best Cleaner Tests Achieved on Open Pit Master Composite No. 2**



*Locked Cycle Test on Open Pit Master Composite No. 2*

A single locked cycle test (LCT-6) was performed utilizing the optimized flotation parameters from SMC-6. The metallurgical projections from the LCT have been presented in Table 5.8.

**Table 5.8 Metallurgical Projections for Open Pit Master Composite No. 2 (LCT-6)**

| Product | Weight (%) | Assays (%) | | | | Distribution (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ni | NiS | S | MgO | Ni | NiS | S | MgO |
| 5th Cl Conc | 1.26 | 22.27 | 15.31 | 24.36 | 10.43 | 52.28 | 57.89 | 69.15 | 0.39 |
| 1st Cl + Scav Tail | 18.31 | 0.29 | 0.17 | 0.16 | 34.85 | 9.85 | 9.19 | 6.70 | 19.00 |
| Rougher Tail | 80.43 | 0.25 | 0.14 | 0.13 | 33.64 | 37.88 | 32.93 | 24.16 | 80.61 |
| Combined Tail | 98.74 | 0.26 | 0.14 | 0.14 | 33.87 | 47.72 | 42.11 | 30.85 | 99.61 |
| Head (calculated) | 100.00 | 0.53 | 0.33 | 0.44 | 32.97 | 100.00 | 00.00 | 100.00 | 100.00 |

Based on these metallurgical projections, the flotation flowsheet will produce a nickel concentrate assaying 22.27% nickel, 10.43% magnesium oxide, with a total nickel recovery of 52.28% (77.23% sulphidic nickel recovery). Based on a 10,000 t/d mill throughput and a 0.364% sulphidic nickel feed head grade (or 8 lb of sulphidic nickel per tonne of feed), it is predicted that 126 t of nickel concentrate would be produced per day.

*Effect of Recycled Water on the Flotation Performance of Open Pit Master Composite No. 2*

A second locked cycled test (LCT-7) was carried out to determine the effect of recycled water on the flotation performance of Open Pit Master Composite No. 2, summarized in Table 5.9. The metallurgical projections show that a LCT concentrate assaying 19.94% nickel, 11.6% magnesium oxide, with a total nickel recovery of 53.79% (78.3% sulphidic Ni) will be produced. Comparison with the results from the first LCT on Open Pit Master Composite No. 2 reveal that the two tests were very similar. This shows that there is no significant impact from using recycled water in the process.

**Table 5.9 Metallurgical Projection of Second LCT on Open Pit Master Composite No. 2 using Recycled Water (LCT-7)**

| Product | Weight (%) | Assays (%) | | | | Distribution (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Ni | NiS | S | MgO | Ni | NiS | S | MgO |
| 5th Cl Conc | 1.43 | 19.94 | 15.59 | 20.28 | 11.59 | 53.79 | 64.04 | 73.47 | 0.53 |
| 1st Cl + Scav Tail | 15.16 | 0.30 | 0.17 | 0.14 | 32.75 | 8.44 | 7.19 | 5.39 | 15.81 |
| Rougher Tail | 83.41 | 0.24 | 0.12 | 0.10 | 31.50 | 37.77 | 28.77 | 21.14 | 83.67 |
| Combined Tail | 98.57 | 0.25 | 0.13 | 0.11 | 31.69 | 46.21 | 35.96 | 26.53 | 99.47 |
| Head (calculated) | 100.00 | 0.53 | 0.35 | 0.39 | 31.19 | 100.00 | 100.00 | 100.00 | 100.00 |

### *Concentrate Assays*

Table 5.10 shows the chemical assays of the concentrate from LCT-6. The concentrate contains 22.3% Ni, 10.4% MgO, 24.4% S, 12.7% $SiO_2$, and 17.0% Fe. The chemical assays of other valuable metals in the concentrate are 1.4% Cu, 0.46% Co, 2.47 g/t Pt, 6.31 g/t Pd, 0.63 g/t Au, 4.3 g/t Ag, and 0.59 g/t Rh. The concentrations of elements that may raise environmental concerns are As 61 g/t, Cd <4 g/t, Cr 410 g/t, Hg <0.3 g/t, Se <40 g/t, and U <60 g/t.

**Table 5.10 Assay of Flotation Concentrate**

| Component | Value | Component | Value | Component | Value | Component | Value |
|---|---|---|---|---|---|---|---|
| Ni (%) | 22.3 | MgO (%) | 10.4 | Hg (g/t) | <0.3 | Sn (g/t) | <20 |
| Cu (%) | 1.4 | $SiO_2$ (%) | 12.7 | K (g/t) | 410 | Sr (g/t) | 40 |
| Co (%) | 0.46 | Al (%) | 0.11 | Li (g/t) | <5 | Ti (g/t) | 200 |
| Pt (g/t) | 2.47 | As (g/t) | 61.0 | Mn (g/t) | 270 | Tl (g/t) | <30 |
| Pd (g/t) | 6.31 | Ba (g/t) | 61.0 | Mo (g/t) | 22 | U (g/t) | <60 |
| Au (g/t) | 0.63 | Be (g/t) | 0.10 | Na (g/t) | 240 | V (g/t) | <20 |
| Ag (g/t) | 4.3 | Bi (g/t) | <20 | P (g/t) | 131 | Y (g/t) | <10 |
| Rh (g/t) | 0.59 | Ca (%) | 2.0 | Pb (%) | 0.097 | Zn (%) | 0.18 |
| S (%) | 24.4 | Cd (g/t) | <4 | Sb (g/t) | <30 | Cl (%) | 0.044 |
| Fe (%) | 17.0 | Cr (g/t) | 410 | Se (g/t) | <40 | F (%) | 0.066 |

### *Flotation Tests on the Variability Samples*

Two sets of cleaner flotation tests were performed on each of the 18 variability samples. One set of test used Calgon as the dispersant/depressant and one set of test used Dep. C as the dispersant/depressant. Calgon was added in the grinding and Dep. C was added in rougher flotation stages. The objective of these tests was to evaluate the flotation performance of samples with different mineralogy and/or

from different locations of the deposit. These test results were used to assess the risk of flotation underperformance in future operations.

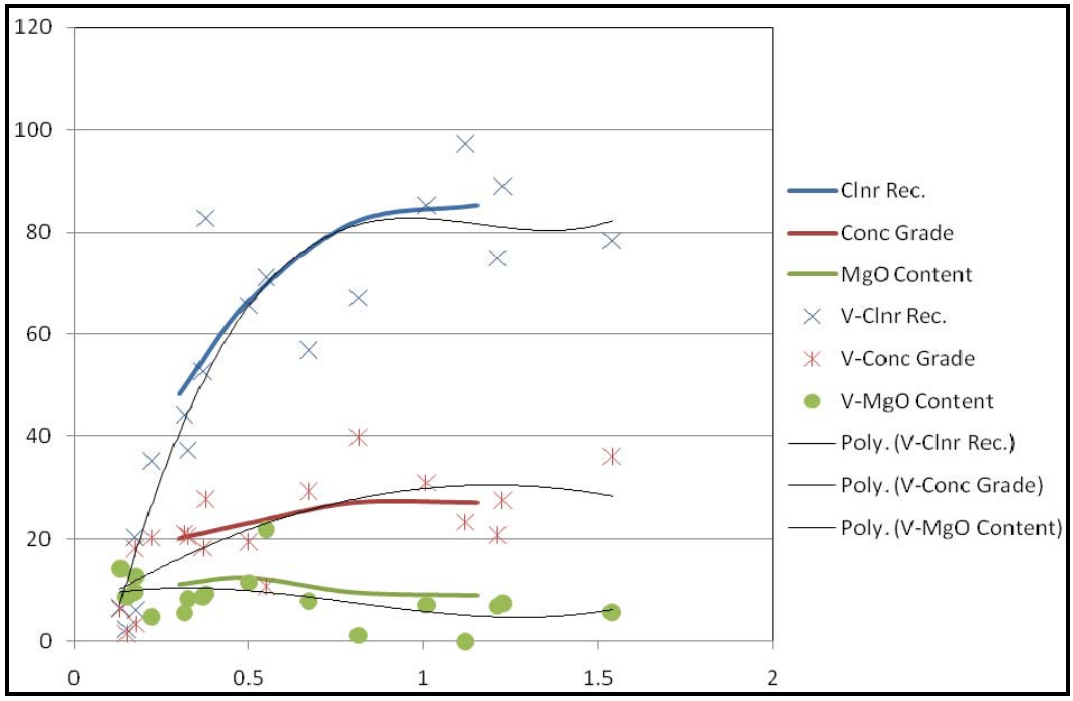
The flotation on the variability samples indicate that Dep. C performed better on 10 out of the 18 variability samples. Calgon performed better on 4 out of the 18 samples, while there was little difference on the other 4 samples. The addition of Calgon could thus help some tests to achieve a nickel concentrate with higher nickel grade and lower MgO content.

Table 5.11 shows the better results of the two flotation tests achieved on the 18 variability samples. The results are also plotted in Figure 5.16, as a comparison with the best cleaner test results on the NiS grade composites. The solid lines in Figure 5.16 illustrate the results of the NiS grade composites.

**Table 5.11 Summary of Variability Sample Flotation Results**

| Sample ID | Feed Grade (%) | | Concentrate Grade (%) | | Recovery (%) | | $P_{80}$ µm |
|---|---|---|---|---|---|---|---|
| | Total Ni | Sulphidic Ni | Ni | MgO | Total Ni | Sulphidic Ni | |
| V4 | 0.27 | 0.13 | 6.34 | 14.3 | 3.1 | 6.5 | 60 |
| V13 | 0.34 | 0.15 | 1.47 | 8.67 | 1.2 | 2.3 | 57 |
| V2 | 0.24 | 0.17 | 18.1 | 9.7 | 14.5 | 20.3 | 72 |
| V9 | 0.29 | 0.18 | 3.40 | 12.7 | 3.7 | 6.1 | 65 |
| V18 | 0.31 | 0.22 | 20.2 | 4.83 | 31.1 | 35.1 | 135 |
| V8 | 0.39 | 0.31 | 21.1 | 5.61 | 39.6 | 44.1 | 108 |
| V11 | 0.53 | 0.33 | 20.5 | 8.40 | 29.4 | 37.2 | 84 |
| V16 | 0.46 | 0.37 | 18.2 | 8.67 | 44.9 | 52.7 | 66 |
| V1 | 0.59 | 0.38 | 23.4 | 9.29 | 50.9 | 84.2 | 82 |
| V14 | 0.62 | 0.50 | 19.4 | 11.5 | 50.7 | 65.4 | 62 |
| V15 | 0.69 | 0.55 | 10.7 | 22.0 | 64.3 | 71.0 | 92 |
| V7 | 0.80 | 0.67 | 29.3 | 7.93 | 47.9 | 56.8 | 94 |
| V6 | 1.13 | 0.81 | 39.8 | 1.27 | 52.5 | 67.0 | 69 |
| V10 | 1.46 | 1.01 | 30.9 | 7.2 | 57.3 | 85.2 | 70.5 |
| V12 | 1.51 | 1.12 | 23.3 | 0.0 | 81.3 | 97.3 | 67 |
| V17 | 1.47 | 1.21 | 20.8 | 6.90 | 67.2 | 74.8 | 54 |
| V3 | 1.65 | 1.23 | 27.5 | 7.52 | 65.7 | 89.0 | 80 |
| V5 | 1.82 | 1.54 | 36.0 | 5.79 | 63.1 | 78.3 | 86 |

**Figure 5.16 Flotation Performance of Variability Samples**




The results of V1 are more significant since this composite represents ores of the first two years of open pit operation. Both of the tests using Calgon and Dep. C achieved flotation results better than the results of the best cleaner test on Open Pit Master Composite No. 2. The test on V1 using Dep. C as the dispersant achieved a fourth cleaner concentrate containing 23.4% total Ni and 9.29% MgO, with a total nickel recovery of 50.9% (equivalent sulphidic nickel recovery of 84.2%). The best cleaner test (i.e. SMC-6) on Open Pit Master Composite No. 2 achieved a cleaner concentrate assaying 22.2% total Ni and 11.8% MgO with a total nickel recovery of 48.1% (equivalent sulphidic nickel recovery of 68.0%). The V1 results predict good recoveries during the first two years of open pit production.

The overall variability sample flotation results shown in Table 5.11 and Figure 5.16 indicate all the variability samples with a sulphidic nickel assay above 0.22% demonstrate floatabilities similar to those of the NiS grade composites. In most of the flotation tests on the variability samples, lower MgO contents in concentrates were achieved relative to the test results from the NiS grade composites.

Tests on three of the four variability samples containing less than 0.2% sulphidic nickel achieved very low nickel recovery. The variability testing results indicate that the risk of “metallurgical underperformance” for the project remains low when the mining cutoff grade is higher or close to 0.2% sulphidic nickel. The risk increases as the mining cutoff grade decreases. More tests on variability samples containing less than 0.2% sulphidic nickel are recommended in order to more accurately define the optimum cutoff grade.

### 5.3.5 LOCKED CYCLE RECOVERY VS. RECOVERY FROM THE SULPHIDIC NICKEL HEAD GRADE-RECOVERY CURVE

The sulphidic nickel recovery from Open Pit Master Composite No. 2 is 12% above the recovery predicted from the head grade-recovery curve established from the nickel sulphide grade composites (Figure 5.17). The sulphidic nickel grade of Open Pit Master Composite No. 2 is 0.36%. The grade-recovery curve (Figure 5.17) predicts a sulphidic nickel recovery of 65.4% for this sulphidic nickel grade; however, the actual LCT recovery achieved is 77.2%.

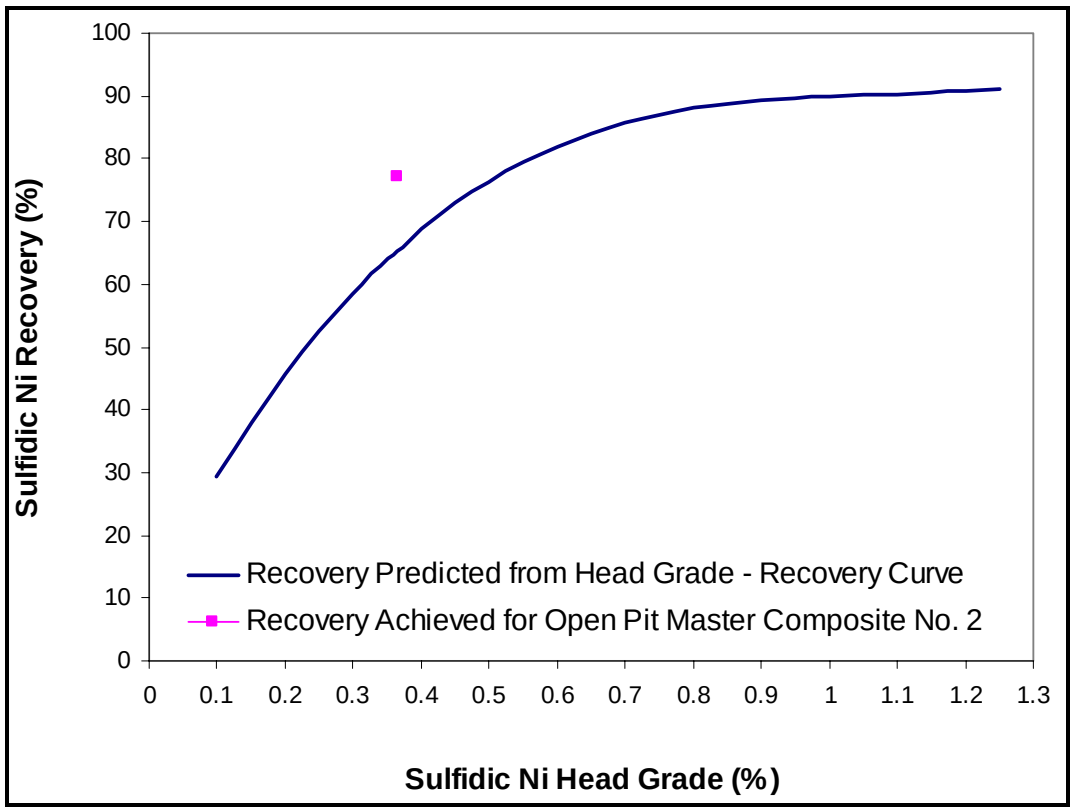
This increased recovery is probably due to the inclusion of intervals with wide ranges of sulphidic nickel assays. Open Pit Master Composite No. 2 contains all the intervals from diluting waste (i.e. intervals with cutoff sulphidic nickel assays to intervals with sulphidic nickel assays higher than 2.0%), while the nickel sulphide grade composites were formed from intervals with a very narrow range of sulphidic nickel assays.

It is believed that the nickel recoveries of the high grade intervals contributed to the overall higher recovery for Open Pit Master Composite No. 2. For similar reasons, the nickel recovery achieved for Open Pit Master Composite No. 1 was also higher than the recovery predicted from the head-grade recovery curve.

The results in Figure 5.17 indicate that the sulphidic nickel head grade-recovery curve is conservative in predicting the recovery based on the average sulphidic nickel grade of a large resource block, which contains ore with a wide range of sulphidic nickel grades. However, the head grade-recovery curve is a valid method to predict the nickel recovery in a large mining resource based on the recovery of each selective mining unit (SMU). SMU is defined as the smallest block of material in a mine that can be classified as either ore or waste.

The curve is used to estimate the nickel recovery of each SMU block within the open pit resource. The SMU block size within the open pit resource is 6 m x 6 m x 6 m. The Minago open pit resource contains approximately 200,000 SMU blocks. The head grade-recovery curve is applied to each SMU to determine whether it is waste or ore. This is done for the entire deposit to develop the optimum pit.

**Figure 5.17 Recovery Achieved for Open Pit Master Composite No. 2 vs. the Head Grade-Recovery Curve Based on NiS Grade Composites**




### 5.3.6 *CALCULATING AVERAGE SULPHIDIC NICKEL RECOVERY FOR AN OREBODY OR DEPOSIT*

As indicated above, the sulphidic nickel head grade-recovery curve is not accurate in predicting the sulphidic nickel recovery based on the average sulphidic nickel grade of a large orebody or the whole deposit.

A more accurate protocol to estimate the sulphidic nickel recovery of an orebody is to calculate the recovery using metal content weighted average of the recovery of each SMU. The sulphidic nickel recovery of each SMU is based on the head grade-recovery curve. To be conservative, a recovery of 0% is recommended for any SMU that contains less than 0.1% sulphidic nickel.

The estimated sulphidic nickel recovery for Open Pit Master Composite No. 2 using the above protocol is 74.45%, slightly lower than the 77.2% recovery achieved in the LCT on the composite. The results indicate that this estimate is more accurate than the 65.4% recovery directly from the head grade-recovery curve, and considered conservative compared to the 77.2% recovery from the LCT.

## 5.3.7 DEWATERING TESTS OF FLOTATION PRODUCTS

### FLOTATION TAILS SETTLING TESTS

#### *Conventional Settling Tests of Flotation Tails*

The conventional flotation tails settling tests were conducted at SGS. Based on the results of flocculant screening, two flocculants (Mag 10 and Mag 351) were further evaluated for the effect of flocculant dosage and initial pulp density.

The results indicate that dilution of the thickener feed resulted in lower achievable pulp density of thickener underflow. At an initial pulp density of 16.38% solids, 1.732 $m^2$/t/d of thickener settling area will be required to achieve a pulp density of 40.7% solids for the thickener underflow. For a mill with a throughput of 10,000 t/d, a 150 m diameter conventional tailings thickener will be required.

#### *High Rate Thickener Settling Tests of Flotation Tails*

The high rate flotation tails settling tests were performed by Outotec using its Supaflo® 100 mm bench-scale HRT test unit at its testing facility in Burlington, Ontario, Canada. The sample was sent to Outotec as 20 kg of solids in two 20 L pails. Based on the results of flocculant screening and preliminary feed density scoping tests, a feed density of 8% solids and a low anionic flocculant MF-10 were selected for further testing. Six bench scale tests were conducted to evaluate the effect of flocculant dosage and solids loading rate.

The results indicate that increasing the flocculant dosage from 11 g/t to 23 g/t increased the underflow density from 45.4% to 49.4% solids and reduced the suspended solids in the overflow from 60 g/t to 20 g/t. The underflow density changed little when the loading rate increased from 0.4 t/$m^2$/h to 0.5 t/$m^2$/h, but decreased to 44.2% and 38.0% after the loading rate was further increased to 0.70 t/$m^2$/h and 0.85 t/$m^2$/h. The overflow clarity was good for all 4 tests with suspended solids of 12 g/t in the overflow of the last 3 tests.

The rheology data indicates that the un-sheared vane yield stress ranged from 31 Pa to 158 Pa and increased concurrently with underflow density. This indicates that no special rake torque and underflow transportation requirements are needed if the underflow density is kept under 49.4% solids.

### FLOTATION CONCENTRATE DEWATERING TESTS

#### *Concentrate Size Analysis*

Pocock Industrial Inc. (Pocock) was subcontracted by SGS to conduct theflotation concentrate size analysis, conventional settling tests, pulp rheology of thickened

concentrate, and pressure filtration tests. Larox Corp. (Larox) also conducted pressure filtration tests on the underflow from the concentrate settling tests provided by Pocock. The concentrate sample was wet-screened at 38 µm (400 mesh) and the oversize fraction was dry-screened with a Ro-tap sieve shaker. The concentrate had a $P_{80}$ of 42 µm and a $P_{90}$ of 54 µm.

### *Conventional Concentrate Settling Tests*

Pocock selected the flocculant Hychem AF 308 HH, a high molecular weight 50% charge density anionic polyacrylamide, for concentrate settling after flocculant screening tests.

The results indicate that the concentrate was best thickened at feed solids of 15% to 20%. Flocculant dosage should be maintained at a minimum of 10 g/t. Pocock recommended a unit area of 0.150 $m^2$/t/d for concentrate thickener design (where t/d is metric tonnes per day; the original Pocock data was supplied in short tons per square foot).

### *Pulp Rheology of Thickened Concentrate*

Viscosity tests were performed to examine the rheological behavior of the thickened concentrate pulp across a specific shear rate range. The thickened materials were pre-sheared by destroying the flocculant using a laboratory mixer prior to viscosity testing on a Fann (Model 35A) unit.

A decreasing apparent viscosity with increasing shear rate or “shear thinning” behavior of the thickened concentrate slurry is characteristic of the pseudoplastic class of non-Newtonian fluids. It demonstrates the need to achieve and maintain a specific velocity gradient or shear rate in order to initiate and maintain the flow. Since the yield values of the thickened concentrate slurry are less than 30 $N/m^2$, conventional thickening and pumping systems are recommended for settling of the Minago concentrate.

### *Pressure Filtration Test by Pocock*

The pressure filtration test results are summarized in Table 5.12. The results indicate that 4 minutes were required to dry a 15.5 mm filter cake to a moisture of 8.2%.

Based on the data in Table 5.12, the filter cycle time to produce a filter cake moisture of 12%, 11%, 10%, 9%, and 8% at a filter cake thickness of 50 mm will be 8 minutes, 9.7 minutes, 12.4 minutes, 17.3 minutes, and 28.2 minutes, respectively. The cycle time almost doubled when the final moisture was reduced from 9% to 8%. A Power PF 9.5-38 press filter with a total filter area of 19 $m^2$ was recommended by Pocock for the Minago Project at a filtration capacity of 130 t/d.

*Pressure Filtration Test by Larox*

Larox also performed pressure filtration tests on the thickened concentrate slurry from the settling tests conducted at Pocock, and recommended a LAROX PF 16/19 M1 45 press filter for processing the concentrate. The designed capacity of the filter is 126 t/d, and the designed filter cake moisture is 8.5%. The pressure filtration tests are summarized in Table 5.13.

**Table 5.12 Results of Pressure Filtration Tests Performed by Pocock**

| Test No. | Filtration Pressure | | | Filtration Time | | | | Test Results | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Form Pressure (kPa) | Wash Pressure (kPa) | Dry Pressure (kPa) | Form Time (m) | Wash Time (m) | Dry Time (m) | Presence of Cake Cracks | Filtrate Volume (mL) | Wash Volume (mL) | Cake Thickness (mm) | Wet Cake Weight (g) | Dry Cake Weight (g) | Cake Moisture (%) | Cake Density (dry kg/m$^2$) |
| 1 | 551.6 | 551.6 | 551.6 | 0.08 | 1.47 | 4.0 | no | 14.0 | 100 | 15.5 | 55.86 | 51.26 | 8.23 | 28.33 |
| 2 | 551.6 | 551.6 | 551.6 | 0.25 | 1.68 | 2.0 | no | 31.0 | 70 | 30.0 | 103.04 | 90.32 | 12.34 | 49.91 |
| 3 | 551.6 | 551.6 | 551.6 | 0.50 | 1.78 | 1.0 | no | 36.0 | 50 | 36.0 | 149.04 | 126.64 | 15.03 | 69.98 |
| 4 | 551.6 | 551.6 | 551.6 | 0.83 | 1.37 | 0.5 | no | 44.0 | 30 | 44.0 | 195.95 | 164.08 | 16.26 | 90.67 |

**Table 5.13 Pressure Filtration Results from Larox**

| Test Parameters | | Unit | Test Results | | |
|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 |
| **Process Conditions** | | | | | |
| Slurry Density | | kg/L | 1.93 | 1.93 | 1.93 |
| Liquid in Slurry Density | | kg/L | 1.00 | 1.00 | 1.00 |
| Slurry Specific Gravity of Solids | | $kg/dm^3$ | 3.7 | 3.7 | 3.7 |
| Solids in Slurry | | % w/w | 65.8 | 65.8 | 65.8 |
| Temperature Slurry | | °C | ambient | ambient | ambient |
| **Filtration Parameters** | | | | | |
| Duration of: | Pumping | min | 1.0 | 1.0 | 1.0 |
| | Pressing | min | 1.0 | 1.0 | 1.0 |
| | Drying | min | 4.0 | 4.0 | 4.0 |
| | Technical Time | min | 4.0 | 4.0 | 4.0 |
| | Total Cycle Time | min | 10.0 | 10.0 | 10.0 |
| **Measured Process Parameters During Filtration Tests** | | | | | |
| Pressure of: | Slurry Feed | bar | 6.00 | 6.00 | 6.00 |
| | Pressing I | bar | 16.0 | 16.0 | 16.0 |
| Quantity of Filtrate During: | Pumping | L | 0.042 | 0.040 | 0.032 |
| | Pressing (I + II) | L | 0.005 | 0.004 | 0.003 |
| | Air Drying | L | 0.027 | 0.020 | 0.022 |
| **Process Results** | | | | | |
| Moisture in Cake | | % w/w | 8.6 | 8.5 | 8.0 |
| Cake Thickness | | mm | 40 | 33 | 27 |
| Wet Cake Weight | | kg | 0.22 | 0.183 | 0.157 |
| Dry Cake Weight | | kg | 0.201 | 0.167 | 0.145 |
| Wet Cake Specific Gravity | | $kg/dm^3$ | 2.197 | 2.216 | 2.332 |
| Filtration Rate (dry solids) | | $kg/m^2h$ | 481.9 | 401.4 | 347.5 |
| Filtration Rate (filtrate) | | $L/m^2/h$ | 177.6 | 153.6 | 136.8 |
| Solids Ratio in Cake | | % v/v | 54.0 | 54.5 | 57.7 |
| Air in Cake vs. Void Volume | | % | 58.9 | 58.6 | 55.9 |

### 5.3.8 OPEN PIT METALLURGICAL TESTING PROGRAM CONCLUSIONS

The major conclusions drawn from the open pit metallurgical testing program are summarized as follows:

- A significant portion of the nickel in the Minago deposit is in the form of nickel silicates. The ratio of nickel content in silicate form to the nickel content in sulphides varies over the deposit. It is, however, impossible to assess the nickel recovery and therefore the project economics according to a deposit model based only on total nickel assays.

- Using the sulphidic nickel assay data obtained in the current testing program, along with historical sulphidic nickel assay data, Wardrop produced a geological block model based on both total nickel and sulphidic nickel assays. The sulphide nickel block model gives a more accurate account of the recoverable nickel. The overall ratio of sulphidic nickel to total nickel in the new sulphidic nickel block model is 75.4% at a cutoff grade of 0.20% sulphidic nickel. This average ratio is based on the open pit portion of the deposit to an elevation of -120 m or approximately 366 m below surface.
- A sulphidic nickel head grade-recovery curve was generated for a more accurate assessment of the recoverability of the nickel and the resultant economics of the optimum pit and the design of the open pit. The head grade-recovery curve was built on the results of LCTs using composite samples with different sulphidic nickel head grades.
- Open Pit Master Composite No. 2, which was designed to represent the overall open pit ore for sulphide nickel, contained 0.53% total nickel and 0.36% sulphidic nickel.
- The LCT on Open Pit Master Composite No. 2 achieved a nickel concentrate containing 22.23% nickel, 10.43% MgO, with a sulphidic nickel equivalent recovery of 77.2%. Multiplying this recovery by the average sulphidic nickel to total nickel ratio of 75.4% yields an average total nickel recovery of 58.2%.
- The grindability testing samples have a median SPI of 27.4 minutes, a median RWI of 9.6 kWh/t, and a median BWI of 14.9 kWh/t. The data indicates that the hardness of the samples with respect to grinding is intermediate on average.
- The optimum grind size for the Minago samples was determined to be at $P_{80}$ = 68 µm.
- Samples from different locations have different responses to the change of flotation parameters.
- The equivalent sulphidic nickel recoveries achieved for the 0.30%, 0.80% and 1.15% sulphidic nickel grade composites were 58.6%, 90.1% and 88.0% respectively.
- Flotation tests on the variability sample representative of the first two years of open pit production show that the composite floated better than Open Pit Master Composite No. 2, which indicates that little difficulty is expected for the start-up and early operation of the plant in terms of the metallurgical performance of the ore.
- Flotation tests on the variability samples selected based on the lithology and location of the intervals show that most of the variability samples floated as well as or better than the NiS grade composites tested earlier in this testing program. The results indicate that the metallurgical performance of the samples is not significantly affected by the rock types of the samples in the open pit portion of the deposit.

- Dewatering tests on locked cycle flotation tails and concentrate indicated that a high rate thickener worked better for the thickening of the tails, and a pressure filter could achieve a moisture level of 8.5% in the concentrate filter cake.

## 5.4 PROCESS DEVELOPMENT HISTORY

There have been several test programs on the Minago deposit. Test programs carried out by Outokumpu (now Outotec), Lakefield Research Ltd. (Lakefield) (now SGS), Process Research Associates Ltd. (PRA), and Harris Exploration Services Ltd. (Harris) have been summarized in this section.

### *5.4.1 OUTOKUMPU REPORT (1976)*

Outokumpu tested one serpentinite ore sample and one peridotite ore sample in 1976; both the samples contained 1.0% Ni. The development tests on the two samples focused on the optimum grinding size, slurry pH, PAX dosage, depressant type and dosage. Sulphuric acid ($H_2SO_4$) and sodium carbonate ($Na_2CO_3$) were used for slurry pH modification. The optimum grind size was determined to be 60% to 70% -74 µm for the serpentinite ore and 70% to 80% -74 µm for the peridotite ore. Flotation results on the two samples indicated that an acidic pulp is best in rougher flotation for both the peridotite ore and the serpentinite ore. A combination of $Na_2CO_3$ and CMC or Acrol J2P was most beneficial in cleaning for both types of ore. Two 4-cycle LCTs were run on each of the samples after about 25 development tests were finished on each of them. Based on the LCT results, shown in Table 5.14, Outokumpu predicted a nickel recovery of 75% for the serpentinite ore and a nickel recovery of 65% for the peridotite ore at a concentrate grade of 20% Ni with 15% MgO.

**Table 5.14 Outokumpu Flotation Test Results**

| | Serpentinite | Peridotite |
|---|---|---|
| Grind (% passing 75 µm) | 60-70 | 70-80 |
| Feed Grade (Ni %) | 1.00 | 1.00 |
| Concentrate Grade (Ni %) | 20 | 20 |
| Concentrate Grade (MgO %) | 15 | 15 |
| Recovery (Ni %) | 75 | 65 |

Outokumpu's observation (conclusion) on the effect of pH contradicts the recent flotation results obtained at SGS results from scoping and feasibility testing programs, the recent tests indicated that the addition of acid has a significant negative effect on the floatability of the samples.

Outokumpu also observed that the serpentinite ore had an extremely large specific surface area (i.e. approximately 200,000 $cm^2/g$). The corresponding figure for peridotite is approximately 40,000 $cm^2/g$. Part of the pentlandite in the peridotite sample occurs in magnesium-silicates as a very fine dissemination. The serpentinite sample consumed much more collector while the peridotite sample consumed more acid. The BWI for the serpentinite ranged from 6.2 kWh/t to 9.3 kWh/t and for the peridotite 9.2 kWh/t to 16.5 kWh/t.

### 5.4.2 *LAKEFIELD PROJECT REPORT # LR3879 (1990)*

Lakefield tested one serpentinite composite and one peridotite composite in 1990. The serpentinite sample contained 1.15% Ni (1.13% sulphidic Ni) and the peridotite sample contained 1.26% Ni (1.11% sulphidic Ni). The development flotation work was mainly conducted on the serpentinite sample and only four tests were completed on the peridotite sample. Table 5.15 illustrates the findings from the development tests on the serpentinite composite. The best cleaner test on the serpentinite sample Test 29 achieved a fourth cleaner concentrate assaying 28.7% Ni and 6.73% MgO with a nickel recovery of 76.5%. The best cleaner test on the peridotite sample Test 2B achieved a fourth cleaner concentrate assaying 27.2% Ni and 4.29% MgO with a nickel recovery of 69.6%. Another cleaner test Test 4B achieved similar results as Test 2B with much lower reagent dosage. Table 5.15 and Table 5.16 present the results of the three cleaner tests on the two composites as well as the other tests in the program. A LCT was performed on the serpentinite sample, but the results achieved were not better than the results of the best cleaner test. All tests were conducted using a 35% pulp density in the rougher flotation.

**Table 5.15 Lakefield 1990 – Flotation Test Results**

| Parameters Tested | Test Number | Best Result |
|---|---|---|
| Primary Grind | 1-6,19 | Recovery increases, grade decreases |
| Talc Pre-float | 7, 9, 10 | Unacceptable nickel loss |
| Depression of Talc | 12, 14-17, 20, 27-28 | Depramin 75 (a CMC variant) |
| Viscosity Control | 8, 11, 13, 23-24, 32 | Low froth stability at low density |
| Frothers | 12,18,29 | Pine oil/furnace oil/DF250 (30-30-40) |
| pH Regulation | 11-12, 21022 26, 34 | Rougher pH 4.5 |
| Copper Sulphate | 22, 25 | No improvement |
| Collectors | 29, 31, 33 | PAX |
| Flowsheet Development | 20, 30, 34 | Limited due to small test size |
| LCT | 35 | Only one test |

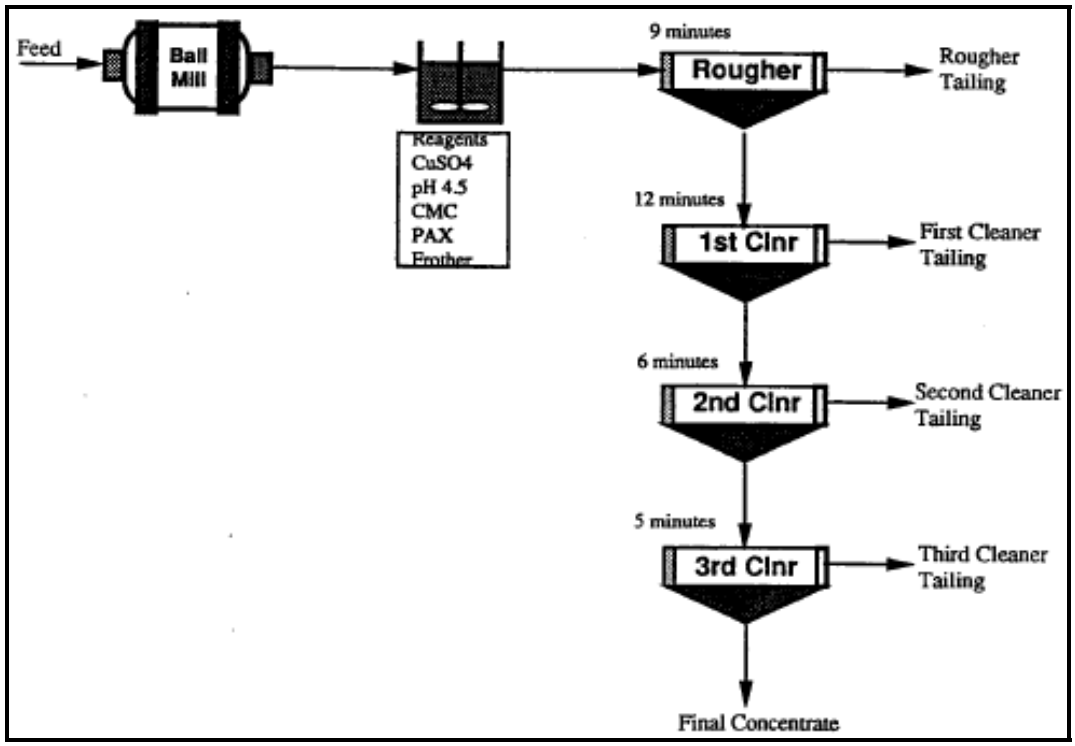
**Table 5.16 Lakefield 1990 – Serpentinite/Peridotite Flotation Tests Results**

| | Serpentinite (Test 29) Best Batch Results | Peridotite (Test 4B) Best Batch Report |
|---|---|---|
| **Feed Grade** | | |
| % Ni | 1.15 | 1.26 |
| % MgO | 33.8 | 40.6 |
| **Concentrate Grade** | | |
| % Ni | 28.7 | 27.3 |
| % MgO | 6.73 | 3.0 |
| **Recovery** | | |
| % Ni | 76.5 | 68.1 |
| % MgO | 0.6 | 0.2 |

As indicated in Table 5.15, a talc pre-float was tested but resulted in unacceptable nickel losses to the talc concentrate stream; only a minimal increase to the nickel concentrate was achieved.

The flowsheet utilized for the laboratory testwork is illustrated in Figure 5.18. The flotation times utilized for the tests are shown in the flowsheet.

**Figure 5.18 Lakefield 1990 – Laboratory Flotation Testing Flowsheet**



The specific gravity (SG) was 2.82 for serpentinite and 3.2 for peridotite. The BWI was 13.0 kWh/t for serpentinite and 12.1 kWh/t for peridotite.

Lakefield also performed tailings settling tests which determined that the required tailings thickener area would be 0.70 $m^2$/t/d using Allied Colloids Percol 351 as the flocculant. Based on a 10,000 t/d production rate, the tailings thickener would be 30 m in diameter. The current test program predicted a 32 m diameter high rate tailings thickener.

### 5.4.3 PROCESS RESEARCH ASSOCIATES LTD. (2005)

PRA received two types of samples in May 2005, designated as serpentinite and peridotite samples. PRA only conducted flotation tests on the serpentinite sample assaying 0.77% Ni. Besides flotation, other mineral concentrating methods such as gravity and magnetic separation were investigated but the results were not promising. The development test results revealed that, at a grind size less than 80 µm, nickel losses to the tailings were reduced. The flotation tests were carried out in a pH range between 5.6 and 8.0. The nickel recoveries were slightly better under acidic conditions. The study also tested three stages of sequential grinding at consecutive $P_{80}$ of 197 µm, 100 µm, and 47 µm. Similar nickel recoveries to the single stage of grinding to a grind size of 51 µm were achieved, but with lower MgO.

A LCT was performed on the samples after 16 development tests. The LCT achieved a nickel recovery of 59.0% with a concentrate assaying 35.6% Ni and 7.33% MgO. The conditions for the LCT were:

- primary grind size $P_{80}$ = 120 µm
- initial pH = 8 (200 g/t $H_2SO_4$)
- 25% solids pulp density.

Reagent additions to the roughers and scavenger were 160 g/t copper sulphate ($CuSO_4$), 660 g/t PAX, and 1,350 g/t CMC. The rougher concentrate was subjected to regrinding to a $P_{80}$ of 50 µm with 75 g/t PAX followed by four stages of cleaning with 257 g/t CMC. A mixture of pine oil and Dow Froth 250 were used as the frother. Figure 5.19 illustrates the flowsheet of the LCT.

Harris performed a mineralogical study on three process samples from the PRA test program. The tails samples contained 0.2% to 0.48% Ni. The conclusion of the study was that there was only a minor component of pentlandite and that the nickel was found primarily in an unrecoverable silicate form.

**Figure 5.19 PRA LCT Flowsheet**



### 5.4.4 SGS METALLURGICAL PROJECT 11241-001 (2006)

This metallurgical test program was run at SGS from February 2006 to November 2006, to support the PEA completed by Wardrop. Two serpentinite composites from different drill holes were used in the testing program. The second composite, Composite 2 was prepared to continue the testing after the first composite, Composite 1 was exhausted. The assays of the two composites are shown in Table 5.17. An LCT run on Composite 2 achieved a total nickel recovery of 57% with a concentrate grade of 27% Ni and 9.5% MgO. The rougher flotation was performed at a pulp density of 30% solids. The pulp density of the cleaner flotations was 15% to 20% solids.

**Table 5.17 SGS (2006) – Composites 1 and 2 Analysis**

| Analysis | Composite 1 | Composite 2 |
|---|---|---|
| Ni (%) | 0.7 | 0.7 |
| MgO (%) | 30.2 | 28.3 |
| S (%) | 0.54 | 0.53 |
| Ag (g/t) | 28 | <0.53 |

QEMSCAN® analysis of Composite 1 revealed that the composite contained 1.9% nickel sulphides in the forms of pentlandite, millerite, and violarite. Nickel deportment results indicated that the nickel is mainly distributed in four minerals: pentlandite (28.4%), millerite (27.0%), violarite (21.8%), and serpentine (19.2%). The major gangue minerals in Composite 1 were 35.2% serpentine, 17.5% talc, 13.0% chlorite, 6.8% phlogopite, 6.7% feldspar, and 6.6% amphibole. A grindability test run on the first composite obtained a BWI of 14.6 kWh/t, which is in the medium range of hardness based on the SGS database.

Nineteen development tests were conducted on Composite 1. The parameters investigated in the testing included grinding fineness, dosage of collectors and depressants, and type of depressants. Two split circuit configurations were also assessed: one to regrind rougher tail scavenger concentrate and first cleaner tails, and one to regrind rougher and first cleaner tails. The re-ground material from the split circuit was cleaned separately. The two split circuit configurations proved not to be beneficial. The final LCTs were based on a conventional configuration with the rougher and first cleaner tails to be considered as final tails, and the tails from other cleaners were recycled to the previous stage of cleaning. The grind sizes of the LCTs were $P_{80}$ = 100 µm.

The best test results from the two LCTs from each of the two composites are shown in Table 5.18.

The test conditions for LCT1 were:

- $P_{80}$ = 100 µm grind size
- 200 g/t PAX in rougher flotation and 40 g/t PAX in cleaner flotation
- 400 g/t CMC in rougher flotation and 1,050 g/t CMC in cleaner flotation
- 105 g/t DF 250 in rougher flotation and 20 g/t in first cleaner flotation.

The test conditions for LCT4 were:

- $P_{80}$ = 100 µm grind size
- 200 g/t PAX in rougher flotation and 20 g/t PAX in first cleaner flotation
- no CMC in rougher flotation and 1,100 g/t CMC in cleaner flotation
- 40 g/t methylisobutyl carbinol (MIBC) in rougher flotation and 2.5 g/t MIBC in fourth cleaner flotation.

**Table 5.18 SGS (2006) – LCT Results**

| Test ID | Associated Batch Test | Product | % | Assays (%) | | Distribution (%) | |
|---|---|---|---|---|---|---|---|
| | | | | Ni | MgO | Ni | MgO |
| LCT1 | F9 | Final Concentrate | 1.3 | 25.3 | 9.25 | 50.4 | 0.4 |
| | | First Cleaner Tail | 47.4 | 0.38 | 30.83 | 28.5 | 49.1 |
| | | Rougher Tail | 51.3 | 0.264 | 29.26 | 21.1 | 50.5 |
| | | Combined Final Tail | 98.7 | 0.321 | 30.01 | 49.6 | 99.6 |
| | | Rougher Concentrate | 48.7 | 1.04 | 30.26 | 78.9 | 49.5 |
| | | Head | 100.0 | 0.64 | 29.750 | 100.0 | 100.0 |
| | | Stability | 94.0 | | | 92.2 | 94.8 |
| LCT4 | F-28 Composite 28 | Final Concentrate | 1.2 | 30.4 | 7.5 | 56.2 | 0.3 |
| | | First Cleaner Tail | 22.3 | 0.31 | 29.6 | 10.3 | 23.9 |
| | | Rougher Tail | 76.5 | 0.290 | 27.3 | 33.4 | 75.7 |
| | | Combined Final Tail | 98.8 | 0.294 | 27.8 | 43.8 | 99.7 |
| | | Rougher Concentrate | 23.5 | 1.87 | 28.4 | 66.6 | 24.3 |
| | | Head | 100.0 | 0.66 | 27.601 | 100.0 | 100.0 |
| | | Stability | 97.6 | | | 101.0 | 96.2 |

The results from Composite 2 tests (i.e. LCT4) gave a higher nickel recovery and grade than Composite 1 (i.e. LCT1). The difference in flotation performance may be due to mineralogical or nickel sulphide liberation differences. Mineralogical analysis of the cleaner tailings from LCT4 indicated that the majority of nickel sulphides were pentlandite with some millerite and violarite present. The pentlandite particles showed that they were rimmed or encapsulated by violarite or gangue minerals. The rimming of pentlandite by gangue minerals and fine disseminated millerite

contributed to the nickel sulphides losses to the tails. A significant portion of the total nickel losses were also attributed to nickel in silicate form.

Other findings from this test program were:

- Approximately 23% of the nickel in Composite 1 occurs as a solid solution in the silicates.
- The main nickel sulphides in Composite 1 are pentlandite, millerite, and violarite.
- MIBC was selected as the frother to allow adequate drainage.

### 5.4.5 CONCLUSIONS FROM HISTORICAL TEST WORK

A summary of conclusions from the different historical test programs are as follows:

- The head grades for the ore were different for all of the historical test programs. The BWIs ranged from 6.2 kWh/t to 14.6 kWh/t for serpentinite samples and 9.2 kWh/t to 16.5 kWh/t for peridotite samples.
- The SGS and PRA studies identified nickel occurring in silicate form and related this finding to nickel losses in flotation.
- The highest flotation nickel recoveries were reported by the Outokumpu testwork, but with unacceptable concentrate nickel grades.
- CMC proved beneficial in all of the test programs.
- Slightly acidic conditions (i.e. pH <7) in the rougher flotation, and neutral to alkaline conditions for cleaner flotation, were beneficial to the nickel grades and recoveries. Acidic conditions can however be problematic since the mild steel used for tanks and pump boxes could be subjected to acid attack.
- Talc pre-float tests were not successful in improving the overall flotation performance.

## 5.5 METALLURGICAL PROCESS SELECTION AND DESIGN

### 5.5.1 CRUSHING

The regular mine ore from the open pit will have a lump size up to 1,000 mm and must be crushed before grinding. Wardrop selected a single crushing stage since the grindability testing results indicated that SAG mill grinding was suitable for this ore.

A gyratory crusher was selected following a comprehensive review of crushing options that compared the capital and operating costs for installation of a gyratory and a jaw crusher. The capital cost for the installation of a gyratory crusher was

slightly higher than that of a jaw crusher, but the gyratory crusher's operating cost will be lower. The gyratory crusher will have additional capacity for further throughput increase. A gyratory crusher will also facilitate direct ore dumping from the hauling trucks to the crusher.

The possibility of using high pressure grinding rolls (HPGR) for the Minago Project was examined at the initial stage of the metallurgical testing program. Wardrop decided that the ore is too soft and sticky for grinding rolls and no further HPGR tests were pursued.

The primary crusher discharge will be conveyed to a stockpile.

### 5.5.2 GRINDING

The grindability tests showed that Minago ore is easy to grind in a SAG mill due to its high content of serpentinite and talc. A single SAG mill/pebble crusher/single ball mill grinding configuration was chosen. A pebble crusher was selected because of the presence of significant amounts of granite and the SAG mill capacity will be significantly reduced if the granite were allowed to accumulate in the SAG mill circuit. The recycle load through the pebble crusher will be 16% of the mill feed.

Grinding configurations with one SAG mill and two ball mills, and two SAG mills and two ball mills were also considered in order to achieve better delivery times on smaller diameter mills. The option was dropped due to higher capital and operating costs. The delivery times were also not significantly better.

The CEET simulation study performed by SGS, based on the grindability testing results, suggested a SAG mill with 2,681 kW power draw at shell and a ball mill with 6,069 kW power draw at shell. Similar values were obtained from the JKSimMet simulation.

The SAG mill will discharge onto a double-deck vibrating screen. The oversize will be conveyed to the pebble crusher and then conveyed back into the feed of the SAG mill. The screen undersize will be combined with the ball mill discharge and sent to a hydrocyclone cluster, which will generate an overflow with a $P_{80}$ of 68 µm to feed flotation, and the underflow will return to the ball mill.

### 5.5.3 FLOTATION CIRCUIT

The feasibility metallurgical testing program proved that a conventional flotation circuit is suitable for processing Minago ore. The feed to the mill will first be subjected to grinding with Calgon and PAX. The overflow of the cyclone will be further conditioned with PAX before being sent to five stages of rougher flotation. PAX was added in each stage of rougher to maximize nickel recovery. The rougher concentrate will be cleaned in five stages of cleaner flotation. The tails of the first cleaner will be scavenged with additional collector. The tails from the scavenger will

be combined with the rougher tails and sent to the tails dewatering and disposal circuit. The concentrate from the first cleaner tails scavenger flotation and the tails of the second cleaner flotation were combined and recycled to the start of the rougher flotation. The tails from other cleaner flotations were recycled to the cleaner stage preceding it.

The effect of regrinding rougher concentrate and first cleaner concentrate was investigated in the feasibility metallurgical test program. The results indicate that regrinding of the intermediate concentrate has a markedly negative effect on the final nickel recovery.

Other flowsheet configurations, such as sequential grinding and split circuit flowsheet, were either tested in the feasibility metallurgical testing program or in the historical testing program. No significant beneficial effects were achieved in these tests to justify the selection of any of these flowsheet configurations.

### 5.5.4 *DEWATERING CIRCUIT*

#### TAILS THICKENING

A high rate thickener was selected to thicken the flotation tails of the Minago Project. The test results by Outotec indicated that a 32 m diameter high rate thickener is needed to process the mill tails at a throughput of 10,000 t/d. The results of conventional settling tests indicated that a 150 m diameter conventional thickener would be required. The fine serpentine and talc contents in the final tails are the probable cause for the slow settling of the materials. However, given the local climate and need to enclose the thickener in winter, the small diameter is preferred.

#### CONCENTRATE DEWATERING CIRCUIT

A 5 m diameter conventional concentrate thickener was selected based on the fact that the concentrate settled well in conventional settling tests. The quantity of the concentrate to process is very small when compared to the quantity of the tails, and the concentrate has a much higher density than the tails.

A pressure filter was selected to achieve a final concentrate moisture of 8.5%, which is considered low enough to prevent the concentrate from freezing during winter transportation. A concentrate dryer was therefore not included in the current design, but room for a dryer installation has been considered in the layout of the plant in case a dryer operation is required in the future.

## 5.6 MASS BALANCE

Complete material and water balances are presented in the process flow drawings (PFDs). Table 5.19 presents the material and water balance data of some key streams.

The material and water balance was based on a mill feed head assay of 0.54% total Ni and 0.36% sulfidic Ni and on the interpolation of the locked cycle test LCT-6. The material balance data in the PFDs were used as a base for equipment sizing with suitable safety factors. The mill was designed to process 10,000 t of ore (dry weight) and produce 126 t of concentrate and 9,874 t of tailings each day. Due to recycle load, the SAG mill, ball mill, hydrocyclone cluster, and rougher flotation bank will process 11,600 t, 35,000 t, 45,000 t, and 11,787 t, respectively, of solid material each day. The process will use 22,999 t of recycled water (from tails and concentrate thickeners) and 11,553 t of external water each day.

**Table 5.19 Minago Project Water and Material Balance Data**

| Steam No. | Steam Name | % of Feed | Solids | | | | Pulp | | Water ($m^3$/d) | Assays (%) | | Recovery (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | t/d | SG | $m^3$/d | % Solids | t/d | SG | | Ni | MgO | Ni | MgO |
| 1 | Primary Crusher Feed (ROM) | 100.0 | 10,000.0 | 2.65 | 6,250.0 | 95.0 | 10,526.3 | 1.60 | 526.3 | 0.54 | 33.57 | 100.0 | 100.0 |
| 3 | Pebble Mill Recycle | 16.0 | 1,600.0 | 2.65 | 1,000.0 | 92.0 | 1,739.1 | 1.60 | 139.1 | 0.54 | 33.57 | 100.0 | 100.0 |
| 5 | SAG Mill Feed | 116.0 | 11,600.0 | 2.65 | 7,250.0 | 80.0 | 14,500.0 | 1.89 | 2,900.0 | 0.54 | 33.57 | 100.0 | 100.0 |
| 8 | SAG Screen Undersize | 100.0 | 10,000.0 | 2.65 | 3,773.6 | 35.0 | 28,571.4 | 1.28 | 18,571.4 | 0.54 | 33.57 | 100.0 | 100.0 |
| 9 | Ball Mill Discharge | 350.0 | 35,000.0 | 2.65 | 13,207.5 | 60.0 | 58,333.3 | 1.60 | 23,333.3 | 0.54 | 33.57 | 100.0 | 100.0 |
| 11 | Cyclone Cluster Feed | 450.0 | 45,000.0 | 2.65 | 16,981.1 | 45.4 | 99,149.7 | 1.39 | 54,149.7 | 0.54 | 33.57 | 100.0 | 100.0 |
| 12 | Cyclone Underflow/ Ball Mill Feed | 350.0 | 35,000.0 | 2.65 | 13,207.5 | 60.0 | 58,333.3 | 1.60 | 23,333.3 | 0.54 | 33.57 | 100.0 | 100.0 |
| 13 | Cyclone Overflow/ Conditioning Tank Feed | 100.0 | 10,000.0 | 2.65 | 3,773.6 | 24.5 | 40,816.3 | 1.18 | 30,816.3 | 0.54 | 33.57 | 100.0 | 100.0 |
| 15 | 1st Cleaner Tails Scavenger - Concentrate | 1.3 | 127.3 | 2.65 | 48.0 | 4.5 | 2,822.6 | 1.03 | 2,695.3 | 0.65 | 33.00 | 1.5 | 1.3 |
| 17 | 2nd Cleaner Tails | 16.6 | 1,659.7 | 2.65 | 626.3 | 11.6 | 14,327.9 | 1.08 | 12,668.2 | 0.56 | 32.70 | 17.3 | 16.2 |
| 19 | Rougher Flotation Feed | 117.9 | 11,787.0 | 2.65 | 4,447.9 | 20.0 | 58,935.0 | 1.14 | 47,148.0 | 0.54 | 33.44 | 100.0 | 100.0 |
| 20 | Rougher Flotation Concentrate | 37.4 | 3,743.7 | 2.68 | 1,399.0 | 16.0 | 23,398.4 | 1.11 | 19,654.7 | 1.16 | 33.01 | 80.9 | 36.8 |
| 21 | Rougher Flotation Tailings | 80.4 | 8,043.3 | 2.64 | 3,046.7 | 22.6 | 35,536.6 | 1.16 | 27,493.4 | 0.25 | 33.64 | 37.9 | 80.6 |
| 22 | 1st Cleaner Tails Scavenger - Tailings | 18.3 | 1,830.5 | 2.65 | 690.8 | 25.2 | 7,257.4 | 1.19 | 5,426.8 | 0.29 | 34.85 | 9.8 | 19.0 |
| 23 | Tailings Thickener Feed | 98.7 | 9,873.8 | 2.64 | 3,740.1 | 23.1 | 42,794.0 | 1.17 | 32,920.2 | 0.26 | 33.87 | 47.7 | 99.6 |
| 24 | Tailings Thickener Underflow | 98.7 | 9,873.8 | 2.64 | 3,740.1 | 45.0 | 21,941.7 | 1.39 | 12,067.9 | 0.26 | 33.87 | 47.7 | 99.6 |
| 25 | Tailings Thickener Overflow | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 1.00 | 20,852.3 | 0.00 | 0.00 | 0.0 | 0.0 |
| 27 | 1st Cleaner Feed | 37.4 | 3,743.7 | 2.65 | 1,412.7 | 15.0 | 24,962.8 | 1.10 | 21,219.1 | 1.16 | 33.01 | 80.9 | 36.8 |

| Steam No. | Steam Name | % of Feed | Solids | | | | Pulp | | Water ($m^3$/d) | Assays (%) | | Recovery (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | t/d | SG | $m^3$/d | % Solids | t/d | SG | | Ni | MgO | Ni | MgO |
| | | | | | | | | | | | | | *table continues…* |
| 28 | 1st Cleaner Tails | 19.6 | 1,957.8 | 2.65 | 738.8 | 19.4 | 10,080.0 | 1.14 | 8,122.2 | 0.31 | 34.73 | 11.4 | 20.3 |
| 29 | 1st Cleaner Concentrate | 17.9 | 1,785.9 | 2.70 | 660.2 | 12.0 | 14,882.8 | 1.08 | 13,096.9 | 2.09 | 31.13 | 69.6 | 16.6 |
| 30 | 3rd Cleaner Tail | 8.4 | 840.5 | 2.65 | 317.2 | 7.8 | 10,775.7 | 1.05 | 9,935.2 | 0.64 | 32.50 | 10.0 | 8.1 |
| 33 | 2nd Cleaner Feed | 26.3 | 2,626.4 | 2.69 | 977.4 | 10.0 | 26,263.0 | 1.07 | 23,636.5 | 1.63 | 31.57 | 79.6 | 24.7 |
| 34 | 2nd Cleaner Concentrate | 9.7 | 966.7 | 2.75 | 351.1 | 8.1 | 11,935.1 | 1.05 | 10,968.3 | 3.46 | 29.62 | 62.3 | 8.5 |
| 35 | 4th Cleaner Tail | 2.6 | 262.6 | 2.65 | 99.1 | 6.2 | 4,262.8 | 1.04 | 4,000.3 | 2.15 | 28.00 | 10.5 | 2.2 |
| 38 | 3rd Cleaner Feed | 12.3 | 1,229.3 | 2.73 | 450.2 | 7.5 | 16,392.3 | 1.05 | 15,163.0 | 3.18 | 29.27 | 72.8 | 10.7 |
| 39 | 3rd Cleaner Concentrate | 3.9 | 388.8 | 2.92 | 133.0 | 6.9 | 5,616.6 | 1.05 | 5,227.8 | 8.68 | 22.30 | 62.8 | 2.6 |
| 40 | 5th Cleaner Tail | 0.7 | 70.8 | 2.65 | 26.7 | 4.0 | 1,771.0 | 1.03 | 1,700.2 | 4.97 | 24.00 | 6.5 | 0.5 |
| 43 | 4th Cleaner Feed | 4.6 | 459.7 | 2.88 | 159.8 | 6.0 | 7,662.1 | 1.04 | 7,202.4 | 8.11 | 22.56 | 69.3 | 3.1 |
| 44 | 4th Cleaner Concentrate | 2.0 | 197.1 | 3.25 | 60.7 | 5.8 | 3,399.2 | 1.04 | 3,202.1 | 16.05 | 15.31 | 58.8 | 0.9 |
| 46 | 5th Cleaner Feed | 2.0 | 197.1 | 3.25 | 60.7 | 5.0 | 3,941.6 | 1.04 | 3,744.6 | 16.05 | 15.31 | 58.8 | 0.9 |
| 47 | 5th Cleaner Concentrate | 1.3 | 126.2 | 3.72 | 33.9 | 5.8 | 2,170.6 | 1.04 | 2,044.4 | 22.27 | 10.43 | 52.3 | 0.4 |
| 49 | Concentrate Thickener Feed | 1.3 | 126.2 | 3.72 | 33.9 | 5.5 | 2,285.1 | 1.04 | 2,158.8 | 22.27 | 10.43 | 52.3 | 0.4 |
| 50 | Concentrate Thickener Underflow | 1.3 | 126.2 | 3.72 | 33.9 | 70.0 | 180.3 | 2.05 | 54.1 | 22.27 | 10.43 | 52.3 | 0.4 |
| 52 | Concentrate Filter Product | 1.3 | 126.2 | 3.72 | 33.9 | 91.4 | 138.1 | 2.00 | 11.9 | 22.27 | 10.43 | 52.3 | 0.4 |
| 55 | Total Internal Recycle Water | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 1.00 | 22,999.2 | 0.00 | 0.00 | 0.0 | 0.0 |
| 117 | Process Water Tank Demand | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 1.00 | 34,471.9 | 0.00 | 0.00 | 0.0 | 0.0 |
| 118 | Process Water Tank Supply (from Thickeners) | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 1.00 | 22,957.0 | 0.00 | 0.00 | 0.0 | 0.0 |
| 119 | Process Water Tank Required Makeup from Tailings Management Area | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 1.00 | 11,514.9 | 0.00 | 0.00 | 0.0 | 0.0 |

# 6.0 NICKEL ORE PROCESSING PLANT

## 6.1 INTRODUCTION

The nickel ore processing plant is designed to process nickel ore at a nominal rate of 10,000 t/d. The process will consist of the following operations:

- primary crushing
- ore stockpile and reclaim
- grinding circuit and size classification
- rougher/scavenger/cleaner flotation
- concentrate dewatering and load out
- tailings thickening.

A gyratory crusher will crush the ore to 80% passing 130 mm. The grinding circuit, consisting of one SAG mill and one ball mill, will reduce the ore to 80% passing 68 µm. A pebble cone crusher will perform intermediate crushing of SAG mill oversized product. A vibrating screen will be used to classify the SAG mill discharge and the oversize that will be crushed and recycled to the SAG mill feed by transfer conveyors.

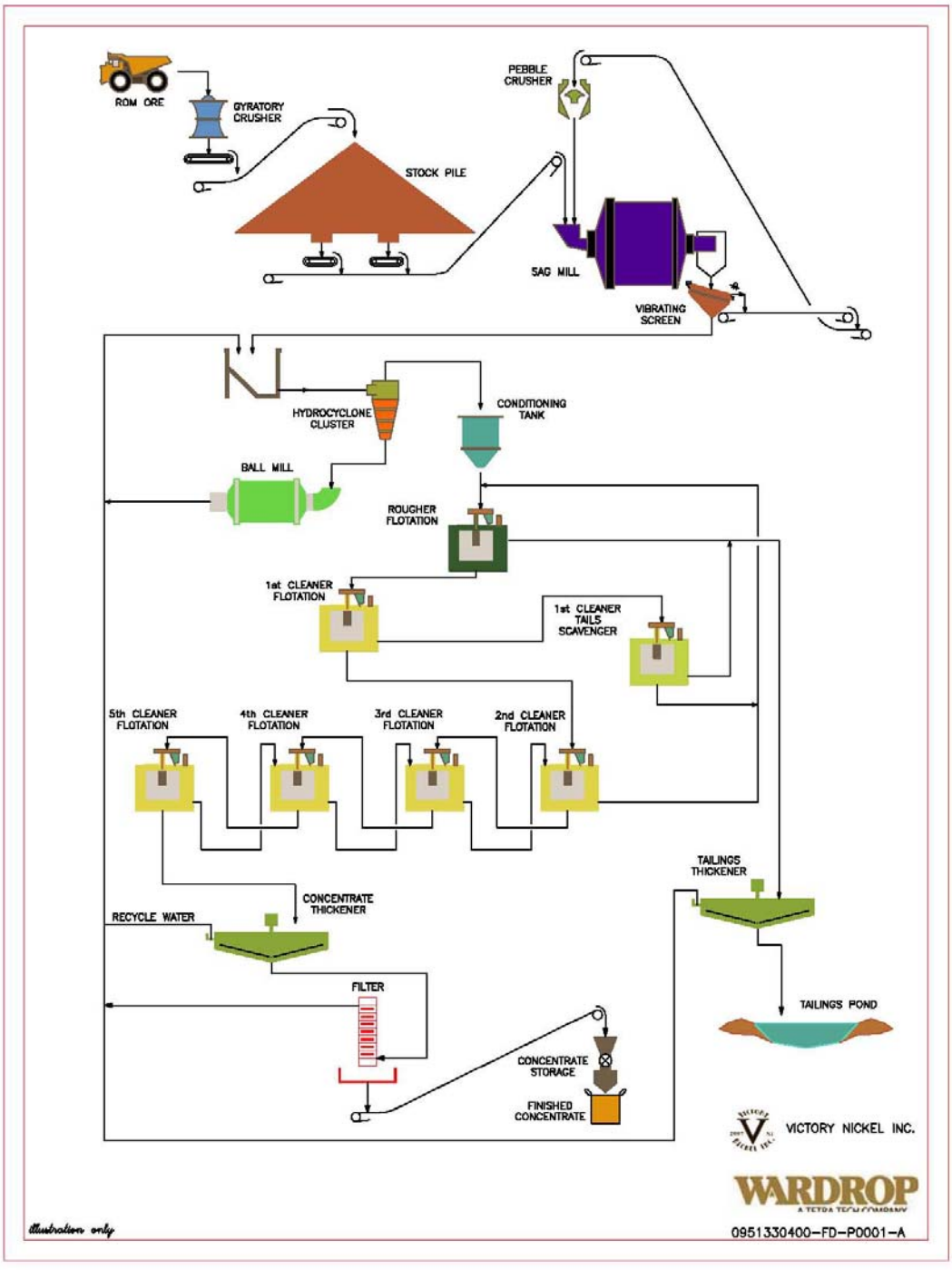
The hydrocyclone cluster will classify the ball mill discharge and the underflow of the vibrating screen. Underflow from the hydrocyclone cluster (oversize ball mill product) will be recycled to the ball mill feed while the undersize overflow will gravity-flow to the flotation circuit.

The flotation circuit will produce a high-grade nickel concentrate and final tailings. The flotation circuit will consist of one bank of rougher flotation cells, one bank of scavenger flotation cells, and five banks of cleaner flotation cells. The final flotation concentrate will be thickened in a conventional thickener and stored in a stock tank prior to pressure filtration.

The horizontal plate filter press will dewater the concentrate to an 8.6% moisture content.

A simplified flowsheet is provided in Figure 6.1.

**Figure 6.1 Simplified Flowsheet**



## 6.2 PROCESS OVERVIEW

The concentrator is designed to process 10,000 t/d. The major design criteria are outlined in Table 6.1.

**Table 6.1 Major Design Criteria**

| Criteria | Qty | Unit |
|---|---|---|
| Operating Days per Year | 365 | d |
| Overall Plant Availability | 95 | % |
| Primary Crushing Rate | 502 | t/h |
| Primary Crusher Availability | 83 | % |
| Ore SG | 2.65 | |
| Processing Rate (at 100% availability) | 416.7 | t/h |
| SAG Mill Feed Size, 80% Passing | 130,000 | µm |
| SAG Mill Product Size, 80% Passing | 1,072 | µm |
| SAG Mill Circulating Load | 16 | % |
| Ball Mill Circulating Load | 250 | % |
| Primary Grind Size, 80% Passing | 68 | µm |
| Primary BWI | 14.9 | kWh/t |
| Abrasion Index | 0.065 | |
| Concentrate Thickener Underflow | 70 | % Solids |
| Final Concentrate Moisture Content | 8.6 | % |

The complete design criteria are detailed in Appendix F-1.

The grinding mills were sized based on the JKSimMet and CEET grinding simulations completed by SGS Lakefield. These simulations were based on configuration that included a single SAG mill and two ball mills. Mill suppliers sized the mills according to the optimum layout of one SAG mill and one ball mill.

The flotation cells were sized based on the laboratory optimum flotation times and the scale-up factors of similar operations.

## 6.3 PLANT LAYOUT

Several plant layout options were considered; the layout provided in Dwg. 70000-G-0004 to 70000-G-0006 (Volume II - Drawings) was selected as the optimal layout.

The grinding area options were to either install the SAG and ball mills side by side, or in a radial or longitudinal orientation. The longitudinal orientation was chosen to achieve efficient ore flow as well as minimize the size of the building. Placing the SAG and ball mill longitudinally also seemed to require the least amount of structure and was optimal for the process. As seen in the layout drawing, the SAG and ball

mill products discharge into a common pump box. Since the hydrocyclone cluster underflow launder feeds the ball mill feed chute, the hydrocyclone cluster was located on the north side of the ball mill.

The flotation cells will located in one area, serviced by a single overhead crane. Each bank of flotation cells was laid out linearly to maximize efficient operation of the cells and eliminate short-circuiting . Pumps and pump boxes will be positioned around the exterior of the flotation area for ease of maintenance and access.

The flotation cell banks will be positioned to decrease the length of pipelines and to decrease the amount of pumps and pump boxes. For example, the fourth cleaner bank of cells will be located above the fifth cleaner cells, so concentrate and tailings can flow by gravity and eliminate the need for pumps and pump boxes. The scavenger cells will also be slightly elevated to allow the concentrate and tailings to gravity flow to the desired locations.

Locating the reagent area on the west side of the building proved to be the optimal location; the number of reagent addition points in the flotation circuit indicated that locating the reagent area on the west wall will minimize pump head and pipe lengths.

A central control room located between the grinding and flotation areas will allow control room operators to oversee the operations in both areas.

## 6.4 CRUSHING AND GRINDING EQUIPMENT SELECTION

### *6.4.1 CRUSHING*

The primary gyratory crusher facility is designed to crush ore at an average rate of 502 t/h (83% availability). The crusher feed size will be approximately 1,000 mm with a product size of 80% passing 130 mm. The crushing plant will operate on a 24-hour cycle to always be available to receive mine feed (except during brief maintenance outages).

The major equipment in the crusher facility includes:

- one 1.067 m (42”) x 1.651 m (65”) gyratory crusher
- one 1.829 m (72”) x 8.2 m (323”) apron feeder
- one 1.067 m (42”) x 178 m (584’) stockpile feed conveyor
- one hydraulic rock breaker.

The ore from the open pit will be transported to the primary crusher by 240 t haul trucks. A hydraulic rock breaker will break oversize rocks to obtain a feed size below 1,000 mm.

The crushed product will gravity flow to a discharge pocket where it will be fed by an apron feeder at a nominal rate of 500 t/h to the stockpile feed conveyor, and at a linear rate of under 1 m/s for maximum safety. The troughing angle will be 20 degrees.The apron feeder is designed for a peak flow rate of 800 t/h.

A fogging dust suppression system will be incorporated into the primary crusher facility to minimize the amount of dust generated during crushing and handling. The system should be an air/water system to minimise the use of fresh water.

A pebble cone crusher will be act as an intermediate crusher in the grinding process. The cone crusher is designed to crush ore at an average rate of 67 t/h. The oversized SAG mill product will be fed to the pebble crusher before being recycled to the SAG mill feed. The cone crusher 80% passing feed size is 63 mm with a product size of 80% passing 16 mm. Refer to Dwg. 73000-P-002 (Volume II - Drawings) for the process grinding flow sheet.

### 6.4.2 ORE STOCKPILE

The nickel ore stockpile will have a live capacity of 10,700 t. The ore will be reclaimed from the stockpile by two 1.219 m (48") x 8.0 m (26'3") apron feeders. Each reclaim apron feeder will feed a single 1.067 m (42") x 123 m (403') SAG mill primary feed conveyor at a nominal rate of 250 t/h. A wheeled loader will be required at this site to trim the stockpile.

The stockpile (in addition to all transfer points along the discharge conveyors) will be equipped with a fogging dust suppression system to minimize the amount of dust generated during material handling..

### 6.4.3 GRINDING AND CLASSIFICATION

The designed grinding circuit will consist of a single SAG mill and a single ball mill with a throughput of 10,000 t/d. The grinding circuit will consist of;

- one 7.92 m (26') diameter x 4.27 m (14') long SAG mill with one 5,000 hp low fixed speed synchronous motor
- one 6.096 m (20') diameter x 11.582 m (38') long twin pinion ball mill with two 5,000 hp low speed synchronous motors
- two 2.4 m (8') wide x 6 m (20') long vibrating screens (1 operating, 1 standby)
- one hydrocyclone cluster with seven 330 mm (13") hydrocyclones (six operating, one standby).

The product of the grinding circuit will be 80% passing 68 µm. The maximum SAG mill feed size will be 153 mm, based on the maximum product size of the primary crusher. The SAG mill product will be fed to a vibrating screen. The screen oversize

will be recycled through a cone crusher for intermediate crushing to 80% passing 16 mm. The crushed product will be conveyed back to the SAG mill feed conveyor. The screen underflow will gravity-feed to the hydrocyclone cluster feed pump box, which will feed the hydrocyclone cluster.

The hydrocyclones' underflow will feed an underflow launder, and will then gravity-flow to the ball mill feed chute at a recirculating load of 250%. The hydrocyclone cluster overflow launder will also gravity-flow to the conditioning tank at the start of the rougher flotation.

Potassium amyl xanthate (PAX) and sodium hexametaphosphate (SHMP or Calgon) will be added to the ore in the grinding stage to enhance the flotation performance downstream. PAX is a collector used in flotation and SHMP is a dispersant which acts to prevent the talc (MgO) in the ore from floating.

Refer to the grindability testing report prepared by SGS Lakefield Ltd. in (SGS, 2008) for the grindability data on Minago samples and the proposed grinding system.

## 6.5 FLOTATION AND DEWATERING EQUIPMENT SELECTION

### *6.5.1 FLOTATION*

The flotation circuit is designed to produce a high-grade nickel concentrate. The major equipment in the flotation circuit includes:

- one 120 $m^3$ conditioning tank
- eight 160 $m^3$ rougher flotation tank cells
- eight 50 $m^3$ first cleaner flotation tank cells
- two 30 $m^3$ first cleaner scavenger flotation tank cells
- six 50 $m^3$ second cleaner flotation tank cells
- four 50 $m^3$ third cleaner flotation tank cells
- four 10 $m^3$ fourth cleaner flotation tank cells
- four 5 $m^3$ fifth cleaner flotation tank cells.

The rougher flotation circuit will consist of a conditioning tank and a single bank of eight rectangular 160 $m^3$ flotation tank cells. The rougher concentrate will flow from each rougher cell into a rougher concentrate pump box. The rougher tailings will be fed from the discharge box of the last cell to the final tailings pump box.

The rougher concentrate pump box will feed the first cleaner cells. The concentrate from the first cleaner will be pumped as feed to the second cleaner bank, while the tailings will be pumped to the feed of the first cleaner scavenger cells.

The first cleaner scavenger concentrate will gravity-flow to the rougher recycle pump box, while the tailings will flow by gravity to the final tailings pump box.

The second cleaner flotation concentrate will be pumped as feed to the third cleaner cells, while the tailings will gravity-flow to the rougher recycle pump box. The rougher recycle pump box will be pumped to the rougher feed. The final tailings pump box will be pumped to the tailings thickener.

The third cleaner flotation concentrate will be pumped as feed to the fourth cleaner cells, while the tailings will be pumped to the feed to the second cleaner cells.

The fourth cleaner concentrate will gravity-flow to the fifth cleaner cells located directly below. The tailings will gravity-flow to the third cleaner cells.

The fifth cleaner tailings will be pumped to the fourth cleaner cells, while the concentrate will be pumped to the concentrate thickener for dewatering.

PAX and methyl isobutyl carbinol (MIBC), a frother, will be added at five different stages to the rougher flotation circuit. Depramin C (CMC), an MgO depressant, will be added to the cleaner flotation cells to make sure the concentration of MgO in the concentrate is within acceptable limits.

Flotation optimization will be provided by 12 on-stream samplers, 2 particle size analyzers and an online x-ray analyzer. An automatic sampling system will collect samples from various product streams for on-line analysis and daily metallurgical accounting. Particle size analyzers will provide main inputs to the control system and monitor equipment production. An online x-ray analyzer will be used to monitor the performance of the flotation process to optimize concentrate grade and nickel recoveries.

Refer to the process flow diagrams in Volume II - Drawings for the flotation circuit design and Table XX for reagent consumption rates.

### 6.5.2 DEWATERING

The final flotation concentrate will be thickened to 70% solids in a 5 m diameter conventional thickener. The thickener underflow will be pumped to a concentrate stock tank which will feed the pressure filter.

The 5.2 m diameter stock tank will have the capacity to accumulate 24 hours of production, which will allow the filter press to be service and eliminate the need for a spare. The thickener overflow will be recycled and pumped to the process water tank.

The final flotation tailings will be pumped to a 32 m diameter tailings high-rate thickener. The thickener underflow of 45% solids will be pumped to the tailings management area while the thickener overflow will be recycled for process water.

### 6.5.3 REAGENTS

All mixing and storage tanks will be equipped with low and high level indicators and instrumentation to ensure that spills do not occur during preparation and normal operation. Sump pumps will be located throughout the reagent area to contain spills. Shower and eye wash safety stations will also be installed. Appropriate ventilation, fire and safety protection and Material Safety Data Sheet (MSDS) stations will be provided at the facility.

Each reagent line and addition point will be labelled in accordance with WHMIS standards. All operation personnel will be required to receive WHMIS training and additional training for the safe handling and use of all reagents.

Drawings 75000-P-0009, 75000-P-0120 and 75000-P-0121 (Volume II - Drawings) illustrate the preparation, mixing, storage and distribution process as well as the reagent addition locations.

#### PAX

PAX will be shipped to the site in bulk 1,000 kg super sacs. The bulk PAX will be diluted to a 10% solution in a 49.2 $m^3$ (13,000 gal) mixing tank. Each batch process will consume five bulk super sacs per day. Once properly mixed, the PAX solution will be stored in a 60.6 $m^3$ (16,000 gal) storage tank. The PAX solution will be pumped from the holding tank to a distribution trough. The distribution trough will allow for proper calibration and will feed separate metering pumps for each addition point.

### MIBC

MIBC will be shipped at 100% concentration in bulk 20 $m^3$ (5,280 gal) tankers, stored in a 26.5 $m^3$ (7,000 gal) storage tank and pumped in undiluted form to a distribution trough. The distribution trough will feed separate diaphragm metering pumps which will distribute the MIBC to each addition location.

### FLOCCULANTS

The concentrate flocculant, Hychem 308, or equivalent, will be shipped in 25 kg bags. The concentrate flocculant will be diluted to a 0.1% solution in a 1.1 $m^3$ (300 gal) mixing tank.

Each batch process will consume 1 kg of concentrate flocculant every second day. After mixing, the 0.1% solution will be pumped to a 1.5 $m^3$ (400 gal) storage tank. Stored concentrate flocculant will be pumped to a distribution trough. A progressive cavity pump will pump the required amount of flocculant from the distribution trough to the concentrate thickener.

The tails flocculant, Mag 10, will be shipped in 200 L drums containing 91% active flocculant. The tails flocculant will be diluted to a 0.5% solution in a 38 $m^3$ (10,000 gal) mixing tank. Each batch process will consume one drum per day. After mixing, the Mag 10 flocculant will be stored in a 45.4 $m^3$ (12,000 gal) storage tank. The Mag 10 solution will be pumped from the storage tank to a distribution trough by a low shear progressive cavity pump. A progressive cavity metering pump will meter the flow from the distribution trough to the tails thickener at a precise flow.

### SHMP

SHMP will be shipped in 1,000 kg bulk super sacs. The SHMP will be diluted to a 10% solution in a 56.8 $m^3$ (15,000 gal) mixing tank. Each batch process will consume six bulk super sacs once per day. The SHMP will be stored in a 68 $m^3$ (18,000 gal) storage tank. The 10% SHMP solution will be pumped from the storage tank to a distribution trough by a horizontal centrifugal pump. The flow from the distribution trough will be metered through a progressive cavity pump to the addition point in the SAG mill.

### CARBOXYMETHYL CELLULOSE (CMC)

CMC will be delivered by 20 t bulk tanker trucks and stored in a 56.6 $m^3$ (2,000 $ft^3$) dedicated silo. Bulk CMC will be retrieved from the silo by a roots type blower to a 10 $m^3$ (350 $ft^3$) transition hopper located in the reagent preparation area. CMC will be metered from the transition hopper by a screw conveyor and vibrating feeder to an agitated 45.4 $m^3$ (12,000 gal) mixing tank. The 2% CMC solution will be prepared continuously and pumped to a 208 $m^3$ (55,000 gal) storage tank. The mixing tank will have a retention time of approximately three hours. The storage tank capacity is

based on 14 hours of reagent consumption, to allow for servicing the mixing tank agitator and pumps without affecting the CMC addition to the process. CMC from the storage tank will be pumped to a distribution trough. The flow will then be metered through separate progressive cavity pumps to each addition location.

### 6.5.4 ASSAY AND METALLURGICAL LABORATORY

The compact laboratory facility will be located on the main floor on the east side of the mill building. Access to the laboratory facility will be provided from the interior and exterior of the building.

The footprint of the laboratory will be 250 $m^2$ (2,690 $ft^2$). The square footage was estimated to support the mine's anticipated assaying needs.

The receiving area will be raised with respect to the road for ease of sample unloading. The vehicle area at the unloading bay will be covered with side walls for weather protection while unloading the samples.

The laboratory will consist of a receiving area, sample preparation area, a mineral processing laboratory, a chemical assay laboratory, an environmental laboratory, an office, a washroom and a locker area. A list of laboratory equipment is summarized in Appendix F-2. The office will be laid out to accommodate two workstations (computer and telephone) and storage such as shelves and filing cabinets. Lockers will be provided by the entrance for storage of personal laboratory and safety equipment. One washroom will be included within the laboratory building.

Core logging will be done in a separate building of approximately 6 m x 8 m, located in close proximity to the assay laboratory. The basic operations in the core logging facility will be the splitting, examining, and storing of the core samples. An overhead door will provide access for fork-truck pickup and delivery of samples. Specimens will be brought to the assay laboratory for further analysis. Appendix F-2 also includes the core logging laboratory equipment.

A ventilation system comprised of a bag house and blower unit to control dust and fumes will be installed in the laboratory building.A make up air system will condition the fresh air into the laboratory building (i.e. filtering, heating, and cooling).

A sprinkler system for fire protection will be installed in the assay laboratory building. The core logging facility, being in a separate building would not require a sprinkler system.

## 6.6 FILTRATION AND DRYING (EQUIPMENT SELECTION)

The horizontal plate filter press will be fed from the concentrate stock tank. The slurry in the stock tank consisting of 70% solids will be fed to the filter press at a solids feed rate of 5.26 t/h (3.7 $m^3$/h). The horizontal plate filter press will filter the

concentrate cake to a moisture content of 8.6% by weight with a designed cake thickness of 40 mm. The filter press operates on an intermittent process with a cycle time of 7.5 minutes: the filter will be back-flushed to prevent cloth blockages at a rate based upon vendor advice . The product of the filter press will be stored in a hopper on the concentrate bagging machine belt feeder.

A dryer was not incorporated into the design because the horizontal plate filter press is capable of dewatering the final concentrate to a moisture content of 8.6%, which eliminates the need for a dryer. The layout design includes a dryer space in case future increases in tonnage, or the need for a drier cake becomes necessary, in the future.

A concentrate bagging machine is located beneath the filter press storage hopper. The concentrate filter cake will flow by gravity from the hopper to the concentrate belt feeder which will feed the bagging machine. The bagging machine is designed to operate 10 h/d and will bag 2 t concentrate bags. During bagging machine shutdown, the concentrate storage hopper capacity will allow storage of 14 hours of concentrate production.

## 6.7 WATER AND AIR SUPPLY

### *6.7.1 WATER SUPPLY*

Fresh water will be supplied by an 11 m diameter and 10.4 m high storage tank. Water pumps will be used to pump the water to the desired locations. The tank has a total capacity of 757 $m^3$ (200,000 gal). The lower portion (75%) will be used for fire water The upper portion will be used for reagent mixing water, grinding mill cooling water, pump gland water, potable water treatment system, and the fresh water supplied to the frac sand plant and nickel ore processing plant. Dewatering wells consisting of twelve boreholes will be utilized to supply water to the fresh water tank.

A secondary fresh water tank will be located in the reagent area and used strictly for reagent mixing. Mill cooling water from the grinding area will be recycled to the reagent water tank and fresh water will be supplied to the reagent tank to maintain a specific level depending on consumption.

Process water will be supplied by an 11 m diameter and 10.4 m high storage tank. The process water tank will be supplied from the fresh water tank, concentrate thickener overflow, tailings thickener overflow, and water recycled from the tailings management area. Process water will be required for all flotation cells (launders) mill grinding areas, as well as the concentrate filter press.

Dwgs. 70800-P-0008 and 70000-P-0128 (Volume II - Drawings) detail the water distribution, in flowsheet format.

### FRESH WATER SUPPLY PUMP HOUSE

The fresh water supply pump house will supply all fresh water to the plant. The supply will comprise three separate systems. Each of these systems will consist of one pump capable of satisfying the demand and one spare pump of identical size. The house will be insulated and heated and will have crawl beams installed to facilitate removal of the pumps and motors. The floor will be graded to a sump. The house will also have a welding outlet installed. The electrical switch gear for the house, a mini distribution system, will be located in a separate room in the pump-house. The capacity of the pump house is shown in Table 6.2.

**Table 6.2 Pump House Capacity**

| Service | Requirement | To be installed |
|---|---|---|
| Potable water | 5 m3/hr (22 gpm) | 2 @ 5 hp |
| Gland water | 75.6 m3/hr (332 gpm) | 2 @ 25 hp |
| All other fresh water | 50 m3/hr (220 gpm) | 2 @ 25 hp |

### RAW WATER SUPPLY PUMP HOUSE

The raw water supply pump house will supply all raw water to the plant, at a required rate of 1440 $m^3$/hr (6339 gpm). The water will be pumped with one 300 hp pump rated at 1600 $m^3$/hr (7000 gpm). A second identical pump will be installed for redundancy. The house will be insulated and heated and will have crawl-beams and electrical hoists installed to facilitate removal of the pumps and motors. Because of the size and weight of the pumps/motors (maximum of 1600 kg) a high-load bearing floor along with appropriate equipment door will allow a fork lift to access the building. The floor will be graded to a sump. The house will have a welding outlet installed. The electrical switch gear for the house (a mini distribution system) will be located in a separate room in the pump-house.

#### Air Supply

The mill building air supply will be produced by two plant air compressors (one standby), a dedicated filter press compressor, and three aeration blowers (two operating, one standby).

The plant air compressor will supply process air for the mill lubrication system, concentrator utility hoses, reagent area and plant valves and piping leaks. The plant air compressor will also supply air to an instrument air dryer which will produce instrument air for the pneumatic valves, reagent dust collectors, assay laboratory bag house, laboratory equipment, and the mill pneumatic clutches.

Low pressure air will be supplied to the flotation circuit by two operating aeration blowers. A standby blower will be utilized to generate enough capacity in the event of a blower failure.

The air distribution block diagram in drawing 70000-P-0126 (Volume II - Drawings) illustrates the air supply and demand.

## 6.8 PROCESS CONTROL AND INSTRUMENTATION

### *6.8.1 INSTRUMENTATION*

The instrument index was developed during the process of taking the Process Flow Diagrams (PFDs) and developing them into Process and Instrumentation Diagrams (P&IDs). With the background information from similar project and mining metallurgy expertise, the instruments were specified and recorded to provide an instrument index that contains all of the instrumentation to develop this process. The instrument index was used to produce the following items:

- the instrument cable schedule
- the air piping schedule
- the control system architecture and specification
- the fibre optic cable schedule and bill of materials
- the instrument valve and equipment list.

### *6.8.2 PROCESS CONTROL SYSTEM*

#### PROCESS CONTROL SYSTEM SPECIFICATIONS

The control system will be comprised of control and control sub-system hardware located in electrical rooms, with a dual redundant data communication network (DCN) that will provide real-time communication between the control sub-systems, remote Operator Interface Systems (OIS) and Engineering Work Stations (EWS). All critical modules of the control system shall be implemented in a redundant configuration with dual redundant processing, power distribution and communications to enable uninterrupted automatic control. Redundant input/output (I/O) modules will not be provided.

The central control room located in the process plant will provide site-wide control and monitoring though the use of each interconnected area control system. The crusher/stockpile area will also have the provision for local control through a local control panel.

Alarm annunciation and alarm summary displays with user-configurable alarm limits, alarm enable/disable functions, alarm logging, and acknowledgement facilities will also be provided with the control system. This will include real time and historical trending with a selectable sample time.

The control system consists of four areas which include the following:

- crusher/stockpile
- process plant
- tailings pump house
- well dewatering.

The main equipment and associated instrumentation are located on the following P&IDs. Please refer to the P&ID drawings (Volume II – Drawings).

- Crusher/Stockpile Area:
  - Gyratory Crusher - 70000-P-101
  - Crusher Apron Feeder - 70000-P-101
  - Stockpile Feed Conveyor - 70000-P-101
  - Stockpile Apron Feeders 1 & 2 - 70000-P-101
- Process Plant Area:
  - SAG & Ball Mill - 70000-P-102
  - SAG Mill Feed Conveyor - 70000-P-102
  - Pebble Crusher - 70000-P-102
  - SAG Mill Discharge Vibratory Screen & Conveyor - 70000-P-102
  - SAG Mill Flexiwall Conveyor - 70000-P-102
  - Cyclone Cluster & Pumpbox - 70000-P-103
  - Ball Mill - 70000-P-103
  - Rougher/Cleaner/Scavenger Flotation Cells & Pumpboxes - 70000-P-104/105/106/107/108
  - Tailings & Concentrate Thickeners & Pumpboxes - 70000-P-109/110
  - Concentrate Filter Press, Feeder, & Bagging Machine - 70000-P-110
  - CMC/PAX/MIBC/SHMP/ Flocculent Reagents - 70000-P-111/112/113
  - Sample Pumps & X-Ray/Particle Analyzer - 70000-P-114
  - Potable Water Plant - 70000-P-115
  - Sewage Treatment Plant - 70000-P-116
  - Emergency Genset
  - Air Compressors - 70000-P-119.

Additional systems which will be monitored and controlled through the central control room in the process plant include the potable water plant, the sewage treatment plant, and the backup genset.

- Tailings Pump House Area:
  - Transfer Pond - 70000-P-109
  - Transfer Well - 70000-P-109

- Tailings Management Area Pond - 70000-P-109
- Polishing Pond - 70000-P-109

- Well Dewatering Area:
  - Open Pit Dewatering Wells - 70000-P-117.

#### PROCESS CONTROL SYSTEM RECOMMENDATION

Invensys's Foxboro Distributed Control System (DCS) meets most of the requirements that the Minago mine site requires and is the recommended process control system. Using the Instrument Index an I/O list was developed. This provided the necessary requirements for a process control system. A process control system technical specification and a DCS system architecture was then developed. These criteria documents can be found in the Design Basis, Appendix F-1.

In the technical bid analysis, Wardrop reviewed four vendors for Programmable Logic Controller (PLC)/DCS systems: Allen-Bradley, Emerson, Modicon, and Invensys.

Using the criteria, Invensys met most of the requirements. But there is some concern with this vendor with digital control. A further study was completed for use of a combined system using a DCS system with PLC controls in the detailed engineering phase.

### *6.8.3 MAJOR DESIGN CONSIDERATIONS*

#### PRIMARY CRUSHER

To optimize cost and schedule, Wardrop selected a gyratory crusher over a jaw crusher as the primary crusher. For this Project, a gyratory crusher holds several advantages over a jaw crusher.

1. The overall cost of a gyratory crusher installation is only slightly higher than that of a jaw crusher; a gyratory crusher will have a higher capital cost, but a lower operating cost than a jaw crusher.

2. The size of the gyratory crusher will allow 240 t haul trucks to dump directly onto the crusher without an intermediate apron feeder.

3. A gyratory crusher's capacity can be more reliably upgraded to accommodate future development.

4. The selection of a gyratory over a jaw crusher will minimize the risk of reduced throughput due to low capacity of the primary crusher.

5. The gyratory will also guarantee a finer crushed product that will require less energy in the grinding process. It does, however, require a higher intial

capital expenditure for equipment as well as the need for a major ramp to the top of the gyratory crusher.

6. A gyratory crusher will allow for a smaller discharge setting compared to a jaw crusher. The product size of a jaw crusher at the desired throughput would be to large and would have a negative impact on the SAG mill liners.

### SAG AND BALL MILL CONFIGURATIONS

According to SAG and ball mill suppliers, the lead time for large mills is expected to be approximately 16 months. The long lead times are the result of the lack of availability of casting suppliers for the large casts required, and the lack of availability of large ring gear cutters. There are only three large ring gear cutters globally, and there is a sizeable backlog on these cutters.

Wardrop considered using two smaller SAG mills and two smaller ball mills, sized for the 10,000 t/d production rate. Smaller diameter ring gears and smaller castings may be more widely available, and may require shorter lead times. In addition, if the Project's production rate were to be reduced over time, one SAG/ball mill pair could be taken off-line, leaving the remaining SAG/ball mill pair to handle the lower throughput. Wardrop also considered using one large SAG mill and two smaller ball mills.

However, from an operational standpoint, these alternative configurations have several disadvantages.

- The operating and maintenance costs for the additional grinding mills would increase, since the auxiliary equipment to support these mills (e.g. pumps, piping) would increase.

- Taking one SAG/ball mill pair off-line would not be advantageous, since the flotation circuit design is based on a 10,000 t/d production rate. Developing two smaller flotation circuits to create two separate SAG/ball/flotation lines would also increase capital and operating costs.

- Suppliers' delivery and budgetary cost proposals were similar to the single large diameter SAG mill and single large diameter ball mill configuration.

- Suppliers' lead times for the alternative configurations were comparable.

Wardrop ultimately concluded that alternate grinding mill configurations would not be feasible, and based the nickel ore processing plant design on a single SAG mill and single ball mill configuration.

## FILTER PRESS

A horizontal plate filter press  for concentrate filtration has a higher capital cost, however it has many advantages over a vertical plate filter press.

- Horizontal plate filter replacement components, such as bearings, are interchangeable between standard manufacturers, and are locally available.
- The plate filter construction eliminates the use and necessary replacement of diaphragms and seals, leading to lower maintenance costs.
- The horizontal press utilizes fewer components compared to a vertical press, leading to lower maintenance costs.
- The horizontal plate filter is a fully automatic operation with minimal operator involvement.
- The specialized filter media can be supplied for specific process requirements.
- Fast cycle times provide high outputs per unit filter area, which minimizes the overall footprint.
- Horizontal presses allow for a wide range of flow rates, pressures, and temperatures, which is ideal for process fluctuations.

Because of these operational and maintenance advantages, Wardrop concluded that the horizontal plate filter press is the optimal choice for concentrate filtration.

# 7.0 FRAC SAND

## 7.1 INTRODUCTION

In November 2006, Wardrop completed a Preliminary Economic Assessment (PEA), which identified a sandstone horizon averaging ten metres thick above the unconformity of the main nickel bearing serpentinite. At that time, these well rounded silica sand particles in the sandstone formation were identified as being suitable for use as hydraulic fracturing sand, or "frac sand". When used as proppants in oil or gas wells these sands will improve the porosity of the shale beds leading to improved recovery and enhanced production. Currently, in onshore US wells, approximately 50% of the gas wells and 30% of the oil wells are hydraulically fractionated.

Together with the limestone-dolomite, this sandstone layer must be removed to access the mineralization within the proposed open pit mine. To capture the value of this sand, Victory Nickel instructed Wardrop to include an assessment of Frac Sand within the Minago Feasibility Study. As a result of this additional work, the economic viability of commercial frac sand production has been established.

The frac sand was tested in three different laboratories to determine its quality under standards established by the American Petroleum Institute (API). Based on the test results, the sand products can be described as having good characteristics with sphericity, roundness, turbidity, crush resistance, low impurity levels in the friable portion of the sand. These characteristics meet all API standards.

The Minago sand will be mined, and then hauled to a temporary stockpile location separate from the waste dumps, where it will be processed. The sand will be mined each time excavation passes through the bedrock contact during a three year period. A separate NI-43-101, document for the Standard Disclosure of Mineral Projects was filed with Sedar to qualify the Sand Resources.

Outotec Physical Separation Division (Outotec) in Jacksonville, FL, designed the frac sand plant and issued a Frac Sand Plant Design study (Outotec, 2008). Outotec's design allows for sand processing at a feed rate of 1.5Mt/a, yielding 1.143 Mt/a of various grades of marketable sand.

## 7.2 GEOLOGY

The Minago deposit is unconformably overlain by the Winnipeg Formation sandstone that is overlain by competent limestones and dolomites of the Red River Formation.

The Winnipeg Formation is a series of interbedded sandstones and shales varying from 90% shale to 90% sandstone. At a maximum thickness of 68.6 m in the south-western corner of Manitoba, the formation thins to zero metres towards the north at a rate of at least 17% per 100 km. The sandstone content increases relative to shale from south to north, with several sandstone units within the Winnipeg Formation. The stratigraphically higher sandstone units contain larger proportions of finer, more angular quartz grains. The stratigraphically lower basal sandstone unit consists of larger proportions of more rounded and coarser grained quartz.

The overlaying basal sandstone averages approximately 10 m vertical thickness varying from highly cemented competent rock to loose, unconsolidated sand size grains. The sandstone consists largely of quartz with impurities, which include lesser interbedded shale, and pyritic, phosphatic and/or limonitic concretions.

## 7.3 MINING

The Minago deposit is overlain by a surficial layer of overburden of peat, sands and clay approximately 10 m thick followed by approximately 70 m of limestone. The layer of silica sand exists immediately beneath the limestone, down to the contact of the basement granites and ultramafic rocks.

The layer of sandstone may be removed without drilling and blasting but may require backhoe cleanup. The backhoe will windrow the sand so that the front end loader can load the material while minimizing losses. The sand will then be hauled to a separate stockpile located near the sand processing facility for processing. The sand will be mined in three phases as outlined in Table 7.1.

**Table 7.1 Final Pit Contained Sand Resource**

| Phase | Sand (t) | Year Mined |
|---|---|---|
| Starter Pit | 5,288,864 | 1 |
| Phase 1 | 2,091,628 | 2 |
| Phase 2 | 7,466,065 | 3 |
| **Total** | **14,846,557** | |

## 7.4 LABORATORY TEST PROGRAMS

To determine the quality of the sand and to evaluate the feasibility of the project, Wardrop arranged a series of test programs conducted by various independent laboratories. Representative Minago sand samples were tested for different standard quality parameters in accordance with the American Petroleum Institute (API) “Recommended Practice 56 - Recommended Practices for Testing Sand Used in Hydraulic Fracturing Operations, 1995”, as referenced in Appendix G-1.

Three different test programs were conducted between May 2007 and November 2008.

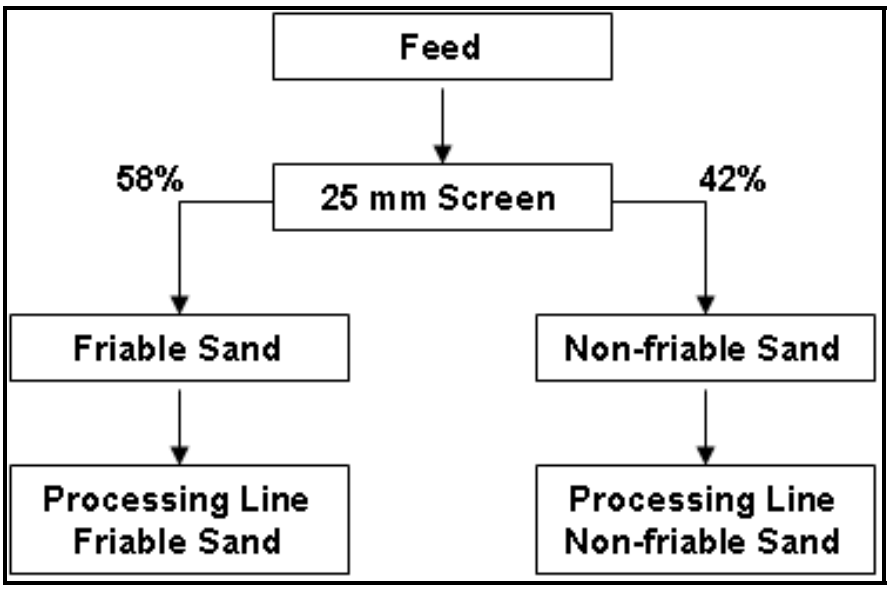
- **Program 1**: Between May and July 2007, Loring Laboratories Ltd. (Loring) of Calgary, AB performed mineralogical analyses, and EBA Consulting Engineers and Scientists (Material and Pavements Practice) (EBA) of Calgary, AB, performed material analyses.
- **Program 2**: Between May and September 2007, the Saskatchewan Research Council of Saskatoon, SK (SRC) performed mineralogical analyses, and the University of Saskatchewan performed a material analysis.
- **Program 3**: between December 2007 and January 2008, and between September and November 2008, Outotec Physical Separation Division (Outotec) in Jacksonville, FL performed mineralogical analyses and a material analysis.

During Program 1, each of the four drill hole representative samples were split into two; the first half of each sample was provided to Loring for testing, the second half of each sample was retained. The sample from a fifth hole was split into four samples, which then formed the basis of Program 2.

The results from both Programs 1 and 2 indicated low crush resistance parameters. Outotec initiated a third test program; wherein the remaining halved cores from the four original samples, plus representative samples from two additional holes, were delivered to Outotec and combined into a blended sample.

Outotec separated the sandstone into hard (non-friable) sand and consolidated (friable) sand, as shown in Figure 7.1. Using this unique approach, Outotec was able to improve the crush resistance parameter of the friable sand to meet API standards, thereby increasing the marketable volume. The non-friable sand was then crushed to produce a fine frac sand product suitable for shale gas applications.

**Figure 7.1 Outotec Flowsheet, Separating Friable from Non-friable Sand**




Source: Outotec Test Report, 2008

The results of the Outotec tests were compared with those of Loring/EBA and SRC. The test confirmed the crushing strength and other parameters comply with the API specifications.

The results from the Outotec test program, and the ability to separate friable and non-friable sand, greatly improved project economics.

### 7.4.1 TEST PROCEDURE

API has established a range of tests to determine the product standard. The laboratories executed the following test procedures to demonstrate compliance with API standards:

**Granulometric (Particle Size) Analysis:** Representative sub-samples were screened and analyzed for particle size over US Standard Sieves Nos 8, 12, 16, 20, 30, 35, 40, 50, 60, 70, 100, 140, 200, pan. This analysis determines the quantity of the different size fractions. Only the fractions 20/40 (frac sand), 20/50 (frac sand), 40/70 (frac sand), and 40/140 (glass sand) are marketable products.

**Geochemical and Mineralogical Analyses:** Subsamples were chemically analyzed to determine the amounts of impurities contained in the product. This included % aluminium oxide ($Al_2O_3$), barium (Ba), % calcium oxide (CaO), chromium (Cr), % iron oxide ($Fe_2O_3$), % potassium oxide ($K_2O$), % magnesium oxide (MgO), % manganese oxide (MnO), % sodium oxide ($Na_2O$), nickel (Ni), % phosphorus pentoxide ($P_2O_5$), % sulphur trioxide ($SO_3$) ,% silicon dioxide ($SiO_2$), strontium (Sr), % titanium dioxide ($TiO_2$), vanadium (V), and % Loss on Ignition (LOI) at 1,000 °C.

**Laboratory 20/40 Frac Sand Sample:** 20/40 frac subsamples were washed over a 200 mesh screen to remove clay contaminant, and then analyzed against the API standards (20/40 particle size guidelines) over US Standard Sieves Nos 16, 20, 30, 35, 40, and pan. A subsample of the 20/40 sample was chemically analyzed for %$Al_2O3$, Ba, %CaO, Cr, %$Fe_2O_3$, %$K_2O$, %MgO, %MnO, %$Na_2O$, Ni, %$P_2O_5$, %$SO_3$, %$SiO_2$, Sr, %$TiO_2$, V, and %LOI at 1,000°C.

**Sand Roundness and Sphericity Determinations:** This test includes observation of coatings, type of grain, presence of fracture etc., on 50 grains from each fraction, except the smallest fraction. A subsample of the 20/40 frac samples was tested for API standards roundness and sphericity.

**Particle Sphericity:** This test measures how closely a sand particle or grain approaches the shape of a sphere. The most widely used method of determining sphericity is with a visual comparator, based on a table developed by Krumbein and Sloss in 1963. The recommended sand sphericity is 0.6 or greater.

**Grain Roundness:** This test measures of the relative sharpness of grain corners, or grain curvature. The evaluation of sand roundness is made on the same sample used for sphericity determination. The recommended sand roundness is 0.6 or greater.

**Acid Solubility Analysis:** A subsample of the 20/40 frac samples was evaluated for the sands solubility in acid according to the API suggested Acid Solubility test procedure. The solubility of the sand in acid is an indication of the amount of undesirable contaminants like carbonates, feldspars, iron oxides and clays. The lower the acid solubility, the lower the contaminant. The acid used was 12-3 hydrochloric-hydrofluoric acid (HCl-HF).

**Turbidity Measurement Analysis:** A subsample of the 20/40 frac samples was analyzed for the sands silt content according to the API suggested Formazin Turbidity Measurement test procedure. Turbidity in water is the result of suspended clay, silt, or finely-divided inorganic being present. The sand sample can be placed in distilled water to measure the turbidity of the resulting liquid. Turbidity is measured in FTU – Formazin Turbidity Unit and the recommended maximum turbidity for the sand tested is 250 FTU. Lower turbidity shows lower quantity of suspended clay, silt and other impurities.

**Crushing Tests:** A subsample of the 20/40 and 40/70 frac samples were tested to measure the sand's resistance to crushing. The test is performed in accordance with the API's 4,000 psi crush test procedure. Compression tests the crushing and compression resistance of the frac sand. Silica's hardness and its overall structural integrity combine to deliver the required crushing resistance present in wells up to 2,450 m deep where high pressures are present.

**Laboratory Glass Sand Sample:** API standards set out separate specifications for glass sand, which is generally finer and cannot be used for frac sand applications. A representative 40/140 glass sand subsample was washed over a 200 mesh screen to remove clay contaminant. The sand was then analyzed against the API size guidelines over the following US Standard Sieves No: 30, 40, 50, 60, 70, 100, 140, pan. A subsample of the 40/140 was analyzed chemically for the following compounds or metals: %Al2O3, Ba, %CaO, Cr, %Fe2O3, %K2O, %MgO, %MnO, %Na2O, Ni, %P2O5, %SO3, %SiO2, Sr, %TiO2, V, %LOI at 1,000°C.

For glass sand, the grain shape is one of the most important properties: the more angular and rough the sand particle, the greater the amount of binder needed to achieve the same coating thickness and bonding strength (due to an increased surface area). These factors will significantly increase the cost of sand mixture and result in gas-related defects during casting. Therefore, the sand grain roundness and sphericity is meaningful to the glass industry.

### 7.4.2 LORING / EBA TEST PROGRAM SAMPLING

Four sand samples numbered 924078, 924079, 924080 and 924081 were shipped and tested at the Loring laboratory. Each sample represents half of the entire interval of sand intersected in each drill hole as noted below.

- 924078 – Diamond drill hole N-07-43A – from 78.14 m to 86.00 m
- 924079 – Diamond drill hole N-07-01 – from 83.32 m to 96.73 m
- 924080 – Diamond drill hole N-07-09 – from 74.70 m to 84.25 m
- 924081 – Diamond drill hole N-07-41B – from 69.14 m to 78.19 m

### 7.4.3 SASKATCHEWAN RESEARCH COUNCIL TEST PROGRAM SAMPLING

Four samples representing the sand from drill hole N-07-25, numbered 924060, 924061, 924062 and 924063, were tested at SRC. The drill hole interval represented by each sample is provided below.

- 924060 – from 77.28 m to 78.62 m
- 924061 – from 78.62 m to 83.00 m
- 924062 – from 83.00 m to 86.00 m
- 924063 – from 86.00 m to 88.20 m

### 7.4.4 OUTOTEC TEST PROGRAM SAMPLING

Four representative sand samples, representing half of the core were numbered, shipped and tested at Outotec. Each sample represents half of the entire interval of sand intersected in each drill hole as noted below:

- Diamond drill hole N-07-01 – from 83.32 m to 96.73 m

- Diamond drill hole N-07-09 – from 74.70 m to 84.25 m
- Diamond drill hole N-07-25 – from 77.28 m to 88.20 m
- Diamond drill hole N-07-41B – from 69.14 m to 78.19 m
- Diamond drill hole N-07-43A – from 78.14 m to 86.00 m

In addition, Diamond drill holes V-08-02 and V-08-07 were sent to Outotec in early January 2009 to complete the test program.

For the purposes of the frac sand testing, Outotec combined all the samples from the first group to provide the data in the test report. The non-friable portion from the second set of core was used in combination with the initial non-friable portion to conduct the crushing tests. Samples from both sets of cores were combined for the Rotex and thickening tests.

### 7.4.5 COMPARISON OF THE RESULTS

#### SUMMARY OF RESULTS

Table 7.2 presents the laboratory results and the API standards for comparison purposes.

**Table 7.2 Summary of the Results (20/40 Frac Sand)**

| Test | API Standard | Loring/EBA Lab | SRC Lab | Outotec Lab |
|---|---|---|---|---|
| Roundness | 0.60 | 0.64 | 0.60 | 0.78 |
| Sphericity | 0.60 | 0.70 | 0.71 | 0.72 |
| Turbidity | 250 FTU* | 66 FTU* | 82 FTU* | 24 FTU* |
| Crush Resistance | 14% (for 20/40) | 33% | 44% | 11.5% |
| | 8% (for 40/70) | 30% | - | 6.8% |
| Acid Solubility | 2% | - | - | 0.92% |

*FTU – Formazin Turbidity Unit

#### SCREEN ANALYSIS (GRANULOMETRY)

The screen analysis conducted at Loring, SRC, and Outotec show that the 20/40 (frac sand) and 40/140 fractions are the marketable products of the Minago sandstone. These products can then be broken down into different size fractions as required by the end user. Table 7.3 shows the screen analysis results from each laboratory.

**Table 7.3 Screen Analysis for the Two Best Fractions**

| Usable Product | Laboratory | | |
|---|---|---|---|
| | Loring (%) | SRC (%) | Outotec (%) |
| 20/40 | 10 – 15 | 11 – 16 | 16 – 20 |
| 40/140 | 68 – 73 | 73 – 80 | 74 – 83 |
| Total Usable | 80 – 87 | 82 – 90 | 90 – 94 |

Note: The figures in Table 7.3 represent all usable sand, including the non-friable portion.

The results of these laboratories are similar, with the exception of the superior results from Outotec based on different processing approach. The laboratory results show that about 10% to 20% of the sand in 20/40 fraction and around 70% to 83% of the sand in 40/140 fraction are marketable materials.

Based on Outotec testing, the percentage of the usable product from the two fractions varies between 90% and 94%, meeting API requirements for this type of test.

### IMPURITIES

The impurities reported by Loring, SRC, and Outotec were compared. The results confirm that there are no impurities of a quantity sufficient to complicate the process and that process operating costs are not expected to increase due to deleterious elements.

### ROUNDNESS AND SPHERICITY

The Loring, SRC, and Outotec average sphericity and roundness test results for the fraction 20/40 are provided in Table 7.4. Both the Loring and SRC results show similarly encouraging parameters, with sphericity around 0.70 and roundness between 0.60 and 0.64, both of which meet the API standard. The Outotec test results show much better roundness and similar sphericity.

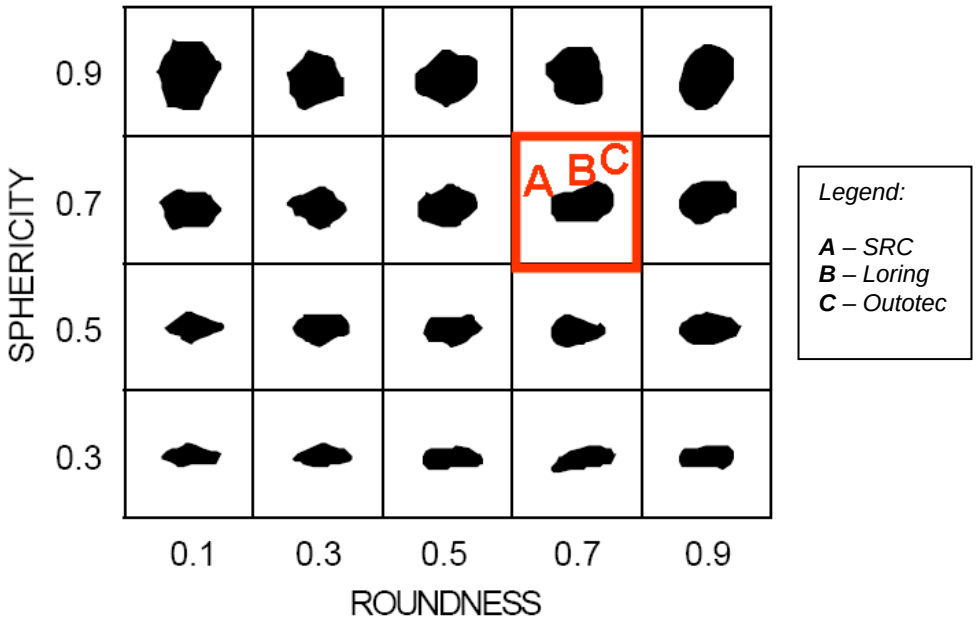
**Table 7.4 Roundness and Sphericity (20/40 Fraction)**

| Usable Product | Laboratory | | |
|---|---|---|---|
| | Loring (%) | SRC (%) | Outotec (%) |
| Roundness | 0.64 | 0.60 | 0.78 |
| Sphericity | 0.70 | 0.71 | 0.72 |

These results have been placed accordingly in the roundness and sphericity chart provided in Figure 7.2. This chart has been produced by API as a standard for the analysis of roundness and sphericity.

The most desirable shape is a sphericity of 0.9 or higher, and a roundness of 0.9 or higher. The 20/40 fraction obtained from the Minago sandstone has been plotted on Figure 7.2 for comparison purposes. Based on this comparison it is clear that the 20/40 fraction obtained from the Minago sandstone is one of the more desirable shapes.

**Figure 7.2 Roundness and Sphericity Chart**




## CRUSH RESISTANCE

The crush resistance test conducted at Loring/EBA shows a product with low crush resistance. With a 14% API maximum allowable level of fines, the various test results, without any additional treatment, show about 30-40% of fines. Only after an additional attrition and acid bath treatment did the level of fines drop to 14%, which reduced the marketable product to approximately 50%.

The various SRC crush tests yielded average percent fines, by mass, of 51.4%, 62.6%, 41.9% and 34.2%, respectively. For all of the samples, the average percent fines exceeded the maximum acceptable API-recommended value of 14% by a substantial margin, which confirmed the EBA test results.

Outotec's crush tests show that the average percent fines, by mass, are between 9.8% and 13.3% for the 20/40 fraction (API's maximum allowable is 14%), and between 6.4% and 7.3% for the 40/70 fraction (API's maximum allowable is 8%). In both cases, the fines exceeded API standards, due to Outotec's processing approach that separates the friable from the non-friable sand portions in the initial stage of the proposed flowsheet. With this, the friable portion does not undergo additional crushing, which maintains the high crush resistance performance required

by the API. In addition it increases the saleable production volumes. The non-friable portion is the main source of the finer 50/140 sand used for scouring and fluid loss control. This application does not require API standards for crush resistance.

In light of these results, the sand processing plant was designed to treat the friable and non-friable portions separately, in two parallel circuits. Only the non-friable portion of the material will be crushed. This approach ensures that the friable products will meet all of API's standards, leading to a higher volume of production of the different marketable products.

### 7.4.6 SUMMARY OF THE TESTING PROGRAM

In general, the two independent laboratory test programs at Loring/EBA and SRC showed comparable results. The Outotec results were a significant improvement on previous Loring/EBA and SRC results, because of the initial screening stage that separates the consolidated portion. Loring/EBA and SRC agreed that if Outotec's approach is adopted, the sand crush resistance will meet the API standards.

The parameters of the various friable sand products meet all the API standards: sphericiy and roundness, turbidity, crush resistance, low impurity level. The non-friable portion does not require API testing.

The Minago PEA study assumed a marketable product of 25% of the total sand tonnage. The laboratory results indicate this percentage is actually more than 76% of the total sand tonnage.

## 7.5 SAND PROCESSING

The Frac Sand Plant Design portion of the study was completed by Outotec (Outotec, 2008).

In a best-case scenario, the frac sand processing plant could be operational 16 months after award of a contract. Commencement during a period of unfavourable weather conditions will extend the time of completion.

### 7.5.1 DESIGN BASIS

The process design basis defines the relevant considerations as agreed upon by Wardrop and Outotec. Key considerations include deposit characterization and feed material assumptions, plant capacities, operating hours for the plant sections, and product quantities and grades as defined by the Wardrop Frac Sand Marketing study (Wardrop, 2008).

The following key assumptions were made in the preliminary design basis of the plant:

- The plant will have the capacity to produce of 1,142,805 t/a, comprised of 569,125 t/a API frac sand, and 529,941 t/a non-API sand, which includes 62,500 of flux sand.
- The plant will have feed rate of 265 t/h or 1,500,000 t/a.
- The plant will operate 4,822 h/a.
- The plant will operate 12 months per year for wet and dry process sections.
- Friable and non-friable sands will be processed in separate, dedicated circuits.
- The wet plant and dry plant will maintain limited operational independence from one another.
- Two wet winter stockpiles (250,000 t each) will be provided to allow stockpiling of screened friable and non-friable material during non-freezing months, for use as feed in the winter months because the screening stage cannot distinguish between a single large rock and a lump of frozen ore.
- The plants will be fed using front-end loaders via hopper and feeder systems.
- Marketable product will be held in two-day capacity storage silos based on average production rates, and will be transported via truck to the rail load-out or marketplace.
- Solid waste products will be stored in stockpiles if solid or sent to tailings impoundment via the thickener. Solid waste material will be removed by loader and truck.

### 7.5.2 PROCESSING PLANT DESIGN

Outotec performed laboratory testing, flow sheet development work and preliminary plant design to determine the cost of the plant, with an accuracy of -10%/+20%. Cost estimates are based on Outotec's experience in designing and building several frac sand plants.

Initial studies determined the deposit was capable of producing three saleable products: two types of fracturing sand, 20/40 and 40/140 which can then be broken down into different size fractipons to meet customer requirements and a flux sand product. Based on the Marketing study results (Wardrop, 2008) for annual sales. Outotec designed a plant capable of producing 825,000 t/a. Approximately 490,000 t/a of the final product will be frac sand capable of meeting the API specifications, and 335,000 t/a of the final product will be non-API frac sands, to be sold on other markets. The initial design was followed by a Phase II revision, which included improvements to reduce the total costs and improve general plant and process operations. The Phase II design takes into account the fluctuating seasonal demands of the frac sand market, the inclement winter weather in Manitoba, and the need to operate the full plant year-round. The wet and dry plants will operate together in

series, and are designed to operate at wet plant feed rate of 265 t/h. The overall plant can achieve a throughput of 1.6 times the average production rate, allowing plant capacity to meet periods of expected peak demand. The capability to produce non-API 20/40 sand has been included in the design, increasing the potential total production of the plant from 825,000 t/a to 1,142,805 t/a.

## 7.6 RAIL LOAD-OUT AREA

IM&M completed the rail load-out design portion of the study for which the following is the summary of the report (IM&M, 2009) by IM&M Consulting, Calgary, AB

### *7.6.1 DESIGN BASIS*

The rail load-out facility will be located approximately 60 km from the proposed loading facility at the mine. A portion of the sand will be trucked from the mine to the frac sand transload facility site, then transloaded into rail cars and shipped to market.

Operationally, this facility will require two switches per week, of 90 hopper cars each. On average, one car will be loaded every 50 minutes. Conceptual plans include three 30-car storage tracks, one 10-car loading area, and a 30-car in-pre-loading storage area. A car mover is expected to perform the switching within the facility.

The facility will consist of two buildings. The first building will be a covered truck unloading building designed to accommodate a Super B tractor/trailer unit. This building will be 30.5 m long x 6 m wide and 6 m clear above the top of rail siding rail, with an 5.5 m high x 5 m wide truck pass opening at both ends.

The second building will be a railcar loading building that will contain an 18.2 m car. The building will be 30.5 m long x 12.2 m wide, and 6.1 m clear above the top of rail with an 6.1 m high x 6.1 m wide rail car pass opening at both ends. To accommodate the overhead rail loading equipment, an additional 9.1 m long x 3.7 m wide x 4.5 m high structure will be centered into the roof of the original building.

The building structures will be unheated but have been designed to protected workers from wind and precipitation.

Other the facility design features include the following:

- The product will be protected from the elements and remain dry to within 1% moisture content.
- Transloading will be conducted using two modified Super B grain trailer loads per single rail car. The product will be scaled into the trucks at the dry plant; weigh scales for the transload site will not be required.
- The design product load for each rail car is 88 Mt, although the current track maximum is 79.4 Mt. The design product load for the Super B unit is 22 Mt.

- Super B grain trailers will bottom-dump into two under-floor unloading hoppers spaced at 8.5 m on-center. These 3 m x 3 m x 1.2 m hoppers will be contained within a concrete vault that allows for inspection of the tail pulley and conveyor load centering device on each of two 0.5 m conveyors.
- The conveyors will extend 37 m between the center lines of the two buildings. They will extract sand from the unloading hoppers and transfer it into rail cars. The covered conveyors will be 39.6 m long. Dust collection at the filling spouts will be discharged into rail cars.
- The rail cars will be constructed with two 13.7 m compartment-covered hoppers with 0.75 m hatches spaced at 3 m on-center. This design will allow for the use of 18.3 m cars.
- Dust collection at the filling spouts for the rail cars has been included in the design, but is not required for the truck receiving hoppers.The railcar loading building will require a minimum vertical clearance of 2.5 m over the cars for the main portion of the building, increasing to 11.5 m in the overhead loading section.
- Protection to guard against the operator from falling will be provided within the railcar unloading building. A stair case will be required to a gantry located 4.5 m above top of rail, for the full length of the building. Workers will be allowed access to the top of the rail cars, within the environmental protection of the building, to open and close hatches. A drawbridge gangway will be required at the loading point, and 15.2 m (50') on center on both sides of the loading point. A continuous lanyard style fall protection system is to run the full length of the structure.
- An electrically-heated operations building will be provided at the gantry elevation level near to the filling location. The operations building will be sized as a two-man warm-up area, and will contain the motor control panel for the conveyors, loading spouts, and dust collectors. The rail car filling area and the tops of cars in front and behind the filling area will be viewable from this building.

# 8.0 INFRASTRUCTURE

## 8.1 SUMMARY

The proposed infrastructure for the Project will include:

- site haul and access roads
- a fuelling storage and dispensing facility for mobile equipment
- modular facilities, including mine site staff dormitories, wash/laundry facilities, staff kitchen/cafeteria, mine dry, a modular office complex and a recreational facility
- miscellaneous facilities including emergency services building, cold storage building, process and fresh water pump house, security guardhouse and scale house
- a general maintenance building for servicing mine mobile equipment
- associated Tailings and Waste Rock Management Facility (TWRMF)
- water and waste water facilities, including a sewage treatment plant, a potable water treatment plant, and site infrastructure piping
- storm water management
- dewatering facilities
- electrical power supply, transformation and distribution
- process plant control system
- security systems
- data and communications infrastructure
- waste disposal

The modular camp, which is designed to accommodate 300 people, will form the basis of the accommodation for the construction workforce.

## 8.2 SITE LAYOUT

All infrastructure facilities will be located at least 300 m from Highway 6, to provide a visual tree-line barrier from traffic to the Minago operation. Only the guard house and

scale house will initially be visible from Highway 6. Since the tailings dam is of limited height and is set back from the road, the tree lined barrier will limit visibility.

Major infrastructure facilities such as the mill, crushing facility and truck garage will be located in the northwest corner of the site, where the overburden thickness is minimal. This area has the highest site elevation, which eliminates on-site drainage and flooding concerns. Site roads will be located throughout the site to provide access to all operational areas of the mine.

Haul roads were designed for the 240-ton trucks. The minimum distance requirements to separate the explosive plant operations from other operations have been maintained. Similarly, the necessary minimum clearances to the 230 kV and other electrical lines have been taken into account in the site layout.

## 8.3 ROADS

Roads will vary in width and cross-section depending on their location, staging and ultimate use. Initial road widths of 6 m, 8 m, 12 m, 20 m and 30 m will be used throughout the mine site, and will be constructed so that the finished roadway surface is a minimum 0.8 m – 1.0 m above the surrounding ground elevation.

A number of the roads will have elevated berm sections to accommodate utilities/pipelines. The elevated berms will prevent vehicles from wandering across the roadway and into the utilities themselves.

Some of the roads will have semi-pervious clay lined slopes to act as pseudo-dyke structures slowing the migration of surface water through the embankments and across the site. These pseudo-dykes are designed to partially redirect overland flows toward the natural drainage channels. Sources of the highly plastic clay required for the construction of the clay lined slopes have not been determined. It is anticipated that both imported and on site clays will be required at various stages of mine development. The practicality of accessing and handling the onsite clays for this work has not been determined.

In general, the roads carrying highway truck traffic for incoming supplies and materials and outgoing ore concentrate will be designed to accommodate a Super B-Train loading (GVW 62,500kg) and roads carrying mining ore will accommodate GVW 324,000kg haul trucks.

Parking areas will be illuminated and equipped with electrical plugs where necessary.

The mine site access road will require improvements where it intersects with Highway 6 to accommodate turning and slow-moving truck traffic. The improvements will include pavement widening to create auxiliary acceleration/deceleration lanes.

## 8.4 FUELLING FACILITIES

The diesel fuel storage capacity for the mining operation is 380,000 L, which includes the fuel requirements for explosives. Fuel will be delivered from Thompson, Manitoba twice a week, or more if required. The fuel reserve capacity allowance is 3-4 days.

The fueling system will consist of four 95,000 L above-ground double-walled diesel fuel tanks, a diesel fuel pumphouse, and a receiving station. Standard vehicles will be serviced using a dual-fuel dispensing unit and one 4,500 L double-walled diesel fuel tank and one 4,500 L double-walled gasoline tank.

## 8.5 MODULAR FACILITIES INCLUDING ACCOMMODATIONS

The following buildings will be part of the modular building complex:

- mine site staff dormitories
- mine staff kitchen/cafeteria
- mine dry including male and female facilities and shift change rooms
- recreational facilities
- mine office complex

All modular facilities will have wheelchair access and will be connected by an enclosed walkway. The buildings will be designed for a heavy-duty industrial environment, with an expected life of approximately 20 years.

The mine site staff dormitories will be sized to accommodate 300 personnel, including construction crew. The dormitory complex will consist of 120 double sleeper units, 60 single sleeper units and 6 executive suites.

The project will employ 422 staff members; however, workers will rotate on a 12-hour shift schedule, and each shift worker will vacate the site once for every 2-week shift period. In addition, some daytime workers that commute from Grand Rapids will not require accomodations. Accordingly, it is not necessary for the dormatories to accommodate all 422 workers.

**Table 8.1 Staff Breakdown**

| | Total | On Site | Off Shift Req. Bed | Rooms Available | Remaining | Comments |
|---|---|---|---|---|---|---|
| Shift Workers (2 Bed Rooms) | 335 | 168 | 84 | 120 | 36 | Excess rooms available for construction crew |
| Daytime Workers (Single bed rooms) | 87 | 87 | 87 | 66 | -21 | Personnel without rooms commute to Grand Rapids |
| Totals | 422 | 255 | 171 | 186 | 15 | |

The daytime workers may utilize the 60 single rooms while the remaining employees will commute 90 minutes from Grand Rapids. Staff employees from Grand Rapids will commute due to their shorter, 8-hour shifts.

Shift workers will be housed in a double-sleeper unit that will be shared with a cross-shift employee; one employee will occupy the room while the other works a shift. Replacement workers will occupy the same room during the other two week period. Since four workers will utilize one double sleeper unit in a four week period, only 120 double-sleeper units will be required. Shift workers will utilize 84 double- sleeper units while the remaining 36 sleeper units will be used for the construction crews. This provides accommodations for a total of 72 construction workers.

The kitchen/cafeteria will be sized for 200 personnel and will house the kitchen staff office. The kitchen/cafeteria area will be approximately 9500 $ft^2$ (50' W x 190' L) and will consist of food storage, food preparation, kitchen and cafeteria.

Each 20-person dormitory unit will be 1440 $ft^2$, and will consist of 10 individual double-sleeper units. A total of twelve 20-person dormitory units will make up the total of 120 double-sleeper units accommodating 240 persons. Each double-sleeper unit will have two twin beds, a desk with lamp, a chair and two 72-inch high wardrobes.

Each 12-person dormitory unit will be 1440 $ft^2$ and consist of 12 individual single sleeper units. A total of five 12-person dormitory units will make up the total of 60 single sleeper units. Each single-sleeper unit will have one twin bed, a desk with lamp, a chair and one 72-inch high wardrobe.

The 6-person executive unit will be 1440 $ft^2$, and will consist of 6 individual rooms. Each executive suite will have one queen size bed, a desk with lamp, chair, one 72-inch high wardrobe and a 22-inch LCD television.

Each dormitory block will be capable of housing either male or female personnel. Modular lavatories will have designated male and female washrooms and will be located throughout the complex, including facilities adjacent to the locker areas. Each washroom facility will be equipped with wheelchair access. Laundry facilities are also included throughout the dormitory.

The mine dry will accommodate 306 lockers, with 102 lockers per mudroom area. The three mine dry areas will be divided into two male facilities and one female facility. Each single-tier three section locker set will be 12" W, 12" D and 60" H. Thirteen sterling compression moulded utility sinks and thirty six-foot-long wood benches will be included. The recreational facility will be equipped with two treadmills, two Nordic track bikes, one elliptical machine, complete dumbbell sets with benches, a foosball table and a pool table.

These facilities will serve as the construction camp facilities for approximately two years, and will then be converted to a permanent camp. Initially, temporary power, water and sewer services will be provided for the construction camp, and then for the permanent camp once the power distribution, potable water plant, sewage treatment plant infrastructure is completed.

The office complex will accommodate up to 60 personnel. The complex will consist of mine manager's office, 13 enclosed offices, 8 open offices and 38 cubicles. The office complex will be approximately 8,500 $ft^2$ (50' W x 170' L) and will form part of the modular dormitory building. The office complex will be accessible from the exterior and interior of the complex building.

The office complex will accommodate:

- an adequate number of washrooms to meet Manitoba Building Code requirements
- partitioned offices at least 11 $m^2$, and a mine manager's office at least 22 $m^2$
- cubicles at least 7 $m^2$ each
- a main entrance with a reception area, waiting room, printing/copy areas, coffee station, covered walkway to other modular facilities and barrier-free access
- a large meeting room
- a library/file area at least 22 $m^2$
- a nursing station with an office, treatment room, and file storage
- a utility room, a janitor's room, and a server room.

## 8.6 MISCELLANEOUS FACILITIES

The emergency vehicle garage will be a pre-engineered building with an area of approximately 240 $m^2$. The garage will house an ambulance and a fire truck, along with one small office and storage space for emergency equipment.

A 950 $m^2$ cold storage warehouse will be located south of the general maintenance building. This building will be a sprung structure, with metal roll-up doors facing east and west.

The process and freshwater pumphouse will be comprised of two side-by-side pre-engineered buildings, with a combined area of approximately 170 $m^2$. The pumphouse complex will be located east of the ore processing facility. A monorail will be installed above each pump system to facilitate maintenance.

A fire protection water pump house will be located directly beside the fresh water tank. In the event of a fire, the fire water pumps will discharge water from the fresh water tank to the appropriate area. Fire protection will be required at the modular complex building, frac sand plant, mill, maintenance building, fueling area, and primary crusher building.

The security guardhouse and scale house will be located at the entrance to the site, near Highway 6. The guardhouse and scale house will be a single-storey 3.6 m x 6 m modular trailer complete with a washroom facility. A septic system will be used to accommodate the sewage from the guardhouse and scalehouse. Potable water will be pumped from the water treatment plant to the guardhouse and scalehouse.

## 8.7 GENERAL MAINTENANCE BUILDING

The truck repair shop will be a 3,865 $m^2$ x 18.5 m high building complete with two 50-t bridge cranes. There will also be a 1,935 $m^2$ x 9.5 m high lean-to building containing offices and warehouse space integrated into the repair shop.

In summary the general maintenance building will include:

- seven heavy vehicle repair bays including four drive-through bays
- a light vehicle repair bay, a tire bay, a welding bay, and a wash bay
- a lube storage facility
- a machine/hydraulic shop, a fabrication/welding shop, an electrical shop, and an instrumentation shop
- a 1,290 $m^2$ storage warehouse
- five offices, a lunch room and washroom facilities

- an upper level mezzanine with mechanical and compressor rooms

## 8.8 TAILINGS AND WASTE ROCK MANAGEMENT FACILITY

To support the TWRMF a ring main pipe, a floating barge pumping station, and three perimeter ditch pumping stations will be provided. Tailings discharge will be pumped to the polishing pond and flood retention area to meet water quality standards, and then pumped to the Minago River watershed.

The TWRMR will receive water from the mill tailings thickener, sewage treatment plant, waste frac sand and the underflow from the frac sand clarifier. A ring main pipe with spigots will be located along the entire perimeter of the tailings dam, to eliminate solids that accumulate in a particular area and allow for uniform discharge throughout the tailings pond.

Seepage from the tailings pond will be collected in a perimeter ditch and pumped back into the tailings pond by three 15 hp submersible pumps. Three pumping stations will be located along the low-elevation east-side ditch area. The tailings water from the TWRMF pond will be pumped to the polishing pond and flood retention area by three 60 hp vertical turbine pumps, each capable of pumping 530 $m^3$/h. These pumps will be mounted on a floating barge pump station, similar to the station shown in Figure 8.1.

**Figure 8.1 Typical Floating Barge Pump Station**



As shown in the water block diagram (Drawing 20200-P-0127), the barge pumps in the tailings management facility will have a nominal discharge rate of 621 $m^3$/h, and a maximum discharge capacity of 1384 $m^3$/h to accommodate a 1-in-20 year, 5-day major rainfall event. The maximum discharge rate is based on pumping the major rainfall event over a two week period.

Typical tailings water inputs include 503 $m^3$/h from the process plant and 118 $m^3$/h from the waste receiving pump box. The waste receiving pump box will contain 100.4 $m^3$/h of waste frac sand, 12.4 $m^3$/h of underflow from the frac sand clarifier and 5 $m^3$/h from the sewage treatment plant.

The following design considerations were taken into account for the tailings management area.

- Ultramafic waste will be dumped in the Tailings and Waste Rock Management Facility (TWRMF). Utilizing co-deposition, all contaminants will be placed into a single area in a containment structure (21 m high). The tailings will be deposited onto the ultramafic waste to fill in voids within the rock by opening and closing of valves along the pipe ring main.
- The tailings deposition will create a decant pond sized for not less than five days of retention time. A minimum water depth of 1.5 m will be maintained in the pond at all times.
- Decant water from the tailings pond will be pumped to the polishing pond and flood retention area.
- Seepage ditches around the perimeter of the TWRMF will collect the seepage and runoff and transfer the water back into the tailings pond.
- The TWRMF site will be located in permanently-flooded terrain. The construction of the TWRMF dam will be preceded by construction of roads surrounding the site.
- The TWRMF must provide adequate volume for containment of tailings, ultramafic waste and supernatant water. Ice formation over the tailings due to discharge in subfreezing temperatures during winter operations is envisaged, and contingency storage capacity has been provided in the design.

## 8.9 WATER AND WASTE WATER FACILITIES

### *8.9.1 SEWAGE TREATMENT PLANT*

The domestic sewage generated on the site will be collected by sanitary sewers and conveyed to an extended aeration mechanical sewage treatment plant. The proposed plant meets Manitoba Conservation requirements, and will meet 25/25 mg/L Five-day Biochemical Oxygen Demand (BOD5) andTotal Suspended Solids

(TSS) targets. The plant design incorporates nitrification to reduce ammonia concentrations in the effluent to within Manitoba Conservation's winter and summer restrictions. Nitrogen or phosphorous removal is not expected to be required, since the discharge will flow into the catchment area of Lake Winnipeg.

The sewage treatment plant will be located east of the maintenance building to allow all sewage to flow by gravity to the plant. A separate sewage pumping station with a fibreglass tank will be located at the modular complex facility to pump the raw sewage from the complex building to the sewage treatment plant. The treatment plant will accommodate 450 people at 230 L/c/d plus 10% for the water treatment plant backwash. The average daily flow will be 113,800 L/d.

The per capita BOD5 contribution will be 0.091kg/c/d. The daily BOD5 loading will be 40.9 kg BOD5/d.

The tanks, which will be buried, will be constructed with fibreglass materials that meet CSA BL66 standards. The effluent will be disinfected using ultraviolet (UV) radiation.

The treated effluent will be discharged to the waste receiving pump box, and then discharged to the tailings management area. The treatment plant will include an on-line lockable refrigerated composite sampler that will available to Manitoba Conservation for independent effluent sampling. Treated effluent sampling and analyses to detect BOD5, ammonia, TSS, and fecal coli forms, will be performed on a monthly basis.

The sewage treatment plant will use an extended aeration system, supplied by Canwest Tanks and Ecological Systems Ltd. or equivalent.

A two-compartment fibreglass tank will receive the raw sewage. The tank will be divided into a sludge storage tank and a flow equalization chamber. The flow equalization chamber will also serve as a raw sewage lift station and will contain dedicated submersible pumps, one for each aeration treatment train, complete with float switches and a control panel. The raw sewage will enter the sludge storage chamber, which will also serve as a primary clarifier. The sewage will then overflow into the lift station.

Two identical aeration treatment trains, each rated at 2.4 $m^3$/h, will be provided to handle the average day flow of 4.7 $m^3$/h. The volume of each aeration tank will be approximately 56,900 L. The tanks will include a fixed media system for retention of nitrifying bacteria during the cold weather operation.

Sludge return will be performed with air lift pumps. Mixed liquor will be pumped continuously from each aeration tank and returned to the sludge storage compartment.

UV disinfection will be performed, and an effluent pumping station will collect the effluent from each aeration basin, disinfect it, and then pump it via an insulated heat-traced 75 mm diameter HDPE force main to the tailings pump box in the mineral processing plant.

Spare off-the-shelf parts will be supplied for critical items such as pumps, blowers, motors, UV sleeves and bulbs, UV ballasts. There will also be a general inventory of spare parts.

A grease trap will be installed at the discharge from the camp kitchen prior to the connection with the sewer system.

The sludge storage tank will be periodically de-sludged using three submersible pumps installed in the sludge storage tank. The sludge will be pumped into a tanker truck and hauled to the lagoon at Grand Rapids for disposal. The estimated sludge production is 0.15 to 0.23 $m^3$/h.

An insulated pre-fabricated building will house the blowers, control panel, sampler and similar equipment. The building will be skid-mounted and installed on a crushed stone base. There will be no special electrical code requirements since none of the electrical equipment will be exposed to sewage or sludge.

A lockable, refrigerated composite sampler will be installed in the blower building.

### 8.9.2 POTABLE WATER TREATMENT PLANT

The potable water supply will be drawn from the fresh/fire water storage tank and the ground water wells. Potable water will be used for the safety shower/eye wash stations, personal consumption, washrooms, canteen and dry. Potable water will not be used for fire water, process water or general plant distribution.

Since raw water will be supplied from a confined aquifer, it is not considered Groundwater Under Direct Influence of Surface Water (GUDI). Accordingly, no special preventitive precautions will be needed for giardia, cryptosporidium or similar parasites.

Potable water treatment will consist of a bank of manganese greensand pressure filters to remove iron and manganese less than 0.05 mg/L and 0.3 mg/L, respectively. The aesthetic limits are recommended by Manitoba Conservation as well as Health Canada's Canadian Guidelines for Drinking Water Quality. The filtration rate will be 6.1 $m^3$/hr per $m^2$.

Post-chlorination treatment will be performed by sodium hypochlorate (bleach) with an inline residual chlorine analyser. If the chlorine residual exceeds the range of the high and low level set points, an alarm will alert the operator to review the problem and adjust the chlorine levels appropriately.

The treatment plant will include enough treated water storage to accommodate an average day's consumption, expected to be 4.3 $m^3$/hr; peak demand flows are expected to reach up to 17.3 $m^3$/hr. The treatment plant will be located west of the modular complex building since the complex building requires the greatest amount of potable water. Potable water will be pumped to the other areas including maintenance building, primary crusher building, crushed ore delivery tunnel, security building, and frac sand plant.

### 8.9.3 *SITE INFRASTRUCTURE PIPING*

Water supply pipes and sewers will be High Density Polyethylene (HDPE) and will be buried on a benched part of the roadways to prevent freezing. In high density peat areas, concrete pipe weights may be require to secure the pipes and prevent flotation.

The domestic sewers will be 50 to 200 mm diameter low pressure force mains in some areas. Gravity sewers will be utilized in areas with suitable ground conditions.

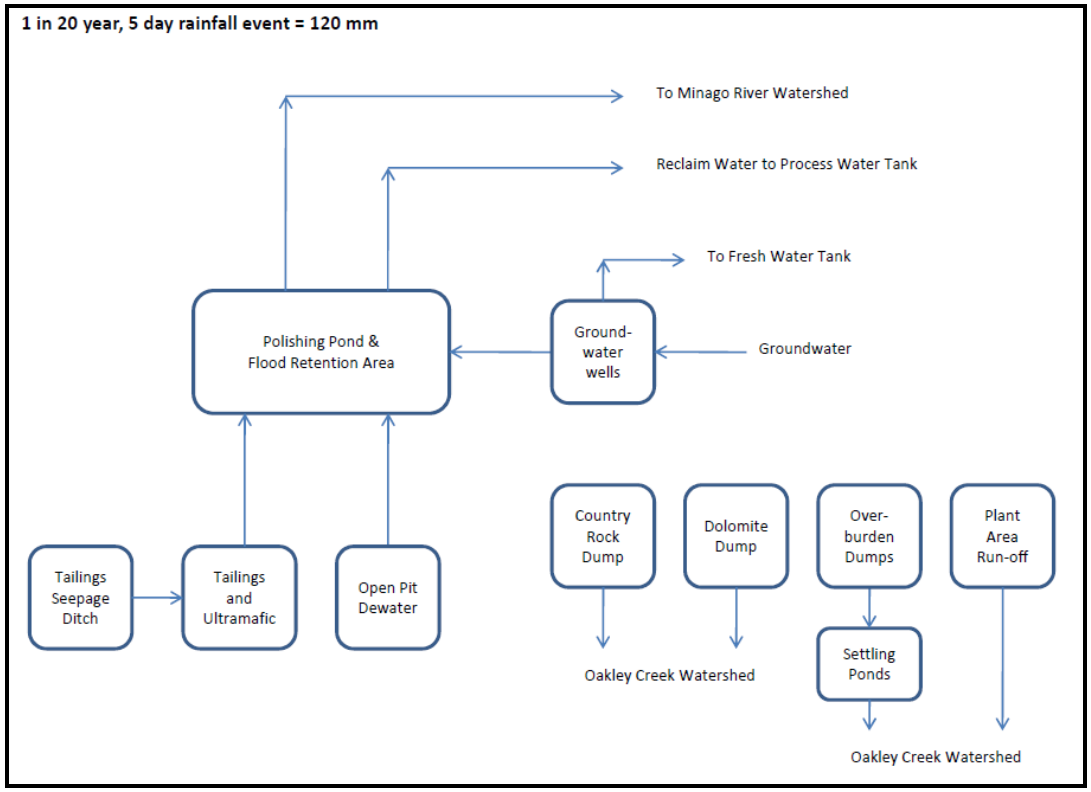
## 8.10 STORM WATER MANAGEMENT

The site storm water management is designed to accommodate a 1-in-20 year storm event over a 5-day period (120 mm). The general site storm water management plan will comprise the following componenets:

- The stormwater falling on non-process areas including the Dolomite Limestone and Country Rock Dumps will report to the natural environment.
- The major facilities such as the Open Pit Mine, TWRMF and Polishing Pond will be isolated with sealed dykes integral with the perimeter roads.
- The major cross-site ditch will report to the ditch at Highway 6 and to the Oakley Creek through the low lying marsh on the east side of Highway 6.
- Process water from the TWRMF and Open Pit surface pumping will report to the Polishing Pond before being pumped to the Minago River.
- After closure the water from the polishing pond will be discharged into the cross-ditch to report to the Oakley Creek.
- Settling ponds will be built to control major events in the Overburden Disposal Facility area as well as run-off through the cross-site ditch from the plant and camp facilities.

The simplified water block diagram (Figure 8.2) outlines the overall flow of water through the site.

**Figure 8.2 Site Water Block Diagram**




### 8.10.1 ULTRAMAFIC ROCK DUMP

The ultramafic waste will be dumped directly into the TWRMF, limiting the potential contamination to a single dump area. The ultramafic waste will be deposited by a perimeter ramp along the inside of the tailings area, which will allow for co-depositing. The tailings will be discharged into the voids of the ultramafic waste. The ultramafic waste and tailings area is designed to accommodate a 1-in-20 year, 5-day major rainfall event. The nominal discharge in this area will be increased and pumped over a two week period during such an event.

### 8.10.2 OVERBURDEN DISPOSAL FACILITY

The Overburden Disposal Facility dump area will be stored within a containment berm. Weirs will allow water to discharge to the settling ponds, which will be used for storage of excess water and precipitation. Due to restraints on TSS, the settling ponds will be used for settlement prior to discharging to the Oakley creek water shed. Flocculent addition may be required to meet water quality. Placement of material in the Overburden Disposal Facility will be complete within the first two years of construction and vegetation of the surface will occur immediately after completion.

During a 1-in-20 year, 5-day major rainfall event, the settling ponds will be used for settlement and storage with the presence of an overflow line to discharge benign rainfall. Once the vegetation is established, it is anticipated the rainfall will be benign and will meet TSS water quality standards. The area boundaries of the Overburden Disposal Facility dump will contain a permeable dyke/road which will contain a filter cloth and sand bed to filter the water through the roadway. Due to the benign nature of the runoff, water will be discharged to the environment instead of the flood retention area.

### 8.10.3 PLANT AREA

The plant area runoff including the frac sand plant and sand storage pile will be clean water and can be discharged directly to the environment. Since the plant area is located in the northwest corner of the site, benign rainfall will runoff through the roadway ditches to the Overburden Disposal Facility settling pond as well as runoff to the Oakley creek watershed.

### 8.10.4 DOLOMITE & COUNTRY ROCK DUMPS

The non-reactive dolomite and country rock will be hauled to the designated dump areas shown in the attached site plan. Since the rock is non-reactive and will not contain contaminants, direct runoff to a local watershed will suffice. The majority of the runoff will discharge directly to the environment, while a minimal amount will runoff to the roadway ditches and eventually to the Overburden Disposal Facility settling pond. There are no anticipated problems with TSS during a major event due to the nature of coarse waste rock.

### 8.10.5 POLISHING POND & FLOOD RETENTION AREA

During a 1-in-20 year, 5-day major rainfall event (120 mm), the polishing pond and flood retention area will acquire approximately 550,000 $m^3$ of water over a surface area of 750,000 $m^2$, which will produce an average depth of approximately 0.75 m throughout the settling area. The roads surrounding the polishing pond and flood retention area will have a minimum height of 1 m (0.75 m depth and 0.25 m freeboard). This height will allow for sufficient water storage capacity for the effects of rainfall on the open pit and TWRMF during a major event.

The majority of the site water accumulated in the polishing pond and flood retention area will be pumped to the Minago river water shed while 12,000 $m^3$/d will be diverted to the process water tank as reclaim water (see **Error! Reference source not found.**Figure 8.2) Due to the high head and flow capacities, three 600 hp vertical turbine pumps will be used to generate the flow through an 800 mm (32”) HDPE pipe to the Minago River watershed. In the summer months, the water will be discharged to the Minago River watershed by a distribution manifold, while in winter months the pipe outlet will discharge directly to an open ditch after the distribution manifold.

## 8.11 DE-WATERING FACILITIES

Open pit dewatering will be accomplished by perimeter groundwater pumps as well as open-pit centrifugal and submersible pumps to properly dewater the pit.

The groundwater pumps will consist of twelve 75 hp Grundfos groundwater pumps which will discharge approximately 35,000 $m^3$/d directly into the retention area while 5,000 $m^3$/d will be diverted to the fresh water tank.

The open-pit will be de-watered by the use of 11 centrifugal pumps and 6 submersible pumps. The dewatering pumps were sized to accommodate a 1-in-20 year, 5-day major rainfall event, and to eliminate down times within the pit due to flooding and will allow for the pit to be dewatered more rapidly. Pumping stations will be located on designated levels throughout the pit to optimize head loss and pipe lengths. The open pit dewatering will be performed by three separate pumping loops in series and will discharge to the polishing pond and flood retention area.

## 8.12 ELECTRICAL POWER SYSTEM

### *8.12.1 INCOMING POWER SUPPLY*

The primary source of electrical power will be the Manitoba Hydro 230 kV line along the east side of Highway 6. From the connection at Highway 6, a 6-km, 230 kV power transmission line will feed the main substation located to the west of the process plant in the northwest corner of the site.

The connection from the Manitoba Hydro 230 kV line will be provided with gas-filled isolation switches.

### *8.12.2 MAIN SUBSTATION*

The main substation will consist of two main transformers rated at 50 MVA each capable of supplying the full load. The transformers will transform the power down from 230 kV to 13.8 kV to the main 13.8 kV switch room via metal clad switchgear.

The system is sized and configured for full redundancy, allowing the transformers to operate in parallel or individually while maintaining full production. Each transformer must accommodate the full operational loads in the event of a failure of the other. Details of the switching and isolation provisions for the transformers are detailed on the electrical single line drawings E0001 and E0005.

The main sub-station will be protected by a secure chain link fence surrounding a crushed stone bed for easy maintenance and to ensure effective drainage.

### 8.12.3 SITE POWER DISTRIBUTION

Power from the main switchgear room will be distributed at 13.8 kV via overhead line to the various distribution centres around the site. Details of the distribution of power around the site are given on the electrical single line drawings E0001, E0005, E0015, E0016 and E0017. As necessary; outdoor oil filled transformers will transform the primary 13.8 kV to 6,600 V, 4160 V and 600 V.

*Open Pit Mining:* A 13.8 kV overhead distribution line circling the pit will provide power to the pit shovels, drills, dewatering pumps and surface pumps. Outdoor oil filled transformers on portable substations will transform from 13.8 kV to 6.6 kV to feed the shovels and drills for mining. Within the pit, other portable substations will transform the primary 13.8 kV to 600 V to power the dewatering pumps.

*Ore Processing Plant:* The ore processing plant, including crushing and grinding will be provided with separate electrical rooms to support the motor control centres for the facility. The ball mill and SAG mill will operate at 4160 V and will be provided with liquid rheostat starters. The primary crusher, cyclopack pump with VFD and process water pumps which will operate at 4160 V will be provided with soft starters to reduce inrush current. Motor control centers will be housed in two electrical rooms, one above the other; the upper room will house the low voltage switchgear and the lower room is dedicated to the medium voltage equipment. A separate MCC will be installed in the gyratory crushing plant to house 4160 V and 600 V switchgear associated with this building.

*Frac Sand Processing Plant:* The frac sand plant will be powered from the main switchgear by its own overhead 13.8 kV line. Outdoor oil filled transformers will transform from 13.8 kV to 600 V to feed the various loads. From a separate room, the motor control centers and 600 V panel boards will distribute power in each area.

*General:* The modular complex building, water treatment plant, maintenance building, fueling area, emergency building and sewage treatment plant will be provided with power via an overhead 13.8 kV line. At these locations, outdoor oil-filled transformers will transform primary power at 13.8 kV to 600 V to feed the various loads. From a centrall-located room, motor control centers and 600 V panel boards will distribute power in each of these areas.

*Site Facilities:* Another 13.8 kV overhead distribution line will feed the polishing pond pumping station, the water discharge line, the explosive plant, and the tailings management area. An extension from the open pit 13.8 kV overhead line will service the guardhouse and scalehouse located at the site entrance. Each plant and pumping station will have the necessary transformation and motor control centers for their application.

### 8.12.4 EMERGENCY POWER

Two diesel generator sets rated at 1.5 MW, 13.8 kV with associated switchgear will be housed in a dedicated building located near the main electrical substation.

The system will be designed to provide power during the construction phase, and then emergency power during the operations phase for life-sustaining and critical process equipment. The emergency power system will feed the entire plant grid with operators isolating non-emergency switchgears to direct the standby power to the critical services. The emergency power will provide critical power to the dewatering pumps in the event of a utility power failure.

A trade-off study was conducted to determine if the additional capital cost of installing a line from William Lake would off-set the cost of diesel fuel during construction. The trade-off report for Minago Power Supply 0751331011-REP-E0003-00 determined that diesel generators were the most economical solution. In addition, diesel generators provide redundancy as both the 230 kV primary power and the 66 kV line from William Lake would both feed from the main 230 kV Manitoba Hydro AC Line.

Details of the emergency power requirements and the switching arrangement are shown on the electrical single line drawing, E0005.

### 8.12.5 ESTIMATED LOAD

The peak connected load is estimated to be 42.4 MW (50 MVA), based upon the power requirements of operations and auxiliary equipment on the site and an average power factor of 0.85. The operational load was estimated by analyzing load characteristics and applying a load factor of 0.75 and a utilization factor of 0.8 to the connected load. The effects of seasonal variation in load were analyzed and determined to be negligible. The estimated operating load for the five cost centres including future growth is 30.0 MVA.

**Table 8.2 Estimated Electrical Loads for Cost Centres**

| | Cost Centre | Connected Load (MVA) | Operational Load (MVA) |
|---|---|---|---|
| 1 | Open Pit Mining | 14.3 | 8.6 |
| 2 | Frac Sand Processing Plant | 2.5 | 1.5 |
| 3 | Ore Processing Plant | 23.4 | 14.0 |
| 4 | Site Facilities/General & Admin | 5.2 | 3.1 |
| 5 | Future Growth | 4.6 | 2.8 |
| | **Total** | **50.0** | **30.0** |

## 8.13 PROCESS PLANT CONTROL SYSTEM

The process plant control system will utilize a distributed control system (DCS) with PC-based operator interface system (OIS) located in two control rooms. The DCS, in conjunction with the OIS will perform necessary equipment and process interlocking, control, alarming, trending, event logging, and report generation. DCS input/output (I/O) cabinets will be located in small electrical rooms throughout the plant, interconnected through a plant-wide fibre optic network.

Field instruments will be microprocessor-based "smart" type devices. These will be grouped by process area, and wired to respective areas using local field instrument junction boxes. Signal trunk cables will connect the field instrument junction boxes to the DCS I/O cabinets.

Intelligent-type motor control centers (MCCs) will be located in electrical rooms throughout the plant. A serial interface to the DCS will facilitate the MCC's remote operation and monitoring.

The plant control rooms will require to be staffed by trained personnel during periods of operation.

### *8.13.1 PRIMARY CRUSHING CONTROL SYSTEM*

A single OIS will be installed in the primary crushing building to monitor crushing and conveying operations onto the coarse ore stockpile including:

- plugged chute detection at all transfer points
- zero speed switches, side travel switches, emergency pull cords, and belt rip detection on conveyors
- weightometers on selected conveyors to monitor feed rates and quantities
- equipment bearing temperatures and lubrication system status
- Vendors' instrumentation packages.

To control and monitor mill building processes, three OISs will be installed in the building's central control room. The operator interface controllers (OIC) will control and monitor the following:

- grinding and pebble crushing conveyors using zero speed and side travel switches, emergency pull cords and plugged chute detection
- grinding mills to measure mill speed, bearing temperatures, lubrication systems, clutches, motors, and feed rates
- pebble crushers to measure speed, bearing temperatures, lubrication systems, motors, and feed rates

- particle size monitors to ensure grinding optimization
- pump box, tank, and bin levels and variable speed pumps
- cyclone feed density controls
- thickener drives, slurry interface levels, underflow density, and flocculants
- flotation cells for level controls, reagent addition, and airflow rates
- samplers and x-ray analyzer to ensure flotation optimization
- concentrate pressure filter and load out
- reagent handling and distribution systems
- tailing disposal
- water storage, reclamation, and distribution, including tank level automatic control and fuel storage using radio linked remote I/O
- air compressors
- vendors' instrumentation packages.

## 8.14 LIFE SAFETY AND SECURITY SYSTEMS

The fire alarm and detection systems will be analog addressable systems from a single manufacturer with a proven and reliable technology. The system will integrate all detection and annunciation devices with the main annunciation panel located at the security station.

The security system will employ proven and reliable technology to integrate door alarms and motion sensors for key areas into a central system monitored at the security station. The system will also provide monitored card access for offices, IT rooms and other secure areas.

## 8.15 DATA AND COMMUNICATIONS

The telecommunications design will incorporate proven, reliable and state-of-the-art systems to ensure personnel at the mine will have adequate data, voice and other communications channels available. The telecommunications system will be procured as a design-build package with the base system installed during the construction period then expanded to encompass the operating plant.

The design will include:

- a Voice Over Internet Protocol (VoIP) telephone system
- satellite communications for voice and data

- ethernet cabling for site infrastructure
- wireless Internet access
- two way radio communications at site
- satellite TV.

A main telecommunications centre, the central equipment office will comprise a pre-manufactured trailer. Prior to shipment, the main communications contractor will install and test the main sub-systems for the facilities. The trailer will form the first block in a system to support the initial construction needs and then the operating needs of the project following construction.

Spare parts for critical and main components will be provided to ensure maximum reliability, and minimum down time. A variety of communications media will be incorporated in the overall design to suit the phasing requirements. During the construction phase, these media will be copper and wireless and during the operating phase fibre optic.

The requirements for communications, particularly satellite bandwidth, are a function of the voice and data requirements of the active participants in the project. The expectation is that the need for satellite bandwidth will build to a peak during the plant construction phase, and then taper off slightly as the initial construction crew yields to plant operations.

Technologies and services that will be provided during the construction phase will include:

- local VOIP wireless network
- satellite link for Voice, Data and Video services
- personal computer Local/Wide Area Network (PC LAN/WAN)
- trunked mobile radio system
- internet service
- private telephone system for voice and fax
- video conferencing to minimize travel during design and construction
- ground-go-air communications system (VHF Radio)
- cable television (CATV) on independent satellite system

Technologies and services that will be provided during the operation phase include the following selected services in addition to those above:

- process monitoring and control for efficient operation and maintenance
- fibre optic cabling for plant wide communications

- security access control
- CCTV for process, security and safety

CCTV cameras will be installed at various locations throughout the plant, including the primary crushing facility, the stockpile conveyor discharge point, the stockpile reclaim tunnel, the SAG and pebble crushing area, and the concentrate handling building. The cameras will be monitored from the plant control rooms.

### 8.15.1 SITE WIDE RADIO COMMUNICATIONS SYSTEM

The site radio communication system will operate in simplex and duplex modes. In simplex mode, only one user may communicate at a time. The system will also be capable of transmitting and receiving both voice and data. The surface site communication system will be capable of connecting to the future underground leaky feeder communication system. Also, ultra high frequency (UHF) and microwave point-to-point communications may be used to augment the capability of the system where necessary.

Site wide communications system will be comprised of the following:

- fixed radios/repeaters
- portable radios
- frequency assignment/approvals.

### 8.15.2 SITE WIDE FIBRE COMMUNICATIONS SYSTEM

The site fibre communication system will be capable of operating in single and multimode depending on the length of fibre run. The fibre trunk will act as the main route of communication for the process LAN, business LAN, VoIP communication, and possibly security communication. The fibre trunk will connect all areas to the process mill and office complex.

Site wide fibre communications system will comprise of the following:

- fibre interface panels
- managed ethernet switches
- fibre optic trunk.

## 8.16 WASTE DISPOSAL

The site waste disposal including all domestic garbage disposals will be accumulated in designated garbage areas and will be hauled from the Minago site to the municipal

dump in Grand Rapids. It is anticipated the waste disposal will be provided on a weekly basis.

# 9.0 TRANSPORTATION

## 9.1 TRANSPORTATION ROUTES

The Minago Property is located directly adjacent to Manitoba Provincial Highway 6, a major north-south highway transportation route. The Property may be served by the Hudson Bay Railway Company (HBR), with rail lines accessible from Ponton, MB, approximately 65 km north of the mine site.

**Figure 9.1 Minago Shipping Route**




## 9.2 INBOUND FREIGHT

Due to the Property's proximity to Provincial Highway 6, Wardrop assumed that all inbound freight for equipment and construction services will arrive by highway transportation. Quotations for major pieces of mechanical equipment have been provided with separate freight prices. The freight costs for equipment and construction services will form part of the indirect costs for capital expenditures.

The following equipment list represents the items for which separate freight costs were requested.

- Sag Mill
- Ball Mill
- Apron Feeders
- Hydrocyclones
- Rock Breaker
- Cranes and Hoists
- Gyratory Crusher
- Pebble Crusher
- Flotation Cells
- Vibrating Screens
- Thickeners
- Filter Press
- Conveyors

Operational inbound freight will arrive via road transport. The major transportation hubs closest to the Minago site are Winnipeg and Churchill, Manitoba.

## 9.3 CONCENTRATE TO SMELTER TRANSPORTATION

During the PEA study, Wardrop considered the transportation options for several possible final smelter locations to which the nickel concentrate from the Minago Project might be saleable, including:

- containerized shipping to a smelter in China
- containerized shipping to a smelter in Finland
- bulk shipping by rail to Montreal then by sea to a smelter in Finland
- bulk shipping by rail to Sudbury, ON
- bulk shipping by rail to Thompson, MB.

Other transportation options were considered, such as bulk shipping from a west coast port or through the port in Churchill, MB. In each of the west coast options, Wardrop determined that the existing infrastructure at these ports to store, bulk load, and ship the nickel concentrate was inadequate. The capital cost to construct a facility of this capacity in this northern environment could be prohibitive.

Wardrop determined that shipping the concentrate by typical highway-type tractor trailer for 223 km (one way) to the smelter in Thompson, MB, was the most viable option.

Wardrop explored the possibility of outsourcing shipping to a trucking company with the equipment and experience in transporting concentrate to Thompson. A budgetary quotation of $32.52/t (or $29.50/ton) was received from Kleysen Group LP (Kleysen) of Winnipeg, MB. Kleysen has been transporting nickel concentrate from their depot in Winnipeg to Thompson for a number of years. The Kleyson quotation is provided in Appendix H-1.

## 9.4 FRAC SAND TRANSPORTATION

A separate study titled “Transportation Analysis for the Minago Sand Project” (Wardrop, 2008) was completed for frac sand products to examine potential methods of bulk transportation from the Minago operation, such as railroad and highway-type haul trucks.

For the purposes of this report, it was assumed that the sand products produced at the Minago operation will either be trucked from the mine site directly to buyers, or trucked to a rail siding located at Ponton, MB, where it will be loaded into rail cars for onward shipment. This siding would be serviced by HBR, which has a working relationship with CN Rail. Alternatively, the sand may be trucked into Winnipeg where both CN Rail and CP Rail lines can be accessed.

The primary market destinations investigated for sand were:

- Fort Nelson and Prince George in British Columbia (BC), which service the BC Shales
- Medicine Hat, Alberta (AB), and Grande Prairie, AB
- Weyburn/Estevan in Saskatchewan (SK), which services the Bakken Field
- Houston, Texas (TX), which services the Barnett Shales.

These destinations were identified as the current distribution centres for frac sand. Based on these destinations, quotations were acquired, and a cost analysis was performed.

Wardrop chose to explore a shipping option that would involve a mix of several shipping companies and transportation methods, in order to minimize risk and accommodate the expected volume of frac sand.

The selected transportation mix is outlined in Table 9.1.

**Table 9.1 Final Sand Transportation Mix**

| Destination | Company | Price ($/t) | Annual Freight Tonnages | Comments |
|---|---|---|---|---|
| Weyburn/Estevan, SK | Sand Source | **75.00** | 158,437 | Trucked direct, one third of sales of 20/40, 30/50 |
| Houston, Texas, USA | Kleysen Group | **121.25** | 225,000 | Truck/rail via Winnipeg, all 50/150 up to 225,000 t/a (constraint from rail) |
| Thompson, MB | Kleysen Group | **25.00** | 62,500 | Truck direct all flux sand |
| Fort Nelson, BC | CN Rail | **103.51** | 552,743 | Truck/rail via Ponton, all 40/70 and remain 50/150 |
| Grand Prairie, AB | CN Rail | **81.32** | 144,125 | Truck/rail via Ponton, one third production sold of 20/40, 30/50 |

## 9.5 ENVIRONMENTAL IMPACT

There is no significant increase in environmental impact from these transportation decisions because current and well-established transportation routes and practices already exist on the Provincial Highway 6 corridor.

## 9.6 WORKFORCE LOGISTICS

The Minago operation will be staffed by workers on a rotating 14-day basis. The majority of the operational workforce will be comprised of residents from surrounding local communities. Victory Nickel may provide bus service to and from the mine site through a contracted local bus company.

# 10.0 STAFFING AND PERSONNEL DEVELOPMENT

## 10.1 OVERVIEW

Well trained, qualified personnel are essential to a successful operation. The correct staffing levels and the requirements in each category define the basis for assessing labour operating costs. Out of a total contingent of 422 employees, 349 will be employed directly by Victory Nickel and the balance of 73 will be staff contracted to a service supplier.

## 10.2 STAFFING ARRANGEMENTS AND AUGMENTED STAFF

The schedule implements the following staffing arrangements:

- **Regular day-time employment:** this arrangement applies to managerial and professional staff working a 40-hour, 5-day week, 8 hours per day.
- **Regular four-shift employment:** this arrangement applies to skilled and semi-skilled staff working a 12-hour day, 7 days per week, 2 weeks on and 2 weeks off.

In estimating labour requirements, augmented staff allowances were provided for the various employee categories to account for absences due to vacation, training, or sick leave. An estimated augmented staff factor of 12% was allowed for in each work force category.

## 10.3 LABOUR RATES

The labour rates used in the preparation of operating costs were referenced from the Canadian Mine, Salaries, Wages and Benefits, 2007 Survey Results, published by InfoMine USA, Inc. These rates were then adjusted to account for the specific shifting and employee burden rates applicable in Manitoba to reflect the Minago operation as per spreadsheet provided in Appendix I-1.

The burdens for hourly, four shift employees include:

- Statutory holidays (8 days/yr)

- Approx. 2,100-2,200 hrs/yr
- Paid Vacation Time (2 wks/yr)
- Other benefits (including health and disability insurance)
- Canada Pension Plan Contribution
- Employment Insurance Premium
- Workers Compensation Insurance

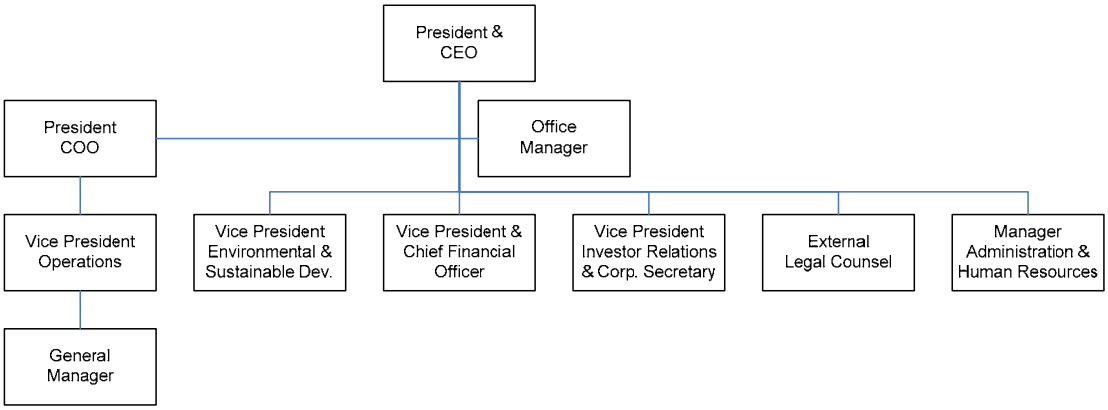
These burdens are calculated to be between 25% to 29% for the average four-shift employee.

For regular hourly employees, the burden rate could be increased to 35% to allow three weeks vacation plus other additional benefits.

## 10.4 CORPORATE MANAGEMENT

The Corporate Organization Structure, which includes the Victory Nickel staff resident at the head office, is shown in Figure 10.1.

**Figure 10.1 Senior Management Corporate Organization Structure**




Victory Nickel intends to maintain its corporate office in Toronto and retain external legal counsel.

For various senior management positions, the pay categories and the salaries are developed by area. For purposes of this study, $500,000 per annum has been allocated for services chargeable to the Project.

## 10.5 MINE SITE ORGANIZATION STRUCTURE

The organization structure at the mine site will be headed by the General Manager, with direct reporting from the following operational and administrative departments:

- Maintenance Department
- Mining Department
- Processing Department
- Geology Department
- Engineering Department
- Human Resources Department
- Environmental Department
- Mine Controller Department

The staffing of each department is provided in Table 10.1. There will also be dual functional reporting lines with the following mine personnel reporting to corporate positions.

- Mine Controller
- Mine Environmental Manager

**Table 10.1 Department Staffing (Including Contracted Services Personnel)**

| Department | No. of Personnel |
|---|---|
| Maintenance Department | 94 |
| Mining Department | 121* |
| Processing Department | 94 |
| Geology Department | 4 |
| Engineering Department | 5 |
| Human Resources Department | 14 |
| Environmental Department | 5 |
| Mine Controller Department | 14 |
| Contracted Services Personnel | 71 |
| **Total** | **422** |

*includes two contract employees

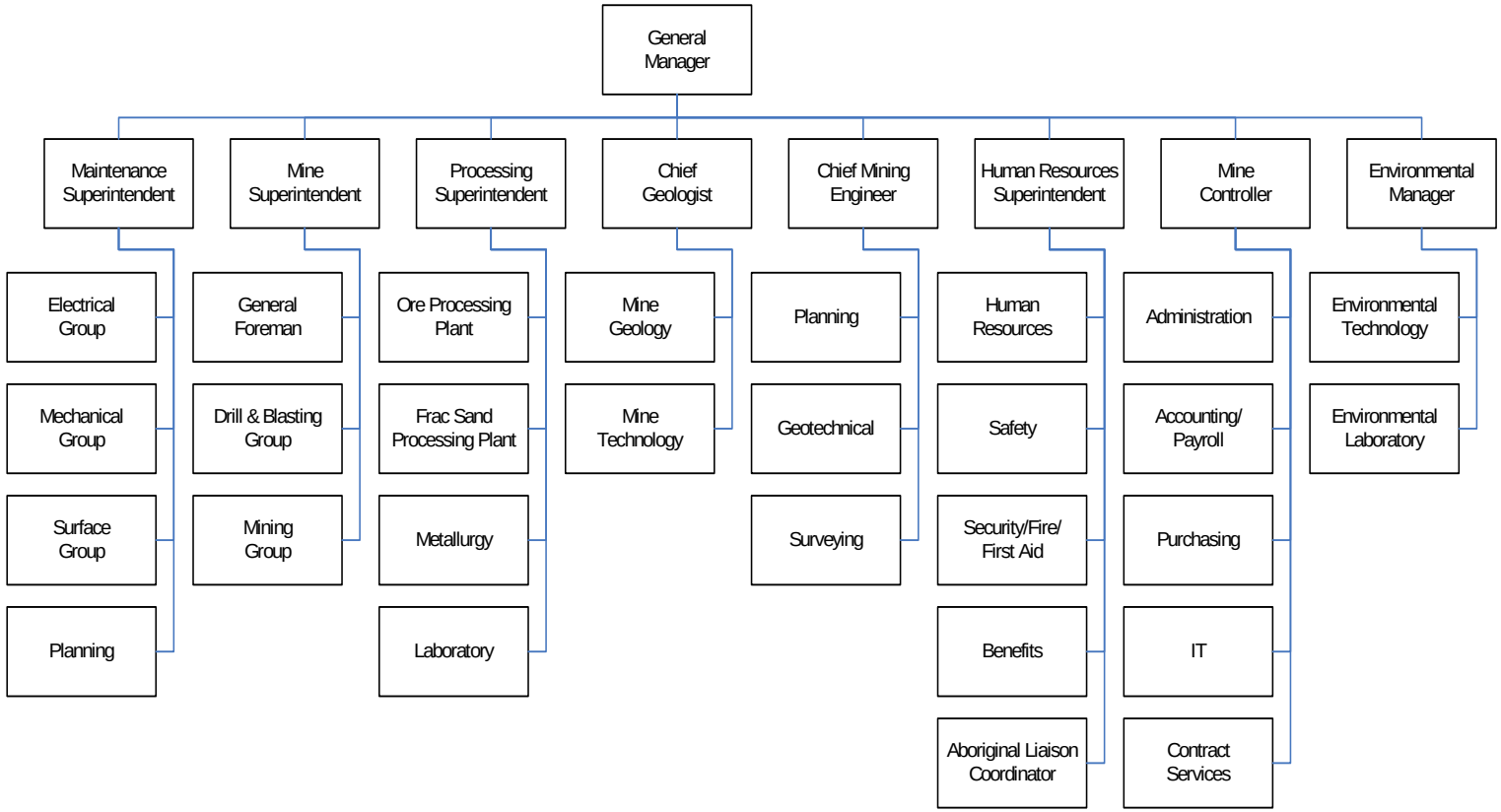
The number of personnel supports shift rotation and augmented staff.

The proposed Mine Management Organization Chart for the Project is provided in Figure 10.2.

The work force schedule will change each year. The staffing levels have been assessed to take vacations, training, and absence relief into account for the various categories.

The full Workforce Schedule, which summarized in the departmental summaries below (Tables 10.2 to 10.10) is attached in Appendix I-2

**Figure 10.2 Mine Management Organization**



### 10.5.1 MAINTENANCE DEPARTMENT

The Maintenance Superintendent, who reports to the General Manager, has overall responsibility for maintenance.

The pay categories and salaries for the staff for the Maintenance Department are provided in Table 10.2.

**Table 10.2 Maintenance Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Maintenance Superintendent | 1 | Surface Facilities | $56.86 | $125,146 |
| Planning Clerk | 1 | Surface Facilities | $43.36 | $95,437 |
| Electrical Foreman | 1 | Surface Facilities | $46.38 | $102,079 |
| Electrician (Surface Facilities) | 2 | Surface Facilities | $33.51 | $73,751 |
| Electrician (Mine) | 4 | Mining | $33.51 | $73,751 |
| Electrician (Processing) | 4 | Processing | $33.51 | $73,751 |
| Electrician Helper (Surface Facilities) | 2 | Surface Facilities | $28.10 | $61,838 |
| Electrician Helper (Mine) | 4 | Mining | $28.10 | $61,838 |
| Electrician Helper (Processing) | 4 | Processing | $28.10 | $61,838 |
| Mechanical Foreman | 1 | Surface Facilities | $46.38 | $102,079 |
| HD Mechanics | 16 | Mining | $33.51 | $73,751 |
| LD Mechanics | 4 | Surface Facilities | $33.51 | $73,751 |
| Drill Repairman | 1 | Surface Facilities | $33.51 | $73,751 |
| Welders | 10 | Mining | $33.51 | $73,751 |
| Tire Men | 2 | Mining | $33.51 | $73,751 |
| Labourers | 4 | Surface Facilities | $26.29 | $57,871 |
| Surface Foreman | 1 | Surface Facilities | $46.93 | $103,287 |
| Carpenters | 1 | Surface Facilities | $33.51 | $60,841 |
| Plumber | 1 | Surface Facilities | $33.51 | $60,841 |
| Operators (processing) | 2 | Processing | $33.51 | $73,751 |
| Operators (Surface Facilities) | 10 | Surface Facilities | $33.51 | $73,751 |
| Machine Shop | 2 | Surface Facilities | $33.51 | $73,751 |
| Sanitary Disposal | 4 | Surface Facilities | $26.29 | $57,871 |
| Radio Tech | 1 | Surface Facilities | $26.29 | $57,871 |
| Water Management | 2 | Surface Facilities | $33.39 | $73,482 |
| Augmented Staff (Surface Facilities) | 5 | Surface Facilities | $26.29 | $57,871 |
| Total | 94 | | | |

### 10.5.2 MINING DEPARTMENT

The Mine Superintendent responsible for the open pit mining operations will report to the General Manager who will be responsible for the daily mine production. The pay categories and salaries for the staff for the Open Pit Mining are provided in Table 10.3.

**Table 10.3 Mining Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Mine Superintendent | 1 | Mining | $61.74 | $135,894.93 |
| Planning Clerk | 1 | Mining | $57.41 | $126,354.10 |
| Drill & Blast Foreman | 4 | Mining | $46.38 | $102,079.33 |
| Drill Operator | 12 | Mining | $33.51 | $73,750.92 |
| Drill Helper | 4 | Mining | $29.91 | $65,820.80 |
| Blaster | 2 | Mining | $31.26 | $68,806.19 |
| Blaster's Helper | 2 | Mining | $26.74 | $58,852.90 |
| Mining Forman | 4 | Mining | $46.38 | $102,079.33 |
| Labourers | 4 | Mining | $26.29 | $57,870.83 |
| Loader Operators | 12 | Mining | $33.51 | $73,750.92 |
| Truck Drivers | 56 | Mining | $33.51 | $73,750.92 |
| Compressor Operator | 4 | Mining | $33.51 | $73,750.92 |
| Explosives Plant Operators | 2 | Mining | Contracted | Contracted |
| Augmented Staff | 13 | Mining | $33.51 | $73,750.92 |
| Total | 121 | | | |

### 10.5.3 PROCESSING DEPARTMENT

The Processing Superintendent, who will be responsible for the nickel ore and sand processing operations will report to the General Manager. The Processing Superintendant will be responsible for daily processing production.

The pay categories and salaries for the staff for the Processing Department are provided in Table 10.4

**Table 10.4 Processing Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Processing Superintendent | 1 | Processing | $58.56 | $128,890 |
| Shift Supervisor | 4 | Processing | $45.50 | $100,147 |
| Control Room Operators | 4 | Processing | $33.06 | $72,765 |
| Millwrights | 4 | Processing | $31.72 | $69,812 |
| Labourers | 8 | Processing | $26.29 | $57,871 |
| Crusher Operator | 4 | Processing | $31.72 | $69,812 |
| Grinding Operators | 4 | Processing | $31.72 | $69,812 |
| Flotation And Dryer Operators | 8 | Processing | $31.72 | $69,812 |
| Reagent Operators | 2 | Processing | $29.00 | $63,836 |
| Samplers | 4 | Processing | $28.10 | $61,838 |
| Concentrate Load Out | 4 | Processing | $26.29 | $57,871 |
| Frac Sand Plant Supervisor | 4 | Sand | $45.89 | $100,147 |
| Dry Plant Operator | 4 | Sand | $33.06 | $72,765 |
| Wet Plant Operator | 4 | Sand | $33.06 | $72,765 |
| Load Out operator (At Rail Siding) | 4 | Sand | $26.29 | $57,871 |
| Labourers | 8 | Sand | $26.29 | $57,871 |
| Sand Shipping & Dispatcher's | 1 | Sand | $45.89 | $97,490 |
| Metallurgy Technician | 1 | Processing | $57.24 | $93,867 |
| Senior Metallurgist | 1 | Processing | $57.24 | $125,992 |
| Metallurgical Technician | 1 | Processing | $57.24 | $93,867 |
| Chief Chemist / Assayer | 1 | Processing | $42.65 | $90,848 |
| Assayers | 4 | Processing | $28.10 | $61,838 |
| Buckers | 4 | Processing | $28.10 | $61,838 |
| Augmented Staff (sand) | 3 | Sand | $26.29 | $57,871 |
| Augmented Staff (processing) | 7 | Processing | $31.72 | $69,812 |
| **Total** | **94** | | | |

### *10.5.4 GEOLOGY DEPARTMENT*

The Geology Department is headed by the Chief Geologist who will be responsible for all the geological aspects related to the mine.

The pay categories and salaries for this department are provided in Table 10.5

**Table 10.5 Geology Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Chief Geologist | 1 | G&A | $50.33 | $110,775 |
| Mine Geologist | 1 | Mining | $42.26 | $93,022 |
| Mine Geology Technicians | 2 | Mining | $35.56 | $78,259 |
| **Total** | **4** | | | |

### 10.5.5 ENGINEERING DEPARTMENT

The Engineering Department is headed by the Chief Mine Engineer who will be responsible for engineering aspects of the mine and mine planning.

The pay categories and salaries for this department are provided in Table 10.6.

**Table 10.6 Engineering Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Chief Mine Engineer | 1 | G&A | $57.41 | $126,354 |
| Planning Engineer | 1 | Mining | $57.41 | $126,354 |
| Mine Technologist | 1 | Mining | $35.56 | $78,259 |
| Surveyors | 2 | Mining | $42.26 | $93,022 |
| **Total** | **5** | | | |

### 10.5.6 HUMAN RESOURCES DEPARTMENT

The Human Resources Department is headed by the Human Resources Superintendent who is responsible for safety as well as aboriginal affairs through the aboriginal liaison offices and human resources. The pay categories and salaries for this department are provided in Table 10.7.

**Table 10.7 Human Resources Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Human Resources Superintendent | 1 | G&A | $57.08 | $125,629 |
| Aboriginal Liaison Co-Coordinator | 2 | G&A | $57.08 | $125,629 |
| Safety Officer | 1 | G&A | $41.39 | $91,089 |
| Benefits Clerk | 1 | G&A | $41.39 | $91,089 |
| Human Resources Officer | 1 | G&A | $27.42 | $60,346 |
| Security Fire And First Aid Officer | 8 | G&A | $27.31 | $60,097 |
| **Total** | **14** | | | |

### 10.5.7 ENVIRONMENTAL DEPARTMENT

The Environmental Department is headed by the Environmental Manager.

The pay categories and salaries for this department are provided in Table 10.8.

**Table 10.8 Environmental Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Environmental Manager | 1 | G&A | $47.31 | $104,132 |
| Environmental Technologist | 3 | G&A | $35.56 | $78,259 |
| Environmental Technician | 1 | G&A | $35.56 | $78,259 |
| **Total** | **5** | | | |

### 10.5.8 MINE CONTROLLER DEPARTMENT

The Mine Controller Department is headed by the Chief Controller who will be responsible for administration, accounting, payroll, purchasing, IT and contract services.

The pay categories and salaries for this department are provided in Table 10.9.

**Table 10.9 Mine Controller Department**

| Position | No. of Personnel | Cost Centre | Loaded Rate ($/hr) | Annual Salary Including Burden |
|---|---|---|---|---|
| Mine General Manager | 1 | G&A | $94.78 | $208,598 |
| Chief Controller | 1 | G&A | $41.39 | $91,089 |
| Contract Services Supervisor | 1 | G&A | $44.29 | $97,490 |
| Purchasing Agent | 1 | G&A | $44.29 | $97,490 |
| IT Technician | 1 | G&A | $35.56 | $78,259 |
| Warehouse Attendant | 2 | G&A | $28.55 | $62,829 |
| Purchasing Agent Assistant | 1 | G&A | $27.42 | $60,346 |
| Administration Clerk | 1 | G&A | $27.42 | $60,346 |
| Augmented Staff (G&A) | 3 | G&A | $27.42 | $60,346 |
| Accounting And Payroll Clerk | 2 | G&A | $27.31 | $60,097 |
| **Total** | **14** | | | |

### *10.5.9 CONTRACT PERSONNEL*

Victory Nickel expects to contract out the following services:

- explosives plant operation (included in mining department Table 10.3)
- camp services
- employee bussing transportation
- heavy equipment machines
- tire maintenance.

Except for the explosives plant operators, who will be supervised through the Mining Department, the administration of these various contract services will be the responsibility of the Contract Services Supervisor.

The staffing levels for contracted personnel identified above are summarized in Table 10.10 below.

**Table 10.10 Contract Personnel**

| Job/Position | No. of Personnel (No. Includes rotation) |
|---|---|
| Staff Service Foreman | 1 |
| Cooks | 12 |
| Dishwashers | 8 |
| Cafeteria Staff | 8 |
| Janitorial Staff (Camp) | 16 |
| Laundry Staff | 8 |
| Janitorial Staff (Offices) | 3 |
| Janitorial Staff (Dry) | 4 |
| Bus Drivers | 4 |
| Augmented Staff (contracted) | 7 |
| **Total Contracted Staff** | **71** |

The Occupational Health and Safety legislation and other requirements identified in Section 12.6 will apply to contract personnel.

## 10.6 POLICIES AND PRACTICES

This section identifies the policies and practices that Victory Nickel would employ to effectively manage human resource activities. Victory Nickel recognizes that a secure, well-structured work environment is essential to achieving a satisfied and fulfilled work force. In so doing, employees should be able to acquire additional skills to meet their trade or professional aspirations.

Staff training and staff development facilities will be provided to support these policies and practices. In attaining the human resources objectives, Victory Nickel will strive to create a challenging and congenial working environment that will encourage employees to perform well, acquire skills and fulfill professional ambitions.

### *10.6.1 SKILLS AVAILABILITY*

Given the Project's proximity to Thompson, MB, and the presence of several mining operations in the area, Victory Nickel anticipates that some skilled workers will be locally available. Before embarking on a recruitment and selection process, Victory Nickel will conduct a survey to determine the depth and strength of this pool of skills.

A key component in this survey will be to ascertain the strength and availability of skills from local First Nation bands. Victory Nickel proposes to develop a comprehensive schedule to define the required office and trades requirements.

### 10.6.2 EMPLOYEE RECRUITMENT AND SELECTION

Where appropriate, employee recruitment proposals will be reviewed with the local First Nations bands to maximise the employment opportunities for local aboriginal communities.

For senior and highly skilled positions that cannot be filled by local personnel, Victory Nickel will recruit staff from major centres such as Winnipeg, Thompson or further afield. With the recent slowdown in activity in the oil patch, a greater availability of experienced senior staff is anticipated.

### 10.6.3 TRAINING

Victory Nickel recognizes the highly technical nature of the skills required to operate a mine, mill and associated facilities. Further, Victory Nickel recognizes the importance of developing the local talent from the local aboriginal groups to meet the requirements of the mine. To that end, Victory Nickel is committed to providing the enhanced training to enable employees to match the required skill levels.

To help facilitate the training programme, Victory Nickel will cooperate with the Government of Manitoba to integrate various government programs into the mine training programme.

In addition to the formal trades training, employees and contractors will be required to undergo a formal training programme. This programme will be designed to alert employees to the potential work-related risks and acquaint employees with:

- health, safety and environmental regulations
- the use of personal protective equipment
- emergency procedures
- internal work regulations and employee services
- duties, job requirements, and reporting relationships
- Workplace Hazardous Materials Information System (WHMIS) training
- environmental awareness and relevant corporate code of practices.

## 10.7 EMPLOYEE CONDITIONS

### 10.7.1 OCCUPATIONAL HEALTH AND SAFETY

Victory Nickel will work to ensure the health and safety of employees. In particular, the requirements of Canadian and Manitoba occupational health and safety legislation will be assumed to be the minimum standards. Hazardous areas will be

identified and the notices advising the requirements for personal protective equipment will be posted.

Employees working in hazardous areas will be trained to minimise any physical and chemical risks. The training programmes will include preventative and emergency measures to deal with the effects of the hazards.

### 10.7.2 WORK CLOTHES AND PERSONAL PROTECTION EQUIPMENT

Victory Nickel will ensure that employees are provided with the necessary safety boots and protective equipment required by legislation and good safety practice. In addition, the company will provide laundry service for employees working in the processing, mining and maintenance departments.

The standard personal protective equipment will include helmets, safety glasses, ear plugs, dust masks, respirators, gloves and safety boots.

### 10.7.3 HOUSING AND FOOD SERVICES

Victory Nickel will provide room, board, a recreation centre and janitorial services to employees. Catering services will provide three meals a day and optional packed meals for field staff.

The accommodation will be single occupancy, dual-use for non-professional staff with a change-over every two weeks. There will be a communal wash block with laundry facilities and lockers for use during change-overs. For professional staff, there will be a shared washroom arrangement with one shared washroom between two adjoining rooms.

### 10.7.4 BENEFITS

Employees benefits are expected to exceed or equal the minimum employment standards required by legislation.

# 11.0 SOCIAL CONTEXT

## 11.1 OVERVIEW

As part of the Minago Feasibility Study, an Environmental Impact Assessment (EIA) of the potential mine development was undertaken. Victory Nickel retained DHR Associates to conduct a socioeconomic assessment of the development area. This section presents objectives and findings of a Socioeconomic Assessment (SEA) for the Minago Project. The SEA process was carried out from May to August, 2007.

The Minago Property is located adjacent to Highway 6 in Manitoba's Thompson Nickel belt approximately 485 km north-northwest of Winnipeg, Manitoba and 105 (kilometres) north of Grand Rapids, Manitoba, Canada (Figure 11.1). The area is depicted on the National Topographical System (NTS) map sheet 63J/3.

Neighbouring communities to the Minago Property include Grand Rapids (GR), Moose Lake (ML), Cross Lake (CL), Snow Lake (SL) and Norway House (NH). Each community has its own governing infrastructure usually collectively known as the First Nations in the Northern Region of Manitoba.

To undertake the SEA, a series of meetings and interviews were held with a wide range of key stakeholders to identify their views and opinions with respect to the Project. The stakeholders included Norway House Cree Nation (NHCN) and Norway House Community (NHC); Grand Rapids Cree Nation (GRCN) and Grand Rapids Community (GRC); Cross Lake Band of Indians (CLBI) and Cross Lake Community (CLC); Moose Lake Cree Nation (MLCN) and Moose Lake Community (MLC); Snow Lake; Manitoba Metis Federation (MMF); Trapline Owners (TLO); Norway House Resource Management Board (NHRMB) and Government Agencies. Consultation, small group and open house meetings were held in the individual communities (Norway House, Cross Lake, Grand Rapids, Moose Lake, Snow Lake), Thompson, The Pas and Winnipeg. Figure 11.2, Figure 11.3, Figure 11.4, Figure 11.5, and Figure 11.6 give snapshots of meetings that took place in the respective communities.

A Memorandum of Understanding (MoU) was signed between Cross Lake, Moose Lake and Grand Rapids First Nations' Bands and Victory Nickel (see Figure 11.7).

**Figure 11.1 Site Location Map**

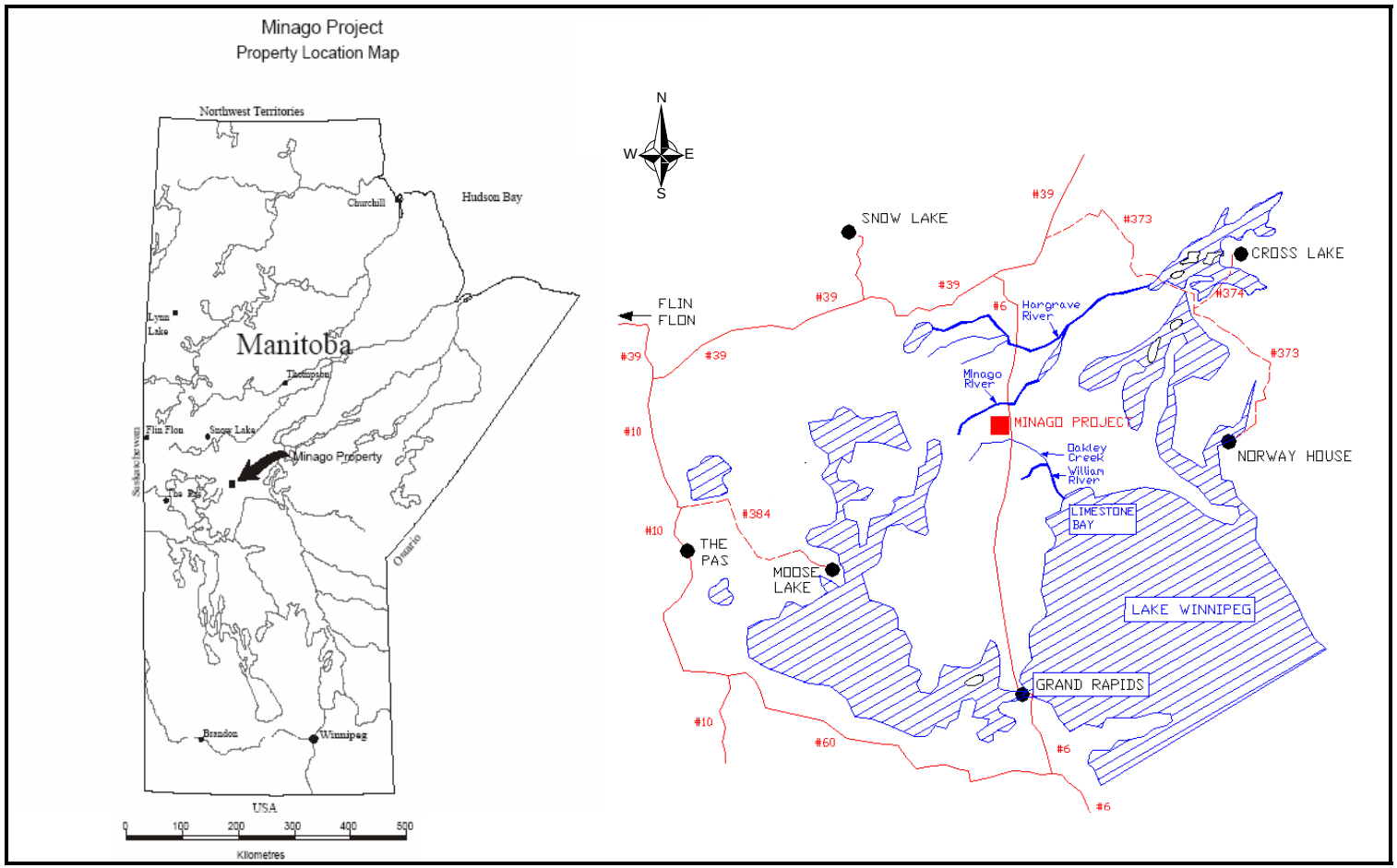


**Figure 11.2 Open House Meeting in Cross Lake May 2007**



**Figure 11.3 Open House Meeting in Grand Rapids, May 8, 2007**



**Figure 11.4 Open House Meeting in Norway House, May 23, 2007**



**Figure 11.5 Open House Meeting in Moose Lake May 17, 2008**



**Figure 11.6 Meeting with the Trapline Owners (Land Use Meeting) in Norway House, May 23, 2007**



**Figure 11.7 Signing of the MOU – Victory Nickel Inc., Cross Lake, Moose Lake, and Grand Rapids, December 7, 2008**



### 11.1.1 STRUCTURE OF THIS REPORT

This section presents the SEA for the Project and is structured as follows:

- Section 11.1 outlines the objectives of the SEA.
- Section 11.2 sets out the approach of the assessment process and the content of the questionnaire used.
- Section 11.3 provides the socioeconomic profiles of the communities studied.
- Section 11.4 identifies the key issues raised by stakeholders during the fact-finding process.
- Section 11.5 identifies potential opportunities for the Communities of Interest (COI).
- Section 11.6 gives a summary of socioeconomic indicators and their impact on the Communities of Interest.

### 11.1.2 OBJECTIVES

The objectives of the SEA for the Minago Project were to:

- introduce the major components of the Minago Project complete with its to a wide range of key stakeholders
- inform communities and stakeholders of potential impacts (positive and negative) and their relative magnitude on the communities' social and economic well-being
- provide an opportunity for the integration of diverse community values into the decision making process for the mine development
- understand the concerns of the communities and stakeholders to develop potential mitigative measures that are practical and cost effective
- provide information for addressing the potential impacts of the Minago Project on the socioeconomic resources of the communities.

### 11.1.3 PROJECT TEAM

The SEA was carried out by Dr. Frank Vuo of DHR Associates, and assistants from various communities:

- Snow Lake: Kimberly Stevens
- Pimicikamak Cree Nation and Cross Lake: Alan Paupanekis
- Mosakahiken Cree Nation and Moose Lake: Murray Campbell
- Misipawistik Cree Nation and Grand Rapids: Joanne Mckay
- Norway House Cree Nation: Loretta Mowatt
- Norway House Cree Nation: Ken Budd

In addition, support was provided by Alison Forster from the Norway House Cree Nation.

## 11.2 ASSESSMENT APPROACH

The SEA examined how the proposed mining project would change the lives of current and future residents of the surrounding communities socially and economically. Indicators used to measure the potential social-economic impacts included:

- demographics
- market analysis, businesses and services
- public services
- social well-being
- occupational skills
- aesthetic quality.

### DATA SOURCES AND LIMITATIONS

DHR attempted to maximize the use of available data. Economic and social data on small rural communities is sparse. Of particular importance is the census, which is conducted every five years and contains information on a number of important economic and social indicators. Economic data includes information on population, education, labour force, employment and unemployment, income, occupational information, and employment by industry. The censuses also have a number of different social indicators including religion, age and sex distribution, education, family composition and housing. This formal data has been supplemented and complemented with more qualitative information about the communities. Based on a set community profiles and field assessments through interviews with various community members, the qualitative information is intended to provide a more holistic sense of baseline socioeconomic conditions of the study area.

#### *Census Data*

Starting in 1971, Statistics Canada began publishing community profiles. At first, profiles were only available for communities over 5,000 people, but beginning in 1981 profiles have been done on all communities. However, hardly any economic data is published for communities with fewer than 200 people to protect the confidentiality of Census respondents. There are also other sources of population information for the COI. These include but are not limited to INAC, individual Bands and Municipality data bases.

*Income Tax Data*

Another source of useful information is the Canada Customs and Revenue Agency which publishes income tax statistics for every community in Canada. However, for small communities both the Census and income tax data are not complete to protect people's confidentiality.

*Data on Business and Tourism*

Data on businesses is even more limited as the only source of information for small communities is the local chambers of commerce. However, even then, the available data is limited to protect the unintentional disclosure of confidential business data.

### 11.2.1 THE ASSESSMENT PROCESS

The assessment process will be conducted in two main stages as described below. This report covers the results of Stage 1 of the process.

#### STAGE 1 OF THE SEA

During Stage 1 of the social economic assessment, DHR Associates:

- profiled Victory Nickel Inc. and communities surrounding the Minago Property (SL,GR,CL,ML,NH),
- identified key stakeholders and relevant issues related to the socioeconomic impact indicators, and
- Interviewed key stakeholders to elicit the positive and negative impacts of the project.

#### STAGE 2 OF THE SEA

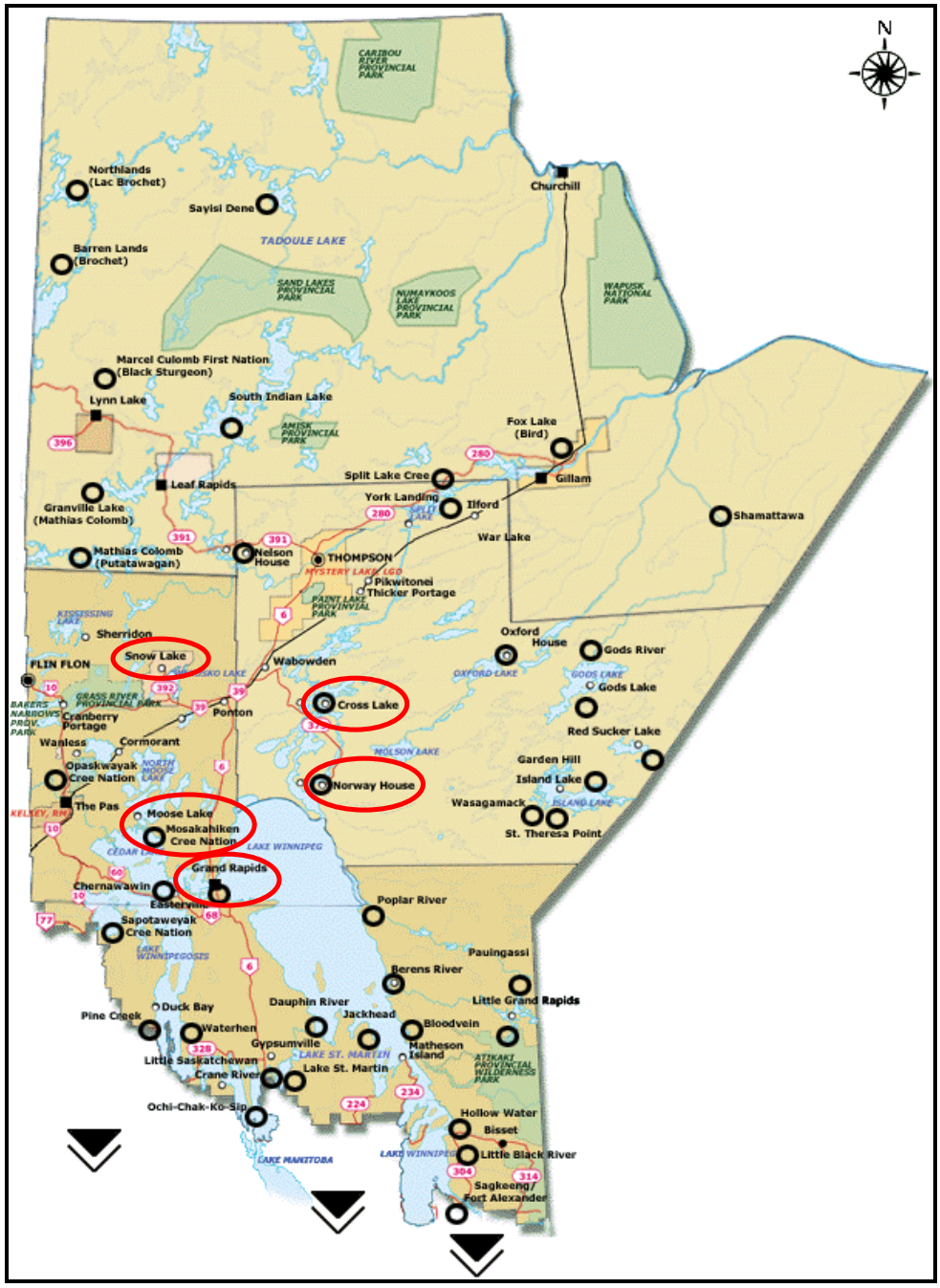
Stage 2 of the social economic assessment will identify and assess the socioeconomic impacts and share results of the assessment with stakeholders. The process will involve the following three steps:

- Step A: Identification of significant impacts,
- Step B: Integration of environmental assessment findings; and
- Step C: Assessment of the project's mitigation measures and initiatives.

#### COMMUNITIES ASSESSED

The assessed communities are illustrated in Figure 11.8 and include: Snow Lake (SL), Grand Rapids (GR), Cross Lake (CR), Moose Lake (ML), and Norway House (NH).

**Figure 11.8 Communities of Interest Surveyed**




Source: Manitoba Government, Manitoba Community Profiles

## QUESTIONNAIRE

To guide the fact-finding process, a questionnaire was developed. The contents of the questionnaire were as follows:

a. Demography

- Number of inhabitants
- Size of the band
- Proportion of population: under 18 & over 65
- Ratio of males to females
- Composition of the community
- Family size

b. Economy

- Types of jobs and required skills
- Proportion of population employed
- Participation in the labour force
- Businesses available to provide services to Victory Nickel

c. Social Structure

- Educational attainment
- Family income
- Housing availability and condition
- Civic associations and clubs
- Political participation
- Band government size
- Community government size

d. Public Service

- Schools: capacity and number of teachers
- Medical care
- Public health
- Fire and police protection
- Social and legal services
- Recreational facilities

e. Social Well Being

- Crime and delinquency
- Alcohol and mental illness
- Sexual/gender discrimination
- Family disruption
- School dropouts
- Unemployment rate
- General poverty
- Substandard housing
- Public violence

f. Occupational/Vocational Skills

A vocational skills analysis form as given below was used to record the pertinent information.

| **Vocational Skills Analysis Form** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Location:** | | | | | | | | |
| **For each job/occupation individual personal competencies will be identified and analyzed as follows:** | | | | | | | | |
| **Name** | **Job** | **Industry /Sector** | **Date last worked in Industry** | **Competency:** | | | | |
| | | | | **Training** | **Education** | **Years of Experience** | **Level** | **Work at Minago** |
| | | | | | | | | |

g. General Comments

- Public issues
- Political activities
- Band/community programs
- Band/community planning

## 11.3 SOCIOECONOMIC PROFILES OF THE COMMUNITIES

The fact-finding process resulted in the establishment of the following social economic profiles of the communities.

### *11.3.1 SNOW LAKE*

The Town of Snow Lake was brought to life by gold mining. Prospectors discovered this spectacularly beautiful place in the 1940's and officially made it a town in 1947. The town quickly became successful due to the bounty of mineral resources.

Snow Lake is a small community situated mid-way between Thompson, Flin Flon and The Pas (Figure 11.1 and Figure 11.8). The community is located along Provincial Road 392. Snow Lake is 685 km north of Winnipeg and has a land area of 1,212 square kilometres, which is 0.2% of the total land area of Manitoba.

#### DEMOGRAPHY

According to Statistics Canada, Snow Lake had a population of 837 people in 2006, a decrease of 30.7% from 2001 census statistics (Table 11.1 and Table 11.2). Snow Lake's population represents less than one percent (0.7%) of the total population of

Manitoba. The decrease in population since 2001 has been attributed to slowing economic activities in the mining and related sectors. Former residents of this community have moved to other mining areas within and outside of Manitoba to look for employment. Other characteristics of Snow Lake's population are as follow:

- The ratio of men to women is almost 1 to 1
- The population includes 120 Métis
- On average there are 2.2 persons per household while provincial average is 2.5
- Snow Lake population older than MB median[1] age of 41.9 compared to 38.1;
- The 2005 median income of private households was $75,515.00, more than $25,000 over the provincial figure of $47,875.00.

**Table 11.1 Population and Dwellings Count – Snow Lake – 2006**

| Population and Dwelling Counts | Snow Lake, Town | Manitoba |
|---|---|---|
| Population in 2006 | 837 | 1,148,401 |
| Population in 2001 | 1,207 | 1,119,583 |
| 2001 to 2006 population change | -30.7% | 2.6% |
| Total private dwellings | 477 | 491,724 |
| Private dwellings occupied by usual residents | 355 | 448,766 |
| Population density per square kilometre | 0.7 | 2.1 |
| Land area (square km) | 1,211.89 | 552,369.96 |
| Median age of the population | 41.9 | 38.1 |

Source: Statistics Canada, Community Profile, Census 2006

**Table 11.2 Selected Household Characteristics – Snow Lake – 2006**

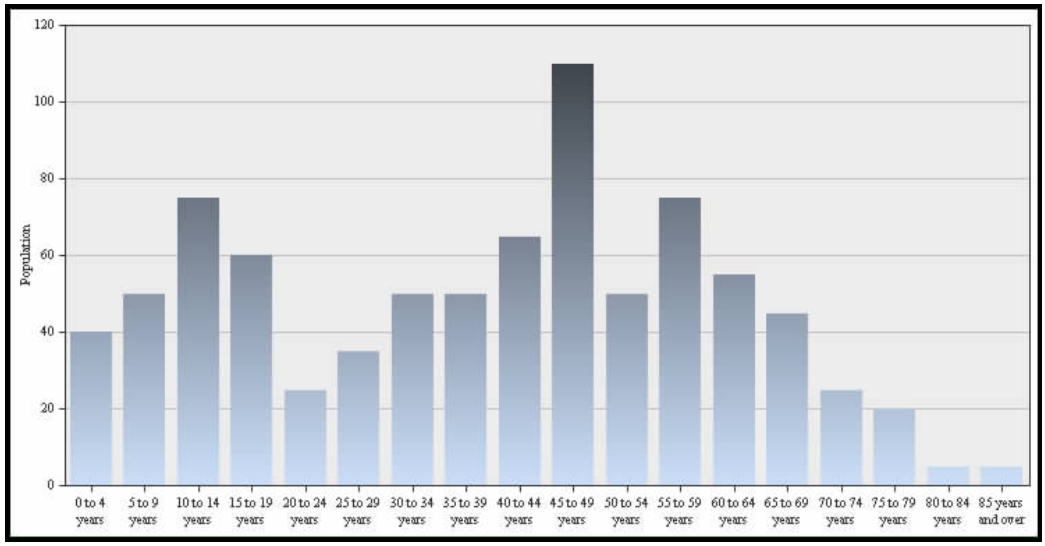
| Selected Household Characteristics | Snow Lake, Town | Manitoba |
|---|---|---|
| Total private households | 355 | 448,780 |
| Households containing a couple (married or common-law) with children | 85 | 124,025 |
| Households containing a couple (married or common-law) without children | 135 | 126,755 |
| One-person households | 100 | 128,295 |
| Other household types | 35 | 69,705 |
| Average household size | 2.2 | 2.5 |
| Median income in 2005 – All private households | $75,515 | $47,875 |

Source: Statistics Canada, Community Profile, Census 2006

[1] The median age is the age 'X', for which exactly one half of the population is older than 'X' and the other half is younger than 'X'.

Figure 11.9 illustrates a breakdown of the Snow Lake's population by age. In 2006, almost 80% of the population was over 15 years of age (665 inhabitants), and this group formed the work force of the community. This compares well with the provincial average of 79.5%.

**Figure 11.9 Population Age Breakdown – Snow Lake – 2006**




Source: Statistics Canada, Community Profile, Census 2006

## DWELLINGS

Most of the dwellings in Snow Lake are in good condition. In 2006, there were a total of 355 dwellings occupied by regular residents corresponding to an average of 2.3 persons per dwelling. The majority of the dwellings (87%) are single detached. The number of owned dwellings was 300 in 2006, which means the majority of the community owned their own dwelling. Only 55 dwellings were rented. Between 1986 and 2006, 20 new dwellings were constructed (i.e. one new dwelling per year). A little more than 8% of the total occupied private dwellings require major repair.

Based on interviews conducted by DHR Associates in 2007, housing availability is low in the community. There were only 15 houses on the market when this research was conducted (May to August 2007).

## ECONOMY

The Hudson's Bay Mining and Smelting facility used to be a prominent feature in the Town of Snow Lake. The mine used to employ a large number of residents of Snow Lake and its surrounding communities. The mining activity has gone down since 2001. However, most of Snow Lake's population is still employed in mining and mining related sectors.

Another industry, that is growing, is tourism. Snow Lake is characterized by excellent fishing opportunities and a natural beauty that attract tourists from all parts of North America. The town has all businesses and facilities needed to be a wilderness vacation destination. These facilities include restaurants, hotel and motel accommodations, and facilities for recreation.

According to the Statistics Canada 2006 census, 665 residents of Snow Lake were 15 years and older. The labour force was composed of 395 people of whom 375 were employed and 20 were not employed. Thus, the unemployment rate was 5% in 2006. A total of 275 people were not in the labour force. As indicated in Table 11.3, Snow Lake's participation rate was 59.4%, which was below the provincial rate of 67.3%.

**Table 11.3 Labour Force Activity and Indicators – Snow Lake – 2006**

| Labour Force Activity | Snow Lake | Manitoba |
|---|---|---|
| Total population 15 years and over | 665 | 908,450 |
| In the labour force | 395 | 611,280 |
| Employed | 375 | 577,710 |
| Unemployed | 20 | 33,570 |
| Not in the labour force | 275 | 297,170 |
| Participation rate[2] | 59.4 % | 67.3 % |
| Employment rate[3] | 56.4 % | 63.6 % |
| Unemployment rate[4] | 5.1 % | 5.5 % |

Source: Statistics Canada, Community Profile, Census 2006

### *Industry*

Figure 11.10 illustrates the distribution of Snow Lake's experienced labour force by industry. In 2006, Snow Lake had a total experienced labour force of 395. Of these 395 individuals, 35% were engaged in agriculture and other resource based industries, 12% in manufacturing, 12% in retail, 12% in health care and social services, 5% in education, 5% in business, 2.5% in construction, 2.5% in wholesale, and 13% did other work.

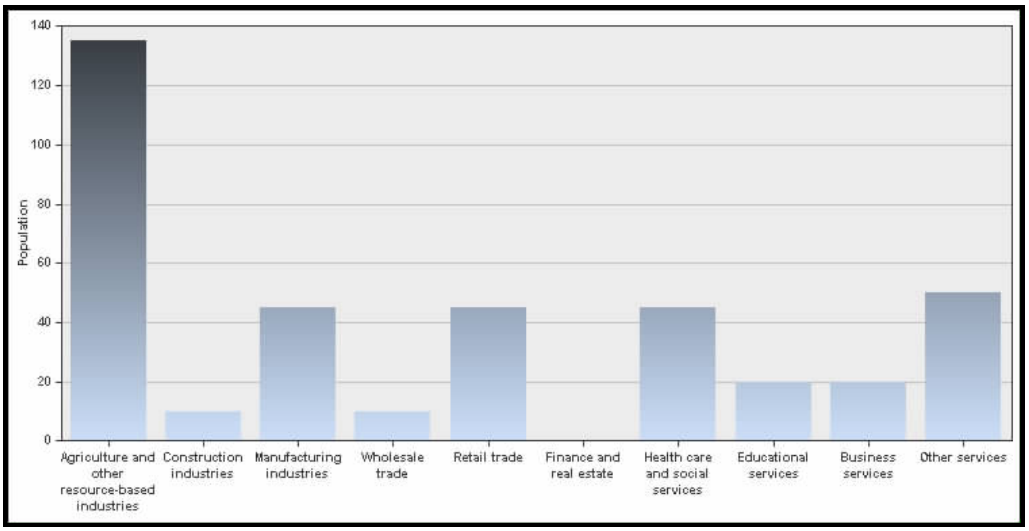
### *Occupation*

In 2006, the majority of Snow Lake's experienced labour force (15 years and over) was employed in three occupations, namely, sales and services, occupation unique

[2] Participation rate is the proportion of persons in the labour force (individuals actively employed and persons receiving unemployment benefits) compares to the population ages 15 years and over.
[3] The employment rate – also known as the employment population ratio – refers to the percentage of individuals employed compared to the population aged 15 years and over.
[4] The unemployment rate represents the number of persons receiving unemployment benefits as a percentage of the labour force.

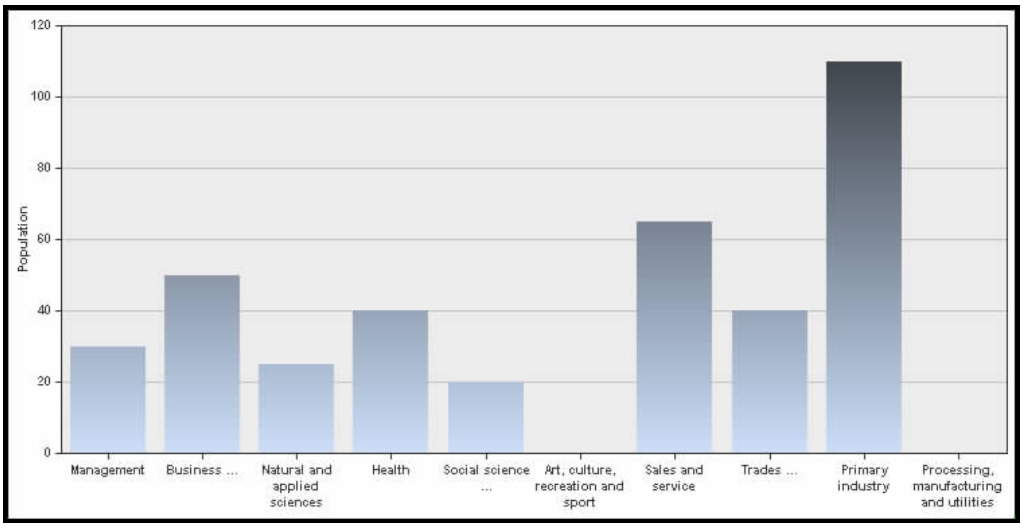
to primary industry and trade, and occupations related to transport and equipment (Figure 11.11).

**Figure 11.10 Experienced Labour Force 15 Years and Over per Industry – Snow Lake – 2006**




Source: Statistics Canada, Community Profile, Census 2006

**Figure 11.11 Experienced Labour Force 15 Years and Over per Occupation – Snow Lake -2006**




Source: Statistics Canada, Community Profile, Census 2006

### *Vocational Skills*

DHR Associates' survey (2007) identified the vocational skills of people interested to work for Victory Nickel. Table 11.4 lists number of individuals with vocational skills in Snow Lake. These individuals may serve as potential workforce at the Minago project. Snow Lake's population includes 9 experienced miners.

**Table 11.4 Vocational Skills in Snow Lake Town – 2007**

| Occupations | Number of Individuals |
|---|---|
| Miners | 9 |
| Heavy equipment operators | 2 |
| Supervisors | 2 |
| Accountants | 1 |
| Laboratory technicians | 1 |
| Administrative assistants | 1 |
| Drillers and blasters | 2 |
| Nurses | 1 |
| Housekeepers | 4 |
| Geologists | 1 |
| Clerks | 4 |
| Assayers | 1 |
| Truck drivers | 2 |
| Trainers | 1 |
| Millwrights | 2 |
| Security officers | 3 |
| Catering | 5 |

## SOCIAL STRUCTURE

Few characteristics of Snow Lake's social structure are:

- The presence of one High school - Joseph H. Kerr School – that has 273 students and a student/teacher ratio of 13 to 1;
- The medium gross family income was between $45,000 to $50,000 per year (DHR Associates Survey-2007);
- The community is well organized in terms of Civic associations and clubs making it comparable to larger cities in the province;
- Political participation is excellent at 95%;
- The governance of the community is under the leadership of one mayor and six councillors.

### *Social Well-being*

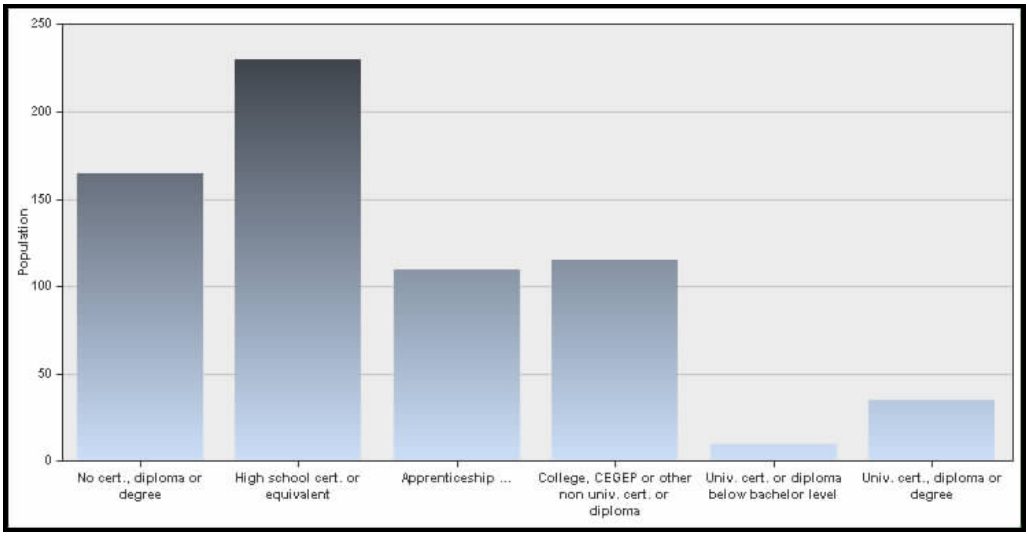
The DHR Associates Survey (2007) confirmed that the social well-being of this community is good. No serious crime has been reported in Snow Lake. There has been a zero crime rate and zero public violence. Alcohol and drug abuse has been almost negligible, mental illness unknown. No family violence or family disruption has been noted. Gender discrimination is rarely experienced. The education system is excellent and the school dropout rate has been negligible. For example, for the past 5 years only one student has dropped out of school. In 2007, all of the community's labour force was engaged in income generating activities. In other

words, the labour force employment was 100%. Less than 5 people were welfare recipients. Accommodation and housing standards are good and comparable to standards in larger cities of the province.

## EDUCATIONAL ATTAINMENT

Figure 11.12 below summarizes the educational achievement levels of Snow Lake's population (15 years and over). In 2006, there were 230 High School certificate holders, 115 College graduates and 10 University graduates.

**Figure 11.12 Educational Attainment in Snow Lake – 2006**




Source: Statistics Canada, Community Profile, Census 2006

## PUBLIC AND COMMUNITY SERVICES

Public facilities in Snow Lake include:

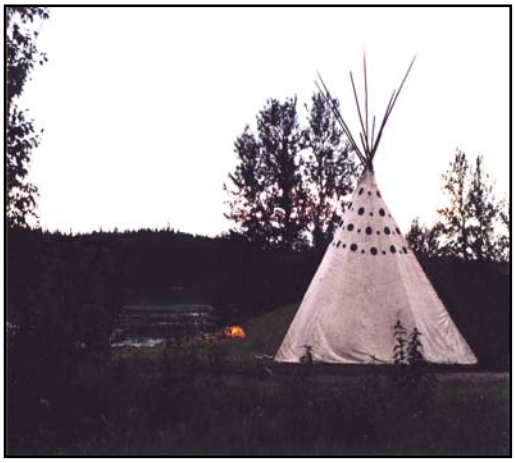
- A library, a museum and heritage sites;
- Various religious facilities;
- Parks, playgrounds and an arena;
- One high school;
- One hospital and 4 personal care beds. The medical care is good. The Snow Lake population of 837 is served by 2 doctors, 6 nurses, and 10 nursing aides. This means that population per doctor ratio was 1:418 while the population per nurse ratio was 1:140. Home care and public health nurses are available. There are one non-residential dentist and one psychologist. X-Ray services are available and the Emergency Medical Services (EMS) has 2 ambulances;
- A water treatment plant and a sewage treatment plant, which needs repair;

- Other public services include police (Royal Canadian Mounted Police (RCMP)), fire hall, air strip, post office, and one bank (Royal Bank of Canada).

### 11.3.2 CROSS LAKE BAND OF INDIANS

Cross Lake is located in Northern Manitoba approximately 520 air kilometres north of Winnipeg along the shores of the Nelson River, and 130 air kilometres south of Thompson, Manitoba. It is accessible by aircraft with two daily flights from Winnipeg via Perimeter Air. With a newly constructed bridge, there is also all weather road access from provincial roads 373 and 374 to the community. Grey Goose Bus Lines also provides daily service to Cross Lake. Most of the roads in the community are paved.

The Cross Lake Community is composed of two closely related and adjoining, but independent settlements. One is the Cross Lake Indian Reserve (Pimicikamak Cree Nation) where the main developed area is called Cross Lake, and the other is provincial crown land (Division No. 1 and No. 22, unorganized territory). The two settlements are presented as separate profiles below.



In the Cross Lake community, the two main languages spoken are Cree and English; especially the young population is bilingual.

The Cross Lake Band is a signatory to Treaty 5 signed in 1875 and is one of the five Bands covered by the provision of the Northern Flood Agreement. The Cross Lake Band has been devastated by the Manitoba Hydro's Jenpeg Dam Project and Lake Winnipeg Control Structure located 15 kilometres upstream from the reservation.

### 11.3.3 PIMICIKAMAK CREE NATION (CROSS LAKE FIRST NATION)

#### DEMOGRAPHY

The population of Cross Lake First Nation has fluctuated over the years. Cross Lake had 3,157 residents in 1996, 2,544 in 2001 and 3,854 in 2006 (Table 11.5). In 2006, 99% of the population were aboriginal (98% were North American Indians, and 0.5% were Métis (Table 11.6).

**Table 11.5 Population of Cross Lake – 1996 to 2006**

| Year | 1996 | 2001 | 2006 |
|---|---|---|---|
| Total Population | 3,157 | 2,544 | 3,854 |
| Percent Change | | -19.4% | 51.5% |

Source: Statistics Canada, Aboriginal Population Profile, Census 1996, 2001 and 2006

**Table 11.6 Aboriginal Identity Population - CLFN – 2006**

| | |
|---|---|
| Total Aboriginal identity population | 3,810 |
| *North American Indian* | *3,770* |
| *Métis* | *20* |
| *Aboriginal responses not included elsewhere* | *25* |
| Non-Aboriginal identity population | 25 |
| Total Population | 3,845 |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

According to Indian and Northern Affairs Canada, the registered population of the Cross Lake First Nation living on reserve was 4,903 persons as of June 2008 (Table 11.7). Thus, there was a population increase of more than 1,000 people between 2006 and 2008. In terms of age distribution, 58% of the Aboriginal population (3,815) was under 25 years old and the median age was 20.3. In comparison, the percentage of Manitoba's population under 25 years is 20% and 38.1 years is the median age. Thus, the CLFN is much younger than the Manitoba's population. The average number per household was 3.8 compared to the provincial average of 3.0.

**Table 11.7 Registered Cross Lake First Nation Population – June 2008**

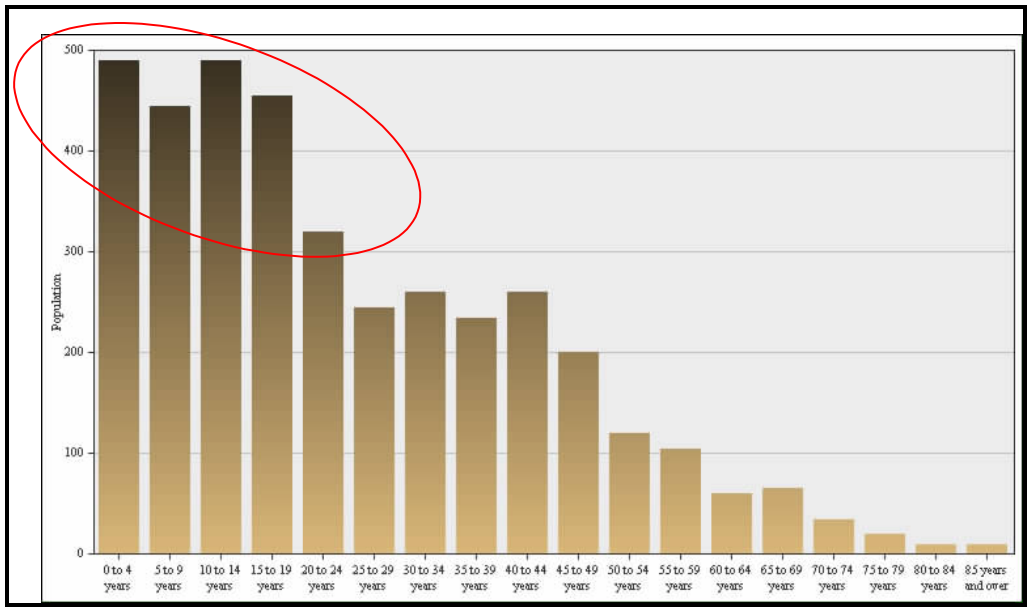
| Residency | # of People |
|---|---|
| Registered Males On Own Reserve | 2,488 |
| Registered Females On Own Reserve | 2,415 |
| ***Total Population On Own Reserve*** | ***4,903*** |
| Registered Males On Other Reserves | 62 |
| Registered Females On Other Reserves | 69 |
| Registered Males On Own Crown Land | 10 |
| Registered Females On Own Crown Land | 1 |
| Registered Males On Other Band Crown Land | 1 |
| Registered Females On Other Band Crown Land | 3 |
| Registered Males On No Band Crown Land | 2 |
| Registered Females On No Band Crown Land | 1 |
| Registered Males Off Reserve | 894 |
| Registered Females Off Reserve | 951 |
| **Total Registered Population** | **6,897** |

Source: Indian and Northern Affairs Canada: Research and Analysis Directorate (2008)

Dwellings

The 2006 occupied private dwelling characteristics are given in Table 11.8. Based on 2006 Statistics Canada data, there were 780 private dwellings occupied by usual residents. Each dwelling had an average of 6.3 rooms and 21% of the total dwellings had more than one person living per room. There were about 5 people occupying each family unit. House occupancy tends to be lifelong for members of the CLFN. More than 6 out of 10 dwellings (60%) needed major repair, despite the fact that 71% of the dwellings had been constructed within the past 20 years. The houses within the community, which are maintained by the Band, are in average condition in terms of exterior outlook.

**Figure 11.13 Population Age Breakdown – CLFN – 2006**




Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

**Table 11.8 Occupied Private Dwelling Characteristics – 2006**

| | |
|---|---|
| Total Private Dwellings Occupied by Usual Residents | 780 |
| Number of owned dwellings | 60 |
| Number of rented dwellings | 35 |
| Dwellings constructed before 1986 | 230 |
| Dwellings constructed between 1986 and 2006 | 550 |
| Dwellings requiring minor repairs only | 185 |
| Dwellings requiring major repairs | 475 |
| Average number of rooms per dwellings | 6.3 |
| Dwellings with more than one person per room – as a % of total occupied private dwellings | 21.2% |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

Economy

The reported unemployment rate was high for Cross Lake First Nation: 29.3% in 2006 and 85% in 2007. For comparison, the provincial unemployment rates were 5.5% in 2006 and 4.0% in 2007 (Table 11.9).

**Table 11.9 Unemployment Rates – 2001, 2006 and 2007**

| | Cross Lake | Manitoba |
|---|---|---|
| 2001 | N/A | 6.0% |
| 2006 | 29.3% | 5.5% |
| 2007 | 85.0% | 4.0% |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census and Community Profile, Census 2001 and 2006 and The Daily, February 8th, 2007.

Regarding employment rate and participation rate, Cross Lake First Nation rates are low compared to provincial rates. The participation rate (proportion of persons in the labour force) in Cross Lake was 42.9% compared to 67.3% in Manitoba. The employment rate in Cross Lake was 30.3% compared to 63.6% in Manitoba. The employment rate represents a region's capacity to create jobs for its citizens and in doing so creates income for them. An employment rate of less than half of the provincial rate suggests that the standard of living in Cross Lake is lower than in an average community in Manitoba.

Industry

Except in the construction industry, women and men were equally employed within the community business. In terms of the age breakdown regarding employment, most of the individuals within the community who are over the age of 65 were self-employed. Some of the types of jobs that are available within the community are in the service, construction, electrical and mechanical industries. Some of the businesses within the community include those dealing with construction, restaurants (4), mechanical garages (2), gas vendors (2), grocery stores (2), as well as stores dealing with retail and general merchandise. The community of Cross Lake also has a motel with a lounge and vending services. According to Statistics Canada, 36% of total experienced labour force 15 years and over occupied sales and service jobs in 2006. All of Cross Lake's businesses are listed in Table 11.10.

Most full time jobs in Cross Lake are those that are offered by the Awasis Agency, the Band office and the Cross Lake Education Authority where school teaching staff is 80% Aboriginal. The Band office and the Cross Lake Education Authority are the largest employers along with the Northern Stores and Family Foods. The majority of total experienced labour force 15 years and over worked in the following sectors:

- Health care and social service (22%);
- Educational services (22%);
- Other services (24%).

Vocational Skills

According to a study conducted by DHR Associates in November 2007, Cross Lake has people with vocational skills that may be needed at Minago. The community has 21 heavy equipment operators and 6 truck drivers for instance. Table 11.11 lists the vocational skills within the Cross Lake First Nation community.

**Table 11.10 Businesses in Cross Lake**

| | |
|---|---|
| Allan McLeod Construction | Merle's Flower Shop and Confectionery |
| Bethanie's Restaurant | Mid-North Development Corporation |
| Blacksmith Transportation (Emergency Ambulance) | Mistasineek Gas Bar |
| C.F.N.C. (Local Radio Station) | Multi-Channel MCTV |
| Canada Post Corporation | Muskego's Service and Towing |
| CLEA Adult Education Centre | Natural Resources |
| Chicken Chef | Northern Stores |
| Child and Family Services | Northern Quick Stop |
| Cross Lake Community Council | Nursing Station |
| Cross Lake Day Care | Pharmacy |
| Crisis Centre | Dental Office |
| Cross Lake Family Foods | Public Health |
| Cross Lake Inn - Restaurant and Lounge | Perimeter Airlines |
| Cross Lake Sports Complex | R.C.M.P. |
| D.R. Hamilton School | Ross Video |
| Fire Garage | Royal Bank |
| Fire Hall | Triple R Electric |
| Flo's Crafts and Video Centre | William Muswagon Construction |
| Kasayak Center (Elderly Home) | 24/7 Confectionery |
| Kipapanow's Restaurant | Manitoba Hydro |

*Social Structure*

Schools and Training Facilities

The community has two schools and one Adult Education Center:

The Mikisew School (Figure 11.14) was built in 1997 and is located at the north end of the community. This school caters to students in grades 5 to 8. The Mikisew School also has two nursery and kindergarten classrooms. The Mikisew School has a student population of approximately 544 students in the middle years. Mikisew School has 53 staff members including education assistants and resource teachers.

The school offers the compulsory courses in Language Arts, Math, Science, Social Studies, Native Language, First Nation Studies and an Alternative Education program for all students. Also, the school runs programs in Home Economics, Industrial Arts, and Computers and has a large gymnasium.

**Table 11.11 Vocational Skills in Cross Lake First Nation – 2007**

| Occupations | Number of Individuals |
|---|---|
| Miners | 1 |
| Heavy Equipment Operators | 21 |
| Administrative Assistants | 1 |
| Drillers and Blasters | 2 |
| Mechanics | 2 |
| Carpenters | 4 |
| Housekeepers | 6 |
| Geologists | 2 |
| Safety Experts | 1 |
| Clerks | 1 |
| Truck Drivers | 6 |
| Surveyors | 1 |
| Computer Technicians | 1 |
| Security Officers | 2 |
| Catering | 4 |

Source: DHR Associates Survey (2007)

**Figure 11.14 Mikisew School, Cross Lake**



Otter Nelson River (ONR) School (Figure 11.15) is located at the South side of the community. It has a student population of approximately 1,055 (2004-2005 nominal roll stats), which consists of primary and senior year students. In total, ONR has 86 staff members which include educational assistants. Some of the courses offered are Math, English, Science, Biology, Chemistry, Physics, World Issues, Geography, First Nations Language, First Nations Studies and an Outdoor Education program.

In the Outdoor Education program, students learn about the traditional way of living and get lessons in hunting, fishing and trapping. The Otter Nelson River School also offers programs in Home Economics, Industrial Arts, and Computers for both early and senior years. There are three computer labs and a gymnasium at the school.

**Figure 11.15 Otter Nelson River (ONR) School, Cross Lake**




Cross Lake has an Adult Education Center with a staff of 20 employees comprising a co-ordinator, community based counsellor, instructors, teachers, assistants, maintenance staff and custodians. The total number of students enrolled at the Adult Education Center was 67 students in the 2004 /2005 school year.

Cross Lake also has established a regionalized campus with the University College of the North offering various community-based programs.

Band Government

The Band government structure has one Chief and eight Councillors. In addition, Cross Lake First Nation has four Councils: the Chief and Council, Women's Council, Youth Council and the Elder's Council.

Civic Associations and Clubs

Cross Lake had no civic associations or clubs in 2007.

### *Social Well-Being*

Drug and alcohol abuse are common within the community, as is suicide. As well, gang violence and vandalism are common. Family violence and divorce occur at an average level. The rates of school dropout are low within the community, but there have been reported incidents of bullying at school.

There is a very high unemployment rate, as well as a high rate of people surviving off welfare. This has led to a high level of poverty within the community. According to Statistics Canada, the median income in 2005 for all private Aboriginal households was $32,704 compared to $47,875 in the province.

The Community Well-being Index (CWB), compiled by Indian and Northern Affairs Canada, for the Cross Lake First Nation is 56, well below the Manitoba Non-First

Nation's average score of 81 and just below the Manitoba First Nation's average score of 59 (Table 11.12).

**Table 11.12 Community Wellbeing Index – 2001**

| | |
|---|---|
| Highest Manitoba Community Score | 93 |
| Manitoba Non-First Nations Average Score | 81 |
| **Cross Lake First Nation** | **56** |
| Manitoba First Nations Average Score | 59 |
| Lowest Manitoba Community Score | 44 |

Source: Indian & Northern Affairs Canada: Research & Analysis Directorate (2001)

The CWB Index is a method designed to examine the well-being of individual communities by using various indicators of socioeconomic well-being including education, income, housing and labour force activity. These indicators are combined to give each community a well-being "score" between 0-100.

Educational Attainment

Most members (66%) of the CLFN do not have a certificate, diploma or degree. Nevertheless, 185 CLFN members are college graduates, 100 have a university certificate below the bachelor level and 100 are university graduates.

For the 475 community members who have certificates, diplomas or degrees depict the following breakdowns:

- 22% studied education;
- 20% studied architecture, engineering and related technologies; and
- 16% studied business, management and public administration.

Public and Community Services

According to the Cross Lake Education Authority (CLEA,) public and community services are described as follows:

Cross Lake Band has one fire truck and twelve water trucks with fire fighting capabilities. The Band has a fire hall with a volunteer fire fighting unit in place. The Band also has joint forces with the Cross Lake Community (Metis) fire department. For Police protection, there are fifteen officers stationed in the Cross Lake RCMP detachment and the Band has four full time and three part time constables. Health care services are also available.

The Cross Lake Nursing Station has 10 to 12 nurses and 4 doctors working on rotation. Dental care is available all year round with a dental therapist at each of the two schools. A mental health therapist visits the community on a bi-weekly basis. The nearest hospitals are located at Norway House and Thompson., Manitoba.

The infrastructure of the Cross Lake Band is in sound condition. Electrical services are provided by a land line from the Jenpeg Power Dam. For water supply, part of the community is serviced by a main line piping and the rest by holding tanks. Approximately 90% of the community have their own septic tanks and the remaining 10% use a treatment facility. Every household utilizes a garbage bin and a local contractor picks up garbage on a daily basis.

Other public and community services are:

- A post-office;
- Grey Goose bus service and an airport which is serviced by Perimeter Airline;
- A local radio system and television, with cable stations but no MTS cell phone service;
- A Royal Bank;
- Anglican, Roman Catholic, Mennonite and Evangelist churches, with the Roman Catholic being the most active, and;
- Parks, playgrounds, an arena/hockey rink and a community hall available for recreation.

## COMMUNITY OF CROSS LAKE (UNORGANIZED TERRITORY)

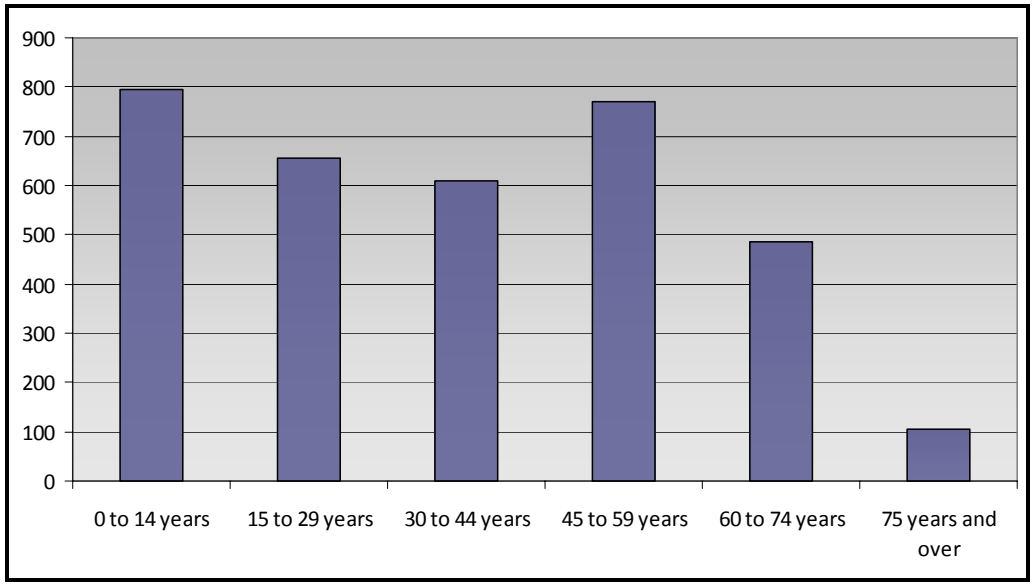
The Community of Cross Lake includes the unorganized territories of Division No. 1 and Division No. 22. These unorganized territories cover 91,947 square kilometres. The population density (persons per square kilometre) for this land is low at 0.035 compared to a population density of 2.1 for the Province of Manitoba.

### *Demography*

Total population of the Community of Cross Lake was 3,455 in 2006 and the age distribution was similar in the age groups up to 59 years (Figure 11.16).

In the Community of Cross Lake, 53% (1,820) were Aboriginals and 47% (1,635) were Non-aboriginal in 2006. Most of the Aboriginal people lived in Division No.22.

**Figure 11.16 Cross Lake Community's Population Age Breakdown – 2006**




Source: Statistics Canada, Community Profile, Census 2006

### *Dwellings and Households*

Table 11.13 lists key dwelling and household characteristics for the Community of Cross Lake. In 2006, there were 1,240 private dwellings occupied by usual residents. Seventy percent (70%) were constructed prior to 1986, 30% after 1986 and 18% of the buildings required major repairs in 2006.

**Table 11.13 Dwellings and Households Characteristics – Community of Cross Lake – 2006**

| **Total private dwellings occupied by usual residents** | **1,240** |
|---|---|
| Number of owned dwellings | 830 |
| Number of rented dwellings | 375 |
| Dwellings constructed before 1986 | 860 (70%) |
| Dwellings constructed between 1986 and 2006 | 380 (30%) |
| Dwellings requiring major repairs | 227 (18%) |
| Average value of owned dwellings | $253,741 for Division No. 1<br>$161,282 for Division No. 22 |
| Median income in 2005 – All private households | $60,750 for Division No. 1<br>$51,461 for Division No. 22 |

Source: Statistics Canada, Community Profile, Census 2006.

### *Economy*

Labour force activity in Cross Lake community is summarized in Table 11.14. For residents of Division No. 1, the participation rate was 60.2%, the employment rate

was 54.2% and the unemployment rate was 9.1% in 2006. For residents of Division No. 22, the participation rate was 53.3%, the employment rate was 40.1% and the unemployment rate was 25.4% in 2006. Overall the unemployment rate was 18.8% for the Community of Cross Lake compared to a provincial unemployment rate of 5.5% in 2006.

**Table 11.14 Labour Force Activity – 2006**

| | Division No. 1 | Division No. 22 | Cross Lake Community | Manitoba |
|---|---|---|---|---|
| Total population 15 years and over | 1,005 | 1,660 | **2,665** | 908,450 |
| …. in the labour force | 605 | 885 | **1,490** | 611,280 |
| Employed | 545 | 665 | **1,210** | 577,710 |
| Unemployed | 55 | 225 | **280** | 33,570 |
| Not in the labour force | 400 | 770 | **1,170** | 297,170 |
| Participation rate2 | 60.2% | 53.3% | **55.9%** | 67.3% |
| Employment rate | 54.2% | 40.1% | **45.4%** | 63.6% |
| Unemployment rate | 9.1% | 25.4% | **18.8%** | 5.5% |

Source: Statistics Canada, Community Profile, Census 2006.

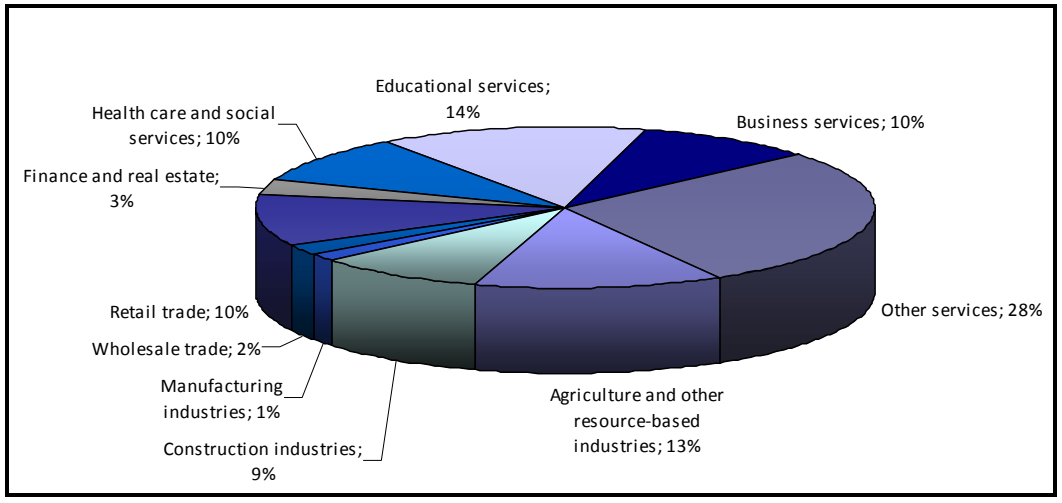
Industry

Figure 11.17 illustrates the 2006 labour force per industry in the Community of Cross Lake. The total experienced labour force aged 15 years and over included 1,405 people. Among those, 14% worked in industries related to educational services; 13% in the primary sector (resource-based industry); and 10 % each in business services, health care and social services, and retail trade.

*Occupation*

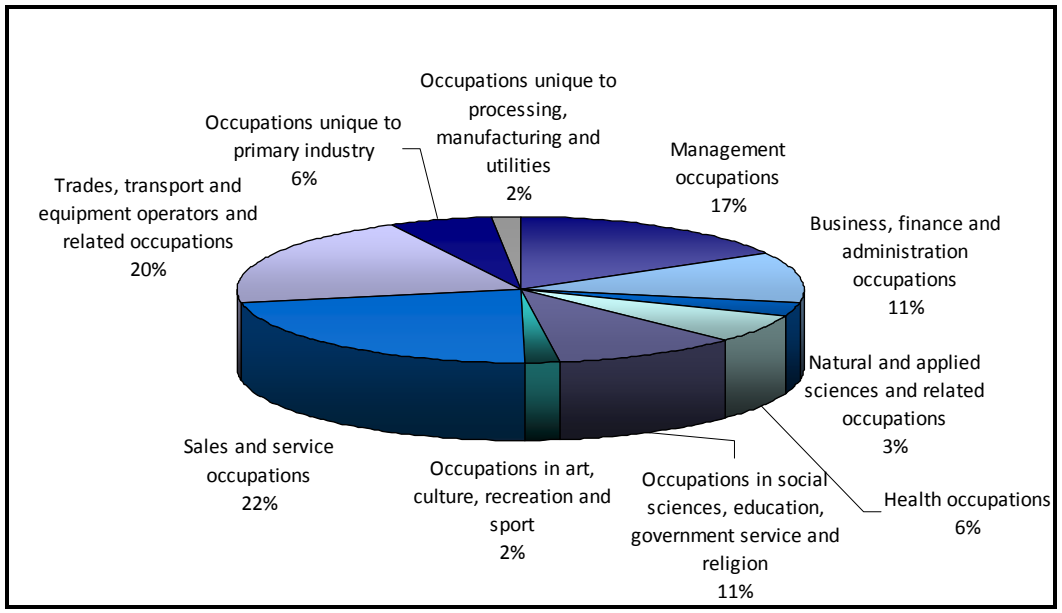
In 2006, Cross Lake's experienced labour force worked in three major occupations, which were sales and service occupations (22%); trades, transport and equipment operators (20%); and management occupations (17%) (Figure 11.18).

**Figure 11.17 Labour Force per Industry – 2006**




Source: Statistics Canada, Community Profile, Census 2006.

**Figure 11.18 Community of Cross Lake Labour Force per Occupation – 2006**




Source: Statistics Canada, Community Profile, Census 2006.

### *Social Structure*

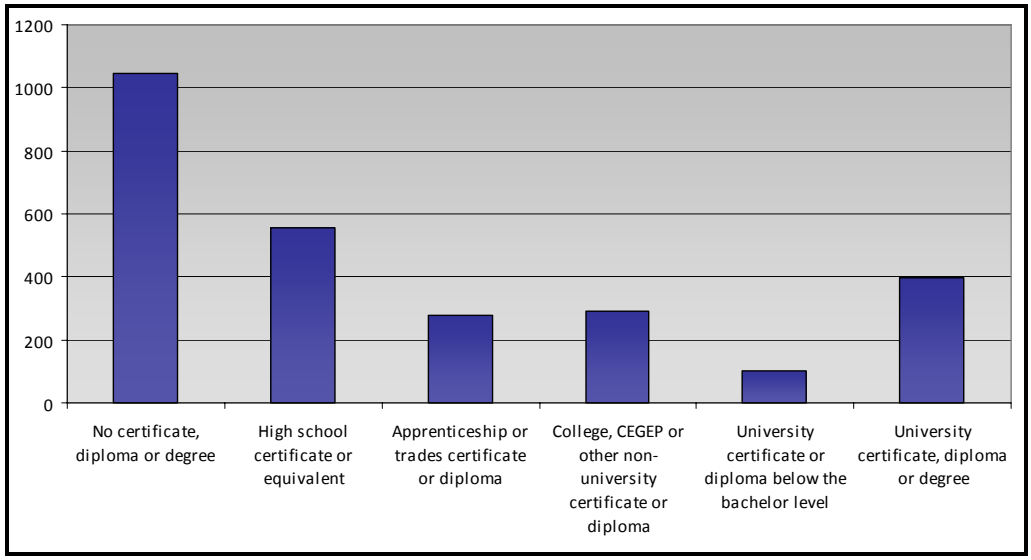
The community has one school – D.R. Hamilton School – that caters to students from grades 1 to 9.

The community government is composed of one Mayor and 4 councillors.

*Educational Attainment*

Out of the 2,665 members of the Community of Cross Lake that were over 15 years and over, 39% did not possess a certificate, diploma or degree; 30% (785 community members) possessed a college or university diploma or certificate, 22% completed high school, and 9% held an apprenticeship or trades certificate or diploma (Figure 11.19).

**Figure 11.19 Educational Attainment in the Community of Cross Lake – 2006**




Source: Statistics Canada, Community Profile, Census 2006.

Among the 1,055 people possessing a post-secondary diploma or certificate, major fields of study were:

- Architecture, engineering and related technologies (25%);
- Business, management and public administration (22%);
- Health, parks, recreation and fitness (18%);
- Education (15%); and
- Other (20%).

## 11.3.4 MOSAKAHIKEN CREE NATION AND MOOSE LAKE

Mosakahiken Cree Nation and the Moose Lake Métis Settlement are two closely related but independent communities located on the northern limits of the Saskatchewan River Delta, situated about 100 kilometres south east of The Pas, Manitoba. The community is only accessible by gravel road which is approximately 64 kilometres from the nearest paved Highway.

The Mosakahiken Cree Nation is located on the adjoining Reserve 31A, Big Island, Trader's Lake, Crossing Bay and Little Limestone.

## DEMOGRAPHY

The population of Mosakahiken Cree Nation (MCN) was 556 in 1996, 740 in 2001 and 700 in 2006 (Table 11.15). Out of the 700 residents in 2006, 680 (97%) were North American Indian and 1.5% were Métis. None of the residents identified themselves as Non-aboriginals (Table 11.16).

**Table 11.15 Population of the Mosakahiken Cree Nation (Indian Band Area) – 1996 to 2006**

| Year | 1996 | 2001 | 2006 |
|---|---|---|---|
| Total Population | 556 | 740 | 700 |
| Percent Change | | 33% | -5.4% |

Source: Statistics Canada, 1996, 2001 and 2006 Aboriginal Population Profile

**Table 11.16 Aboriginal Identity Population – MCN – 2006**

| **Total population** | **700** |
|---|---|
| Total Aboriginal identity population | 700 |
| *North American Indian* | *680* |
| *Métis* | *10* |
| *Aboriginal responses not included elsewhere* | *10* |
| Non-Aboriginal identity population | 0 |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census

The DHR Associates survey in 2007 established that MCN had a population of approximately 1,000 people, the Moose Lake Metis settlement had a population of 300 people, and Cross Bay had approximately 80 residents. Based on June 2008 Department of Indian Northern Affairs Canada's (INAC, 2008) records, 1,295 MCN and Métis lived in the community and 446 people lived off the reserve.

The age distribution in Moose Lake is quite different from the age distribution in the Province of Manitoba. The biggest difference is in the number of individuals under 14 and over 45 years old. Provincially, there are more people over the age of 45 (40%) than under the age of 14 (20%). However, the largest population group in Moose Lake First Nation is that of under 14 year olds, comprising over 40% of the total population of the community and the over 45 year olds comprise 15.7% (Figure 11.20). This seems to be a trend witnessed among most Aboriginal populations within Manitoba. Aboriginals tend to have lower life expectancies than non-Aboriginal groups, and the Aboriginal population tends to be younger than the non-Aboriginal population (Manitoba Aboriginal and Northern Affairs, n.d.). In 2006, the median age in the MCN community was 20.6 compared to 38.1 in the Province of Manitoba.

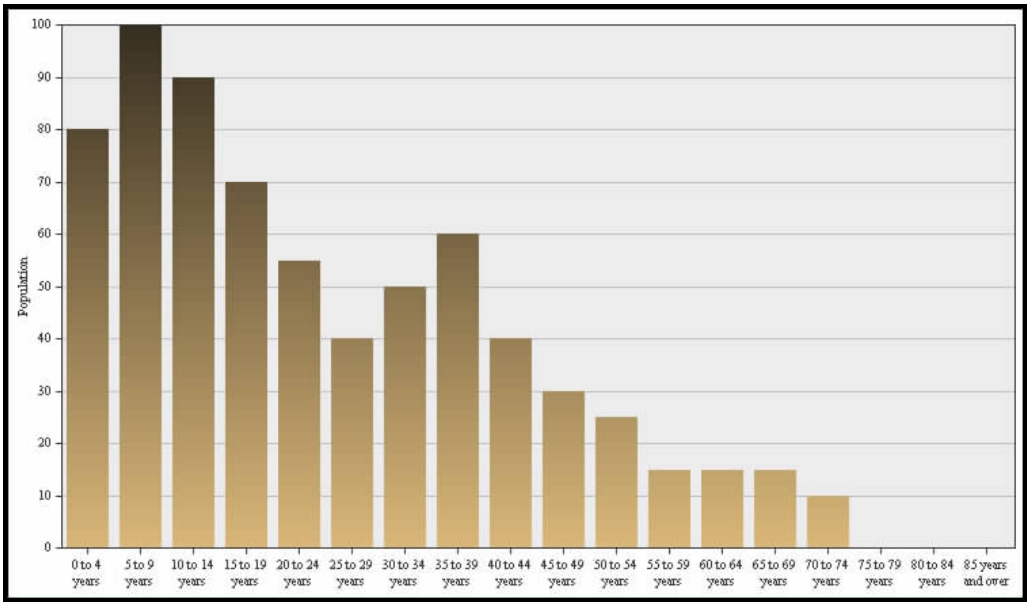
The community of Moose Lake also has a higher average family size (between 5 and 6 people per family) compared to the provincial average of 3 people per family.

**Table 11.17 Registered Population – MCN – June 2008**

| Residency | # of People |
|---|---|
| Registered Males On Own Reserve | 656 |
| Registered Females On Own Reserve | 639 |
| ***Total Population On Own Reserve*** | ***1,295*** |
| Registered Males On Other Reserves | 7 |
| Registered Females On Other Reserves | 4 |
| Registered Males On Own Crown Land | 0 |
| Registered Females On Own Crown Land | 0 |
| Registered Males On Other Band Crown Land | 0 |
| Registered Females On Other Band Crown Land | 0 |
| Registered Males On No Band Crown Land | 2 |
| Registered Females On No Band Crown Land | 3 |
| Registered Males Off Reserve | 190 |
| Registered Females Off Reserve | 240 |
| **Total Registered Population** | **1,741** |

Source: Indian and Northern Affairs Canada: Research & Analysis Directorate (2008)

**Figure 11.20 Population Age Breakdown in Moose Lake – 2006**




Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

### DWELLINGS

Housing within the community is in fairly poor condition, with the biggest problems being mold and shift of foundation. In 2007, there were no unoccupied houses within the community, and there were about 9 to 10 people occupying each household. According to the 2006 Aboriginal Population Census, there were 170 private Aboriginal households with a median household income of $28,011 (Table 11.18). In addition, there were 165 private dwellings occupied by usual residents in Moose Lake First Nation. Each dwelling had an average of 5.5 rooms and 24.2% of the total dwellings had more than one person per room. Of the private dwellings, 76% were constructed in the past 20 years and 24% of total private dwellings were constructed before 1986. Approximately 58% (95 out of 165) of all dwellings required major repair in 2006.

**Table 11.18 Occupied Private Dwelling Characteristics – 2006**

| **Total private dwellings occupied by usual residents** | **165** |
|---|---|
| Number of owned dwellings | 15 |
| Number of rented dwellings | 10 |
| Dwellings constructed before 1986 | 40 |
| Dwellings constructed between 1986 and 2006 | 125 |
| Dwellings requiring minor repairs only | 50 |
| Dwellings requiring major repairs | 95 |
| Average number of rooms per dwellings | 5.5 |
| Dwellings with more than one person per room – as a % of total occupied private dwellings | 24.2% |
| Total private Aboriginal households | 170 |
| Median Income in 2005 – All private households | $28,011 |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

### ECONOMY

The Band is the main employer within the community of Moose Lake. However, there are a few businesses such as grocery and retail/general merchandise stores that offer jobs in the service, clerical, management and administration fields. Fishing and trapping are the economic activities of the community ('Moose Lake' Community Overview, 2003). However, about 95% of the community was unemployed in 2007, and relied upon welfare as their base income. This unemployment rate is extremely high compared to the provincial 2007 unemployment rate of 4.0% (Table 11.19).

This trend was noticed among all of the Aboriginal communities within Manitoba. They had a higher than average unemployment rate compared to Non-Aboriginal communities (The Premier's Economic Advisory Council, 2005).

**Table 11.19 Unemployment Rates – Moose Lake – 2001, 2006 and 2007**

| | Moose Lake | Manitoba |
|---|---|---|
| 2001 | 44.0% | 6.0% |
| 2006 | 28.1% | 5.5% |
| 2007 | 95.0% | 4.0% |

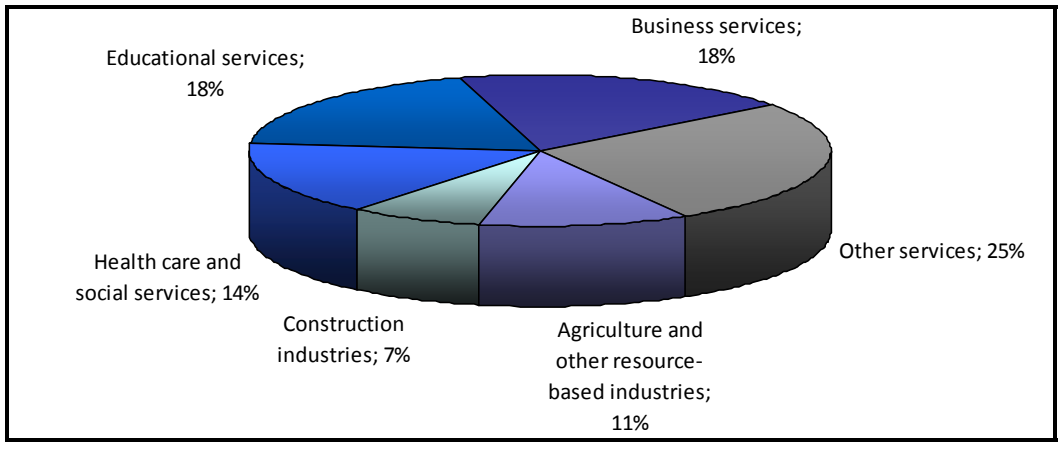
Source: Statistics Canada, Aboriginal Population Profile, 2006 Census and Community Profile, Census 2001 and 2006 and The Daily, February 8th, 2007.

The participation rate in Moose Lake First Nation was 37.69%, a low rate compared to the provincial average of 67.3%. In fact, it is important to note that 62% of the total Aboriginal population 15 years and over (425) was not in the labour force in 2007. The employment rate was also weak - 27.1% in Moose Lake compared to 63.6% in Manitoba.

### *Industry*

In 2006, women and men were unequally employed (43%-57%) in the community: women mainly worked in health care, social and educational services while men tended to work in resource-based and construction industries and business services. Figure 11.21 shows total experienced labour force of MCN per industry in 2006.

**Figure 11.21 Moose Lake Labour Force per Industry – 2006**




Source Statistics Canada, Aboriginal Population Profile, 2006 Census.

### *Vocational Skills*

Table 11.20 lists the vocational skills of members of the Moose Lake community. The 2007 DHR Associates' survey identified the skills of those interested to work for Victory Nickel. The skills that people have in the Moose Lake community are limited to specific trades.

**Table 11.20 Vocational Skills within Community of Moose Lake First Nation**

| Occupations | Number of Individuals |
|---|---|
| Heavy Equipment Operator | 8 |
| Mechanics | 3 |
| Carpenters | 8 |
| Truck Drivers | 13 |
| Security Officers | 2 |
| Catering | 1 |

Source: DHR Associates Survey (2007)

## SOCIAL STRUCTURE

The government structures are fairly similar between the reserve and the town. The Band government is structured with one Chief and five councillors, while the community government has one Mayor and five councillors. There are few civic associations and clubs within the community.

The available public education is a school (from kindergarten to grade 9) within the community. Students must travel to The Pas to attend High School. The Pas is approximately 74 km southeast of the community (Moose Lake Community Profile, 2003).

The average family income within the community is $30,000 to $40,000 per year. This is slightly lower than the provincial average of approximately $47,875. The difference may be due to the types of available jobs within the community. According to the 2006 Census, 40 people worked in sales and service occupations, 30 people worked in the trades and transport industries, and 25 were employed in occupations which are unique to a primary industry. These occupations may have lower than average salaries.

### Social Well-Being

There is gender discrimination within the community. Levels of divorce, spousal abuse (especially directed towards wives) and general abuse are all on the rise, along with domestic violence, child abuse and neglect. Alcohol and drug abuse are fairly high within the community, as well as the incidence of youth gangs, fighting and vandalism. The housing is of poor quality, as most of the units are lacking general maintenance. There have been a few reported incidences of public violence, including property damage.

In 2007, about 95% of the population were on social welfare. The lack of high school facilities, as mentioned earlier, within the community is a fairly big problem, especially considering that the closest high school is located 74 kilometres away from the community and that approximately 40% of the population is younger than 15.

The Community Well Being Index (CWB), compiled by the Indian and Northern Affairs Canada (2001), for Mosakahiken Cree Nation is 55. This number is well below the average provincial score of 81 and below the First Nations average score of 59 (Table 11.21).

**Table 11.21 Community Well Being Index for MCN – 2001**

| | |
|---|---|
| Highest Manitoba Community Score | 93 |
| Manitoba Non-First Nations Average Score | 81 |
| **Mosakahiken Cree Nation** | **55** |
| Manitoba First Nations Average Score | 59 |
| Lowest Manitoba Community Score | 44 |

Source: Indian & Northern Affairs Canada: Research & Analysis Directorate (2001)

### EDUCATIONAL ATTAINMENT

In terms of levels of education within the community, the average level of attainment is between the Grades 7 and 10. This is fairly low compared to the general population of Manitoba. The majority of the population had a high school certificate or no certificate at all (88%). Of the community members, 4% completed an apprenticeship or trade program, 5% a College program, and 2% have a University degree.

The fields of study for the 60 individuals who had a postsecondary certificate, diploma, or degree included: education; social and behavioural sciences and law; business; management and public administration; architecture; engineering and related technologies; agriculture; natural resources and conservation; and personal, protective and transportation services (Statistics Canada, Census 2006).

### PUBLIC AND COMMUNITY SERVICES IN MOOSE LAKE

Following are Moose Lake's public and community services:

- There is an Anglican and an Evangelical church in the community;
- Medical care is provided by a nursing station, with a doctor who visits 2 times a week. There are 5 public health workers, as well as health counselling services available once a month. In addition, the Manitoba government provides Mental Health and Suicide Prevention Services;
- Sanitation is provided by a lagoon, sewage tanks and pump trucks;
- Manitoba Hydro is responsible for the electricity within the community;
- Fire protection is provided by 8 firefighters, and there are also ambulances and both RCMP and Band police present;

- The community has a post office, as well as radio service and high-speed internet service. However, there is no television service, local newspaper or MTS cell phone service for the community;
- The recreation services available to the community are fairly limited and consist of a children's playground and youth sports activities, primarily soccer, baseball and badminton;
- Cultural facilities are limited. Along with the school, the community has a library as well as a heritage site in the cemetery;
- An Adult Education Centre is available to provide education to people who have not completed High School. This was recently introduced.

### 11.3.5 MISIPAWISTIK CREE NATION AND GRAND RAPIDS

The community of Grand Rapids is governed by two authorities: Misipawistik Cree Nation, a community of 651 (Statistics Canada, 2006 Census) and the Town of Grand Rapids, a community of 336 (Statistics Canada, 2006 Census). The Grand Rapids community is divided into three distinct areas: the Misipawistik Cree Nation, the Town of Grand Rapids, and the Hydro Sub-division. The Misipawistik Cree Nation constitutes the part of the community, which is located on reserve land, and is governed by a Chief and Council. The Town of Grand Rapids and the hydro sub-division are situated on land under provincial jurisdiction. The hydro sub-division is the area in the community where many of the staff and families who work for Manitoba Hydro reside. The Town of Grand Rapids was incorporated on January 1, 1997. One Mayor and Council govern both the town and the hydro sub-division (Source: NOR-MAN Regional Health Authority, 2007).

#### MISIPAWISTIK CREE NATION

The Misipawistik Cree Nation is located 426 kilometres north of Winnipeg on Highway #6. It is situated at the confluence of the Saskatchewan River with Lake Winnipeg. The Misipawistik Cree Nation, which is also referred to as the Grand Rapids First Nation (GRFN). The Misipawistik Cree Nation is located on the east and south banks of the Saskatchewan River, immediately across from the town site of Grand Rapids. The total land area of GRFN is 16.97 square km.



#### *Demography*

The population of Misipawistik Cree Nation increased by approximately 10 people per year from 1996 to 2006. The Misipawistik Cree Nation had 546 members in 1996 and 651 in 2006 (Table 11.22). Based on 2006 Statistics Canada data, 97% of

the Misipawistik Cree Nation were North American Indians and 3% were Métis (Table 11.23).

Based on DHR Associates' August 2007 survey, there were 570 members of the community living off the reserve and not in the Town of Grand Rapids. According to Indian and Northern Affairs Canada, the registered population of Grand Rapids First Nation living on reserve was 872 and the total registered population was 1,523 in June 2008 (Table 11.24).

**Table 11.22 Population Change – Misipawistik Cree Nation – 1996 to 2006**

| Year | 1996 | 2001 | 2006 |
|---|---|---|---|
| Total Population | 546 | 591 | 651 |
| Percent Change | | 8.2% | 10.1% |

Source: Statistics Canada, 1996, 2001 and 2006 Aboriginal Population Profile

**Table 11.23 Aboriginal Identity Population of the Misipawistik Cree Nation – 2006**

| | |
|---|---|
| **Total population** | **650** |
| Total Aboriginal identity population | 650 |
| *North American Indian* | *630* |
| *Métis* | *20* |
| *Aboriginal responses not included elsewhere* | *0* |
| Non-Aboriginal identity population | 0 |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

**Table 11.24 Registered Population – Misipawistik Cree Nation – June 2008**

| Residency | # of People |
|---|---|
| Registered Males On Own Reserve | 454 |
| Registered Females On Own Reserve | 418 |
| ***Total Population On Own Reserve*** | ***872*** |
| Registered Males On Other Reserves | 32 |
| Registered Females On Other Reserves | 30 |
| Registered Males On Own Crown Land | 0 |
| Registered Females On Own Crown Land | 1 |
| Registered Males On Other Band Crown Land | 0 |
| Registered Females On Other Band Crown Land | 0 |
| Registered Males On No Band Crown Land | 3 |
| Registered Females On No Band Crown Land | 5 |
| Registered Males Off Reserve | 259 |
| Registered Females Off Reserve | 321 |
| **Total Registered Population** | **1,523** |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

In terms of the age distribution within the community, Grand Rapids like Moose Lake had a much higher proportion of individuals younger than 14 years (36%) and much lower proportion of individuals older than 45 23% compared to the provincial average (Table 11.25). In the general population of Manitoba, 20% of the population is younger than 14 years and 40% is older than 45. In 2006, the median age was 21.6 in the GRFN compared to a median age of 38.1 for the Province of Manitoba.

**Table 11.25 Population Total and Age Breakdown – GRFN – 2006**

| | Grand Rapids First Nation | Manitoba |
|---|---|---|
| **Total** | **651** | **1,148,400** |
| 0 to 14 years | 36% | 20% |
| 15 to 29 years | 25% | 20% |
| 30 to 44 years | 20% | 20% |
| 45 to 64 years | 18% | 26% |
| 65 years and over | 5% | 14% |
| Median age | 21.6 | 38.1 |

Source: Statistics Canada, Aboriginal Population Profile and Community Profile, 2006 Census

In terms of family size, Grand Rapids First Nation had larger families than average residents of Manitoba. According to the 2001 Statistics Canada Census, the average family size was 4.6 in the community, which is higher than the provincial average of 3.0.

### *Dwellings*

The houses on the reserve were in very poor condition during the 2007 DHR Associates' survey and there were no vacant apartments or single family units. Despite the fact that most of the dwellings have been constructed within the past 20 years, more than half of them required major repairs in 2006 (Table 11.26).

**Table 11.26 Dwellings Characteristics – GRFN – 2006**

| **Total private dwellings occupied by usual residents** | **170** |
|---|---|
| Number of owned dwellings | 10 |
| Number of rented dwellings | 0 |
| Dwellings constructed before 1986 | 45 (26%) |
| Dwellings constructed between 1986 and 2006 | 130 (74%) |
| Dwellings requiring major repairs | 90 (53%) |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census

Local involvement in dealing with the First Nations housing crisis, led to creation of a Sustainable Housing Pilot Project (Source: National Cree Gathering 2007 Web Site).

*Economy*

The Misispawistik Cree Nation is still reliant upon the traditional resources of fishing, trapping and hunting. Community members are also employed by Manitoba Hydro and in forestry and mining sectors. The GRFN is also looking towards developing opportunities in eco-tourism (Source: National Cree Gathering 2007 Web Site).

The Misispawistik Cree Nation and the Town of Grand Rapids offer various commercial and business services (Table 11.27). Half of the businesses are owned by Aboriginal or Métis people.

**Figure 11.22 Fishing and Recreation Activities (Lake Winnipeg)**



**Table 11.27 Commercial Business and/or Services Operated by GRFN, Métis or Others**

| Description | GRFN | METIS | OTHER |
|---|---|---|---|
| Esso Service Station/ Restaurant (off-reserve; non-Aboriginal owned) | | | X |
| Grand Rapids Fishermen's Co-op (on-reserve; commercial fishermen owned bulk are Aboriginal | X | | |
| E.T. Trucking Freight service (on-reserve; privately owned by First Nation) | | | X |
| Grand Rapids Lodge (off-reserve; Métis owned) | | X | |
| Grand Rapids Laundromat (off-reserve) | | | X |
| Hilltop Motel (off-reserve; Métis owned) | | X | |
| Riverview Campground (off-reserve) | | | X |
| Moak Lodge (off-reserve) | | | X |
| Pine Grove Cabins (off-reserve) | | | X |
| Herb Cook & Sons/heavy machines (off-reserve; privately owned by First Nation) | | | |
| Riverview Video (off-reserve) | | | X |
| Consumer Co-op Grocery (on-reserve; member owned) | X | | |
| Pelican Landing Gas Station (on-reserve; First Nation owned) | X | | |
| Grand Wish Restaurant (@ Pelican Landing; privately owned leased from Band) | | | X |
| Median Credit Union (@ Pelican Landing; on reserve member owned all members Aboriginal) | X | | |
| Maskiki Health (@ Pelican Landing; First Nation owned) | X | | |
| Misipawistik Telecommunications Coop (on reserve; First Nation owned) | X | | |
| King's Boat Repair (off reserve; non-Aboriginal owned) | | | X |
| Johnnie's Garage (off-reserve; Métis owned) | | X | |
| Big Joe's Convenience Store (off-reserve; Métis owned) | | X | |
| Northbrook Inn (off-reserve; privately owned) | | | X |
| Siggy's Taxi (health trips only) | | | X |
| Little Niska Day Care (on-reserve; First Nation owned) | X | | |
| Little Minnow Day Care (off-reserve) | | | X |
| **TOTAL** | **7** | **4** | **12** |

Source: DHR Associates Survey (2007)

GRFN's unemployment rate at approximately 33% in 2006 (Statistics Canada) and 50% (The Daily, Feb. 8, 2007) in 2007 is high compared to the provincial averages of 5.5% and 4% in 2006 and 2007, respectively (Table 11.28).

**Table 11.28 Unemployment Rates – GRFN – 2001, 2006 and 2007**

| | Grand Rapids First Nation | Manitoba |
|---|---|---|
| 2001 | 32.0% | 6.0% |
| 2006 | 33.3% | 5.5% |
| 2007 | 50.0% | 4.0% |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census and Community Profile, Census 2001 and 2006 and *The Daily*, February 8th, 2007.

According to DHR Associates' survey in 2007, 65% of the women and 35% of the men between the ages of 19 and 65 were unemployed in the community. The main types of jobs available in the community were within the service, construction, maintenance, electrical, mechanical and truck driving sectors, which may explain the gender disparity in unemployment. The major employers were the Misispawistik Cree Nation band office and Manitoba Hydro.

According to the Statistics Canada 2006 Census, 140 individuals (33%) of the total population 15 years and over (415) were not in the labour force, 185 were employed, and 90 were unemployed. GRFN had an employment rate of 45% and a participation rate of 65%. This participation rate is relatively high compared to the other communities that were assessed by DHR Associates in the course of this work with the exception of Snow Lake.

Industry

In 2007, GRFN had a total experienced labour force of 225 individuals (DHR Associates survey). By industry,

- 31% worked in resource-based industries;
- 16% worked in health care and social services, and;
- 31% provided in other services (such as tourism).

Development Project

Misipawistik First Nation was recently chosen as the location of an Israeli-Manitoba pilot project to develop greenhouse technology. The principal goal of this project is to encourage the sharing of scientific knowledge between Israelis and Manitobans. Greenhouse technology will enable the Grand Rapids community to grow fresh produce, which would result in a dietary improvement and which might help combat the increasing prevalence of diabetes among the native Cree population. This project is also an opportunity to engage individuals in community gardening as a healthy, productive activity. In fact, Grand Rapids' Chief is determined to rebuild the economy of his First Nations, with the greenhouse project being the first step in a planned revitalization program. This initiative is considered to be a catalyst for the development of future partnerships with both Israeli and Canadian institutions. For instance, in the context where Israel's water is a scarce resource, scientists have developed a filtration system to desalinate and treat polluted water, turning it into a

usable resource for irrigation and fish breeding. According to Grand Rapids' Chief, a lot of the water surrounding Grand Rapids, such as Lake Winnipeg, is unclean and unusable and something has to be done about the water situation in Canada (Source: Canada-Israel Committee Web Site).

Vocational Skills

The 2007 DHR Associates' survey identified existing vocational skills in the community of Grand Rapid First Nation, especially for people interested to work for Victory Nickel. Table 11.29 indicates that 79 community members possess skills potentially suitable for working at Minago.

**Table 11.29 Vocational Skills in the GRFN Community – 2007**

| Occupations | Number of Individuals |
|---|---|
| Miners | 3 |
| Heavy Equipment Operators | 9 |
| Pipe Fitters | 1 |
| Supervisors | 3 |
| Accountants | 2 |
| Public Relations Specialists | 2 |
| Administrative Assistants | 4 |
| Drillers and Blasters | 3 |
| Mechanics | 1 |
| Carpenters | 8 |
| Human Resource Specialists | 2 |
| Nurses | 5 |
| Photographers | 1 |
| Housekeepers | 9 |
| Safety Experts | 1 |
| Clerks | 5 |
| Managers and Executives | 2 |
| Truck Drivers | 5 |
| Electricians | 1 |
| Welders | 1 |
| Surveyors | 1 |
| Engineers and Technicians | 1 |
| Millwrights | 1 |
| Security Officers | 4 |
| Catering | 4 |

Source: DHR Associates Survey 2007

### *Band Leadership*

The Band government is structured with one Chief and 3 councillors.

Social Well-Being

Alcohol and drug abuse within the community are rampant. Assaults, break-ins and thefts are common occurrences, as is armed robbery, rape and highway traffic incidents. As well, family violence and divorces are common within the community. There is a rather high rate of school drop-out, and a large number of people within the community depend on social assistance – 80% of members off the reserve and 20% of those within the town. The standard of housing within the community is poor to average. The physical health is not really good but mental health is fair.

The Community Well-Being Index (CWB), compiled by the Indian and Northern Affairs Canada (2001), is 60 for the Grand Rapids First Nation, which is well below the provincial index of 81 but slightly above the First Nations average score (Table 11.30).

**Table 11.30 Community Well-Being Index – 2001**

| | |
|---|---|
| Highest MANITOBA Community Score | 93 |
| MANITOBA Non-First Nations Average Score | 81 |
| **Grand Rapids First Nation** | **60** |
| MANITOBA First Nation Average Score | 59 |
| Lowest MANITOBA Community Score | 44 |

Source: Indian & Northern Affairs Canada: Research & Analysis Directorate (2001)

### *Educational Attainment*

The average level of education is between Grades 7 to 12 (high school). Most of the population aged 15 years and over (60%) does not have a certificate, diploma or degree. According to the Statistics Canada 2006 Census, only 55 community members possess a post-secondary certificate, diploma or degree. Of these community members, 15 studied business, management and public administration and 15 architecture, engineering and related technologies.

### *Public and Community Services*

The community has a school that caters to students from kindergarten to grade 12. The school has a library that is open for public use. The student-teacher ratio is 14-1.

Language protection and enhancement is an issue in most Aboriginal communities. The Cree Nation is committed to protecting and enhancing the Cree Language. The Grand Rapids School has introduced a Cree Immersion class at the nursery school. The school will maintain a Cree Immersion class each year for this class until there is

full immersion at the elementary level (Source: National Cree Gathering 2007 Web Site).

There are no hospitals within the community, but there is a provincial nursing station with 3 nurses, 1 health care worker and 1 administrative secretary. As well, there is a visiting doctor who comes to the community for 2 days on a bi-weekly basis. There is also a phone in on-call doctor in Winnipeg. Recently, the community has opened a telepharmacy, which provides the full service of a pharmacy right in the community. No longer will members of the community have to travel out of the community to have their prescriptions filled. The telepharmacy also carries a wide selection of health care products, which are also available to the community.

The community has ambulance service, pump truck fire protection as well as police protection from both the RCMP and Band police.

Manitoba Hydro provides the community with electricity. The sewage services available include septic tanks and a sewage lagoon on the reserve. However, there is no water treatment plant within the community. Internet service is available within the community.

There is one bank, the Median Credit Union, a post office and Anglican, Catholic and Baptist churches in Grand Rapids.

### THE TOWN OF GRAND RAPIDS

Grand Rapids is located on Highway #6 approximately 250 kilometres south east of the Town of The Pas and 400 kilometres north of the City of Winnipeg. Grand Rapids is situated at the confluence of the Saskatchewan River with Lake Winnipeg and has a land area of 85.95 square km.

#### Demography

The population within the town has decreased slightly over the past few years from 404 in 1996 to 336 in 2006 (Table 11.31). This may be attributed to the rate of mobility in the community. Approximately 10 people move into the community (reserve and town) every year, while about 20 leave every year (DHR Associates Survey, 2007).

Approximately 57% of the Grand Rapids residents are Aboriginal and 43% are Non-Aboriginal. The Aboriginal influence is also seen in the language spoken most often at home. Approximately 20% of the total population in the Town of Grand Rapids speaks a non official language at home.

**Table 11.31 Population Change – Town of Grand Rapids – 1996 to 2006**

| Years | 1996 | 2001 | 2006 |
|---|---|---|---|
| Total Population | 404 | 355 | 336 |
| Percent Change | | -12% | -5.3% |

Source: Statistics Canada, 1996, 2001 and 2006 Community Profile

Grand Rapids' population distribution per age group is similar to Manitoba's population except having more young people (less than 14 years old) and less people aged 65 years and over.

Dwellings

With a total population of 336 people and 135 dwellings in the community, 2.5 people live on average in each dwelling. The vast majority of houses (85%) were constructed prior to 1986 and 33% of the houses require major repairs in 2006 (Table 11.32).

**Table 11.32 Dwellings and Households Characteristics – 2006**

| Total private dwellings occupied by usual residents | 135 |
|---|---|
| Number of owned dwellings | 75 |
| Number of rented dwellings | 55 |
| Dwellings constructed before 1986 | 115 (85%) |
| Dwellings constructed between 1986 and 2006 | 15 (15%) |
| Dwellings requiring major repairs | 44 (33%) |
| Average value of owned dwellings | $95,896 |
| Median income in 2005 – All private households | $51,286 |

Source: Statistics Canada, Community Profile, Census 2006.

### *Economy*

The economic base of the Town of Grand Rapids depends on commercial fishing, tourism, to some extent trapping, and the Manitoba Hydro Plant. The School Board is also one of the largest employers in the area. Manitoba Hydro is the largest public employer with 58 employees. The town of Grand Rapids has established infrastructure to accommodate commercial development in the service and tourism sectors. In fact, tourist related occupations provide employment for many residents of the town and surrounding area. The area is known for having some of the finest master angler fishing lakes in the province, and many tourists arrive each year and stay at lodges and outposts and look for guides and other services. Business, trades and professional services in the Town of Grand Rapids are listed in Table 11.33. In spite of the small community population of 336 people, the town has 4 businesses in construction, gas station and 3 repair service enterprises.

The large number and variety of businesses, trades and professional services in the Town of Grand Rapids are a result of an employment rate of 67.3% (Table 11.34).

This employment rate is higher than the provincial average of 63.6%. Eighty-five (85) people or 35% of the population aged 15 years and over are not in the labour force and depend on social assistance.

Industry

Figure 11.23 illustrates the Grand Rapids labour force by industry. In 2006, the majority of total experienced labour force (160) worked in services industries (24% in retail, 21% in educational services, 6% in health care and social services) followed by resource-based industries (18%).

**Table 11.33 Businesses, Trades and Professional Services in the Town of Grand Rapids – 2008**

| Businesses, Trades and Professional Services | Number |
|---|---|
| **Accommodations** | |
| Campgrounds | 1 |
| Hotels | 2 |
| **Automotive** | |
| Auto body repair | 2 |
| Auto fuel sales (no mechanic-gas bar) | 1 |
| Auto/truck parts / accessories (new) | 1 |
| Auto/truck parts / accessories (used) | 1 |
| Diesel sales | 1 |
| Propane gas | 1 |
| Service stations with mechanic(s) | 1 |
| Specialty auto parts / service (tires, muffler shop, oil / lube shop, etc) | 1 |
| **Construction / Hardware** | |
| Concrete / Cement suppliers | 1 |
| Gravel, sand suppliers | 1 |
| Lumber / Hardware stores | 1 |
| Road construction | 1 |
| **Financial** | |
| Credit unions / Caisse Populaire | 1 |
| **Food And Beverages** | |
| Beverage rooms, lounges, etc. | 1 |
| Candy stores | 2 |
| Coffee / Tea Rooms, Donut shops | 1 |
| Convenience stores | 2 |
| Grocery stores | 2 |
| Liquor stores | 1 |
| Meat shops, butchers | 1 |
| Restaurants, drive-through or drive-in | 2 |
| Restaurants, licensed | 1 |
| Restaurants, sit-down, not licensed | 1 |
| **General Merchandise** | |
| Hobby / craft shops | 1 |
| Hunting, fishing, bait stores | 1 |
| **Other Services** | |
| Barber shops / hair salons | 1 |
| **Repair Services** | |
| Machine shops / welding | 2 |
| Small engine repair | 1 |
| **TOTAL** | **37** |

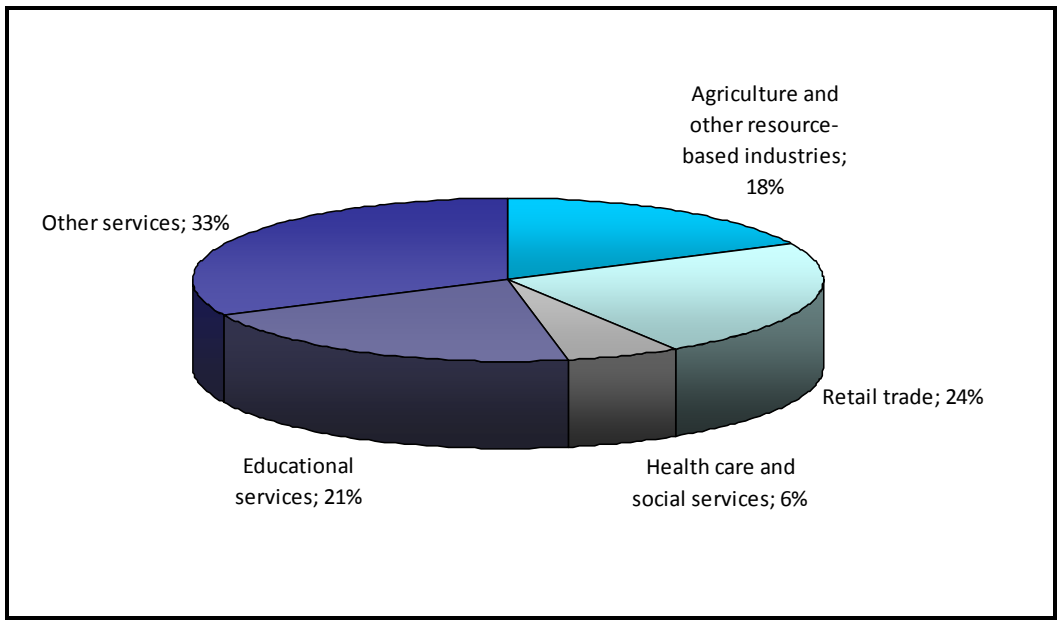
Source: Government of Manitoba, The Town of Grand Rapids Community Profile, Web Site consulted July 2008.

**Table 11.34 Labour Force Activity – Town of Grand Rapids – 2006**

| | Town of Grand Rapids | Manitoba |
|---|---|---|
| Total population 15 years and over | **245** | 908,450 |
| In the labour force | 160 | 611,280 |
| Employed | 160 | 577,710 |
| Unemployed | 0 | 33,570 |
| Not in the labour force | 85 | 297,170 |
| Participation rate | 65.3% | 67.3% |
| Employment rate | 67.3% | 63.6% |
| Unemployment rate | 0.0% | 5.5% |

Source: Statistics Canada, Community Profile, Census 2006

**Figure 11.23 Labour Force per Industry – Town of Grand Rapids – 2006**




Source: Statistics Canada, Community Profile, Census 2006

### *Social Structure*

The Town of Grand Rapids is governed by one Mayor and four councillors.

There are a few civic association and clubs within the community including the Grand Rapids Community Development Corporation.

There is one school (pre-school/nursery, elementary, junior high school, high school) in the community - Grand Rapids School – that caters to 382 students. The student-teacher ratio is 16.6 to 1.

*Educational Attainment*

Thirty-nine percent (39%) of Grand Rapids' residents have a university certificate or diploma below the bachelor level or a university certificate, diploma or degree, which is above the provincial average of 19% (Statistics Canada 2006 Census). Twenty-nine (29%) of the total population aged 15 years and over do not possess a certificate, diploma or degree.

*Public and Community Services*

Services and utilities in the Town of Grand Rapids include:

- garbage pick-up,
- police and RCMP (7 officers) services,
- fire department,
- public water system,
- municipal sewer system,
- telephone, cellular and hydro electricity services,
- 2 daily and 1 weekly newspapers
- 2 cemeteries.

Sports and recreation facilities include:

- an arena (hockey/skate rink) having a seating capacity of 150;
- community halls;
- 1 curling rink with artificial and natural ice and 2 curling rinks with artificial ice;
- 2 baseball diamonds (with backstop) having a seating capacity of 100;
- 1 cross-country ski trail;
- 3 playgrounds;
- 1 public boat launch;
- 1 tennis court; and
- 1 park (Tamway Park).

Recently, the Town of Grand Rapids constructed a sports/ recreation multiplex centre, which will also house a University College of the North campus.

The services and utilities that are lacking in the community are: 911 Service, Fibre Optics service, local Internet service provider, local radio station or local television.

Concerning health care services, Grand Rapids has a medical clinic and access to an ambulance and medical airlift services. The community also has one dentist and

one family medicine doctor. The closest hospital and personal care home are located in The Pas. There are no licensed day care facilities, senior residences or community mental health centres.

Concerning transportation, taxi and bus services are available and there are small craft harbours / marinas.

### 11.3.6 NORWAY HOUSE CREE NATION AND COMMUNITY COUNCIL NORWAY HOUSE

Norway House is a northern community, located 30 km north of Lake Winnipeg on the bank of eastern channel of Nelson River. The community has two closely knit settlements - Norway House Cree Nation (Indian Reserve) and the Norway House community settled by Métis and Non-Aborginals. The community is 456 air kilometres north of Winnipeg, 208 air kilometres east of The Pas and 190 air kilometres south of Thompson, Manitoba. Norway House has a land area of 72.99 square km, which is less than one percent of the whole province of Manitoba (Manitoba has 552,369.9 sq. km).

#### DEMOGRAPHY

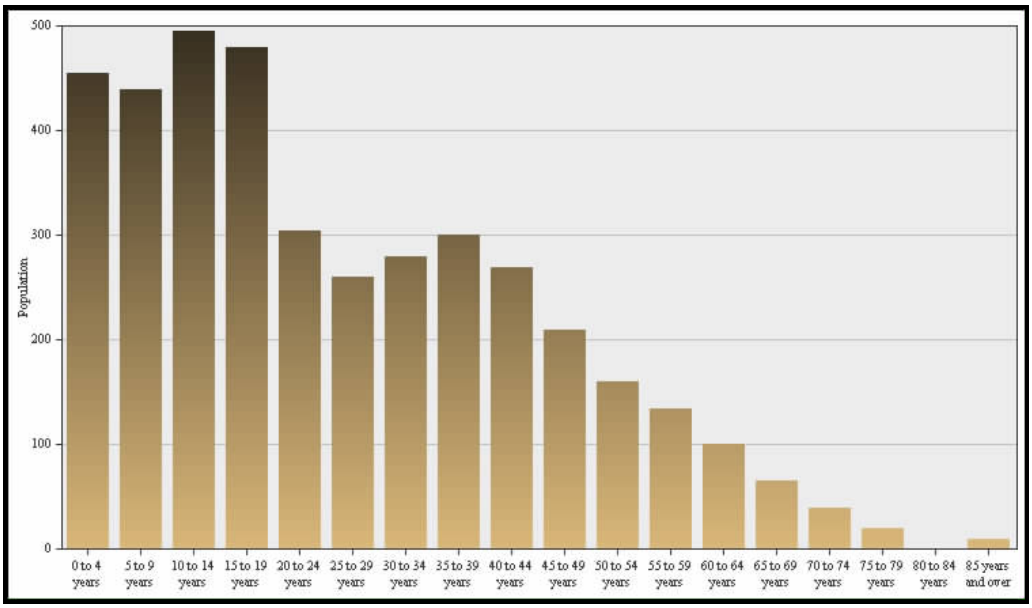
According to Statistics Canada 2006 Census, Norway House First Nation (NHFN) had a population of 4,071, which represents 0.35% of the total population in Manitoba. The population increased by 3.1% from 2001 to 2006, which is similar to the population increase in Manitoba (2.6%). The ratio of men to women was almost one to one (1:1) (50.3% men and 49.7% women). On average each family has between 4 to 5 members.

Figure 11.24 illustrates the population age breakdown for the Norway House Cree Nation in 2006. Based on this data, approximately 56% of the population was 15 years or over and 44% were younger than 15. The median age was 22.1 compared to the provincial median age of 38.1. Thus, the Norway House community is much younger than average communities in Manitoba. Figure 11.24 depicts a young man learning traditional pursuits from an elder.

**Figure 11.24 A Young Man Learning Traditional Pursuits from an Elder**



**Figure 11.25 Population Age Breakdown – Norway House Cree Nation – 2006**




Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

## DWELLING

Dwelling characteristics in Norway House are as follows. In 2006, the total number of private dwellings occupied by usual residents was 1,005 (Table 11.35). Out of

these dwellings, 190 dwellings were constructed before 1986 and 815 were constructed since 1986 due to an increase in economic activity in the community. Based on the data collected from this survey, houses are overcrowded in the community with 11 people living in 3 bedrooms units and 4.9 people in 4 bedroom units. Also, houses were substandard; most of them are old, small and with mould problems. In addition, the community faces a shortage of housing.

The households can be analyzed further on the basis of selected characteristics such as: household with married or common law couples; couples with or without children, and median income of each household. Out of the 1,005 private households, 365 were couples with children who had a median income of $33,280. There were 110 households with couples without children. Their median income was $27,808 slightly more than half of the provincial average of $47,875.

**Table 11.35 Occupied Private Dwelling Characteristics – Norway House Cree Nation – 2006**

| **Total private dwellings occupied by usual residents** | **1,005** |
|---|---|
| Number of owned dwellings | 50 |
| Number of rented dwellings | 20 |
| Dwellings constructed before 1986 | 190 |
| Dwellings constructed between 1986 and 2006 | 815 |
| Dwellings requiring minor repairs only | 365 |
| Dwellings requiring major repairs | 335 |
| Average number of rooms per dwellings | 5.6 |
| Dwellings with more than one person per room – as a % of total occupied private dwellings | 16.0% |
| Total private Aboriginal households | 1,005 |
| Median Income in 2005 – All private households | $27,456 |

Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

## ECONOMY

Major economic activities include government services, commercial fishing, trapping and logging in the community. Because of these activities, seasonal unemployment varies, with peaks as high as 70%. The 2007 DHR Associates survey established that the community's unemployment rate was about 24%. This means that a lot of people depend on social welfare for their living.

Table 11.36 below summarizes labour force activity indicators established by Statistics Canada (2006). Out of a total population of 2,655 individuals 15 years and over, 1,190 are in the labour force, and out of them, 76% are employed.

### Industry

The experienced total labour force was 1,100 in 2006. Approximately 35% provided health care, social and education services, 12% business services, 9% retail

services; and 8% worked in construction, 6% in agriculture and resource-based sectors, 1% in manufacturing, 1% in wholesale, and 25% in other areas (Figure 11.26).

According to the 2007 DHR Associates' survey, the community has various businesses: construction, garages, gas vendors, grocery stores, restaurants, retail and general merchandise services, video rentals, hotels, small engine repair shops and Cree Nation design.

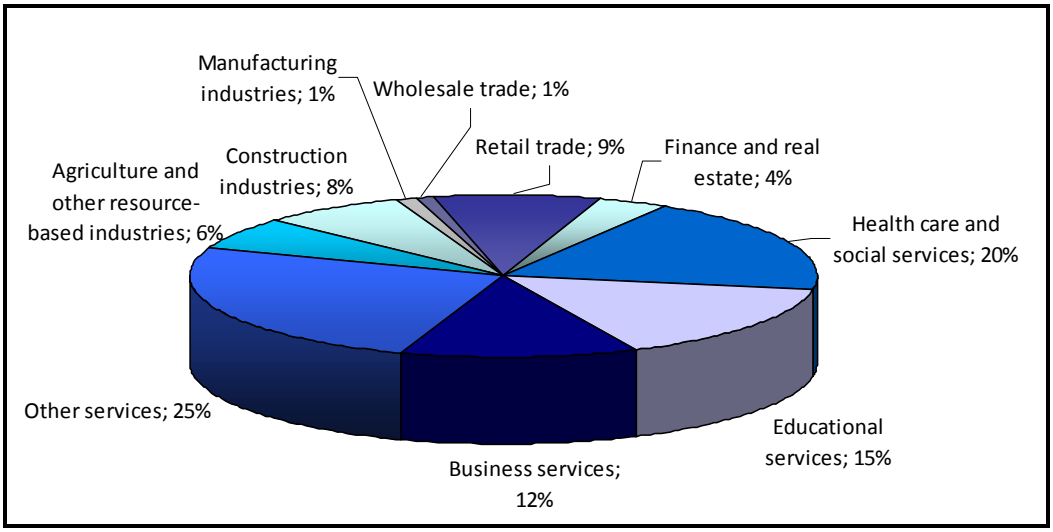
According to Statistics Canada, the median earnings were $10,923 per year in 2006, which is less than the provincial median of $24,484. In most cases, men were earning more than women. This could be because men do more complicated and physical jobs than women. Such jobs also require longer hours.

**Table 11.36 Labour Force Activity – Norway House Cree Nation – 2006**

| | Norway House | Manitoba |
|---|---|---|
| Total population 15 years and over | **2,630** | 908,450 |
| In the labour force | 1,190 | 611,280 |
| Employed | 900 | 577,710 |
| Unemployed | 290 | 33,570 |
| Not in the labour force | 1,435 | 297,170 |
| Participation rate | 45.2% | 67.3% |
| Employment rate | 34.2% | 63.6% |
| Unemployment rate | 24.4% | 5.5% |

Source: Statistics Canada, Aboriginal Population Profile, Census 2006

**Figure 11.26 Labour Force per Industry – Norway House – 2006**




Source: Statistics Canada, Aboriginal Population Profile, 2006 Census.

Occupation

In 2006, 36% of the total experienced labour force worked in sales and service occupations; 20% in trade, transport and equipment operator and related occupations; and 14% in social science, education, government service and religious occupations.

Vocational Skills

This study identified existing vocational skills of community members who are interested to work for Victory Nickel and also it was found that more than 350 individuals possess skills or experience in occupations related to mining. As illustrated in Table 11.37, the community has 50 truck drivers, 41 carpenters, 33 heavy equipment operators and 32 pipe fitters.

**Table 11.37 Vocational Skills in Norway House Community – 2007**

| Occupation | Number of Individuals |
|---|---|
| Heavy equipment operators | 33 |
| Pipe fitters | 32 |
| Supervisors | 10 |
| Accountants | 8 |
| Laboratory technicians | 5 |
| Administrative assistants | 3 |
| Mechanics | 8 |
| Carpenters | 41 |
| Human resource specialists | 2 |
| Nurses | 2 |
| House keeping | 14 |
| Clerks | 10 |
| Assayers | 7 |
| Marketing personnel | 15 |
| Truck drivers | 50 |
| Electricians | 23 |
| Welders | 7 |
| Surveyors | 27 |
| Engineers and technicians | 3 |
| Trainers | 10 |
| Computer technicians | 14 |
| Millwrights | 6 |
| Security officers | 10 |
| Catering | 14 |

## SOCIAL STRUCTURE

Band's government is composed of one Chief and 6 councillors and Community's Government is structured with one Mayor and 5 councillors.

*Social Well-being*

Both the Norway House Cree Nation (Indian Reserve) and the Community have reported many incidences of drug addiction, alcohol abuse and several suicides, property damage, shop lifting, breaking into houses. This has been happening mainly because of lack of employment and, as pointed out earlier, an important part of the population depends on social welfare. Also many incidences of family violence, divorces and incest are reported.

Community Well Being Index (CWB) compiled by Indian and Northern Affairs Canada's Research and Analysis Directorate is not available for Norway House.

## EDUCATIONAL ATTAINMENT

According to Statistics Canada 2006 Census, among total population aged 15 years and over in the Norway House Indian Reserve, 71% of them (1,875) do not have a certificate, diploma or degree. Only 16% community members possess a postsecondary diploma, certificate or degree.

## PUBLIC AND COMMUNITY SERVICES

As Norway House is one of the most well developed reserves in Manitoba and perhaps Canada, the Norway House Cree Nation and Community offer several public services.There are several restaurants, two hotels, a Royal Bank with ATM facilities, an insurance company (Ranger Insurance Broker), two Northern stores, a full service post office, a video store, a school (kindergarten to high school (Figure 11.27) and paved roads within the community. The Kinosao Sipi Mall and the recently added cell phone service are improvements to this northern community. It is home to a regional centre of the University College of the North and has a satellite degree programming from Brandon University's Faculty of Education and the University of Manitoba.

**Figure 11.27 Norway House District School**



Other public services include:

- Water treatment and sewage services. This operation has 10 water trucks, 10 sewer trucks, and 3 solid waste trucks.
- Norway House is serviced by the RCMP with 10 officers in 2007 and this number is expected to increase to 15. Norway House also has a NHCN Band police.
- Emergency Services include fire protection with 3 trucks and 21 employees; and an Ambulance services (3 ambulances and 12 employees).
- Health services and medical care are provided by The Norway House Indian Hospital, which offers physical and medical specialist services, renal health program/dialysis, personal care home services and personal care beds (outpatients and inpatients), public health and health education, water quality / environmental health, community wellness, and a dental clinic.
- Communication services are being provided by CJNC Radio and Television, and Native Communication Incorporated (NCI).
- Land transport services include a daily bus service provided by Greyhound. Air transport is provided by Perimeter Aviation and North America Charters.
- Recreation facilities include parks, outdoor rinks and a multiplex recreation facility.
- Religious denominations include Roman Catholic, Anglican, United Church, Pentecostal, House of Prayer, and Revival Centre.
- There are four heritage sites: York Village, Fort Island, George Point United Church, and Hanes Creek.
- There is a plan to develop a Museum soon.

## 11.4 KEY ISSUES RAISED BY STAKEHOLDERS

### *11.4.1 INTRODUCTION*

A series of meetings were held with key stakeholders to identify their views on Victory Nickel Inc. and the Minago Project in general. The various stakeholders ranged from local business operators to community representatives. It should be noted that there is considerable resentment to development projects in the area due to adverse past experience with some companies. However many stakeholders who were aware of the Minago Project and Victory Nickel Inc. were appreciative of the company's consultation process.

### 11.4.2 EXPECTED PROJECTS IMPACT ON THE LOCAL COMMUNITIES

The results of the fact-finding process were overwhelmingly positive. Following is a summary of quotations concerning the expected positive and negative impacts of the Minago project on each community.

#### SNOW LAKE COMMUNITY

*Positive Impacts*

- Victory Nickel will stimulate the economy of Snow Lake and hence improve the infrastructure to accommodate growth and increase society social interaction.
- The Mine will be good for Snow Lake's high school graduates who may be hired by the company.
- We need a company like Victory Nickel in our community. It will stimulate the economy and increase business.
- The socioeconomic impact of the mine will be nothing but positive. The mine will reduce unemployment.
- The mine will bring new businesses to our town.
- The mine will give occupational focus to young people who hence will stay away from criminal activities.
- The mine will help the town regarding population growth, which is needed badly.
- The impact of the mine will always be positive to businesses and eventually to the entire Snow Lake Community.

*Negative Impacts*

- The mine may increase alcohol and drug abuse incidents.

#### MISIPAWISTIK CREE NATION AND THE TOWN OF GRAND RAPIDS

*Positive Impacts*

- The First Nation people living off reserve would move back here, especially if there was work available.
- Victory Nickel will create opportunities for local individuals and businesses through contracts.
- Victory Nickel would likely arouse the interest of having more resource use especially in recreation and potentially improve the quality of life in Grand Rapids.

- The mine development could lead to better sales, more workers, and possible business expansions.
- Definitely the development of the mine will lead to hiring more staff and finding a better and more convenient location for a new post office.
- Victory Nickel development will have a positive impact because it would mean more business for the lodge due to recreational use of the facilities and resources.
- The mine development will mean for us to get better school facilities.
- Development of the mine is a good idea. It may bring about the changes Grand Rapids had always wanted e.g. better grocery store, a strip mall with a variety of services.
- Victory Nickel will affect everybody in Grand Rapids because there will be more jobs, more money and less welfare.
- The mine development may bring about new positive behaviours in Grand Rapids such as shopping options and evening recreational activities.
- Victory Nickel will have a positive impact on the community. It would solidify the improvement in the relationship between the RCMP detachment, the Town of Grand Rapids, Missipawistik Cree Nation and Chemawawin (Easterville). These communities have the same goal – better and healthier community life.
- People need jobs and long term work. The Minago Project is what we need for the future younger generation. It is true that the mine may affect trapping but the majority of the residents of Grand Rapids do not live that way anymore. Victory Nickel Inc. should study the effect of the mine in order to avoid problems in the future.
- It is great that Victory Nickel is bringing the mining industry to Grand Rapids. The company will have to train people, because the employment base is not here. The greatest opportunities would be in sub-contracting part of the mine development activities.
- The socioeconomic impact of the mine will be good for Grand Rapids not just for the First Nation but for the town as well. Economically it will generate more business, which is an excellent opportunity for our grandchildren and their future.
- The mine will be good for the young people if they could be given the opportunity to work there.
- Victory Nickel will be good for the economy and will not have severe effect on fishing.
- Victory Nickel will have positive impact economically and business wise. It is great and really good because it is time to move ahead.

*Negative Impacts*

- There are environmental concerns which will require more information before the band could support the mine.
- Fishing, trapping and logging activities maybe affected negatively although Minago is located rather far from Grand Rapids.
- The open-pit operations will affect the eco-system: air, water, vegetation, animals, and humans
- Economic benefits may be outweighed by resulting social problems such as crack and meth abuse.

## CROSS LAKE BAND OF INDIANS

*Positive Impacts*

- Victory Nickel is doing the proper thing by interviewing residents of Cross Lake. I welcome the process and the project. The residents will benefit especially from spin-off jobs.
- The project is positive because it will bring employment and jobs to Cross Lake. This means there will be more money in the community directly and indirectly through subcontracting.
- What Victory Nickel is doing is good since we will have jobs, employment and training.
- One can only think of the positives – good jobs, more money, happy families, and schools.
- The mine will bring more business to Cross Lake.
- Victory Nickel may be our chance to improve the community infrastructure and public services such as Youth Programs, Fire Protection, and Drug Enforcement.
- The mine will be beneficial to all residents of Cross Lake. It will offer employment, school improvement, and entice people to come back home. The mine may bring money in the community to build the badly needed Youth Centre and Job Centre.
- The Minago Project may mitigate the socioeconomic helplessness which is the main cause of suicide incidents in the community.
- It will definitely create a huge opportunity for employment and training. But promises must be kept.
- Victory Nickel will benefit both businesses and the community.
- The development of the mine will give employment to our young people. It will also create awareness of and put Cross Lake on the map. This may increase economic activities in the area.

- The mine will create more business which will result in more work and employment.
- The project will increase and improve business through gas sales and rooms/accommodation.
- There will be more jobs and business for our community.
- The mine is welcome. We need more work for the young people.

*Negative Impacts*

- Spillway from the mine into Minago River will affect trapping and fishing especially in Zone E.
- Currently, drug and alcohol abuse is very serious in the community and the mine may increase the problem.

## MOSAKAHIKEN CREE NATION AND THE COMMUNITY OF MOOSE LAKE

*Positive Impacts*

- The Minago Project is welcome. As long as Victory Nickel hires Moose Lake residents there will be socioeconomic benefits.
- The mine will have economic benefit especially for the youth. It may increase the gang activities but this can be controlled through workshops and law enforcement.
- The mine is good for the economy of all Moose Lake residents, the majority of whom are on welfare.
- Will create work for our young people.
- In general, the mine is a good thing for Moose Lake. It will bring jobs, but the youth have to be given the training on work ethics, money management, and time management.
- It will generate a lot of work/employment opportunities for our community.
- The mine will have positive impact on the community. With more financial resources we can pave our roads and develop various business initiatives.
- There will be a lot of spin-off businesses, which will create jobs and develop a sense of purpose for the youth.
- The mine operation will help the community in mitigating the effect of welfare. There will be more jobs and luxury life.
- Victory Nickel will give jobs and employment to Moose Lake residents but the company should take care of the environment.
- Having a big employer in the vicinity will improve family behaviour of residents.

- The mine operation will be good for the community since there will be jobs for people.

*Negative Impacts*

- People have not forgotten the mistreatment by other companies, which did not keep their promises.
- The mine will contaminate herbs that the locals use for medicine and food.
- Sudden influx of money in the community may cause crime to go up.

### NORWAY HOUSE CREE NATION

*Positive Impacts*

- The project will create jobs and generate revenue.
- May stimulate side economic developments and services like Mc Donald's, Wal-Mart badly needed in Norway House.
- More people in the area for sports competitions.
- May bring spin off economic activities.
- May stimulate educational initiatives.
- The project will create an opportunity that will open doors for employment and increase the economic base of NHCN.
- The project may indirectly increase operational funds for the Cree Nation.
- The project will create jobs even though people will have to be trained.
- Will promote community exposure.
- Project will alleviate poverty in the community.
- The youth will have something to look for in the future in terms of jobs.
- Improvement of lifestyle since people will be off social welfare.

*Negative Impacts*

- Environmental degradation of the lake, Limestone Bay.
- Will interfere with the water table and pollute the air (toxins) and the water.
- May affect the trappers and fishers.
- Economic development comes with its social problems such as drug abuse and alcoholism.
- Families may be uprooted be relocating to campsite.
- Animals and other wildlife will be affected.

## 11.5 POTENTIAL OPPORTUNITIES FOR THE COMMUNITIES OF INTEREST

### *11.5.1 EMPLOYMENT OPPORTUNITIES*

The Minago Project should it become a reality, it will create significant number of direct employment for Northern Manitobans. The Open Pit Mining, Milling, and Services and the Frac Sand Operations will create 422 plus 220 contract jobs in Frac Sand Transportation. Many of these employment opportunities are in transportation; maintenance; camp and hospitality services; security; and site support services.

### *11.5.2 BUSINESS OPPORTUNITIES*

The Minago Project will also create business opportunities for the Communities of Interest. The communities could create transportation entities to transport materials and personnel (150 to 180 employees per week) between mine site and communities.

Other business opportunities include but are not limited to camp and hospitality services in catering, camp maintenance and hospitality; site services such as garbage removal, snow removal, supply of aggregates; and suppliers of consumables, spare parts, fuels, and other services.

The Communities of Interest also can also enter into Joint Ventures arrangements with major contractors responsible for Mining; Equipment Maintenance; Construction; Explosive Suppliers and Camp and Hospitality Services. The Communities of Interest could bid for these contracts individually or in Joint Venture arrangements with large companies.

Trucking of Frac Sand is also a great opportunity for a JV requiring a capital investment of about $3M. Trucking of Frac Sand will involve movement of some 900,000 tonnes of sand per annum with projected revenue of between $ 9M and $ 10M.

Many of these opportunities may be configured as Joint Ventures such as in catering with a company such as Sodexo. A JV of this nature will create 60 direct jobs with Victory Nickel Inc. contributing a kitchen and dining facilities. There are existing successful models that the Communities could learn from such as the Athabasca Catering Limited Partnership, wholly owned by Aboriginal (Five First Nations) partners. This organization provides catering and janitorial services for a number of Saskatchewan mines.

Site closure and Reclamation is another opportunity for the Communities to get involved. The potential here include decommissioning of infrastructure, site reclamation, maintenance and post closure environmental monitoring if required.

## 11.6 CONSULTATIONS AND COMMUNITY ENGAGEMENTS

During the past three years (2007-2009), government agencies, public, First Nations and Métis consultation and community engagements have occurred on various aspects of the Minago Project. During this period, Victory Nickel has been involved with consultation and community engagement activities.

Consultation and community engagement have occurred with government regulators, First Nations Métis, general public and the government. Issues raised by each of these groups during this process have been documented and are summarized in previous Sections. Victory Nickel participated in community engagement in Norway House (Norway House Cree Nation (NHCN) and Norway House Community (NHC), Grand Rapids (Grand Rapids First Nation (GRFN) and Grand Rapids Community (GRC), Cross Lake (Cross Lake Band of Indians (CLBI)) and Cross Lake Community (CLC), Moose Lake First Nation (MLFN) and Moose Lake Community (MLC), Snow Lake (public), and The Pas (Métis).

### *11.6.1 REGULATORY AGENCY CONSULTATION AND ENGAGEMENT*

As part of the exploration and development process for the Minago Project, meetings between Victory Nickel Inc. (VNI) and provincial and federal regulatory agencies focused on environmental protection and wildlife, waste management, vegetation, fisheries, benthos, air and water quality, and permitting and regulatory requirements. Consultation and engagement first began in 2007 by introducing the Minago Project Scoping Study and Definitive Feasibility Study (DFS). As the DFS evolved further, information was presented to the regulatory agencies. The regulatory agencies consulted include Science, Technology, Energy and Mines (STEM); MB Conservation; MB Water Stewardship; Environment Canada; and Canadian Environmental Assessment Agency.

### *11.6.2 TECHNICAL ADVISORY COMMITTEE AND GOVERNMENT MEETINGS*

VNI had technical sessions with the provincial and federal government representatives, including the Provincial/Federal Technical Committee and consultants. The meetings were held in Winnipeg between 2007 and 2008. The meetings focused on the Feasibility Study components, Environmental Baseline Studies (vegetation, soil, fisheries, sediments, wildlife and water quality assessments, hydrology and hydrogeology), socioeconomic assessment, geochemical characterization, geotechnical aspects, mining, nickel milling and ore processing, water management, pit dewatering, frac sand mining and processing, tailings management, waste rock dumps, design basis and criteria, site reclamation, Métis and First Nations consultations and engagement, and permitting. The issues and comments raised during these meetings were incorporated in the planning and design of the Minago Project and are summarized in Table 11.38.

### 11.6.3 FIRST NATIONS CONSULTATION AND ENGAGEMENT

The Minago Project area falls within the Treaty 5 traditional territory and specifically the Norway House Resource Management Area. In 2007, in-depth community meetings were initiated to introduce the project. In 2008, additional community engagement meetings were initiated to discuss preliminary findings of the Environmental Baseline Studies (EBS) and some of the design basis and criteria for the frac sand plant, water management systems, pit dewatering systems, mine, mill, tailings storage facilities, waste rock dumps, and overall site infrastructure. In 2009, Victory Nickel concentrated on negotiating Social Economic Participation Agreement with Cross Lake, Grand Rapids and Moose Lake First Nations.

Overwhelmingly, there were more positive impacts issues raised than negative ones as detailed in the previous sections. The concerns that the First Nations (NHCN, CLBI, MLCN and GRCN) and Métis had were in regard to impacts to wildlife, water, social issues and traditional land use.

### 11.6.4 COMMUNITY INVOLVEMENT

Along with meetings with Norway House Cree Nation, Misipawistik Cree Nation (Grand Rapids), Mosakahiken Cree Nation (Moose Lake), Cross Lake Band of Bands and the Métis Federation of Manitoba, a series of public open houses were held to allow residents of Norway House, Cross Lake, Moose Lake, Grand Rapids, and Snow Lake to provide comment on the project's progress and proposed activities. The issues raised during the meetings concerned employment and business opportunities, including the issues given in Table 11.38. Meetings with the members of the Métis Federation of Manitoba (MMF) were held in Grand Rapids on May 08, 2007, in Norway House on May 23, 2007, and in The Pas on October 08, 2008. Victory Nickel also participated in the 2008 MMF Annual General Meeting that was held in Brandon, Manitoba.

**Table 11.38 2007-2008 First Nations Consultation Issues and Responses**

| Issues Raised During Consultations and Community Engagement | Company Response |
|---|---|
| Wildlife issues:<br>Elders and Band members were very concerned about wildlife. | Will initiate an animal sightings log as per Wildlife Management Protection Plan in the Draft EIS. |
| Overuse of access road:<br>People using it to come in and hunt moose. | The access road will be gated and will be private and would not be used by any third party, except in emergency situations. |
| Concerns over the negative impacts on First Nations. | The issue is covered under the environmental assessment including socioeconomic agreement. |
| Use of chemicals at the mine. | Few chemicals will be used to process ore. Flotation reagents, explosives and fuels and lubricants are the primary chemicals. |

*table continues…*

| Issues Raised During Consultations and Community Engagement | Company Response |
|---|---|
| Reclamation of the area:<br>There should be a requirement for a reclamation bond from the provincial government. | It is VNI's policy to reclaim disturbed areas in a timely manner and requirements for bonding exists under the MB Minerals Act. |
| There are environmental concerns, which will require more information before the band could support the mine. | The issues will be covered under the environmental impact assessment (EIA). |
| Fishing, trapping and logging activities may be affected negatively although Minago is located rather far from Grand Rapids. | The project is designed with appropriate control measures not to affect fishing, and logging activities. The measures are detailed in the environmental impact statement. Effect of the project on trapping will be much localized and discussions with the RTL holder from Norway House have been initiated. |
| The open-pit operations will affect the eco-system: air, water, vegetation, animals, and humans. | All these aspects are taken into consideration when planning and designing the Minago Project. Details pertaining to these environmental attributes are covered in the Environmental Impact Assessment (EIA). |
| Economic benefits may be outweighed by resulting social problems such as crack and meth abuse. | It will be difficult for VNI to control the use of such substances in the communities. However, VNI will implement a Drug Abuse Policy for its employees, contractors, suppliers and sub contractors. It is important to note that there are existing government programs to deal with substance abuse and the communities of interest can tap into such services when needed. |
| Spillway from the mine into Minago River will affect trapping and fishing especially in Zone E. | All flows to the Minago River will be controlled discharges. The discharge system design and related monitoring systems are given the EIA. |
| Currently, drug and alcohol abuse is very serious in the community and the mine may increase the problem. | It will be difficult for VNI to control the use of such substances in the communities. However, VNI will implement a Drug Abuse Policy for its employees, contractors, suppliers and sub contractors. It is important to note that there are existing government programs to deal with substance abuse and the communities of interest can tap into such services. |
| People have not forgotten the mistreatment by other companies, which did not keep their promises. | VNI will not follow the paths of other companies. VNI should be judged by its own actions and not actions by others. For example, VNI was the first Company to contact the First Nations about the Minago Project and will continue to communicate as the project evolves. |
| The mine will contaminate herbs that the locals use for medicine and food. | On the basis of the vegetation studies, there are no herbs documented that locals use for medicine and food. The results from archaeological study showed that the project area has no archaeological attributes. |

*table continues…*

| Issues Raised During Consultations and Community Engagement | Company Response |
|---|---|
| Sudden influx of money in the community may cause crime to go up | VNI will have no control on this matter. However, the company will encourage employees to undertake financial management courses. It is also important to mention that there are government programs available that the communities of interest can use to deal with financial problems if they occur. |
| Families may be uprooted be relocating to campsite. | First Nations who choose to stay in their communities will have a choice to commute to work. VNI will facilitate reasonable transportation to and from Minago. The employees also can car pool. |
| Project may affect the trappers and fishers. | The project will not affect fishers. Impacts on trapping will be localized and VNI has initiated discussions with the affected individual trappers. |
| Potential Environmental degradation of the Lake Winnipeg and Limestone Bay. | There will be no uncontrolled discharges to Lake Winnipeg and Limestone Bay. All discharges will meet regulatory requirements. |
| Animals and other wildlife will be affected. | There will be no significant impacts on animals and wildlife. Details pertaining to these attributes are covered in the EIA. |
| Project will interfere with the water table and pollute the air (toxins) and the water. | The water table in Minago's vicinity will not be affected. This has been confirmed from pumping tests undertaken by Golder Associates. Furthermore, VNI will initiate monitoring programs during operations. The details pertaining to groundwater aspects are covered in the EIA. |
| Economic development comes with its social problems such as drug abuse and alcoholism. | It will be difficult for VNI to control the use of such substances in the communities. However, VNI will implement a Drug Abuse Policy for its employees, contractors, suppliers and sub contractors. It is important to note that there are existing government programs to deal with substance abuse and the communities of interest can tap into such services. |

### 11.6.5 PUBLIC CONSULTATION

There is some overlap between the Communities of Interest (COI) and the public as the majority of the local communities, notably Grand Rapids, Norway House, Moose Lake, and Cross Lake, are represented by members of the Cree Nations. In addition to respective community band councils, each community has its own local government. People from the local communities also attended scheduled meetings in Norway House, Cross Lake, Moose Lake, and Grand Rapids.

VNI initiated community consultations in 2007 when undertaking the Feasibility Study and continued these consultations and community engagements through October, 2008. Initially, the purpose of the consultation was to provide information on the results of the Scoping Study and the type and amount of work planned for the

Feasibility Study. The consultation process evolved in response to participants' suggestions, and as people became aware of the project, they were able to contribute information to VNI.

Between 2006 and 2008, VNI met on many occasions with individuals, groups and communities to share information. In addition to meeting with local people, VNI also encouraged and provided opportunities for locals to participate in the project through employment opportunities. Employing and involving locals in VNI's business helped VNI understand local concerns and values.

### 11.6.6 FUTURE CONSULTATION AND COMMUNITY ENGAGEMENT MEETINGS

As the project progresses, Victory Nickel will hold additional consultation and community engagement meetings with the First Nations, Metis, government, the public and other stakeholders to project related information. These meetings will take place in 2010.

### 11.6.7 PERMITTING

Victory Nickel plans to submit an Environmental Act application to the Manitoba government during the First Quarter of 2010.

# 12.0 ENVIRONMENTAL CONSIDERATIONS

## 12.1 INTRODUCTION

In parallel with the preparation of the Minago Feasibility Study, Victory Nickel conducted baseline studies of the area surrounding the proposed mine site. These studies included surface water quality, monitoring, vegetation surveys, fisheries assessment, benthic community enumeration, wildlife surveys, a sediment characterization, a soil assessment, a socio-economic assessment, a geochemical characterization, and hydrology and hydrogeology studies. The goal of this study is to determine the potential impacts of the Minago Project on those environs by comparing baseline indicators and operational data.

## 12.2 ARCHAEOLOGY

Victory Nickel retained Quaternary Consultants Ltd. (QCL) to conduct an archaeological impact assessment of the proposed Minago Project development area.

QCL concluded that it is very unlikely that the mine site vicinity was usable before Pre-Contact times. The area is located at a considerable distance from lakes or navigable rivers and access at any time of the year would be very difficult. Potential historical use would likely have been limited to the winter months, and would have probably related to the fir trade. It is not impossible to predict where such activity would have taken place as traplines are re-located every year to accommodate animal movement. Even if resources from this activity were present, they would be buried deep in the sphagnum moss that covers the area and would be impossible to locate. Comprehensive testing in such conditions would prove nearly impossible and the odds of finding anything using such a technique would be astronomical.

Overall, the field investigations confirmed that archaeological potential was extremely low; it is highly improbable that the area was used by inhabitants prior to the introduction of the fur trade. The possibility of finding any evidence of Pre-Contact utilization of the area is next to impossible and likelihood of locating any evidence of Fur Trade or later use, other than prospecting and mining activities is extremely minimal.

The Historic Resources Branch of the government of Manitoba reviewed QCL's final report under Permit A40-08 – Archaeological Impact Assessment of the Minago Mining site and accepted the report as a fulfillment of the conditions outlined in the

permit and have no further concerns or recommendations. On August 06, 2008, the Historic Resources Branch gave clearance to Victory Nickel Inc. to proceed with the project.

Based on the field investigations by QLC, no residual adverse project effects on heritage resources are anticipated. Studies consisting of conventional surificial examination and subsurface testing were completed at all Victory Nickel identified areas of potential disturbance. COIs have not yet been consulted and no traditional use input has been provided. While the field investigation concluded that there will be no effect on heritage resources, Victory Nickel is nonetheless committed to mitigating the impact of the Project on any identified sites to the satisfaction of the COI. Accordingly, Victory Nickel will implement a follow-up program to incorporate input from the COI. In addition, contingency measures to identify and protect heritage resources known sites and sites that may be encountered during site preparation and construction will be provided in the project Environmental Protection Plan in the Environmental Impact Statement (EIS).

Based on Victory Nickel's commitment to the follow-up program and implementation of mitigation measures, no significant adverse residual project effects on heritage resources are expected. On this basis the likelihood of the conclusions of this report occurring as predicted is high.

## 12.3 SURFACE WATER QUALITY

Surface water quality in watercourses surrounding the Minago Project was assessed by Wardrop (2007) from May to October 2006, URS (2008g) from May to August 2007, and KR Design Inc. from September 2007 to May 2008. Wardrop (2007) monitored water quality in Oakley Creek and Minago River while URS (2008g) and KR Design Inc. regularly monitored water quality in Oakley Creek, Minago River, William River, and Hargrave River. One-time assessments of surface water quality were also completed for William Lake, Little Limestone Lake, Russell Lake, and two locations near the confluence of William River and Limestone Bay on Lake Winnipeg.

Overall, the water quality was good in the vicinity of the Project, with only some parameters exceeding Manitoba and/or Canadian Council of Ministers of the Environment (CCME) limits for the protection of freshwater aquatic life. The most common exceedances of Manitoba water quality guidelines occurred for aluminum and iron (many exceedances) followed by Nitrite-N (13 exceedances), copper (2 exceedances), total dissolved solids (1 exceedance), and selenium and silver (1 exceedance each). The 2002 Metal Mining Effluent Regulations (MMER) was exceeded only once, for TSS. The main exceedances are discussed below.

### 12.3.1 GENERAL PARAMETERS

To date, all water samples collected were alkaline (with pH ranging between 7.01 and 8.84) and the average and median field pH were 7.82 and and 7.81, respectively. The total alkalinity ranged from 56.6 to 703.0 mg/L (as $CaCO_3$) with average and median concentrations of 166.3 mg/L and 161.5 mg/L, respectively. Water in watercourses surrounding the Minago site is relatively hard. The recorded hardness ranged from 61.5 to 715 mg/L (as $CaCO_3$). The average and median hardness was 173.9 mg/L and 170 mg/L (as $CaCO_3$), respectively. The temperature, recorded between May and October of 2006, 2007, and 2008 varied seasonally. Recorded water temperatures ranged from a minimum of 2.7oC to a maximum of 22.2 oC in 2006 and from a minimum of 4.7 oC to a maximum of 25.6 oC in 2007. As expected, dissolved oxygen concentrations were lowest in the summer months due to higher water temperatures. The dissolved oxygen concentration ranged from 5.8 mg/L to 12.6 mg/L in 2006 and from 5.7 mg/L to 13.4 mg/L in 2007. In percent saturation, the reported dissolved oxygen concentrations ranged from 61.4 to 106.3% in 2006 and from 83.6 to 109.2% in 2007. The field specific conductivity (conductivity measured at in situ water temperature corrected to 25 ° C ranged from 127 to 580 µS/cm with average and median values of 214.2 and 215.5 µS/cm, respectively. The ORP (Oxidation Reduction Potential) ranged from 116 to 309 mV with average and median values of 210 mV and 208 mV, respectively. The ORP of surface watercourses in the vicinity of the Minago site is on the lower (more reducing) side of the normal range (100 to 500 mV).

### 12.3.2 EXCEEDANCES

In watercourses surrounding the Minago site, the total aluminum concentration ranged from 0.001 to 1.94 mg/L with average and median values of 0.197 mg/L and 0.053 mg/L, respectively. The average total aluminum level was significantly above Manitoba Tier III Freshwater quality and CCME (2007) guidelines for the protection of Aquatic Life (0.1 mg/L for a pH greater than 6.5). The dissolved aluminum concentration ranged from 0.001 to 0.319 mg/L with average and median values of 0.026 and 0.005 mg/L, respectively. To date, the dissolved aluminum concentrations exceeded the Manitoba Tier II Water Quality Objective (0.1 mg/L for a pH greater than 6.5) on 4 occasions.

Total iron concentration ranged from 0.025 to 1.89 mg/L in watercourses surrounding the Minago site. The average and median total iron concentrations were 0.271 mg/L and 0.137 mg/L, respectively. The dissolved iron concentration ranged from 0.01 to 1.19 mg/L with average and median values of 0.088 and 0.052 mg/L, respectively. The average total and dissolved iron levels were above Manitoba Tier III Freshwater quality and CCME (2007) guidelines levels (0.3 mg/L) on 20 and 4 occasions, respectively.

The elevated concentrations of aluminum and iron, in light of complete absence of any type of industrial or domestic development in the vicinity of the Minago site, are

likely due to eroded clay particles and leaching from the muskeg and peat in the area. Correlation analyses were conducted for total aluminum and total iron concentrations versus turbidity. For a perfect correlation, the correlation coefficient R is 1 and R2 is 1. Based on the water quality results obtained to date, total aluminum concentrations correlated very well (R2 > 0.86) with turbidity for stations OCW1, WRW2x and MRW1; total iron concentrations correlated well (R2 > 0.81) with turbidity for stations WRW2x, OCW1, HRW1, and MRW1.

The nitrite-N concentration in watercourses surrounding the Minago site ranged from <0.001 to 0.29 mg/L with average and median concentrations of 0.04 mg/L and 0.0005 mg/L, respectively. Measured nitrite levels were above the CCME (2007) guidelines for the protection of aquatic life (0.06 mg/L) on 13 occasions.

The total copper (Cu) concentration in watercourses surrounding the Minago site ranged from <0.0001 to 0.0064 mg/L with average and median concentrations of 0.0007 mg/L and 0.00037 mg/L, respectively. Based on the recorded total copper and hardness levels at Minago, the CCME guideline limit was exceeded twice (in September 2007 and March 2008) at sampling station HRW1 and once (in May 2006) at sampling station MRW1.

The 2002 Metal Mining Effluent Regulations (MMER) was only exceeded by TSS. The MMER guideline value for TSS is 15 mg/L for a monthly mean and 30 mg/L for grab samples. At Minago, the total suspended solids measurements ranged from 0.5 to 65 mg/L with average and median concentrations of 11.5 mg/L and 5.0 mg/L, respectively. TSS exceeded the MMER (2002) guideline value of 30 mg/L for grab samples on 4 occasions at HRW1, on two occasions at WRW1x and WRW2x, and once each at OCAWR and WRAOC.

## 12.4 HYDROGEOLOGY AND GROUNDWATER QUALITY

Wardrop (2007) conducted an initial hydrogeological assessment in early 2007 with a goal to determine the underground flow regime and hydraulic conductivity of the various geological units that will be affected by mining. Wardrop (2007) found that the principle stratigraphic units were overburden (peat and clay; OB), shallow limestone (SLS), limestone (LS), sandstone (SS), and granite (GR). Limestone at Minago is 55 m (180 ft) thick and consists of shallow limestone that has an upper zone of water bearing fractures (up to 40 m depth) and deep limestone underlying this zone. Underlying the limestone is approximately 10 m (30 ft) of sandstone, followed by some shale and weathered granite of the Precambrian Shield (Wardrop, 2007; Golder Associates, 2008a, 2008b). The Ordovician limestone and sandstone were found to have significant groundwater producing potential.

The preliminary hydrogeological program was followed by a comprehensive hydrogeological characterization of the site in the summer of 2008. That program involved pumping of four high capacity dewatering wells located along the perimeter

of the proposed open pit mine and monitoring the hydrogeologic response in these wells and in 24 observation wells. Results of the long duration pumping test program were used to develop a conceptual hydrogeological model of the Site in the upper 75 m of the subsurface and a groundwater flow model of the proposed open pit area.

### 12.4.1 CONCEPTUAL HYDROGEOLOGICAL MODEL

The limestone aquifer forms the main aquifer at the Site. The limestone aquifer is confined by the overburden clay deposit, a 5 m-thick aquitard. The upper 20 to 30 m of the limestone unit is more permeable than the deeper limestone, particularly in the North Pit Wall region of the proposed open pit. The ambient groundwater flow direction in the limestone is from west to east. During pumping, the water level in the limestone was lowered below the top of the limestone (i.e., below the bottom of the overburden unit) within about 100 m of the dewatering wells, under the pumping rates of the pumping test. In these regions, the limestone aquifer becomes unconfined, and groundwater is released through aquifer drainage. Some amount of leakage from the overburden aquitard into the limestone aquifer occurs, providing some additional flow to the dewatering wells. The sandstone aquifer is affected by pumping in the limestone, and experiences greater drawdown than in the limestone because of its comparatively lower hydraulic conductivity. The weathered granite that is in direct contact with the sandstone aquifer is likely more permeable than the underlying non-weathered granite. The non-weathered granite likely acts as a lower confining unit, or an aquitard, that provides minimal leakage to the sandstone unit, possibly through vertical fractures.

### 12.4.2 DEWATERING WELL DESIGN

Based on Golder Associates' (2008b) hydrogeological model, the current dewatering design consists of 12 dewatering wells located at a distance of approximately 300 m to 400 m along the crest of the ultimate pit, and pumping simultaneously from the limestone and sandstone units. The total pumping rate for the wellfield is predicted to be approximately 40,000 $m^3$/day (7,300 USgpm), and the average pumping rate for an individual well is estimated at about 3,300 $m^3$/day (600 USgpm). The associated drawdown cone, defined using a 1 m drawdown contour, is predicted to extend laterally in the limestone to a distance of approximately 5,000 m to 6,000 m from the proposed open pit. The results of this analysis suggests that the actual dewatering rate for the entire wellfield could vary from 25,000 $m^3$/day (4,600 USgpm) to 90,000 $m^3$/day (16,500 USgpm).

The recommended dewatering well design includes the following: 1) Each well will be drilled 10 m into the weathered granite unit; 2) A sump will be placed in the bottom 5 m of the well; 3) A well screen will be placed above the sump such that it is completed in at least 5 m of limestone; 4) The well casing in the limestone will be slotted throughout most of its length; 5) The well annulus in the limestone will be

filled with gravel to allow free downward drainage; and, 6)The pump will be installed in the sump in the bottom 5 m of each well.

The above design will allow well pumping to the extent that drawdown in the well will be near the bottom of the screen. This would effectively create a seepage face in the well screen/slotted casing that intersects the sandstone–limestone contact.

### 12.4.3 HYDRAULIC CONDUCTIVITY FOR THE OVERBURDEN

The Hantush-Jacob (1995) steady state solution for leaky aquifers was used to estimate the vertical hydraulic conductivity of the overburden clay (i.e. the overlying aquitard). Based on the results from the overburden wells situated at least two kilometres from the pumping wells (MW7-OB, MW8-OB and MW9-OB), the vertical hydraulic conductivity (KV) of the overburden was estimated to range from $4\times10^{-9}$ m/s to $6\times10^{-9}$ m/s (Golder Associates, 2008b).

Based on the single-well response tests, the horizontal hydraulic conductivity estimates for the overburden aquitard ranged from $6\times10^{-6}$ m/s to $6\times10^{-9}$ m/s, with a geometric mean of $4\times10^{-8}$ m/s. This mean is one order of magnitude greater than the mean vertical hydraulic conductivity estimate for the overburden based on the pumping test analyses (KV = $5\times10^{-9}$ m/s), indicating an anisotropy ratio (KH/KV) of 10 for the overburden aquitard (Golder Associates, 2008b).

Using Darcy's Law for flow through porous media (groundwater flux (q) = hydraulic conductivity (K) × hydraulic gradient ($\partial h/\partial z$)) and the estimates of hydraulic gradient and KV presented above, the vertical flux through the overburden prior to pumping was (Golder Associates, 2008b):

- North Pit Wall Area of Open Pit: q = downward $1\times10^{-9}$ m/s (40 mm/a);
- South Pit Wall Area of Open Pit: q = upward $8\times10^{-10}$ m/s (10 mm/a); and,
- About 2 km from Open Pit: q = upward $2\times10^{-9}$ m/s (60 mm/a).

### 12.4.4 GROUNDWATER QUALITY

To date, several groundwater samples have been collected from the Minago Property. Groundwater samples were collected as part of the initial hydrogeological program in 2007, after the installation of pumping wells in March 2008, and at the end of the long-term pump test in August 2008. All groundwater samples were collected in a representative manner and according to standard groundwater sampling protocols to minimize sample contamination. Based on the groundwater quality results, treatment of the groundwater discharge from the limestone and sandstone formations may be required to meet the CCME (2007) freshwater aquatic life standards for total aluminum, total iron, zinc, total fluoride, and dissolved oxygen. If the groundwater is being considered as a possible source of potable water for the

mine camp, it may also require filtration to meet Health Canada's 2008 and Manitoba's 2002 Guidelines for Drinking Water for turbidity.

## 12.5 BENTHOS, PERIPHYTON AND SEDIMENT QUALITY

Sediment quality and benthic communities were assessed in 2006, 2007 and 2008 at the Minago Property according to Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring (Environment Canada, 2002). The benthic invertebrate communities collected in Minago samples were enumerated using a variety of statistics and indices in order to assess the aquatic habitat quality, as well as identify differences between sampling sites, and populations. The analysis of benthic invertebrate communities permits an assessment of long-term, sub-lethal effects that cannot be determined using standard water quality sampling as the sole indicator.

In 2006, Wardrop (2007) collected five (5) sediment samples from Oakley Creek (at OCW-1, OCW-2, OCW-3) and Minago River (at MRW-1), identified all organisms in each sample to family, and calculated the Simpson's Index of Diversity, Evenness, Taxon Richness, and the Bray-Curtis distance. In 2007, URS (2008h) conducted a stream sediment and benthic invertebrate sampling program at nine locations in the vicinity of the Minago Project. In 2008, Roche (2008a) collected sediment samples from six (6) stations (Cross Lake (CLF1), Hill Lake (HLF1), Limestone Bay (LBF1), Minago River (MRF3), William River (WRF3) and Oakley Creek (OCF1)). They collected benthic samples from the same locations, except from HLF1 and measured key parameters related to invertebrate habitats.

The locations and descriptions pertaining to the sampling stations are provided in Figure 12.6 and Table 12.7 in this section, and in Figures 13.6 and Table 13.7 in Section 13.

### *12.5.1 SEDIMENT QUALITY, 2006 AND 2007*

Average moisture content in tested sediment samples ranged from 42.4% to 82.6%. Sediment pH levels ranged from 6.88 to 8.45 and the average pH was 7.8 (alkaline) (Wardrop, 2007). The only sediment that had a pH value less than 7 was located at OCW-3. Sediment pH values were lowest at upstream sites and increased to the highest at downstream sites.

The organic matter content ranged from a minimum of 7.72% at OCW-1 to a maximum of 30.5% at OCW-3. The average Total Organic Carbon (TOC) content ranged from a minimum of 4.5% at OCW-1 to a maximum of 17.7% at OCW-3 in 2006. Based on 2006 results, the ratio of organic matter to total organic carbon ranged from 1.69 to 1.8 (Wardrop, 2007).

Only total chromium exceeded the CCME (2002) Interim Freshwater Sediment Quality Guidelines (ISQGs). Average chromium levels, based on 5 replicate samples, were higher than the ISQGs level for OCW-1, OCW-2, OCW-3 and MRW-1 in 2006. In 2006, average chromium concentrations were 38.4 mg/kg at OCW-2, 39.8 mg/kg at OCW-3, 69.2 mg/kg at MRW-1, and 71 mg/kg at OCW-1 (Wardrop, 2007). In 2007, the chromium level, based on one sample per monitoring station, exceeded the ISQG at MRW2. In 2007, the chromium concentration ranged from a minimum of 9.9 mg/kg at MRW3 to a maximum of 39.2 mg/kg at MRW2 (URS, 2008h).

More than 95% of the mineral fractions of examined sediments were finer than 2 mm. Only two locations, OCW1 (downstream) on Oakley Creek and MRW1 (downstream) on the Minago River, contained substrate coarser than sand (> 2 mm).

### 12.5.2 SEDIMENT QUALITY, 2008

Arsenic and chromium contents in sediments exceeded Interim Freshwater Sediments Quality Guidelines (ISQGs). Concentrations were lower than the probable effect level (PEL). At MRF3, other metals concentrations were also higher.

Most Total Organic Carbon (TOC) concentrations were below 4% and sediment quality did not appear to be a limiting factor for the viability of benthic communities. However, in Limestone Bay and Oakley Creek, TOC concentrations ranged from 19.4 to 23.3%, indicating a possible deleterious effect on benthic invertebrates.

### 12.5.3 BENTHIC INVERTEBRATES RESULTS, 2006

The highest density of benthic organisms occurred at OCW-2 (9,555 ind/$m^2$) with community densities at OCW-3 (3,775 ind/$m^2$) and OCW-1 (2,451 ind/$m^2$) approximately 30% of that at OCW-2. Taxon richness was also highest at OCW-2, with a mean of 16 taxa/sample with similarly lower values of 10 taxa/sample at OCW-1 and 11 taxa/sample at OCW-3.

The numerically dominant (i.e., most abundant) organisms at all stations were midge larvae (Chironomidae), which represented 31% to 64% of the community. The Ceratopogonidae was the only sub-dominant (>5% of community density) taxon common to all three stations (Wardrop, 2007). The Tubificidae were sub-dominants at OCW-2 and OCW-3 and the Sphaeriidae were sub-dominants at both OCW-1 and OCW-3. Other sub-dominant taxa included the Elmidae and Caenidae at OCW-1 and the Hydroptilidae at OCW-2.

The mean value of Simpson's Index of Diversity was highest at OCW-1 (0.801) and lowest at OCW-2 (0.610). Evenness was low at all stations, with the mean value ranging from 0.036 at OCW-2 to 0.118 at OCW-1. This is the result of the strong dominance of the Chironimidae at each station (Wardrop, 2007).

The reference median for the Bray Curtis distance calculation was based on the pooled data from all three Oakley Creek stations. The resulting Bray Curtis distances ranged from 0.453 to 0.622 and provide a numerical demonstration of the moderate similarity in the composition and structure of the three communities on Oakley Creek.

### 12.5.4 BENTHIC INVERTEBRATES RESULTS, 2007

The highest benthic invertebrate densities were found in Minago River at MRW3 (27,550 ind/$m^2$) and the lowest invertebrate density in 2007 was also encountered in Minago River at MRW1 (1,400 ind/$m^2$). Benthic invertebrate densities in Oakley Creek showed similar variability with the highest numbers found at OCW3 (13,300 ind/$m^2$) and much lower numbers at OCW2 (8,716 ind/$m^2$) and OCW1 (2,100 ind/$m^2$). Results for the William River were similar for both locations WRW1 (2,617 ind/$m^2$) and WRW2 (3,100 ind/$m^2$). Reference site HRW1 had an average of 3,700 total numbers of organisms/$m^2$ and 7 taxonomic groups.

Dominance values generated in the August 2007 samples were low to moderate for all sites ranging between 0.06 and 0.45 (URS, 2008h). Lower dominance values were determined for sites MRW1 (0.06) and OCW1 (0.09) while moderate values were determined for sites MRW3 (0.37) and HRW1 (0.45). These values were much lower than those determined from the 2006 data which showed Simpson's Index values between 0.61 at OCW-2 and 0.80 at OCW-1.

Equitability is a measure of evenness in the distribution of taxa and is inversely related to dominance. Equitability is related to the dominance values indicated above but is compared to a standard of 1, which represents an equal distribution. If a given taxonomic group dominates samples, this condition tends to decrease the equitability factor. All of the August 2007 sediment samples indicated high evenness values ranging from 0.55 to 0.94 (URS, 2008h).

Richness compares the number of taxa present at a particular site to population density. Richness values ranged from 13.3 at MRW1 to 142 at MRW3 in 2007 benthic samples.

Species diversity was measured using the Shannon-Weaver and Margalef equations. The Shannon-Weaver Diversity index values were lowest for samples collected at HRW1 (1.57) and highest at MRW1 (3.05). The Margalef index values were lowest for samples collected at site OCW2 (0.75) and highest at site WRW2 (1.66).

Similarity: The reference site used for the Bray-Curtis distance calculations was based on pooled data from the location HRW1 on Hargrave River. This location was chosen because it is outside of the watershed connected to the future mining operations. The Bray-Curtis distance provides a numerical assessment of the similarity of the structure and composition of the nine locations sampled in 2007.

Bray-Curtis distances ranged from 0.79 to 0.85 indicative of moderate to high similarity between populations.

EPT/EPT+Chironomid Ratio biometric: General indicator of the health was evaluated using the EPT/EPT+Chironomid Ratio biometric. The EPT/EPT+Chironomid Ratio values were lowest for the samples collected at sites OCW2 (0.03) and OCW3 (0.16). The highest values were determined for the samples collected from site WRW2 (1.0). Overall the sampling sites had low numbers of chironomids, which is a general indicator of community health and little or no pollution levels. The low ratios calculated for the two locations upstream of the highway on Oakley Creek were the resuit of high chironomid numbers and may represent a natural characteristic of the Oakley Creek in this area such as the high percentage of organic carbon found in the sediment at these locations compared to other sites in the area. Sites OCW2 and OCW3 also had low results for dominance and diversity.

### 12.5.5 BENTHIC INVERTEBRATES RESULTS, 2008

In 2008, a total of 25 taxa (24 families and one phylum) of benthic invertebrates were identified among the 5 samples collected within the study area. Five phyla were identified: Porifera (sponges), Nematoda (roundworms), Mollusca, Annelida (segmented worms) and Arthropoda (including arachnids, insects and crustaceans).

Only Nematocera (Ceratopogonidae and Chironomidae) were observed at every station while other 10 benthic invertebrates were observed at only one station: Ancylidae (WRF3), Glossiphoniidae (MRF3), Unionicolidae (CLF1), Cyclopidae (CLF1), Candonidae (MRF3), Corduliidae (OCF1), Leptophlebiidae (OCF1) Corixidae (OCF1), Elmidae (OCF1) and Haliplidae (OCF1). Out of 25 taxa, 16 were observed less than ten times and 14 at two or less sampling stations. William River station WRF3 had the highest total number of benthic invertebrates (4,310), followed by Limestone Bay station LBF1 (2,479) and Cross Lake station CLF1 (1,754).

Taxonomic richness ranged from 10 to 15 species per stations. The lowest value was observed within Limestone Bay on Lake Winnipeg. Five taxa were denser than 100 individuals/m2 for at least two stations, namely Sphaeriidae, Tubificidae, Ephemeridae, Ceratopogonidae and Chironomidae. The most abundant taxa (relative abundance higher than 20% for at least one station) were Chironomidae, Ephemeridae, Tubificidae, Sphaeriidae and Nematoda.

The Simpson's diversity index takes into account both the relative abundance and the taxonomic richness of a community. The Simpson's diversity index was highest in William River, where a maximum amount of species were observed and where four different taxa had a relative abundance higher than 15%. The Simpson's diversity index was lowest in Cross Lake, where one taxa represented almost 60% of all the benthic invertebrates collected.

Even though the Bray-Curtis distance is usually used to compare one site to a reference site, it was used by Roche (2008a) to evaluate how benthic communities differed from each other in their composition. The investigated communities were quite different as no two stations had a Bray-Curtis distance lower than 0.56.

The EPT/EPT+Chironomid Ratios were 0.06 at LBF1, 0.19 at MRF3, 0.58 at WRF3, 0.65 at OCF1, and 0.84 at CLF1. No Plecoptera species were identified. This indicates that Limestone Bay and Minago River experience deleterious impacts caused by pollution of some kind (Roche, 2008a). These two stations (LBF1 and MRF3) also showed the lowest values in terms of taxonomic richness, being both dominated by chironomids with relative abundances higher than 20%. In contrast, almost 60% of all species collected at Cross Lake station CLF1 were Ephemeridae, which indicates a low level of pollution.

## 12.6 FISH RESOURCES

Fish assessments (fish habitat and abundance) were undertaken by Wardrop (2007) in May and August 2006, by URS (2008b) in May/June 2007, and by Roche Consulting Engineers (Roche) in May 2008. Wardrop (2007) undertook fisheries assessments at three stations on Oakley Creek and at one station on Minago River. URS (2008b) assessed fish habitat and abundance on Oakley Creek, Minago River, and William River at three stations per watercourse. Fish samples were also collected for baseline measurements of metal concentrations in fish. Roche's (2008a) work included the installation of two to three bait traps in Oakley Creek, Minago River, and William River and one bait trap and one experimental net each in Cross Lake, Hill Lake and Limestone Bay on Lake Winnipeg. Roche (2008a) also collected tissue samples in order to evaluate total metal content for 20 individuals (13 predators and 7 preys).

The locations and descriptions pertaining to the sampling stations are provided in Figure 12.6 and Table 12.7 in this section, and in Figures 13.6 and Table 13.7 in Section 13.

### *12.6.1 FISH COMMUNITY RESULTS, 2006*

Wardrop (2007) captured a total of 90 fishes on May 16, 2006. Brook stickleback (Culaea inconstans) were the dominant species followed by pearl dace (Margariscus margarita) and white sucker (Catostomus commersoni). Two adult white suckers were captured and released. Adult suckers (Catostomus spp.) were observed in deeper pools of Oakley Creek as far upstream as OCW-2 on 17 May, 2006.

On 22-23 August 2006, Wardrop (2007) captured fishes at all sites surveyed (OCW-1, OCW-2, OCW-3 and MRW-1). Forty-nine fishes were captured at OCW-1 and species richness increased from three species in May to six in August 2006. Central mudminnow (Umbra limi) dominated the catch followed by brook stickleback, pearl

dace, white sucker, blacknose shiner (Notropis heterolepis) and johnny darter (Etheostoma nigrum). At OCW-2, a total of 49 fishes were captured with central mudminnow being the dominant species followed by brook stickleback and pearl dace. At OCW-3, a total of 17 fishes were captured with the catch being dominated by brook stickleback followed by central mudminnow and pearl dace.

At MRW-1, a total of 56 fishes were captured, with johnny darter being the dominant species followed by central mudminnow, white sucker, Iowa darter (Ethiostoma exile), and longnose sucker (Catostomus catostomus) (Wardrop, 2007).

Overall, species diversity was greatest at OCW-1 in August 2006, with six species from five families captured (Umbridae, Cyprinidae, Catostomidae, Gasterosteidae, and Percidae). Five species were captured at MRW-1, representing three families (Umbridae, Catostomidae, and Percidae). Three species, representing three families (Umbridae, Cyprinidae, Gasterosteidae) were captured at OCW-3 in August, 2006 (Wardrop, 2007).

### *12.6.2 FISH COMMUNITY RESULTS, 2007*

URS (2008b) found that lake-run white suckers (Catostomus commersoni) were abundant throughout the distance of Oakley Creek. Large lake-run white suckers were not observed in the mainstem of William River and Minago River. Dwarf white suckers were captured in both the Oakley Creek and in the tributary of the Minago River at sample location MRF2-2007.

Other than white suckers, the only other lake-run fish captured were emerald shiners (Notropis atherinoides) collected at sample locations WRF1 and WRF2 and a single rainbow smelt (Osmerus mordax) collected at sample location WRF2.

Following is a list of species collected at the 2007 fish sampling locations by URS:

- OCF1: central mudminnow (Umbra limi), brook stickleback (Culaea inconstans), and white sucker (Catostomus commersoni both lake-run and dwarf resident)
- OCF2-2007: brook stickleback (Culaea inconstans), white sucker (both lake-run and dwarf resident), and pearl dace (Margriscus margrita)
- OCF3: central mudminnow, brook stickleback, and lake-run white sucker,
- MRF1: central mudminnow and pearl dace
- MRF2-2007: central mudminnow and dwarf white sucker
- MRF3: pearl dace and Iowa darter (Etheostoma exile)
- WRF1: central mudminnow, brook stickleback, emerald shiner (Notropis atherinoides), and Johnny darter (Etheostoa nigrum)

- WRF2: brook stickleback, Johnny darter, emerald shiner, and rainbow smelt (Osmerus mordax)
- WRF3: Johnny darter and blacknosed shiner (Notropis heterolepis).

It should be noted that the spawning migrations of walleye (Sander vitreus) and northern pike (Exox lucius) from Lake Winnipeg (Oakley Creek and the William River) and Lake Hill (Minago River) were over before URS began sampling in May/June 2007.

### 12.6.3 FISH COMMUNITY RESULTS, 2008

Roche (2008a) caught a total of 1184 fishes using experimental nets installed in Cross Lake, Hill Lake and Limestone Bay of Lake Winnipeg between May 6 and 9, 2008. Rainbow smelts (Osmerus mardax) represented 86.8 % of all fishes caught at station LBF1 and 86.99% of the overall May 2008 catch. Northern pikes (Esox lucius) were the second most abundant species, representing 9.5 % of the overall catch. Northern pikes (Esox lucius) represented 73.3% of the non Rainbow smelt species caught.

During the 2008 fishing program, only 3 brook sticklebacks (Culaea inconstans) and 4 pearl daces (Margariscus margarita) were caught using bait traps. These species were all caught at station OCF2-2008.

### 12.6.4 FISH TISSUE METAL CONCENTRATIONS, 2008

All species examined during the 2007 fisheries program exhibited concentrations of aluminum (Al), barium (Ba), manganese (Mn), and zinc (Zn) within the effects range of these elements and these levels of concentrations were found in all three watersheds sampled. Only aluminum and zinc concentrations in examined specimens exceeded published threshold levels. None of the concentrations measured exceeded the 2007 Canadian Food Inspection Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products. All examined fish tissue samples were relatively small with a maximum weight of 45.4 g.

The concentrations did not significantly increase as sample locations moved downstream. It is likely that in most cases, concentrations of the four elements (Al, Ba, Mn, and Zn) exceeding thresholds for sublethal effects may be due to ingestion of stream sediments. The four metals are frequently found in fine stream sediments and might have been ingested by small fish while foraging.

### 12.6.5 FISH TISSUE METAL CONCENTRATIONS, 2008

In the 2008 fisheries program by Roche, tissue samples were collected in order to evaluate total metal content (As, Pb, Se, Ni and Hg) in 20 specimens. Tissue samples were collected from four walleyes (Stizostedion vitreum), seven northern

pikes (Esox lucius), three white suckers (Catostomus commersoni), four longnose suckers (Catostomus catostomus), and two yellow perch (Perca flavescens). One of the northern pike specimens weighed 4.5 kg, which is more than the average for this species (1 to 2 kg) (Roche, 2008a). The smallest fish sampled weighed 0.22 kg (yellow perch). Northern pike, walleye and perch are predators while suckers are preys.

None of the analyzed tissue samples exceeded the 2007 Canadian Food Inspection Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products criteria for arsenic and lead. In fact, metal concentrations for arsenic, selenium and lead were always below the detection limit. However, twenty-five percent (25 %) of all sample fishes showed mercury concentrations above the 2007 Canadian Food Inspection Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products (Roche, 2008a). Measured mercury concentrations varied from 0.06 to 1.6 mg/kg. These exceedances were essentially observed for northern pike (40 %) and walleye (60 %).

The elevated mercury concentrations may be explained by the trophic level of northern pike and walleye. Mercury bioaccumulation along the food chain occurs and highest contamination levels are often found in predators at the top of the food chain. It is also important to note that the highest mercury concentration (1.6 mg/kg) was observed for the northern pike specimen weighing 4.5 kg and measuring nearly 1 m. The fish was assumed to have been older than the other sampled fish and might therefore have accumulated more mercury over a longer period of time and also have eaten bigger and thus more contaminated fish (Roche, 2008a).

## 12.7 WILDLIFE

URS Canada Inc. (URS, 2008e) conducted a spring wildlife survey in 2007 and a winter wildlife survey in 2008 and Roche Consulting Engineers (Roche, 2008a) conducted an opportunistic observation of wildlife from May 6-9, 2008. The spring 2007 wildlife survey consisted of a qualitative presence/absence terrestrial survey at the proposed Minago Mine Project site and opportunistic observations made throughout an eight-day fisheries and wildlife field survey. The 2008 winter wildlife survey consisted of an aerial survey of a 16 by 18 km2 $km^2$ area surrounding the Minago Mine Project site, terrestrial transects, and helicopter transects along winter roads. The main objective of August 2008 wildlife assessment program was to document the presence of large and small mammal species as well as of bird species. However, no specific survey was carried out to document the presence of wildlife.

The Minago Mine Project area is not heavily utilized by all wildlife species with the exception of shore birds, sharp-tailed grouse, small forest carnivores and black bear, beaver, and amphibians (and likely the red-sided garter snake) (URS, 2008e). None

of the project area habitat is particularly critical to the survival of these species in the project vicinity.

With the exception of the long-tailed weasel (Mustela frenata), northern raccoon (Procyon lotor), Arctic fox (Alopex lagopus), American badger (Taxidea taxus), and bobcat (Lynx rufus), the range of all species of furbearers native to Manitoba generally occurs throughout the Minago Project area (URS, 2008e).

Small forest carnivores, such as marten and ermine, were observed in moderate abundance. Other carnivores, such as lynx and fisher, utilize Minago Project area as habitat. However, prey species typically utilized by these species, such as showshoe hare and red squirrel are either limited in distribution or rare within the Minago Project area, requiring these species to utilize alternative prey species, such as voles, sharp-tailed grouse, and lemmings. Although shorebirds are probably a normal resident of the Minago Project area bog and fen habitat, their numbers are probably elevated due to the presence of the peat soil that has been converted into muck along the drill site access roads (URS, 2008e).

With rare exceptions, such as grouse, all of the birds that occur in the Minago Project vicinity are migratory and most occur at the Minago Project site only during their nesting seasons (URS, 2008e). None of the birds occurring in the Minago Project area have special status other than that conferred by the various treaties and conventions between Canada, the U.S., Japan, Mexico, and the former Soviet Union for the protection of migratory birds and by hunting seasons established by federal, provincial, and First Nations resource management agencies.

As timber harvest operations in central Manitoba create suitable early seral stage habitat, white-tail deer are likely to occur occasionally in the Minago Project area as they continue to invade more northern habitats in the boreal forest of Manitoba. This may eventually lead to the spread of Meningeal worm through the moose and caribou populations, causing declines of population.

Moose populations in the Minago Project vicinity are concentrated north, south, and west of the Minago Project area. There is currently some summer and winter utilization of riparian habitat along Oakley Creek, bog habitat between the Moose Lake Winter Road and Oakley Creek, and bog and post-fire shrub habitat along the western edge of the Minago Project area. Although moose do enter the Minago Project area, they do not seem to make much use of it or utilize it as a migration route. Moose have been documented to forage most heavily on riparian willow, particularly where wildfire has stimulated willow production in burned black spruce stands.

However, one wildlife species of concern has been documented to occur in the vicinity of the project area. The boreal population of woodland caribou (Rangifer tarandus caribou) is listed as “threatened” by the Committee on the Status of endangered Wildlife in Canada (COSEWIC) in the Species at Risk Act and

Manitoba's boreal woodland caribou populations were listed as "threatened" in The Manitoba Endangered Species Act in June, 2006.

### 12.7.1 THE BOREAL WOODLAND CARIBOU

Listed as threatened, was not documented in the project area or vicinity during any of the 2007 and 2008 wildlife surveys conducted for this project. There are two woodland caribou herds in the project vicinity: the Wabowden and William Lake herds. There are approximately 25-40 caribou in the William Lake herd and 200-225 caribou in the Wabowden herd (Manitoba Conservation, 2005). The William Lake herd has a low conservation concern rating, while the Wabowden herd has been assigned a medium conservation concern (Manitoba Conservation, 2005), based on the presence of industrial forestry in the Wabowden region north of the project vicinity.

At Minago, the habitat is of limited value to woodland caribou because treed islands of black spruce do not occur within open muskegs and any individual caribou migrating south from the Wabowden herd will encounter a large area of burned-over land to the north and west of the project area that is occupied by moose, a species they are not competitive with. In addition, the moose population may have increased wolf densities and the primary forage in these areas is shrub habitat, rather than the niche forage of lichens utilized by woodland caribou.

Any woodland caribou entering the project area at this time and for the foreseeable future are likely to be stray individuals from the main bodies of the two herds and the project area is not likely to provide critical habitat for either herd.

## 12.8 GEOCHEMISTRY

URS (2008i) conducted a geochemical (ARD/ML) assessment of major lithologic units and Precambrian geologic units expected to be encountered, excavated and/or exposed during open pit mining of and tailings generated by the proposed Minago Project.

The overall objectives of the geochemical (ARD/ML) assessment were to: 1) Conduct static and kinetic tests to assess the acid rock drainage and metal leaching (ARD/ML) potential of major lithologic units and Precambrian geologic units anticipated to be exposed, excavated or otherwise disturbed during the proposed open pit mining activities and tailings generated by milling activities; and 2) Based on the results of the geochemical test program, provide recommendations to support Victory Nickel's Environmental Impact Assessment and Feasibility Study submissions in support of mine development of the Minago Project.

Based on the results of the geochemical characterization program to date, overburden, limestone, and sandstone major lithologic units are considered non-acid

generating and minor metal leaching. The Precambrian geologic units amphibolite, mafic dike, and regolith are also considered non-acid generating. Overall, the Precambrian granite geologic unit is considered to be non-acid generating when local hot spots of moderate to high sulphide sulphur and negligible carbonate may create localized potentially acid generating granite. The Precambrian geologic unit serpentinite is considered non-acid generating primarily due to an abundance of carbonate neutralization. The Precambrian geologic unit mafic metavolcanic is considered potentially acid generating based on the presence of sulphides and negligible carbonate neutralization. The Precamabrian geologic unit metasediment is considered to be potentially acid generating due to variable (low to high) sulphide sulphur content and low carbonate neutralization.

URS (2008i) recommended to conduct an operational program for static testing on blast hole cuttings to be able to segregate and dispose potentially acid generating waste in an appropriate facility from non-acid generating mine waste. Based on kinetic test carbonate molar ratios, URS (2008i) recommended a preliminary Neutralization Potential Ratio criterion of 1.7 for segregation of potentially acid generating from non-potentially acid generating waste.

Laboratory kinetic humidity cell tests indicate that the time to depletion of sulphides in Precambrian lithologies (AR and ORE) encountered within and adjacent to the pit shell is of the order of 12 to 58 years compared to carbonate neutralization within 49 to 954 years. Humidity cell results also suggest that limestone mixed with Precambrian AR and ORE is effective at providing excess carbonate neutralization to neutralize secondary sulphide oxidation products on a micro-scale (mm-cm) or meso-scale (cm-m) in-situ.

Based on loading rates from laboratory kinetic humidity cell tests of material from the altered. Precambrian basement and Precambrian basement lithologies encountered in and adjacent to the pit shell, the time calculated to completely oxidize sulphide material is 12 to 58 years, while the time calculated to consume acid neutralization potentials is a period of 49 to 954 years. The humidity cell test results also suggest that limestone mixed with altered Precambrian basement and Precambrian basement would be effective in providing excess acid neutralization capacity to compensate secondary sulphide oxidation products on a micro-scale or meso-scale in-situ.

Static and laboratory kinetic subaqueous column test results indicate that potential tailings material is NAG, due to very low sulphide sulphur content and moderate carbonate mineral content. The subaqueous column results indicate that a water cover over tailings material would be effective at minimizing sulphide oxidation and/or metal leaching.

## 12.9 HYDROLOGY AND SURFACE WATER

This Baseline Hydrologic Study was commissioned to determine the long term climatic and hydrometric characteristics of the area encompassing the proposed Minago Project development.

Water quality sampling was initiated in the project area in 2006, while climate and hydrometric data collection started in 2007.

Regional temperature and precipitation data are available from seven climate stations located in northern Manitoba. Regional evaporation estimates, relative humidity, wind and radiation are also respectively available at one or more of these stations. Regional precipitation data is supplemented by a national database of snow survey and snow water equivalent information that is current up to 2004.

Data from eight regional hydrometric stations were available from Water Survey of Canada. River and lake ice information was available from the Canadian Ice Database. Data from three regional sediment sampling stations completes the database.

January and July are typically the coldest and warmest months of the year, with mean daily air temperatures of approximately -22 ºC and 18 ºC, respectively. The average annual precipitation at the project site is estimated to be 510 mm after accounting for rainfall and snowfall undercatch. Average annual rainfall is 369 mm, with monthly rainfall averages greater than 10 mm from April to October. Average annual snowfall is 141 mm snow water equivalent (SWE), with monthly snowfall averages greater than 10 mm from October to April. The 24-hour rainfall amount with a 10-year return period is estimated to be 79 mm. Observations at the project site indicate that wind occurs more frequently from the east and west directions. Based on the available data, the average wind speed at the site is about 20 km/hr. The west wind occurs most frequently, although the mean speed of the north-westerly wind is the highest (24 km/hr). The 100-year hourly wind speed was estimated to be 97 km/hr.

Annual lake evaporation at the project site is estimated at 566 mm, mostly occurring over the April to October period. Annual loss of snowpack to sublimation and redistribution is estimated at 39% (or approximately 55 mm). Estimates of the basin combined evapotranspiration/infiltration losses are 343 mm for the Oakley Creek and Minago River watersheds, and 353 mm for the Hargrave and William River watersheds.

The ice regime in the Minago area was characterized on the basis of regional observations. Mean ice thickness varies over a narrow range between 0.8 and 0.9 m. Occurrence of ice may be as early as mid-October. Complete freeze cover is observed by the end of October or early November. Deterioration of the ice cover is observed by late April and would likely coincide with the freshet.

The mean annual watershed runoff is estimated to be 117 mm for the Oakley Creek and Hargrave, Minago and William River watersheds. Runoff typically peaks in May. For the spring freshet period occurring between April and May, the 10-year return period annual flood peak discharges are estimated to be 8.3 and 16.3 m3/s for the Oakley Creek basin at station OCW2 and the Minago River at station MRW2, respectively; and

18.4 and 42.6 $m^3$/s for the William River at station WRAOC and Hargrave River at station HRW1, respectively. For these watersheds, the 10-year return period annual flood peak discharges during the summer/fall period are estimated to be about 5.8, 11.4, 16.1 and 29.1 $m^3$/s, respectively. For both ice-cover and open water periods, the 10-year return period 7-day low flows are estimated to be about 0.057, 0.13, 0.51 and 0.90 $m^3$/s at the OCW2, MRW2, WRAOC and HRW1 stations, respectively.

The annual sediment yield from the Oakley Creek and Minago River watersheds is estimated to be 0.0001 mm or less. The sediment yield estimated from the Hargrave and William River watersheds is between 0.0005 and 0.0009 mm per year. The low yield at Oakley Creek and Minago River are indicative of lower land erosion in their watersheds compared to the watersheds of the Hargrave and William Rivers.

The increase in annual temperature, over a 100-year period ending in 2100, is projected to be +4.3 ºC based on the available regional climate change projections. Higher increases are expected over the winter period, with lower increases in the summer. Precipitation is also projected to rise by an average of +15% over this period.

The results of this hydrologic baseline study provide the basis for the preliminary planning and design of water management infrastructure at the project site. The study can also be used to support the surface water assessment component of an environmental impact statement for the project. The climate and hydrometric characteristics described for the project area are based on long-term regional information. The available site data at the Minago project site fits within the regional variability in climate and hydrologic conditions.

The baseline hydrologic condition presented in this report should be periodically updated as additional data is collected from these monitoring programs. Climate and hydrometric characteristics presented in this report might be subject to adjustments in future updates due to potential effect from climate change. This update could support adjustment of the water management practice at the project site, as required. Recommendations for continued monitoring of site climate and hydrometric characteristics are provided. A summary of effects is given in Table 12.1.

**Table 12.1 Summary of Effects on Surface Water Hydrology**

| Potential Effect | Level of Effect | | | | | | Effect Rating | |
|---|---|---|---|---|---|---|---|---|
| | Direction | Magnitude | Extent | Duration/ Frequency | Reversibility | Likelihood | Project Effect | Cumulative Effective |
| **Construction, Operations and Decommissioning** | | | | | | | | |
| Reduced low flows in Oakley Creek due to pit dewatering | Neutral | Low | Site specific | Long term | Reversible | Low | Not significant | Not significant |
| Increased flows in Oakley Creek and Minago River due to Discharge from the Settling Pond | Positive | Moderate | Local | Long term | Reversible | Low | Not significant | Not significant |
| **Closure** | | | | | | | | |
| Increased flows in Oakley Creek and Minago River due to discharges from the TMF and Mine Water Treatment Plant | Neutral | Low | Site specific | Long term | Reversible | Low | Not significant | Not significant |

## 12.10 SITE WATER MANAGEMENT

The water management components at Minago will include:

- twelve dewatering wells to dewater the open pit area
- a potable water treatment plant to produce potable water
- a sewage treatment lagoon for disposal of on-site grey water and sewage
- mill and Frac Sand Plant tailings and effluents that will be discharged to the Tailings and Waste Rock Management Facility (TWRMF)
- a Tailings Waste Rock Management Facility (TWRMF) will store tailings and ultramafic waste rock permanently and effluents from various site operations temporarily
- waste rock dump collections that will be directed towards the TWRMF or the receiving environment depending on the water quality of the collections
- overburden dump collections that will be directed towards the receiving environment
- an open pit dewatering system that will ensure safe working conditions in and around the open pit
- polishing pond to serve as holding pond for water that will either be recycled to site operations or discharged to the receiving environment
- Water delivery systems and appurtenances for TWRMF, open pit and dewatering
- a water delivery system to supply process and potable water when and where required and
- discharge pipelines to Minago River and Oakley Creek to discharge excess water from the polishing pond to the receiving environment.

As the the ultramafic waste rock has the potential to generate acid (PAG), it was decided to disposed of ultramafic rock with the tailings in a facility called the TWRMF. The goal is to control the acid generation associated with the ultramafic rock (Precambrian Waste Rock) within the non-acid generating (NAG) tailings. The TWRMF will store approximately 36,600,000 $m^3$ of tailings and ultramafic rock within an area of 2,430,000 $m^2$.

Primary sources of water that need to be managed are the dewatering well water and precipitation (rainfall and snowfall) and processing effluents. Primary losses of water include sublimation, evaporation, and evapotranspiration. Seepage losses to groundwater will likely be very small due to on-site dewatering activities and the thick layer of clay that is underlying the muskeg. The vertical hydraulic conductivity (KV) of the overburden clay, which is an aquitard overlying the limestone, was estimated

to range from 4×10-9 m/s to 6×10-9 m/s and the horizontal hydraulic conductivity, KH, was estimated to range from 6×10-6 m/s to 6×10-9 m/s, with a geometric mean of 4×10-8 m/s. These hydraulic conductivities are indicative of an anisotropy ratio (KH/KV) of 10 (Golder Associates, 2008b).

### 12.10.1 GENERAL DESCRIPTION OF THE SITE WATER MANAGEMENT SYSTEM

Water at Minago will be managed to ensure safe working conditions and minimum impacts to the local and regional flow regimes and water quality. As water will be managed to suit various operational and closure stages. The closure stages are broken down into the following five scenarios:

- water management during mine development
- water management during operations
- water management during temporary suspension
- water management during the state of inactivity
- water management during closure and
- water management during post closure.

The Mine Development Period covers the initial years from Year -3 to the start of operations during which dredging and limestone removal are progressed. Initially during Year -3, the overburden will be removed by dredging during which operation the water balance will be maintained by water from the dewatering wells. Once the dredging is complete, the dredges will be used to draw down the dredging pond in preparation for the limestone removal. During the limestone removal period, the dewatering wells will be used to lower the ground water level ahead of the excavation. Given the configuration of the starter pit and the progress of the excavation down to the country rock with the subsequent development of the pushbacks, the discharge will progressively increase to the full quantity.

“Temporary suspension” means that advanced exploration, mining or mine production activities have been suspended due to factors such as low metal prices and mine related factors such as ground control problems or labour disputes. The site will be monitored continuously during the Temporary Suspension of operations and dewatering of the mine site will continue as it did during operations.

The “State of Inactivity” implies that mine production and mine operations at the mine site have been suspended indefinitely. The state of inactivity may turn into a state of permanent closure, if prevailing conditions for the resumption of operations are not favourable. During the state of inactivity, mine dewatering will be reduced significantly and only a skeleton crew will be assigend to the site to monitor and ensure safety on site.

Closure involves decommissioning of processing facilities and buildings and infrastructure that are no longer needed and site reclamation such as recontouring and revegetation. The closure period is a transition stage between the operational and the post closure periods.

The post closure period refers to the period after all decommissioing activities of mining facilities and infrastructure have been completed and the site is in its final, post mining state.

### WATER MANAGEMENT SYSTEM DURING MINE DEVELOPMENT YEARS

***Overburden Removal (Years –3, 2011)***: The quantity of water estimated a make-up water for the dredging is 0.20 cumecs or 17,250 cum per day. This requirement is approximately 45% of the designed discharge of 40,000 cum per day from the dewatering wells. The additional discharge capacity of the designed discharge over the expected draw for dredging will provide a reserve to cover any additional requirement in excess of the estimated. There will be no surplus discharge as the quantity of water required for the dredging will be adjusted accordingly. At the completion of the dredging, the dredge pumps will be utilised to draw down the water in the overburden pit. If the water quality is satisfactory in terms of TSS, this water will be pumped directly to the cross-site ditch. Otherwise a flocculant/coagulant will be added to the pit water to bring the render the TSS levels acceptable.

***Limestone Removal and Extraction of First Sand (Year -2, 2012):*** The water which is pumped from the dewatering wells will be discharged into the main cross-site ditch. From this ditch the water will report to the Highway 6 ditch, to the marsh area on the east of Highway 6 and finally to Oakley Creek from the tributary at the discharge of the marsh. The maximum estimated flow at the completion of the Limestone Removal just prior to mining of the ore will be 40,000 cum per day. This amount will increase to approximately 35% of the full amount during the first year of Limestone Removal.

***Limestone Removal of Balance and Extraction of Remaining Sand (Year -1, 2013):*** As with the initial Limestone Removal, The water which is pumped from the dewatering wells will be discharged into the main cross-site ditch. During this year the discharge to the cross-site ditch will increase to the estimated total quantity of 40,000 cum per day. At this time the discrge to the Oakley Creek is expected to increase to the maximum monthly average flow by 12.5%.

In Year 1, 2014, with the commissioning of the concentrator the water balance diagram below will apply.

### WATER MANAGEMENT SYSTEM DURING OPERATION

To facilitate the description of the water management model, key components are illustrated with boxes in the schematic water balance diagram and flow(s) in and out

of each area as shown in Figure 12.1. All flows in the schematic water balance diagram are from left to right except for flows in recycle loops, which flow from right to left.

Following is a description of the water management model during operations depicted in Figure 12.1.

*Dewatering Well Water (Flow Q1):*

To allow ore extraction, the open pit area needs to be dewatered. Based on pumping tests, a dewatering well system has been designed by Golder Assoaciates. The design consists of 12 dewatering wells located at a distance of approximately 300 m to 400 m along the crest of the ultimate open pit, pumping simultaneously from the limestone and sandstone units. The total pumping rate for the wellfield is predicted to be approximately 40,000 $m^3$/day (7,300 USgpm), and the average pumping rate for an individual well is estimated to be about 3,300 $m^3$/day (600 USgpm) (Golder Assoicates, 2008b). The associated drawdown cone, defined using a 1 m drawdown contour, is predicted to extend laterally in the limestone to a distance of approximately 5,000 to 6,000 m from the proposed open pit. Based on sensitivity analyses, the actual dewatering rate for the entire wellfield could vary from 25,000 $m^3$/day (4,600 USgpm) to 90,000 $m^3$/day (16,500 USgpm) (Golder Associates, 2008b).

In the Minago water balance model, presented towards the end of this section, the dewatering rate was assumed to be 40,000 $m^3$/day (32,000 $m^3$/day originating from the dewatering wells and 8,000 $m^3$/day from dewatering of the Open Pit).

*Process Water and Excess Dewatering Well Water (Flows Q2, Q3, Q4, Q5, Q6, and Q7):*

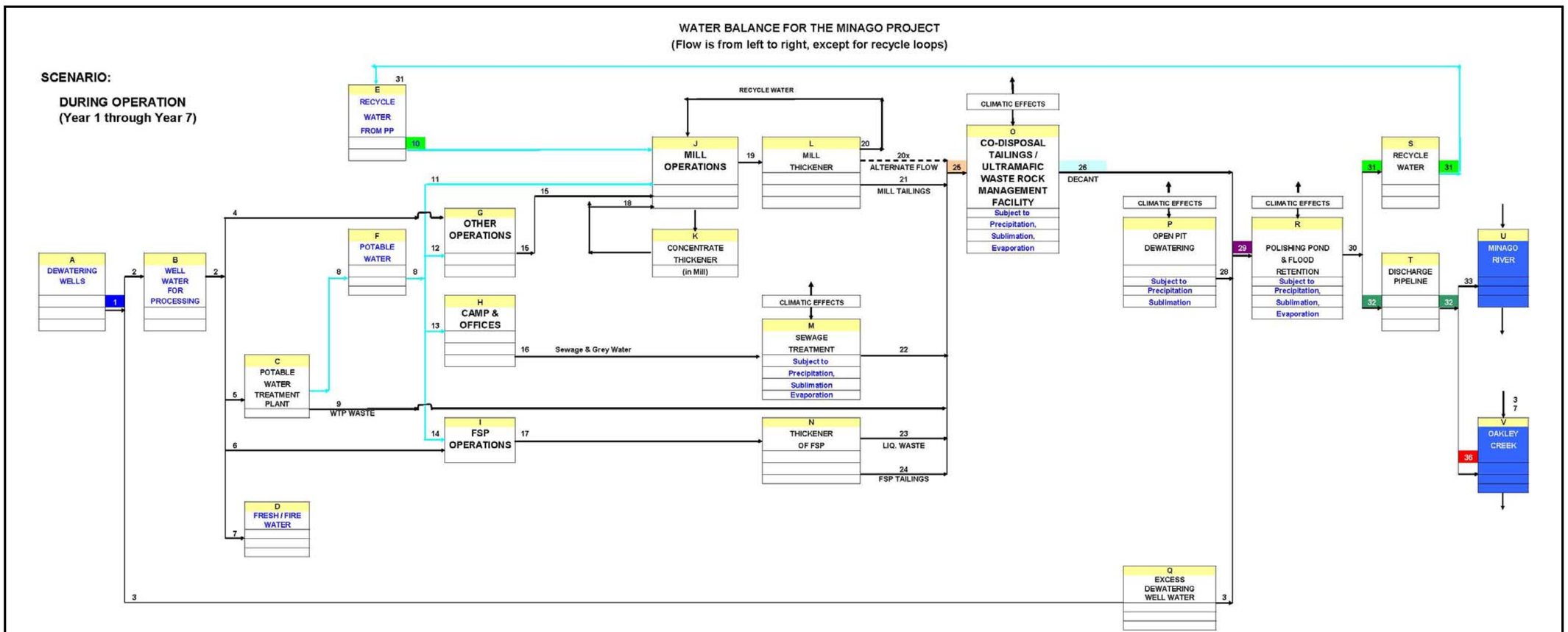
Water from the dewatering wells will be used as process water (Q2) in the industrial complex (Q4), as input to the potable water treatment plant (Q5), as input to the Frac Sand Plant (Q6), and as fire water (Q7). Any dewatering well water not used for these purposes (Q3) will be discharged to the polishing pond.

*Potable Water / Grey Water / Sewage (Flows Q8, Q9, Q11, Q12, Q13, Q22 and Q23):*

A potable water treatment plant will be operated on the Minago site to produce sufficient potable water (Q8) for the camp (Q12), all other on-site personnel (Q11 and Q13), and any other processes that require potable water. Sludge from the potable water treatment plant (Q9) will be disposed of in the TWRMF.

All on-site grey water and sewage (Q22) will be collected and directed towards an engineered sewage lagoon. Outflow from the sewage lagoon (Q23) will be directed towards the TMF.

**Figure 12.1 Water Management System During Operation**




SYSTEM OF LINEAR EQUATIONS (FOR FLOWS)

| | |
|---|---|
| DEWATERING WELLS | Q1 = Q2+Q3 |
| PROCESS WATER | Q2 = Q4 + Q5 + Q6 + Q7 |
| RECYCLED WATER FROM FINAL POLISHING POND | Q10 = Q31 |
| | |
| TMF INFLOW | Q25 = Q9+Q20x+Q21+Q22+Q23+Q24 |
| TMF DECANT | Q26 |
| POLISHING POND INFLOW | Q29 = Q3+Q26+Q28 |
| DISCHARGED WATER | Q32 |
| MINAGO RIVER DOWNSTREAM | Q35 = Q33+Q34 |
| OAKLEY CREEK DOWNSTREAM | Q38 = Q36+Q37 |

MINAGO WATER MANAGEMENT DIAGRAM DURING OPERATIONS

The sewage lagoon will be subject to climatic effects. In the water balance model, presented below, these climatic effects were assumed to consist of precipitation, sublimation, and evaporation.

*Mill Complex (Flows Q10, Q11, Q14, Q15, Q17, Q17x, Q18):*

Nickel milling operations at Minago are located on the west side of the site and south of the the limestone bluff. Schematically, the mill complex is illustrated with 'Mill Operations', 'Concentrate Thickener in Mill', and 'Mill Thickener' in Figure 12.1.

The mill complex has the following inflows:

1. Recycle water from the polishing pond (Q10);
2. Potable water (Q11);
3. primary crusher products and crushed ore from the Other Operations area (Q14);
4. recovered water from the concentrate thickener (Q15); and
5. Recycle water from the mill thickener (Q17).

Outflows from the mill complex are nickel concentrate that will be shipped for sale and mill tailings (Q18) that will be discharged to the Tailings Management Facility (TMF). A portion of the recycle water from the Mill Thickener (Q17x) may also be directed towards the TMF, if the quality of the recycle water does not meet the process water quality standards for the mill. However, the redirection of the recycle water from the Mill Thickener is not expected under normal operating conditions.

*Frac Sand Plant (Flows Q6, Q13, Q19, Q20 and Q21):*

The Frac Sand Plant will receive process water (Q6) consisting of dewatering well water and potable water (Q13). Liquid waste from the Frac Sand Plant (Q19) will be directed towards the thickener of the Frac Sand Plant.

During operations of the nickel mill, Frac Sand Plant tailings (Q21) and liquid waste (Q20) from the Frac Sand Plant will be directed to the TWRMF.

*Other Operations (Flow Q14):*

The term 'Other Operations' in the context of the site water management plan refers to the primary crusher, crushed ore tunnel, maintenance building, fueling area, and substation. The main outflow of the Other Operations Area (Q14) will be crushed ore that will be directed towards the mill complex. Grey water and sewage from the Other Operations Area will be directed towards the sewage lagoon. Hyrdrocarbons and other potentially deleterious substances in the Other Operations Area will be handled, stored and disposed of in an appropriate manner in compliance with all applicable regulations and guidelines.

*Tailings and Waste Rock Management Facility (Flows Q9, Q17x, Q18, Q20, Q21, Q23, Q25, and Q26):*

The Tailings Waste Rock Management Facility (TWRMF) is a key component of the water and waste management system at Minago for liquid waste, tailings and ultramafic rock. The TWRMF will serve as repository for ultramafic rock, nickel mill and Frac Sand Plant tailings.

Tailings and ultramafic rock will be stored subaqueously. Submerging or "subaqueous disposal" of ultramafic waste rock that has the potential to generate acid tailings is practiced at many metal mines to keep oxidative rates at a minimum and to minimize metal leaching. Based on geochemical work done to date, Minago's nickel tailings will contain low sulphide levels and were deemed to not become acid generating (URS, 2008i). Sulphide levels were less than or equal to 0.07 % in the Master tailings samples tested while the ultramafic – Precambrian waste rock was deemed as PAG.

The TWRMF will remain in place after all operations have ceased at the site. The TWRMF inflow (Q25) consists of:

1. alternate flow from the mill thickener (only if warranted) (Q17x);
2. mill tailings (Q18) and leachates from the ultramafic rock;
3. sludge from the potable water treatment plant (Q9);
4. liquid waste from the Frac Sand Plant (Q20);
5. tailings from the Frac Sand Plant (Q21);
6. outflow from the sewage treatment lagoon (Q23); and
7. Ultramafic Rock will be saturated in the TWRMF and will not contribute contaminants to the decant system.

Tailings slurry will be conveyed to the TWRMF by a high-density polyethylene (HDPE) delivery pipeline. The slurry will then be fed into the dam by spigot deposition. In so doing, beaches of sand-sized tailings will be deposited near the edge of the dam surface, with silt-clay particles settling out at a distance from the spigotting points.

Outflows from the TWRMF include the TWRMF Decant (Q26) and seepage, which will be captured by interceptor ditches surrounding the TWRMF and be pumped back to the TWRMF. The flow volume of the TWRMF Decant will be regulated automatically by a control system.

During operations, water storage in the TWRMF will be minimized as much as possible and continuous discharge from the TWRMF will ensure that contaminants will not build up in the water retained by the TWRMF. The design of the facility will include several baffles and/or barriers to encourage the settlement of suspended solids and to ensure that TWRMF decant has a low suspended solids concentration.

The TWRMF contents (tailings and ultramafic rock) will be saturated throughtout the operational and closure phases.

The TWRMF will be subject to climatic effects, which were assumed to consist of precipitation, evaporation and sublimation in the Minago water balance model.

The TWRMF will provide 35 million m3 of storage with a maximum water surface area of approximately 220 ha. The large surface area of the pond will provide adequate aeration for aerobic degradation of the organic reagents.

*Open Pit Dewatering (Flow Q28):*

During operations, the open pit will be dewatered to ensure safe and dry working conditions in the pit. Open pit dewatering (Q28) will be subject to climatic effects, which were assumed to include precipitation and sublimation in the Minago water balance model.

The open pit dewatering water will be pumped to the polishing pond.

*Polishing Pond (PP) Area (Flows Q3, Q26, Q28, Q30, Q31, Q32):*

The Polishing Pond will be used as water storage, final settling pond, and flood retention area. The Polishing Pond will be approximately 75 ha in area.

The Polishing Pond will receive decant water from the TMF (Q26), dewatering water from the Open Pit (Q28), and excess groundwater from the twelve (12) mine dewatering wells (Q3). Under normal operating conditions, water retained by the Polishing Pond (Q30) will either be recycled to the milling process (Q31 = Q10) or discharged to the receiving environment via a discharge pipeline system (Q32).

*Discharge System to Minago River (Summer and Winter) (Flows Q32 and Q33):*

Excess water in the polishing pond that will not be recycled will be discharged through the Minago/Oakley Creek pipeline system (Q32). Discharge to the Minago River (Q33) will occur year round at rates that will be adjusted seasonally to ensure that the discharged flows will not overwhelm the flow regime nor the flora and fauna in Minago River.

In the water balance model, it was assumed that 70 % of all water to be discharged to the receiving environment will be directed towards Minago River during the non-winter months (May to October) and that 100% of all excess polishing pond water will be discharged to Minago River during the winter months (November to April).

*Discharge System to Oakley Creek (Summer):*

Excess water in the polishing pond that will not be recycled will be pumped to the discharge pipeline system (Q32). It was assumed that Oakley Creek will be completely frozen during the winter months and therefore no discharges are planned to Oakley Creek in the winter months. Discharge to Oakley Creek (Q36) will occur from May to October. Discharges to Oakley Creek will be adjusted seasonally to ensure that the discharged water will not overwhelm the flow regime nor the flora and fauna in Oakley Creek. In the water balance model, presented below, it was assumed that 30% of the water that will be discharged to the receiving environment will be discharged to Oakley Creek during non-winter months.

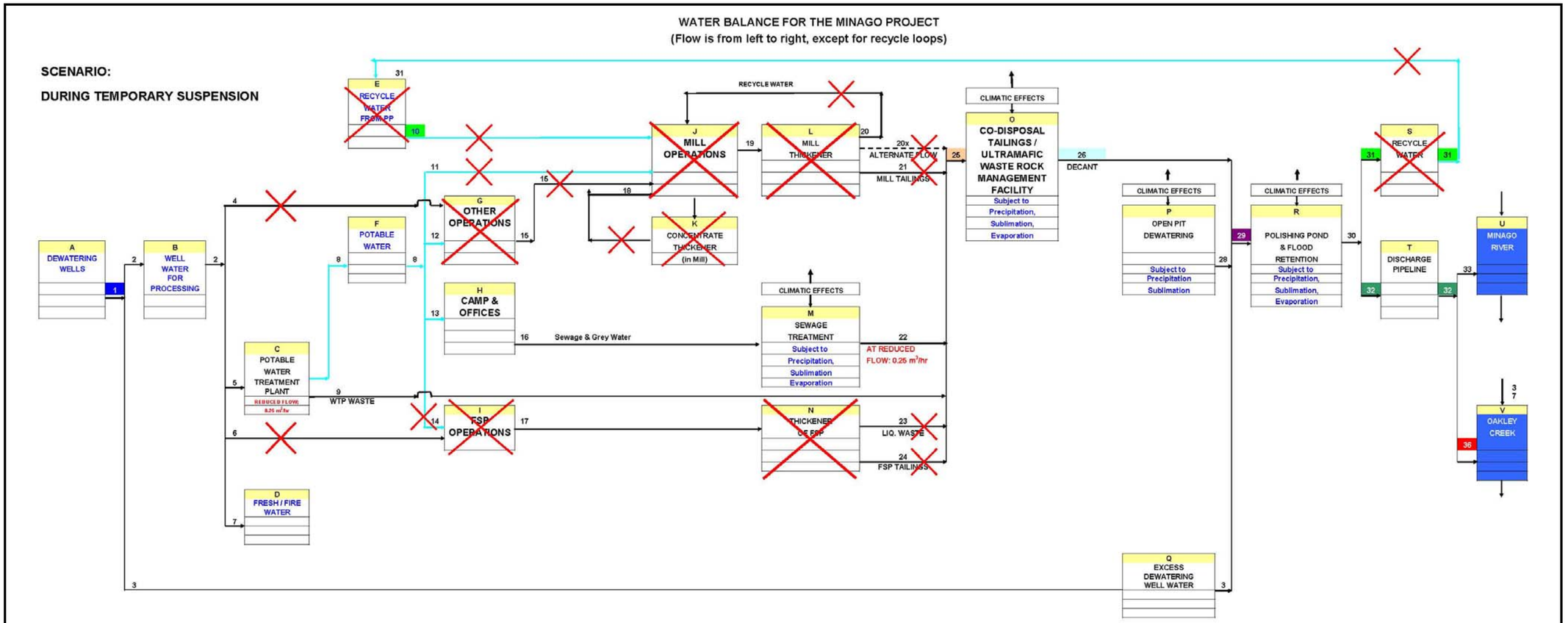
### WATER MANAGEMENT SYSTEM DURING TEMPORARY SUSPENSION

A schematic of the site water management system during temporary suspension is given in Figure 12.2. As the name implies, the state of Temporary Suspension is typically of temporary nature. Due to the temporary nature of the state of Temporary Suspension, only processing facilities at the site such as the mill complex (mill operations, mill thickener, and concentrate thickener in the mill), Frac Sand Plant, the thickener of the Frac Sand Plant, and Other Operations will be shut down. During Temporary Suspension, recycling of water from the polishing pond will also cease, but the mine site and open pit dewatering will continue as during normal operations.. Continued dewatering of the site will permit a fast start-up after the temporary suspension of site operations is lifted and normal operations resume.

All other components of the water management system that will not be shut down will be as was described previously for the operational period.

In the water balance model, presented and discussed below, it was assumed that the state of Temporary Suspension will occur at the end of Year 4.

**Figure 12.2 Water Management System During Temporary Suspension**




SYSTEM OF LINEAR EQUATIONS (FOR FLOWS)

| | |
|---|---|
| DEWATERING WELLS | Q1 = Q2+Q3 |
| PROCESS WATER | Q2 = Q4 + Q5 + Q6 + Q7 |
| RECYCLED WATER FROM FINAL POLISHING POND | Q10 = Q31 |
| | |
| TMF INFLOW | Q25 = Q9+Q20x+Q21+Q22+Q23+Q24 |
| TMF DECANT | Q26 |
| POLISHING POND INFLOW | Q29 = Q3+Q26+Q28 |
| DISCHARGED WATER | Q32 |
| MINAGO RIVER DOWNSTREAM | Q35 = Q33+Q34 |
| OAKLEY CREEK DOWNSTREAM | Q38 = Q36+Q37 |

MINAGO WATER MANAGEMENT DIAGRAM DURING TEMPORARY SUSPENSION

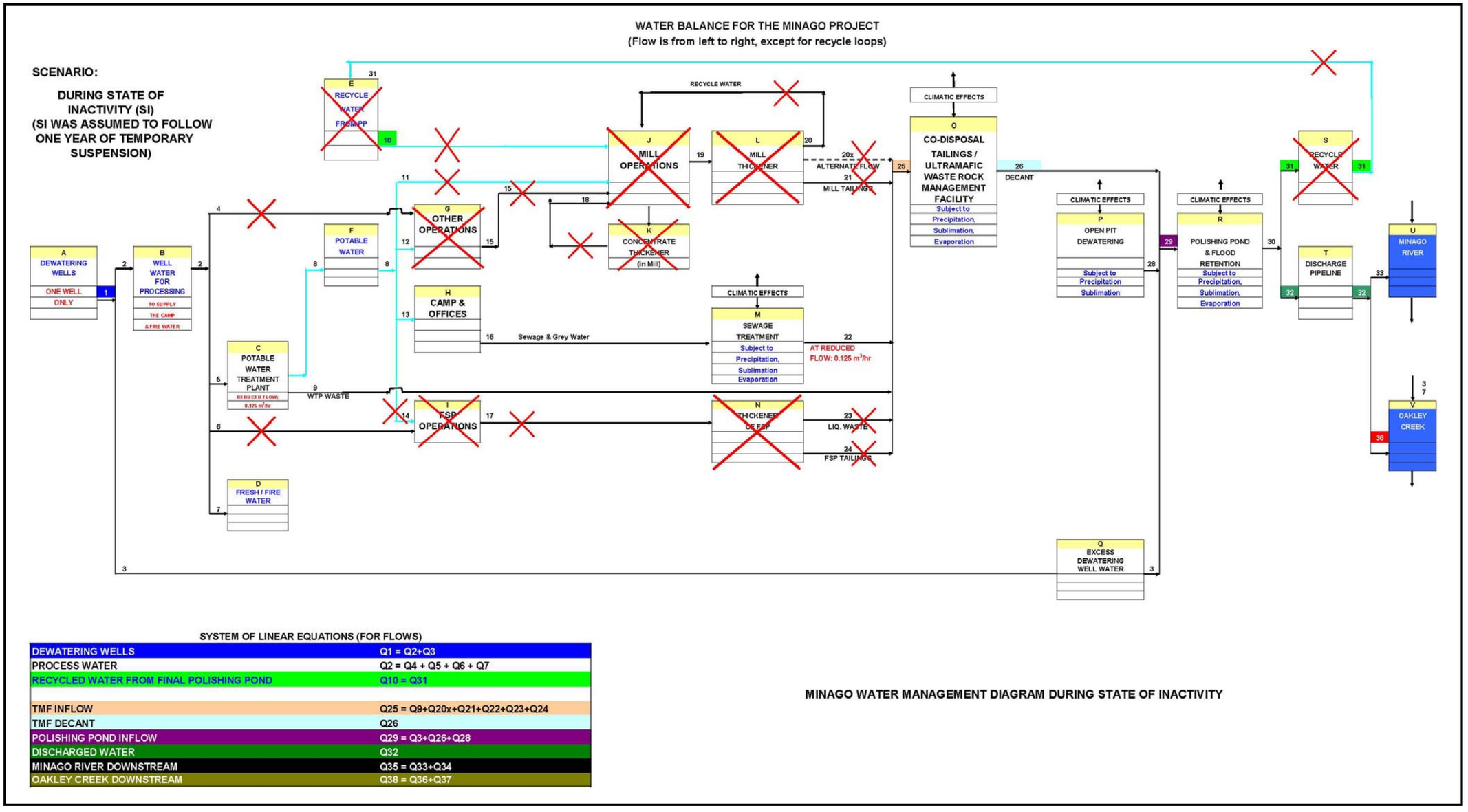
## WATER MANAGEMENT SYSTEM DURING A STATE OF INACTIVITY

A schematic of the site water management system during a state of inactivity is given in Figure 12.3. During the state of inactivity, all operations cease at the processing facilities and the mill complex (mill operations, mill thickener, concentrate thickener in the mill), Frac Sand Plant, the thickener of the Frac Sand Plant, and Other Operations will be shut down. Recycling of water from the polishing pond will also cease and dewatering of the mine site will be suspended. As illustrated in Figure 12.3, the water for the camp will be provided by a small local well or intermittently from only one of the dewatering wells. However, dewatering of the open pit will only be partial as only one out of the twelve dewatering pumps will be operating.

All other components of the water management system that will not be shut down will be as was described for the operational period.

In the Minago water balance model, the state of inactivity was assumed to occur after one year of Temporary Suspension, which, in turn, was assumed to have occurred after Year 4.

**Figure 12.3 Water Management System During a State of Inactivity**




SYSTEM OF LINEAR EQUATIONS (FOR FLOWS)

| | |
|---|---|
| DEWATERING WELLS | Q1 = Q2+Q3 |
| PROCESS WATER | Q2 = Q4 + Q5 + Q6 + Q7 |
| RECYCLED WATER FROM FINAL POLISHING POND | Q10 = Q31 |
| | |
| TMF INFLOW | Q25 = Q9+Q20x+Q21+Q22+Q23+Q24 |
| TMF DECANT | Q26 |
| POLISHING POND INFLOW | Q29 = Q3+Q26+Q28 |
| DISCHARGED WATER | Q32 |
| MINAGO RIVER DOWNSTREAM | Q35 = Q33+Q34 |
| OAKLEY CREEK DOWNSTREAM | Q38 = Q36+Q37 |

MINAGO WATER MANAGEMENT DIAGRAM DURING STATE OF INACTIVITY

**Water Management System During Closure**

During the closure period, site and infrastructure decommissioning and site reclamation will take place and all processing facilities and appurtenances will be shut down. Water management during the closure period is illustrated in Figures 12.4 and 12.5. The first stage of the closure period is illustrated in Figure 12.4 and the second stage of the closure period is illustrated in Figure 12.5.

The following components will operate during the first stage of closure: dewatering wells, effluent water treatment plant, potable water treatment plant (at an appropriate rate based on on-site personnel), sewage lagoon, TWRMF, polishing pond, and the discharge pipeline system to the receiving environment. All of these components with the exception of the dewatering wells will be the same as was described for the operational period. The dewatering wells will be used to install a 1 m high water cover on top of the TWRMF.

All water management components for the second stage of closure will be the same as for the first stage except for the dewatering wells. All dewatering wells will be decommissioned in the second stage of closure. To minimize pumping distances and costs, a new groundwater well may also be established in close proximity to the potable water treatment plant.

The first stage of the closure period will call for the dewatering well water to be directed towards the TWRMF. Dewatering water will be directed towards the TWRMF to speed up the installation of aapproximately 1 m high of water cover. The provision of a water cover does not mean that the tailings are acid generating. The effluent from the TWRMF will be discharged to the Polishing Pond. Water Management System during Post Closure

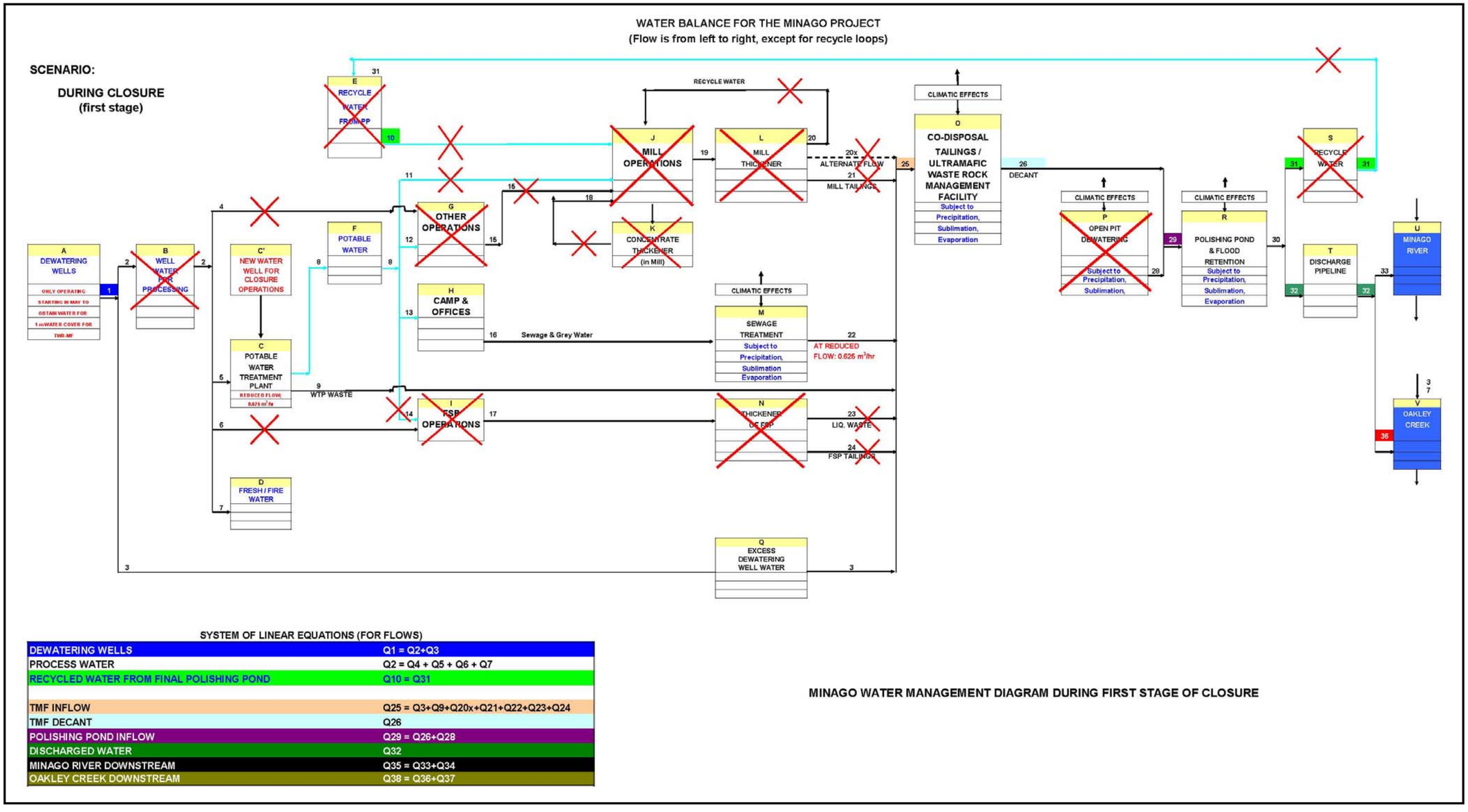
Water management during the post closure period is illustrated in Figure 12.6. In the post closure period, all mining facilities and infrastructure will have been decommissioned.

Effluent from the TWRMF Flow from Node Q, (Q26) will be discharged to the Polishing Pond.

In the post closure phase, the TWRMF will have been decommissioned and reclaimed as much as possible by revegetating tailings dams and installing a spillway with an invert elevation that will be approximately 1 m above the deposited tailings and direct the discharge by gravity to the Polishing Pond. The spillway will be installed before the closure phase and will allow the drainage of TWRMF supernatant (Q26) that is in excess of the 1 m high water cover. The provision of a water cover does not mean that the tailings are acid generating.

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**Figure 12.4 Water Management System During First Stage of Closure**

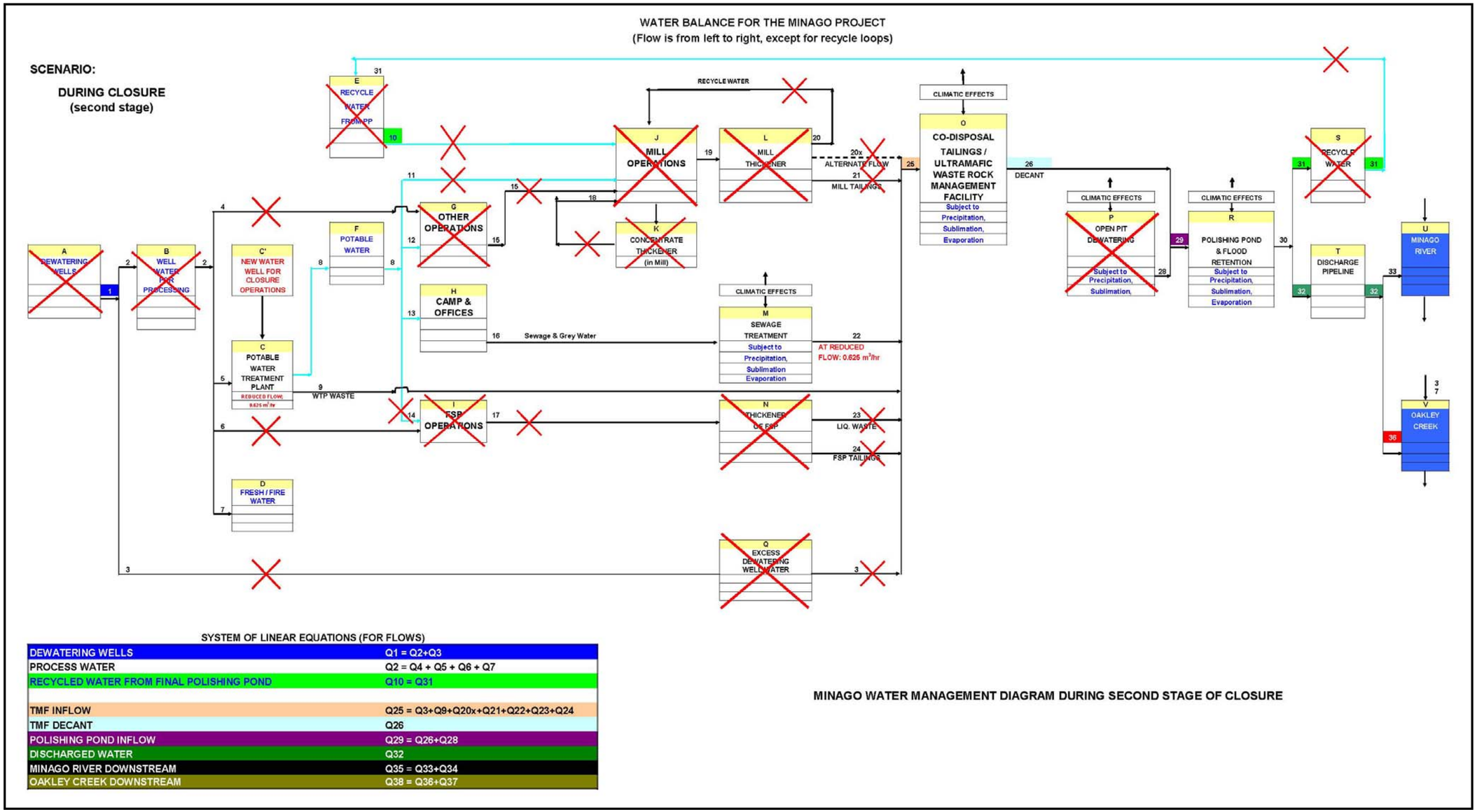



SYSTEM OF LINEAR EQUATIONS (FOR FLOWS)

| | |
|---|---|
| DEWATERING WELLS | Q1 = Q2+Q3 |
| PROCESS WATER | Q2 = Q4 + Q5 + Q6 + Q7 |
| RECYCLED WATER FROM FINAL POLISHING POND | Q10 = Q31 |
| | |
| TMF INFLOW | Q25 = Q3+Q9+Q20x+Q21+Q22+Q23+Q24 |
| TMF DECANT | Q26 |
| POLISHING POND INFLOW | Q29 = Q26+Q28 |
| DISCHARGED WATER | Q32 |
| MINAGO RIVER DOWNSTREAM | Q35 = Q33+Q34 |
| OAKLEY CREEK DOWNSTREAM | Q38 = Q36+Q37 |

MINAGO WATER MANAGEMENT DIAGRAM DURING FIRST STAGE OF CLOSURE

**Figure 12.5 Water Management System During Second Stage of Closure**




SYSTEM OF LINEAR EQUATIONS (FOR FLOWS)

| | |
|---|---|
| DEWATERING WELLS | Q1 = Q2+Q3 |
| PROCESS WATER | Q2 = Q4 + Q5 + Q6 + Q7 |
| RECYCLED WATER FROM FINAL POLISHING POND | Q10 = Q31 |
| | |
| TMF INFLOW | Q25 = Q3+Q9+Q20x+Q21+Q22+Q23+Q24 |
| TMF DECANT | Q26 |
| POLISHING POND INFLOW | Q29 = Q26+Q28 |
| DISCHARGED WATER | Q32 |
| MINAGO RIVER DOWNSTREAM | Q35 = Q33+Q34 |
| OAKLEY CREEK DOWNSTREAM | Q38 = Q36+Q37 |

**MINAGO WATER MANAGEMENT DIAGRAM DURING SECOND STAGE OF CLOSURE**

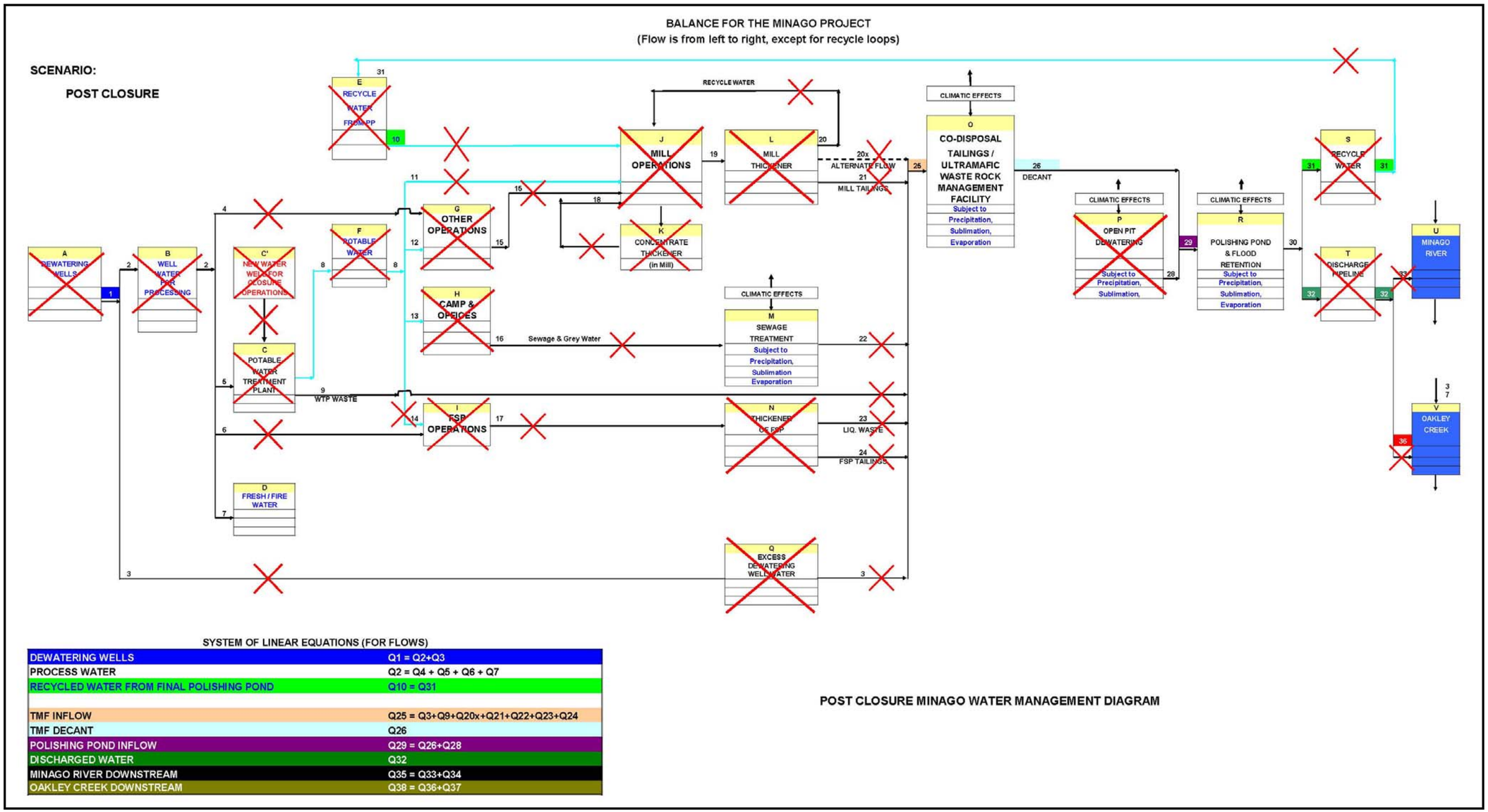
### 12.10.2 MINAGO WATER BALANCE MODEL

A water balance model was developed to estimate average elemental concentrations in flows that will be part of the working mine. The water balance was developed based on expected inputs and outputs. Inputs and outputs are related to three main contributors: dewatering well water and its uses and discharges; mining and milling process to produce concentrate and saleable products out of the ore; and climatic conditions (rainfall, snowfall, sublimation, evaporation, and evapotranspiration). Key assumptions of the water balance model are summarized below, first in general terms and then in detail.

As for the general description of the water management, the water balance model is described for the following five scenarios in this document:

- water balance during Operations (illustrated in Figure 12.1);
- water balance during Temporary Suspension (illustrated in Figure 12.2);
- water balance during the State of Inactivity (illustrated in Figure 12.3);
- water balance during Closure (illustrated in Figures 12.4 and 12.5); and
- water balance during Post Closure (illustrated in Figure 12.6).

**Figure 12.6 Post Closure Water Management System**




SYSTEM OF LINEAR EQUATIONS (FOR FLOWS)

| | |
|---|---|
| DEWATERING WELLS | Q1 = Q2+Q3 |
| PROCESS WATER | Q2 = Q4 + Q5 + Q6 + Q7 |
| RECYCLED WATER FROM FINAL POLISHING POND | Q10 = Q31 |
| | |
| TMF INFLOW | Q25 = Q3+Q9+Q20x+Q21+Q22+Q23+Q24 |
| TMF DECANT | Q26 |
| POLISHING POND INFLOW | Q29 = Q26+Q28 |
| DISCHARGED WATER | Q32 |
| MINAGO RIVER DOWNSTREAM | Q35 = Q33+Q34 |
| OAKLEY CREEK DOWNSTREAM | Q38 = Q36+Q37 |

**POST CLOSURE MINAGO WATER MANAGEMENT DIAGRAM**

## GENERAL DESCRIPTION OF INPUTS AND OUTPUTS OF THE WATER BALANCE MODEL

The primary water inputs of the water balance model are due to dewatering wells that enable mining in the open pit by lowering the water table. In the water balance model, it was assumed that approximately 32,000 $m^3$/day will be pumped from 12 dewatering wells that surround the open pit and 8,000 $m^3$/day will be pumped from the open pit. Dewatering well water will be used for processing in the mill and Frac Sand Plant and to create potable water. However, the vast majority (approximately 84%) of the dewatering well water will be discharged unused to the Polishing Pond for subsequent discharge to the receiving environment (Minago River or Oakley Creek) during mine operations.

Major inputs into the water balance model are precipitation and associated climatic effects. All large storage areas considered in the water balance model are subject to climatic effects. These areas include the the TWRMF, the Open pit, the Polishing Pond, and the Sewage Treatment Lagoon.

Key assumptions regarding climatic effects at Minago are as follows:

### *Precipitation*

The precipitation at Minago was assumed to be 510 mm consisting of 369 mm (72%) of rain and 141 mm (28%) of snow (Golder Associates, 2009). It was further assumed that 40 mm of rain falls in the month of May and 329 mm in the period of June to October.

### *Snow Storage*

Snow sublimation and redistribution has a notable impact on the amount of water in the snowpack and therefore affects the water balance of a watershed. Sublimation can occur directly from snowpack surfaces or during blowing snow events with overall rates dependent on humidity and wind speed (Essery et al., 1999; Déry and Yau, 2002). Snow sublimation is highly dependent on the thermal balance of the snowpack. Golder Associates (2009) projected an average snow sublimation rate of 39% of the average annual snowfall for the Minago Project.

### *Snowmelt*

In the water balance model, snowmelt was assumed to occur in the month of May.

### *Lake Evaporation and Evapotranspiration*

Evaporation is the process by which water is transferred from land and water to the atmosphere. Transpiration is the evaporation of water from the vascular system of plants to the atmosphere. The combination of both processes is termed

evapotranspiration and is a function of the type of surface (open water, leaf or leaf canopy, bare soil, etc.), the availability of water, and the net energy input into the system.

The seasonal distribution of evaporation is affected primarily by solar radiation. During the snowmelt period, evaporation is relatively small compared with the large supply of melt water within a thinly thawed active layer (Woo and Steer, 1983). Evaporation is greatest following snowmelt and decreases through the summer period. Evaporation decreases as the latitude increases. Evaporation losses from lakes are greater than evapotranspiration losses from an equivalent terrestrial area.

Lake evaporation in the vicinity of the proposed project site is expected to be 500 mm or more (EMRC, 1995), while evapotranspiration is estimated to range between 350 and 400 mm (EMRC, 1995).

In the Minago water balance model, it was assumed that the evaporation from the Tailings Management Facility (TMF), the Polishing Pond, and the Sewage Treatment Lagoon will be 50% of the lake evaporation estimated for large lakes in the vicinity of the Minago Project. Evaporation was assumed to be 56 mm in May, 218.35 mm in the period from June to October (over a period of 154 days), and 0 mm in the winter months (November to April). Evaporation losses were assumed to be negligible for the waste rock dumps due to the coarseness of the material as well as for the open pit due to the continuous removal of water that infiltrates the pit during operations.

### *Ice Regime*

The mean ice thickness in the vicinity of the Minago Project is expected to be between 0.75 and 1 m in lakes and rivers (Allen, 1977). The freeze-over date is expected to be early to mid November, while the ice-free date would occur by mid April (Allen, 1977).

Based on March 2008 field measurements, Oakley Creek was found to be completely frozen near Highway #6 (at monitoring station OCW1). Therefore, it is proposed not to discharge any water to Oakley Creek in the winter months.

### *Outputs*

Major outputs of the water balance are the discharges to Minago River and Oakley Creek watersheds. All other clean, potable, grey, and processing waters will be managed internally at the Minago Project.

## DETAILED ASSUMPTIONS OF THE WATER BALANCE MODEL

Key assumptions of the water balance model regarding climatic conditions and the stages of Operations, Temporary Suspension, State of Inactivity, Closure and Post Closure are presented below. Based on the stated assumptions, elemental

concentrations and flowrates were estimated for combined flows that have a bearing on the receiving environment.

### *Key Climatic Assumptions*

Key climatic assumptions used for the water balance model are given in Table 12.2.

**Table 12.2 Climatic Assumptions Used for the Minago Water Balance Model**

| | | |
|---|---|---|
| **PRECIPITATION:** | | |
| **Average annual precipitation:** | **510 mm** | Source: Golder Associates (2009) |
| 72% falls as rain: | 369 mm | Source: Golder Associates (2009) |
| 28% falls as snow: | 141 mm | Source: Golder Associates (2009) |
| **Snow Sublimation:** | | |
| 39% of annual snow fall: | 54.99 mm | Source: Golder Associates (2009) |
| Water equivalent remaining in the spring: | = 141-54.99 mm = 86.01 mm | |
| **Water Balance Model Assumptions:** | | |
| - It was assumed that 40 mm of rain falls in the month of May (31 days). | | Source: Golder Associates (2009) |
| - It was assumed that 141 mm of snow falls between November and April (180 days). It was assumed that 86.01 mm water equivalent remains of the snowfall in the spring. | | Source: Golder Associates (2009) |
| - It was assumed that 329 mm of rain falls in June, July, August, September, and October (2.1364 mm/day over 154 days). | | Source: Golder Associates (2009) |
| **LAKE EVAPORATION:** | | |
| **Average annual lake evaporation in the vicinity:** | 566.0 mm | Source: Golder Associates (2009) |
| in April: | 17.6 mm | Source: Golder Associates (2009) |
| in May: | 112.0 mm | Source: Golder Associates (2009) |
| in period from June to October: | 436.7 mm | Source: Golder Associates (2009) |
| **Water Balance Model Assumptions:** | | |
| It was assumed that water evaporates from the sewage lagoon, Tailings Management Facility (TMF), and polishing pond at 50% of the lake evaporation measured for big lakes in the vicinity of the Minago Project. For the 50% evaporation model, it was assumed that 56 mm evaporate in the month of May (1.80645 mm/day over 31 days) and 218.35 mm (1.4179 mm/day over 154 days) evaporate in June, July, August, September and October. | | |

### *Key Assumptions for Operations (Year 1 through Year 7):*

1. Tailings will only leach for the first year after deposition due to their low sulphide levels and their subaqueous disposal. Thus, tailings that will be deposited in Year 7 were assumed to cease leaching at the end of Year 8.
2. Voids in freshly deposited tailings will represent 22% of the tailings stream. Voids were assumed to be filled with water of same quality as the supernatant of the Tailings Mangement Facility (TWRMF). This porewater was assumed to be unavailable for discharge from the TWRMF.
3. Ultramafic – Precambrian Waste Rock will be disposed of together with the tailings in the Tailings and Waste Rock Management Facility. The waste rock that is PAG will be saturated during the operational and closure phases.
4. All twelve dewatering wells will be running and the Open Pit will be dewatered.
5. On-site potable water consumption was assumed to be ~ 300 L/person/day.
6. TMF and polishing pond supernatant will be discharged completely year round during the operational phase (Year 1 though Year 7).

7. Excess groundwater from the dewatering wells will be discharged year round.
8. Water from the discharge pipeline will be discharged at 70 % to Minago River and at 30% to Oakley Creek at all times with the exception of the winter months (November through April) for Oakley Creek. In the winter months, it was assumed that all water will be discharged to Minago River.
9. In Year 7, an effluent water treatment plant will be constructed to be operational at the beginning of Year 8.

*Key Assumptions for Temporary Suspension at the End of Year 4:*

1. All operations will have ceased at the Mill and Frac Sand Plant and related appurtenances at the end of Year 4.
2. No more tailings will be deposited and deposited tailings will only leach for the first year after deposition due to their low sulphide levels and their subaqueous disposal. The waste rock will be saturated and therefore, will not produce acidity. Thus, deposited tailings were assumed to stop leaching at the end of Year 5.
3. Dewatering wells will be running as usual during regular operations.
4. On-site potable water consumption was assumed to be 6 m3/day (~ 300 L/person/day).
5. Excess groundwater from the dewatering wells will be discharged year round.
6. TWRMF and polishing pond supernatant will be discharged completely year round.
7. Water from the discharge pipeline system will be discharged at 70 % to Minago River and at 30% to Oakley Creek at all times, except in the winter months (November through April) for Oakley Creek. In the winter months, it was assumed that all water will be discharged to Minago River.

*Key Assumptions for The State of Inactivity:*

1. The State of Inactivity was assumed to have occurred after one year of Temporary Suspension at the end of Year 5.
2. Deposited tailings will not leach anymore (since tailings were assumed to leach for only one year after deposition due to their low sulphide content and subaqueous disposal).
3. The ultramafic waste rock will not produce any acidity as it will be totally submerged.
4. All operations will have ceased at the Mill and Frac Sand Plant and related appurtenances.
5. Only one dewatering well will be running to supply the camp and site activities with water.

6. On-site potable water consumption was assumed to be 3 m3/day (~ 300 L/person/day for 10 people).
7. Excess groundwater from the dewatering wells will be discharged year round.
8. TWRMF and polishing pond supernatant will be discharged completely year round.
9. Water from the discharge pipeline will be discharged at 70 % to Minago River and at 30% to Oakley Creek at all times, except in the winter months (November through April) for Oakley Creek. In the winter months, it was assumed that all water will be discharged to Minago River.

*Key Assumptions During Closure:*

The closure period was broken down into two stages (first and second) for which the assumptions are summarized below.

*Assumptions for the First Stage of Closure:*

1. No more tailings and ultramafic waste rock will be deposited at the beginning of Year 8 and deposited tailings will only leach for the first year after deposition due to their low sulphide levels and their subaqueous disposal.
2. All operations will have ceased at the Mill and Frac Sand Plant and related appurtenances.
3. On-site potable water consumption was assumed to be 15 m3/day (~ 300 L/person/day) for 50 persons.
4. Effluent from the TWRMF will be discharged to the Polishing Pond and from the Polishing it will meet the MMER discharge criteria during the first three years following closure and after that the governments of Manitoba discharge criteria. The effluent from the Polishing Pond will be discharged to Oakley Creek through the cross-site ditch.
5. Open pit dewatering will have ceased at the end of Year 7.
6. Dewatering wells will be used to install a 1 m high water cover on top of the Tailings Management Facility (TWRMF).
7. Polishing pond supernatant will be discharged completely year round.

*Assumptions for the Second Stage of Closure:*

All assumptions are as for the first stage of closure except for the dewatering wells. The dewatering wells will be decommissioned, once a water cover of 1 m height will have been installed on top of the TMF.

*Key Assumptions for Post Closure:*

1. All decommissioning activities of mining facilities and infrastructure will have been completed.
2. Any TWRMF supernatant in excess of the 1 m water cover will be discharged to the receiving environment via a spillway and the Polishing Pond to the cross-site ditch.
3. Ultramafic rock will be saturated; therefore, will not contribute to the TWRMF loadings into the Polishing Pond.
4. The site storm water will continue to flow to the cross-site ditch and then to the Oakley Creek through the Highway 6 ditch and the marsh area to the east of Highway 6.

Table 12.3 depicts the assumed flow rates in the Minago River and Oakley Creek during the months of May; June to October; and November to April.

**Table 12.3 Assumed Flowrates in Minago River and Oakley Creek**

| Time Period Stream | May ($m^3/s$) | June to October ($m^3/s$) | November to April ($m^3/s$) |
|---|---|---|---|
| Minago River | 10 | 1.9 | 0.8 |
| Oakley Creek | 4 | 0.5 | 0 |

## RESULTS OF THE MINAGO WATER BALANCE MODEL

Following are key results of the water balance model based on the assumptions outlined above. As for the general description of the water management, the water balance model results are presented for the operational, Closure and Post Closure phase. Water balance models for all mine development phases were developed for three periods of the year: May; June to October; and November to April. These periods were chosen to represent average conditions during the freshet, summer, and winter.

Estimated elemental concentrations in the various flows of the Minago water balance model, presented below, were compared to Manitoba Water Quality Standards, Objectives and Guidelines (Williamson, 2002) (Tier II and Freshwater Quality). Estimated elemental concentrations are also listed against the Canadian Guidelines for the Protection of Aquatic Life (CCME, 2007) and Metal Mining Effluent Regulations (2002). These guideline limits are presented in Table 12.4. Elemental concentrations were estimated for aluminum (Al), antimony (Sb), arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), molybdenum (Mo), nickel (Ni), selenium (Se), and zinc (Zn).

The Tier II Water Quality Objectives are defined for a limited number of common pollutants (such as dissolved metals and nutrients) in Manitoba that are routinely controlled through licencing under the Manitoba Environment Act. Manitoba Tier II

Water Quality Objectives typically form the basis for the water quality base approach when additional restrictions need to be developed to protect important uses of ground or surface waters (Williamson, 2002).

**Table 12.4 Guideline Limits Used for Interpreting Water Balance Results**

| WATER QUALITY PARAMETER | Manitoba Water Quality Standards, Objectives, and Guidelines (Williamson, 2002) | | Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2007) | Metal Mining Liquid Effluents (2002) | |
|---|---|---|---|---|---|
| | TIER II Water Quality Objectives; assuming hardness = 150 mg/L $CaCO_3$ (mg/L) | Freshwater (mg/L) | (mg/L) | Monthly Mean (mg/L) | Grab Sample (mg/L) |
| **Aluminum** | | 0.005 - 0.1 | 0.005 | | |
| **Antimony** | | | | | |
| **Arsenic** | 0.15 mg/L (4-Day, 3-Year) [A] | Tier II | 0.005 | 0.5 | 1 |
| **Cadmium** | 0.00302 [B] | Tier II | 0.000017 | | |
| **Chromium** | 0.10331 [C] | Tier II | | | |
| **Cobalt** | | | | | |
| **Copper** | 0.01266 [D] | Tier II | 0.002 | 0.3 | 0.6 |
| **Iron** | | 0.3 | 0.3 | | |
| **Lead** | 0.0039 [E] | Tier II | 0.001 | 0.2 | 0.4 |
| **Molybdenum** | | 0.073 | | | |
| **Nickel** | 0.07329 [F] | Tier II | 0.025 | 0.5 | 1 |
| **Selenium** | | 0.001 | 0.001 | | |
| **Zinc** | 0.16657 [G] | Tier II | 0.03 | 0.5 | 1 |

**Notes:**

Tier II Water Quality Limits for arsenic, cadmium, chromium, copper, lead, nickel, and zinc are hardness dependent as follows:

A Arsenic limits: 0.15 mg/L for averaging duration 4 days (4-Day, 3-Year or 7Q10 Design Flow);
0.34 mg/L for averaging duration 1 hr (1-Day, 3-Year or 1Q10 Design Flow)

B Cadmium limits: [e{0.7852[ln(Hardness)]-2.715}]×[1.101672-{ln(Hardness)(0.041838)}] for 4 days averaging duration.
[e{1.128[ln(Hardness)]-3.6867}]×[1.136672-{ln(Hardness)(0.041838)}] for 1 hour averaging duration.

C Chromium limits: Chromium III: [e{0.8190[ln(Hardness)]+0.6848}]×[0.860] for 4 days averaging duration.
Chromium III: [e{0.8190[ln(Hardness)]+3.7256}]×[0.316] for 1 hour averaging duration.
Chromium VI: 0.011 mg/L for averaging duration 4 days (4-Day, 3-Year or 7Q10 Design Flow);
0.016 mg/L for averaging duration 1 hr (1-Day, 3-Year or 1Q10 Design Flow)

D Copper limits: [e{0.8545[ln(Hardness)]-1.702}]×[0.960] for 4 Days hour averaging duration.
[e{0.9422[ln(Hardness)]-1.700}]×[0.960] for 1 hour averaging duration.

E Lead limits: [e{1.273[ln(Hardness)]-4,705}]×[1.46203 -{ln(Hardness)(0.145712)}] for 4 Days averaging duration.
[e{1.273[ln(Hardness)]-1.460}]×[1.46203 -{ln(Hardness)(0.145712)}] for 1 hour averaging duration.

F Nickel limits: [e{0.8460[ln(Hardness)]+0.0584}]×[0.997] for 4 Days averaging duration.
[e{0.8460[ln(Hardness)]+2.255}]×[0.998] for 1 hour averaging duration.

G Zinc limits: [e{0.8473[ln(Hardness)]+0.884}]×[0.976] for 4 Days averaging duration.
[e{0.8473[ln(Hardness)]+0.884}]×[0.978] for 1 hour averaging duration.

Canadian Water Quality Guidelines for the Protection of Aquatic Life define acceptable levels for substances or conditions that affect water quality such as toxic chemicals, temperature and acidity. As long as conditions are within the levels established by the guidelines, one would not expect to see negative effects in the environment (CCME, 2007). These guidelines are based on toxicity data for the most sensitive species of plants and animals found in Canadian waters and act as science-based benchmarks.

The Metal Mining Effluent Regulations (MMER) were registered on June 6, 2002, under subsections 34(2), 36(5), and 38(9) of the Fisheries Act and replaced the MMLER and the associated Metal Mining Liquid Effluent Guidelines. The MMER prescribe authorized concentration limits for deleterious substances in mine effluents that discharge to waters frequented by fish. The MMER apply to all Canadian metal mines (except placer mines) that exceed an effluent flowrate of 50 m3 per day. The MMER apply to effluent from all final discharge points (FDPs) at a mine site. An FDP is defined in the Regulations as a point beyond which the mine no longer exercises control over the quality of the effluent. The regulated MMER parameters are arsenic, copper, cyanide, lead, nickel, zinc, TSS, Radium 226, and pH.

It should be noted that water quality guideline limits for heavy metals (such as cadmium, chromium, copper, lead, nickel and zinc) depend on hardness. Therefore, results presented below are listed in terms of applicable equations to determine the guideline limits based on hardness as well as for a hardness of 150 mg/L CaCO3. The hardness level of 150 mg/L CaCO3 was chosen as comparison for results obtained with the Minago water balance model based on water quality results obtained to date. For these results, listed in Table 12.5, the average hardness was 192.2 mg/L CaCO3, the median hardness was 193 mg/L CaCO3, and the weighted average hardness was 173.1 mg/L CaCO3.

### *Water Balance Modeling Results during Operations*

#### *Flow*

Projected operational flow rates are given in Appendix J-1.

#### *Water and Effluent Quality*

Appendices J-2 and J-3 show projected effluent/water quality for the operational phase - Years 1-4 ; and years 5-8.

**Table 12.5 Hardness Levels Measured at Minago**

| | Number of Samples | Minimum ($mg/LCaCO_3$) | Average ($mg/LCaCO_3$) | Maximum ($mg/LCaCO_3$) |
|---|---|---|---|---|
| Frac Sand Plant Overflow | 2 | | 171.5 | 194 |
| Frac Sand Plant Underflow | 2 | | 167 | 192 |
| Sub-aqueous Col. Pore Water | 53 | 145 | 232 | 358 |
| Sub-aqueous Col. Surface Water | 53 | 71.2 | 102.8 | 138 |
| Groundwater Limestone | 3 | 242 | 267 | 287 |
| Groundwater Sandstone | 3 | 165 | 196 | 257 |
| Upstream Minago (MRW2) | 7 | 169 | 192 | 213 |
| Downstream Minago (MRW1) | 14 | 87.2 | 149 | 256 |
| Upstream Oakley Cr. (OCW2) | 13 | 169 | 204.8 | 265 |
| Process Water (Nov. 2008 SGS Lakefield Results) | 1 | | 240 | |
| Total | 151 | | | |
| Minimum | | 71.2 | | |
| Average | | | 192.2 | |
| Maximum | | | | 358.0 |
| Weighted Average | | | 173.1 | |

The projected outflow from the Polishing Pond meets MMER requirements at all times.

*Water Balance Results during Closure*

Estimated flowrates during the first and second stages of the closure period are listed in Appendix J-4. The water balance during the first stage of Closure is illustrated in Figure 12.4 and the second stage of Closure is illustrated in Figure 12.5.

During both stages of Closure, the projected water quality in Minago River and Oakley Creek downstream of the mixing zones will meet the Manitoba Freshwater guidelines for all parameters.

*Balance Results during Post Closure*

During the Post Closure period, all discharge pipeline systems to Minago River and Oakley Creek will have been dismantled and excess water from the TMF (Q26 = TWRMF Decant) will be discharged via a spillway instead. The active and inactive water balance components during the Post Closure period are illustrated in Figure 12.6.

Projected flowrates during the post closure period are listed in Table 12.9. Projected TWRMF decant rates range from 0 m3/day in the winter, 1725 m3/day in the period from June to October, and 5474 m3/day in May.

Projected water/effluent quality data during closure and post closure is given in Appendix J-5.

*Contaminants of Concern (CoC)*

All discharges to the receiving environment (end of pipe) are expected to meet the MMER guidelines during all stages of the mine development and during the closure and post closure periods (First years of closure).

In the event that effluent quality does not meet discharge criteria for selenium for example, Victory Nickel will resolve the problem by improvising a water treatment plant. However, on the basis of the water balance and contaminant loading investigations, the effluent discharge requirements will be met for selenium and other contaminants of concern.

## 12.11 OPERATIONAL MONITORING PROGRAMS

Victory Nickel will develop environmental monitoring programs during the operational phase. The program will mirror the baseline program undertaken between 2006 and 2008. Table 12.11 gives the nomenclature and coordinates of the biophysical

monitoring stations for the baseline programs. The goal of the operational monitoring program will be to determine potential environmental impacts of the Minago Project. Amongst other things, the program will be designed to protect the watersheds surrounding the project area. Figure 12.7 gives the watersheds surrounding the Minago Project. Table 12.12 gives the proposed monitoring program for the TWRMF.

**Table 12.6 Nomenclature and Coordinates of Biophysical Monitoring Stations**

| Victory Nickel Sample Location (as of Sept. 15, 2007) | UTM (NAD 83) | | UTM (NAD 83) | | Description |
|---|---|---|---|---|---|
| | Northing | Easting | Latitude | Longitude | |
| HRW1 | 6028072 | 495606 | 54o24.041' N | 99o04.051' W | Hargrave River immediately west of Highway 6 |
| MRW1 | 6005277 | 488671 | 54o11.721' N | 99o10.420' W | Minago Project River immediately west of Highway 6 |
| MRW2 | 6001212 | 472476 | 54o09.494' N | 99o25.290' W | Minago Project River near Habiluk Lake |
| MRW2x | 6001166 | 472571 | 54o09.470' N | 99o25.206' W | Minago Project River near Habiluk Lake (~ 100 m downstream of MRW2) |
| MRW3 | 6007895 | 494274 | | | Minago Project River downstream of Highway 6 near powerline cut |
| OCW1 | 5990510 | 489322 | 54o03.762' N | 99o09.786' W | Oakley Creek immediately east of Highway 6 |
| OCW2 | 5990961 | 487463 | 54o04.002' N | 99o11.492' W | Oakley Creek immediately downstream of north tributary |
| OCW3 | 5990892 | 487230 | 54o03.965' N | 99o11.707' W | Oakley Creek immediately upstream of north tributary |
| WRW2x | 5987162 | 495416 | 54o01.963' N | 99o04.199' W | William River approx. 6 km upstream of the Oakley Creek confluence |
| WRW1x | 5986554 | 498523 | 54o01.637' N | 99o01.350' W | William River approx. 100 m downstream of the Oakley Creek confluence |
| WRAOC | 5986647 | 498452 | 54o01.685' N | 99o01.416' W | William River approx. 50 m upstream of the Oakley Creek |
| OCAWR | 5986744 | 498457 | 54o01.738' N | 99o01.414' W | Oakley Creek approx. 50 m above William River |
| WRALSB | 5969206 | 503935 | 53o52.278' N | 98o56.410' W | William River approx. 100 m above Limestone Bay |
| LSBBWR | 5968889 | 504092 | 53o52.107' N | 98o56.262' W | Limestone Bay approx. 250 m below William River |
| Little Limestone Lake | 5954922 | 478725 | | | Little Limestone Lake (at end of road) |
| Russell Lake | 5967117 | 482571 | | | Russell Lake (at end of road) |
| William River (Winter) | 5973774 | 485141 | 53o54.730' N | 99o13.574' W | William River east of Highway 6 |
| William River at Road | 5973791 | 485078 | | | William River west of Highway 6 |
| William Lake | 5973831 | 479083 | | | William Lake at end of access road |
| Polishing Pond | TBA | TBA | TBA | TBA | Polishing Pond Outflow to Receiving Environment during Closure |

**Figure 12.7 Minago Project – Site Watersheds**

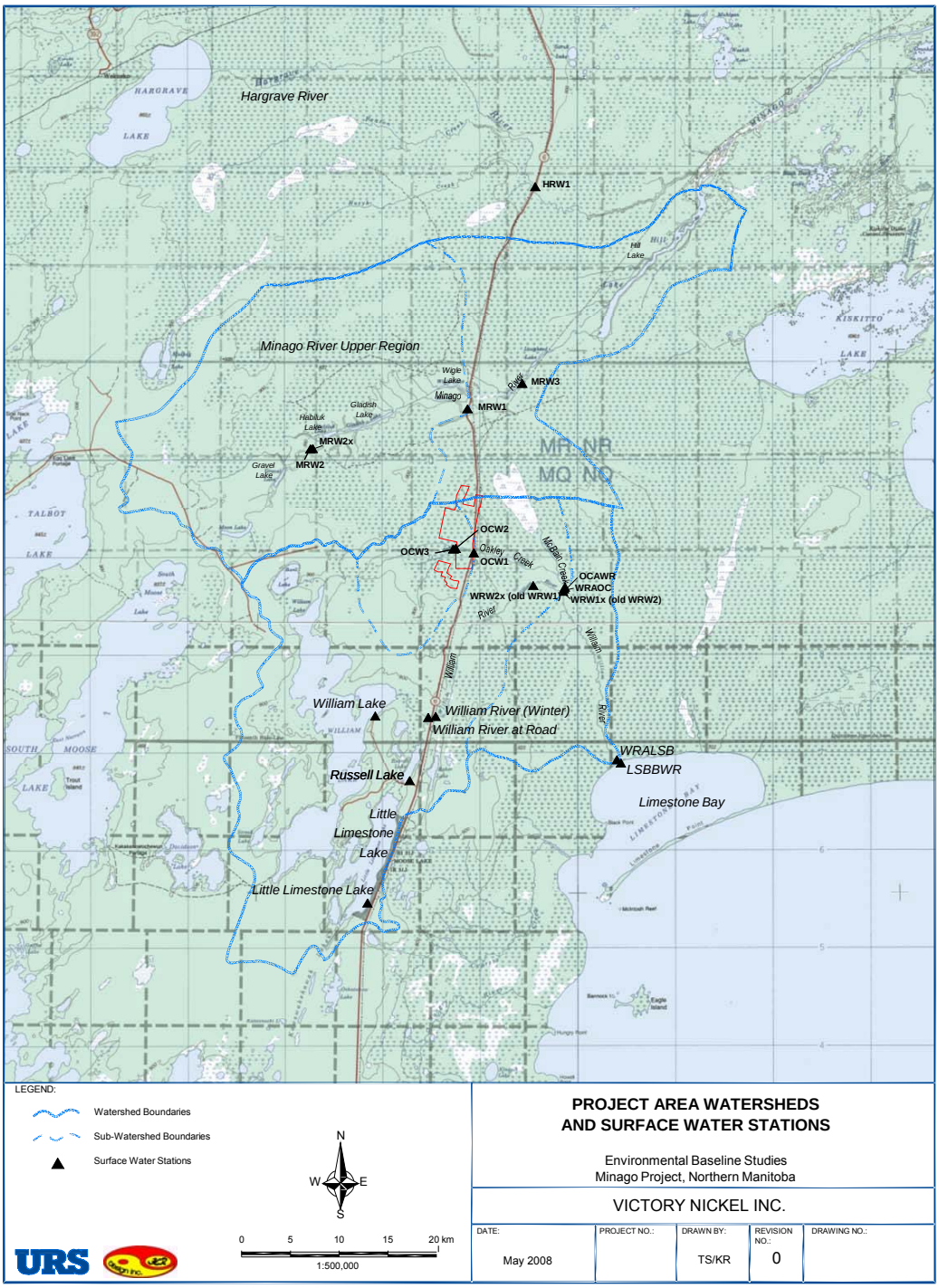


**Table 12.7 Proposed Operational Monitoring Program for the TWRMF**

| Criteria or Monitoring Parameter | Monitoring Frequency |
|---|---|
| Weekly Visual Inspection | Weekly inspection |
| Annual Inspection by a Competent Person | Annual Inspection |
| Dam Safety Review | Every 7 Years (CDA Dam Safety Guidelines, 1999) |
| Instrumentation (Piezometers – Electric and Standpipe) | Monthly |
| Embankment Movement Points | Annually |
| Seepage at Toe of the Dam | Weekly |
| Pond Water Level | Weekly |
| Crack in Crest of the Dam | Weekly |
| Distance between Water Pond and Upstream edge of Embankment Crest | Weekly |
| Storm | Immediately after the storm |
| Earthquake | Immediately after the Earthquake |

## SEDIMENT AND WATER QUALITY CHARACTERIZATION

The water quality parameters and associated minimum detection limits are given in Table 12.13. The respective QA/QC criteria and procedures for closure will be similar to the operational ones.

**Table 12.8 Water Quality Parameters and Detection Limits**

| Parameter | | Detection limit (mg/L) | Analytical Method |
|---|---|---|---|
| Aluminum, total and dissolved | Al | 0.001 | ICP / ICP MS |
| Antimony, total and dissolved | Sb | 0.00005 | ICP / ICP MS |
| Arsenic, total and dissolved | As | 0.00005 | ICP / ICP MS |
| Barium, total and dissolved | Ba | 0.00005 | ICP / ICP MS |
| Beryllium, total and dissolved | Be | 0.0005 | ICP / ICP MS |
| Bismuth, total and dissolved | Bi | 0.0005 | ICP / ICP MS |
| Boron, total and dissolved | B | 0.001 | ICP / ICP MS |
| Cadmium, total and dissolved | Cd | 0.00005 to 0.02 | ICP / ICP MS |
| Calcium, total and dissolved | Ca | 0.05 | ICP / ICP MS |
| Chromium, total and dissolved | Cr | 0.0001 | ICP / ICP MS |
| Cobalt, total and dissolved | Co | 0.0001 | ICP / ICP MS |
| Copper, total and dissolved | Cu | 0.0001 | ICP / ICP MS |
| Iron, total and dissolved | Fe | 0.01 | ICP / ICP MS |
| Lead, total and dissolved | Pb | 0.00005 | ICP / ICP MS |
| Lithium, total and dissolved | Li | 0.001 | ICP / ICP MS |
| Magnesium, total and dissolved | Mg | 0.05 | ICP / ICP MS |
| Manganese, total and dissolved | Mn | 0.00005 | ICP / ICP MS |

| Parameter | | Detection limit (mg/L) | Analytical Method |
|---|---|---|---|
| Mercury (total) , total and dissolved | Hg | 0.00005 | Cold Oxidation (CVAAS) |
| Molybdenum, total and dissolved | Mo | 0.00005 | ICP / ICP MS |
| Nickel, total and dissolved | Ni | 0.0001 | ICP / ICP MS |
| Phosphorus, total and dissolved | P | 0.05 | ICP / ICP MS |
| Potassium, total and dissolved | K | 0.2 | ICP / ICP MS |
| Selenium, total and dissolved | Se | 0.0005 | ICP / ICP MS |
| Silicon, total and dissolved | Si | 0.05 | ICP / ICP MS |
| Silver, total and dissolved | Ag | 0.00001 | ICP / ICP MS |
| Sodium, total and dissolved | Na | 2 | ICP / ICP MS |
| Strontium, total and dissolved | Sr | 0.0001 | ICP / ICP MS |
| Thallium, total and dissolved | Tl | 0.00005 | ICP / ICP MS |
| Tin, total and dissolved | Sn | 0.0001 | ICP / ICP MS |
| Titanium, total and dissolved | Ti | 0.01 | ICP / ICP MS |
| Vanadium, total and dissolved | V | 0.001 | ICP / ICP MS |
| Zinc, total and dissolved | Zn | 0.001 | ICP / ICP MS |
| Total alkalinity | $CaCO_3$ | 1 | Titration to pH=4.5 |
| Ammonia | N | 0.005 | Colorimetry |
| Nitrate | N | 0.005 | Ion Exchange Chromatography |
| Nitrite | N | 0.001 | Colorimetry |
| Nitrite + nitrate | N | 0.005 | Ion Exchange Chromatography |
| Sulphate | $SO_4$ | 0.03 | Ion Exchange Chromatography |
| Total dissolved solids | | 1 to 5 | Filtration/Gravimetric |
| Total suspended solids | | 1 to 5 | Filtration/Gravimetric |
| Turbidity | | 1.0 (NTU) | Nephelometric |
| Conductivity | | 1.0 (µS) | Conductivity cell |
| pH (RelU) | | 0.1 (RelU) | Potentiometric |
| Cyanide (total) | CN | 0.005 | Distillation/UV Detection |
| Fluoride | F | 0.02 | Colorimetry |
| Chloride | Cl | 0.5 | Colorimetry |

Stream sediments and water were sampled to establish baseline data in the past. These streams will continue to be sampled during the operational and closure phases to determine impact(s) with time. The stations that will be sampled during the closure phase are given in Table 12.14. In addition, the site will be required to undertake environmental effects monitoring (EEM). Other environmental monitoring programs including fisheries, wildlife and vegetation aspects will be developed to

assess operational impacts. A waste management plan will be developed to manage wastes on site in order to minimize future environmental liability and impacts.

**Table 12.9 Sediment and Surface Water Monitoring Stations**

| Victory Nickel Sample Location (as of Sept. 15, 2007) | Description | Sediment Quality | Water Quality | Flow |
|---|---|---|---|---|
| HRW1 | Hargrave River immediately west of Highway 6 | A | Q | Q |
| MRW1 | Minago River immediately west of Highway 6 | Q | M | M |
| MRW2 | Minago River near Habiluk Lake | A | A | A |
| MRW2x | Minago River near Habiluk Lake ( 100 m downstream of MRW2) | A | A | A |
| MRW3 | Minago River downstream of Highway 6 near powerline cut | M | M | M |
| OCW1 | Oakley Creek immediately east of Highway 6 | M | M | M |
| OCW2 | Oakley Creek immediately downstream of north tributary | Q | Q | Q |
| OCW3 | Oakley Creek immediately upstream of north tributary | Q | Q | Q |
| WRW2x | William River approx. 6 km upstream of the Oakley Creek confluence | Q | M | M |
| WRW1X | William River approx. 100m downstream of the Oakley Creek confluence | Q | M | M |
| WRAOC | William River approx. 50 m upstream of the Oakley Creek | A | Q | Q |
| OCAWR | Oakley Creek approx. 50 m above William River | A | A | A |
| WRALSB | William River approx. 100 m above Limestone Bay | Q | M | M |
| LSBBWR | Limestone Bay approx. 250 m below William River | Q | M | M |
| Little Limestone Lake | Little Limestone Lake (at end of road) | A | A | A |
| Russell Lake | Russell Lake (at end of road) | A | A | A |
| William River (Winter) | William River east of Highway 6 | Q | M | M |
| William River at Road | William River east of Highway 6 | A | Q | Q |
| William Lake | William Lake at end of access road | A | A | A |
| Polishing Pond | Polishing Pond Outflow | - | W | W |

A= Annually, Q= Quarterly W= Weekly

## TWRMF MONITORING AND SURVEILLANCE PROGRAMS

Surveillance is essential to ensure satisfactory performance of the TWRMF and all of its components beyond the operational phase. The monitoring and surveillance programs are designed to track performance indicators in relation to pre-determined safe thresholds.

A successful surveillance program will help identify potential problems before they become major problems. Design or performance criteria of the TWRMF surveillance program will continue to evolve as the facility changes in design or performance criteria, site conditions and / or the operation it is accommodating.

The Surveillance Program for the TWRMF will consist of both routine and event-driven activities. The basis is the combination of all the regular inspections assisted by the eyes of site personnel to ensure continued integrity and performance of the facility.

External consultants will also be inspecting the facility as part of a regular program of expert review.

# 13.0 CLOSURE PLAN

## 13.1 DECOMMISSIONING AND CLOSURE ACTIVITIES

In keeping with its high standards for environmental and social responsibility, Victory Nickel will implement an environmentally sound and technically feasible decommissioning and closure plan for the Minago Project. Closure planning and its implementation will be undertaken with appropriate environmental care to meet provincial and federal laws, satisfy the interests of the public, Communities of Interest, and the company's environmental standards. Victory Nickel will exercise reasonable efforts to plan, design, construct and operate the facilities for closure, with the intention of achieving a "walk-away" scenario.

Closure activities planning involved an assessment of the key site components that may place the public or the environment at risk after closure. Mitigation measures were designed to address public safety issues and environmental concerns. Post-closure monitoring and inspections were planned at the commencement of the Project to ensure that objectives are met. Wardrop anticipates that final determination of the effectiveness of closure measures for walk-away status of the project will be subject to review to ensure compliance regulatory requirements.

Where possible, performance-based criteria have been adopted for the decommissioning and closure plan. The Metal Mines Effluent Regulations (MMER) end-of- pipe effluent discharge standards were used as criteria for waters emanating from the polishing pond. CCME Water Quality Guidelines for the Protection of Freshwater Aquatic Life, (CCME, 1999) were used to assess effectiveness of closure measures to local downstream receiving waters. These same performance-based criteria will be used to determine the effectiveness of closure measures during post-closure monitoring. It is expected that post closure monitoring, and inspection results will be reviewed to ensure that the projected objectives continue to be met after the Project is decommissioned. If the projected objectives are not met, maintenance or contingency plans will be developed as necessary to address potential areas requiring further mitigation.

The closure strategy was developed to achieve the following objectives:

- protection of public health and safety.
- implementation of environmental protection measures that prevent adverse environmental impact.
- ensuring land use commensurate with surrounding lands.

- implementation of progressive reclamation measures during mine operations.
- post-closure monitoring of the Project site to assess effectiveness of closure measures for the long-term.
- achieve “walk-away” post-closure monitoring and management until the mine presents evidence of long-term compliance with closure criteria and objectives.

### 13.1.1 OVERVIEW

The closure plan addresses the short-term and long-term physical, chemical and biological stability of the site including reclamation of surface disturbances. A plan has been developed that manages and monitors the site both during closure implementation in years 1 to 3 and after decommissioning and reclamation measures are completed in years 4 to 6. The details of the plan will be updated and/or altered as information becomes available. Decommissioning cost estimates have been provided and financial security requirements have been reviewed.

### 13.1.2 PROGRESSIVE RECLAMATION PROGRAMS

During the Operational Phase, VNI will focus on progressive reclamation as appropriate. The criteria used to select candidate areas for progressive reclamation initiatives will take into account the redundant nature of site components with respect to inherent risks, impacts on the receiving environment and budgetary constraints.

At this stage, the areas that will be considered for progressive reclamation may include, but are not limited to:

- lay down areas that will not be needed after construction of the mine site.
- temporary structures installed during the construction phase.
- areas disturbed during the construction phase.
- redundant transportation corridors developed during the construction phase.
- redundant components during the operational phase.

Components required for ongoing operations will not be subject to progressive reclamation. Necessary environmental protection measures have been adopted in the development of the overall project plan to ensure a healthy environment after mine closure.

## RECLAMATION RESEARCH

Victory Nickel will continue to gather additional information to develop a cost-effective and environmentally and technologically feasible optimal closure plan. Victory Nickel has recognized the need to improve the co-disposal approach for tailings and ultramafic rock to mitigate acid rock drainage (ARD) from reactive ultramafic waste rock. Special industry/government/university task forces, such as the Mine Environment Neutral Drainage (MEND) Program and the B.C. Task Force on ARD Program, were established by the industry to address acid rock drainage and its control. The MEND program completed its mandate a number of years ago and produced guidelines for the prediction and control of ARD. However, respective components of the guides commonly require fine-tuning to reflect the site-specific nature of mine environs. To achieve this, Victory Nickel will undertake ongoing studies to develop and optimize the proposed mitigation measures. The areas of studies will include but will not limited to:

- Undertake ARD and Metal Leaching (ML) studies specific to Minago Project mine wastes, namely, ultramafic waste rock
- Develop Site-Specific Water Quality Objectives (SSWQO) specific for the Oakley Creek Watershed. The SSWQO will replace the generic guidelines used at the inception of the project such as the CCME Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life
- Undertake an Environmental Effects Monitoring (EEM) program to better understand the impacts of the discharges on the receiving environment. The EEM program will be undertaken in part to fulfill the MMER requirements and as a tool to fine-tune and optimize the Victory Nickel environmental programs
- Develop a custom seed mixture specific to the local conditions for the reclamation of the disturbed areas
- Undertake vegetative trials using local plant species e.g. green alder for the reclamation of disturbed areas
- Undertake hydrological and hydro-geological studies to optimize the site water balance
- Fine-tune the TWRMF operational phase wet cover option to prepare for the closure phase
- Confirm the performance of the planned operational water cover for the TWRMF taking into account extreme wet and dry years and
- Develop approaches towards maintenance-free methods including passive technologies to treat mine site effluent.

All of the above studies will be undertaken during the operational, temporary suspension and state of inactivity and post-closure phases, if required. Victory

Nickel will work with consultants and other technical groups to address the environmental constraints associated with aspects such as ARD and/or ML, and overall site issues.

### 13.1.3 PRE-FINAL MINE CLOSURE STAGES

There are essentially two stages prior to final closure: temporary suspension (TS) and state of inactivity (SI). TS means that mining and milling production activities have been suspended, while SI means that mine production and mining operations on site have been suspended indefinitely. The TS may become an SI if the suspension period is longer than planned. Similarly, the SI may turn into a permanent closure if prevailing conditions for resumption of operations are not favourable.

Additional information on these pre-final mine closure stages is provided in Section 12.0.

#### TEMPORARY SUSPENSION AND STATE OF INACTIVITY

TS means that advanced exploration, mining or mine production activities have been suspended due to factors such as low metal prices, or mine-related factors such as ground control problems and labour disputes. On the other hand, SI occurs when mine production and mine operations have been suspended indefinitely.

Victory Nickel recognizes the legitimate concern that government and the public may have with respect to a TS. Generally, Victory Nickel will not be able to definitively state when the Project will reopen after a TS. However, during a TS, Victory Nickel will act as a responsible steward and will demonstrate its commitment to reopening the site by:

- continuing to have the site under the care and maintenance of an on-site caretaker
- continuing to maintain the main access road in a manner that heavy equipment can be brought to the site on short notice to deal with any environmental emergency;
- continuing to adequately monitor and maintain buildings and facilities such as the TWRMF on the site;
- ensuring that major fixed equipment and buildings remain essentially intact on site.

The Provincial government may periodically review the temporary closure status of the mine. If the above conditions are not substantially met, then the closure may be deemed “permanent” unless factors exist to reasonably convince the government otherwise. If closure is deemed to be permanent, then the Decommissioning and

Closure Plan must be implemented. An updated closure plan to reflect the state of the site may be required.

### *Access and General Site Measures*

During a TS, the site will be staffed or inspected by representatives from Victory Nickel on a 24-hour basis. The main access roads remain open and regularly maintained. Access roads to the TWRMF will be blocked with large rock boulders or equivalent barriers.

All underground corridors will be covered by wooden slats or metal gates, which will be maintained by Victory Nickel. Corridors encased in concrete will remain in place.

### *Security of Mine Openings and Operating Facilities*

All mine openings, with the exception of the pit, will be fenced or gated to restrict access to the mine. Access points to surface openings will be blocked using large boulders (boulder fencing) or equivalent barriers. All other access points to the vertical openings will be secured during the temporary suspension stage.

In the event that a TS stage turns into an SI, all vertical openings (with the exception of the open pit) that are no longer required will be capped in accordance with standard cap design.

### *Mine Facilities and Equipment*

All mine facilities will be locked and trespassing signs will be posted. All unused mining equipment will be left in no-load condition. Equipment that will not be in use for site work by Victory Nickel personnel or its contractors will be stored in appropriate areas.

In the event that the TS becomes an SI, Victory Nickel will attempt to dispose of all non-mining equipment during the SI. Unsold machinery and equipment will be left in no-load condition and will be stored in appropriate areas.

#### *Buildings*

To prevent inadvertent access, all buildings on site will be locked. Other potential entry points to the buildings, such as windows, will be secured. Where possible ladders or other access to hazardous areas will be removed or made inaccessible. Surface facilities will only be accessible to Victory Nickel personnel, designated agents/representatives or government officials.

In the event that the TS turns into an SI, some of the redundant buildings will be removed and disposed of in an environmentally acceptable manner. All buildings will remain locked and access restricted to designated personnel.

*Aboveground and Underground Tanks*

The storage tanks will be regularly monitored for leakage to ensure they are operating according to the applicable regulations and licenses.

In the event that the TS turns into an SI, a fuel distribution agent or a licensed waste management contractor will pump out the contents of all storage tanks that were not used during the TS and disposed of appropriately. Tanks that will not be reused will be removed and offered for sale or scrap, following appropriate procedures and protocols.

*Waste Management*

All mine wastes will be handled, stored, managed and disposed of in a proper manner during the TS. As there will be no tailings and waste rock generated during this phase, the main waste sources will be from the mobile equipment such as spent fuels, domestic waste and other minor waste streams. A waste management plan will be developed during the operational phase to deal with the site waste. The wastes stored during the operational phase and the TS will be disposed of in an environmentally-sound manner, either locally or at a licensed waste management facility. Sludge from active water treatment will be deposited in the tailings facility.

Non-hazardous solid wastes (garbage) will be disposed of in an acceptable manner as per Solid Waste Regulations. Victory Nickel also may apply for a license to burn some of the waste materials on site through a Burning Permit.

### *Pipelines, Power Lines and Power Supply*

All out of service, above-ground pipelines, except for the water lines, will be cut into usable sections and offered for sale or disposed of in a proper manner. Out of service pipelines in the underground corridors will be left in place. Any underground power lines associated with the demolished buildings will be disconnected and abandoned in situ.

### *Tailings and Waste Rock Management Facility*

The management System for the Tailings and Waste Rock Maintenance Facility (TWRMF) includes tailings and waste rock impoundment and ancillary facilities. These ancillary facilities include a tailings dam, diversion ditches and collection ditches, a spillway and a seepage recovery system. The tailings are co-disposed of with ultramafic rock as shown in the Wardrop Site Plan (Figure 1.2, Section 1.0).

*Tailings Dams*

All dams will be maintained in a safe condition pursuant to Dam Safety Guidelines. with spillways left open to ensure natural drainage. A geotechnical inspection protocol will be developed for the TS, SI and ultimate closure. The inspection

protocols will be in line with the TWRMF Operating, Maintenance and Surveillance (OMS) program. Three levels of surveillance to monitor the TWRMF:

1. daily visual inspection of the TWRMF by site personnel;
2. annual geotechnical inspection of the TWRMF by a geotechnical engineer;
3. dam safety review will be completed as per Dam Safety Guidelines.

Instrumentation will be in place to assess the geotechnical behaviour of the TWRMF. The instrumentation will include but not be limited to the following:

- electric wire and standpipe piezometers to measure pore pressure in the tailings upstream of the dam;
- embankment movement points and settlement pins to measure surface deformation of the dam(s);
- weirs at the toe of the dam to estimate seepage through the dam; and
- survey levels on the decant system (e.g. towers) to measure pond water levels.

Meteorological data (temperature, rainfall, snow pack, etc.) will continue to be collected to confirm design assumptions and to establish monitoring frequency during the operational and closure phases.

*Tailings Pond*

The tailings pond will be regularly monitored to ensure that the TWRMF integrity is not compromised. The same inspection protocol will be used for the tailings management system to provide early warning measures for the facility. To minimize acid generation, adequate water cover shall be provided to the PAG rock.

*Contingency Measures*

Should these measures be insufficient to meet water quality objectives, Victory Nickel will review implementation of the contingency measures detailed in the next section.

Water quality of the collection system and discharges to the receiving environment will be monitored in accordance with the MMER, CCME Guidelines (for aquatic environment) or Site Specific Water Quality Objectives (SSQO) and Water License operating standards. If there is any significant degradation of water quality, Victory Nickel will investigate and develop contingency measures that will best achieve water quality improvements. Contingency measures intended to address upset conditions are detailed below. The measures to reduce water inputs into the water management system will include but not be limited to the following:

- reduction of clean or contaminated surface water input to the TWRMF by construction of additional diversion systems to allow more rapid flows of watershed runoff
- maintenance of the existing diversion corridors and, if required, enlargement thereof to increase water handling capacity
- monitoring of all sensitive areas.

Any bare or denuded areas will be reseeded and shrubs will be planted; areas that appear to be nutrient-deficient will be re-fertilizated. It is expected that shrubs and tree growth will occur naturally within the re-vegetated areas. All major re-vegetation tasks will occur after roads and structures are removed.

*Monitoring Program*

The permit-related monitoring program would continue during the TS phase. The program will be adjusted to account for the non-operational main waste stream for tailings slurry. The permit and non-permit related waste streams will be assessed in terms of their physical and chemical characteristics. For any parameters that exceed the stipulated thresholds, Victory Nickel will develop contingency measures to ensure that the receiving environment is protected.

*Operations, Maintenance and Surveillance*

During operations, the site will develop an Operation, Maintenance and Surveillance (OMS) manual to deal with operations facets of the TWRMF.

The preparation of an OMS Manual for the TWRMF will be one of the major components of an overall site management framework, with linkages to other aspects of the operation. It also falls under the tailings management framework suggested by the Mining Association of Canada (MAC) in 1998. The framework includes the integration of environmental and safety considerations into each stage of the life cycle of a tailings facility.

The objective of an OMS Manual is to have one lead document which will provide basic information and procedures required for the safe operation, maintenance and surveillance of the TWRMF. It will also provide reference information to enable access to pertinent technical information.

The OMS Manual will define and describe:

- roles and responsibilities of personnel assigned to the facility
- procedures and processes for managing change including to TS and SI states
- key components of the facility
- procedures required to operate, maintain and monitor performance of the facility to ensure that it functions according to its design and meets regulatory and corporate policy obligations and links to emergency planning and response and
- requirements for analysis and documentation of the performance of the facility (MAC, 2003).

### *Hazardous Materials and Lubricants*

Victory Nickel will maintain the appropriate permits to ensure compliance with conditions under the Environment Act and applicable regulations, such as the Storage Tanks Regulations, for the storage and handling of petroleum products and other hazardous substances.

*Chemicals*

All unused chemicals that have short shelf lives will be returned to suppliers/manufacturers; all other chemicals will be disposed of in an environmentally-sound manner. In the event that the TS becomes a SI, no chemicals will be stored at the site, with the exception of those required for incidental uses.

*Fuels*

Fuel supplies for equipment will remain on-site and diesel fuel tanks will remain in service during this stage. Victory Nickel will comply with the requirements under the Environment Act pertaining to storage and handling of petroleum products.

*Explosives*

All unused explosives and blasting agents will be returned to the suppliers by the explosive contractor. If considered impractical, then, the explosives will be destroyed in a safe manner consistent with the Explosives Act by the Explosive contractor.

*Chemical Wastes*

All chemical wastes will be handled, stored and disposed of according to the appropriate regulations under the Manitoba Government, (MBG) Environment Act and Special Waste Regulation. The appropriate regulations include but are not limited to the Contaminated Site Regulation, Special Waste Regulation, Solid Waste Regulation, Storage Tank Regulation and Spills Regulation.

## WATER MANAGEMENT

Schematic diagram of the water management systems for the site during TS, SI, Closure and Post Closure Stages are given in Section 12.0. The main objectives of the system will remain the same to some extent as in the TS and SI. Therefore, the water management systems will be maintained to:

- meet the MMER Water Quality standards through the treatment of effluents from various sources as per schematic diagram
- facilitate the recovery and removal of as much supernatant water as practicable from within the TWRMF during TS and SI
- allow the discharge of water to the environment only upon verification of acceptable quality. The tailings supernatant water will be directed to the polishing pond. The discharge from the polishing pond will be pumped out to the Minago River during TS and SI.

However, the TS and SI will differ from the operational water management system configuration as follows:

- the recycle loop of water to the process plant will not exist during the TS and SI and
- a small quantity of water will be pumped from the ground water wells to provide water for firefighting.

The projected flow rates based upon the information available are provide in Appendix J-1 and water quality data is given in Appendices J-2, and J-3 referenced in Section 12.0, Environmental Considerations.

#### POLISHING POND

The water quality in the polishing pond will be monitored to ensure that all discharges to the receiving environment meet the MMER discharge criteria (MMER (2002)). The MMER discharge criteria are presented in Table 13.1.

**Table 13.1 MMER End-of-Pipe Effluent Discharge Criteria**

| Contaminant of Concern | Maximum Authorized Monthly Mean Concentration | Maximum Authorized Concentration in a Composite Sample | Maximum Authorized Concentration in a Grab Sample |
|---|---|---|---|
| Arsenic | 0.50 mg/L | 0.75 mg/L | 1.00 mg/L |
| Copper | 0.30 mg/L | 0.45 mg/L | 0.60 mg/L |
| Lead | 0.20 mg/L | 0.30 mg/L | 0.40 mg/L |
| Nickel | 0.50 mg/L | 0.75 mg/L | 1.00 mg/L |
| Zinc | 0.50 mg/L | 0.75 mg/L | 1.00 mg/L |
| TSS | 15.00 mg/L | 22.50 mg/L | 30.00 mg/L |
| Radium 226 | 0.37 Bq/L | 0.74 Bq/L | 1.11 Bq/L |

During TS and SI, the influent to the polishing pond will be lower than the operational inputs to the plant. This is due to the fact that sources of effluents such as the process plant will be eliminated. Victory Nickel will develop an OMS manual for the polishing pond in order to ensure that the discharges to the receiving environment meet discharge criteria. The sludge from the polishing pond will be redirected to the TWRMF. Victory Nickel will ensure that stringent sludge handling, storage and disposal measures are implemented and are in line with the Regulations under the MB Environment Act.

### *13.1.4 MINE AND INDUSTRIAL COMPLEX*

Figure 1.2 Section 1.0 provides a general arrangement plan for the planned infrastructure at the Minago Project. This portion of the study focuses on the site components that require action upon closure of the operation and is restricted in scope towards the physical safety and stability of these features.

## CLOSURE ISSUES

### *Open Pit Mining Activities*

#### *Equipment and Materials*

All materials with marketable value will be removed from the pit workings. Materials without any marketable value, which are non-hazardous, such as piping, wood, and concrete, etc., will be left in place. Electric installation and cables will be removed. Mobile equipment such as mine trucks, drills and shovels will be removed from the pit. Equipment that cannot be sold will be disposed of in a proper environmentally – sound manner.

### *Explosives and Chemicals*

All explosives, detonators and accessories will be removed and returned to suppliers by the explosive contractor. Any remaining explosives that cannot be returned to suppliers will be disposed of in accordance with the Explosive Act by the explosive contractor.

### *Surface Openings*

All minor horizontal openings that may cause safety problems will be capped with dolomitic waste rock and the cap will be shaped to form a 2:1 (H:V) slope to ensure stability. Any waste rock piled outside the openings will be re-graded, scarified and re-vegetated.

### *Borrow Areas*

During construction, a large quantity of benign material will be required for the construction of the TWRMF and site infrastructure. The TWRMF and transportation corridors construction programs will require 2.2 million $m^3$ of construction quality limestone partly from the limestone bluff (limestone quarry). The walls of areas that have public safety issues related to the slope of the walls of the quarry will be stabilized by drilling and blasting.

Runoff from the borrow areas will be controlled with ditches, sediment fences and settling ponds during the initial years following decommissioning. The quarry will be monitored and the performance results will be evaluated and the decision will be made at the time whether the closure measures are satisfactory or not. The flats will be re-vegetated using a custom seed mixture and local plant species. The seed mixture will be developed during the operational phase as part of the research program.

### 13.1.5 WASTE ROCK DUMPS

#### CLOSURE ISSUES

Waste rock from the mine will be end-dumped at a designated area – either the TWRMF (ultramafic rock will be co-disposed of with tailings), dolomitic dump and country rock dump. The material quantities expected at closure are given in Table 13.2.

**Table 13.2 Projected Quantities of Various Materials at the End of Mine Life**

| Material Quantities at Closure | | Density ($t/m^3$) | Volume (in-situ $m^3$) | Volume (swelled $m^3$) |
|---|---|---|---|---|
| Swell Value | 30% Tonnes (kt) | | | |
| Ore | 25,166 | 2.612 | 9,634,697 | 12,525,106 |
| Frac Sand | 14,847 | 2.400 | 6,186,065 | 8,041,885 |
| Waste Rock | 122,005 | 2.702 | 45,148,004 | 58,692,405 |
| Ultramafic Waste | 35,659 | 2.590 | 13,767,708 | 17,898,020 |
| Overburden Material | 11,217 | 1.856 | 6,044,945 | 7,858,428 |
| Limestone | 111,032 | 2.790 | 39,797,437 | 51,736,668 |
| Total Waste (Rock Dump) | 268,695 | | 98,713,149 | 128,327,093 |
| Overall Total | 319,924 | | 120,578,855 | 156,752,512 |

### 13.1.6 TAILINGS MANAGEMENT FACILITY

The layout of the Tailings and Waste Rock Storage Facility complete with associated appurtenances is given in Figure 1.2, Section 1.0. The facility will store 25.1 and 35.6 Mt of tailings and ultramafic waste rock, respectively.

The water balance studies performed by Wardrop shows that the facility will operate with a net water surplus. In order to minimize the amount of runoff from entering the TWRMF, Victory Nickel will install diversion ditches along the upland flank of the tailings impoundment. In addition, a seepage recovery ditch will also be installed to capture leakage through TWRMF.

Tailings supernatant waters will be discharged to the polishing pond before the water is discharged into the receiving environment. An emergency spillway will also be maintained during mining operations to allow discharge of water under severe storm conditions.

The tailings are non-acid generating (NAG). The ultramafic waste rock is potentially acid generating (PAG) and is expected to be disposed of under the planned closure

scenario, with the tailings under a "wet" closure, to avoid ARD or ML from the ultramafic rock store in the TWRMF. A permanent water cover is proposed in order to keep the materials saturated. Tailings and ultramafic waste rock geochemical characterization data are covered in Section 12.0.

## GENERAL

The tailings (NAG) and ultramafic rock (PAG) will be disposed of in the TWRMF to mitigate ARD. The wet closure option calls for maintaining a minimum of 1 to 2 metres of water cover.

### *TWRMF Description*

The TWRMF consists of a tailings dam (storing tailings and ultramafic waste rock), a seepage recovery dam, seepage collection ditches, a spillway and a polishing pond. The general layout of the TWRMF is shown in Site Plan given in Figure 1.2, Section 1.0. The TWRMF will have a capacity to store tailings and ultramafic waste rock in the order of magnitude of approximately 25 Mt and 36 Mt respectively. The estimated volume for the tailings and ultramafic waste rock is 40 million $m^3$.

## CLOSURE ISSUES

The long-term physical stability of the tailings embankment and the geo-chemical stability of the ultramafic waste rock are the key items that have been addressed in this closure plan. The key physical stability issues are associated with potential design flood and seismic events. The only chemical stability issues associated with the waste rock in the TWRMF is the fact that these materials are PAG as described above.

### *Physical Stability*

The design earthquake selected for the tailings dam was based on the Canadian Dam Safety Guidelines (CDA 1999). The tailings impoundment is classified as a Significant/High Consequence Facility, the annual probability of exceedance of horizontal peak ground acceleration is chosen as 0.001, corresponding to a return period of 1,000 years. For the seepage recovery dam, the annual probability of exceedance of horizontal peak ground acceleration is selected as 0.0021, corresponding to a return period of 475 years, as no tailings are stored behind the dam Additional information on Geotechnical issues is given in detail in Section 4.0, Geotechnical Issues.

### *Flood*

Selected design flood criteria for water management for the surface water diversion ditches, starter dam and staged raised emergency spillway, tailings dam closure

spillway, seepage collection ditches and seepage recovery pond spillway are 100, 200, 10000, 100 and 100 years, respectively. The above design criteria are therefore, expected to be adequate to protect the integrity of the TWRMF that might be caused by flood events.

### *Chemical Stability*

The ultramafic waste rock that will be stored in the TWRMF has the potential to generate acid (PAG). If left uncontrolled, the discharge will have a detrimental effect on the environment. In order to control ARD/ML, a water cover was selected as the design basis for the TWRMF. Therefore, the TWRMF is designed as a water–retention structure and a wet balance is to be maintained in the impoundment during the operational, TS, SI and closure phases. The minimum water cover depth required within the impoundment to limit oxygen ingress and hence prevent the onset of ARD, is a function of the site water balance considering direct precipitation, run-in to the pond, pond evaporation and seepage losses. A minimum water depth capable to prevent de-saturation of the tailings during a 1:100 year dry-year hydrological event has been selected as the design criteria. In general, the minimum water cover could be expected to be approximately 0.5 m. As the submerged beach will slope towards the centre of the pond, there could be in the order of 2 metres of water cover at the lowest point. During operation, the Project will develop a tailings and coarse waste rock deposition plan to ensure that all wastes are submerged.

During TS, SI and closure phases, best efforts will be made to ensure a water cover is maintained to limit the formation of ARD. The water cover will address the chemical stability problems associated with the geochemical nature of the tailings and coarse waste rock. The tailings pond natural catchment area will be maintained to provide the required water balance. During operation, Victory Nickel will undertake a sensitivity analysis on the water balance for the tailings impoundment after mine closure to explore the condition of water during dry year or other return periods.

### *Tailings Embankments*

During the TS and SI, the tailings embankments will be maintained and inspected as per the TWRMF OMS manual. The site will develop an OMS to ensure the structural integrity of the embankments is protected. The embankments will be maintained at all stages to provide water cover for the mitigation of ARD/ML.

### *Dust Control*

Redundant components associated with the TWRMF, will be decommissioned and re-contoured; where needed, a nominal 300 mm cover of soil will be placed over the areas to control dust and provide a growth medium for re-vegetation. The soil will consist of locally available overburden with sufficient amounts of fines for seeding and planting

### *Interceptor Ditches*

Redundant interceptor ditches associated with the TWRMF will be breached and regraded to restore the ground to erosion resistant drainage patterns.

### *TWRMF Pond Decant System*

The decant system and its accessories will be maintained and inspected during the TS and SI. However, the decant system will be removed during closure and post closure phases, and supernatant water will gravity-flow to the polishing pond from the spillway. The TWRMF will be inspected during the initial stage of closure, expected years 1-3) and post-closure expected years 4 to 6 phases to ensure that it operates as per design criteria.

### *Tailings Pipelines*

During the TS and SI stages, the high density polyethylene (HDPE) tailings pipelines will be left in place and will be maintained to ensure that they are operable when operations resume.

During the closure and post closure phases, the HDPE pipelines will be removed and stored on site for future use and those sections that are of poor quality will be disposed of in a proper manner. All drop boxes will be removed.

### *Spillway*

The spillway is designed to allow the safe passage of flood water without overtopping the tailings dam under extreme design hydrological events. The spillway will be maintained during the TS, SI and closure phase to ensure that it performs as per design intent and criteria. The spillway approach channel to the polishing pond will be maintained to ensure the coarse-grained material used to provide cover to prevent local re-suspension of tailings solids is in working order. The spillway crest and side slopes will be covered by a riprap.

### *Seepage Recovery Ditch*

The seepage recovery pond will be maintained and inspected on a regular basis during the TS, SI, and closure and post-closure phases.

## OVERALL APPROACH TO THE TWRMF MANAGEMENT

The overall operation of the tailings management system during the operational phase, TS, SI, closure and post closure stages will be reviewed periodically by a competent person to ensure that the TWRMF component are functioning as per design criteria and intent. In addition, prior to decommissioning, a comprehensive plan for decommissioning will be developed and submitted to the Government of

Manitoba for review and approval and all subsequent decommissioning activities will be carried out according to the approved plan.

### 13.1.7 INFRASTRUCTURE: BUILDINGS, STRUCTURES AND SERVICES

The infrastructure, including buildings, structures and services, will be left in place during the TS and SI stages. However, the redundant infrastructure will be decommissioned and disposed of in an appropriate manner. Closure issues related to infrastructure include public health and safety, site stabilization aesthetics and restoration of disturbed lands.

Site decommissioning will include the removal of all constructed infrastructure materials, with the exception of concrete foundations which will be demolished and buried in situ. This will be accomplished using internal resources and contractor demolition companies. It is expected that there will be salvage value for much of the materials, particularly structural steel and other crushing, grinding and processing equipment from the mill. The residual values of the mining and milling equipment and materials may be used to offset closure costs.

In all cases, concrete foundations and other concrete structures will be broken down to ground level and buried.

Equipment with marketable value will be removed first; the remaining facilities and equipment will be assessed for disposal through demolition and salvage contracts. It is not possible to accurately predict the residual values of the non-reclamation assets at the time of closure; values have instead been assumed based on current market conditions. Milling and mining equipment are expected to carry significant salvage value that can be used to offset closure costs. Material that is not economically salvageable will be buried in an on-site refuse landfill.

At the time of closure, the following infrastructure will remain in place to support post closure care and maintenance.

- local access roads to the base camp and water treatment plant
- reclamation equipment such as trucks, dozer and snowmobile machine
- water management systems
- fuel storage facility
- small power generating facility
- small maintenance workshop
- limited accommodations
- environmental laboratory
- communication system.

The above facilities will be decommissioned when will be no longer required.

### CONCENTRATOR BUILDING (MILL BUILDING)

The concentrator building will be maintained during the TS, SI stages and will be decommissioned during the closure phase.

The ore concentrator (the “mill”) is comprised of the mill building itself, the crusher house, grinding, flotation and dewatering systems, conveyors and truck load out facility. All buildings will be made from steel and constructed on concrete slab flooring. The mill building itself will house what is expected to be the most marketable components from a salvage perspective, especially the crushing and grinding circuits and structural steel, as well as other scaffolding and processing equipment.

Buildings and equipment that are not be salvaged will be demolished and the debris will be hauled for burial in the refuse landfill on site. The concrete foundations will be demolished to ground level and the rubble will be buried in situ after being covered.

### MAINTENANCE SHOP

The maintenance shop will be maintained during the TS and SI stages, and demolished and removed upon closure. Debris will be hauled to the refuse landfill.. The foundation will be demolished to ground level and buried on-site with approximately 300 mm of native soil material.

### THE CAMP

The 300-person camp will consist of sleeping units, ablution units, communal cafeteria style kitchen and limited indoor recreational facilities. The modular units will factory-built to minimize construction time on site. Few of the sleeping units will be occupied during the TS and SI phases, since there will be a limited number of people on site for care and maintenance. These will be secured until closure when they will be removed from the property and sold.

### EXPLOSIVE MAGAZINES

Explosives magazines will be either returned to suppliers for credit, or shipped to other nearby mines that may use the explosives. Unused explosives will be checked and either returned to the supplier for credit or destroyed through appropriate procedures. Detonation devices will be returned to the supplier for credit. In all cases, the explosives will be handled, transported and disposed of in accordance with the Explosive Act.

#### MISCELLANEOUS BUILDINGS AND STRUCTURES

Miscellaneous buildings and structures that will not be required during TS and SI stages will be decommissioned and demolished. During the closure phase, all miscellaneous buildings and structures will be demolished and the debris disposed of in an environmentally sound manner.

Fuel tanks will be hauled away and sold. Fuel berks will be re-contoured, the liner removed and hauled to the refuse landfill on site. The back-up diesel generators will be removed for salvage. The power transformers and power line will be removed for salvage; power poles will be destroyed or removed for salvage based on their condition. Fencing will be demolished and buried on site.

### *13.1.8 INDUSTRIAL REAGENTS AND WASTES*

Table 13.3 provides the details of closure measures and disposal methods for the industrial reagents.

**Table 13.3 Reagents and Flocculants in the Mining and Milling Process**

| Reagents | | Other Name | Use | Target | Closure Measures |
|---|---|---|---|---|---|
| CMC | Carboxmethyl Cellulose | Wood product (used to make creamy soups) | Depressant | Depressant for Talc (MgO) coats talc particles to make them hydrophilic | 1 |
| PAX | Potassium Amyl Xanthate | | Collector | Collector for minerals coats mineral particles to render them hydrophobic so that they are attracted to air bubbles and reject water | 1 |
| SHMP | Sodium hexametaphophate | Calgon (water softener) | Dispersant | Dispersant for Talc keeps talc particles from adhering to mineral particles | 1 |
| MIBC | Methyl isobutyl carbinol | Similar to dish soap | Frother | Frothing agent to create stable froth bubbles in flotation cells to float metal particles | 1 |
| Flocculant (Tails) | Anionic polyacrylamide | Used in water treatment | Coagulant | Used in thickeners and clarifiers to collect particles so that they will agglomerate and sink | 1 |
| Flocculant (Conc.) | Anionic polyacrylamide | Used in water treatment | Coagulant | Used in thickeners and clarifiers to collect particles so that they will agglomerate and sink | 1 |

1 = Return to the Supplier or destroy in and environmentally-sound manner.

## MILL REAGENTS

Some chemicals and mill reagents will be more likely than others to be sold. These chemicals and reagents as shown in Table 13.3 will be shipped and stored in the concentrator in kilogram barrels. Storage of reagents in the mill provides containment within a concrete foundation in the event of leakage or fire.

### OTHER CHEMICALS

Other chemicals such as solvents, paints, cleaners, and battery acid will be removed and:

- returned to the original supplier for credit and reuse
- given to a third party user, subject to meeting the MBG Environment Act or
- removed from the mine site and disposed of through a licensed waste management firm. In such an event, the disposal will only take place following consultation with and approval from the appropriate regulatory authorities.

Waste vehicle batteries will be segregated and stored in a containment area for periodic shipment to a licensed battery disposal facility.

### SEWAGE SYSTEM

Upon closure the septic system will be pumped out and de-sludged. The sludge will be deposited in the TWRM. The remaining infrastructure (i.e. piping and related materials, including the septic field) will be buried on-site.

### FUELS AND LUBRICANTS

It is expected that the inventory of hydrocarbon products at the Minago Project will be consumed as mine operations are brought to a close. Fuels and lubricants will be required during the closure phase.

The inventory remaining on-site once all activities have ceased will be:

- returned to the original supplier for credit wherever possible
- sold to a third-party user
- trucked to an authorized disposal agency to be recycled or destroyed.

Diesel-powered vehicles and the back-up diesel-fired electrical generators will provide Victory Nickel with a method of reducing remaining inventory of diesel fuel as the mining operations cease. Excess gasoline storage facilities will be removed and disposed of in an approved manner. The bulk diesel fuel storage tanks will be emptied of their contents in accordance with the Manitoba Environment Act. Tanks too large to be removed will be cleaned by a licenced waste management company. The sludge will be treated or removed in accordance with regulations. The cleaned tanks will then be salvaged, or buried on-site in the landfill.

Rental propane tanks will be removed by the propane supplier. Associated fuel delivery lines will be removed and disposed of in a manner similar to that of the gasoline and diesel fuels.

Victory Nickel plans to return unused hydrocarbon products, such as hydraulic fluids, lubricant oils, greases, antifreeze and solvents, to suppliers for reuse or sale. In certain circumstances, small volumes of specialized products may require disposal through a licensed waste management firm.

During the final site assessment, hydrocarbon contaminated soils will be isolated and processed for remediation. Any fuel storage areas and refuelling stations, once decommissioned, will then be assessed for soil contamination. The contaminated soils may be removed from the mine site and disposed of through a licensed waste management firm. Alternatively, the soil land may be farmed in cases where bioremediation will effectively clean the soils. In either case, the selected disposal method will be in accordance with the Provincial Environment Act and Special Waste Regulation.

#### SCRAP METAL

Scrap equipment will be stored in various lay-down areas located within the industrial area. At the time of mine closure, salvageable material from these sites will be sold as scrap and removed from the site. Materials that have no scrap value will be disposed of in the landfill on site. Prior to disposal in the landfill, all of the materials will be examined to ensure that all hazardous materials have been removed and disposed of in an environmentally sound manner.

#### SITE LANDFILL (GARBAGE DISPOSAL AREA)

The landfill on site will be used for the disposal of non-putrescible wastes, such as lumber and scrap metal, that have no salvage value. Where permitted, the combustible wastes in the landfill area will be burned and the non-combustible debris will be buried under a soil cover. Final demolition and reclamation of the site will generate some non hazardous waste material that will be disposed of in the landfill area. The landfill area will be reclaimed with a 300 mm thick layer of compactable soil material obtained from overburden dump. The landfill will be graded to prevent pooling of precipitation runoff and to encourage the shedding of water. The site will then be re-vegetated.

### *13.1.9 LAND RECLAMATION AND LAND USES*

#### PRE-MINING AND CURRENT LAND USE

Existing land use for the project area consists largely of wildlife habitat with some limited hunting, trapping and fishing. Land uses for TS, and SI phases will be the

same as those for the operational phase. The recreational capability of the area is limited by poor accessibility due to presence of muskegs and soft clays, excessive snow depths and prolonged climatic winter conditions.

At present there are no agricultural activities in the area. Soil capability for agriculture is restricted by climatic limitations including short growing season and wetland conditions.

### POST-MINING LAND USE

Reclamation plans will be developed to return the site to a condition that will support wildlife uses, which in a large part centres on the deactivation of access corridors and surface openings. The projected end land use is qualified by the fact that the site experiences significant snow depths, prolonged winter climatic conditions and isolation from large population centres. There will be no losses of valuable aquatic habitat during the operational, TS, SI and closure phases.

The project area does not have any significant marketable timber and therefore, commercial harvesting of timber from the claims area in the future is unlikely. Consequently, lands within the project area are classified as having low forestry capability.

### LAND RECLAMATION

The primary objectives of land reclamation will be to provide short and long-term erosion control, to ensure land uses compatible with surrounding lands, and to create a self-supporting ecosystem. The overall goal is to prepare the site so that the vegetation returns to a state as near as possible to that in existence prior to mining activities.

This section describes the areas projected for reclamation, and the closure constraints and measures proposed.

Willows and graminoids are the predominant plant species found near the Project area. An initial ground cover of graminoids will stabilize slopes and control soil erosion. Victory Nickel will determine the availability of natural seed or productive seed material available from local surroundings for the reclamation of the disturbed areas. The natural vegetation found on undisturbed sites around the project area generally indicate the underlying soil properties, including texture, drainage, and pH, and the level of available nutrients.

Re-vegetation seed mixtures will be formulated using knowledge of the naturally occurring vegetation and soil conditions. Additional soil samples on the disturbed areas will be required to determine areas of localized nutrient deficiencies. Further to soil sampling, experimentation with seeding and fertilizer rates will be carried out at the property to determine the optimum mixes for preventing seeded species from

becoming too firmly established which will in turn inhibit the invasion of the area's natural colonizing species.

The nutrient uptake by northern native seed varieties on nutrient deficient soil is usually more effective than nutrient uptake by southern agronomic species. Seeding with agronomic species at the site may be required due to high cost and limited availability of northern native re-vegetation species.

To determine whether wildlife are exposed to metal poisoning, Victory Nickel will test various site plant species for metals uptake to assess if there are any potential concerns of ingestion of the plants by grazing and/or browsing animals.

In order to establish a successful re-vegetation program, Victory Nickel will initiate a methodical program to confirm:

- an inventory of overburden dump soils around the site for reclamation cover.
- the nutrients in available soils to determine level of amendments required.
- optimum seed mixes to determine appropriate seed mixes for reclamation.
- the potential metals uptake by the plants.

These studies are expected be implemented during the operational phase to establish the recipe for progressive reclamation and closure. Victory Nickel plans to develop field test trials and test plots as part of the assessment.

In large areas, such as the industrial areas, where natural seed sources are less available, the seeding/planting of indigenous shrub species (primarily willow, birch and alders) may be required to encourage the later stages of plant succession on these sites. Shrub species will be planted concurrent to the re-vegetation program.

### 13.1.10 EFFECTS ASSESSMENT METHODOLOGY

The objective of this assessment is to predict project and cumulative effects of the Minago Project on vegetation; to identify mitigation measures to both minimize adverse effects and associated impacts to vegetation and wildlife habitat; and to support sound project design.

### 13.1.11 PROJECT RELATED EFFECTS

Project development will involve the following new clearing or other vegetation disturbance as set out in Table 13.5. Disturbed sites will include flat sites in or to close to the natural muskeg, which is poorly drained/saturated and organic. Generally, flat sites that are poorly drained/saturated have a lower organic matter and plant nutrient content than the muskeg sites, and may also be compacted. In addition there may be rocky, well-drained sites with little or no organic matter, little or

no plant nutrients, and low water holding capacity. The affected vegetation areas do not involve species at risk. Any useful timber will be harvested or salvaged during clearing, and will be made available to the nearby communities for use as firewood. The forested areas will also be prepared to facilitate natural re-vegetation at mine closure.

The only permanent vegetation losses will be the areas occupied by the waste rock dumps, the TWRMF, the pit area and (to some extent) the overburden dump. Victory Nickel will exercise reasonable efforts to re-vegetate the industrial area after all buildings have been decommissioned and the waste rock dumps and all access roads are no longer required. After mine operations cease, the pit will be left to flood, tailings and ultramafic rock contained in the TWRMF will be submerged under 1 -2 metres of water, and the polishing pond will receive discharge from TWRMF and eventually will naturally turn into a wetland.

### 13.1.12 CUMULATIVE EFFECTS

Currently, there are no other projects planned in the vicinity of the Project site.

### 13.1.13 MITIGATION MEASURES

Erosion and sedimentation caused by work-related activities will be minimized by managing onsite runoff. Erosion and sedimentation control will involve:

- minimizing the disturbance to vegetation and limiting the area of clearing
- installation of sediment control measures (silt fences, sediment traps, etc.) before starting work
- regular inspection and maintenance of sediment control measures
- minimizing the length of time that unstable erodible soils are exposed
- conveying sediment-laden or turbid runoff into settling ponds or vegetated areas and
- stabilizing erodible soils as soon as practical by seeding, re-vegetation or installing erosion control blankets.

The primary mitigation measures regarding vegetation involve land reclamation and re-vegetation of the Minago Project property to provide short- and long-term erosion control, to ensure that end land use is compatible with surrounding lands, and to leave the area as a self-supporting ecosystem. The overall goal will be to prepare the site so that the vegetation returns to a state as near as possible to that in existence prior to mining activities by modifying site features where necessary and by facilitating ”natural” reestablishment of indigenous vegetation and productive habitat for wildlife. Victory Nickel will develop a reclamation plan during the operational phase for the Project site to specify appropriate reclamation techniques for the

different types of conditions identified. Reclamation techniques will include site preparation (such as scarification), planting or seeding techniques, specification of suitable planting stock or seed mix(es) for re-vegetation, and specifications for fertilization if required. Best periods for planting/seeding will be determined. The progressive reclamation plan will also detail stockpiling techniques for muskeg and surface soils that will be removed during the construction and operation of site facilities to ensure their viability as top soils.

The Project reclamation plan will include the identification and amelioration of physical environmental impediments to restoration. The plan will ensure low side slope angles for waste rock dumps (2.5H: 1V), ripping/scarifying of compacted surfaces prior to replanting/re-vegetating; recontouring and scarifying of decommissioned roads and borrow pits if necessary. The goal is to facilitate the reestablishment of native vegetation; and where possible, applying of organic matter such as peat/muskeg stockpiled in the initial construction phase to nutrient and organic matter deficient sites. Stockpiled top soil/muskeg will be spread, where available, to facilitate re-vegetation and to increase the organic matter content and water holding capacity of disturbed sites.

The re-vegetation program will include a research component that will identify the most suitable local species and reclamation techniques for the range of disturbed sites that will need to be reclaimed and re-vegetated, including the waste rock dumps. The research component will include the installation of field test plots established on representative disturbed site conditions to evaluate the vegetation's rate of establishment, growth, and nutrient and metal status as well as its suitability as wildlife habitat. The Project's reclamation plan will be based on the results of the research component, and will incorporate a progressive reclamation strategy for disturbed areas that will no longer be used for site operations. Whenever possible, local, native planting stock and seed mixes will be used to ensure a high success rate of the re-vegetation program and compatibility with surrounding lands. Freshly re-vegetated or reseeded sites will also be protected from further disturbance by humans by posting signs and/or restricting access where possible for example with soil or rock roadblocks. Restricted access will allow seedlings to become established.

## CURRENTLY ESTABLISHED AND POTENTIAL RE-VEGETATION SPECIES

To identify potential, local and native re-vegetation species, the established shrub and vascular herb strata were reviewed Succession studies reported in the literature identified pioneer vegetation species and their seed dispersal capability, reproductive capabilities, and timeframes for establishment. The established shrubs and herbs in the dominant in tree and shrub units are summarized in the next Section.

### *Established Shrubs and Herbs in the Tree and Shrub Units*

The currently-established shrubs and herbs in the dominant in tree and shrub units are summarized below based on the vegetation baseline studies conducted at Minago Project.

In the Intermediate Closed Evergreen Tree (IB1c) unit (Table 13.4), encountered on 34% of the Minago Project site, the shrub stratum was composed of diamond leaf willow (Salix planifolia), green alder (Alnus crispa), and small paper birch (Betula papyrifera) found primarily atop the hummocks. The herb stratum was fairly diverse, but was dominated by sedges (Carex sp.), bluejoint reedgrass (Calamagrostis canadensis), and arrow-leaved TWRMF (Petasites sagittatus) (URS, 2008d).

In the Dwarf Open Evergreen Tree (IB2e) unit (Table 13.4), encountered on 25% of the site, the shrub stratum was dominated by shrub birch (Betula glandulosa), bog rosemary (Andromeda polifolia), and small bog cranberry (Oxycoccus microcarpus). The herb stratum was dominated by sedges (Carex sp.) and buckbean (Menyanthes trifoliata) (URS, 2008d).

In the Dwarf Closed Evergreen Tree (IB1e) unit (Table 13.4), encountered on 14% of the site and located on poorly-drained soils, the shrub stratum was dominated by shrub birch (Betula glandulosa), bog rosemary (Andromeda polifolia), and small bog cranberry (Oxycoccus microcarpus). Sedges (Carex sp.) made up most of the herb layer (URS, 2008d).

In the Intermediate Open Evergreen Tree (IB2c) unit (Table13.4), encountered on 7% of the site, the shrub stratum was dominated by shrub birch (Betula glandulosa), Labrador tea (Ledum groenlandicum), and diamond leaf willow (Salix planifolia). The herb stratum was dominated by sedges (Carex sp.) and buckbean (Menyanthes trifoliata) (URS, 2008d).

The Intermediate Open Deciduous Shrub (IIA2c) unit (Table 13.4), encountered on 8% of the site and located on poorly-drained soils, the dominant shrubs were shrub birch (Betula glandulosa) and tall blueberry willow (Salix myrtillifolia var. cordata). The herb stratum was dominated by swamp horsetail (Equisetum fluviatile) and bog sedge (Carex magellanica) (URS, 2008d).

The Intermediate Sparse Deciduous Shrub (IIA3c) (Table 13.4), encountered on 6% of the site and was located on very poorly-drained soils, the dominant plant in the shrub stratum was myrtle-leaved willow (Salix myrtillfolia). The herb stratum was dominated by beaked sedge (Carex utriculata) and water sedge (Carex aquatilis) (URS, 2008d).

### *Potential Re-vegetation Species*

Based on the review of currently established shrub species in the previous Section, green alder (Alnus crispa), willows (Salix spp.), and potentially paper birch (Betula papyrifera) and/or shrub birch (Betula glandulosa) appear to be candidates for

successful re-vegetation at Minago Project (Table 13.5). All of these species have been successfully used or recommended at other sites for the purposes of reclamation and re-vegetation (Densmore et al., 2000; Smyth and Butler, 2004; Geographic Dynamics Corp., 2002; Strathcona County, 2008).

**Table 13.4 Potential Re-vegetation Species Based on Currently Established Vegetation**

| Vegetation Classification | Current Site Coverage at Minago Project | Currently Dominant Shrubs | Currently Dominant Herbs |
|---|---|---|---|
| Intermediate Closed Evergreen Tree (IB1c) | 34% | green alder (*Alnus crispa*), paper birch (*Betula papyrifera*) | bluejoint reedgrass (*Calamagrostis canadensis*) |
| Dwarf Open Evergreen Tree (IB2e) | 25% | shrub birch (*Betula glandulosa*) | sedges (*Carex* sp.) |
| Dwarf Closed Evergreen Tree (IB1e) | 14% | shrub birch (*Betula glandulosa*) | sedges (*Carex* sp.) |
| Intermediate Open Deciduous Shrub (IIA2c) | 8% | shrub birch (*Betula glandulosa*) | swamp horsetail (*Equisetum fluviatile*) |
| Intermediate Open Evergreen Tree (IB2c) | 7% | shrub birch (*Betula glandulosa*) | sedges (*Carex* sp.) |
| Intermediate Closed Evergreen Tree (IB1c) | 34% | diamond leaf willow (*Salix planifolia*) | sedges (*Carex* sp.) |
| Intermediate Open Evergreen Tree (IB2c) | 7% | diamond leaf willow (*Salix planifolia*) | sedges (*Carex* sp.) |
| Intermediate Open Deciduous Shrub (IIA2c) | 8% | tall blueberry willow (*Salix myrtillifolia* var. *cordata*) | bog sedge (*Carex magellanica*) |
| Intermediate Sparse Deciduous Shrub (IIA3c) | 6% | myrtle-leaved willow (*Salix myrtillfolia)* | beaked sedge (Carex utriculata) and water sedge (Carex aquatilis) |

Out of these potential re-vegetation species, green alder and willows will be used for the reclamation program at the Project.

Green alder seedlings will be planted throughout the site to result in an approximate density of 0.1 alder per square metre, and willows in islands amongst the alders to facilitate their establishment and seed dispersal as soon as possible (progressive re-vegetation). It is anticipated that there will be approximately one willow island consisting of 50 stems per hectare. A custom seed mix will also be developed or obtained to seed small areas prone to erosion or areas for which re-vegetation with shrubs is not suitable (e.g. shoulders of access roads that will remain trafficable)

*Alnus crispa (Green Alder)*

Alnus crispa (= Alnus viridis ssp. crispa), a common alder species at Minago Project, is useful for re-vegetation projects. Green Alder grows growth on harsh sites, their ability to fix nitrogen, easy seed collection, and simple propagation make alder the species of choice for many re-vegetation projects (Densmore et al., 2000). Planting container grown seedlings is typically the most efficient, because on disturbed sites with very poor soils, alders tend to have trouble getting started from seed, but will grow well once they are established (Densmore et al., 2000).

To obtain green alder planting stock for Minago Project, potential nurseries in Manitoba and Saskatchewan, and Alberta will be contacted. Victory Nickel will collect green alder cones, if no suitable planting stock is available for the Minago Project site from potential suppliers. The collected cones will be kept dry and warm to ensure complete drying of the seeds. Seeds will then be collected from the dried cones, kept in sealed plastic bags and stored in a freezer until use. Alders form root nodules that contain the microorganism Frankia sp., which fix nitrogen, and convert it to a form of nitrogen usable by plants.

If treated and planted appropriately, survival rates of alders are usually very high (> 95%) after 5 years for container grown alder seedlings, with a growth of 1 m in 3 years (Densmore et al., 2000).

*Salix spp. (Willows)*

Willows typically produce numerous seeds, which are dispersed for kilometres by wind, and they will establish naturally from seed on all disturbed sites suitable for willow growth (Densmore et al., 2000). Willows (Salix spp.), when grown alongside alders, will use some of the nitrogen fixed by the alders, which promotes growth of willows on soils where soil nitrogen is low. To speed up the restoration process at Minago Project, willows will be planted alongside green alders in clumps (vegetation islands) on the disturbed sites. To protect the genetic integrity of the Minago Project site, willow cuttings will be collected from the site and its vicinity. Most willows are adapted to root rapidly after stems are buried by flooding and have dormant root buds all along the stems. These buds, called preformed root initials, are formed in each year's new shoot growth and are covered by wood in subsequent years. As not

all willows root readily from root initials, only willows will be selected for the reclamation at Minago Project that will grow readily from root initials and are acclimatized to the site conditions. Cuttings will be 1.0-2.5 cm in diameter at the base and 25-45 cm in length. Each cutting will at least have one leaf node or bud. The node is the place where shoots originate, and without a node, the cutting will not grow.

The re-vegetation program will rely mainly on dormant willow cuttings. Dormant willow cuttings are typically preferred for re-vegetation because they have higher carbohydrate reserves and can be stored frozen for long periods of time. Cuttings can be stored in a freezer or under snow and sawdust (Densmore et al., 2000). Once the air temperature rises above freezing in the spring, the cuttings will be planted as soon as possible. If not planted, the quality of the cuttings will deteriorate as melting snow will thaw the cuttings after which the cuttings will start using the stored carbohydrates, which they will also need for establishing themselves on a disturbed site.

It is anticipated that willow cuttings will be planted in shallow holes at an approximate angle of 45°. The planting holes will be deep enough to bury the cuttings and allow 5-8 cm of the cuttings to protrude above the soil surface. Willow cuttings will be fertilized with a slow release fertilizer or fertilizer tablets designed for trees and shrubs. The fertilizer will be placed at the bottom of the hole, but will not touch the cutting. Each planted cutting will be watered, if possible. Typically, willow cuttings root in 1-3 weeks. Growth rates of 0.5 m per year are considered good. Moose and snowshoe hares often browse planted willows (Densmore et al., 2000).

### *Custom Seed Mix*

A custom seed mix will be developed or obtained to seed small areas prone to erosion or areas for which re-vegetation with shrubs is not suitable (e.g. shoulders of access roads that will remain trafficable). An effort will be made to source local and native seed mixes. Due to the remote site location, suitable seed mixes for the climatic and soil conditions at the Project site may not be commercially available. An “autumn seed blitz technique” (Densmore et al., 2000) may be used in the event that suitable seed mixes cannot be easily sourced,

The autumn blitz technique involves harvesting a variety of seeds near the disturbed area, and may also involve sowing them immediately on the disturbed areas. In the autumn seed blitz technique, seeds are collected from a variety of plants that are ripe. Seeds must be dry on the plant. Whole seed heads may be collected for later separation of individual seeds from the seed heads.

By swamping a disturbed site with seeds from a variety of native species, prevailing site conditions will determine which species will survive. This technique usually provides cover and high species diversity, especially if sown seeds are raked into the soil and fertilized to enhance seed germination (Densmore et al., 2000).

### 13.1.14 MONITORING AND FOLLOW-UP

The re-vegetated areas will be subject to scheduled periodic inspections for the first five years, in order to track the re-vegetation success and to make adjustments to the program as required. Success of the re-vegetation program will be determined by measuring a number of aspects including growth, survival, density and diversity of perennial species, metal uptake in vegetation, and the inspection of native plant invasion. Monitoring locations will include randomly located plots within areas representative of the reclaimed lands. A number of transects will also be established permanently across selected disturbed sites to assess native species ingress. The monitoring will be continued until the ecosystem has been self-regulating for some period of time.

Monitoring reports will be submitted to the regulatory agencies and communities of interest as required to obtain feedback on the success of the reclamation program.

A summary of projected spatial disturbances for the project are given in Table 13.5.

**Table 13.5 Summary of Projected Spatial Disturbances for the Minago Project**

| Component | Area | Units |
|---|---|---|
| Industrial Complex (Buildings) | 4.2 | ha |
| Transportation Corridors and Access Road | 40 | ha |
| Dolomite Waste Rock Dump | 191 | ha |
| Country Rock Dump | 301.4 | ha |
| Polishing Pond | 75 | ha |
| TWRMF | 219.7 | ha |
| Overburden Dump | 300 | ha |
| 300 Person Camp | 2.4 | ha |
| Total | 1133.3 | ha |

The proposed reclamation measures for the disturbed areas are provided in Table 13.6. For costing purposes, seed mixes for linear development; and for landfill and borrow pit areas were selected and are provided in Table 13.7 and Table 13.8.

**Table 13.6 Proposed Land Reclamation Measures**

| Component | Approach |
|---|---|
| Slope on Side of the Tailings Pond | Seeded with shallow rooted grass |
| Landfill | Decommission and cover the dump with a 300 mm soil layer and re-vegetate |
| Quarry and other Borrow Areas | Scarify, recontour and re-vegetate |
| Access Road and other Transportation Corridors | Will be deactivate |
| Tailings/Reclaim Pipelines | Remove the pipelines and scarify and re-vegetate |
| 300 Person Camp | Demolish portions of the camp when needed and reclaim the area and remove for sale |
| Industrial Area | Isolate contaminated areas and demolish buildings and infrastructure and scarify, recontour and re-vegetate |
| TWRMF | Maintain operational spillway and construct exist channel at the discharge end of the Polishing Pond |
| Organic Material Stockpile | Remove material, assess for soil contamination and reclaim |
| Haul Roads | Stabilize slopes and re-vegetate and fertilize |

**Table 13.7 Proposed Seed Mixes for Linear Development**

| Agronomic Selections | | Native Alternatives | |
|---|---|---|---|
| **Type** | **kg/ha** | **Type** | **kg/ha** |
| Red top (Agrostis gigantea) | 4 | Red top (Agrostis gigantea) | 2 |
| Meadow foxtail (Alopecurus pratensis) | 6 | Meadow foxtail (Alopecurus pratensis) | 3 |
| Smooth brome (Bromus inermis) | 8 | Violet wheatgrass (Agropyron violaceum) | 5 |
| Sheep Fescue (Festuca ovina) | 4 | Sheep Fescue (Festuca ovina) | 2 |
| Creeping red fescue (Festuna rubra) | 3 | Tufted hairgrass (Deschampsia caespitosa) | 2 |
| Fowl bluegrass (Poa palustris) | 6 | Glaucous bluegrass (Poa glauca) | 3 |
| Alfalfa (MedicaOakley sp.) | 3 | Mackenzie's hedysarum (Hedysarum mackenzii) | 2 |
| Alsike clover (Trifolium hybridum) | 3 | Arctic lupine (Lupinus arcticus) | 2 |
| Total | 37 | Total | 21 |

Note:The nutrient requirements for the seed mix are Nitrogen (100 kg N/ha) and Phosphorus (120 kg $P_2O_5$ per hectare).

**Table 13.8 Proposed Seed Mixes – Borrow Pits**

| Agronomic Selections | | Native Alternatives | |
|---|---|---|---|
| **Type** | **kg/ha** | **Type** | **kg/ha** |
| Meadow foxtail (Alopecurus pratensis) | 8 | Meadow foxtail (Alopecurus pratensis) | 3 |
| Tufted hairgrass (Deschampsia caespitosa) | 4 | Tufted hairgrass (Deschampsia caespitosa) | 2 |
| Timothy (Phleum pretense) | 8 | Violet wheatgrass (Agropyron violaceum) | 5 |
| Sheep Fescue (Festuca ovina) | 6 | Sheep Fescue (Festuca ovina) | 3 |
| Creeping red fescue (Festuna rubra) | 8 | Alpine bluegrass (Poa alpine) | 2 |
| Alsike clover (Trifolium hybridum) | 4 | Glaucous bluegrass (Poa glauca) | 3 |
| | | Mackenzie's hedysarum (Hedysarum mackenzii) | 2 |
| Total | 38 | Total | 20 |

Note:The nutrient requirements for the seed mix are Nitrogen (150 kg N/ha) and Phosphorus (150 kg $P_2O_5$ per hectare) and Potash (50 kg $K_2O$ per hectare)

### 13.1.15 MONITORING AND MAINTENANCE PROGRAMS

Operational monitoring program results will be used to refine the post closure monitoring requirements. The site will develop and monitoring program to monitor chemical, biological and physical parameters as follows:

- physical parameters for site structures
- physical water parameters
- chemical water quality
- biological monitoring as per MMER ( for a three year period) and permit requirements
- vegetation metal uptake
- plant growth, mortality and diversity for the re-vegetated areas
- dam stability review as per CDA and permit requirements and
- diversion system's physical integrity.

#### CHEMICAL MONITORING

Chemical monitoring will be undertaken for the first three years after closure, in accordance with permit and MMER requirements. An application for amendment setting out revised program for approval will be submitted to the respective agency. In addition to meeting permit requirements of the day, monitoring will be limited in scope to those parameters given in Schedule 4 of MMER. After MMER, monitoring

will continue as per the proposed program for three additional years. During the closure phase chemical monitoring data will be reviewed for continual improvement.

### BIOLOGICAL MONITORING

Biological monitoring will be undertaken to meet permit and MMER related requirements. Toxicity testing will be part of the biological monitoring program and will continue as required. After MMER, monitoring will continue as per the proposed program for seven additional years.

### PHYSICAL MONITORING

Monitoring programs to assess physical parameters will be undertaken during the three year demonstration period (expected to be years 4-6 after closure). In the event of any significant improvement or deficiency, Victory Nickel will apply for an amendment setting out a revised program for approval.

### VEGETATION MONITORING PROGRAMS

The re-vegetated areas will be subjected to:

- annual monitoring of the metal uptake in vegetation
- annual inspection of native plant invasion during the demonstration period and
- annual evaluation of plant growth for the re-vegetated areas.

Success of the re-vegetation program will be determined by measuring a number of aspects including growth, survival, density and diversity of perennial species. The assessment will be based on randomly allocated plots located within areas representative of the reclaimed lands. As the results from the monitoring program show improvements during the demonstration period, Victory Nickel will terminate the monitoring programs.

### WATER AND SEDIMENT MONITORING PROGRAMS FOR CLOSURE

Surface water quality in watercourses surrounding the Minago Project was assessed by Wardrop (2007) from May to October 2006, URS (2008g) from May to August 2007, and KR Design Inc. from September 2007 to May 2008. Wardrop (2007) monitored water quality in Oakley Creek and Minago Project River while URS (2008g) and KR Design Inc. regularly monitored water quality in Oakley Creek, Minago Project River, William River, and Hargrave River. One-time assessments of surface water quality were also completed for William Lake, Little Limestone Lake, Russell Lake, and two locations near the confluence of William River and Limestone

Bay on Lake Winnipeg. The selected locations for surface water sampling stations were based on:

- a review of topographic maps, orthophoto and drainage features at and surrounding the Project site
- consideration of the simultaneous collection of hydrological data, stream sediment and benthic samples during one or more of the surface water sampling events
- consideration of the selection of representative stations both upstream and downstream of the Project site for the development of long-term sampling stations to monitor long-term trends in surface water quality during the exploration phase of the Project and during potential development, operation and post-closure phases of the Project mine life.

Water samples were analyzed for field parameters (pH, temperature, conductivity, oxidation-reduction potential (ORP), and dissolved oxygen (DO)), nutrients, major ions, metals, Radium-226, and other physicochemical parameters. Collection methods conformed to the guidelines outlined in the federal Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring (MMER-EEM; Environment Canada 2002).

Potential project effects on water and sediment quality in local watersheds during operational and closure may have been caused by the following:

- discharge from the polishing pond into the Oakley Creek and the Minago River
- introduction of sediments (total suspended solids) to receiving waters due to runoff from disturbed areas during mine facility construction.

Victory Nickel intends to design its sewage works to ensure that the above effects to not occur. However, in order to assess impacts, Victory Nickel will undertake a regional study during and after closure. The regional study area includes water bodies and watersheds beyond the local project area that reflect the general region to be considered for cumulative effects and that provide suitable reference areas for sampling:

- Minago River downstream and upstream of the polishing pond discharge
- Cross Lake
- William River
- Limestone Bay
- Hargrave River
- Oakley Creek and William River Confluence

Sampling sites were established as outlined in Table 3.9 and Figure 3.2. These sampling sites will be used during the TS, SI and closure stages.

*Physical Inspection of the TWRMF*

The TWRMF will be inspected by Victory Nickel personnel and competent individuals during the post-closure phase (Year 4 to 6). The details and the inspection and monitoring frequencies are given in Table 13.10.

**Table 13.9 Nomenclature and Coordinates of Biophysical Monitoring Stations**

| Victory Nickel Sample Location (as of Sept. 15, 2007) | UTM (NAD 83) | | UTM (NAD 83) | | Description |
|---|---|---|---|---|---|
| | Northing | Easting | Latitude | Longitude | |
| HRW1 | 6028072 | 495606 | 54o24.041' N | 99o04.051' W | Hargrave River immediately west of Highway 6 |
| MRW1 | 6005277 | 488671 | 54o11.721' N | 99o10.420' W | Minago Project River immediately west of Highway 6 |
| MRW2 | 6001212 | 472476 | 54o09.494' N | 99o25.290' W | Minago Project River near Habiluk Lake |
| MRW2x | 6001166 | 472571 | 54o09.470' N | 99o25.206' W | Minago Project River near Habiluk Lake (~ 100 m downstream of MRW2) |
| MRW3 | 6007895 | 494274 | | | Minago Project River downstream of Highway 6 near powerline cut |
| OCW1 | 5990510 | 489322 | 54o03.762' N | 99o09.786' W | Oakley Creek immediately east of Highway 6 |
| OCW2 | 5990961 | 487463 | 54o04.002' N | 99o11.492' W | Oakley Creek immediately downstream of north tributary |
| OCW3 | 5990892 | 487230 | 54o03.965' N | 99o11.707' W | Oakley Creek immediately upstream of north tributary |
| WRW2x | 5987162 | 495416 | 54o01.963' N | 99o04.199' W | William River approx. 6 km upstream of the Oakley Creek confluence |
| WRW1x | 5986554 | 498523 | 54o01.637' N | 99o01.350' W | William River approx. 100 m downstream of the Oakley Creek confluence |
| WRAOC | 5986647 | 498452 | 54o01.685' N | 99o01.416' W | William River approx. 50 m upstream of the Oakley Creek |
| OCAWR | 5986744 | 498457 | 54o01.738' N | 99o01.414' W | Oakley Creek approx. 50 m above William River |
| WRALSB | 5969206 | 503935 | 53o52.278' N | 98o56.410' W | William River approx. 100 m above Limestone Bay |
| LSBBWR | 5968889 | 504092 | 53o52.107' N | 98o56.262' W | Limestone Bay approx. 250 m below William River |
| Little Limestone Lake | 5954922 | 478725 | | | Little Limestone Lake (at end of road) |
| Russell Lake | 5967117 | 482571 | | | Russell Lake (at end of road) |
| William River (Winter) | 5973774 | 485141 | 53o54.730' N | 99o13.574' W | William River east of Highway 6 |
| William River at Road | 5973791 | 485078 | | | William River west of Highway 6 |
| William Lake | 5973831 | 479083 | | | William Lake at end of access road |
| Polishing Pond | TBA* | TBA | TBA | TBA | Polishing Pond Outflow to Receiving Environment during Closure |

*TBA – to be available

**Figure 13.1 Minago Project – Site Watersheds**

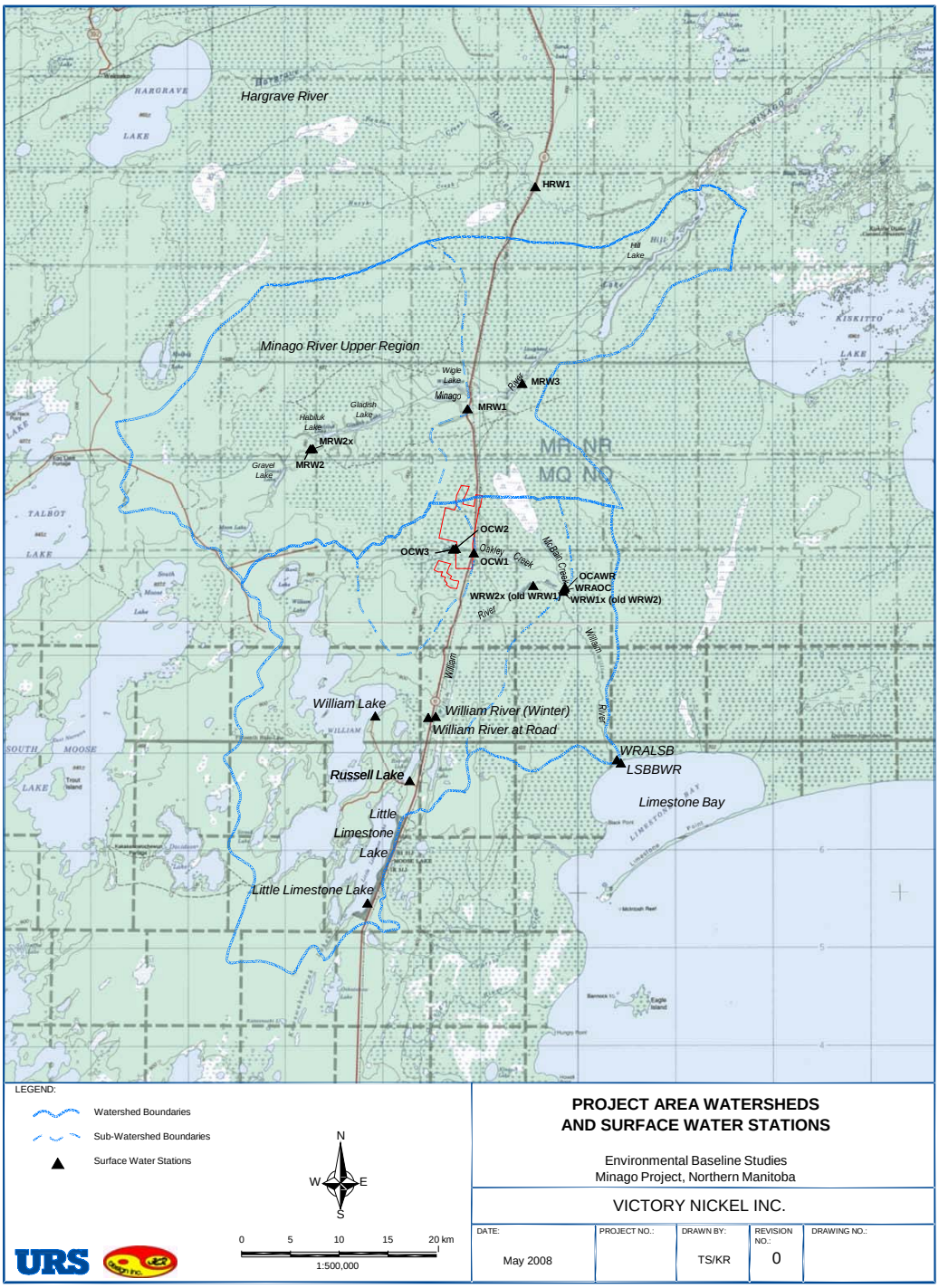


**Table 13.10 Proposed Monitoring Program for the TWRMF for Closure (During the Demonstration Period – Expected to occur in Years 4 to 6)**

| Criteria or Monitoring Parameter | Monitoring Frequency |
|---|---|
| Weekly Visual Inspection | Weekly inspection |
| Annual Inspection by a Competent Person | Annual Inspection |
| Dam Safety Review | Every 7 Years (CDA Dam Safety Guidelines, 1999) |
| Instrumentation (Piezometers – Electric and Standpipe) | Monthly |
| Embankment Movement Points | Annually |
| Seepage at Toe of the Dam | Weekly |
| Pond Water Level | Weekly |
| Crack in Crest of the Dam | Weekly |
| Distance between Water Pond and Upstream edge of Embankment Crest | Weekly |
| Storm | Immediately after the storm |
| Earthquake | Immediately after the Earthquake |

## SEDIMENT AND WATER QUALITY CHARACTERIZATION

The water quality parameters and associated minimum detection limits are given in Table 13.11. The respective QA/QC criteria and procedures for closure will be similar to the operational ones.

**Table 13.11 Water Quality Parameters and Detection Limits**

| Parameter | | Detection limit (mg/L) | Analytical Method |
|---|---|---|---|
| Aluminum, total and dissolved | Al | 0.001 | ICP / ICP MS |
| Antimony, total and dissolved | Sb | 0.00005 | ICP / ICP MS |
| Arsenic, total and dissolved | As | 0.00005 | ICP / ICP MS |
| Barium, total and dissolved | Ba | 0.00005 | ICP / ICP MS |
| Beryllium, total and dissolved | Be | 0.0005 | ICP / ICP MS |
| Bismuth, total and dissolved | Bi | 0.0005 | ICP / ICP MS |
| Boron, total and dissolved | B | 0.001 | ICP / ICP MS |
| Cadmium, total and dissolved | Cd | 0.00005 to 0.02 | ICP / ICP MS |
| Calcium, total and dissolved | Ca | 0.05 | ICP / ICP MS |
| Chromium, total and dissolved | Cr | 0.0001 | ICP / ICP MS |
| Cobalt, total and dissolved | Co | 0.0001 | ICP / ICP MS |
| Copper, total and dissolved | Cu | 0.0001 | ICP / ICP MS |
| Iron, total and dissolved | Fe | 0.01 | ICP / ICP MS |
| Lead, total and dissolved | Pb | 0.00005 | ICP / ICP MS |
| Lithium, total and dissolved | Li | 0.001 | ICP / ICP MS |

*table continues…*

| Parameter | | Detection limit (mg/L) | Analytical Method |
|---|---|---|---|
| Magnesium, total and dissolved | Mg | 0.05 | ICP / ICP MS |
| Manganese, total and dissolved | Mn | 0.00005 | ICP / ICP MS |
| Mercury (total) , total and dissolved | Hg | 0.00005 | Cold Oxidation (CVAAS) |
| Molybdenum, total and dissolved | Mo | 0.00005 | ICP / ICP MS |
| Nickel, total and dissolved | Ni | 0.0001 | ICP / ICP MS |
| Phosphorus, total and dissolved | P | 0.05 | ICP / ICP MS |
| Potassium, total and dissolved | K | 0.2 | ICP / ICP MS |
| Selenium, total and dissolved | Se | 0.0005 | ICP / ICP MS |
| Silicon, total and dissolved | Si | 0.05 | ICP / ICP MS |
| Silver, total and dissolved | Ag | 0.00001 | ICP / ICP MS |
| Sodium, total and dissolved | Na | 2 | ICP / ICP MS |
| Strontium, total and dissolved | Sr | 0.0001 | ICP / ICP MS |
| Thallium, total and dissolved | Tl | 0.00005 | ICP / ICP MS |
| Tin, total and dissolved | Sn | 0.0001 | ICP / ICP MS |
| Titanium, total and dissolved | Ti | 0.01 | ICP / ICP MS |
| Vanadium, total and dissolved | V | 0.001 | ICP / ICP MS |
| Zinc, total and dissolved | Zn | 0.001 | ICP / ICP MS |
| Total alkalinity | $CaCO_3$ | 1 | Titration to pH=4.5 |
| Ammonia | N | 0.005 | Colorimetry |
| Nitrate | N | 0.005 | Ion Exchange Chromatography |
| Nitrite | N | 0.001 | Colorimetry |
| Nitrite + nitrate | N | 0.005 | Ion Exchange Chromatography |
| Sulphate | $SO_4$ | 0.03 | Ion Exchange Chromatography |
| Total dissolved solids | | 1 to 5 | Filtration/Gravimetric |
| Total suspended solids | | 1 to 5 | Filtration/Gravimetric |
| Turbidity | | 1.0 (NTU) | Nephelometric |
| Conductivity | | 1.0 (µS) | Conductivity cell |
| pH (RelU) | | 0.1 (RelU) | Potentiometric |
| Cyanide (total) | CN | 0.005 | Distillation/UV Detection |
| Fluoride | F | 0.02 | Colorimetry |
| Chloride | Cl | 0.5 | Colorimetry |

Stream sediments and water were sampled to establish baseline data in the past (2006, 2007 and 2008). These streams will continue to be sampled during the operational and closure phases to determine potential impact(s) over time. The stations that will be sampled during the closure phase are provided in Table 13.12.

**Table 13.12 Sediment and Surface Water Monitoring Stations**

| VICTORY NICKEL Sample Location (as of Sept. 15, 2007) | Description | Sediment Quality | Water Quality | Flow | No. of Years |
|---|---|---|---|---|---|
| HRW1 | Hargrave River immediately west of Highway 6 | A | Q | Q | 6 |
| MRW1 | Minago River immediately west of Highway 6 | A | Q | Q | 6 |
| MRW2 | Minago River near Habiluk Lake | A | A | A | 6 |
| MRW2x | Minago River near Habiluk Lake ( 100 m downstream of MRW2) | A | A | A | 6 |
| MRW3 | Minago River downstream of Highway 6 near powerline cut | A | Q | Q | 6 |
| OCW1 | Oakley Creek immediately east of Highway 6 | A | Q | Q | 6 |
| OCW2 | Oakley Creek immediately downstream of north tributary | A | A | A | 6 |
| OCW3 | Oakley Creek immediately upstream of north tributary | A | A | A | 6 |
| WRW2x | William River approx. 6 km upstream of the Oakley Creek confluence | A | Q | Q | 6 |
| WRW1X | William River approx. 100m downstream of the Oakley Creek confluence | A | A | A | 6 |
| WRAOC | William River approx. 50 m upstream of the Oakley Creek | A | Q | Q | 6 |
| OCAWR | Oakley Creek approx. 50 m above William River | A | A | A | 6 |
| WRALSB | William River approx. 100 m above Limestone Bay | A | Q | Q | 3 |
| LSBBWR | Limestone Bay approx. 250 m below William River | A | Q | Q | 1 |
| Little Limestone Lake | Little Limestone Lake (at end of road) | A | A | A | 1 |
| Russell Lake | Russell Lake (at end of road) | A | A | A | 1 |
| William River (Winter) | William River east of Highway 6 | A | A | A | 1 |
| William River at Road | William River east of Highway 6 | A | Q | Q | 6 |
| William Lake | William Lake at end of access road | A | A | A | 1 |
| Polishing Pond | Polishing Pond Outflow | Q | Q | Q | 6 |

A= Annually, Q= Quarterly

## TWRMF MONITORING AND SURVEILLANCE PROGRAMS

Surveillance is essential to ensure satisfactory performance of the TWRMF and all of its components beyond the operational phase. The monitoring and surveillance programs are designed to track performance indicators in relation to pre-determined safe thresholds.

A successful surveillance program will help identify potential problems before they become major problems. Design or performance criteria of the TWRMF surveillance program will continue to evolve as the facility's design or performance criteria changes in, site conditions and/or the operation it is accommodating.

The TWRMF surveillance program will consist of both routine and event-driven activities. The basis is the combination of all the regular inspections assisted by the eyes of site personnel to ensure continued integrity and performance of the facility.

External consultants will also inspect the facility as part of a regular program of expert review.

### *Monitoring and Trigger Levels*

A number of behaviours and events will help to predict the performance and expected behaviour of the facility. Visual performance indicators are the first and easiest type to identify an emergency condition of the facility. The first level of routine observations includes indicators such as:

- seepage through the dam
- turbidity of water in Oakley Creek downstream of the facility
- seepage through the spillways
- water or tailings flowing down the embankment indicating a possible broken pipeline
- failure or breach of the embankment.

Routine surveys will ensure the TWRMF will perform below established action trigger levels. The routine surveys are as detailed below:

- measurements of water through the closure spillway
- water pond setbacks from perimeter embankment in the impoundment areas
- checking for settlement or holes in embankment crest or benches
- checking for holes on the surface of the tailings indicating possible piping of material to outside
- crack measurements

- closure spillway performance – flow rates, metals loading
- pore pressures in the tailings, embankment and foundation areas during construction and closure phases
- surface movement monuments - displacements of perimeter embankment
- seepage flow rate and water chemistry
- piezometer pore pressures – from downloaded data.

Threshold levels or maximum allowable values will be established for all monitoring instrumentation (e.g., piezometers, crack extensometers and displacement monuments) on the embankment slopes. If these values are exceeded, geotechnical consultants and the government will be notified to determine corrective actions.

The proposed schedule for reviewing and updating the surveillance, instrumentation, OMS and dam safety and emergency preparedness plan for the TWRMF is provided in Table 13.13.

**Table 13.13 Proposed Schedule for Reviewing and Updating the TWRMF Dam Safety Programs**

| Program | Significant Consequence Dam as per CDA Classification |
|---|---|
| Site Surveillance (a) | Weekly |
| Formal Inspection (b) | Semi Annually or Annually |
| Instrumentation | As per OMS Manual * |
| Test Operation of Outlet Facilities, Spillway and Mechanical Components | Annually |
| Emergency Preparedness Plan | Update Communications Directory Semi Annually or as needed |
| Operation, Maintenance & Surveillance Plan | Review on a regular basis or when needed |
| Dam Safety Review (c) | Every 7- 10 Years (d) |

* Operation, Maintenance, and Surveillance Manual.
(a) Site surveillance may consist of visual inspections and/or monitoring of automated data acquisition systems. Reduced frequencies of visual inspections may be determined by seasonal conditions.
(b) Formal inspections are intended as more thorough inspections performed by the appropriate representative of the owner responsible for safety surveillance.
(c) A Dam Safety Review involves collection of all available dam records, field inspections, detailed investigations and possibly laboratory testing. It then proceeds with a check of structural stability and operational safety of the dam, beginning with a reappraisal of basic features and assumptions. The level of detail required in a Dam Safety Review should be commensurate with the importance and complexity of the dam, as well as the consequences of failure.
(d) Dam owners must conduct an annual review of conditions downstream of their dam and notify a dam safety officer if the downstream consequence classification level increases.

The proposed monitoring program for the Project is provided in Table 13.12. The monitoring frequency will be reviewed on an annual basis and adjusted as necessary to reflect site conditions and observations made over the previous year.

The monitoring program for the TWRMF is given in Table 13.10. Table 13.13 gives the proposed schedule for reviewing and updating the TWRMF safety programs. The monitoring frequency will be reviewed on an annual basis and adjusted as necessary to reflect site conditions and observations made over the previous year.

### 13.1.16 POST-CLOSURE REVIEWS AND CONSULTATIONS

To meet MMER end of commercial operation notification requirements, Victory Nickel will notify MMER authorization officer in writing with respect to the closure no later than 90 days after the end of commercial operation. In addition to the MMER notification requirements, Victory Nickel will also meet the Chief Inspector's and other agencies' notification requirements.

A mechanism will be established to ensure that communication between government agencies, communities of interest and Victory Nickel is clear and consistent. In order to foster better communication, Victory Nickel will establish pre and post-closure review protocols. The objective of the pre and post-closure consultation will be to review the planned closure reclamation and decommissioning programs together with post-closure environmental monitoring, acid rock mitigation measures and maintenance programs. The issues to be discussed during the consultation process include but are not limited to the following:

- review compliance issues
- review post-closure effluent discharge criteria as per MMER and permit requirements
- review post-closure monitoring and reporting programs
- review decommissioning, closure and reclamation cost estimates
- review of permitting monitoring and reporting requirements
- review MMER monitoring and reporting requirements and
- termination/revision of various permits and licenses.

All post-closure work will be reviewed annually following implementation to assess the success of the remediation measures. Any trend indicating an adverse change in the projected environmental quality will trigger a review of management strategy, and changes will implemented as required. An annual report will be prepared to summarize the activities.

A ten-year test/demonstration period is proposed after which Victory Nickel will prepare a final report summarizing all monitoring results, and assess the

performance of the closure plan. A three-year demonstration period required under MMER for closed out mines will be part of the proposed ten year demonstration.

### 13.1.17 ENVIRONMENTAL AND SOCIAL IMPACT EVALUATION OF CLOSURE

#### AIR QUALITY

Air quality in the mine area will be affected mainly by fugitive dust from access roads, and to a lesser degree from haul roads, crushing and conveying systems.

As all mine components will be decommissioned and disturbed areas rehabilitated as such, it is anticipated that, there will be no long term air quality problems.

#### SURFACE WATER

Surface water quality is expected to improve as there will be no additional disturbances and contaminants created. Discharge water quality will meet the MMER and the permit discharge criteria of the day.

#### FISHERIES

Victory Nickel will ensure that the immediate aquatic habitat will not be adversely affected during and after closure.

#### VEGETATION AND SOILS

It is anticipated that metal uptake in soils and vegetation will be reduced significantly, since there will be no additional pollutants discharged into the receiving environment. Aspects such as fugitive dust will be eliminated or reduced by the application of vegetative cover on various site components.

However, vegetation in reclaimed areas will require temporary maintenance; it is expected that these areas will become maintenance-free during the demonstration period.

#### WILDLIFE

Over time, decreased industrial and human activities and the enhancement of the disturbed areas through recontouring and vegetative covers will bring wildlife population to the original levels.

### 13.1.18 LAND CAPABILITY, USES AND CONDITIONS

#### LAND USE

The land will become undeveloped wilderness at the conclusion of the Project. Trapping and hunting capabilities are expected to improve after mine closure.

#### LAND CAPABILITY

*Forestry*

Forest capability within the project area is poor. Presently, there are no economic stands of timber within the project area and it is expected to be the same after closure.

*Industrial*

Limited industrial activity will continue after mine closure. However, this will be limited in nature to remediation activities that will be required to ensure site discharges satisfy water quality criteria.

*Agriculture*

Presently, the site is not suitable for agricultural land uses and it is anticipated to remain the same at closure.

*Heritage Resources*

There are known archaeological sites within the project area and Victory Nickel will ensure that these sites are protected during the operational and closure phases.

## 13.2 POST-CLOSURE SITE MANAGEMENT AND SCHEDULE

The closure phase will commence with cessation of mining and milling activities. Once all mineable ore reserves have been processed, the mill and concentrator will be flushed out and the tailings facility will be put on a closure a wet closure mode. During the active decommissioning phase which is expected to last approximately 3 years, the number of personnel required will vary depending on site activities. However, during this period it is expected that all major decommissioning and reclamation tasks will be completed and the number of personnel will decline significantly. The anticipated personnel requirements are given in Table 13.15. Following the three year period will be the demonstration period scheduled to last three years (expected to occur in Years 4-6). The length of the demonstration period may vary depending on whether the decommissioning, closure and reclamation

objectives are met at the time. The duration may be extended to ensure that the reclamation objectives are achieved.

The length of the demonstration period and the nature of site management and monitoring will be partially guided by the Certificate of Approval or other permit requirements, the performance of physical structures remaining on site and the ability to achieve and demonstrate fulfilment of long-term compliance requirements. Once overall closure performance has been demonstrated for all aspects of decommissioning, closure and reclamation, maintain licenses or permit requirements will be examined, and stakeholder communities will be consulted for their input.

### 13.2.1 ORGANIZATION, SITE ACCESS AND SECURITY

A number of personnel will be required on site to implement the various decommissioning, closure and reclamation tasks. The tasks will entail closure of the pit and related components, decommissioning of the TWRMF, salvage and removal of infrastructure, equipment and reagents, removal of redundant access corridors and reclamation and re-vegetation of disturbed lands. The majority of these activities for decommissioning and reclamation of the site will be undertaken on a seasonal basis (May–October). A portion of the camp will remain operational to accommodate site personnel.

During the initial closure stage, the site will continue to require security personnel and procedures; the caretaker will remain on-site following the seasonal closure of the site. Security personnel will be no longer be required once decommissioning activities have been completed on the property.

Prior to undertaking closure activities, as part of a comprehensive environmental site assessment, areas of suspected oil, chemical or other contaminant spills will be tested to confirm locations and extent of clean-up.

Victory Nickel plans to complete the majority of the closure works during the first three years following initiation of closure. During this period, the mine workings and other mine related appurtenances will be decommissioned. Closure measures related to the TWRMF will be limited in scope to the facility and related appurtenances. The tailings line from the mill to the TWRMF will be removed; tailings line from the TWRMF to the Settling Pond will be left in place until the end of the demonstration period.

The mill and infrastructure decommissioning will take place during the first three years following initiation of closure. The number of personnel will be reduced once decommissioning of these components is completed.

Some of the buildings may be left in place if the Communities of Interest (COI) so request, subject to satisfactory stewardship arrangements being made.

The main access road and property security gate will be maintained during the implementation of the closure phase. Access to the site will be required for personnel and truck haulage to and from the site.

Once decommissioning, closure and reclamation activities meet the respective objectives, the site will be declared as permanently closed.

***Supervision and Documentation of Work***

All decommissioning, closure and reclamation (DCR) works will be properly supervised and documented to ensure that works are planned and performed according to their design and that the work is properly carried out as per industry practice and legal requirements. The project manager or the construction supervisor will supervise all the closure works. Daily inspection protocols will be developed to ensure that construction is carried out in accordance with construction design specifications. The works will be conducted in accordance with the environmental, health and safety requirements at the time.

For the TWRMF, closure designs and construction plans for earthen works will be prepared and submitted to the Manitoba government and other Communities of Interest (COI) for their review and approval prior to construction. A competent person following standard quality control and assurance procedures would also inspect and document the construction works. As-built plans and drawings will be completed and the results of the closure work will be reported in a final as-built report. The reports will be submitted to the Manitoba government upon completion of the construction program.

Upon completion of the DCR works, a final site plan report will be prepared to document the facilities remaining on site. The plan will detail the locations of buried concrete structures, scrap and landfill disposal areas.

### 13.2.2 SITE RECORDS

All DCR works will be documented. The open pit records will be retained by Victory Nickel and other records will be archived. Those records (plans or drawings) that are required for mine safety reasons will be submitted to the Mines Branch offices. As - built reports for structures completed for closure and the final site report will be retained for record and submitted to respective government agencies.

### 13.2.3 COMPLIANCE MONITORING AND REPORTING

Environmental, Health and Safety (EHS) compliance monitoring will be enforced and will be adjusted to address construction issues of concern. EHS inspections will be instituted to ensure that the work is undertaken as per legal requirements. The inspections will include but not be limited to the following aspects:

- Scheduled inspections of the TWRMF and other site components to monitor environmental performance;
- Scheduled water quality sampling and flow measurements of upstream and downstream creeks and rivers;
- Scheduled receiving environs monitoring programs for benthic invertebrates, stream sediments and fish to monitor downstream environmental quality;
- Scheduled instrumentation monitoring to assess the performance of physical structures such as tailings dams; and
- Annual geotechnical inspection of the TWRMF, dikes and settling ponds for structural integrity;

During the demonstration period, it is expected that the frequency and the number of stations and parameters to be monitored will be reduced commensurate with the reduced activity. However, this is dependent on Victory Nickel demonstrating that the DCR objectives are being achieved.

It is important to note that it is not proposed that all monitoring will be completely ceased after the demonstration period. On the basis of the results from the monitoring program and discussion with the appropriate regulators during this period, the need for and the frequency of additional site monitoring will be determined at that time. If the results from the monitoring indicate that the site is stable with acceptable geotechnical and EHS performance, then it could be expected that Victory Nickel will propose to decrease the frequency. If the results from the monitoring program indicate that there are concerns with either geotechnical conditions or EHS concerns at the site, then the site will address the problems and/or develop an acceptable surveillance program.

Access to the property for closure monitoring will continue to be via the main access road as it will remain open. The main access road will be maintained by Victory Nickel during the closure phase and possibly during the demonstration period.

Company personnel responsible for the management of the Minago Project would continue to meet with regulatory agencies and the COI on an as needed basis to appraise interested parties of the decommissioning activities and results of post-closure monitoring.

It is expected that Victory Nickel will involve all the key communities of interest in reviewing the performance of the reclamation DCR programs and once the review is completed, the Company will lodge an application to the appropriate authorities to certify that the site is closed and it will no longer be responsible for the site. At that time, Victory Nickel will have fulfilled their closure obligations for the Minago Project.

### 13.2.4 DECOMMISSIONING, CLOSURE AND RECLAMATION SCHEDULE

The Decommissioning, Closure and Reclamation (DCR) schedule will depend on a number of factors including: redundancy nature of the component(s), future use of the component, EHS considerations and cost effectiveness. Table 13.14 gives DCR projections for the closure implementation stage (1 to 3 years following closure) and demonstration period (4 to 6 years following closure implementation stage). It is important to note that once the closure is declared, Victory Nickel will develop a detailed closure plan complete with revised cost estimates and time schedule. The revised DCR plan will be the basis for final closure implementation and setting out the components for the demonstration period.

**Table 13.14 Minago Project DCR Schedule**

| Component or Program | Closure Implementation Stage (Years 1 to 3 Following Closure) | Demonstration Period (Three years Following Closure Implementation Stage): Years 4 to 6 |
|---|---|---|
| Site Access Corridors that are Redundant | Will be decommissioned and reclaimed during this stage | Performance monitoring will be undertaken |
| Industrial Area Complex (Mill, Frac Sand, Warehouse, Maintenance Shop, etc.) | Will be decommissioned and removed during this stage | Performance monitoring will be undertaken |
| Main Access Road | Access road will be blocked to restrict entry. | Access road will be blocked to restrict entry. However, the Access Road may not be completely deactivated if the COI would like to use it in the future and therefore, stewardship will be transferred to COI |
| Open Pit Mine | Pit will be decommissioned and flooded | Performance monitoring will be undertaken to determine the water quality and discharge points |
| Co-Disposal Site (TWRMF and Ultramafic Waste Rock) | Will be decommissioned and closed out with a water cover | Will remain to be a water retention dam to provide a wet cover to mitigate ARD. Performance monitoring will be performed during this stage |
| Personnel Camp | Partial | Limited camp buildings will be left |
| Water Discharge Line to the Minago Project | Will be deactivated | Water discharge line will be decommissioned and the line removed. The line bed will be blocked to prevent entry |
| Polishing Pond | Depending on TWRMF water quality the Polishing Pond will be decommissioned and reclaimed during this phase | Performance monitoring will not be required during this period |
| Oakley Creek | Monitor surface water upstream and downstream of the Oakley Creek watershed | Monitor surface water upstream and downstream of the Oakley Creek watershed |

*table continues…*

| Component or Program | Closure Implementation Stage (Years 1 to 3 Following Closure) | Demonstration Period (Three years Following Closure Implementation Stage): Years 4 to 6 |
|---|---|---|
| Minago River | Discharge to the Minago River will be staged to allow smooth transition to pre-development base flows. Water quality will be monitored to determine recovery after closure | Monitor water quality to determine the degree of recovery after closure |
| William River downstream of Oakley Creek | Monitor impacts (if any) and degree of recovery | Monitor impacts (if any) and degree of recovery |
| Industrial Area – Contaminated Sites | Undertake an assessment and remediation programs | Monitor to determine performance of remediation measures |
| Hydro Sub Stations | Decommission and leave adequate capacity for the closure implementation period, demonstration period and beyond, if needed | Assess future power requirements |
| Pit Dewatering Wells | Decommission the Pit Dewatering Wells and remove their appurtenances | Decommission the Pit Dewatering Wells and remove their appurtenances |
| Waste Rock - Dolomite Waste Rock Dump | Where practical, plant green alder seedlings | Monitor the performance of the revegetated areas of the dump |
| Waste Rock - Country Rock Dump | Where practical, plant green alder seedlings | Monitor the performance of the revegetated areas of the dump |
| Overburden Dump | Where practical, plan green alder seedlings | Monitor the performance of the revegetated areas of the dump |
| Runoff Collection Systems | The site ditches will be left in place | The ditches will be left in place and will be monitored accordingly |
| Equipment | Set aside reclamation assets and disposed of non reclamation assets | Continue to market non-reclamation assets and assess equipment needs for post-demonstration period, if required. |
| Water Supply Systems | To be decommissioned, if not required | To be decommissioned if not already done so |
| Reclamation Maintenance | Assess requirements for reclamation maintenance | Assess requirements for reclamation maintenance |
| Decommissioning, Closure and Reclamation (DCR) Cost Estimates | Continue to review the DCR cost estimates | Continue to review the DCR cost estimates |
| Monitoring Programs | Update monitoring programs to reflect prevailing environmental constraints | Update monitoring programs to reflect prevailing environmental constraints |
| Comprehensive DCR Performance | Plan for a comprehensive DCR performance assessment | Undertake DCR performance assessment. Obtain Certificate of Closure if all requirements are met or exceeded |

**Table 13.15 Site Decommissioning, Closure and Reclamation Personnel Requirements (Seasonal and Permanent)**

| Personnel | Post-Closure Year 1 | Post-Closure Year 2 | Post-Closure Year 3 | Long Term Care and Maintenance: Years 4 to 6 |
|---|---|---|---|---|
| Seasonal | | | | |
| Project Manager | 1 | 1 | 1 | - |
| Construction Supervisor | 1 | 1 | 1 | - |
| Equipment Operators | 6 | 2 | 2 | - |
| Equipment Mechanics/Welders/Electricians | 3 | 2 | 1 | - |
| General Labourers | 4 | 2 | 1 | - |
| Catering Staff | 2 | 1 | 1 | - |
| **Total Seasonal** | 17 | 9 | 7 | |
| **Permanent** | | | | |
| Environmental Coordinator/Monitor/Technician | 2 | 2 | 2 | 2 |
| Off Season Site Security/Caretaker | 1 | 1 | 1 | |
| **Total Permanent** | 3 | 3 | 3 | 2 |

Note: Although some of the above personnel will be Victory Nickel Staff, the Closure costing presented in this report reflects costs for third party contractors.
Seasonal: May to October of each year (Six months – 10 hr Shifts)

## 13.3 CLOSURE COST ESTIMATES

The costs of site rehabilitation have been developed using of market prices for similar work recently completed or quoted on other sites. Using rates for the demolition of buildings solicited from local contractors, typical demolition unit rates were evaluated. For the Minago Project, unit rates between $10 and $30 per square metre for demolition were used. Other unit rates for associated work were also solicited from Contractors with experience on similar projects. Tables 13.16 to 13.21 summarizes the reclamation, decommissioning, monitoring, closure and post-closure costs.

The demolition costs have been estimated assuming that salvaged material is the property of the contractor after the removal of process equipment.

On the basis of the cost estimates, the overall closure cost is estimated to be Cdn$7,260,590.

**Table 13.16 Estimated Closure Costs for the TWRMF**

| | Description | Cost |
|---|---|---|
| **1** | **Tailing Management System** | |
| **1.1** | **Construct Spillway Exit Channel to the Pond** | |
| | Supply and Place Geotextile | $8,000 |
| | Supply and Place Riprap | $11,550 |
| | Design of Spillway and Channel | $11,500 |
| | Construct Spillway Exit | $14,800 |
| | Site Supervision of Spillway and | $- |
| | Channel | $6,400 |
| | **Sub Total** | **$52,250** |
| **1.2** | **Tailings Pipeline (4 km)** | |
| | Remove Pipeline from mill to TWRMF | $40,530 |
| | Seeding and Fertilizer Application | $4,240 |
| | **Sub Total** | **$44,770** |
| **1.3** | **Pipeline to Minago River** | |
| | Remove Pipeline(10 km) | $98,440 |
| | Seeding and Fertilizer Application | $7,950 |
| | **Sub Total** | **$106,390** |
| | **Estimates Closure Costs for the TWRMF** | **$203,410** |

**Table 13.17 Estimated Demolition Costs for Site Buildings**

| | Description | Cost |
|---|---|---|
| 2.1 | Concentrator Building | $243,000 |
| 2.2 | 229 kV Substation &Switch Yard - Pre-Engineered Prefab Type 1 Building | $840 |
| 2.3 | Fire Pumphouse Building Prefab Type 2 | $560 |
| 2.4 | Site Fuelling Pump House Prefab Type 2 | $560 |
| 2.5 | Tailings Water Pumphouse - Prefab Type 2 | $560 |
| 2.6 | Modular Accommodations/Dry/Laundry/Kitchen Type 3 Fabric Portable | $184,960 |
| 2.7 | Explosive Plant and Magazine (Belongs to the Explosive Contractor) | $0- |
| 2.8 | Frac Sand Process Building Prefab Type 2 | $108,000 |
| 2.9 | Truck Unloading Building Prefab Type 2 | $4,875 |
| 2.1 | Frac Sand Vehicle Building - Type 2 | $6,875 |
| 2.11 | Frac Sand Rail Loadout - Type 1 | $9,375 |
| 2.12 | Process Water Pumphouse Type 2 | $1,060 |
| 2.13 | Fresh Water Pumphouse Type 2 | $1,060 |
| 2.14 | Crusher Building Type 4 | $8,250 |
| 2.15 | Emergency Services Building Type 2 | $5,775 |
| 2.16 | Unheated Warehouse Type 2 | $23,675 |
| 2.17 | Core Shack Type 1 | $4,650 |
| 2.18 | General Maintenance Building Type 3 | $243,000 |
| 2.19 | Miscellaneous Buildings | $2,170 |
| 2.2 | Removal of Contaminated Debris for Disposal | $100,000 |
| | **Estimated Demolition Costs for Site Buildings** | **$949,245** |

**Table 13.18 Estimated Costs for Miscellaneous Site Components**

| | Description | Cost |
|---|---|---|
| **3.1** | **Sub Stations, Genset and Power Lines** | |
| | Remove salvageable equipment | $17,850 |
| | Salvage and remove powerline and poles | $25,000 |
| | Dismantle Building – Manpower | $11,680 |
| | Dismantle Building – Equipment | $7,440 |
| | Concrete Demolition | $7,440 |
| | Reslope, contour and bury | $5,400 |
| | Misc. Supplies & Tools | $1,500 |
| | Scrap haul to landfill- Grand Rapids | $6,000 |
| | **Subtotal** | **$82,310** |
| **3.2** | **Water Supply** | |
| | Remove salvageable equipment - pipeline/pumps | $4,600 |
| | Remove pipeline | $38,600 |
| | **Subtotal** | **$43,200** |
| **3.3** | **Industrial Reagents, Fuels & Waste** | |
| | Industrial Reagents | $25,000 |
| | Waste Fuels | $20,000 |
| | Hazardous Wastes | $20,000 |
| | **Subtotal** | **$65,000** |
| **3.4** | **Fuel Storage Facilities and Site Remediation** | |
| | Site Wide Spill Clean Up and Removal of Fuel Storage Facilities | $100,000 |
| | **Subtotal** | **$100,000** |
| **3.5** | **Demolition Overheads** | |
| | Supervision | $80,000 |
| | Mob/Demob | $30,000 |
| | Office/Admin Costs | $5,000 |
| | **Subtotal** | **$115,000** |
| | **Estimated Costs to Dismantle Structures and Services** | **$405,510** |

**Table 13.19 Land Reclamation and Re-vegetation**

| | Description | Cost |
|---|---|---|
| **4** | **Land Reclamation and Re-vegetation** | |
| **4.1** | **Industrial Area** | |
| | Stabilize Slopes - Erosion Barrier (Est) | $6,000 |
| | Revegetate - fertilize (4.2 ha) | $5,565 |
| | Mulch Application | $6,000 |
| | **Subtotal** | **$17,565** |
| **4.2** | **Service and Haul Roads within the Project Area (40 ha)** | |
| | Road Barriers/Gates | $15,000 |
| | Scarify | $14,080 |
| | stabilize slopes - erosion barriers | $50,000 |
| | Revegetate - fertilizer application | $53,000 |
| | Application cost | $3,180 |
| | **Subtotal** | **$135,260** |
| **4.3** | **Polishing Pond** | |
| | Revegetate - seed Fertilizer (Assume 20% of 75 ha - footprint) - application cost | $19,875 |
| | **Subtotal** | **$19,875** |
| **4.4** | **Outer Slope of TWRSF(Est. 10.8 ha)** | |
| | Mulch Application | $16,200 |
| | Seeding and Fertilizer Application | $14,310 |
| | **Subtotal** | **$30,510** |
| **4.5** | **Disturbed Sites - Industrial Site, Refuse Areas, Borrow Areas (approximately 20 ha)** | |
| | Recountour refuse, borrow, industrial areas | $21,000 |
| | Bury debris | $21,000 |
| | Revegetate – seed/fertilizer application | $26,500 |
| | Mulph application | $30,000 |
| | **Sub Total** | **$99,700** |
| **4.6** | Country Rock Dump (301.40 ha) (Green Alders) | $301,400 |
| | Mulch Application (Assume 25% of 301.4 ha) | $113,025 |
| | **Subtotal** | **$414,425** |
| **4.7** | Overburden Dump (25% of 300 ha) | $75,000 |
| | **Subtotal** | **$75,000** |
| **4.8** | Landfill Reclamation | $30,000 |
| | **Subtotal** | **$30,000** |
| | **Estimated Cost in Land Reclamation** | **$822,335** |

**Table 13.19 Estimated Costs for Post-Closure Site Management Protection Programs**

| | Description | Cost |
|---|---|---|
| **5** | **Post-Closure Site Management** | |
| **5.1** | **Organization, Security and Overhead Costs** | |
| | Pre-closure planning and Org | $52,800 |
| | Project manager | $105,600 |
| | Camp cost | $354,090 |
| | Construction Supervision, Operators, Mechanics, General Labour and Catering Staff | $1,782,000 |
| | Pre-closure site environmental assessment | $100,000 |
| | Post-closure environmental | |
| | clean-up Confirmation | |
| | Assessment | $100,000 |
| | vehicles for security, environmental Group | |
| | and manager | $288,000 |
| | miscellaneous office/supply/ | |
| | miscellaneous costs | $120,000 |
| | **Subtotal** | **$2,902,490** |
| **5.2** | **Supervision and Documentation of Work** | |
| | Site Environmental monitoring, documentation, reviews and close-out | $567,600 |
| **5.3** | **Compliance Monitoring and Reporting** | |
| | Water Quality Monitoring (WQM | $180,000 |
| | WQM – Helicopter | $60,000 |
| | WQM – Post Closure | $75,000 |
| | Post Closure - Helicopter | $75,000 |
| | Geotechnical Inspections (PC) | $90,000 |
| | Geotechnical Inspections (DCI) | $90,000 |
| | Biological Monitoring (BM) | $60,000 |
| | Lab Analysis (BM) | $75,000 |
| | Professional Fees | $60,000 |
| | Lab Analysis (CI) | $150,000 |
| | Compliance with Environmental Monitoring | $150,000 |
| | **Subtotal** | **$1,065,000** |
| **5.4** | **Post Closure Maintenance** | |
| | Post Closure Maintenance | $45,000 |
| | **Subtotal** | **$45,000** |
| **5.5** | **Water Management** | |
| | Clean-up of Contaminants of Concern | $300,000 |
| | **Subtotal** | **$300,000** |
| | **Estimated Cost for Post Closure Site Management** | **$4,880,090** |

**Table 13.20 Closure Cost Summary**

| Component | Cost |
|---|---|
| Estimated cost for TWRMF closure | $203,410 |
| Estimated demolition costs for site buildings | $949,245 |
| Estimated costs for closure of miscellaneous site components | $405,510 |
| Estimated costs for land reclamation | $822,335 |
| Estimated costs for post closure site management & environmental protection | $4,8800,090 |
| **Total** | **$7,260,590** |

# 14.0 CONCENTRATE AND FRAC SAND PRICING

## 14.1 NICKEL CONCENTRATE PRICING

A review of concentrate pricing includes a review of the nickel market estimates of Smelter Terms prepared by Reid Resources (Reid, 2009). The forecasted prices for nickel in this report, Nickel Market Review and Estimates of Smelter Treatment Terms dated January 21, 2009 have not been carried through to this Financial Analysis outlined in Section 17.0.

### *14.1.1 MARKET BASED CONCENTRATE PRICING*

For the purposes of the Financial Model described in Section 17.0, metal prices and exchange rate have been established on the basis of a 3 year rolling average. This approach which is used by the Securities and Exchange Commission in the United States, considers the behaviour of the market in the previous three years. By using this approach, we have not included forecast pricing to establish forward looking pricing for our Financial Analysis. However, to gauge the sensitivity of the Financial Analysis to pricing and exchange rate we have included sensitivity analyses within Section 17.0, Project Economic Analysis.

Victory Nickel considers that historical pricing with adjustments for market over-reaction and under reaction is a more appropriate method of valuing a project. This is particularly relevant given the volatility observed in 2007, 2008 and 2009 in both the US$ and the commodity prices which makes exchange rate and metal forecasting ever more tenuous. In mid-2007 the nickel price reached over US$24 per pound which reflects an overheated market and conversely in late 2008 the market overreacted on the downside when the nickel price reached US$4.15 per pound.

Given the uncertainty in forecasting future prices, Wardrop has agreed to establish the commodity pricing using a three-year trailing average. However, to permit an evaluation of the possible effects of future fluctuations in commodity prices Wardrop has prepared various sensitivity analyses. In Section 17.0, the essential commodity prices and the US$ exchange have been varied by +/-10% from the three-year trailing averages.

### 14.1.2 SMELTER TERMS

The typical concentrate composition from Minago ore produced by locked cycle batch flotation tests is shown in Table 14.1.

**Table 14.1 Minago Concentrate Analysis from Flotation Tests**

| Component | Analysis |
|---|---|
| **Ni (%)** | **22.3** |
| Cu (%) | 1.4 |
| Co (%) | 0.46 |
| **Zn (%)** | **0.18** |
| Pb (%) | 0.10 |
| Al (%) | 0.11 |
| S (%) | 24.4 |
| Fe (%) | 17.0 |
| **MgO (%)** | **10.4** |
| $SiO_2$ (%) | 12.7 |
| Pt (g/t) | 2.47 |
| Pd (g/t) | 6.31 |
| Au (g/t) | 0.63 |
| Ag (g/t) | 4.3 |
| Rh (g/t) | 0.59 |
| Cr (g/t) | 410 |
| As (g/t) | 61 |
| Se (g/t) | <40 |
| Sn (g/t) | <20 |

The 22.3% nickel in the concentrate would make it essentially the highest nickel grade concentrate available in the world. However, the 10.4% MgO content of the concentrate will increase the difficulty and cost of smelting and will be reflected within the penalties in the Smelter Terms. Because of the high MgO content, it is possible that a single smelter would not agree to purchase the total annual Minago concentrate production, requiring production to be split between a number of smelters. Similarly the 0.18% zinc content is expected to impact the sale price by attracting further penalties.

### 14.1.3 METAL PRICING BASIS

The following basis of metal pricing is commonly accepted in contract terms:

- **Nickel:** Lower of the LME “cash” or “3 month” as per the Metal Bulletin.
- **Copper:** Lower of the LME “Grade A cash” or “3 month” price as per the Metal Bulletin.

- **Cobalt:** Lower of the "Metal Bulletin free market US$/lb 99.3% low" or "cobalt Metal Week US Spot Cathode low" price.
- **Gold:** Monthly average "Gold per troy Ounce, London afternoon price" per the Metal Bulletin.
- **Platinum:** Monthly average "Platinum per troy ounce, London afternoon price".
- **Palladium:** Monthly average "Palladium per troy ounce, London afternoon price".
- **Silver:** Monthly average of the London Spot/US Equivalent price for refined silver as in Metals Week.

Indicative terms are, as the expression indicates, indicative. The final or contract terms that are negotiated may be more favourable to the seller than the indicative terms. Some idea of the improvement in treatment charges and minimum deductions that may be realized through negotiation is set out in Table 14.2.

**Table 14.2 Typical Indicative and Final Pricing Terms**

| Inputs | Typical Indicative Offer | Potential Contract Terms |
|---|---|---|
| **Metal Accountability** | | |
| Ni (%) | 88 | 93-94 |
| Cu (%) | 85 | 88 |
| Co (%) | 50 | 50-65* |
| Au (%) | 80 | 80 |
| Pt (%) | 80 | 80 |
| Pd (%) | 80 | 80 |
| Ag (%) | 60 | 60 |
| **Minimum Deduction** | | |
| Ni (%) | 0 | 0 |
| Cu (%) | 0 | 0 |
| Co (%) | 0 | 0 |
| Au (ppm) | 0.5 | 0.5 |
| Pt (ppm) | 1 | 1 |
| Pd (ppm) | 1 | 1 |
| Ag (ppm) | 15 | 15 |
| Treatment Charge (US$/t conc.) | 240 | 150-240 |

*table continues…*

| Inputs | Typical Indicative Offer | Potential Contract Terms |
|---|---|---|
| **Refining Charge** | | |
| Ni (US$/lb) | 0.70 | 0.60 |
| Cu (US$/lb) | 0.45 | 0.40 |
| Co (US$/lb) | 2.75 | 2.00 |
| Au (US$/oz) | 25 | 15 |
| Pt (US$/oz) | 25 | 15 |
| Pd (US$/oz) | 25 | 15 |
| Ag (US$/oz) | 0.85 | 0.65 |

* Dependent on the efficiency of the smelter in recovering cobalt

Further negotiating benefit between Indicative Terms and Final Terms are the Potential Price Participation and Penalty Schedules given in Table 14.3 below.

**Table 14.3 Potential Price Participation and Penalty Schedules**

| Inputs | Typical Indicative Offer | Potential Contract Terms |
|---|---|---|
| **Price Participation** | | |
| Nickel | Deduct 10% of accountable value of Ni above US$5.00/lb | Typically deduct between 2% and 10% of Ni value above US$5.00/lb |
| Copper | Deduct 10% of accountable value of Cu above US$1.20/lb | Typically deduct between 2% and 10% of Cu value above US$1.20/lb |
| **Penalty Schedule** | | |
| Magnesia (MgO) | Deduct US$7.50/dmt/1% over 4% (Penalty of US$48/dmt of Minago conc) | Jinchuan penalty - US$4.00/dmt/1% over 4% (Penalty of US$25.60/dmt for Minago) |
| Silica ($SiO_2$) | Deduct US$7.50/dmt/1% over 25% | Deduct US$7.50/dmt/1% over 25% |
| Sulphur (S) | Deduct US$3.00/1% below 27% (Penalty of US$7.80/dmt for Minago) | Deduct US$5.00/1% below 24% (Penalty of US$2.00/dmt for Minago) |
| Chromium (Cr) | Deduct US$7.50/dmt/100 ppm above 500 ppm | Deduct US$7.50/dmt/100 ppm above 500 ppm |
| Zinc (Zn) | Deduct US$7.50/dmt/100 ppm above 500 ppm (At 1,800 ppm - penalty of US$97.50/dmt for Minago) | Jinchuan penalty -US$8.00/dmt/1,000 ppm above 1,000 ppm (At 1,800 ppm - Penalty of US$8.00/dmt for Minago) |
| Freight Charges | The party purchasing the conc may request that all freight costs be borne by Minago | In some existing contracts the party purchasing conc pays 100% of sea and land freight. (Compromise between extremes) |

Wardrop estimates nickel concentrate handling losses of 0.30% from the mine to smelter and an average moisture content of 6%. These percentage values have been applied in the financial model in the revenue calculations.

As this schedule indicates, in a worst-case scenario, the zinc content at 0.18% (1,800 ppm) of the Minago concentrate may potentially incur a penalty of nearly US$100/dmt of concentrate. This penalty compares with an expected penalty of about US$50/t for the 10.4% MgO present.

## 14.2 FRAC SAND FORECAST

### *14.2.1 INTRODUCTION*

Wardrop requested IM&M Consulting (Calgary) Ltd. (IM&M) to submit a forecast and opinion for frac sand demand and pricing. The following information has been taken from the IM&M Report, Frac Sand Price Forecast and Terms (IM&M, 2009).

A forecast and opinion is necessary since commercial frac sand terms are not available from potential customers. Nonetheless, potential customers have agreed to buy frac sand product at market prices when it becomes available. They have not committed to a purchase price due to market volatility.

IM& M was requested to compare the market demand with the potential market supply to determine the likely value of the Minago frac sand.

### *14.2.2 PROPOSAL*

In order to complete the analysis, the following considerations were examined:

- an estimate of the real cost of the sand delivered to the distribution points allowing for freight and terminal charges
- an assessment of the current frac sand suppliers, their capabilities, and an estimate of their selling price free on board (FOB) from their plants
- an investigation of the potential Minago frac sand volume available versus the projected market demand of sand for the years 2010 and 2011
- an investigation of existing sale terms between current suppliers and customers for frac sand.
- an estimate of the value of the market share available to Victory Nickel.

### *14.2.3 METHODOLOGY*

To prepare the opinion, IM&M has completed the following:

- contacted industry insiders to establish current pricing for frac sand products
- examined published documentation.

From the discussions with industry knowledgeable persons, a combination of plant pick-up and terminal pick-up pricing for 2008/09 was established. The value for the project's frac sand products was then established for the different markets under consideration.

From estimates of transportation and terminal costs, the net revenue, or net back, was calculated for the existing major suppliers. An estimate regarding the effects of expected supply and demand on pricing and the requirements for Victory Nickel to successfully enter the frac sand market was determined.

A discussion of the market influence on the near term demand and frac sand pricing was determined. The terms offered to the various customers were reviewed in an attempt to identify any barriers which would prevent Victory Nickel from entering the markets.

The size of the markets available to Victory Nickel was established for the period between 2010 and 2012. IM&M has used best efforts to present and analyze the data collected as accurately as possible. Since most of the data collected was from industrial insiders on an interview basis, the report's accuracy is not based on documented factual information.

### *14.2.4 COST OF FRAC SAND PRODUCTS*

The following discussion addresses the real cost of delivering the frac sand to the distribution points, allowing for freight and terminal charges.

In discussion with the customers, it was apparent that due to the volatile market, the price may vary significantly at a particular location from time to time. For instance, different 20/40 products at a specific location have different pricing. This volatility may be attributed to the following variables:

- Differences in purchasing power between customers. Multinational corporations, for example, may be able to obtain lower prices than smaller customers that operate in North America only.
- Contract purchasing appears to generally offer pricing discounts when compared to the spot purchase of product. In the instance of take or pay contracts, if the take offer is declined, the resultant available product is highly subsidized entering the market. In this situation, the spot market purchase is highly discounted.
- Seeking an average price in Canada for an import product is difficult when the commodity is priced in American currency, as the commodity is subject to currency fluctuations.

- There are three price points for any specific product. Those price points break down as:
  - Imported sands from the United States
  - Alberta Domestic ('A Domestic')
  - Saskatchewan Domestic ('S Domestic')

The prices reported below are in Canadian Dollars (Cdn$) per tonne.

### 14.2.5 FRAC SAND PRICING BY PRODUCT AND LOCATION

Table 14.4 through to Table 14.8 provide the pricing for specific products at a specific location. The pricing represents the highest price reported, the lowest price reported, and the average price for all responses.

**Table 14.4 Medicine Hat Frac Sand Pricing**

| Product | | Import 20/40 | A Domestic 20/40 | S Domestic 20/40 | A Domestic 30/50 |
|---|---|---|---|---|---|
| Price Range (Cdn$/t) | Maximum | 170.48 | 132.00 | 165.00 | 108.00 |
| | Minimum | 141.63 | 104.00 | 158.00 | 98.00 |
| | Average | 156.88 | 117.05 | 161.10 | 103.00 |

**Table 14.5 Tilly Frac Sand Pricing**

| Product | | A Domestic 20/40 | S Domestic 20/40 | A Domestic 30/50 |
|---|---|---|---|---|
| Price Range (Cdn$/t) | Maximum | 130.00 | 165.00 | 108.00 |
| | Minimum | 104.00 | 162.00 | 98.00 |
| | Average | 115.92 | 163.72 | 103.00 |

**Table 14.6 Red Deer Frac Sand Pricing**

| Product | | Import 20/40 | A Domestic 20/40 | S Domestic 20/40 | A Domestic 30/50 |
|---|---|---|---|---|---|
| Price Range (Cdn$/t) | Maximum | 203.26 | 108.96 | 215.00 | 108.96 |
| | Minimum | 152.25 | 97.37 | 186.00 | 88.96 |
| | Average | 173.98 | 99.53 | 200.50 | 98.96 |
| **Product** | | **Import 30/50** | **Import #100** | **A Domestic #100** | **S Domestic #100** |
| Price Range (Cdn$/t) | Maximum | 169.17 | 229.49 | 149.59 | 262.28 |
| | Minimum | 168.46 | 196.71 | | 215.00 |
| | Average | 168.81 | 210.38 | | 250.45 |
| **Product** | | **Import 40/70** | **S Domestic 40/70** | | |
| Price Range (Cdn$/t) | Maximum | 185.00 | 185.00 | | |
| | Minimum | 169.17 | | | |
| | Average | 177.08 | | | |

**Table 14.7 Peers Frac Sand Pricing**

| Product | | Import 20/40 | S Domestic #100 |
|---|---|---|---|
| Price Range (Cdn$/t) | Maximum | 216.38 | 211.00 |
| | Minimum | 183.59 | 170.00 |
| | Average | 199.99 | 190.50 |

**Table 14.8 Grand Prairie Frac Sand Pricing**

| Product | | Import 20/40 | A Domestic 20/40 | S Domestic 20/40 | A Domestic 30/50 |
|---|---|---|---|---|---|
| Price Range (Cdn$/t) | Maximum | 203.26 | 126.50 | 190.00 | 116.50 |
| | Minimum | 173.14 | 96.50 | 170.17 | 106.50 |
| | Average | 191.87 | 113.74 | 182.06 | 109.00 |
| **Product** | | **Import 30/50** | **S Domestic 40/70** | **A Domestic #100** | **S Domestic #100** |
| Price Range (Cdn$/t) | Maximum | 189.52 | 170.00 | 162.50 | 235.00 |
| | Minimum | 187.53 | 167.00 | n/a | 170.00 |
| | Average | 188.52 | 168.5 | n/a | 221.55 |
| **Product** | | **Import #100** | | | |
| Price Range (Cdn$/t) | Maximum | 205.00 | | | |
| | Minimum | 183.59 | | | |
| | Average | 194.30 | | | |

### 14.2.6 CURRENT FRAC SAND SUPPLY

The ability of suppliers to meet the consumption demand for frac sand and an overview of the frac sand market in the U.S. and Canada is presented below.

#### UNITED STATES

US Industrial Sand producers produced 29,000,000 tonnes of Industrial sand in 2007 and consumed the same amount. Approximately 18% or 5,260,000 tonnes of the 2007 US consumption total was used by the petroleum industry as a proppant in hydraulic fracturing. The value of the 2007 frac sand sales in terms of net revenue (the 'Net Back') was calculated at US$261,000,000 for an average Net Back US$49.56/tonne. This netback value is based on estimated market value within the U.S. for the respective years mentioned and is not to be compared with the $Cdn 63.02 used in the financial model.

U.S. consumption of industrial sand and gravel increased by 3% in 2007 versus 2006. Texas reported one of the highest consumption increases of industrial sand and gravel at 214% for a resulting annual total of 3,280,000 t. In 2007, Texas consumed more industrial sand and gravel than it produced. For the year, Texas consumed 3,770,000 t of industrial sand and gravel but only produced 3,280,000 t, requiring a 490,000t imported into state. The US exported 351,000 t of industrial sand and gravel to Mexico in 2007. Since industrial sand is freight sensitive, it can be assumed that most of the sand shipped to Mexico would have come from Texas. With the Mexican export amount combined with the net deficit of frac sand production and consumption within Texas, the total 2007 volume of imported sand and gravel

into Texas was 841,000 t.[1] This would equate to approximately 150,000t of frac sand imported into Texas in 2007 and represents a potential market indicator of demand, at least for the state of Texas.

In 2007 the US exported 563,000 t of industrial sand and gravel to Canada. Assuming 17.5% of the total export is frac sand, the same overall percentage reported for the US, this calculates into 98,713 t of frac sand exported to Canada. Only 3 of the top 10 US producers of industrial sand and gravel (Badger Mining Corp., Unimin Corp., and Fairmount Minerals Ltd.) export frac sand into Canada. This indicates a potential market for domestic frac sand from Canada to meet the demands which are located primarily in western Canada.

For the 2008 season, the demand for the coarser frac sand products (12/20 to 20/40) was so great in the US that availability of the coarser sizes was limited in Canada, as the American producers satisfied the US demand first. As a result of the US demand, additional capacity is being developed in the US.

### *Capacity*

Similar to the early 1980s, U.S. production in 2008 was close to its maximum capacity. The increased demand spurred a number of new project investigations, both greenfield and existing plant modifications to increase capacity. Recently, a significant resistance to new plant construction has arisen due to heightened environmental concerns. It is anticipated that up to half of the projects will be delayed due to permitting concerns. Documentation shows Pattison's plant in Arizona and the Canadian sand and proppants projects in Wisconsin have encountered permitting problems.

In the future, new capacity that comes on-line will need to meet the market demand for all frac sand proppant sizes. Increased demand for the non-traditional finer sands is expected to more than compensate for the expected down turn in demand of the coarser traditional sands. With the forecasted growth in demand, it is anticipated that any extra capacity built in 2009-10 will be fully utilized by 2012.

## CANADA

In order to discuss the capabilities of the Canadian producers, a discussion of the quality of frac sand available in the Canadian market is required.

[1] Thomas P. Dolley, USGS 2007 Minerals Yearbook, Silica [Advance Release] November 2008.

*Quality Available*

Including the Winnipeg formation Sand similar to Minago, there are four distinct sand qualities available in Canada:

- Ottawa White sands from the US
- Texas Brown sand from the US
- Winnipeg formation sands from Saskatchewan
- Alberta dune sands.

Ottawa White sands are recognized as the premium quality frac sand proppant, characterized by high silica content, whiteness, high roundness and sphere contoured, and lack of dust generation during use. Ottawa White sands are composed of a single crystal phase resulting in high sand grain crush strength[2].

Texas Brown sand is a high quality fracturing proppant that meets or exceeds all API RP-56 guidelines. The differences between the Texas Brown and Ottawa White sands are that the Texas Brown evaluates as more angular than the Ottawa White and contains more mineral impurities such as feldspar. As a result, the crush strength of the brown sand is less than the white, a consideration at higher closure stresses.

Winnipeg formation sands from Saskatchewan are more angular than Texas Brown sands and can be composed of multi-grains. The sand evaluates as high purity silica but with a lower crush resistance.

Alberta dune sands, generally the youngest sand deposits, are the most angular and have the most diverse mineralogy. These sands generally have the lowest crush resistance and may not meet API RP-56 guidelines.

In Canada, the Ottawa White sand is ranked as highest quality with the Texas Brown Sands from the US ranked second, Saskatchewan sands third, and the Alberta dune sands last. The use of Alberta dune sands is a relatively new phenomenon in Canada. Alberta dune sand products have been marketed in the concrete, sand blasting, foundry, and fiberglass markets for some time. The lack of availability of the traditional US proppants has prompted the use of dune sands. The customers in oil or gas production have resorted to using dune sand to avoid delays in oil and gas well completions caused by inadequate supply of high grade sand. Historically, the cost savings from using low grade dune sand, which has been readily available for decades, was not perceived to be worth the risk to well production rates. This has been the prevalent thought, even though the improved permeability argument by Halliburton (IM&M, 2009), states that for shallower wells with lower closure stresses,

[2] Choosing Fracturing Sand to Optimize Permeability Achieved vs Cost, Halliburton, 2005.

improvement in permeability holds true when utilizing dune sands. The long term effect on the Canadian frac sand market requires further investigation.

### *Capacity*

Marketability of Canadian domestic sand has never been a question of capacity. The quality of the sand products and availability of the higher quality products has had more influence on domestic sand sales than capacity constraints. Best estimates is that the installed capacity of the current domestic sand supplies is approaching 680,000 tonnes for the coarse products and least 600,000 tonnes for the finer products.

New dune sand capacity and current plant capacity upgrades are expected in 2009, subject to pricing and the availability of higher quality product. This new capacity or the increase of installed capacity may not be fully utilized. With regard to the domestic product from Saskatchewan, based on the pricing collected from customers, the Saskatchewan product would have been displaced had a better or equivalent quality product been available. Furthermore, the pricing of the Saskatchewan product, at nearly twice the price of Alberta product, further reinforces a resistance to use the Alberta dune sands.

The Victory Nickel frac sand would be preferred over the lower quality Alberta dune sands in the Saskatchewan market.[3]

### *Net Backs*

The following discussion examines revenue Net Back to the producing plants for frac sand products sold into the different areas of Canada. Net Back is calculated by subtracting the estimated freight and terminal charges from the sales price.

[3] Wardrop Report to Victory Nickel Inc. Marketing Study for the Minago Sand Project, March 2008.

**Table 14.9 Average Netback Revenue to Plants**

| Location | Medicine Hat | | | Tilly | | | Red Deer | | |
|---|---|---|---|---|---|---|---|---|---|
| | Average Price (CAD$/t) | Average Net Back | | Average Price (CAD$/t) | Average Net Back | | Average Price (CAD$/t) | Average Net Back | |
| **20/40** | | | | | | | | | |
| Import | 156.88 | $82.31 | 52.5% | | | | 173.98 | $96.79 | 55.6% |
| S Domestic | 161.10 | $113.10 | 70.2% | 163.72 | $115.72 | 70.7% | 200.50 | $122.70 | 61.2% |
| A Domestic | 116.20 | $66.63 | 57.3% | 113.00 | $65.00 | 57.5% | 99.53 | $63.90 | 64.2% |
| **30/50** | | | | | | | | | |
| Import | | | | | | | 168.81 | $91.62 | 54.3% |
| A Domestic | 103.00 | $55.00 | 53.4% | | | | 98.96 | $60.00 | 60.6% |
| **40/70** | | | | | | | | | |
| Import | | | | | | | 177.08 | $99.89 | 56.4% |
| **50/140** | | | | | | | | | |
| Import | | | | | | | 210.38 | $133.19 | 63.3% |
| S Domestic | | | | | | | 250.45 | $172.65 | 68.9% |
| A Domestic | 162.50 | $125.00 | 76.9% | | | | 149.96 | $125.00 | 83.4% |

| Location | Peers | | | Grand Prairie | | | Fort Nelson | | |
|---|---|---|---|---|---|---|---|---|---|
| | Average Price (CAD$/t) | Average Net Back | | Average Price (CAD$/t) | Average Net Back | | Average Price (CAD$/t) | Average Net Back | |
| **20/40** | | | | | | | | | |
| Import | 199.99 | $116.24 | 58.1% | 191.87 | $101.56 | 52.9% | | | |
| S Domestic | | | | 182.06 | $89.06 | 48.9% | | | |
| A Domestic | | | | 113.74 | $63.90 | 56.2% | | | |
| **30/50** | | | | | | | | | |
| Import | | | | 188.52 | $98.22 | 52.1% | | | |
| S Domestic | | | | 177.00 | $84.00 | 47.5% | | | |
| A Domestic | | | | 109.00 | $57.50 | 52.8% | | | |
| **40/70** | | | | | | | | | |
| Import | | | | | | | 175.00 | $84.69 | 48.4% |
| S Domestic | | | | 168.50 | $75.50 | 44.8% | 200.00 | $110.00 | 55.0% |
| **50/140** | | | | | | | | | |
| Import | | | | 194.30 | $103.99 | 53.5% | 160.00 | $69.69 | 43.6% |
| S Domestic | 190.50 | $139.50 | 73.2% | 221.55 | $118.22 | 53.4% | 200.00 | $110.00 | 55.0% |
| A Domestic | 125.00 | $125.00 | | 162.50 | $125.00 | 76.9% | | | |

### *14.2.7 SAND VOLUMES REQUIRED FOR IDENTIFIED MARKETS*

The following discussion investigates the frac sand demand in the US and Canadian markets.

## UNITED STATES

Raw frac sand proppant is defined as sand-only proppant and does not include resin coated sand. Growth in the US saw frac sand consumption has been reported to average 13.5%/annum between 2007 and 2012. According to the Freedonia Group, over and above the traditional shallow gas consumption of raw frac sand, the use of frac sand in Coal Bed Methane wells is a specific growth segment[4].

**Table 14.10 Raw Frac Sand Proppant Demand 1997 – 2017**

| Item | 1997 | 2002 | 2007 | 2012 | 2017 |
|---|---|---|---|---|---|
| Producing Wells (000) | 884 | 917 | 970 | 1,040 | 1,100 |
| Ton/Well | 1.6 | 1.6 | 4.9 | 7.7 | 11.2 |
| US$/Well | 45 | 59 | 247 | 447 | 745 |
| Sand Proppant Demand (M lb) | 3,285 | 3,560 | 11,545 | 19,500 | 30,000 |
| Sand Proppant Demand (t) | 1,642,500 | 1,780,000 | 5,772,500 | 9,750,000 | 15,000,000 |
| % Raw Frac Sand | 87.1 | 84.6 | 83.2 | 82.6 | 82 |
| Raw Frac Sand Proppant (M lb) | 2,860 | 3,010 | 9,600 | 16,100 | 24,600 |
| Raw Frac Sand Proppant (t) | 1,430,000 | 1,505,000 | 4,800,000 | 8,050,000 | 12,300,000 |
| Cents/lb | 1.4 | 1.8 | 2.5 | 2.9 | 3.3 |
| US$/Ton | 28 | 36 | 50 | 58 | 66 |
| Raw Frac Sand Proppant (M $) | 40 | 54 | 240 | 465 | 820 |
| % Raw Frac Sand | 45.5 | 39.1 | 35.6 | 34.6 | 33.6 |
| Sand Proppant Demand (M $) | 88 | 138 | 675 | 1,345 | 2,440 |

Another growth segment in the US is the non-traditional fine frac sand consumption for the Barnett Shales in Texas. With high fines frac sand consumption of 500 t to 1,000 t per horizontal well, a shortage of fine frac sand (i.e. 40/70 and 50/140) has developed. Saskatchewan Domestic fine sands have been shipped to Texas to address the shortage and command premium pricing up to US$160.00/t.[3]

## CANADA

Based on the survey of frac service companies, the volume of frac sand consumed in the Canadian market in 2008 was 1,017,000 t. The market for 2009 is difficult to predict due to the world recession and the resultant fall in the price of natural gas and oil. The projections in Canada are that drilling for oil and gas wells will be down for 2009, although it appears that the amount of frac sand being consumed per well is increasing. For this report, it is assumed that with more frac sand proppant being consumed per well, the volume of traditional sized frac sand proppant consumed in 2009 should be similar to 2008.

[3] Wardrop Report to Victory Nickel Inc. Marketing Study for the Minago Sand Project, March 2008.
[4] Freedonia Group, excerpts from Study Number 2358, Well Stimulation Materials to 2012, June 2008, www.freedoniagroup.com.

Consumption of traditional frac sand sizes in Canada has closely followed the consumption in the US. As such, the reported increases of 13.5%/a in the US would be expected to be reflected in the Canadian frac sand consumption. Typically the Canadian market for traditional frac sand sizes was 10% to 15% of the US market. The information collected for 2008 from the service companies put the Canadian market closer to 20% of the US. Any tonnage increase in the Canadian market is expected to be less than the US in order to maintain the traditional market relationship.

For non-traditional sizes, 40/70 and 50/140, the volume consumed is seen as bonus volume for 2009. There are as many as four deep shale gas explorations under consideration:

- the Horn River Basin in northeastern BC
- the Montney Basin in northeastern BC
- the Utica Shale along the St. Lawrence valley in Quebec
- the Horton Bluff shales in Windsor, NS.

These areas are under a high level of security with information difficult to obtain. Committed fine sand volume for the first quarter of 2009 is in excess of 110,000 t from the service companies that would report that information. If the northern BC projects proceed, the fine proppant demand could exceed 1,000,000 t/a by 2010 to 2011.

### 14.2.8 FRAC SAND SALES TERMS

An investigation into the terms on which frac sand is sold to different customers was completed. From discussions with the service company customers, frac sand is purchased under a combination of the following:

- take or pay volumes at the terminals
- take or pay volumes at the plants
- based on availability at the terminals
- based on availability at the plants.

”Take or pay” volumes is an annual or monthly volume commitment; if that commitment is not met, a payment is required to reimburse the supplier for sand volume not consumed. Those penalties are higher when a volume commitment is made at a terminal rather than the plant, as the cost of transportation and the terminal charges can enter into the penalty settlements. In all situations, volume released from the commitment is made available to the producer/wholesaler for resale as a sale based on availability. Contracted take or pay pricing is usually less than availability pricing in specific locations.

### 14.2.9 VALUE OF THE ACCESSIBLE MARKET

A calculation of the value of the market accessible to the Minago Project, based on the current pricing and Net Backs to the plant, is provided in Table 14.11.

The sales price is derived from the average pricing as discussed above, and the Wardrop report entitled “Marketing Study for the Minago Sand Project”. Transportation amounts to the different markets from the Minago mine site were collected from the Wardrop report entitled “Transportation Analysis for the Minago Sand Project”[5].

Annual pricing increases for frac sand in the Canadian market are expected in the 4% to 12% range. With the negative pressures on pricing on frac sand as a result of the decrease in oil and gas price and the recession, no pricing increase is expected for 2009.

**Table 14.11 Market Value Accessible to Victory Nickel**

| | Maximum Production (t) | Probable Sales (t) | Sales Price (CDN$/t) | Transport Cost (CDN$/t) | Net Back (CDN$) |
|---|---|---|---|---|---|
| **Friable Sand** | | | | | |
| **20/40 Frac Sand** | 96,625 | | | | |
| Grand Prarie, AB | | 96,625 | 185.00 | 81.32 | 10,018,066 |
| **30/50 Frac Sand** | 95,000 | | | | |
| Estevan, Weyburn, SK | | 47,500 | 140.00 | 75.00 | 3,087,501 |
| Grand Prairie, AB | | 47,500 | 175.00 | 81.32 | 4,449,802 |
| **40/70 Frac Sand** | 152,500 | | | | |
| Ft. Nelson, BC | | 152,500 | 180.00 | 103.51 | 11,666,229 |
| **50/140 Frac Sand** | 268,739 | | | | |
| Ft. Nelson, BC | | 43,739 | 180.00 | 103.51 | 3,346,033 |
| Houston, Texas, USA | | 225,000 | 160.00 | 121.25 | 8,718,750 |
| **Non Friable Sand** | | | | | |
| **Flux Sand** | 123,370 | | | | |
| Thompson, MB | | 62,500 | 36.00 | 25.00 | 687,500 |
| **20/40 Frac Sand** | 110,937 | | | | |
| Estevan, Weyburn, SK | | 110,937 | 100.00 | 75.00 | 2,773,425 |
| **50/140 Frac Sand** | 356,505 | | | | |
| Ft. Nelson, BC | | 356,504 | 180.00 | 103.51 | 27,272,617 |
| **Total** | **1,234,518** | **1,142,805** | | | **$72,019,885** |

[5] Wardrop Report to Victory Nickel Inc. Transportation Analysis for the Minago Sand Project, March 2008.

# 15.0 CAPITAL COSTS

## 15.1 OVERVIEW

The capital cost estimate (CAPEX) for the mine, process plant, load out facility and infrastructure for the Project has been prepared in accordance with standard industry practices for feasibility-level studies, and to a definition level and intended accuracy of -10% to +20%.

This estimate includes direct and indirect cost estimates, based on current pricing for common items required for projects of this nature, and data from projects that have been recently concluded or are currently underway.

To establish current market pricing, various contractors, freight forwarders, vendors and service suppliers were consulted to provide pricing information for use in this estimate. This estimate also considers factors such as construction personnel costs, material availability, work methods, areas of risk, as well as anticipated escalation of capital over the construction period.

## 15.2 SUMMARY

The CAPEX consists of four main parts: Direct Costs, Indirect Costs, Contingency and Owner's Costs. The estimate was developed by a team of engineers, procurement specialists and cost estimators from Wardrop.

As of December 14, 2009 the CAPEX for the Project is estimated to be Cdn$596 million. This estimate is subject to the qualifications, assumptions and exclusions which are detailed in this study. For equipment and services purchased in the United States the exchange rate of Cdn$1.097 = US$1.00 has been used and is based upon a three-year trailing average to December 10, 2009.

The Capital Cost Estimate [CCE] is structured in four levels:

- Level 1 by Category which is the primary reporting level.
- Level 2 by Area which defines physical or process scope.
- Level 3 by Package or by System.
- Level 4 which is the detailed level where the information is structured by Trade.

The Level 4 information is summarized in Level 3, Level 3 in Level 2 and Level 2 in the summary level, Level 1.

The summary Level 1 Capital Cost Estimate is shown in Table 15.1 with the Level 3 Capital Cost attached in Appendix K-1. The Level 1 and Level 2 Capital Cost Summaries can be abstracted directly from the Level 3 Capital Cost Estimate.

**Table 15.1 Summary Project Capital Cost Estimates**

| Category Number | Description | Total (Cdn$) | Pre-Production (Cdn$) | Sustaining (Cdn$) |
|---|---|---|---|---|
| **Direct Costs** | | | | |
| 00000 | General | 5,883,000 | 5,883,000 | $0 |
| 10000 | Site Development | 37,205,500 | 37,205,500 | $0 |
| 20000 | Site Utilities | 47,616,600 | 45,616,600 | 2,000,000 |
| 30000 | Tailings Management Facilities | 16,481,400 | 15,231,400 | 1,250,000 |
| 40000 | Frac Sand Development | 26,639,000 | 26,639,000 | $0 |
| 50000 | Mine Infrastructure | 35,608,600 | 35,608,600 | $0 |
| 60000 | Mobile Equipment | 106,975,000 | 106,975,000 | $0 |
| 70000 | Ore Processing Facilities | 146,696,900 | 146,696,900 | $0 |
| 80000 | Non-Process Buildings | 19,118,900 | 19,118,900 | $0 |
| | Totals - Direct Costs | 442,224,900 | 438,974,900 | 3,250,000 |
| **Overhead Costs** | | | | |
| X0000 | Indirect Costs | 91,399,100 | 91,399,100 | $0 |
| Y0000 | Owner's Costs | 12,847,500 | 12,847,500 | $0 |
| Z0000 | Contingency | 49,796,500 | 49,796,500 | $0 |
| Overhead Cost Total | | 154,043,100 | 154,043,100 | 0 |
| **Grand Total** | | **596,268,000** | **593,018,000** | **3,250,000** |

The direct costs are based on the following information:

- process flow diagrams, site layout and general arrangement drawings, equipment lists, electrical single line diagrams and P&IDs (piping and instrumentation diagrams)
- budget submissions for the design/supply of new major and secondary equipment provided by vendors in accordance with specifications and/or datasheets developed by the engineering groups involved
- prices for permanent materials based on supplier quotations, in-house data, and current market conditions
- quantity take-offs for materials, provided by Wardrop
- labour rates that reflect local and regional construction contractors' rates

- productivities for installing equipment and materials were obtained from northern construction contractors familiar with the project location and local conditions Expected productivities have been discussed for this location and compared to actual results from other projects as well as with in-house data
- supply and installation prices from experienced vendors of pre-engineered and modular buildings and Wardrop in-house data
- direct costs for new equipment, materials, and installation for permanent facilities associated with: crushing, material handling and processing
- process equipment and facilities
- infrastructure roads and site preparation
- power supply and distribution
- pre-production mining
- tailings storage including closure management
- assay, metallurgical and environmental laboratories
- warehousing
- administration
- truck shop
- yard services and other utilities
- control and communications systems
- plant mobile equipment
- fuel storage
- cold storage
- explosives storage.

## 15.3 PRICING

The pricing for commodities or the design/supply of equipment are budgetary and not based upon binding quotations. These budgetary quotations have been obtained from vendors and contractors for major equipment and unit rates. “Budgetary quotations” generally means that indicative pricing has been provided for specified equipment, materials and productivity, but no commitment has been made to provide the equipment or materials at this price at a future date.

## 15.4 TAXES

The Mining Tax applies to all operators engaged in the mining and/or processing of minerals in Manitoba, excluding oil and gas, rock, gravel, peat, clay and gypsum.

An operator of a mineral processing establishment in Manitoba must pay to the minister a tax for each fiscal year equal to:

a. 10% of the operator's profit for the year, if the profit for the year is $50,000,000 or less;

b. $5,000,000 plus 65% of the operator's profit for the year in excess of $50,000,000, if the profit for the year is more than $50,000,000 and not more than $55,000,000;

c. 15% of the operator's profit for the year, if the profit for the year is more than $55,000,000 but not more than $100,000,000;

d. $15,000,000 plus 57% of the operator's profit for the year in excess of $100,000,000, if the profit for the year is more than $100,000,000 and not more than $105,000,000; or

e. 17% of the operator's profit for the year, if the profit for the year is more than $105,000,000.

In addition, there is a 0.5% special tax on mining "profit" although in most cases, based on certain income tax calculations, this tax is fully refundable.

In calculating the profit of an operator in a fiscal year the following expenses, payments and allowances that relate to the mining, processing and sale of output mined in Manitoba, incurred in that fiscal year shall be deducted:

a. the actual costs to the operator of transportation of any output sold

b. the salaries of the employees

c. the actual operating costs of the operator of mining, milling, smelting, refining, recrystallizing or otherwise beneficiating the output in Manitoba

d. the actual cost of insurance, and mint and marketing costs

e. municipal taxes paid by the operator or contributions made to a municipality or local government district in Manitoba

f. the actual net costs to the operator for any research that is designed to reduce the cost per unit of of output or is designed to develop new products or uses of minerals produced from the operator's mine in Manitoba

g. an annual depreciation allowance of the depreciable assets of the operator, which shall not exceed 20% of the undepreciated balance of the depreciable assets

h. exploration expenses

i. the actual costs for the purchase of mineral products mined in Manitoba for further processing or for resale

j. any other expenses incurred by the operator attributable to the mining, processing and sale of the output.

A 'new mine tax holiday' is in effect which provides that no Mining Tax is payable on the profit of a new mine until the tax holiday pool is nil or negative. The profit in a fiscal year for a new mine that is eligible for the new mine tax holiday shall be calculated separately as if the new mine was the only mine in which the operator had an interest. The tax holiday pool is defined by the Manitoba Mining Tax Act Schedule 5 equation below.

$$Tax\ Holiday\ Pool = H + A - D - P - N$$

In this formula:

H is the balance of the tax holiday pool at the end of the previous fiscal year.

A is the expenditures incurred prior to the new mine achieving production in reasonable commercial quantities, for the acquisition of depreciable assets in the current fiscal year.

D is the proceeds of disposal for depreciable assets in the current fiscal year.

P is the new mine profit, before depreciation allowance, earned in the current fiscal year.

N is the new investment credit calculated in accordance with the Manitoba Mining Tax Act Schedule 1 equation below.

$$New\ Investment\ Credit = (.07 \times I) - A$$

In this formula:

I is the total amount invested by the operator in depreciable assets for the construction and equipping of new mines and the construction and equipping of processing structures or facilities in Manitoba.

A is the amount of new investment credit calculated under this Formula for the purposes of a previous fiscal year.

There is not any provision for Mining Taxes included within the Financial Model.

## 15.5 PROJECT CURRENCY, ESTIMATE BASE DATE AND FOREIGN EXCHANGE

All project capital costs are expressed in Canadian Dollars with costs based on June to September 2009 market conditions without any provision for cost escalation beyond this date.

Costs submitted in other currencies have been converted to Canadian Dollars. The foreign currency exchange rates applied to the CAPEX relative to Canadian Dollars are set out in Table 15.2. For equipment and services purchased in the United States the exchange rate of Cdn$1.097 = US$1.00 has been used based upon a three-year trailing average to December 10, 2009.

**Table 15.2 Foreign Exchange Rates**

| Base Currency | Foreign Currency |
|---|---|
| CDN$1.097 | US$1.00 |

Any updates to costing due to currency fluctuations were updated in December 2009.

## 15.6 PROJECT IMPLEMENTATION

The CAPEX is based on the assumption that Victory Nickel will follow the Project Implementation Plan described in this feasibility study. Any significant deviation from this Project Implementation Plan may have an impact on both the project schedule and costs since the various costs have been calculated assuming the timeframe developed in the Project Implementation Plan.

## 15.7 DIRECT COST ESTIMATING BASIS

### *15.7.1 QUANTITY DEVELOPMENT AND PRICING*

All quantities developed are based on general arrangement drawings, process design criteria, process flow diagrams, and preliminary P&IDs. Design allowances are applied to bulk materials based on discussions between the respective discipline and the estimator. The respective discipline quantities are as detailed in the following sections.

### 15.7.2 BULK EARTHWORKS

Bulk earthworks quantities are based on rough grading designs using the Autodesk Land Development Desktop Civil Package. Excavation of overburden and allowances for rock excavation are based on geotechnical information available at the time of the study. Structural fill cost is based on aggregates being produced at site utilizing a portable crushing and screening plant. The price of the aggregate plant is included in the material prices contained in the capital cost estimate.

Earthwork quantities do not include an allowance for bulking or compaction of materials as these allowances are included in the unit prices. Percentages of total quantities allocated to rock either ripped or drill/blast, waste material, and cut/fill is assigned based on available soils information.

### 15.7.3 PLANT SITE SERVICES

Plant site services quantities for fire water, fresh water and sewage disposal are based on engineering designs, sketches and P&IDs which identify pipe sizes and routing.

### 15.7.4 CONCRETE

Concrete quantities are based on “neat” line quantities from engineering designs and sketches. For estimating purposes, designers provided neat quantities in the following breakdown:

- lean mix levelling concrete
- footings and foundations
- retaining walls
- grade beams and pedestals
- perimeter walls
- slab on grade
- elevated slabs
- pads curbs and sumps
- embedded metals and anchor bolts.

Typically all concrete is based on 30 MPa unconfined compressive strength, UCS with the exception of lean mix levelling concrete, which is based on 10 MPa. The unit rates for the supply of the 30 MPa concrete will vary based on installation type.

Quantities are provided by area as defined by the project Work Breakdown Structure (WBS). Unit rates for each type include formwork, reinforcing steel, placement,

additives, and finishing of concrete. Costing is based on pre-mix concrete delivered from a batching plant.

### 15.7.5 STRUCTURAL STEEL

Steel quantities are based on quantities developed from engineering designs and sketches with allowances for cutoffs, bolts, and connections. For estimating purposes, the designers have provided steel quantities as per the following breakdown. As the designers have provided neat quantities, these allowances are to be added by the contractor's estimators.

- light weight steel sections: 0 to 30 kg/m (tonnes)
- medium weight steel sections: 31 to 60 kg/m (tonnes)
- heavy steel sections: 61 to 90 kg/m (tonnes)
- extra heavy steel sections: >90 kg/m (tonnes)
- platforms (tonnes)
- stairways (metres)
- checker plate ($m^2$)
- grating ($m^2$)
- handrail with kick-plate (metres)
- handrail without kick-plate (metres)
- ladders (metres).

Supply unit rates are based on the current world pricing for steel.

Stick build quantities are obtained from layout sketches. "S-Frame" structural modelling and analysis software was utilized for major building structures.

### 15.7.6 PLATEWORK AND LINERS

Quantities for all plate-work and metal liners for tanks, launders, pump boxes, and chutes are calculated based on detailed quantity take-offs developed from design drawings and sketches and are provided in kilograms of steel. Rubber lining for pump boxes is provided on a square metre basis. Wear plate liners and rubber liners are included as appropriate.

### 15.7.7 HVAC

Quantities for HVAC systems have been designed and calculated by Wardrop's building services engineer or obtained from in-house data. Prices have been obtained from suppliers on budgetary quotes.

### 15.7.8 DUST COLLECTION/SUPPRESSION

The pricing information for the dust collection and suppression items has been obtained by Wardrop. Dust suppression system and dust ducting sizes/capacities are designed by normal methods.

The amount of ducting is calculated on anticipated duct runs at the project site.

The installed price of dust collection ducting will be based on rates supplied by Wardrop's building engineer based on previous project information. Installation costs for the equipment and ductwork are based on previous information from similar projects.

### 15.7.9 PIPING

Piping quantities are based on detailed quantity take-offs for pipe over 3" (75 mm) diameter and fittings. The quantity take-offs are developed from pipe routing 'red line' drawings based on the detailed general arrangement drawings and the P&IDs, which identify pipe size. Piping is provided as separate line items and sorted by WBS area and pipe specification. Piping under 3" diameter (including fittings) is included as a total number of lines per area at an average length of 15 m. Special piping such as stainless steel will be listed separately with flanges and bolt-ups included. Allowances will be included for specialty items such as flexible hoses, etc.

Painting and tagging are included as appropriate with pipe insulation quantified and quoted by an insulation supplier.

Specifications for electrical heat tracing for the major pipelines were prepared and issued to suppliers for budgetary quotations. Electrical heat tracing for all other main service lines is priced by Wardrop's electrical engineer, based on Wardrop's in-house data from previous projects.

Two types (categories) for piping supports will be included as follows:

- Type 1 = >300 mm pipe
- Type 2 = 50 mm – 300 mm pipe

Some small bore piping will be supported on cable tray.

### 15.7.10 VALVES

All automated valves are listed as separate line items in the estimate, and are priced from budgetary quotes. All manual valves are included in the blended price for the specific pipe runs.

### 15.7.11 ELECTRICAL

Electrical quantities are included as part of the Wardrop's electrical engineer's scope. These consist of electrical costs for each piece of equipment including cables, which are based on the single line diagram. Project drawings and sketches will be based on the project Work Breakdown Structure (WBS).

The equipment list is used to estimate loading and generation requirements. The equipment list and site plan are used to locate electrical buildings to minimize cable runs.

A single line diagram is developed to indicate major electrical equipment including generators, transformers, feeders, power distribution centres, motor control centres, and requirements for variable frequency drives as appropriate.

The electrical sub-station is to be designed and quoted to be built off-site and delivered as complete modular units. The on-site work will consists of connecting the incoming transformer feed and motor feeders. The electrical areas are self contained with all necessary auxiliary equipment.

Equipment specifications will be prepared for all major equipment to be provided to suppliers for quotation guidance.

The remaining equipment will be designated as "infrastructure". Lighting and grounding estimates are based on square metre calculations.

In-house pricing is used for smaller items as required.

### 15.7.12 INSTRUMENTATION

Instrumentation quantities are included as part of the instrumentation engineer's scope, which includes instrument costs. Each piece of equipment, including cables, is based on project drawings and sketches. Instrument types and quantities are included based on developed P&IDs. Instrument specifications will be written and issued to suppliers to obtain equipment costs.

Quantities will be estimated based on electrical room locations, instrument quantities, and area layouts. Instrument types, quantities, and costs will be assembled to form the instrument index.

### 15.7.13 PRE-ENGINEERED BUILDINGS

Pre-engineered buildings are based on Wardrop's in-house data from previous projects and upon current quotes from Pre-engineered Building contractors.

## 15.8 ENGINEERING, PROCUREMENT, AND CONSTRUCTION MANAGEMENT

Engineering and procurement costs were provided by Wardrop based on the required specifications and estimated number of drawings.

## 15.9 LABOUR RATES

Labour rates include the following:

- base rates include basic rate (based on combined union and non-union)
- payroll burdens including employment insurance, vacation pay, etc
- overtime shift premium rates are included with an allowance for incidental overtime will be included in the estimate's section on indirects.

Applicable contractor's monthly fees were provided for in the hourly rates.

Labour rates utilized in the estimate are summarized in Table 15.3. An average labour rate of Cdn$70 was utilized for the estimate.

**Table 15.3 Construction Labour Rate**

| Personal | Labour Rate (Cdn$/h) |
|---|---|
| Foreman Working | 75.00 |
| Lead Hand Working | 66.00 |
| Journeyman Certified | 62.00 |
| Journeyman Uncertified | 60.00 |
| Labourer Skilled | 56.00 |
| Helper | 54.00 |

The following overhead activities are included in the rates provided in Table 15.4 as a percentage of the base rate:

- contractors field supervision including managers, general foremen, secretarial, and office personnel

- office supplies, running costs, and vehicle costs
- temporary facilities and utilities such as tool sheds, cribs, small equipment, maintenance facilities, power, water, and sewer
- small tools and consumables
- miscellaneous indirect costs such as power and water distribution, clean-up, safety supervision and protection, safety training, welder's certification, etc. (overhead)
- contractors profit and overhead included as a percentage including home office overhead costs and profit
- sub-contractors mark-ups (10%) on materials.

The following labour rated items are calculated separately and included in the section on Indirect Costs:

- additional construction equipment, cranes, and incidental equipment rentals
- mobilization and demobilization costs
- freight costs relating to contractors materials are included in the mobilization and freight sections
- turnaround costs for contractors and construction management/owner personnel
- travel time for personnel if appropriate
- construction camp catering, housekeeping, and maintenance costs at a daily rate of $58.00.

### 15.9.1 LABOUR PREMIUMS

The labour rate is based on a construction schedule of three week in and one week out, and a 70-hour work week. Scheduled site hours are 7 days per week at 10 hours per day, totalling 70 hours per week with 40 hours at straight time and 30 hours at time and a half.

### 15.9.2 PRODUCTIVITY

The labour hours productivity factor for the capital cost is estimated to be 1.20 to 1, or 80% efficiency.

# 15.10 INDIRECT COSTS

## 15.10.1 TEMPORARY CONSTRUCTION FACILITIES AND SERVICES

The following contractor costs are included in the Indirect Cost estimate:

- contractors' mobilization and demobilization
- certain construction equipment such as heavy lift cranes
- construction field offices, furnishings and equipment
- contractor travel and accommodations
- temporary power supply
- temporary water supply
- temporary heating and hoarding
- warehouse and laydown costs
- temporary toilets
- temporary communications
- on-going and final clean-up
- yard maintenance
- janitorial services
- site safety personnel and training.

Generally, costs associated with construction equipment are absorbed by contractors' unit prices and are therefore not included except as noted above.

## 15.10.2 CONSTRUCTION CAMP AND CATERING

A construction camp will be built to accommodate up to 300 construction workers, construction management staff and visitors.

Average catering costs are estimated to be $58 per camp man-day. This estimate accounts for varying construction camp occupancy levels throughout the life of the camp.

## 15.10.3 SPARE PARTS AND FIRST FILLS

An allowance for spare parts is included as follows:

- commissioning spares at 1.5 % of process equipment

- capital spares at 3% of process equipment
- capital mining spares at 5% of mine rolling stock.
- Industry-standard allowances have been included for first fills for items such as start-up grinding media, reagents, and fuel.

### *15.10.4 START-UP AND COMMISSIONING*

In some cases, vendor representatives, contractors' crews, and management staff will be required on-site to supervise equipment installation perform pre-start-up inspections, in order to satisfy equipment performance warranty requirements. Costs associated with this requirement have been included in the estimate.

## 15.11 TAXES

All taxes, such as GST, are excluded from the CAPEX.

## 15.12 ACCURACY

For this Feasibility Study, the required level of accuracy has been established at -10% to +20% in accordance with normal practice. Accuracy is applied to known elements of the work, which have been identified as being part of the scope of work assuming the following:

- the project has been scoped
- the site has been mapped, surveyed, and sampled as necessary
- the locations of the various facilities have been identified
- the prime process parameters have been identified, qualified, and quantified
- comparative studies completed between various products for major systems
- general arrangement drawings, PFDs, and P&IDs have been prepared
- permitting requirements have been identified and included in engineering

## 15.13 CONTINGENCY

A contingency percentage of the total direct and indirect costs has been included to meet unanticipated costs within the scope of the estimate.

The contingency was estimated on a discipline-by-discipline basis, taking into account items that have been quoted, estimated, or factored. The contingency is a subjective allowance based on the degree of confidence that study contributors feel

should be applied to their work. The typical contingency percentage values for the various disciplines are shown in Table 15.4.

**Table 15.4 Contingencies for Various Disciplines**

| Discipline | Percentage |
|---|---|
| Bulk Earthworks | 12 |
| Civil | 10 |
| Concrete | 10 |
| Structural Steel | 10 |
| Architectural | 10 |
| Platework | 15 |
| Mechanical | 10 |
| Piping | 15 |
| Building Services | 10 |
| Instrumentation and Control System | 12 |
| Electrical | 12 |
| Plant Mobile Equipment | 5 |
| Mining Equipment | 5 |
| Construction Indirects | 10 |
| Initial Fills | 10 |
| Spares | 5 |
| Freight and Logistics | 10 |
| Commissioning and Start-up | 5 |
| EPCM | 15 |
| Owners Costs | 10 |

The overall contingency for the Feasibility Study has been estimated as 8.5% of Direct Costs, Indirect Costs and Owner's Costs.

Contingency should be applied on a trade basis to known elements where there is uncertainty over the complete scope of the system recognizing three factors:

- design growth: a percentage added to cover unidentified items.
- value growth: pre-commitment pricing changes from specified revisions and changes.
- allowances: to cover items that can be qualified but not quantified.

In addition to the contingency allocations by the engineer, the Owner will be required to make the following budget allocations within the Owner's Costs:

- inflation
- currency fluctuations
- market conditions

## 15.14 RISK

Wardrop has assisted the Owner in determining an allowance amount for items that are unanticipated and for unforeseen risks, such as Acts of God or other force majeure events. This risk allowance would normally be held in a separate account by the client, and accordingly have been excluded from the CAPEX.

## 15.15 QUALIFICATIONS AND ASSUMPTIONS

This CAPEX assumes that:

- The significant portion of the construction work will be based on unit and fixed-price contracts, not cost plus or time and materials arrangements.
- Budget quotes from vendors for equipment and materials will be valid to within ±15% of the purchase price.
- Concrete aggregate and suitable backfill material will be locally available and suitable areas for supply have been identified by the Owner's geotechnical consultants.
- The geotechnical test results accurately reflect the soil conditions.
- Actual construction activities will match those proposed in the Project Implementation Plan schedule.
- The Labour Productivity factor is appropriate for northern locations and that established and experienced northern contractors are available.
- Bulk materials such as cement, rebar, structural steel and plate, cable, cable tray, and piping will be available when they are required.
- Capital equipment will be available when it is required.

The following items are excluded from the CAPEX

- property taxes
- corporate and mining taxes

The following items are excluded from the CAPEX, but included in the financial model:

- working capital
- closure costs
- salvage values

## 15.16 OWNER'S COSTS

The CAPEX includes the following items as part of Owner's Costs:

- permitting costs
- Victory Nickel project management costs
- environmental permitting, testing and monitoring costs
- socioeconomic management costs
- insurances and fees
- recruitment and relocation costs.

Within Owner's Costs the contingency allowance is intended to provide for the following:

- cost escalation during construction
- scope change costs and costs due to associated delays
- schedule delays and associated costs, such as those caused by:
  - unexpected ground conditions
  - extraordinary climatic events
  - labour disputes
  - permit applications
  - receipt of information beyond the control of EPCM contractors
  - schedule recovery or acceleration

## 15.17 FREIGHT

Freight costs for large and/or heavy equipment items are based on quotes for shipping directly from the respective manufacturers' fabrication plant. Some equipment purchase estimates include shipping. In cases where freight quotations were not available, an allowance has been included in the estimate.

All estimates include packing and crating.

# 16.0 OPERATING COSTS

## 16.1 SUMMARY

On-site operating costs are estimated for five cost centres: General & Administrative (G&A), Surface Facilities, Frac Sand Processing, Ore Processing and Open Pit Mining. To provide a consistent framework for expressing costs within these cost centres, the following cost control categories have been developed: salaries and wages, maintenance, consumables, fuel, power and service contracts.

The salary and wages costs were developed from the organizational chart and the Work Force schedule. The complete schedule is provided in Appendix I-2, and discussed in Section 10.0.

The accuracy of the operating cost estimate is -10% to +20%, which is consistent with capital cost estimating for a feasibility-level study. Labour rates were established labour rates based on Western Mining Engineering's published figures, and from labour rates at similar mining operations in Manitoba. A more detailed and complete breakdown of the Operating Cost Estimate (OPEX) by cost centre and cost category is provided in Appendix L-1.

Within the operating costs, the major operating cost centres comprising Frac Sand Processing, Ore Processing and Open Pit Mining are not operational for the full Life of Project. In contrast, the General & Administrative and Surface Facility Cost Centres will provide support services throughout the full operational period. Table 16.1 identifies the years for which it is anticipated that each Cost Centre will be Partially Operational (P), Fully Operational (F), or Not Operational (N).

**Table 16.1 Operations Summary**

| Cost Centres | Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | -3 | -2 | -1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| General & Administrative | N | N | P | P | F | F | F | F | F | F | F | P | P | |
| Surface Facilities | N | N | P | P | F | F | F | F | F | F | F | P | P | |
| Frac Sand Processing | N | N | N | F | F | F | F | F | F | F | F | F | P | |
| Ore Processing | N | N | N | N | F | F | **F** | **F** | **F** | **F** | F | P | N | |
| Open Pit Mining | N | N | N | F | F | F | F | F | F | F | F | P | N | |

The unit costs summarized in Table 16.2 are evaluated for the condition when the Frac Sand Plant, Ore Processing Plant and Open Pit Mine are all operating. To estimate the General & Administrative and the Surface Facility Costs for partial years when one or more of these facilities is not operating or is only partially operating, Wardrop adopted the following formula in the financial analysis. In this formula, the Frac Sand (FS), Ore Processing (OP) and Mining staffing numbers are factored into the Full Cost with all cost centres operational.

$$For\ any\ year\ G\&A\ or\ S.F.costs = \left\{\frac{\sum Partial\ FS + OP + Mining}{\sum Full\ FS + OP + Mining}\right\}^{(0.8)} * Full\ Cost$$

This simplified approach avoids having to develop organization charts and servicing requirements for each partial condition at a point when the plant requirements are still preliminary.

The (0.8) power to the ratio identified above was selected to reflect the enhanced costs as production is reduced. Wardrop believe that a simple linear ratio would underestimate the General & Administrative, or the Surface Facility costs.

**Table 16.2 Operating Cost Summary (Cdn$'000's)**

| Cost Centres | Project Life | Annual | Daily |
|---|---|---|---|
| General & Administrative | 109,072 | 12,450 | 34.6 |
| Surface Facilities | 39,871 | 4,627 | 12.9 |
| Frac Sand Processing | 73,268 | 7,404 | 30.9 |
| Nickel Ore Processing | 249,252 | 37,568 | 104.4 |
| Mining | 388,242 | 59,071 | 164.1 |
| **Total** | **859,705** | **121,120** | **346.9** |
| **Unit Sand Production Cost ($/tonne)** | **6.48** | | |
| **Unit Nickel Production Cost ($ per lb)** | **4.97** | | |

Notes:
Year 4 has been taken as the representative year.
Frac Sand daily cost is calculated based on 240 day annual operation.
Nickel Concentrate Processing is based on 360 day operations.
G&A and Surface Facility are credited against Ore Processing

To develop the unit sand and nickel costs, the costs for the General & Administrative, Surface Facilities and Mining have been assigned to the Nickel Concentrate production.

## 16.2 GENERAL AND ADMINISTRATIVE

As outlined in the Work Force Schedule, the functions provided under the General & Administrative cost centre comprise Management, Personnel, Accounting,

Purchasing, Warehousing, Security and First Aid, and Geology. Although camp services for cooking, janitorial, laundry and bussing are contracted out these are supervised through General and Administrative.

A summary of the General & Administrative OPEX Costs by Category are provided in Table 16.3 below.

**Table 16.3 General and Administrative Category Costs (Cdn$'000's)**

| Category | Project Life | Annual | Daily |
|---|---|---|---|
| Salaries & Wages | 28,558 | 3,265 | 9.1 |
| Maintenance | 7,003 | 800 | 2.2 |
| Consumables | 1,925 | 220 | 0.6 |
| Fuel | 12,523 | 1,431 | 4.0 |
| Power | 0 | 0 | 0 |
| Service Contracts | 58,952 | 6.734 | 18.7 |
| **Total G&A Costs** | **109,072** | **12,450** | **34.6** |

Notes:
Year 4 has been taken as the representative year.
Frac Sand daily is assumed to be a 240 day annual operation.
Nickel Concentrate Processing is assumed to be a 360 day operations.

## 16.3 SURFACE FACILITIES

As outlined in the Work Force Schedule, the functions provided under the Surface Facilities cost centre comprise general mechanical and electrical maintenance, road maintenance, water management, communications, sanitary disposal and light duty mechanical repairs.

A summary of the Surface Facilities OPEX Costs by Category are provided in Table 16.4 below.

**Table 16.4 Surface Facilities Category Costs Cdn$'000's)**

| Category | Project Life | Annual | Daily |
|---|---|---|---|
| Salaries & Wages | 28,796 | 3,290 | 9.1 |
| Maintenance | 1,249 | 143 | 0.4 |
| Consumables | 0 | 0 | 0 |
| Fuel | 1,857 | 284 | 0.8 |
| Power | 7,969 | 910 | 2.5 |
| Service Contracts | 0 | 0 | 0 |
| **Total Surface Facilities Costs** | **39,871** | **4,627** | **12.8** |

Notes:
Year 4 has been taken as the representative year.
Frac Sand daily is assumed to be a 240 day annual operation.
Nickel Concentrate Processing is assumed to be a 360 day operations.

## 16.4 FRAC SAND PROCESSING

As outlined in the Work Force Schedule, the functions provided under the Frac Sand Facilities cost centre comprise the supervision and operations for the wet and dry circuits and the load out facilities.

A summary of the Frac Sand Processing OPEX Costs by Category are provided in Table 16.5 below.

**Table 16.5 Frac Sand Processing Category Costs (Cdn$'000's)**

| Category | Life of Mine | Annual | Daily |
|---|---|---|---|
| Salaries and Wages | 22,137 | 2,237 | 9.3 |
| Maintenance | 22,463 | 2,270 | 9.5 |
| Consumables | 802 | 81 | 0.3 |
| Fuel | 1,391 | 141 | 0.6 |
| Power | 26,475 | 2,675 | 11.1 |
| Service Contracts | 0 | 0 | 0 |
| **Total Frac Sand Processing Costs** | **73,268** | **7,404** | **30.8** |
| **Unit Sand Cost ($/tonne)** | **6.48** | | |

Notes:
Year 4 has been taken as the representative year.
Frac Sand daily is assumed to be a 240 day annual operation.

## 16.5 ORE PROCESSING

As outlined in the Work Force Schedule, the functions provided under the Ore Processing cost centre comprise supervision and operation for the crushing and grinding, flotation, reagent, metallurgical, and load-out operations.

A summary of the Ore Processing OPEX Costs by category are provided in Table 16.6 below.

**Table 16.6 Ore Processing Category Costs (Cdn$'000's)**

| Category | Life of Mine | Annual | Daily |
|---|---|---|---|
| Salaries & Wages | 35,937 | 5,410 | 15.0 |
| Maintenance | 55,844 | 8,407 | 23.4 |
| Consumables | 126,101 | 18,983 | 52.7 |
| Fuel | 639 | 142 | 0.4 |
| Power | 30,732 | 4,626 | 12.9 |
| Service Contracts | 0 | 0 | 0 |
| **Total Nickel Processing Costs** | **249,253** | **37,567** | **104.4** |
| **Unit Nickel Cost ($/lb)** | **1.57** | | |

Notes:
Year 4 has been taken as the representative year.
Nickel Concentrate Processing is assumed to be a 360 day operations.

## 16.6 OPEN PIT MINING

As outlined in the Work Force Schedule, the functions provided under the Mining cost centre comprise drilling, blasting, loading, hauling, and truck and tire repair.

The unit mining costs have been developed for the annual tonnages mined in the Production Schedule which is included in Section 3.0, Open Pit Mining The boundary limits for the mining operation comprise delivery of ore to the primary crusher and removal and deposition of waste rock and overburden.

A summary of the Open Pit Mining OPEX Costs by Category are provided in Table 16.7.

**Table 16.7 Open Pit Mining Category Costs (Cdn$'000's)**

| Category | Project Life | Annual | Daily |
|---|---|---|---|
| Salaries & Wages | 83,935 | 12,343 | 34.3 |
| Maintenance | 75,775 | 10,503 | 29.2 |
| Consumables | 45,094 | 6,891 | 19.1 |
| Fuel | 92,835 | 14,197 | 39.4 |
| Power | 5,723 | 829 | 2.3 |
| Service Contracts | 84,879 | 14,308 | 39.6 |
| **Open Pit Mining Costs** | **388,241** | **59,071** | **164.0** |
| **Unit Cost per tonne of Ore or Waste** | **1.32** | | |

Notes:
Year 4 has been taken as the representative year.
Open Pit Mining is assumed to be a 360 day operations.

The Open Pit Mining Operating Costs vary significantly from year to year with the mix of activities and numbers of staff involved. A summary of the Open Pit Mining Operating Costs on an average basis is provided in Table 16.8 for comparison.

**Table 16.8 Open Pit Mining Category Costs (Cdn$'000's)**

| Category | Project Life | Average Annual | Average Daily |
|---|---|---|---|
| Salaries & Wages | 83,935 | 18,394 | 23.3 |
| Maintenance | 75,775 | 7,578 | 21.0 |
| Consumables | 45,094 | 4,509 | 12.5 |
| Fuel | 92,835 | 9,283 | 25.8 |
| Power | 5,723 | 572 | 1.6 |
| Service Contracts | 84,879 | 8,488 | 23.6 |
| **Open Pit Mining Costs** | **388,241** | **38,824** | **107.8** |
| **Unit Cost per tonne of Ore or Waste** | **1.32** | | |

The overburden removal has been contracted out prior to the owner's operations commencing during pre-production.

## 16.7 ELECTRICAL POWER COSTS

As advised by the Client the following Manitoba Hydro Rates have been applied to the estimates (Table 16.9).

**Table 16.9 Manitoba Hydro General Service Large User (GSL) Rate 2007**

| Supply Voltage Category | 750V – 30kV | 30kV – 100kV | > 100kV |
|---|---|---|---|
| **Application to Minago Supply Options** | If supply were made available at 13.8kV from Manitoba Hydro | Manitoba Hydro supply at 66kV from William Lake substation | Manitoba Hydro supply at 230kV from transmission grid |
| Energy [Cost per kWh] | 0.0238 | 0.0229 | 0.0226 |
| Demand [Cost per kVA peak per month] | 7.08 | 6.06 | 5.40 |
| **Average Cost per kWh** | **0.0360** | **0.0334** | **0.0319** |

Based on preliminary load characteristics and Manitoba Hydro 2007 published rates.

## 16.8 DIESEL FUEL COSTS

Diesel fuel cast were averaged for the previous three years for the purposes of evaluating the Operational Costs.

The average prices at site are:

- coloured fuel used on-site only = $0.729 $Cdn/L
- clear fuel used off-site = $1.002 $Cdn/L including Manitoba Road Tax.

# 17.0 PROJECT ECONOMIC ANALYSIS

## 17.1 INTRODUCTION

Wardrop prepared an economic evaluation of the Minago Project based on a pre-tax financial model shown in Appendix M-1. The evaluation assumes an ore concentrate processing life of 7.2 years, a nickel mine life of 8.3 years and a frac sand plant life of approximately 10 years.

The following pre-tax financial indicators were calculated:

- an Internal Rate of Return (IRR) of 17.66%
- a 7-year payback period on $596 million capital, in the fourth year from start of nickel production
- a $294 million Net Present Value (NPV) at 8% discount rate.

As the economic analysis is based on the capital cost and operating cost estimates, the same qualifications, assumptions, and exclusions apply. The risks and opportunities provided in Section 19.0 will have both positive and negative impacts on this economic analysis. Also, this economic analysis is subject to the same allowances for currency exchange rate fluctuations and price escalations provided for in the capital cost and operating cost sections.

The results of the financial analysis are provided as the IRR, payback period and NPV for a given discount rate. To understand the effect of the variables, a sensitivity analysis was performed to demonstrate the influence of capital cost, nickel price, frac sand revenue, transportation, and operating costs on these financial indicators. Graphs have been prepared to illustrate the effects of nickel price on the IRR and the NPV, and a “spider” graph to illustrate the range of sensitivities.

Post-tax financial modelling was not completed for the project, at the request of Victory Nickel.

## 17.2 FINANCIAL MODELLING

Wardrop developed a base case financial model to ascertain the economics of the project. The model presents a compact summary of the business case for the project throughout the Life of Mine (LOM). The financial model was calculated on

a 100% equity basis and used 3-year trailing averages for nickel and other metal prices, and exchange rate. As part of the sensitivity analysis, an alternative financial model was also developed which used current metals prices and exchange rate, the current case.

The basic input data is represented by the revenue and expenditure summaries on a year-by-year basis beginning during the construction phase. The revenue and expenditure summaries by year have been summarized to produce annual cash flows to calculate net cash flows by year. The revenue summary includes frac sand revenues by year and nickel concentrate revenues by year including smelter terms, payable metal revenues and penalties for zinc and MgO. An expenditure summary has also been provided that includes capital costs, operating costs and transportation costs.

Working capital estimates have also been included in the model using estimates of 60 days for concentrate receivables, 45 days for payables, excluding employee costs, and 30 days for frac sand receivables.

Tonnage milled, head grade and recovery parameters have been incorporated into the pre-tax financial model to calculate annual production values for nickel concentrate and frac sand. The market prices for nickel, copper, gold and silver have been adjusted to the assumed price levels by applying the smelter charges for smelting and refining including penalties where necessary. Unit operating costs for mining, milling, plant services, and G&A areas were applied to annual milled tonnages to determine the overall mine site operating cost to derive annual net cash flows.

## 17.3 PRE-TAX ECONOMIC EVALUATION PARAMETERS

For the purposes of the financial model, at the request of Victory Nickel, we have established pricing and exchange rate on the basis of three year trailing averages. This approach, which is used by the Securities and Exchange Commission in the United States, considers the current behaviour of the market. Furthermore, the current case, based on the current pricing and exchange rate in effect as of December 10, 2009, is included to illustrate sensitivities to metals prices and exchange rate.

**Table 17.1 Pricing and Exchange Rate Assumptions**

| Financial Inputs | Units | Base Case | | Current Case | |
|---|---|---|---|---|---|
| | | US$ | Cdn$ | US$ | Cdn$ |
| Nickel | lbs | $11.19 | $12.27 | $7.35 | $7.72 |
| Copper | lbs | $2.91 | $3.19 | $3.07 | $3.22 |
| Palladium | oz | $322.40 | $353.64 | $368.00 | $386.55 |
| Platinum | oz | $1353.78 | $1,484.97 | $1,423.00 | $1,494.72 |
| Gold | oz | $836.25 | $917.29 | $1,131.35 | $1,188.37 |
| Cobalt | lbs | $27.73 | $30.42 | $19.00 | $19.96 |
| Silver | oz | $14.25 | $15.63 | $17.39 | $18.27 |
| Rhodium | oz | $2,254.56 | $2,473.04 | $2,200.00 | $2,310.88 |
| Frac Sand Price | tonne | n/a- | $63.02 | n/a | $63.02 |
| Exchange Rate | n/a | 1.097 | 1.00 | 1.0504 | 1.00 |

The costs and production values are shown in Table 17.2 for capital costs, operating costs, frac sand production, nickel ore concentrate production, and total production.

The smelter terms outlined in Section 14.0, concentrate and frac sand pricing net of freight to customers have been incorporated into the financial model.

**Table 17.2 CAPEX Costs and Production Rates**

| | Base Case (millions $) | Current Case (millions $) |
|---|---|---|
| Pre-Production Capex | $593.0 | $588.5 |
| Sustaining Capex | $3.3 | $3.3 |
| **Nickel Milling (M tonnes)** | | |
| Annual Tonnes Milled * | 3.600 | 3.600 |
| Total Tonnes Milled | 25.2 | 25.2 |
| **Frac Sand Processing (M tonnes)** | | |
| Annual Tonnes Produced * | 1.143 | 1.143 |
| Total Tonnes Produced | 11.312 | 11.312 |
| **Concentrate Production (tonnes)** | | |
| Total Concentrate Production | 346,152 | 346,152 |
| Total Nickel contained in Concentrate | 77,192 | 77,192 |

* full year basis

## 17.4 FINANCIAL EVALUATION PARAMETERS – NPV, IRR, AND PAYBACK

NPV is defined as the present value of a series of future cash flows for a specified discount rate.

The IRR which is the discount rate that gives an NPV of zero is a commonly-used measure of investment efficiency.

The payback period is defined as the period of time required for the return on an investment to "repay" the sum of the original investment. The payback year is calculated on an undiscounted basis measured from the beginning of the year in which nickel production first starts.

**Table 17.3 Minago Project – Economic Summary**

| | Units | Base Case* | Current** |
|---|---|---|---|
| Undiscounted cash flow | $million | $917.7 | $291.0 |
| NPV @ 8% | $million | $293.8 | $-38.9 |
| NPV @ 6% | $million | $402.6 | $15.5 |
| NPV @ 4% | $million | $538.0 | $85.5 |
| IRR | % | 17.66 % | 6.52 % |
| Payback from start of nickel production, in years | years | 4 | 7 |

* Three-year trailing average metal prices and exchange rate
** As of market close December 10, 2009

## 17.5 CASHFLOW AND PAYBACK

The cash flow summary determines the annual cash flow from revenues and costs including capital and working capital over the life of the mine. To determine the net annual cash flows, the costs are deducted from the net revenues before taxes. The pre-production capital costs include the expenditures accumulated prior to first production of concentrate.

An estimate of the working capital requirements, as described earlier, have been made for each year and has been applied to the financial model. An allowance for credit losses has not been made in the financial model.

The annual cashflow and cumulative cashflows for the base case and current case are illustrated in Figure 17.1 and Figure 17.2 from which the payback periods are assessed. These periods start from the beginning of the year in which frac sand revenues are generated which is one year prior to the year in which nickel revenues are generated.

**Figure 17.1 Annual and Cumulative Cashflows for Base Case**

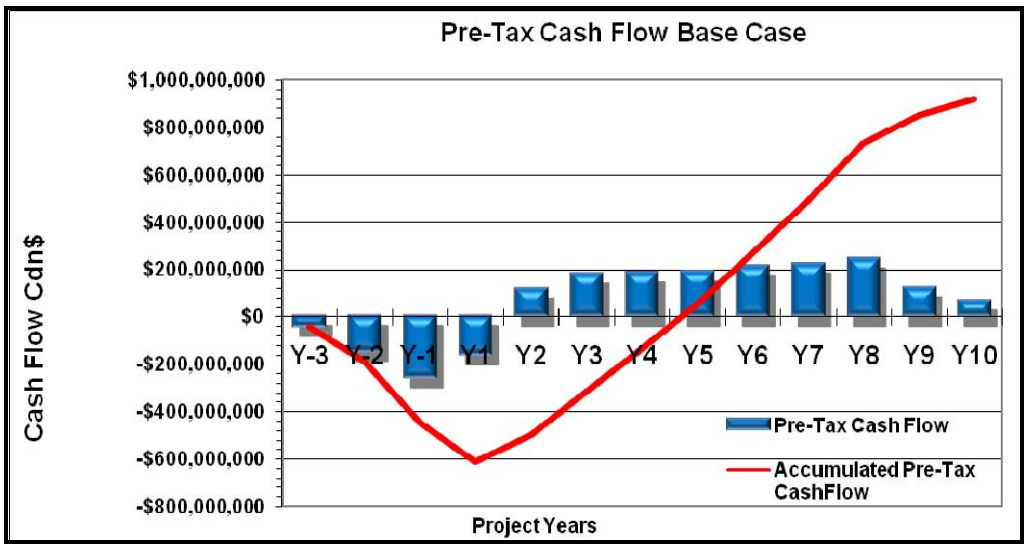
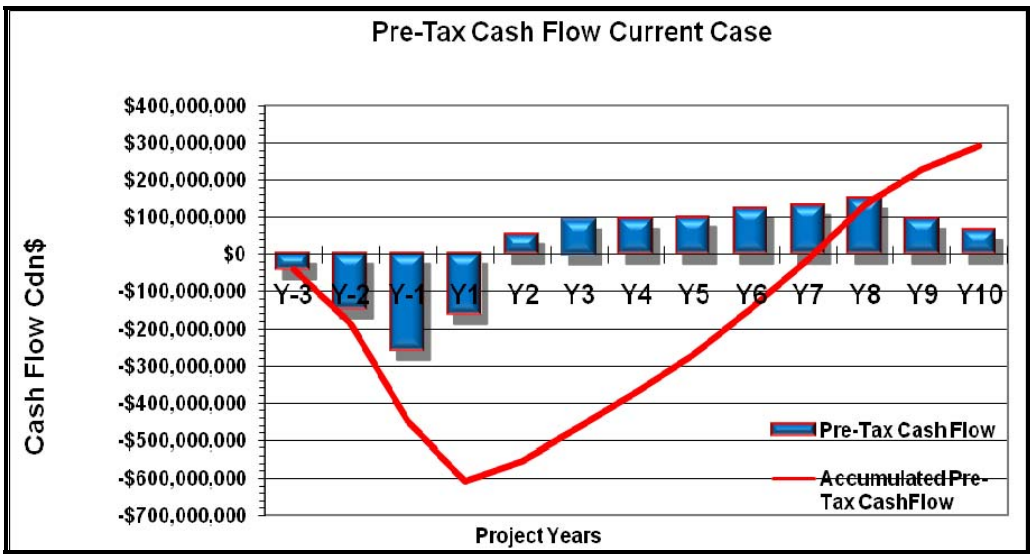



**Figure 17.2 Annual and Cumulative Cashflows for Current Case**




## 17.6 SENSITIVITY ANALYSIS

Sensitivity analyses on the Base Case were carried out to evaluate the project economics in the context of nickel price ranging from US$4.00/lb to US$20.00/lb. The results of the analysis have been tabulated for NPV, IRR and payback of capital (Table 17.4). Discount rates of 8%, 6% and 4% were applied to the financial model to calculate the NPV. The Payback Year is estimated from the beginning of the year in which first nickel concentrate production starts.

**Table 17.4 Summary of Pre-Tax NPV, IRR, and Payback Sensitivities**

| Nickel Price Scenario | NPV at Selected Discount Rates (in Million$) | | | IRR (%) | Payback (Years) |
|---|---|---|---|---|---|
| | 8% | 6% | 4% | | |
| $4.00 | -286.3 | -271.8 | -249.6 | -4.4% | n/a |
| $6.00 | -119.9 | -78.4 | -23.7 | 3.3% | 8 |
| $8.00 | 39.5 | 107.0 | 192.7 | 9.4% | 6 |
| $10.00 | 198.9 | 292.3 | 409.2 | 14.8% | 5 |
| $12.00 | 358.3 | 477.7 | 625.6 | 19.5% | 4 |
| $14.00 | 517.8 | 663.1 | 842.1 | 23.8% | 4 |
| $16.00 | 677.2 | 848.4 | 1,058.6 | 27.7% | 3 |
| $18.00 | 836.6 | 1,033.8 | 1,275.0 | 31.3% | 3 |
| $20.00 | 996.0 | 1,219.1 | 1,491.5 | 34.6% | 3 |

*stated in terms of years of nickel concentrate production

Using the values in Table 17.4, in Figure 17.3 below, the sensitivity of the IRR is described with respect to changes in the nickel price from US$4.00 to US$20.00.

**Figure 17.3 Sensitivity Analysis – IRR against Ni Price**

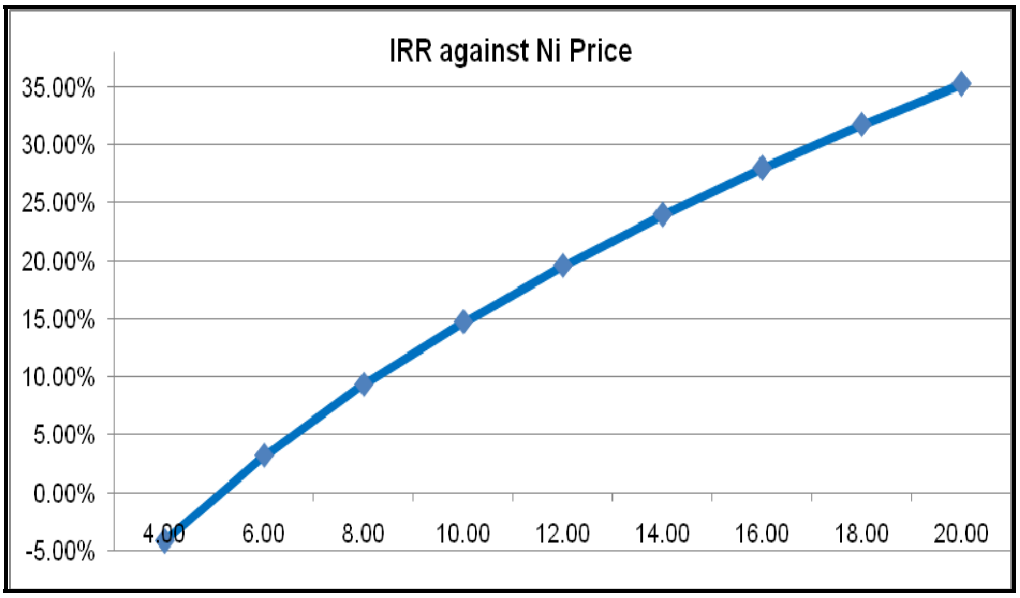
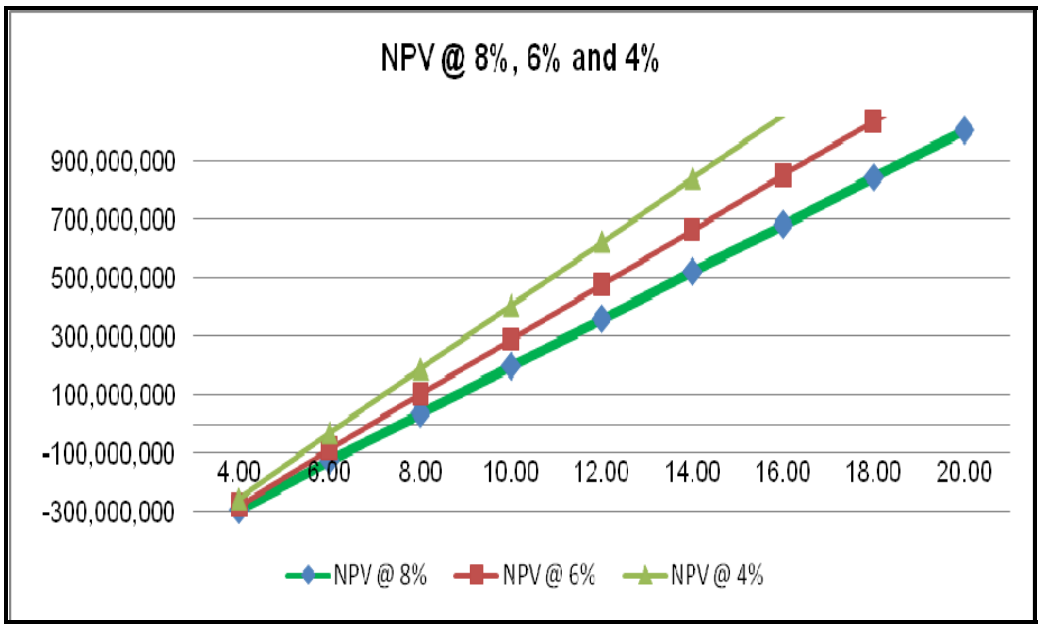



Figure 17.3 shows the break-even price of nickel to be US$5.06 per pound.

Once again using the values in Table 17.4, in Figure 17.4 below, the sensitivity of the NPV for 8%, 6% and 4% discount rates are described with respect to changes in the nickel price from US$4.00 to US$20.00.

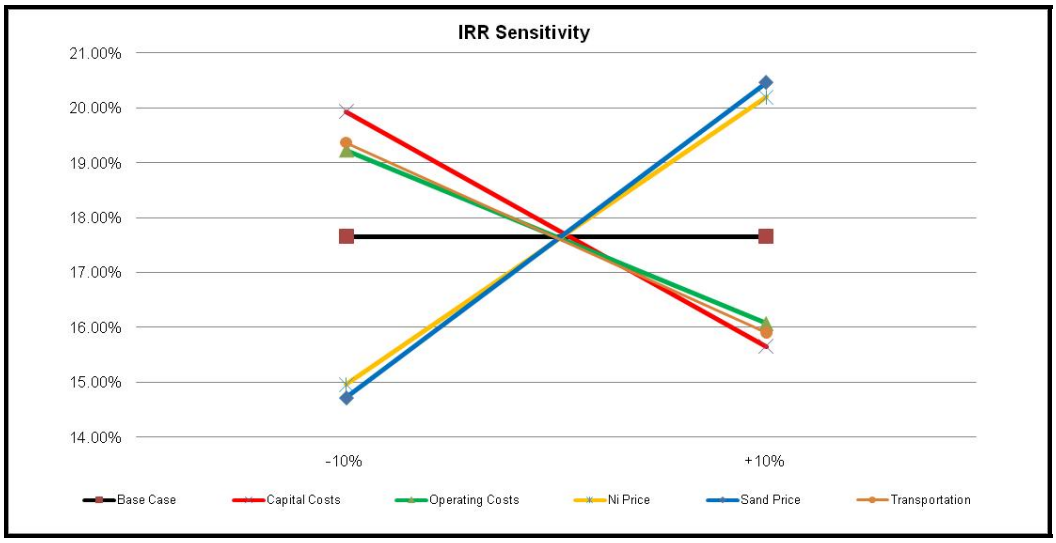
**Figure 17.4 Sensitivity Analysis – NPV @ 8%, 6% and 4% against Ni Price**




## 17.7 FINANCIAL MODEL SENSITIVITIES

In addition, to illustrate the sensitivity of the IRR to capital cost, nickel price, frac sand revenue, transportation and operating costs the following “spider” graph is presented (Figure 17.5).

**Figure 17.5 Sensitivity Analyses IRR**



As a check on the sensitivity of the financial model to additional reserves, a further year of production was added to the Base Case financial model. An additional 11,036 tonnes of nickel concentrate and 1,142,850 tonnes of frac sand production were inserted into the middle of the production schedule to represent an additional 1 year of resource.

Assuming no expenditure of additional capital, which is reasonable based on the short mine life increase, the NPV @ 8% increased to $376 million from $294 million and the IRR increased to 19.11% from 17.66%.

## 17.8 TOTAL COST SUMMARY

The average life of mine operating costs per pound of nickel before by product credits is estimated to be $6.95 and net of by product credits $2.12. In Table 17.5 below these costs are summarized by pound of nickel and by tonne of ore.

**Table 17.5 Total Nickel Cost Summary**

| | Operating Cost ($/lb nickel) | Operating Cost ($/tonne ore) |
|---|---|---|
| General and Administrative | $0.69 | $4.33 |
| Surface Facilities | $0.25 | $1.58 |
| Ore Processing | $1.57 | $9.90 |
| Mining | $2.45 | $15.43 |
| Concentrate Transportation | $0.06 | $0.39 |
| Smelter and Refining Charges | $1.93 | $12.15 |
| **Cost Before By-product Credits** | **$6.95** | **$43.78** |
| Frac Sand Credit | $4.04 | $25.44 |
| Pay Metal Credit | $0.49 | $4.97 |
| **Cost Net By-product Credits** | **$2.12** | **$13.37** |

# 18.0 PROJECT IMPLEMENTATION PLAN

## 18.1 INTRODUCTION

### *18.1.1 PURPOSE*

This Project Implementation Plan (PIP) is intended to ensure the successful execution of engineering, procurement, and construction phases, and their alignment with subsequent mine development phases. This document will ensure that necessary costs have been included in the cost estimates for the detail design, procurement, and construction phases of the project. The PIP will provide a better understanding of the overall risk profile and risk mitigation strategies for the project.

Mine development includes discovery activities, the development of an understanding of local conditions and history, the project scope and a review of similar projects. The available local resources and facilities need to be understood to determine the extent of external support required from proven external sources. The PIP will include a review of project management methods, the contracting strategies, procurement and logistics, and construction workforce planning including training and housing. Finally, environmental planning issues, site safety, infrastructure and communication aspects of the project will be addressed.

The PIP and the Project Implementation Schedule will form the basis of the Project Execution Plan (PEP) as the project moves forward into subsequent execution phases.

### *18.1.2 OBJECTIVES*

The project objectives form a shared plan between Victory Nickel and Wardrop to achieve a successful project outcome. During the development of the Feasibility Study, the Client's stated objective was to advance development of the frac sand programme to generate early revenues.

The PIP is designed to:

- provide effective safety, environmental monitoring, and quality methods
- execute the project within budget, schedule, and scope
- achieve the desired operating and maintenance costs
- minimize risks and limit or avoid schedule or capital cost overruns

- enhance the local community through employment opportunities.

The following aspects will be included in all engineering:

- constructability issues during the detail design phase
- effective communication between the various project groups
- advantages of cost reductions through schedule compression opportunities
- a competitive tendering procurement process with vendors and contractors assessed based on cost, commercial terms and quality
- methods to assure timely and efficient deliverables and reduce long-lead item delivery times
- procedures to take advantage of bulk material pricing
- procedures to develop an effective cost-reporting, cost control and cost forecasting system.

## 18.2 PROJECT IMPLEMENTATION STRATEGY

The first stage in establishing a Project Implementation Strategy is for the Owner to define a strategy, which best fits the needs of the project. It is assumed that the Owner will require full support during the detailed engineering, procurement, and construction phases of the project. The Owner's plans for the hiring and training of personnel and the operation of the plant have not yet been considered.

The implementation strategy adopted by the Owner will reflect the depth of available skills within the Owner's team, and the degree of involvement the Owner wishes to assume. The project management style should reflect the Owner's role in the management of the Project and the Owner's philosophy with regard to risk.

### *18.2.1 TRADITIONAL IMPLEMENTATION STRATEGIES*

The following are traditional implementation strategies, which Victory Nickel might adopt to progress procurement, construction and commissioning:

#### ENGINEER/PROCURE/CONSTRUCTION MANAGEMENT

Under this arrangement, the Owner enters into multiple contracts for construction packages, which are prepared and managed by an Engineering/Procurement/Construction Management (EPCM) Contractor. The Owner will assume responsibility for the contracts as the Constructor, with the EPCM Contractor acting as the agent. Continuity is maintained since the EPCM Contractor will be available through the engineering, procurement, and construction phases. The systems allows for more deliberate selection of contractors and the selection of

contracts to accommodate the partial release of information to improve schedule. The selected EPCM Contractor must have proven engineering, procurement, construction, and project delivery experience. Utilizing the EPCM strategy, the Owner will be required to manage risk to mitigate potential cost and schedule over-runs.

### LUMP SUM/TURN-KEY

This strategy is appropriate where the Owner does not wish to manage the project or become involved in its design. Generally, the Owner will specify certain performance objectives to ensure that the responsibility for executing the project will rest with the Lump Sum/Turn-key (LSTK) Contractor. The Contractor will turn the project over to the Owner once the agreed performance objectives have been achieved.

### ENGINEER/PROCURE/CONSTRUCT

Under this arrangement, the Owner enters into a single contract with an Engineer/Procure/Construct Contractor (EPC Contractor) who will assume responsibility for all sub-contracts. The selected Engineer/Procure/Construct (EPC) Contractor must have the required depth to manage all project phases with the necessary discipline skills to complement each phase including direct hiring and supervision of the workforce. Generally, since sub-contracts will be with the EPC Contractor, the contractor will be incorporated within Canada with responsibilities for government stoppages. The Contract between Owner and contractor, which may be cost-plus or fixed price, should reflect cost and risk priced into the contract

The essential difference between a LSTK and an EPC Contract is the additional level of engineering required for the EPC. Whereas LSTC projects are developed to the outline stage with performance specifications, EPC are “tight-spec’d” with completed designs. In both cases the contractor would function as the Prime Contractor responsible for coordinating labour and for safety.

### ENGINEER/PROCURE AND CONSTRUCT

Under this arrangement, the Owner will select a single contractor to perform construction work at the end of the design phase. The consulting engineer with responsibility for engineering and for preparing the tender documents will retain responsibility for administration of the Construction Contract. Generally, since sub-contracts will be with the contractor, the contractor will be a Canadian corporation with responsibilities for government stoppages. The contact between the Owner and the contractor, which may be cost-plus or fixed-price, should include cost and risk.

### DESIGN/BUILD/OWN/OPERATE

This strategy is appropriate in situations where the project is independent of the Owner’s core business. The best examples of this arrangement are cogeneration

facilities that supply electric energy or heat to a process plant, or an oxygen facility that supplies oxygen to a plant. Under this arrangement, the Owner would typically provide land with a long-term service agreement to provide a basic return on investment to both parties. Typically, this strategy will include an arrangement whereby the facility operator could sell supply that is in excess of what is required by the plant.

The frac sand plant may be developed by an independent operator as a design/build/own/operate facility.

## 18.3 PROJECT IMPLEMENTATION STRATEGY

The EPCM strategy will address the particular schedule restraints posed by weather and facilitate a flexible contracting strategy that utilizes local labour.

Wardrop believes that the EPCM strategy should provide the Owner with the required flexibility to advance the project in the most timely and cost-effective manner. The flexibility of an EPCM strategy would best ensure that the following objectives and restraints are achieved or ameliorated:

- Initial construction activities should take place in the winter, when the ground is frozen, to accommodate the flooded nature of the site. Victory Nickel proposes constructing an initial road with ditches during the winter of 2009/2010. In the following winter, 2010/2011 a programme of Early Works will be completed between October and March.
- The option to dredge the overburden is preferred to the option to remove the overburden by mechanical means. The pricing for dredging is more favourable, the construction period is less likely to be subject to slippage and the possibility of cost overruns is reduced. The selection of dredging dictates an April 2011 start, which necessitates a contract being placed in the fall of 2010 to permit time for to modify and prepare the dredges and for mobilization on site.
- The de-watering wells and the some infrastructure will be required to support the dredging operation. The infrastructure will include the roads around the pit and impoundment areas, a sub-station and 13.8 kV power distribution. The dolomitic limestone to be excavated for the preparation of the plant and camp areas will be used to construct the roads and the containment areas.
- To meet the tight schedule for the installation and commissioning of the wells and the procurement, construction and commissioning of the sub-station design activities on these early items are scheduled for the beginning of April.
- A basic level of support for an initial camp and facilities will be required to support initial site activates. The full camp will be developed to meet the

additional requirements during construction of the frac sand plant, ore processing plant, Tailings and Waste Rock Management Facility (TWRMF) and associated facilities.

- Initial engineering work will be required for the preliminary detail design, procurement and construction. Other than for long-lead items, the bulk of the engineering will be delayed until the beginning of 2011 with the engineering for the process plants to most minimise manhours.
- Since the initial detail design for roads, dredging, power supply and distribution and long-lead items will involve significantly reduced engineering effort which has been identified as Stage 1. The main engineering, procurement and construction activities will be delayed until early 2011 to conserve manhours when the enhanced engineering effort (Stage 2) is scheduled to start.
- The removal of the dolomitic limestone will take approximately two years; with frac sand will become available at the beginning of 2013, one year into mine development. Ore will be available for processing at the beginning of 2014. Accordingly, the frac sand plant will commence production at the beginning of 2013 and the ore processing plant at the beginning of 2014. The associated engineering work for the two plants will begin in early 2011 construction for both plants will begin in early 2012.
- A flexible contracting strategy will be required to accommodate the timely procurement of long-lead items and construction contracts. Given the complexity of the Project, certain contracts must be tendered and awarded before the design is completed. To achieve this flexibility, the Owner should make the necessary early choices related to the selection of equipment, products and contractors.
- The site may be classified as a remote location. The larger contracting companies may be contracted out of Winnipeg or major centres in other provinces, with supporting services from Thompson. A list of suitable companies will need to be developed.
- Wherever possible, labour should be drawn from local labour pools in Norway House, Grand Rapids, Ponton or Snow Lake. Initial discussions with Aboriginal representatives will be required to identify the local pool of labour and the skill sets available.

The initial steps in the project implementation strategy will include:

- the appointment of a small team by the Owner to oversee the project execution through its various phases
- the selection of an EPCM contractor with the necessary experience to undertake the engineering tasks, including detailed design, procurement, construction management assistance, and testing and commissioning support.

- the selection of the project team, the EPCM project controls systems and the development of the PEP.

The factors that require consideration for the development of the PEP include:

- long-lead equipment ordering requirements
- review of the possible construction contracts
- availability and quality of contracting resources
- ability to define the work as lump-sum, cost-plus or unit rate contracts
- project cash flow
- permits and approvals restraints.

## 18.4 CONTRACTING STRATEGY

### *18.4.1 CONTRACTING CONSIDERATIONS*

In selecting contractors, the following considerations will apply:

- the requirement for Prime Contractors
- the possibility of partitioning the site
- availability of contractors
- union or non-union, Aboriginal or Non Aboriginal contractors
- the size of construction packages required to attract tenders.

Standard Forms of Contract with the necessary supplementary information should be developed for equipment, service and construction contracts.

In general, construction contractors should be responsible for:

- construction labour
- construction equipment
- worker transportation
- site offices and temporary services
- site management
- contractor surveying
- quality control
- contract scheduling

- safety including wcb coverage
- environmental safeguarding
- security for their tools and equipment
- supplying permanent materials as required by contract.

### 18.4.2 MAJOR EQUIPMENT PACKAGES

A summary of the Major Equipment Packages is outlined in Table 18.1.

**Table 18.1 Summary of Major Equipment Packages**

| Contract Description | Type | Comments | Package No. |
|---|---|---|---|
| Transformer Supply Package | Lump Sum | None | ES-01 |
| Sub-Station Switchgear Supply Package | Lump Sum | None | ES-02 |
| Modular Buildings Supply Package | Lump Sum | Modular | AS-01 |
| Pre-Engineered Building Contract 1 | Lump Sum | None | PS-01 |
| Pre-Engineered Building Contract 2 | Lump Sum | None | PS-02 |
| Frac Sand Equipment Supply Package | Lump Sum | Outotec | MS-01 |
| Frac Sand Load-Out Supply Package | Lump Sum | IM&M | MS-02 |
| Open Pit Mining Trucks Supply Package | Lump Sum | Purchase or Lease | MS-03 |
| Open Pit Loaders Supply Package | Lump Sum | Purchase or Lease | MS-04 |
| Open Pit Shovels Supply Package | Lump Sum | Purchase or Lease | MS-05 |
| Open Pit Drill Supply Package | Lump Sum | Purchase or Lease | MS-06 |
| Miscellaneous Vehicle Supply Package 1 | Lump Sum | Purchase or Lease | MS-07 |
| Miscellaneous Vehicles Supply Package 2 | Lump Sum | Purchase or Lease | MS-08 |
| Diesel Generator Sets Supply Package | Lump Sum | None | ES-03 |
| Water Holding Tanks Supply Package | Lump Sum | None | SS-01 |
| De-Watering Pump Supply Package | Lump Sum | None | MS-09 |
| De-Watering Equipment Supply Package | Lump Sum | None | MS-10 |
| Distribution Transformers | Lump Sum | None | ES-04 |
| Sanitary Water Treatment System Package | Lump Sum | None | MS-11 |
| Effluent Treatment System Package | Lump Sum | None | MS-12 |
| Explosives Plant Supply Package | Lump Sum | None | MS-13 |
| Primary Crusher Supply Package | Lump Sum | None | MS-14 |
| Reclaim Ore System Package | Lump Sum | None | MS-16 |
| SAG & Ball Mill Supply Package | Lump Sum | None | MS-17 |
| Pebble Crusher Equipment Supply Package | Lump Sum | None | MS-18 |
| Flotation System Supply Package | Lump Sum | None | MS-19 |
| Reagent System Supply Package | Lump Sum | None | MS-20 |
| Product/Waste Thickener Supply Package | Lump Sum | None | MS-21 |
| Concentrate Pressure Filter Supply Package | Lump Sum | None | MS-22 |
| Conveyor Systems Supply Package | Lump Sum | None | MS-23 |

| Contract Description | Type | Comments | Package No. |
|---|---|---|---|
| | | | *table continues…* |
| Large Diameter Piping Supply Package | Lump Sum | None | MS-25 |
| Site Fuelling System Supply Package | Lump Sum | None | MS-26 |
| Miscellaneous Pump Supply Package 1 | Lump Sum | None | MS-27 |
| Miscellaneous Pump Supply Package 2 | Lump Sum | None | MS-28 |
| Misc. Architectural Systems Package 1 | Lump Sum | None | AS-02 |
| Misc. Architectural Systems Package 2 | Lump Sum | None | AS-03 |
| Mechanical Control Valves Package 1 | Lump Sum | None | MS-29 |
| Mechanical Control Valves Package 2 | Lump Sum | None | MS-30 |
| Mechanical Controls & Switchgear | Lump Sum | None | ES-05 |
| Instrumentation & Controls Supply Package 1 | Lump Sum | None | IS-01 |
| Instrumentation & Controls Supply Package 2 | Lump Sum | None | IS-02 |
| Primary Steelwork Supply Contract | Unit Rates | None | SS-02 |
| Secondary Steelwork Supply Contract | Unit Rates | None | SS-03 |
| Concrete Supply | Unit Price | None | CS-01 |
| Cladding and Roofing | Unit Price | None | AS-04 |
| Process Control System | Fixed Price | None | IS-03 |
| Tailings, Liner & Associated Systems | Fixed Price | None | CS-02 |

### 18.4.3 MAJOR CONSTRUCTION CONTRACTS

A summary of major construction contracts is outlined in Table 18.2.

**Table 18.2 Summary of Major Construction Contracts**

| Contract Description | Type | Comments | Contract No. |
|---|---|---|---|
| Piling Contract | Unit Rates | Technology Vendor | CC-01 |
| Quarry Materials Supply Contract | Unit Rates | For Free-Issue | CC-02 |
| Concrete Supply Contract | Unit Rates | For Free-Issue | CC-03 |
| Initial Site Preparation Contract | Unit Price | Essential Facilities | CC-04 |
| Final Site Preparation Contract | Unit Price | Non-Process | CC-05 |
| Borehole Installation Contract | Lump Sum | None | CC-06 |
| Overburden Stripping Contract | Unit Rate | Muskeg and Clays | CC-07 |
| Initial Site Facilities Contract | Unit Price | Roads and Ditches | GC-01 |
| Final Site Facilities Contract | Unit Price | Roads and Ditches | GC-02 |
| Frac Sand Facility Contract | Lump Sum | None | GC-03 |
| Frac Sand Load-Out Contract | Lump Sum | None | GC-04 |
| Crusher and Reclaim General Contract | Lump Sum | None | GC-05 |
| Ore Concentrator General Contract | Lump Sum | None | GC-06 |
| Maintenance Building General Contract | Lump Sum | None | GC-07 |
| Pre-Engineered General Contract | Lump Sum | None | GC-08 |
| Steelwork Installation Contract #1 | Unit Rates | Miscellaneous Steel | SC-01 |
| Steelwork Installation Contract #2 | Unit Rates | Miscellaneous Steel | SC-02 |
| Dewatering Pumps & Piping Contract | Lump Sum | None | MC-01 |
| Fresh & Potable Water Supply Contract | Unit Rates | None | MC-02 |
| Site Fuel Mechanical Installation Contract | Lump Sum | None | MC-03 |
| Tailings Management Mechanical Contract | Lump Sum | None | MC-04 |
| Crusher & Reclaim Area SMP Contract | Lump Sum | None | MC-05 |
| Ore Processing Plant SMP Contract | Lump Sum | None | MC-06 |
| Process & Wastewater Systems Contract | Lump Sum | None | MC-07 |
| Primary Power Transformation Contract | Lump Sum | None | EC-01 |
| Primary Power Distribution Contract | Lump Sum | None | EC-02 |
| Secondary Power Transformation Contract | Lump Sum | None | EC-03 |
| Secondary Power Distribution Contract | Lump Sum | None | EC-04 |
| Emergency Power Installation Contract | Lump Sum | None | EC-05 |
| Crusher & Ore Reclaim Electrical Contract | Lump Sum | None | EC-06 |
| Ore Concentrator Electrical Contract | Lump Sum | None | EC-07 |
| Modular Building Installation Contract | Lump Sum | None | AC-01 |
| Instrumentation & Controls Contract | Unit Rates | None | IC-01 |
| Communications/Network Systems Contract | Unit Rates | None | NC-01 |

## 18.5 PROJECT IMPLEMENTATION SCHEDULE

The Project Implementation Schedule outlines the primary activities required to engineer, procure, construct, test, commission and operate the Minago Project.

The schedule is based on the following:

- The Environmental Impact Statement will be submitted within two months of completion of Feasibility Study.
- It has been assumed that Environmental permitting will be completed before detail design begins.
- The detail engineering phase will begin without a basic engineering phase.
- Fill project funding will be required to meet the procurement schedule.
- The Project will proceed under a EPCM implementation strategy.
- Permitting approvals will not compromise the engineering, procurement, and construction sequencing schedule, although dates change.

The following principles have been adopted:

- To maintain the schedule at a reasonable length without adding unnecessary complexity, package and contract breakdowns have been limited to primary activities. For example, basic pumps will be procured through a single procurement package rather than a series of smaller packages.
- Construction contracts will be kept separate rather than assembled into larger packages, to allow for adjustments as opportunities arise. In many cases, work packages will be assigned to existing contracts through change orders. Construction packages may also be combined into larger contract packages to facilitate more favourable tendering terms.
- The schedule identifies the long-delivery equipment such as the SAG and ball mills, shovels, trucks and crushers, as well as the time required to obtain the critical design information back from suppliers.
- The overall project execution duration from commencement of limestone removal to mechanical completion of the mill is expected to be 24 months. The duration from field construction of the mill from commencement to mechanical completion is expected to be 20 months.
- The overall duration assumes that required financing will be in place to allow all phases of the project to proceed at their projected start times and that all permits will be in place for the work to proceed as planned and without stoppages.

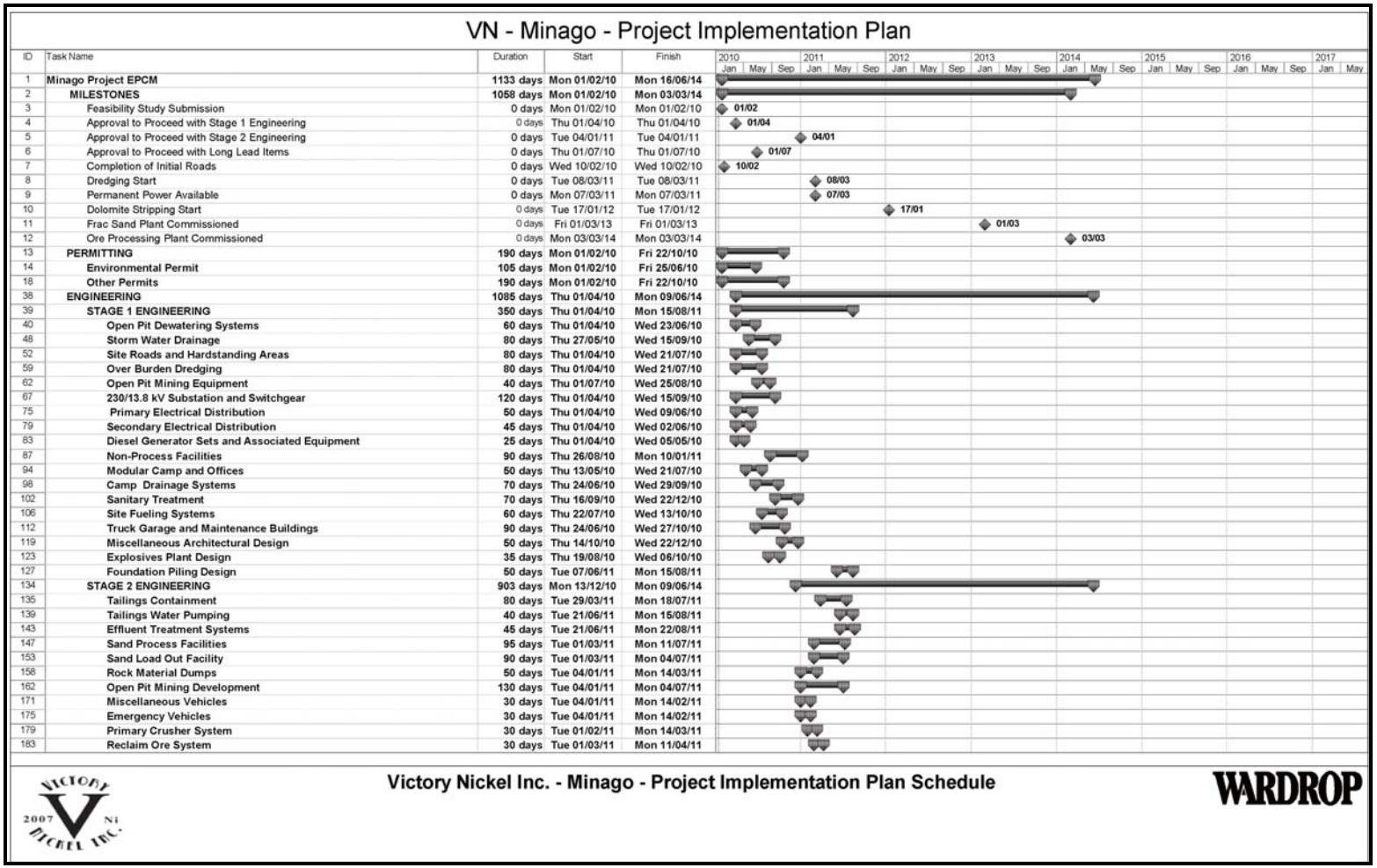
The Project Implementation Schedule is summarized in Figure 18.1 with the full schedule included in Appendix M-1.

## 18.6 PROJECT ORGANIZATION AND MANAGEMENT

### *18.6.1 ORGANIZATIONAL OVERVIEW*

Working under the administration of the Owner's project team, the EPCM Contractor will provide the teams for engineering, procurement, construction, testing and commissioning. The Engineering and Procurement teams will be "home-based" under the direction of the EPCM Project Manager, as shown in Figure 18.2. The construction, testing and commissioning teams will be under the "site-based" Construction Manager who reports to the Project Manager as shown in Figure 18.3.

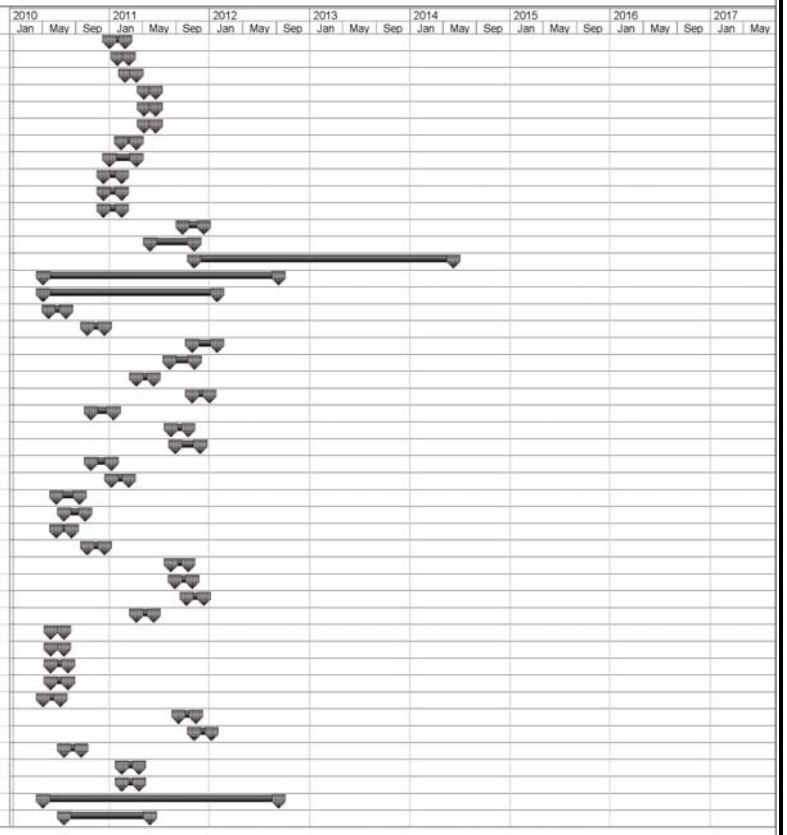
**Figure 18.1 Project Implementation Schedule Summary**




| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | Minago Project EPCM | 1133 days | Mon 01/02/10 | Mon 16/06/14 |
| 2 | MILESTONES | 1058 days | Mon 01/02/10 | Mon 03/03/14 |
| 3 | Feasibility Study Submission | 0 days | Mon 01/02/10 | Mon 01/02/10 |
| 4 | Approval to Proceed with Stage 1 Engineering | 0 days | Thu 01/04/10 | Thu 01/04/10 |
| 5 | Approval to Proceed with Stage 2 Engineering | 0 days | Tue 04/01/11 | Tue 04/01/11 |
| 6 | Approval to Proceed with Long Lead Items | 0 days | Thu 01/07/10 | Thu 01/07/10 |
| 7 | Completion of Initial Roads | 0 days | Wed 10/02/10 | Wed 10/02/10 |
| 8 | Dredging Start | 0 days | Tue 08/03/11 | Tue 08/03/11 |
| 9 | Permanent Power Available | 0 days | Mon 07/03/11 | Mon 07/03/11 |
| 10 | Dolomite Stripping Start | 0 days | Tue 17/01/12 | Tue 17/01/12 |
| 11 | Frac Sand Plant Commissioned | 0 days | Fri 01/03/13 | Fri 01/03/13 |
| 12 | Ore Processing Plant Commissioned | 0 days | Mon 03/03/14 | Mon 03/03/14 |
| 13 | PERMITTING | 190 days | Mon 01/02/10 | Fri 22/10/10 |
| 14 | Environmental Permit | 105 days | Mon 01/02/10 | Fri 25/06/10 |
| 18 | Other Permits | 190 days | Mon 01/02/10 | Fri 22/10/10 |
| 38 | ENGINEERING | 1085 days | Thu 01/04/10 | Mon 09/06/14 |
| 39 | STAGE 1 ENGINEERING | 350 days | Thu 01/04/10 | Mon 15/08/11 |
| 40 | Open Pit Dewatering Systems | 60 days | Thu 01/04/10 | Wed 23/06/10 |
| 48 | Storm Water Drainage | 80 days | Thu 27/05/10 | Wed 15/09/10 |
| 52 | Site Roads and Hardstanding Areas | 80 days | Thu 01/04/10 | Wed 21/07/10 |
| 59 | Over Burden Dredging | 80 days | Thu 01/04/10 | Wed 21/07/10 |
| 62 | Open Pit Mining Equipment | 40 days | Thu 01/07/10 | Wed 25/08/10 |
| 67 | 230/13.8 kV Substation and Switchgear | 120 days | Thu 01/04/10 | Wed 15/09/10 |
| 75 | Primary Electrical Distribution | 50 days | Thu 01/04/10 | Wed 09/06/10 |
| 79 | Secondary Electrical Distribution | 45 days | Thu 01/04/10 | Wed 02/06/10 |
| 83 | Diesel Generator Sets and Associated Equipment | 25 days | Thu 01/04/10 | Wed 05/05/10 |
| 87 | Non-Process Facilities | 90 days | Thu 26/08/10 | Mon 10/01/11 |
| 94 | Modular Camp and Offices | 50 days | Thu 13/05/10 | Wed 21/07/10 |
| 98 | Camp Drainage Systems | 70 days | Thu 24/06/10 | Wed 29/09/10 |
| 102 | Sanitary Treatment | 70 days | Thu 16/09/10 | Wed 22/12/10 |
| 106 | Site Fueling Systems | 60 days | Thu 22/07/10 | Wed 13/10/10 |
| 112 | Truck Garage and Maintenance Buildings | 90 days | Thu 24/06/10 | Wed 27/10/10 |
| 119 | Miscellaneous Architectural Design | 50 days | Thu 14/10/10 | Wed 22/12/10 |
| 123 | Explosives Plant Design | 35 days | Thu 19/08/10 | Wed 06/10/10 |
| 127 | Foundation Piling Design | 50 days | Tue 07/06/11 | Mon 15/08/11 |
| 134 | STAGE 2 ENGINEERING | 903 days | Mon 13/12/10 | Mon 09/06/14 |
| 135 | Tailings Containment | 80 days | Tue 29/03/11 | Mon 18/07/11 |
| 139 | Tailings Water Pumping | 40 days | Tue 21/06/11 | Mon 15/08/11 |
| 143 | Effluent Treatment Systems | 45 days | Tue 21/06/11 | Mon 22/08/11 |
| 147 | Sand Process Facilities | 95 days | Tue 01/03/11 | Mon 11/07/11 |
| 153 | Sand Load Out Facility | 90 days | Tue 01/03/11 | Mon 04/07/11 |
| 158 | Rock Material Dumps | 50 days | Tue 04/01/11 | Mon 14/03/11 |
| 162 | Open Pit Mining Development | 130 days | Tue 04/01/11 | Mon 04/07/11 |
| 171 | Miscellaneous Vehicles | 30 days | Tue 04/01/11 | Mon 14/02/11 |
| 175 | Emergency Vehicles | 30 days | Tue 04/01/11 | Mon 14/02/11 |
| 179 | Primary Crusher System | 30 days | Tue 01/02/11 | Mon 14/03/11 |
| 183 | Reclaim Ore System | 30 days | Tue 01/03/11 | Mon 11/04/11 |

## VN - Minago - Project Implementation Plan

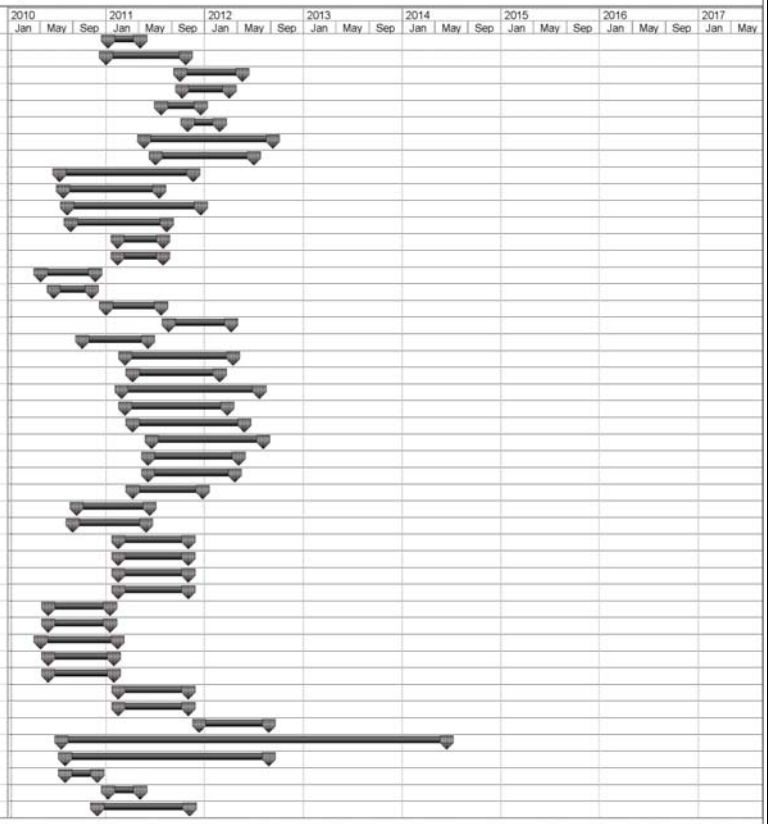
| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 187 | SAG and Ball Mill Equipment | 40 days | Tue 04/01/11 | Mon 28/02/11 |
| 191 | Pebble Crusher Equipment | 30 days | Tue 01/02/11 | Mon 14/03/11 |
| 195 | Flotation System | 30 days | Tue 01/03/11 | Mon 11/04/11 |
| 199 | Reagent System | 30 days | Tue 10/05/11 | Mon 20/06/11 |
| 203 | Product/Waste Thickening Systems | 30 days | Tue 10/05/11 | Mon 20/06/11 |
| 207 | Concentrate Pressure Filter System | 30 days | Tue 10/05/11 | Mon 20/06/11 |
| 211 | Conveyor Systems Supply Package | 40 days | Tue 15/02/11 | Mon 11/04/11 |
| 215 | Process Water Systems | 70 days | Tue 04/01/11 | Mon 11/04/11 |
| 219 | Pumping Systems | 40 days | Mon 13/12/10 | Wed 16/02/11 |
| 223 | Mechanical Control Valves Systems | 40 days | Mon 13/12/10 | Wed 16/02/11 |
| 227 | Instrumentation & Control Systems | 40 days | Mon 13/12/10 | Wed 16/02/11 |
| 231 | Process Control Systems | 55 days | Tue 27/09/11 | Mon 12/12/11 |
| 236 | Concentrator Building | 115 days | Tue 31/05/11 | Mon 07/11/11 |
| 260 | Discipline Engineering Follow up | 675 days | Tue 08/11/11 | Mon 09/06/14 |
| 262 | PROCUREMENT | 605 days | Thu 06/05/10 | Mon 10/09/12 |
| 263 | CONTRACT PACKAGES | 445 days | Thu 06/05/10 | Mon 30/01/12 |
| 264 | Initial Site Facilities Contract (GC-01) | 45 days | Thu 27/05/10 | Wed 28/07/10 |
| 269 | Final Site Facilities Contract (GC-02) | 45 days | Thu 14/10/10 | Wed 15/12/10 |
| 274 | Frac Sand Plant Construction Contract (GC-03) | 65 days | Tue 01/11/11 | Mon 30/01/12 |
| 279 | Frac Sand Loadout Facility Construction Contract (GC-04) | 65 days | Wed 10/08/11 | Wed 09/11/11 |
| 284 | Crusher and Ore Reclaim General Contract (GC-05) | 45 days | Tue 12/04/11 | Mon 13/06/11 |
| 289 | Ore Concentrator General Contract (GC-06) | 45 days | Tue 01/11/11 | Mon 02/01/12 |
| 294 | Maintenance Building General Contract (GC-07) | 50 days | Thu 28/10/10 | Mon 17/01/11 |
| 299 | Piling Contract (CC-01) | 45 days | Tue 16/08/11 | Mon 17/10/11 |
| 304 | Concrete Supply Package (CC-03) | 65 days | Wed 31/08/11 | Tue 29/11/11 |
| 309 | Initial Site Preparation Contract (CC-04) | 45 days | Thu 28/10/10 | Mon 10/01/11 |
| 314 | Final Site Preparation Contract (CC-05) | 45 days | Tue 11/01/11 | Mon 14/03/11 |
| 319 | Drill and Install Borehole System - Contract (CC-06) | 60 days | Thu 24/06/10 | Wed 15/09/10 |
| 324 | Over Burden Dredging Contract (CC-07) | 55 days | Thu 22/07/10 | Wed 06/10/10 |
| 329 | Open Pit Dewatering Pumping and Piping Package - Contract (MC-01) | 40 days | Thu 24/06/10 | Wed 18/08/10 |
| 334 | Site Fueling Mechanical Installation Contract (MC-03) | 45 days | Thu 14/10/10 | Wed 15/12/10 |
| 339 | Tailings Management Mechanical Contract (MC-04) | 45 days | Tue 16/08/11 | Mon 17/10/11 |
| 344 | Crusher and Ore Reclaim SMP Contract (MC-05) | 45 days | Tue 30/08/11 | Mon 31/10/11 |
| 349 | Ore Processing Plant SMP Contract (MC-06) | 45 days | Tue 11/10/11 | Mon 12/12/11 |
| 354 | Process and Waste Water Systems (MC-07) | 45 days | Tue 12/04/11 | Mon 13/06/11 |
| 359 | Primary Power Transmission Contract (EC-01) | 35 days | Thu 03/06/10 | Wed 21/07/10 |
| 364 | Primary Power Transformation Package - Contract (EC-02) | 35 days | Thu 03/06/10 | Wed 21/07/10 |
| 369 | Secondary Power Distribution Contract (EC-03) | 45 days | Thu 03/06/10 | Wed 04/08/10 |
| 374 | Secondary Power Transformation Contract (EC-04) | 45 days | Thu 03/06/10 | Wed 04/08/10 |
| 379 | Emergency Power Contract (EC-05) | 45 days | Thu 06/05/10 | Wed 07/07/10 |
| 384 | Crusher and Ore Reclaim Electrical Contract (EC-06) | 45 days | Tue 13/09/11 | Mon 14/11/11 |
| 389 | Ore Concentrator Electrical Contract (EC-07) | 45 days | Tue 08/11/11 | Mon 09/01/12 |
| 394 | Modular Building Installation Contract (AC-01) | 45 days | Thu 22/07/10 | Wed 22/09/10 |
| 399 | Instrumentation & Control Contract (IC-01) | 45 days | Thu 17/02/11 | Wed 20/04/11 |
| 404 | Communication/Network System Contract (NC-01) | 45 days | Thu 17/02/11 | Wed 20/04/11 |
| 409 | EQUIPMENT PACKAGES | 605 days | Thu 06/05/10 | Mon 10/09/12 |
| 410 | Modular Buildings (Camp and Offices) Supply Package (AS-01) | 215 days | Thu 22/07/10 | Mon 30/05/11 |




Victory Nickel Inc. - Minago - Project Implementation Plan Schedule

## VN - Minago - Project Implementation Plan

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 417 | Miscellaneous Architectural Systems Package 1 (AS-02) | 85 days | Tue 11/01/11 | Mon 09/05/11 |
| 423 | Miscellaneous Architectural Systems Package 2 (AS-03) | 210 days | Tue 04/01/11 | Mon 24/10/11 |
| 430 | Cladding and Roofing (AS-04) | 165 days | Tue 04/10/11 | Mon 21/05/12 |
| 437 | Water Holding Tanks Supply Package (SS-01) | 125 days | Tue 11/10/11 | Mon 02/04/12 |
| 444 | Primary Steelwork Supply Package (SS-02) | 105 days | Tue 26/07/11 | Mon 19/12/11 |
| 451 | Secondary Steelwork Supply Package (SS-03) | 85 days | Tue 01/11/11 | Mon 27/02/12 |
| 458 | Frac Sand Process Plant Supply Package (MS-01) | 340 days | Tue 24/05/11 | Mon 10/09/12 |
| 462 | Frac Sand Loadout Supply Package (MS-02) | 260 days | Tue 05/07/11 | Mon 02/07/12 |
| 468 | Open Pit Mining Trucks Supply Package (MS-03) | 345 days | Thu 15/07/10 | Mon 21/11/11 |
| 474 | Open Pit Mining Loaders Supply Package (MS-04) | 245 days | Thu 29/07/10 | Mon 18/07/11 |
| 480 | Open Pit Mining Shovels Supply Package (MS-05) | 345 days | Thu 12/08/10 | Mon 19/12/11 |
| 486 | Open Pit Mining Drills Supply Package (MS-06) | 245 days | Thu 26/08/10 | Mon 15/08/11 |
| 492 | Miscellaneous Vehicle Supply Package (MS-07) | 120 days | Tue 15/02/11 | Mon 01/08/11 |
| 498 | Emergency Vehicle Supply Package (MS-08) | 120 days | Tue 15/02/11 | Mon 01/08/11 |
| 504 | Dewatering Pump Supply Package (MS-09) | 145 days | Thu 06/05/10 | Wed 24/11/10 |
| 510 | Borehole Equipment Supply Package (MS-10) | 100 days | Thu 24/06/10 | Wed 10/11/10 |
| 517 | Sanitary Treatment System Supply Package (MS-11) | 145 days | Tue 04/01/11 | Mon 25/07/11 |
| 523 | Effluent Treatment System Supply Package (MS-12) | 165 days | Tue 23/08/11 | Mon 09/04/12 |
| 530 | Explosives Plant Supply Package (MS-13) | 165 days | Thu 07/10/10 | Mon 06/06/11 |
| 537 | Primary Crusher System (MS-14) | 285 days | Tue 15/03/11 | Mon 16/04/12 |
| 544 | Reclaim Ore System (MS-16) | 230 days | Tue 12/04/11 | Mon 27/02/12 |
| 551 | SAG and Ball Mill Equipment (MS-17) | 365 days | Tue 01/03/11 | Mon 23/07/12 |
| 558 | Pebble Crusher Equipment (MS-18) | 270 days | Tue 15/03/11 | Mon 26/03/12 |
| 565 | Flotation System (MS-19) | 295 days | Tue 12/04/11 | Mon 28/05/12 |
| 572 | Reagent System (MS-20) | 295 days | Tue 21/06/11 | Mon 06/08/12 |
| 579 | Product/Waste Thickening Systems (MS-21) | 240 days | Tue 07/06/11 | Mon 07/05/12 |
| 586 | Concentrate Pressure Filter System (MS-22) | 230 days | Tue 07/06/11 | Mon 23/04/12 |
| 593 | Conveyor Systems Supply Package (MS-23) | 185 days | Tue 12/04/11 | Mon 26/12/11 |
| 600 | Large Diameter Piping Supply (Dewatering and Storm Water) (MS-25) | 185 days | Thu 16/09/10 | Mon 13/06/11 |
| 607 | Site Fueling System (MS-26) | 185 days | Thu 02/09/10 | Mon 30/05/11 |
| 614 | Miscellaneous Pump Supply Package 1 (MS-27) | 185 days | Thu 17/02/11 | Wed 02/11/11 |
| 621 | Miscellaneous Pump Supply Package 2 (MS-28) | 185 days | Thu 17/02/11 | Wed 02/11/11 |
| 628 | Mechanical Control Valves Package 1 (MS-29) | 185 days | Thu 17/02/11 | Wed 02/11/11 |
| 635 | Mechanical Control Valves Package 2 (MS-30) | 185 days | Thu 17/02/11 | Wed 02/11/11 |
| 642 | Transformer(Pre-Owned) Supply Package (ES-01) | 155 days | Thu 03/06/10 | Mon 17/01/11 |
| 649 | Substation Switch Gear Supply Package (ES-02) | 155 days | Thu 03/06/10 | Mon 17/01/11 |
| 656 | Diesel Generator Sets and Associated Equipment (ES-03) | 195 days | Thu 06/05/10 | Mon 14/02/11 |
| 663 | Distribution Transformers (13.8kV/600V) Supply Package (ES-04) | 165 days | Thu 03/06/10 | Mon 31/01/11 |
| 669 | MCCs and Switchgear (ES-05) | 165 days | Thu 03/06/10 | Mon 31/01/11 |
| 676 | Instrumentation & Controls Supply Package 1 (IS-01) | 185 days | Thu 17/02/11 | Wed 02/11/11 |
| 683 | Instrumentation & Controls Supply Package 2 (IS-02) | 185 days | Thu 17/02/11 | Wed 02/11/11 |
| 690 | Process Control System (IS-03) | 185 days | Tue 13/12/11 | Mon 27/08/12 |
| 697 | CONSTRUCTION | 1010 days | Thu 22/07/10 | Mon 16/06/14 |
| 698 | EARLY/GENERAL WORKS | 530 days | Thu 05/08/10 | Mon 27/08/12 |
| 699 | Initial Site Preparation Contract (CC-04) | 85 days | Thu 05/08/10 | Wed 01/12/10 |
| 703 | Initial Site Facilities Contract (GC-01) | 85 days | Tue 11/01/11 | Mon 09/05/11 |
| 712 | Final Site Preparation Contract (CC-05) | 235 days | Thu 02/12/10 | Mon 07/11/11 |

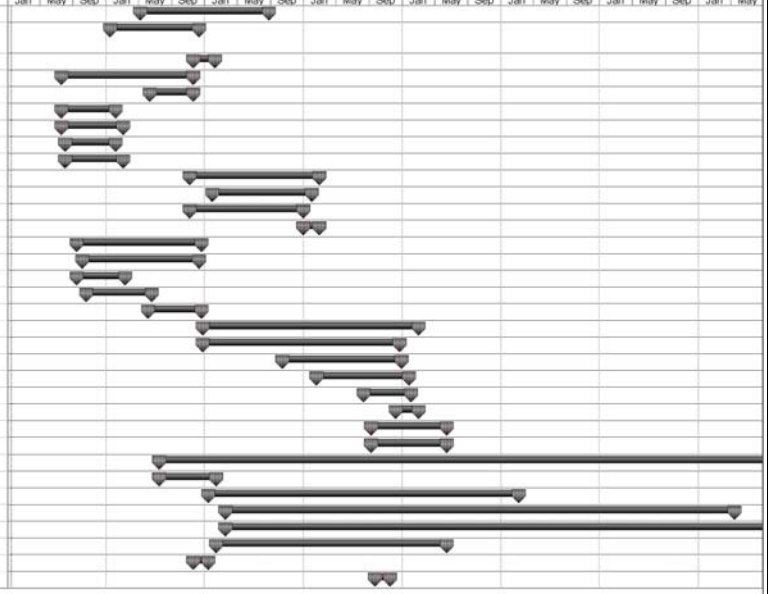



Victory Nickel Inc. - Minago - Project Implementation Plan Schedule

WARDROP

## VN - Minago - Project Implementation Plan

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 718 | Final Site Facilities Contract (GC-02) | 340 days | Tue 10/05/11 | Mon 27/08/12 |
| 726 | Maintenance Building Contract (GC-07) | 235 days | Tue 18/01/11 | Mon 12/12/11 |
| 738 | Piling Contract (CC-01) | 57.5 days | Tue 22/11/11 | Thu 09/02/12 |
| 748 | SITE UTILITIES | 340 days | Thu 22/07/10 | Mon 21/11/11 |
| 749 | Site Fueling System Mechanical Installation Contract (MC-03) | 115 days | Tue 14/06/11 | Mon 21/11/11 |
| 755 | Primary Power Transmission Contract (EC-01) | 135 days | Thu 22/07/10 | Mon 07/02/11 |
| 759 | Primary Power Transformation Contract (EC-02) | 155 days | Thu 22/07/10 | Mon 07/03/11 |
| 768 | Secondary PowerTransmission Contract (EC-03 ) | 125 days | Thu 05/08/10 | Mon 07/02/11 |
| 773 | Secondary Power Transformation Contract ( EC-04) | 145 days | Thu 05/08/10 | Mon 07/03/11 |
| 781 | FRAC SAND | 343.4 days | Tue 08/11/11 | Fri 01/03/13 |
| 782 | Frac Sand Plant Construction Contract (GC-03) | 264 days | Tue 31/01/12 | Fri 01/02/13 |
| 791 | Frac Sand Loadout Construction Contract (GC-04) | 300 days | Tue 08/11/11 | Tue 01/01/13 |
| 803 | Commissioning Frac Sand | 43.4 days | Tue 01/01/13 | Fri 01/03/13 |
| 806 | MINE | 322.5 days | Thu 16/09/10 | Thu 22/12/11 |
| 807 | Overburden Dredging Contract (CC-07) | 300 days | Thu 07/10/10 | Mon 12/12/11 |
| 810 | Drill and Install Borehole System - Contract (CC-06) | 120 days | Thu 16/09/10 | Mon 14/03/11 |
| 815 | Open Pit Dewatering Pumping and Piping System Package (MC-01) | 165 days | Thu 21/10/10 | Mon 20/06/11 |
| 822 | Explosives Plant Supply Package (MS-13) | 142.5 days | Tue 07/06/11 | Thu 22/12/11 |
| 830 | ORE PROCESSING FACILITY | 570 days | Tue 27/12/11 | Mon 03/03/14 |
| 831 | Ore Processing Facility General Contract (GC-05 & GC-06) | 520 days | Tue 27/12/11 | Mon 23/12/13 |
| 855 | Install Mechanical (MC-05 & MC-06) | 315 days | Tue 16/10/12 | Mon 30/12/13 |
| 868 | Install Electrical (EC-06 & EC-07) | 245 days | Tue 19/02/13 | Mon 27/01/14 |
| 876 | Install Instrumentation and Controls (IC-01) | 125 days | Tue 13/08/13 | Mon 03/02/14 |
| 881 | Commissioning Ore Processing Facility | 60 days | Tue 10/12/13 | Mon 03/03/14 |
| 883 | TAILING | 200 days | Tue 10/09/13 | Mon 16/06/14 |
| 884 | Tailings Management Mechanical Contract (MC-04) | 200 days | Tue 10/09/13 | Mon 16/06/14 |
| 887 | OPERATIONS | 2495 days | Tue 19/07/11 | Mon 08/02/21 |
| 888 | Assemble and Commission Mining Equipment | 150 days | Tue 19/07/11 | Mon 13/02/12 |
| 893 | Phase 1- Pit Development (Owner Operated Fleet) | 820 days | Tue 17/01/12 | Mon 09/03/15 |
| 896 | Phase 2 - Pit Development | 1345 days | Tue 20/03/12 | Mon 15/05/17 |
| 903 | Phase 3 - Pit Development | 2320 days | Tue 20/03/12 | Mon 08/02/21 |
| 908 | Tailings Containment | 610 days | Tue 14/02/12 | Mon 16/06/14 |
| 917 | Dolomite Dump | 40 days | Tue 22/11/11 | Tue 17/01/12 |
| 919 | Country Rock Dump | 40 days | Tue 24/09/13 | Tue 19/11/13 |




Victory Nickel Inc. - Minago - Project Implementation Plan Schedule

**Figure 18.2 Home-based Organization Chart**

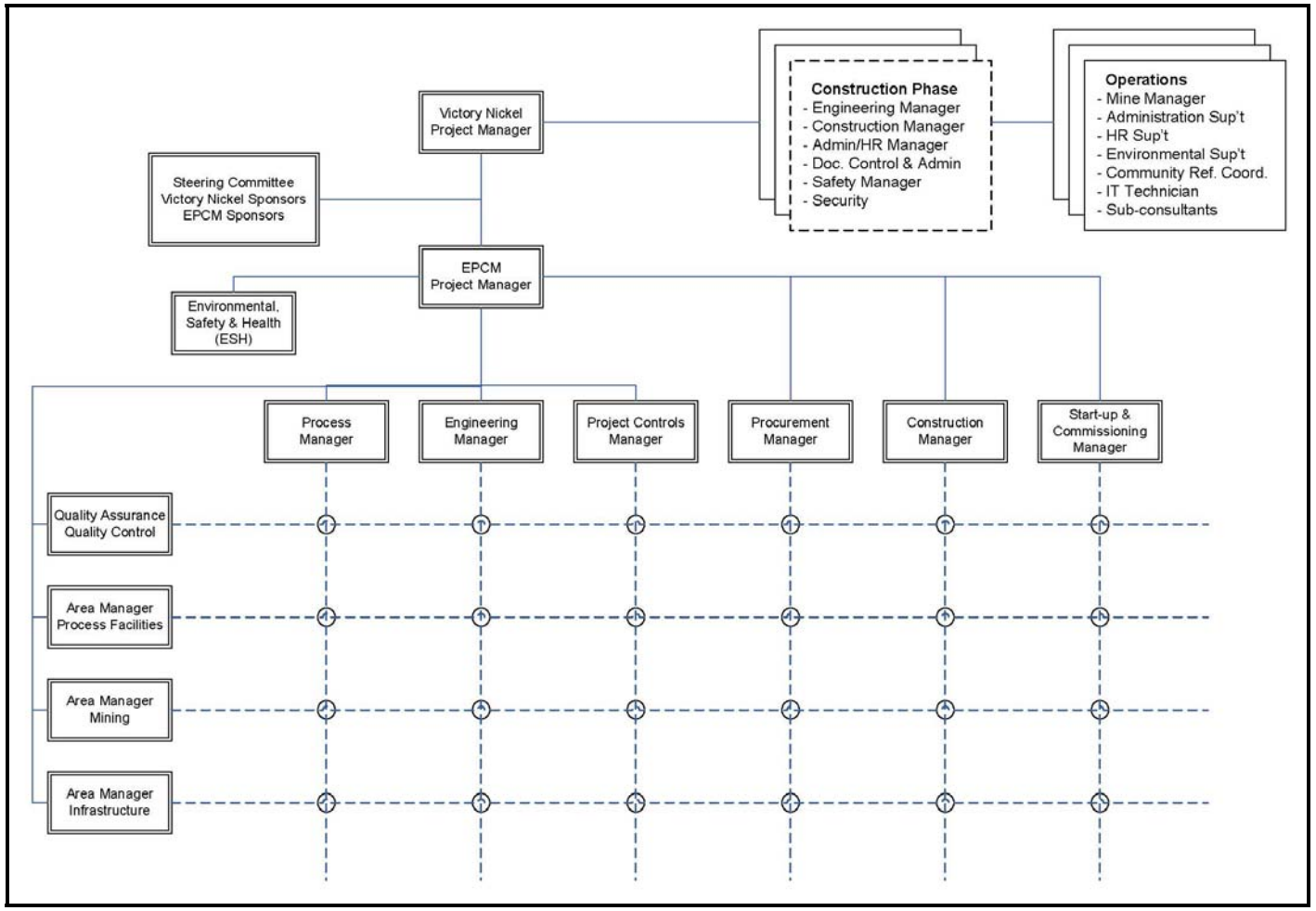
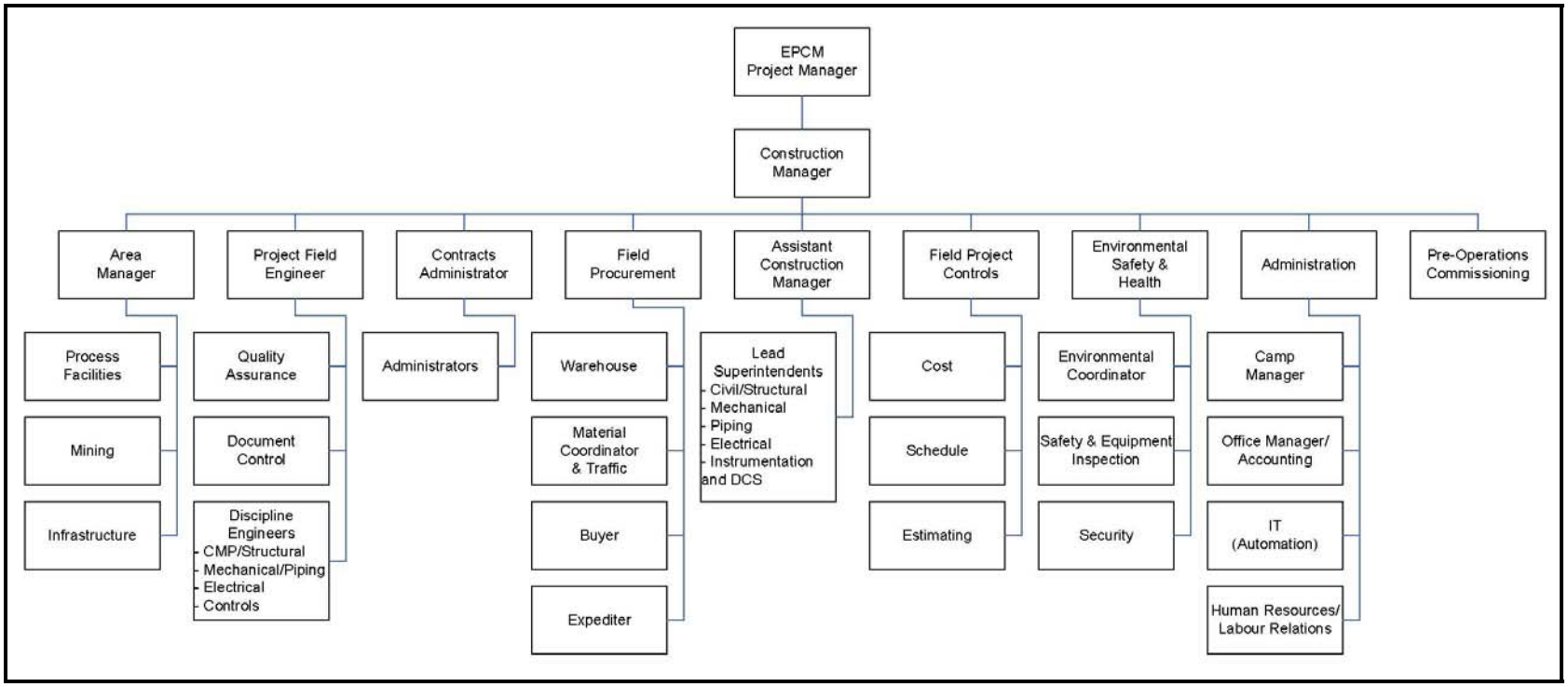


**Figure 18.3 Site-based Organization Chart**



## 18.7 OWNER'S AND EPCM CONTRACTOR'S RESPONSIBILITIES

The Owner will be responsible for the following activities:

- mine planning and early-mine operations
- communication with local communities, and the media
- accounting and invoice payment for equipment, and construction contracts
- permits/licenses for construction, operation, and environmental compliance
- operation staffing and training, commissioning, and start-up.

The EPCM Contractor will retain responsibility for the following activities:

- the project management system for cost reporting, and scheduling
- a comprehensive baseline plan to monitor project progress and productivity
- a procedure for identifying and correcting early departures from the plan
- a procedure for providing commissioning, and start-up support to the owner.

## 18.8 PROJECT MANAGEMENT SYSTEM

A comprehensive Project Procedures Manual will outline the requirements to execute administrative activities. The manual will be prepared by the EPCM Contractor and then issued to the Owner for review and comment prior to formal issue.

The procedures manual will include:

- project organization, key names, and communication procedures
- a responsibility matrix between project stakeholders
- reporting requirements including project systems, meetings, and minutes
- distribution requirements using a communications matrix
- project data management, format, and distribution/filing requirements
- drawing and specification preparation including numbering and transmittal procedures
- site procedures including safety, environmental, emergency numbers, and camp administration rules
- security and quality requirements
- equipment and materials procurement and construction contract procedures

- scheduling requirements, formats, and issue time
- cost reporting and forecasting
- site and office personnel rules and regulations.

## 18.9 ENVIRONMENTAL, HEALTH AND SAFETY RESPONSIBILITY

A fully-integrated workplace safety and environmental responsibility program will be implemented to help achieve a “zero-harm” goal. This program will include the development of an effective Environmental, Health, and Safety (EHS) practices document. The implementation of this document will require a high level of communication, motivation, and involvement with site contractors on topics such as safety training, occupational health and hygiene, hazard and risk awareness, safe systems of work and job safety analysis.

The implementation will include tools for performance tracking and accountability, including the procedures for incident management. In addition, contractors will be required to create individual safety programs and safety plans that meet the expectations of the Construction Management (CM) team.

During Detail Design the project will use sound preventative environmental approaches to engineering design. Engineering stages will incorporate criteria for responsible design of process flows, effluent and waste products to meet established capture and containment guidelines. The design will incorporate clean plant design standards, including operational safety and maintenance access requirements.

A Hazard and Operability Analysis (HAZOP) will be conducted by the project design team for each process area during detailed design to identify hazards requiring attention. Environmental protection will be incorporated into the engineering of the main plant processes, including transportation, storage and material disposal.

Safety tagging and lockout procedures will be established to identify the status of equipment, systems, and mechanical completion as the commissioning process moves forward.

## 18.10 PROJECT INTEGRATION AND CONTROLS

### *18.10.1 COST CONTROL*

The Project Work Breakdown Structure (WBS) will be reviewed to confirm that it correctly defines the elements of project scope. The next step will be to determine the control cost estimate based upon this definitive scope of work and the Work Breakdown Structure.

The cost estimate produced at the conclusion of basic engineering will become the control cost estimate for the project execution phase. Once the budgets are cast against the approved scope, this document will become the baseline control document against which the project costs will be measured.

Cost management will allow the EPCM team to quickly evaluate and minimize any potential negative effects of capital control budget deviations. The project cost management system will provide the Client with comprehensive cost reporting, forecasting and trending.

The project management team will implement a coordinated program to review the Estimate at Completion (EAC) with the EPCM teams. This detailed EAC review will be performed at regular intervals for the various procurement and construction package to monitor the latest available trends. These include changes in quality, quantities, unit prices, site conditions, delays, interferences and other factors that may influence the final cost.

A cash flow schedule will be established once the contracting strategy and construction schedules are finalized and the estimate is re-cast into procurement packages. This cash flow schedule will support the Client's anticipated cash requirements for the Project. As the Project advances, actual expenditures will be recorded and compared to the original cash flow estimate.

Deviations from the scope of the control estimate will be evaluated with respect to cost and schedule impact against the funds approved for the Project. Changes in scope will be monitored against the control cost estimate established for the implementation phase.

### 18.10.2 PLANNING CONTROL

The planning process identifies critical sequences that must be managed to execute the Project successfully. The project master schedule highlights project milestones and critical sequences with executive level reports that provide an ongoing overview of the Project status. The detailed schedules will track the planned and actual progress throughout the duration of the project by phase.

During the Engineering and Procurement phases, activities are scheduled to the deliverables level in the engineering work plan. The procurement activities are determined from the equipment list, which is developed into a procurement packaging strategy. This will track vendor quotations, terms and conditions, fabrication and delivery requirements, engineering information and drawing reviews.

The construction contracting strategy will be developed from an understanding of the scope of the work, the engineering schedule, and the requirements for procuring equipment and services. In parallel, the construction, commissioning and start-up schedules will be developed on the master schedule with input from the engineering,

construction, and operations groups. The construction contract milestone dates will be determined for the procurement and construction packages on the master schedule. The detailed equipment procurement and construction contracts will be closely monitored against the master schedule. Once identified, critical sequences and tie-ins from the Construction Contractor's work plan will be scheduled in the master schedule.

The progress reporting will be based upon earned or weighted value progress measurement for work in place, trend analysis and other techniques as required to ensure precise reporting of Project status.

### 18.10.3 DOCUMENT CONTROL

An effective document management system is crucial to the successful implementation of a project. A collaborative document control system will be implemented that provides status and version control for all issued documents. The system will be capable of publishing documents, text, drawings, photographs, or 3D models to the internet. Where necessary, documents will be linked to the equipment database to ease the delivery of an accessible control system to the operations group at the completion of the design and construction phases.

### 18.10.4 RISK MANAGEMENT STRATEGY

The PIP will include risk reviews of safety, environmental, technical, business and commercial, and project delivery issues. These reviews will identify and assess relevant risks and determine the mitigation strategies.

A formal risk management program will commence during the detail design phase and will continue through construction and commissioning. The project team will periodically review risks and opportunities and take appropriate action to minimize the impact on overall costs and scheduling.

## 18.11 ENGINEERING

We have assumed that the phasing of the Project would move from the Feasibility Study phase directly through to the Detail Design Phase.

The detail engineering tasks will include:

- Process and Utility Flow Diagrams (PFDs) will be updated from feasibility level and finalized to include major equipment vendor information.
- PFDs will also be rebalanced for all existing and new process equipment. The equipment list will be updated to include specific information from the firm-price bids for each selected vendor.

- Piping and Instrumentation Diagrams (P&IDs) will be updated to include major equipment vendor information.
- The preliminary instrument list will be updated based on the P&IDs.
- The general arrangement drawings for new facilities will be advanced to incorporate certified vendor information as received.
- Secondary equipment, including main pipe headers, ducting, air conditioning, equipment, etc., will be incorporated into the layouts.
- Preliminary primary and secondary distribution Electrical Single Line Diagrams (SLDs) will be updated for the Project.
- Electrical load analyses and load flow reports will be completed.
- The engineer will provide licensing and permitting assistance to the Owner as required.
- Specifications will be developed to obtain competitive and firm price bids for major equipment that requires a long-lead for delivery, or which need to be purchased to avoid high price future escalation.
- All manufacturing hold points will be reflected in the plan in cases where the engineer may decide that inspection is required.
- Bids will be technically and commercially evaluated by the EPCM team and recommendations made to the Owner for purchasing.
- Recommendations for purchase orders for long delivery equipment will be issued by the EPCM Contractor to the Owner.
- Once the capital cost estimate from the Feasibility Study has been approved and “converted” to a control budget. This budget will be updated with recent cost information including the values of the released purchase orders.
- The project schedule will be reviewed and amended to reflect the results of the detailed design.
- Purchasing procedures and standard documentation will be developed.
- A series of Standard Forms of Contract for the procurement of equipment and services will be developed for the Owner’s approval.

In addition, the detail design engineering team will:

- Prepare calculations, specifications, drawings, material requisitions, and other items related to detailed engineering in accordance with the engineering procedures.
- Produce design and construction drawings based on the results of site investigations including surveys, inspections all commensurate with the details set out in the Feasibility Study to as great an extent as possible.

- Develop equipment specifications for the remainder of the non-long lead equipment together with the commercial and technical analysis and recommended for purchase to the Owner. All manufacturing hold points are to be included in the specifications.
- Provide material requisitions for the purchase of bulk materials based on material take-offs for items such as electrical cables, cable trays, hi-bay lighting, and piping.
- Provide the construction technical specifications to be included in the construction contract bid packages, as well as pertinent drawings, vendor information when available and quantities for the Form of Tender. Also provide all technical reports that will be referred to by the contractors when bidding the construction work for items such as the geotechnical analysis, studies, and special information from vendors for installation of equipment and special requirements for handling.

## 18.12 PROCUREMENT

The EPCM Contractor's purchasing group will procure capital equipment, construction materials and construction contracts and services. Where necessary for equipment and material purchases, this will involve the expediting of vendor drawings and the inspection of equipment when required. The procurement department will package the technical and commercial documentation and manage the bidding cycle for equipment, materials and contracts. In some cases, equipment and materials will be supplied free-issue by the Owner to the contractors. Standard procurement terms and conditions approved for the Project will be utilized for all equipment and material purchase orders. Suppliers will be selected based on locations, quality, price, delivery and support service.

CM will organize bulk materials purchases, assemble contract tendering documents, establish qualified bid lists, issue tenders, analyze, and recommend suitably qualified contractors to the Owner and will prepare executed contracts for issue.

A Field Procurement Manager will support ongoing construction needs for miscellaneous materials and services to be provided by the Owner as well as provide expediting services. The Procurement Manager will be responsible for the receipt, storage and disbursement of purchased materials and equipment at the job site.

### *18.12.1 CONSTRUCTION CONSIDERATIONS*

The contracting strategy will be designed to make maximum use of the local labour force, create a responsible and sustainable relationship with the nearby communities and provide a mix of senior management and specialists to support the safety, quality and schedule and cost objectives of the Project. In addition, contracts will be

designed to combine timing, scope, battery limits and contract value into manageable packages.

Construction contracts will be designed based on scope and/or discipline with contract packages designed to take advantage of a staggered work schedule. Some contracts, such as transmission line, truck fuel station, and truckshop construction may be issued before the scope of the overall Project is fully defined.

A table will be developed to outline the scope of the major construction contracts and the pricing strategies for individually-issued contracts. In addition, smaller contracts and options will be made available during the execution phase to suit site requirements.

### 18.12.2 EXPEDITING

A plan for expediting equipment purchase orders based on the project schedule and equipment list will be prepared. Expediting will be coordinated as part of Construction Management although third-party resources may be used to inspect equipment in various parts of the world during manufacture. The extent with which purchase orders will be expedited will be based on the order's complexity, manufacturing cycle time and schedule criticality. For purchase orders requiring the highest level of expedition, a resident expediter will be placed at the supplier's facility. Expediting reports will be entered into the material control reporting system after each contact with suppliers.

## 18.13 FREIGHT FORWARDING AND SHIPPING LOGISTICS

### 18.13.1 LOGISTICS

The EPCM team will direct logistics and freight for incoming equipment and materials, to be transported by rail and truck to the site. A single-point freight forwarding company will coordinate with manufacturing facilities, establish shipping points and dates, forward the shipments to the most convenient ports, and complete trans-shipments to the project site.

An experienced freight forwarder with representation in Manitoba will function under the direction of the EPCM Contractor, who will issue timely shipment and materials status reports.

### 18.13.2 WAREHOUSING

The Site Materials Management Group will receive, inspect and log all incoming materials, assign storage locations and maintain a database of materials received and dispensed to the contractors. Ongoing reconciliation with the procurement

system, including reconciliation to the freight consolidation point, will confirm the receipt of materials and payment of suppliers. An allowance for the lease or purchase of warehousing equipment has been included in the construction budget.

## 18.14 CONSTRUCTION MANAGEMENT

### *18.14.1 CONSTRUCTION MANAGEMENT FUNCTIONS*

The CM group will be responsible for the management of all field operations. Reporting to the Owner, the Construction Manager will plan, organize, and manage construction quality, safety, budget and schedule objectives.

Construction of the Project will be performed by contractors under the direction of the CM team, reporting to the EPCM Project Manager.

The Construction Managers key objectives will be to:

- Conduct Health, Safety and Environmental (HS&E) policy training and enforcement for all site and contractor staff. Site hazard management tools and programs will be employed to achieve the no harm/zero accident objective.
- Apply contracting and construction infrastructure strategies to support the project execution requirements.
- Maintain and support a construction-sensitive and cost-effective master project schedule.
- Maintain and support a project cost control system to ensure effective cost reporting, monitoring, and forecasting as well as schedule reporting and control. A cost trending programme will be instigated whereby the EPCM Contractor will be responsible for evaluating costs on an ongoing basis for comparison to budget and forecasting for the cost report on monthly basis.
- Establish a field contract administration system to effectively manage, control, and coordinate the work performed by the contractors.
- Apply an effective field constructability program, as a continuation of the constructability reviews performed in the design office.
- Develop a detailed field logistics and material control plan to maintain the necessary flow and control of material and equipment to support construction operations.
- Meet the schedule for handover of the constructed plant to the commissioning team.

### 18.14.2 SURVEYING

The CM survey crew will verify the accuracy of the existing control system before construction begins. Contractors will use only applicable control data for the project with additional monuments set as needed. The Construction Manager will verify surveys prior to construction but contractors will supervise day-to-day field surveying with the CM team providing spot checks.

### 18.14.3 QUALITY CONTROL/QUALITY ASSURANCE

Contractors will establish and observe their own Quality Control program in accordance with the construction technical specifications and the applicable codes and standards. In addition, the CM Field Engineering team will employ independent CSA-qualified Quality Assurance specialists to ensure that overall quality control procedures are observed.

## 18.15 CONSTRUCTION SITE INFRASTRUCTURE

The Owner will provide contractors and CM staff with:

- on-site, project-wide first aid services
- project-wide security
- locations for offices and equipment/material lay down
- local electrical panels and temporary generator sets
- sources for water
- diesel fuel, including storage, for construction equipment
- concrete and structural aggregates
- permanent bulk materials and capital equipment
- audits of quality assurance and control
- vendor-representative assistance.

### 18.15.1 CONSTRUCTION EQUIPMENT

Individual contractors will be responsible for the equipment required to meet their contract obligations. All equipment must comply with Mine Safety Branch requirements, although the Owner's CM team will perform regular spot checks. Large cranes may be supplied by a single company, managed by the CM team with the major lifts scheduled to minimize the scheduled time on site.

### 18.15.2 CONSTRUCTION CAMPS

Development of a full-service camp for construction contractors will begin with the Client's approval to begin detail design. Initially, the Owner's operating personnel and contractors engaged in the early contracts will need to reside in nearby communities. However, as the workforce becomes larger, the requirement for a permanent camp will become a priority.

The camp, which will be a modular design with propane heat, will be erected in phases as the requirements demand. The camp will accommodate up to 300 workers with double occupancy for couples and handicap-accessible rooms. The recreation complex will contain the games and gym facilities.

Transportation, potable water, waste management and other support services will be scaled to support the various development stages. The CM team will ensure that the catering contractor meets the staffing, hygiene, food handling, storage, and meal expectations.

Only prescription drugs will be permitted on site and firearms, drugs and alcohol will be prohibited.

### 18.15.3 TEMPORARY FACILITIES AND CONSTRUCTION SITE INFRASTRUCTURE

#### COMMUNICATION

The Owner's systems manager will determine the appropriate telecommunications technologies for the project. Requirements include voice and data link technologies adequate to support construction and plant operation growth.

The communications framework for management offices will be installed early in the construction period. The system will be supplemented with additional telephones in common areas and suitable internet connections.

#### CONSTRUCTION POWER

Approximately 1-1/2 MW of operating power capacity will be required for camp utilities excluding heat and limited construction facilities during the construction period. The provision for construction power will comprise one working generator with one generator on standby. Once the Starter Pit excavation is commenced by the Owner, permanent power will supply the power loads for the remaining duration of the construction phase.

### FIRST-AID AND SITE SECURITY

The Owner will provide a fully-equipped first-aid facility with ambulance and fire engine for project-wide use. The facility will normally be staffed 12 h/d, with on-call services ensuring continuous coverage for the camp. In addition, contractors will be expected to provide basic first-aid stations at their working locations.

The Owner will supply a 24-hour staffed site security program during the initial field mobilization. Access to the site will be controlled at the principal road entrance and will be limited to personnel who have induction training and to approved visitors.

## 18.16 MECHANICAL COMPLETION, TESTING AND COMMISSIONING

Detailed responsibility matrices describing the mechanical completion, performance testing, and commissioning phase will be documented in the Project Procedures Manual. The Start-up and Commissioning Procedures Manual will address administrative procedures, performance test procedures, pre-operational testing procedures, commissioning, and ramp-up procedures.

### *18.16.1 MECHANICAL COMPLETION*

The mechanical completion checks will indicate that the mechanical systems are ready for safe dry-testing. In parallel with these checks, final work inspections can be completed, contract deficiency lists generated and resolved and documentation for contract closeouts processed.

Generally, mechanical completion poses the greatest safety risk as coordination passes from construction with the owner assuming responsibility for testing and commissioning. To mitigate risk, added emphasis will be placed on communication, safety procedures, and coordination of construction and commissioning personnel.

Each process system and ancillary facility will be checked for compliance with drawings and specifications, vendor data and lubrication charts.

- Equipment will be checked for proper installation, alignment and rotation.
- Conveyors will be run without load to verify belt alignment.
- Tanks and piping will be water/air tested.
- Electrical equipment and circuits will be checked for proper installation.
- Instrumentation circuits will be checked and instruments zero-calibrated.
- Permanent records maintained for each piece of equipment.

After each mechanical installation has been verified, each system will be run under no-load conditions. The Project will phase the mechanical completion sequence to

level the resource requirements and stage the transition from construction to operation. Critical site infrastructure facilities will be completed first, followed by critical process utilities commissioning before the main process equipment.

### 18.16.2 TESTING/COMMISSIONING INTERFACE

With the exception of mining activities, the EPCM Contractor will have responsibility over the facilities until Mechanical Completion. After Mechanical Completion, on a system-by-system basis, the plant will be transferred to the Owners' operations team for performance testing and commissioning. The EPCM Contractor and the Construction Contractors will provide assistance to the owner during the commissioning and start up phase as requested. In addition, selected members of the project commissioning team may be asked to assist the Owner's group in the commissioning as required.

### 18.16.3 COMMISSIONING

The expected sequence of the commissioning will be as follows:

- temporary power
- de-watering systems
- sub-station connection and installation
- frac sand plant
- ore concentrator plan
- open pit mining equipment.

## 18.17 ENTERPRISE OPERATIONAL READINESS

To ensure a sustainable and profitable business, the owner will need to develop the necessary operational readiness capability. During the detail design phase, an Enterprise Operational Readiness Plan will be developed to support the commissioning and operation of the facilities. The organization to support the staffing requirements such as procedures, systems, information, and supporting infrastructure will need to be established.

Typically an organization team will be formed, comprised of the following parties:

- the Client's management group from existing operations where possible who will form the core of the team
- the EPCM Contractor to facilitate the development of the engineering, operations, maintenance, business systems and training systems

- selected vendors providing supporting engineering services
- selected vendors who will provide business and information systems
- staffing recruitment and training.

# 19.0 PROJECT RISKS AND OPPORTUNITIES

## 19.1 INTRODUCTION

The Minago Project has both risks and opportunities associated with it that may influence a successful outcome. Whether a particular factor should be considered as a risk or an opportunity will depend on the particular circumstances. When events conspire to adversely affect a particular factor, opportunities may become risks, and vice versa.

Wardrop developed a list of applicable parameter within the scope of the study, determined whether a particular parameter represents a risk or an opportunity, and identified possible mitigating solutions to reduce or eliminate the risks.

In addition, Wardrop identified other risks and opportunities that lie outside the scope of the feasibility study:

Some potential risks and opportunities include:

- production performance/operational costs
- commodity issues
- construction/testing/commissioning/maintenance costs
- the project implementation schedule and time required to reach full capacity
- the impact of the mine and plant on the environment
- resource/reserve estimation and mine planning
- environmental/regulatory/approvals/permits
- process design
- financial/commercial/contractual
- logistics/access
- political/labour/social/aboriginal issues
- health, safety and security issues
- equipment supply
- water issues and de-watering
- geotechnical pit slope design

## 19.2 CURRENT MARKET CONDITIONS

The current economic downturn has led to a steep deflationary cycle, which has reduced labour, materials and equipment costs. Suppliers have indicated an approximately 10% reduction in material prices based on the cost of steel. The price of fuel and other base commodities has also dropped from 2008 peaks.

Labour costs increased in 2008 because of increased labour demand generated by Alberta oil sands projects, which compete with large Manitoba projects for labour resources. However, a reduction in the price of oil led to decreased labour demand in Alberta, and skilled labour is now increasingly available in Manitoba.

This general reduction in costs, including labour and contracting costs, presents Victory Nickel with the opportunity to improve project economics by building when construction costs are low. In this type of construction market, delivery times will be improved and delays will be less likely.

## 19.3 PROJECT RISKS AND MITIGATION

### *19.3.1 COMMODITIES ISSUES*

A period of stable commodity prices will be required in order to determining reliable price trends. When the Project was conceived in 2007, the price of nickel briefly reached US$24.00/lb; and a US$15.00/lb price seemed reasonable. However, the price of nickel recently dropped below US$4.00/lb and currently ranges between US$7.00 to US$8.50/lb range.

An internal review by John Reid suggested nickel pricing of US$5.00 for 2009, US$6.00 for 2010, US$7.00 for 2011 and US$8.00 for 2012 and 2013. More positively, prices are expected to increase over the long-term. IM&M suggested that the frac sand prices will remain at the current levels, until the pace of the drilling in the oil shales improves.

### *19.3.2 ABORIGINAL ISSUES*

Aboriginal leaders have made numerous positive public comments regarding the Project; however, Victory Nickel has not yet secured a full agreement with Aboriginal groups to proceed. Nevertheless, Wardrop believes that Victory Nickel is progressively moving to resolve the outstanding aboriginal issues in a responsible manner. Victory Nickel is mitigating this risk by developing relationships with the local aboriginal bands.

### 19.3.3 ENVIRONMENTAL

Until submission of the Environmental Impact Statement and the subsequent review environmental approval cannot be assured. Nevertheless, environmental issues do not currently appear to be insurmountable and Victory Nickel has taken the necessary steps to understand and deal with the environmental issues.

### 19.3.4 MANITOBA HYDRO RATES

Manitoba Hydro's current power rates are the lowest in North America and the Project site is ideally situated close to a 230 kV line. Although there have been no firm negotiations on price, there is reason to believe that the current prices may increase modestly. Wardrop nonetheless believes that the installation of a mine employing local residents and generating local revenue will be a powerful incentive for Manitoba Hydro to apply a favourable rate structure.

To fix the rates going forward, Victory Nickel is having ongoing discussions with Manitoba Hydro.

### 19.3.5 MANITOBA HYDRO CONNECTION

The availability of low-cost electrical power will greatly reduce diesel electric generation costs. To ensure that this power is available at the start of construction, steps are being taken to acquire the approval from Manitoba Hydro to connect into the 230 kV Line early in the approvals process, and expedite a short effective schedule for implementation.

Victory Nickel is reviewing the process for getting approval for the Minago connection to the Manitoba Hydro 230 kV Line.

### 19.3.6 WINTER CONSTRUCTION

Certain construction activities, such as soft clay excavation and road construction, are better executed during the winter. Wherever possible, the schedule should be structured to ensure that these seasonally-sensitive operations take place during the winter. To mitigate this risk, Wardrop has reasonably structured the construction scheduling around winter construction.

### 19.3.7 WATER AND DE-WATERING ISSUES

A comprehensive set of ground water pumping tests were conducted by Golder Associates in the summer of 2008. Based upon these tests, the subsequent analysis indicates that the groundwater pumping rate for mining is expected to be 40,000 $m^3$ per day. This pumping rate is not considered excessive and will not adversely affect the business case.

The presence of surface water will necessitate drainage within the site and some provisions to limit water flowing in across the site boundary. Similar surface water conditions have been encountered at other open pit mines such as Diavik. To understand the potential issues, Victory Nickel intends to install a ditch across the site this winter to evaluate the impact on the drainage of the surface water.

## 19.4 OPPORTUNITIES

### *19.4.1 RECLASSIFICATION OF RESOURCE FROM INFERRED TO INDICATED*

A review of the potential to develop an underground mine concluded that there was insufficient measured and indicated ore to include the underground mine in the Feasibility Study. Similarly, the lack of adequate drilling meant that the lithology could not be adequately defined from the core results. However, the calculation of the inferred resource suggests that significant measured and indicated resources could be ascertained through additional drilling, which may lead to the development of an underground mine. Victory Nickel intends to implement a drilling program during the winter of 2010.

### *19.4.2 DEVELOPMENT OF CONTIGUOUS ORE BODIES*

Victory Nickel has identified the possibility that adequate reserves exist in the North Limb of the ore body. With a mining and milling infrastructure based on the existing mine, the costs for developing these contiguous ore bodies would be reduced. There is also potential to upgraded Inferred material to the Indicated category within the footprint of the pit. If sufficient resources are identified during the detailed design phase, the design of the facilities could be modified to accommodate these additional resources. At 10,000 t/d throughput, the proposed life of the ore processing plant could easily be extended from the seven years to approximately 12-15 years.

The proposed drilling program is expected to include further drill holes in the location of the North Limb.

### *19.4.3 DEVELOPMENT OF UNDERGROUND MINE*

With the viability of the open pit mine confirmed, a further possible step would be the development of an underground mine to extract the deeper portion of the ore body. Because of the depth of the underground resource, diamond drilling from the surface is costly and difficult. Drilling from the base of the open pit mine or from an adit driven closer to the ore body will be more accurate and cost-effective. Once more ore is reclassified from the Inferred category to the Measured or Indicated categories, the option to develop an underground mine can be pursued.

For the underground mine, as with contiguous ore bodies, the proposed life of the ore processing plant can be extended.

### 19.4.4 OPEN PIT SIZING

During the open pit optimization process, the Present Value (PV) based upon mine production was found to vary little from the selected pit at approximately 25 Mt, to a larger pit at approximately 30 Mt. The smaller pit was adopted because it presented Victory Nickel with the most assured business case. However, the design was progressed by making provision for the possibility of mining a larger pit should operating costs be lower than expected and/or the nickel price improve dramatically.

Wardrop recommends that Victory Nickel consider this option when the mine development starts.

### 19.4.5 FRAC SAND PRODUCTION

For the purposes of this Feasibility Study, the annual feed rate for production of frac sand was set at 1.5 Mt/a. If advantageous market conditions prevail, the frac sand plant can accommodate increased production.

### 19.4.6 CONSTRUCTION CAPITAL REDUCTION

Construction costs of the main plant building will be reduced during detailed engineering to minimize excavation, structure, and concrete quantities. The detailed design will consider the relocation of buildings and facilities to reduce construction cost by minimizing excavation and concrete quantities

Construction costs may be reduced, and the certainty of meeting construction deadlines may be increased, through the use of off-site pre-construction. Mine buildings may be modularised, equipment controls and instrumentation pre-wired, and valving fabricated on skids. These types of activities are typically better controlled and executed in a workshop with a lower-rate cost structure.

Capital costs may be reduced through the purchase of second-hand equipment, which is increasingly available due to changing economic conditions.

### 19.4.7 PONTON OPPORTUNITIES

The construction of a rail siding and a loading facility at the small community of Ponton by OmniTRAX would reduce both capital costs and operational costs, and would also offer a base to service other potential mining and forestry clients in the area. Another major opportunity for OmniTRAX, which would benefit Victory Nickel and other clients, would be the installation of a fuel oil siding to take advantage of rail transport to minimise trucking costs.

## 19.5 GEOTECHNICAL CONSIDERATIONS

The present design of the tailings dams, overburden dump and rock dumps are limited in height by the presence of the soft clays. Furthermore, the staging of the construction of these structures imposes schedule restraints, which will have an impact on costs. The most favourable location for these structures could be refined with further comprehensive geotechnical investigation to identify areas with minimal soft clay. The additional geotechnical investigations would incorporate additional testing to confirm the consolidation parameters of the soft clays to define the soil characteristics more precisely.

### *19.5.1 FOUNDATION CONSIDERATIONS*

The location of the ore and frac sand plants on the limestone bluff appears to be optimal with respect to the location to the pit. However, during the detail design phase, when further geotechnical information is available, Wardrop recommends that Victory Nickel undertake a trade-off study to determine the optimal location for these buildings on the limestone bluff.

### *19.5.2 TAILINGS DAMS*

The optimum location for the tailings dams was determined to be the northeast corner of the site. The hard clay conditions found at this location will provide a seal to limit seepage of effluent; in addition, and there is sufficient clearance to provide a 300 m wide visual barrier of trees between the site and Highway 6. Without the soft clay layer at this location the dam height has been increased to 50 m to greatly reduce the areas required and hence the costs. However, further geotechnical tests will help to increase the allowable values of the parameters limiting the dam height.

### *19.5.3 ROCK AND OVERBURDEN DUMPS*

The rock and overburden dumps have been placed close to the pit in order to optimize haul distances. If the load-bearing capacity of the dumps was improved, the dump heights may be able to be increased and the area required for the dumps may be reduced, which will further to reduce both construction and operating costs. Further geotechnical testing will help to increase the allowable values of the parameters limiting the dump heights.

### *19.5.4 OPEN PIT GEOTECHNICAL SLOPE ANGEL*

The current slope design, which directly impacts the strip ratio, is limited by available geotechnical data. As the Project moves toward the detail engineering phase, Wardrop recommends improving slope design and developing a monitoring program

to maximise slopes. The program will involve strain gauges and movement sensors, and will improve efficiency.

## 19.6 LEASING OPTIONS

In order to defer initial capital costs, Victory Nickel considered leasing equipment items such as haulage trucks and shovels. In the Capital Cost Estimate, the Sustaining Capital associated with Leasing Costs may be separated and applied to the financial analysis over the course of the mine life. Leasing would defer the expenditure of initial capital to improve the cashflow at the start of the project.

## 19.7 PROCESSING

Recovery of mineral concentrates may be increased further by the improved use of reagents and by optimizing the flotation process. Further, metallurgical testing during detail design may indicate potential changes to the flotation process that can be implemented at little cost. To reduce smelter penalties side, further studies with reagents may lead to methods whereby the zinc and magnesium content may be reduced in the concentrate.

*Magnesium Oxide:* A recent initiative to remove the talc containing magnesium from the start of the flotation process was identified for further investigation.

Within the mill, the potential exists to increase plant efficiency in the following areas:

*Pebble Crusher:* The current design incorporates a pebble crusher and associated conveyors to transfer material over 9 mm in size back to the SAG mill. With further research and testing, the requirement for a pebble crusher may be eliminated if bulk sampling can confirm that the “pebble material” is indeed waste.

*Concentrate Bagging:* If concentrate were to be shipped overseas in sea cans, Wardrop would propose to consider using large plastic bags which would facilitate loading the sea cans to capacity. These large plastic bags would eliminate the use of 1 tonne bags which are expensive to purchase, expensive to handle and do not utilize the sea cans effectively.

*Jaw Crusher vs. Gyratory Crusher:* Further testing on large bulk samples may indicate that the size of feed to the SAG mill can be increased to 250 mm without an increase in horsepower. If so, the gyratory crusher may be replaced with a jaw crusher to enhance efficiency and reduce overall costs. Bulk samples and experience from the Bucko Mine may be instructive in choosing the most appropriate type of crusher.

Many of the decisions identified above will be determined through additional bulk sample testing.

## 19.8 LOGISTICS

Transportation logistics were based on bulk transport to Thompson. However, off-shore facilities may provide more favourable terms and conditions in the future. Wardrop also believes that concentrate shipping and re-handling costs may be reduced by shipping concentrate all the way to smelter in standard ISO sea containers.

### *19.8.1 REGIONAL*

Other projects in the area, if combined with Victory Nickel's, could provide sufficient feed-stock to justify a hydo-metallurgical process.

### *19.8.2 TRAINING AND RECRUITMENT*

The existence of several communities provides potential for training and recruitment and for building alliances with Aboriginal People in developing a loyal local workforce.

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# 21.0 CERTIFICATES OF QUALIFIED PERSONS

## 21.1 CERTIFICATE FOR CLIFF DUKE, P. ENG.

I, Cliff Duke, of Beausejour, Manitoba, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am a Geological Engineer with Riverbend Geological Services Inc. with a business address at Box 15, Group 310, RR#3, Beausejour, Manitoba, R0E 0C0.
- I am a graduate of the University of Manitoba (B.Sc., Geological Engineering, 1984).
- I am a member in good standing of the Association of Professional Engineers and Geoscientists of Manitoba (#23030).
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes 20 years experience in mine planning and resource estimation.
- I am responsible for the preparation of Section 2.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010. In addition, I visited the Property during the period of July 21 and 22, 2008.
- I have no prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.

- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Winnipeg, Ontario.

*"Original Document, Revision 02 signed and sealed by Cliff Duke, P. Eng."*

Cliff Duke, P. Eng.
Geological Engineer
Riverbend Geological Services Inc.

## 21.2 CERTIFICATE FOR JOHN HOPE, P. ENG.

I, John Hope, of Toronto, Ontario, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am a Senior Project Manager with Wardrop Engineering Inc. with a business address at 900-330 Bay Street, Toronto, Ontario, M5H 2S8.

  I am a graduate of London University: BSc Civil Engineering 1st Class Honours 1968, MSc Advanced Structural Analysis 1969.
- I am a member in good standing with the following associations: Professional Engineers of Ontario (P.Eng), Designated Consulting Engineer, Ontario (C.Eng), Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA).
- I have practiced my profession as a Civil/Structural Engineer continuously since graduation until 1990 when I moved into Project Management which I have been practicing until now..
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes Civil and Structural Engineering, and Project Management including the Oversight of Financial Analysis, Cost Control and Scheduling
- I am responsible for the preparation of Sections 1.0, 9.0, 10.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0 and portions of Section 0.0 of this technical report titled "Minago Feasibility Study", dated March 4th, 2010. In addition, I visited the Property during the period of July 21 and 22, 2008.
- I have no prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Toronto, Ontario.

*"Original Document, Revision 02 signed and sealed by John Hope, P. Eng."*

John Hope, P. Eng.
Senior Project Manager
Wardrop Engineering Inc.

## 21.3 CERTIFICATE FOR PHILIP DAVIS, P. ENG.

I, Philip Davis, of Sudbury, Ontario, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am a Project Engineer with Wardrop Engineering Inc. with a business address at 102-957 Cambrian Heights, Sudbury, Ontario, P3C 5M9.
- I am a graduate of Michigan Technological University, Mechanical Engineering Program (1970).
- I am a member in good standing of the Association of Professional Engineers of Ontario (#10753010).
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes mining and milling, and infrastructure design for several mining operations thorough out Canada.
- I am responsible for the preparation of Section(s) 5.0, 8.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010. In addition, I visited the Property during the summer of 2007.
- I have no prior involvement with the Property that is the subject of the Technical Report As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Sudbury, Ontario.

*"Original Document, Revision 02 signed and sealed by Philip Davis, P. Eng."*

Philip Davis, P. Eng.
Project Engineer
Wardrop Engineering Inc.

## 21.4 CERTIFICATE FOR HAI GUO, P. ENG.

I, Hai Guo, of Toronto, Ontario, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am a Senior Metallurgist with Eldorado Gold with a business address at 1188-550 Burrard Street, Bentall 5, Vancouver, BC, Canada V6C 2B5.
- I am a graduate of Queen's University, (Ph.D., 2004).
- I am a member in good standing of the Association of Professional Engineers of Ontario (Registration # 100110903).
- I have practiced my profession continuously since 1980.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes 30 years of experience in mining industry including resource estimate, metallurgical testing, flow sheet development, mill design and operation.
- I am responsible for the preparation of Section(s) 5.0, 6.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010.
- I have no prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Toronto, Ontario.

*"Original Document, Revision 02 signed and sealed by Hai Guo, P. Eng."*

Hai Guo, P. Eng.
Senior Metallurgist
Eldorado Gold

## 21.5 CERTIFICATE FOR ALEKSANDAR ZIVKOVIC, P. ENG.

I, Aleksandar Zivkovic, of Toronto, Ontario, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am the Manager, Geotechnical Engineering with Wardrop Engineering Inc./Chief Discipline with the business address at 900-330 Bay Street, Toronto, Ontario, M5H 2S8.
- I am a graduate of the University of Belgrade, (dipl. ing., B.A.Sc. Geological Option of Geological Engineering. 1986).
- I am a member in good standing of the Association of Professional Engineers and Geoscientists of Ontario (license #90375882), Association of Professional Engineers and Geoscientists of British Columbia (License #25771), Association of Professional Engineers and Geoscientists of Manitoba (License #32434), ssociation of Professional Engineers and Geoscientists of Saskatchewan (License #16969), and Association of Professional Engineers, Geologists and Geophysicists of Alberta (License # 113119).
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study covers geotechnical engineering design aspects of the development of mine infrastructure and mane waste management including numerous projects in Canada, United States, Europe, Australasia, Latin America and Africa for the past 24 years.
- I am responsible for the preparation of Section(s) 4.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010. In addition, I visited the Property during the period February – April 2008. .
- I have no prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.

- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Toronto, Ontario.

*"Original Document, Revision 02 signed and sealed by Aleksandar Zivkovic, P. Eng."*

Aleksandar Zivkovic, P. Eng.
Manager, Geotechnical Engineering
Wardrop Engineering Inc.

## 21.6 CERTIFICATE FOR BRIAN SAUL, P. ENG.

I, Brian Saul, of Sudbury, Ontario, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am a Manager, Mining with Wardrop Engineering Inc. with a business address at 102-957 Cambrian Heights, Sudbury, Ontario, P3C 5M9.
- I am a graduate of Queen's University, B. Appl. Sc. 1976, M. Sc (Eng.) 1978.
- I am a member in good standing of the Association of Professional Engineers and Geoscientists of Ontario (License #100143403).
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes open pit mine optimisation, planning and equipment selection.
- I am responsible for the preparation of Section(s) 3.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010.
- I have no prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Sudbury, Ontario.

*"Original Document, Revision 02 signed and sealed by Brian Saul, P. Eng."*

Brian Saul, P. Eng.
Manager, Mining
Wardrop Engineering Inc.

## 21.7 CERTIFICATE FOR DAVID MCHAINA, P. ENG.

I, David Mchina Mchaina of Cambridge, Ontario, do hereby certify that as a contributing author of this report, entitled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am employed as Vice President, Environment and Sustainable Development by, and carried out this assignment for Victory Nickel Inc. with a business address at 1802-80 Richmond Street West, Toronto, Ontario, M5H 2A4, Tel: (416) 626 0470, Fax: (416) 626 0890;
- I am a graduate of, B.Sc. in Mineral Sciences (Mining Engineering), University of Zambia (1982); M.Sc. in Mineral Sciences (Mining Engineering), University of Zambia(1985); Ph. D. in Applied Sciences (Mining and Mineral Processing Engineering) (1989), University of British Columbia; Diploma in Environmental Assessment, Lakehead University, Thunder Bay (Lakehead University/Waterloo Program(1992).
- I am a member in good standing of the Association of Professional Engineers of the Province of Ontario (Member # 90332909);
- I have practiced my profession in the mining industry continuously since 1983;
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes closure plan development, environmental impact assessment and development of environmental impact statements and water management studies for various operating mine sites all over the world.
- I am responsible for the preparation of Section(s) 10.0, 11.0, 12.0, 13.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010. In addition, I visited the Property numerous times between 2007 and 2009.
- I have prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am not an independent of the Issuer as defined by NI 43-101 Section 3.5.

- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.
- Signed and dated this 4th day of March 2010 at Toronto, Ontario.

*"Original Document, Revision 02 signed and sealed by David Mchaina, P. Eng."*

David Mchaina, P. Eng.
Vice President, Environmental
and Sustainable Development
Victory Nickel Inc.

## 21.8 CERTIFICATE FOR GEORGI DOUNDAROV, P. ENG., PMP, CCE

I, Georgi Doundarov, of Toronto, Ontario, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am a Senior Metallurgist with Wardrop Engineering Inc. with a business address at 900-330 Bay Street, Toronto, Ontario, M5H 2S8.
- I am a graduate of University of Mining and Geology, Sofia Bulgaria (Master of Science in Infrastructure Management – of Non-ferrous Metal Ores, 1996), and Yokohama National University, (Master of Science in Infrastructure Management – Mineral Processing and Metallurgy, 2005)
- I am a member in good standing of the Association of Professional Engineers of Ontario (License #100107167).
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes over 15 years of continuous solid experience in operations, and consulting work in Canada as well as internationally in Europe and Asia.
- I am responsible for the preparation of Section(s) 7.0 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Toronto, Ontario.

*"Original Document, Revision 02 signed and sealed by Georgi Doundarov, P. Eng."*

Georgi Doundarov, P. Eng., PMP, CCE
Senior Metallurgist
Wardrop Engineering Inc.

## 21.9 CERTIFICATE FOR JOHN REID, PH.D.

I, John Reid, of Brisbane, Australia, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am the Principal with Reid Resource Consulting Pty Ltd. with a business address at 1 Carnoustie Court, Indooroopilly, Brisbane, Queensland, Australia.
- I am a graduate of University of Queensland (Ph.D., Metallurgical Engineering, 1973) and MIT (MBA, 1990).
- I am a member in good standing of the Australian Institute of Mining and Metallurgy and was Chairman of the Nickel Development Institute (NiDi), Toronto, Canada during the period 996-1997.
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes:
  - 1973 - 1975, Process Engineer at Mt Morgan Ltd, copper and gold mine, Queensland (produced copper matte containing gold, shipped for refining by Sumitomo in Japan). Worked in operations and designed, constructed and operated a copper pilot plant based on technology developed and patented during PhD studies at Uni of Qld.
  - 1975 - 1977, Senior Process Engineer at Colorado School of Mines Research lnstitute, Golden, Colorado. Undertook laboratory research and operated hydrometallurgical pilot plants for nickel and copper projects from around the world.
  - 1975 - 1977, Adjunct Professor of Metallurgy at Colorado School of Mines(part-time). Prepared and delivered a hydrometallurgy course to postgraduate students.
  - 1977 - 1998, Queensland Nickel Pty. Ltd., Yabulu, Townsville. Positions held: Technical Manager, Operations Manager, GM Production and Marketing and finally Executive Director on Board.
  - 1998 - Present, Consultant to the mining industry.
- I am responsible for the preparation of portions of Section(s) 14 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010.

- I have no prior involvement with the Property that is the subject of the Technical Report
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Brisbane, Australia.

*"Original Document, Revision 02 signed and sealed by John Reid, Ph.D."*

John Reid, Ph.D.
Principal
Reid Resource Consulting Pt Ltd.

## 21.10 CERTIFICATE FOR KEN MURDOCK, M. ENG., P. ENG.

I, Ken Murdock M.Eng., P. Eng., of Calgary, Alberta, do hereby certify that as a contributing author of this report titled "Minago Feasibility Study", dated March 4th, 2010, I hereby make the following statements:

- I am President 0f 942925 Alberta Limited o/a I.M. & M. Consulting with a business address at 49 Shawfield Road SW, Calgary, Alberta, T2Y 1Y7.
- I am a graduate of McGill University (Masters of Engineering, Environmental Engineering 1996.
- I am a member in good standing of the APPEGA, Member #55688..
- I have practiced my profession continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience with respect to this study includes 13 years as a frac sand consultant.
- I am responsible for the preparation of portions of Section(s) 14 and portions of the Executive Summary of this technical report titled "Minago Feasibility Study", dated March 4th, 2010.
- I have no prior involvement with the Property that is the subject of the Technical Report.
- As of the date of this Certificate, to my knowledge, information, and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
- I am independent of the Issuer as defined by Section 1.4 of the Instrument.
- I have read National Instrument 43-101 and the Technical Report has been prepared in compliance with National Instrument 43-101 and Form 43-101F1.

Signed and dated this 4th day of March 2010 at Calgary, Alberta.

*"Original Document, Revision 02 signed and sealed by Ken Murdock, M. Eng., P. Eng.."*

Ken Murdoch
President
I.M. & M.

Report to:

**VICTORY NICKEL INC.**

# Technical Report on the Mel Deposit, Northern Manitoba

Project No. 0751330400-REP-L0001-00

Report to:

VICTORY NICKEL INC.

# TECHNICAL REPORT ON THE MEL DEPOSIT, NORTHERN MANITOBA

MARCH 2007

| | | | |
|---|---|---|---|
| Prepared by | "Signed and Stamped"<br>Shahé Naccashian, P.Geo. | Date | March 9, 2007 |
| Reviewed by | "Signed and Stamped"<br>Gilles Arseneau, P.Geo. | Date | March 9, 2007 |
| Authorized by | "Signed and Stamped"<br>Tim Maunula, P.Geo. | Date | March 9, 2007 |

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# 1.0 SUMMARY

Located in north central Manitoba, the Mel property is situated within the Nelson House Resource Management Area, approximately 25 kilometres (km) north of the city of Thompson and 764 km north of the provincial capital of Winnipeg, Manitoba, Canada.

The Mel property comprises one mineral lease (ML-007) and 37 unpatented mineral claims totalling an aggregate of 9,516.973 hectares (ha). Both the Mel lease and the Mel claims are held and 100% owned by Inco Limited (Inco), subject to an option/buy-back letter of agreement with Victory Nickel Incorporated (Victory) dated August 27, 1999, as well as subsequent agreements and amendments.

Victory has commissioned Wardrop Engineering Inc. (Wardrop) to carry out an independent resource estimation of the nickel development potential of the Mel deposit. The work entailed estimating mineral resources in conformance with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Mineral Resource and Mineral Reserve definitions referred to in National Instrument 43-101 (NI 43-101) Standards and Disclosure for Mineral Projects.

Road access to the property is provided by Provincial Highway 391, which crosses the extreme southwest corner of the Mel claims. In the summer months, access to the property is possible by boat on the Odei River that meanders throughout the entire length of the Mel property. Access to most of the property is restricted primarily to the winter months when the ground is frozen due to much of the area being covered by muskeg. Access to the property is also possible via helicopter from the city of Thompson.

In the city of Thompson, Inco conducts nickel mining, milling, smelting and refining operations. The city of Thompson, known as a regional trade and service centre of Northern Manitoba, boasts an excellent transportation system of scheduled daily air service, overnight truck delivery, paved roads, and a railway system that connects Thompson with other communities throughout the province. It has all of the services and amenities that would be expected in a much larger, urban centre. There is no mining infrastructure on the Mel property.

The first record of exploration in the vicinity of the Mel property was in 1961, when the Canadian Nickel Company Ltd. (a wholly owned subsidiary of Inco) first discovered the Mel deposit on what is now mineral lease ML-007. Numerous companies were active in the area beginning in 1961; however, activity ceased in 1971 with the advent of exploration prohibitive legislation. The region remained dormant until 1999 when Inco staked the Mel claims. Until recently, Inco along with Victory, have actively explored the Mel property.

The Mel property is situated within the Thompson Nickel Belt; a northeast-southwest trending 10 to 35 km wide belt of Early Proterozoic sedimentary rocks interfolded with

Archean age basement gneisses. The nickel deposits are associated with ultramafic intrusions that occur within the Proterozoic rocks, which have been metamorphosed to schists and gneisses and have subsequently been folded into complex patterns. The Thompson Nickel Belt is fault bounded on both the eastern and western margins. To the east along the Superior Rift fault zone, Archean Superior Province rocks are in contact with the Thompson Nickel Belt (Peredery et al., 1982). To the west, the Thompson Nickel Belt is in direct contact with the Kisseynew domain, located within the Trans-Hudson Orogeny tectonic domains of the Churchill Province (Bleeker, 1990). The Kisseynew paragneisses have been interpreted to represent the metamorphosed remnants of a back-arc or inter-arc basin.

At the Mel deposit, nickel-bearing massive and stringer sulphides occur within and in contact with an ultramafic intrusion. The sulphides are dominantly pyrrhotite with lesser amounts of pentlandite and chalcopyrite. Mineralization strikes approximately 345 degrees (°) for a distance of 1500 metres (m), dips from 70° to 80° east and extends to a known depth of 825 m below surface. The deposit consists of folded, continuous to discontinuous higher-grade nickel bearing sulphide layers up to 15 m thick (horizontal) within a broader mineralized zone with horizontal thicknesses locally exceeding 30 m. Folding appears to have locally caused thickening of the mineralized layers.

Diamond drilling from 1961 to 1971 was AXT size core except for a few holes of AQ size core drilled at the end of the 1971 campaign. Core from that period has been preserved and is stored by Inco in Thompson as abbreviates only with generally one representative sample approximately 10 centimetre (cm) long collected approximately every three metres in the hole. Diamond drilling from 1999 to 2006 is NQ core size. The core is logged, sampled and stored by Inco in Thompson. Mineralized sections of the core are subdivided into sample intervals not exceeding 1.5 m of core length based on rock type, alteration, sulphide abundance and textural variations.

## 1.1 RESOURCE STATEMENT

Wardrop completed an estimation of the mineral resource on the Mel Deposit for Victory. This has resulted in an Indicated resource of 4,279,000 tons grading 0.875% nickel (Ni) plus an Inferred resource of 1,010,000 tons grading 0.839% Ni at a cut-off of 0.5% Ni.

Wardop carried out data verification on 5% of the drillhole database from drill logs and assay values. The database verification conducted by Wardrop found no discrepancies with the original information. Wardrop concludes that the database meets industry standards for resource estimation.

Estimation of the resource included the interpolation methods of nearest neighbour, inverse distance squared and ordinary kriging. The methods were validated by comparison of global mean grades, visual review of coded block grades and swath plots. No significant discrepancies exist between the methods. Ordinary kriging methodology was selected for grade estimation on the deposit.

## 1.2 RECOMMENDATIONS

Additional drilling is recommended on the Mel deposit in order to improve the resource classification and to increase confidence in grade continuity. Wardrop suggests performing infill drilling along strike as well as bracket holes at depth where the higher grade material is identified.

Wardrop recommends exploration on the Mel lease to extend the Mel deposit along strike thereby potentially increasing the tonnage estimates and drilling on Mel mineral claims to further explore the lower Pipe Formation.

This resource estimate only included nickel (Ni) values but the assay database includes values for copper (Cu) and cobalt (Co). Wardrop recommends that all samples be assayed for Ni, Cu, Co and Platinum Group Elements (PGE) as well as all potential payable and deleterious elements.

Additional bulk density determinations of the mineralized material should be carried out so that specific gravity data can be incorporated into resource block model for estimation.

Additional drilling is recommended so that samples can be collected for metallurgical testing and mineral processing at Mel deposit.

Wardrop believes that the current resource block model honours the high grade values well and that local grade variations are reasonably well represented. However, more work is required to improve the local grade estimation within the block model estimation, possibly multiple indicator kriging and unfolding to compare with the current estimation method. Globally, the Wardrop resource compares well with previous Inco estimates. For preliminary economic assessment or feasibility type study work, where selective mining methods or detailed engineering design work will be required, Wardrop recommends updating the current resource block model. This exercise will be beneficial once new drilling data becomes available.

# 2.0 INTRODUCTION AND TERMS OF REFERENCE

Located 25 km north of the city of Thompson, Manitoba, Victory's Mel deposit is one of many nickel deposits that characterize the Thompson Nickel Belt region. Comprising one mineral lease and 37 mineral claims, the Mel property has a surface area totalling 9,516.973 hectares.

At the present time, the Mel deposit is actively being explored. Past drill programs have tested numerous geophysical anomalies associated with known nickel bearing geology. In 2000, a 24-hole diamond drill program verified and improved delineation of the Mel deposit. Most recently, in 2005, diamond drilling tested prospective stratigraphy and electromagnetic anomalies. In addition, geotechnical studies and metallurgical test work have been completed.

## 2.1 TERMS OF REFERENCE

Victory has commissioned Wardrop to carry out an independent resource estimation of the Mel deposit. The work entailed estimating mineral resources in conformance with the CIM Mineral Resource and Mineral Reserve definitions referred to in NI 43-101, Standards and Disclosure for Mineral Projects. It also involved the preparation of a Technical Report as defined in NI 43-101, and in compliance with Form 43-101F1. The inventory of resources represents an update to the existing resource estimate delineated from historical drilling data as prepared by Inco. The work necessitated an independent review of the geology, exploration history, historical resource estimates and the potential for discovery of additional nickel mineralization. The report also provides recommendations for specific areas for follow-up definition drilling in order to complete a NI 43-101 compliant reserve estimation.

Shahé Naccashian, P.Geo., directed the resource estimation and reviewed the geological data. Tim Maunula, P.Geo. and Gilles Arseneau, P.Geo. have carried out peer reviews of all work associated with this report. Shahé visited Inco's exploration office in Thompson, Manitoba from November 16$^{th}$ to 17$^{th}$, 2006. He met with Boris Shepertycky, P.Geo. and conducted data verification on the Mel deposit at Inco's office. Due to inaccessibility to the property, Shahé visited the site for the second time from January 8$^{th}$ to 10$^{th}$, 2007. During this visit Shahé performed core review and visited the Mel Property. This visit was intended to fulfil the NI 43-101 requirement of a site visit by a Qualified Person.

# 3.0 RELIANCE ON OTHER EXPERTS

Wardrop has followed standard professional procedures in preparing the contents of this resource estimation report. Data used in this report has been verified where possible and Wardrop has no reason to believe that the data was not collected in a professional manner.

The information contained in this report is derived from a variety of sources:

- Exploration Summary of the Mel Project and Mineral Resource Estimate for the Mel Deposit, Manitoba by P. Chornoby, P.Geo., dated July 2004;
- Updated Resource Calculation for Mel Deposit, Inco Technical Services Ltd. by A. Aubut, P.Geo., dated July 2004;
- Geological Appraisal and Exploration Summary of Mel Property by P. Chornoby, P.Geo., dated April 2001.

While Wardrop has carefully reviewed all the technical information given to it, no independent geological investigation or sampling of the area has been conducted.

Wardrop has not independently verified the legal status or legal title to the claims, nor has the legality of any of the underlying agreement(s) that may exist concerning the Property been verified.

# 4.0 PROPERTY DESCRIPTION AND LOCATION

## 4.1 PROPERTY LOCATION AND DESCRIPTION

Located in north central Manitoba, the Mel property is situated within the Nelson House Resource Management Area, approximately 25 km north of the city of Thompson and 764 km north of the provincial capital of Winnipeg (see Figure 4.1). The property is located on National Topographic System (NTS) map sheets 63P/13NW, 63O/16NE and 64A/04SW, and geographically centered at latitude 55°28'32" and longitude 97°54'30".

The Mel property comprises one mineral lease (ML-007) and 37 unpatented mineral claims totalling an aggregate of 9,516.973 ha (see Figure 4.2). Both the Mel lease and the Mel claims are held and 100% owned by Inco, subject to an option/buy-back letter of agreement with Victory dated August 27, 1999, as well as subsequent agreements and amendments.

### *4.1.1 MINERAL LEASE ML-007*

Mineral Lease ML-007, with a surface area totalling 749.973 ha, was legally surveyed in 1985. The lease expires April 1, 2013 and thereafter is renewable for an additional 21 years at the discretion of the Manitoba Minister of Industry, Economic Development and Mines. The annual cost of maintaining the lease is $5,999.78 ($8.00/ha).

According to the Mines and Minerals Act of Manitoba (The Mine and Minerals Consequential Amendment Act, Part 7,108), a mineral lease grants to the lease holder:

- The exclusive rights to the minerals, other than quarry minerals, that are the property of the Crown and are found in place on, in or under the land covered by the lease;
- Mineral access rights that include the right to open and work a shaft or mine within the limits of the lease area;
- The right to erect buildings or structures upon the subject land for the purpose of exploration and or mining.

### *4.1.2 MINERAL CLAIMS*

The 37 mineral claims are held by Inco Limited and encompass a combined area of approximately 8,767 ha. Thirty-four of the mineral claims expire at midnight on May 17, 2007. Three of the claims expire at midnight on March 9, 2008. The current annual cost to hold the claims is $109,587.50 ($12.50/ha) in the form of work conducted on the mineral claims and filed for assessment or payment in lieu of assessment work. The names of the claims, as well as their respective expiry dates, are presented in Table 4.1.

**Figure 4.1 Property Location Map**

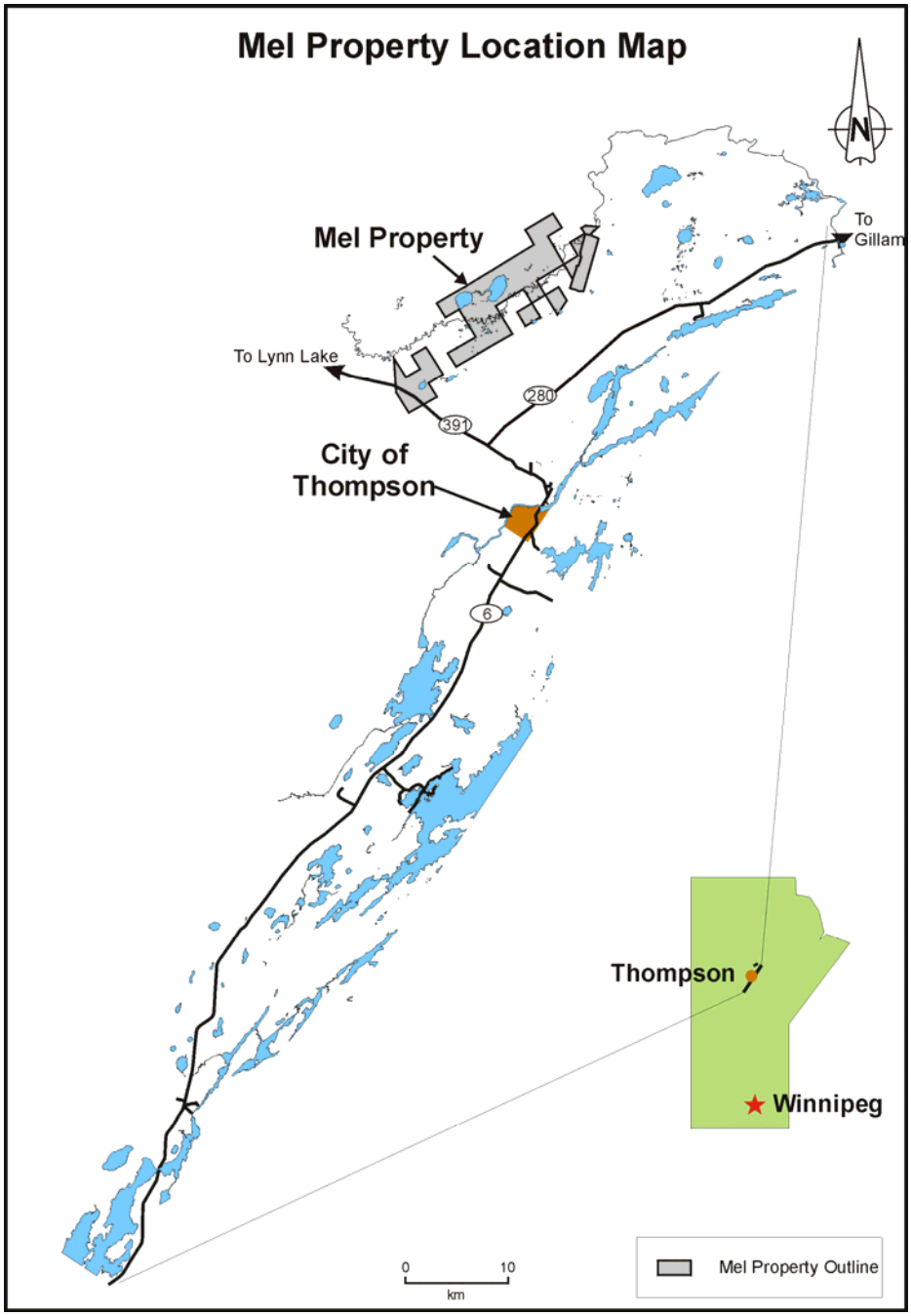


**Figure 4.2 Map of Mel Lease and Mel Claims**

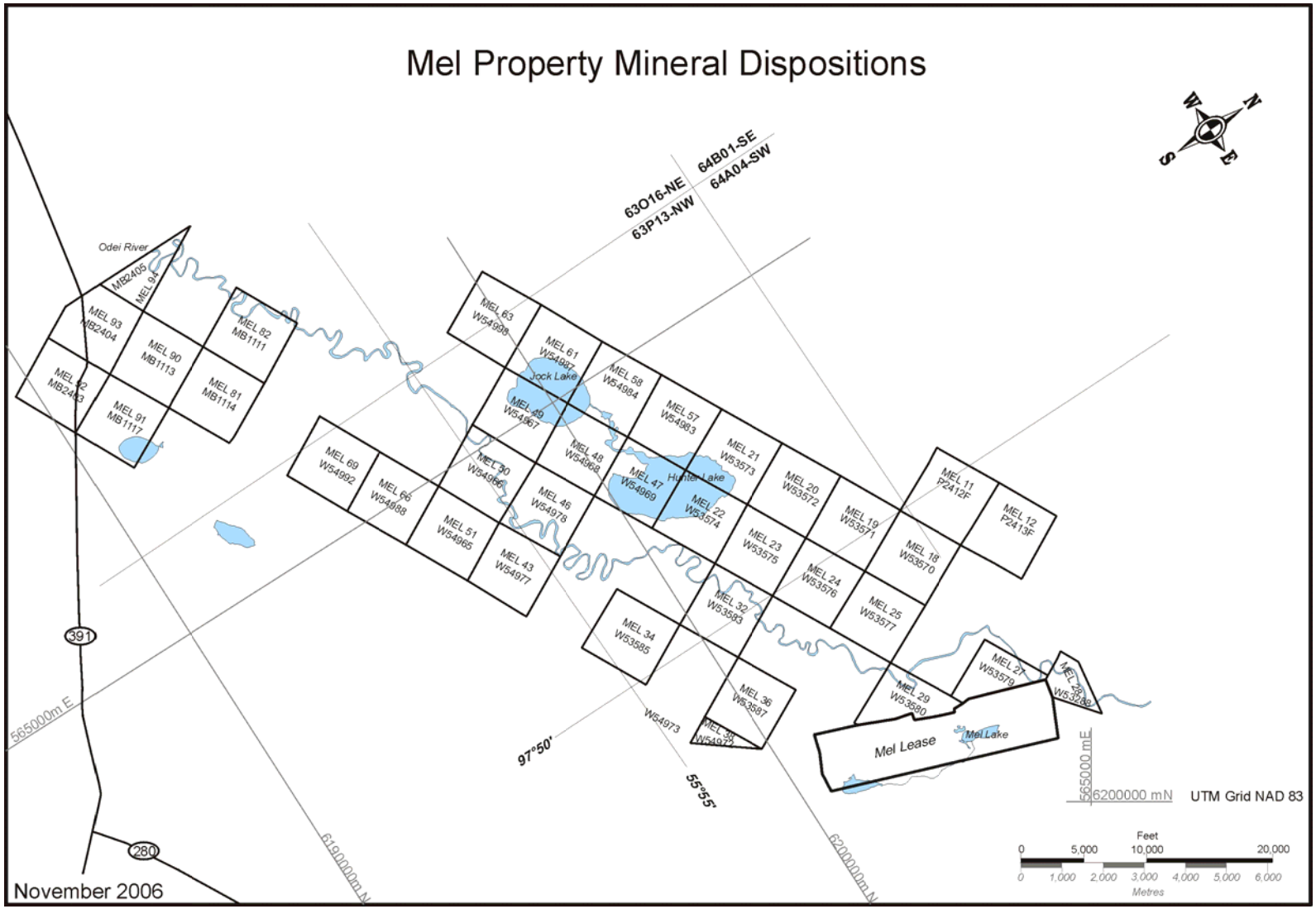


**Table 4.1 Mel Property Mineral Claims**

| | Claim Name | Claim Number | Area (ha) | Recording Date (m/d/y) | Due Date (m/d/y) | Expiry Date (m/d/y) |
|---|---|---|---|---|---|---|
| 1 | MEL 11 | P241F | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 2 | MEL 12 | P241F | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 3 | MEL 18 | W5350 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 4 | MEL 19 | W5351 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 5 | MEL 20 | W5352 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 6 | MEL 21 | W5353 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 7 | MEL 22 | W5354 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 8 | MEL 23 | W5355 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 9 | MEL 24 | W5356 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 10 | MEL 25 | W5357 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 11 | MEL 27 | W5359 | 165 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 12 | MEL 28 | W5328 | 64 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 13 | MEL 29 | W5350 | 165 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 14 | MEL 32 | W5353 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 15 | MEL 34 | W5355 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 16 | MEL 36 | W5357 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 17 | MEL 38 | W5492 | 57 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 18 | MEL 43 | W5497 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 19 | MEL 46 | W5498 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 20 | MEL 47 | W5499 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 21 | MEL 48 | W5498 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 22 | MEL 49 | W5497 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 23 | MEL 50 | W5496 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 24 | MEL 51 | W5495 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 25 | MEL 57 | W5493 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 26 | MEL 58 | W5494 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 27 | MEL 61 | W5497 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 28 | MEL 63 | W5498 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 29 | MEL 66 | W5498 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 30 | MEL 69 | W5492 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 31 | MEL 81 | MB114 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 32 | MEL 82 | MB111 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 33 | MEL 90 | MB113 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 34 | MEL 91 | MB117 | 256 | 3/18/1999 | 3/18/2006 | 05/17/07 |
| 35 | MEL 92 | MB243 | 256 | 1/9/2002 | 1/9/2007 | 03/09/08 |
| 36 | MEL 93 | MB244 | 240 | 1/9/2002 | 1/9/2007 | 03/09/08 |
| 37 | MEL 94 | MB245 | 140 | 1/9/2002 | 1/9/2007 | 03/09/08 |
| **Total Area (ha)** | | | **8,767** | | | |

According to the Mines and Minerals Act of Manitoba [The Mine and Minerals Consequential Amendment Act, Part 5, Division 2, 73([1])], the holder of a mineral claim is granted:

- The exclusive right to explore for and develop the Crown minerals other than quarry minerals, found in place on, in, or under the lands covered by the claim.
- Subject to certain Ministerial considerations, the holder of a mineral claim may enter, use and occupy the surface of the land that is governed by the claim for the purpose of prospecting or exploring or developing, mining or producing minerals on, in or under the land.

## 4.2 OWNERSHIP

Mineral lease ML-007 and the 37 mineral claims that comprise the Mel property are 100% owned by Inco subject to an option/buy-back letter of agreement between Inco and Victory and the subsequent agreements and amendments described below in the following section.

### *4.2.1 AGREEMENTS*

The letter agreement dated August 27, 1999 as amended by three letter agreements dated August 23, 2001, December 20, 2001 and January 15, 2002 was replaced and superseded by an agreement (the Agreement) that was executed in October 2002 and made effective as of August 31, 1999.

The Agreement has been amended by one letter agreement dated February 23, 2004.

Under the terms of the Agreement and the subsequent amendment, Victory has the right and option (The Option Period) to earn a 100% interest in the Mel property by incurring 100% of an aggregate of $6,000,000 of expenditures, as follows:

i) 100% of an aggregate of $4,000,000 of expenditures on the Mel property by the February, 28 2005. At least $2,600,000 of the expenditures must be on the Mel claims.

ii) 100% of an aggregate of $6,000,000 of expenditures on the Mel property by February 28, 2006. At least $4,600,000 of the expenditures must be on the Mel claims.

The option was not exercised by February 28, 2006 and consequently the Agreement was amended a third time on May 9, 2006. The third amendment states that in order to maintain the option granted under the Agreement and two subsequent amendments and in order for the option to be exercised, Victory agrees to:

i) Incur aggregate expenditures up to $2,000,000 by February 28, 2008 of which $500,000 must be spent on the Mel claims.

Once Victory has earned a 100% interest in the Mel property, Inco has the right to buy back (the Inco Option Period) up to 51% interest in the Mel property by funding 100% of the next $6,000,000 of expenditures.

Inco is the manager during the Option Period, the Inco Option Period and thereafter until a feasibility study has been submitted.

Following the submission of a feasibility study and provided Victory has become a participant as per the Agreement, Victory has the right to become the manager.

### 4.2.2 CURRENT STATUS OF THE AGREEMENT – EXPENDITURES

Up to September 30, 2006 an aggregate of $4,095,498 of expenditures have been incurred by Victory on the Mel property of which $1,561,261 has been spent on the Mel Lease and $2,534,237 has been spent on the Mel claims. In addition, Victory has a cash call credit balance of $237,801 paid to Inco that is to be applied against future expenditures.

### 4.2.3 CURRENT STATUS OF THE AGREEMENT

In December 2006, Nuinsco Resources Limited ("Nuinsco") notified shareholders of its intention to hold a Special Meeting of shareholders on January 26, 2007 to consider a special resolution approving the restructuring (the "Arrangement") of Nuinsco and its assets. Pursuant to the Arrangement, which was approved by shareholders, Nuinsco's interest in its Mel, Minago and Lac Rocher sulphide nickel projects along with approximately $12.0 million in cash were acquired by Victory Nickel Inc. ("Victory Nickel"). The effective date of the Arrangement was February 1, 2007, and all individuals holding shares ("old Nuinsco common shares") as of the end of trading on February 5, 2006 received, in exchange for each old Nuinsco common share held, one new Nuinsco common share and 0.75 common shares of Victory Nickel. Shares of Victory Nickel commenced trading on the Toronto Stock Exchange on February 5, 2007 under the ticker symbol Ni.

## 4.3 PERMITS, NOTICES AND AGREEMENTS

Prior to initiating any exploration field activity, a work permit must be obtained by Victory from a representative of Manitoba Conservation in Thompson, Manitoba. In addition, Victory must notify the chief of the Nisichawayasihk Cree Nation as well as the Nelson House Resource Management Board. Victory must also provide the same notification upon completion of the work. Furthermore, a letter of advice must be acquired by Victory from the Federal Department of Fisheries and Oceans and the Manitoba Water Stewardship Board must be advised of the work activities.

### 4.3.1 TREATY LAND ENTITLEMENT AGREEMENT

There are no current known claims on the Mel property under the terms of the Treaty Land Entitlement Agreement between the governments of Canada, Manitoba and the Treaty Land Entitlement Committee Manitoba Inc., representing First Nations.

# 5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

## 5.1 TOPOGRAPHY, ELEVATION AND VEGETATION

The topography of the Mel Property is quite typical of the extreme northern Manitoba physiography. It is gentle in terrain, with relatively low topographic relief. Elevation of the property is similar to that of the Thompson airport; approximately 222 m above sea level. The region can be described as somewhat swampy with numerous ponds, small lakes and creeks. The Odei River crosses the Mel claims. Local vegetation is characteristic of boreal forest; covered primarily with black spruce, willows, poplar, scattered birch and some stands of jack pine. There is very little aspen, occurring only in very small patches. Overburden cover is generally at least 15 m thick and comprises predominantly clay and sandy clay that contain boulders. Up to 60 m of clay and sandy clay are present within the vicinity of the Mel deposit. Outcroppings of bedrock are rare.

## 5.2 ACCESSIBILITY

Road access to the property is provided by Provincial Highway 391, which crosses the extreme southwest corner of the Mel claims. From Highway 280, the eastern part of the property can be reached via two winter roads; one 5.8 km in length and the other 9.5 km in length. In the summer months, access to the property is possible by boat on the Odei River that meanders throughout the entire length of the Mel property. Access to most of the property is restricted primarily to the winter months when the ground is frozen due to much of the area being covered by muskeg. Access to the property is also possible via helicopter from the city of Thompson. The Thompson Airport, with a 3000 foot (ft) runway is located approximately 9 km northwest from the Thompson town site. It was developed originally by the International Nickel Company in 1961, in support of their mining operations. There is a number of private helicopter charter companies located within the city of Thompson.

## 5.3 CLIMATE

Average temperatures at the Mel property range between -26.6˚ Celsius (C) in January and 15˚C in July. The mean temperature in the town of Thompson is -3˚C, with an average temperature of 16˚C in July, and -24˚C in January. Maximum precipitation occurs during the winter months, with annual rainfall averaging 351 millimetres (mm) and an annual snowfall average of 202 cm.

## 5.4 INFRASTRUCTURE

The Mel property is located 25 km from the city of Thompson, Manitoba where Inco conducts nickel mining, milling, smelting and refining operations. The city of Thompson, known as a regional trade and service centre of Northern Manitoba, boasts an excellent transportation system of scheduled daily air service, overnight truck delivery, paved roads, and a railway system that connects Thompson with other communities throughout the province. The city has a population of 13,256 residents and serves as a trade centre for an additional 36,000 to 65,000 Manitobans. As such, it has all of the services and amenities that would be expected in a much larger, urban centre.

There is no mining infrastructure on the Mel property.

# 6.0 HISTORY

The first record of exploration in the vicinity of the Mel property was in 1961 when the Canadian Nickel Company Ltd. (a wholly owned subsidiary of Inco) first discovered the Mel deposit on what is now mineral lease ML-007. Numerous companies were active in the area beginning in 1961; however, activity ceased in 1971 with the advent of exploration prohibitive legislation. The region remained dormant until 1999 when Inco staked the Mel claims. Until the present, Inco along with Victory, have actively explored the Mel property.

Work conducted on the property, as well in within the vicinity of the property, is summarized in the following list.

1961: Canadian Nickel Company Limited (Canadian Nickel) flew a 18,750 km Airborne Electro Magnetic (AEM) survey; 20 drill holes were completed with Hole 22549 intersecting 2.75% Ni over 0.51 m.

1962: Canadian Nickel completed ground magnetic and Vertical Loop Electro Magnetic (VLEM) surveys and drilled an additional 157 diamond drill holes totalling 3,350 m in the area.

Conwest Exploration acquired two blocks of claims in the area and completed magnetic and Horizontal Loop Electro Magnetic (HLEM) surveys, followed by three diamond drill holes totalling 369 m.

Hudson Bay Exploration & Development flew an AEM survey over the southwest portion of the Mel property.

Nickel Belt Extension completed a HLEM survey north east of Hunter Lake.

1963: Canadian Nickel drilled 70 holes totalling 7,885 m. Hole 21988, 3,300 m west north-west of Mel Lake intersected 2.43% Ni over 1.95 m.

North Venture drilled seven holes (739 m) on several claims north east of Hunter Lake.

1964: Canadian Nickel drilled 27 diamond drill holes totalling 3,124 m in the Mel Lake area.

Selco Exploration drilled five diamond drill holes totalling 506 m on what is now Mel 13.

1965-1966: Canadian Nickel did further magnetic surveying and drilled 13 holes totalling 1,371 m.

1966: Canadian Nickel completed 64 fill-in drill holes at Mel Lake totalling 11,270 m.

Merritt Copper surveyed 61 km of HLEM surveying between Hunter and Jock Lakes.

1967: Amax Exploration completed magnetic and VLEM surveys northeast of Hunter Lake.

L. Parres and Tri J Mineral Surveys completed magnetic and VLEM surveys northeast of Hunter Lake.

Merritt Copper drilled 61 holes between Hunter and Jock Lakes, totalling 828 m.

1969: Canadian Nickel drilled 25 holes totalling 7,200 m at Mel Lake.

1970: Canadian Nickel drilled an additional 26 holes totalling 11,360 m at Mel Lake.

1971: Canadian Nickel drilled 31 holes totalling 6,413 m in the Mel Lake area.

1972: Hudson Bay Exploration & Development drilled 14 holes (1,250 m) close to the northeast corner of the present property.

## 6.1 MEL LEASE EXPLORATION 1999 TO 2001

In preparation for an Audio Magneto Telluric (AMT) survey, 3.2 line kilometres of picket line were cut over the Mel lease during January 2000.

During February 2000, AMT data was collected from 22 stations along four lines that cross the Mel lease as part of a larger survey area.

A mineral resource estimate that does not conform to CIM Standards on Mineral Resources and Reserves, August 20, 2000, was competed in May 2000 for the Mel deposit. The resource estimate was based on an underground mining concept.

## 6.2 MEL CLAIMS EXPLORATION 1999 TO 2000

In preparation for geophysical surveys 166 km of grid lines were cut.

AMT were conducted on 115 km of line representing approximately 65% of the Mel claims.

Surface University of Toronto Electro Magnetic (UTEM) surveys were conducted on six grids. The grid locations and geometry were surveyed by Global Positioning System (GPS).

## 6.3 MEL CLAIMS EXPLORATION 2001

Eighty-seven kilometres of grid lines were cut in preparation for AMT surveys.

AMT surveys were conducted on 81 km of line that covered the remaining 35% of the Mel claims.

# 7.0 GEOLOGICAL SETTING

## 7.1 REGIONAL GEOLOGY

The Mel property is situated within the Thompson Nickel Belt, a northeast-southwest trending 10 to 35 km wide belt of Early Proterozoic sedimentary rocks interfolded with Archean age basement gneisses (see Figure 7.1). The nickel deposits are associated with ultramafic intrusions that occur within the Proterozoic rocks, which have been metamorphosed to schists and gneisses and have subsequently been folded into complex patterns. The Thompson Nickel Belt is fault bounded on both the eastern and western margins. To the east, along the Superior Rift fault zone, Archean Superior Province rocks are in contact with the Thompson Nickel Belt (Peredery et al., 1982). To the west the Thompson Nickel Belt is in direct contact with the Kisseynew domain located within the Trans-Hudson Orogeny tectonic domains of the Churchill Province (Bleeker, 1990). The Kisseynew paragneisses have been interpreted to represent the metamorphosed remnants of a back-arc or inter-arc basin.

To the southeast of the Thompson Nickel Belt, the Superior Province Archean age rocks include low to medium grade metamorphosed granite-greenstone and gneissic terranes, as well as the high grade metamorphosed Pikwitonei Granulite Belt. The variably reworked Archean age basement gneisses represent the dominant rock type (volumetrically) in the Thompson Nickel Belt. The Pikwitonei Granulite Belt is interpreted to represent exposed portions of deeper level equivalents of the Superior Province rocks. The Superior Province Archean age gneisses are intruded by multiple mafic to ultramafic dikes of the Molson Swarm dated at 1883 Ma. Dikes of the Molson swarm occur within the Thompson Nickel Belt, but not within the Kisseynew domain located to the northwest.

Along the western margin of the Thompson Nickel Belt, the early Proterozoic rocks are a geologically distinguishable stratigraphic sequence of rocks referred to as the Opswagen Group. The Opswagen Group hosts the nickel deposits of the Thompson Nickel Belt, with almost all of the deposits occurring within the lower Pipe Formation Rocks. The Opswagen Group supercrustal rocks were deposited during subsidence and possible east–west rifting along the edge of the Superior Province.

A stratigraphic nomenclature for the Proterozoic rocks found within the Thompson Nickel Belt was proposed by Bleeker and Macek (1990). This stratigraphic column is summarized in Figure 7.2.

**Figure 7.1 Regional Geology of the Mel Property**

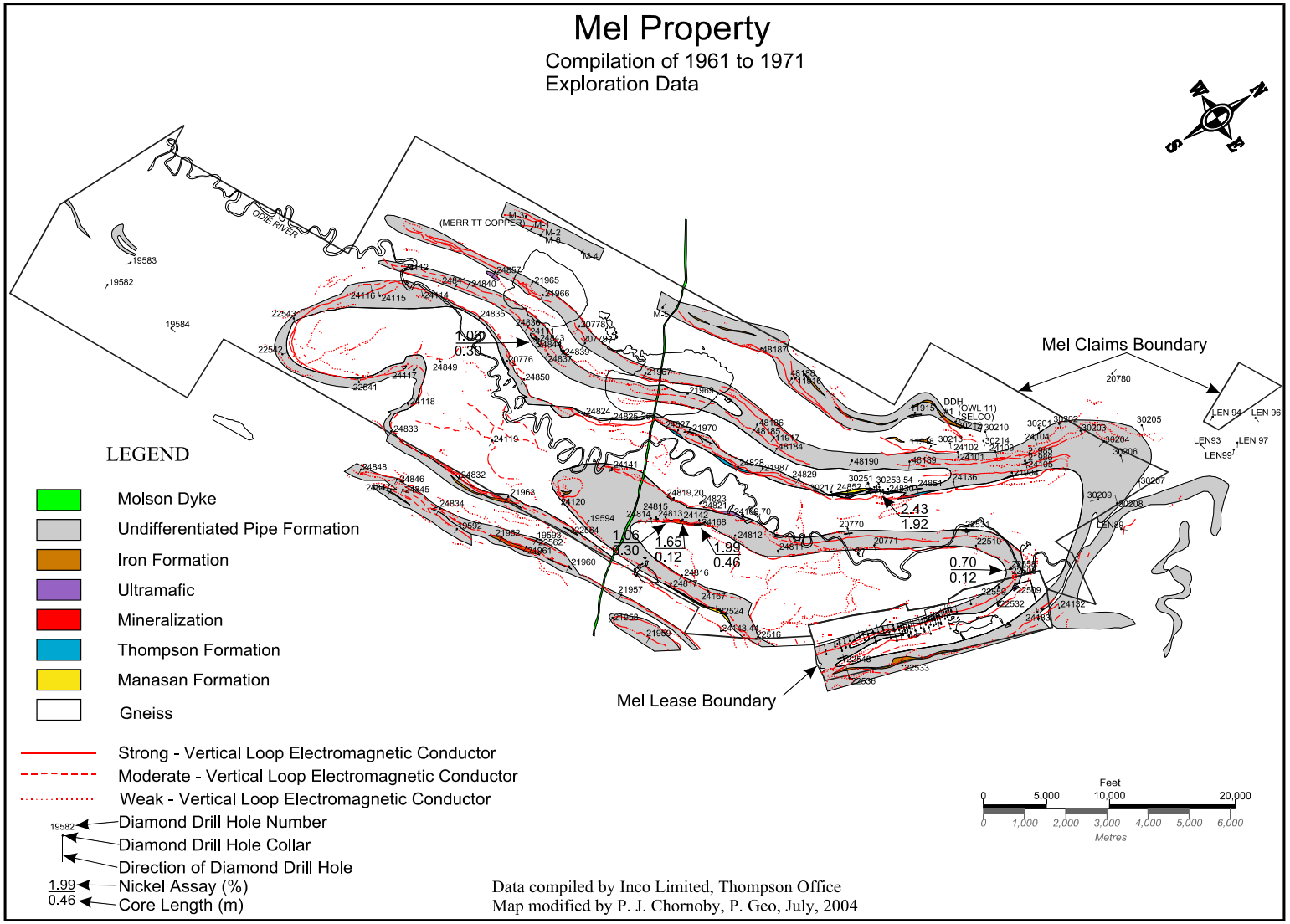
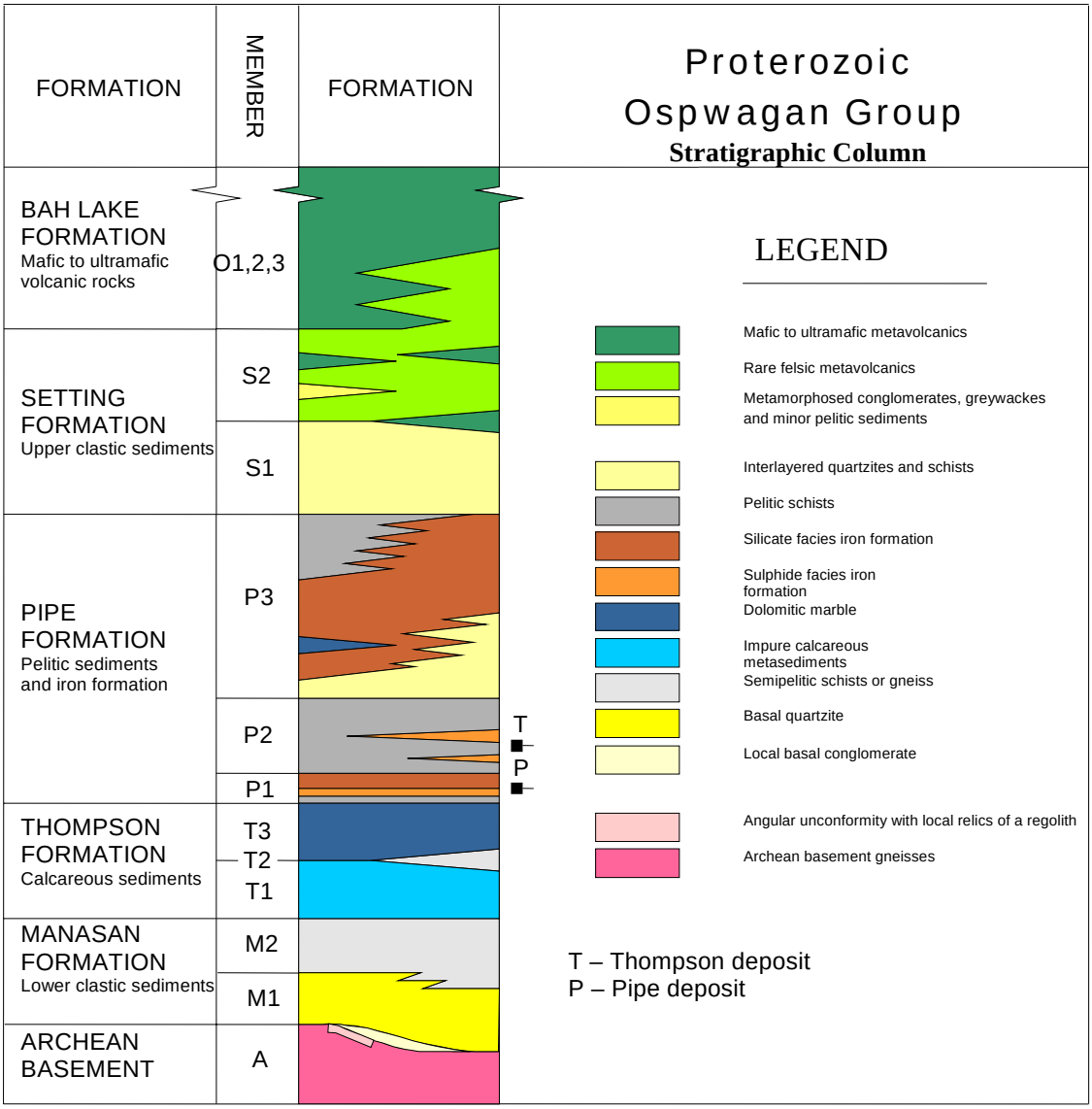


**Figure 7.2 Stratagraphic Column**




### 7.1.1 *Structure and Metamorphism of the Thompson Nickel Belt*

Three major deformational events have affected the Thompson Nickel Belt, producing fold interference patterns on a regional scale. The earliest event (F1) was interpreted by Bleeker (1990) as isoclinal folding, due to compressional tectonism, forming a series of regional-scale nappe-like folds with metamorphic grades of lower amphibolite facies. F1 preceded the emplacement of the Molson dike swarm, providing an upper age constraint of 1,883 million years (Ma) (Heaman et al., 1986). This event was followed by a period of higher temperature, isoclinal recumbent folding (F2) causing the overprinting of F1 and subsequent folding of the Molson dikes (Bleeker, 1990). The thermal peak of metamorphism later overprinted F2. Approximately 30 Ma later, and at much lower temperatures, intense,

sinistral transposition of the sedimentary pile produced high amplitude, near-upright, doubly plunging F3 folds (Naldrett, 2004). These folds transposed the pre-existing recumbent fold pile into a steep gneiss and schist belt.

Concurrent with F3 overprinting, or soon afterwards, the main phase of mylonization occurred. Mylonization is confined to shear zones that tend to be parallel to the steeply dipping limbs of the upright F3 folds.

## 7.2 PROPERTY GEOLOGY

The following section has been summarized from Chornoby (2004). Due to extensive overburden cover, the Mel property has been largely extrapolated from diamond drill core logging and interpreted by Inco exploration personnel from geophysical surveys.

### *7.2.1 STRATIGRAPHY*

The Archean basement rocks and the stratigraphically overlying Manasan Formation, which includes Quartzite (M1) and pegmatite-saturated sillimanite-biotite schist (M2), form an unconformable contact on the property. Where present, the thickness of this unit is comparable to the thickness of Manasan Formation found elsewhere in the Thompson Nickel Belt.

Thompson Formation skarn is mainly olivine-carbonate, with lesser microcline-diopside and phlogopite-carbonate skarn. The skarn, which has been intersected in drilling in a number of areas, has a mineralogical content identical to those in the main Thompson Belt, but the units are somewhat thinner.

The Lower Pipe Formation (P1), not always recognizable, includes thin layers of silicate and sulphide facies iron formation, pelitic schist and quartzite.

The Medium Pipe Formation (P2) is comprised of medium to coarse grained mineralized graphitic sillimanite-garnet-biotite schist, overlying Thompson Formation skarns. In contrast to the main Thompson Belt, the P2 schist is typically coarser grained with less sillimanite and more garnet.

The Upper Pipe Formation (P3), comprising largely chemical sediments, includes garnet-sillimanite-biotite schist, garnetiferous quartzite/greywacke and silicate with minor oxide and sulphide facies iron formation. In contrast to their main Thompson Belt counterparts, the iron formations contain more pyrrhotite and the schists are coarser grained with more garnet. In the past, drilling has focused on strong conductors within the upper Pipe Formation iron formations and mineralized schists (barren pyrrhotite).

The Setting Formation consists of an immature clastic sequence of interlayered quartzites and pelitic schists. Calcareous concretions are diagnostic. Mafic volcanic rocks occur in the upper part of the formation.

On the eastern limb of the easternmost dome in the Mel area, volcanic rocks of the Bah Lake Formation are present. These rocks consist of fine-grained amphibolites that are interpreted to be the pro-grade metamorphic products of basalts. Locally, they have a striped appearance due to silification and carbonatization and, in places, contain auriferous quartz veins (0.86 opt Au/0.2 ft in drillhole BH 38708). In contrast to the main Thompson Formation Belt, the Mel deposit area volcanic rocks are less abundant and less magnesium rich.

The basal stratigraphic sequence less than 100 ft above the unconformity with the Archean gneisses is characterized by ultramafic bodies. In some areas the ultramafic bodies are also completely enclosed in Archean gneiss. In the Mel area, the ultramafics are primarily pyroxenite with minor peridotite.

### 7.2.2 STRUCTURE

The rocks of the Mel property have been complexly folded. The main structural style is refolded, inward facing, synformal keels flanking gneiss domes with local truncations by major faults. The major faults are concentrated on the eastern margin of the easternmost margin of the easternmost dome and may reflect a major mylonite zone. Another major fault appears to truncate the southern part of the Mel Dome. These faults add a significant drag/shear component to original F3 textural folds. Other minor shears in the Mel area produce minor offsets of the stratigraphic sequence.

With respect to the inward-facing synformal keels separated by gneiss, the structural style of the Mel Area is similar to elsewhere in the Thompson Nickel Belt. Other areas with this structural style include the Birchtree-South Manasan and Moak-Mystery synforms.

# 8.0 DEPOSIT TYPE

Sediment hosted nickel sulphide mineralization and magmatic hosted nickel sulphide mineralization are the two distinct and economically important deposit types that occur within the Thompson Nickel Belt. The two deposit types can be distinguished on the basis of field observations as well as structural, textural, mineralogical and chemical criteria. This is especially important because the deposit types are often intimately spatially related due to the interaction of sedimentary, magmatic, metamorphic and deformational processes.

Within the Thompson Nickel Belt, the nickel ores are found almost exclusively within the lower Pipe Formation rocks of the Opswagen group.

Thickening of sulphide layers is directly caused by the formation of dilatent zones in the noses of folds which trap mobilized nickel sulphides. Sulphide enrichment is closely associated with pegmatite melts and breccias derived from existing sedimentary or magmatic sulphides. Pegmatites, formed by partial melting during deformation, accumulated within the same dilatational zones as the remobilised sulphides. In some cases, the sulphide has been removed or disrupted by pegmatite emplacement, forming blocks of sulphide within the pegmatite melt. Multiple deformations of primary magmatic sulphides and the resulting mechanical and/or hydrothermal processes are thought to be the main mechanism for nickel enrichment.

## 8.1 SEDIMENTARY SULPHIDE MINERALIZATION

Sedimentary sulphides may be barren or enriched in nickel. Barren sulphides characterized by nickel concentrations below 500 parts per million (ppm) occur beyond the immediate vicinity of significant nickel enriched zones.

Sedimentary sulphides enriched in nickel by later magmatic processes are visually indistinguishable from barren sedimentary sulphides but occur in close proximity to significant nickel enriched zones.

## 8.2 MAGMATIC SULPHIDE MINERALIZATION

Magmatic nickel sulphide mineralization can be intraparental or extraparental, based on whether it occurs within or external to the ultramafic parent rocks. Typically massive, extraparental mineralization occurs as pods and lenses of variable size within host pelitic schist adjacent to ultramafic boudins. The less competent nature of the pelitic schists provides a suitable conduit for magmatism. In order to explain the amount of nickel sulphide within the deposit, nickel-rich magma would need to pass through the system for an extended period of time, exposing as much melt to sulphide rich sediment as possible

(Constable et al., 2005). High-energy conduit systems or komatiiatic flows could provide sufficient exposure and assimilation of sulphide-rich country rock.

The interpretation of the magmatic affinity of the extraparental mineralization is based on certain shared chemical characteristics with the intraparental mineralization. Intraparental mineralization occurs as lower abundances of interstitial sulphide and semi-massive to massive concentrations of sulphide in veins and breccias all within ultramafic rocks.

# 9.0 MINERALIZATION

The Mel deposit contains barren sedimentary sulphide formation that is known locally to be nickel bearing. This fact is consistent with sulphide mineralization located elsewhere in the Thompson Nickel Belt. Nickel mineralization is associated with pelitic schists of the lower Pipe Formation. Rapid passage from the mantle through fractured crust, and interaction with sulphide-rich sediments, produced a nickel-rich, immiscible, sulphide melt (Wilson and Brisbin, 1961). Subsequent deformation mechanically and/or hydrothermally remobilised nickel sulphides into favourable structural traps.

At the Mel deposit, nickel-bearing massive and stringer sulphides occur within and in contact with an ultramafic intrusion. The sulphides are dominantly pyrrhotite with lesser amounts of pentlandite and chalcopyrite. Mineralization strikes approximately 345° for a distance of 1500 m, dips from 70° to 80° east and extends to a known depth of 825 m below surface. The deposit consists of folded, continuous to discontinuous higher-grade nickel bearing sulphide layers up to 15 m thick (horizontal) within a broader mineralized zone with horizontal thicknesses locally exceeding 30 m. Folding appears to have locally caused thickening of the mineralized layers.

# 10.0 EXPLORATION

The purpose of the current period of exploration is twofold: to explore for nickel deposits by locating and testing more deeply buried high conductivity zones that may be indicative of large volumes with high sulphide content, primarily on the Mel claims; and to better explore, delineate and quantify the mineral resource of the Mel deposit. The former objective is a logical extension of the pre-1971 exploration on the Mel property that identified near surface (generally less than 100 m below surface) geophysical anomalies that were subsequently tested by diamond drilling resulting in the discovery of the Mel deposit. The latter objective is a necessary requisite for upgrading the mineral resource estimate of the Mel deposit prior to initiating a feasibility study. Integration of modern electromagnetic geophysical surveys with improved geological understanding of the Thompson Nickel Belt is an effective exploration approach.

Exploration on the Mel claims consists of line cutting and regional scale AMT surveys followed by preparation of site-specific grids and surface UTEM surveys to identify anomalies characteristic of massive sulphides. Compilation of these data with all of the available geological information is then undertaken to assess whether specific conductors warrant follow-up diamond drilling (see Figures 10.1 and 10.2).

Exploration on the Mel lease is predominantly diamond drilling directed at areas within and adjacent to the Mel deposit that require additional information to enable a higher level of confidence in the mineral resource estimates. Generally the targeted areas are lacking data or are geologically complex. Drill hole targets are selected on the basis of interpretations of the favourable lithologies and mineralization observed in earlier diamond drill holes. More distant from the Mel deposit, where geological information is scarce or absent, geophysical data is utilized in the selection of drill targets.

Inco personnel either conduct or supervise all of the work performed on the Mel property.

All line cutting on the Mel property has been conducted by Durama Enterprises of LaRonge, Saskatchewan.

Representative points along loop lines and survey lines are located with GPS receivers by Inco technicians using two Trimble Geo Explorer III rovers and a Trimble LS4600 base station at Inco's office in Thompson, Manitoba. Field data are differentially post-process corrected using the base station's data thereby giving positional accuracies to within approximately one metre.

AMT surveys are designed and utilized as a reconnaissance exploration geophysical method capable of detecting conductive bodies with an anticipated target size in the order of ten million tonnes to a depth of approximately 1,000 m. The AMT surveys were conducted

on cut grid lines spaced 1,219 m apart with readings at 244 m station intervals by Geosystem Canada Inc. of Ottawa, Ontario under the supervision of Inco Area Geophysicist, B. Czornobay, P. Geo. who was based in Thompson, Manitoba. Resolution and characterization of AMT anomalies is coarse and requires better definition prior to drill testing.

AMT surveys cover all of the Mel claims and a portion of the Mel lease.

Multiple AMT anomalies have been detected.

Surface UTEM surveys are utilized to better define AMT anomalies with respect to their quality and location, and subject to the integration of geological information, identify those anomalies that warrant diamond drilling. The UTEM surveys are read on cut grid lines that are 1,829 m in length spaced 305 m apart with readings taken at 61 m station intervals. Vertical component magnetic data is collected in the typical 10-channel configuration utilizing twin 914 m by 1,290 m loops and a base frequency of approximately four hertz. The UTEM surveys were conducted by Lamontagne Geophysics Ltd., of Kingston, Ontario under the supervision of Inco Area Geophysicist, B. Czornobay, P. Geo. who was based in Thompson.

UTEM surveys have been completed on the Mel lease and the Mel claims.

The UTEM surveys have detected multiple conductive zones.

In-hole electromagnetic surveys are used to detect off-hole conductors and to characterize in hole conductors.

The in-hole UTEM surveys collect three component electromagnetic data at regular intervals (no greater than 36.58 m) in a 10 channel configuration typically utilizing twin 1,219 m by 914 m loops and a base frequency of one hertz.

An in-hole three component BHEM survey was conducted in one drill hole (102596-0) by Crone Geophysics, Mississauga, Ontario.

Mineral resource estimates have been conducted by Inco personnel.

## 10.1 MEL LEASE EXPLORATION 2001 TO JULY 31, 2004

In preparation for surface UTEM surveys four grids totalling 51.82 km and covering the entire Mel lease were cut and chained during January and February of 2004. The grid locations and geometry were surveyed by GPS.

In February of 2004 surface UTEM surveys were conducted on the four grids (see Figure 10.2).

An in-hole UTEM survey was completed on drill hole 102599-0 but was unsuccessful on drillhole 102596-0 due to a blockage in the hole.

A mineral resource estimate that conforms to CIM Standards on Mineral Resources and Reserves, was completed in July, 2004 for the Mel deposit based on an open pit mining concept.

## 10.2 MEL LEASE EXPLORATION AUG 1, 2004 TO NOVEMBER 2006

An in-hole UTEM survey was completed on drillhole 102596-0 indicating the presence of two strong conductors:

- A 396 m sized, steeply west dipping (700), north striking, shallow south plunging (300) conductor intersected at a depth of approximately 360 m near the middle of its bottom edge;
- A 198 m sized, steeply west dipping (700), north striking, shallow north plunging (200) conductor intersected at a depth of approximately 399 m in its bottom northern quadrant.

## 10.3 MEL CLAIMS EXPLORATION 2002

One hundred and eight kilometres of grid lines were cut in preparation for surface UTEM surveys.

Surface UTEM surveys were conducted on seven grids (see Figure 10.2). The grid locations and geometry were surveyed by GPS.

3-D inversions were performed on the AMT data collected in 2000 and 2001.

## 10.4 MEL CLAIMS EXPLORATION 2003

In preparation for surface UTEM surveys 263.93 km of line were cut and chained. The grid locations and geometry were surveyed by GPS.

In January and February, 18 surface UTEM surveys totalling 171.56 km were conducted on the 18 grids (see Figure 10.2).

## 10.5 MEL CLAIMS EXPLORATION 2004

In preparation for surface UTEM surveys 94.31 km of line were cut and chained. The grid locations and geometry were surveyed by GPS.

Surface UTEM surveys totalling 61.96 km were conducted on six grids (see Figure 10.2).

## 10.6 MEL PROPERTY CHANGES

On August 27, 1999, when the option/buy-back agreement between Inco and Victory was formed the Mel property consisted of the Mel lease and 91 Mel claims. Currently the Mel property comprises the Mel lease and 37 Mel claims. Based on exploration merit some mineral claims have been dropped and others added as follows:

1999: The original 91 Mel mineral claims were staked in March 1999.

2002: Three new claims were staked and added to the south end of the Mel property in January 2002.

In March 2002, 16 low priority claims were allowed to lapse.

2003: In March 2003, 18 low priority claims were allowed to lapse.

2005: In March 2004, one low priority claim was allowed to lapse.

2006: In March 2006, 22 low priority claims were allowed to lapse.

**Figure 10.1 AMT Surveys**

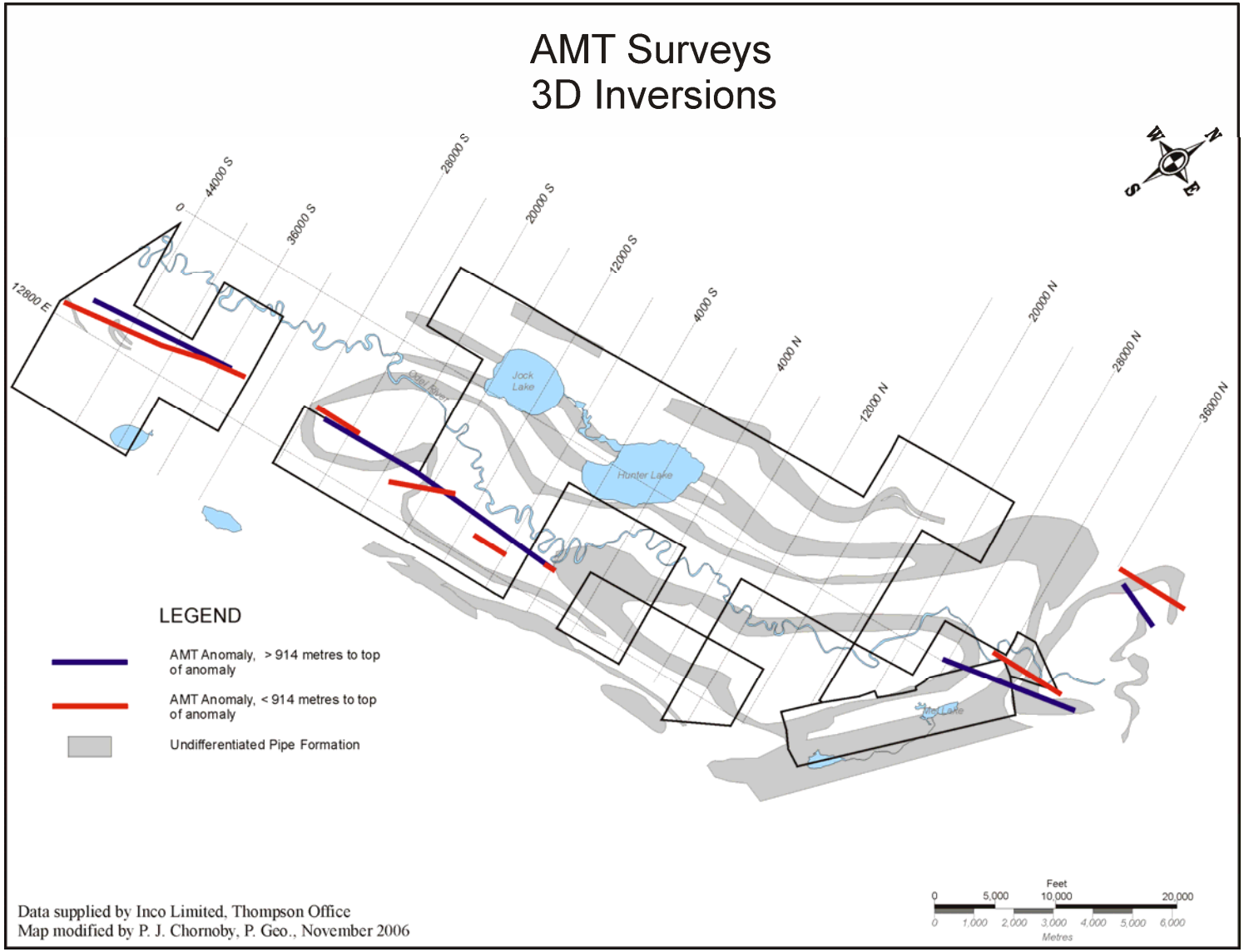
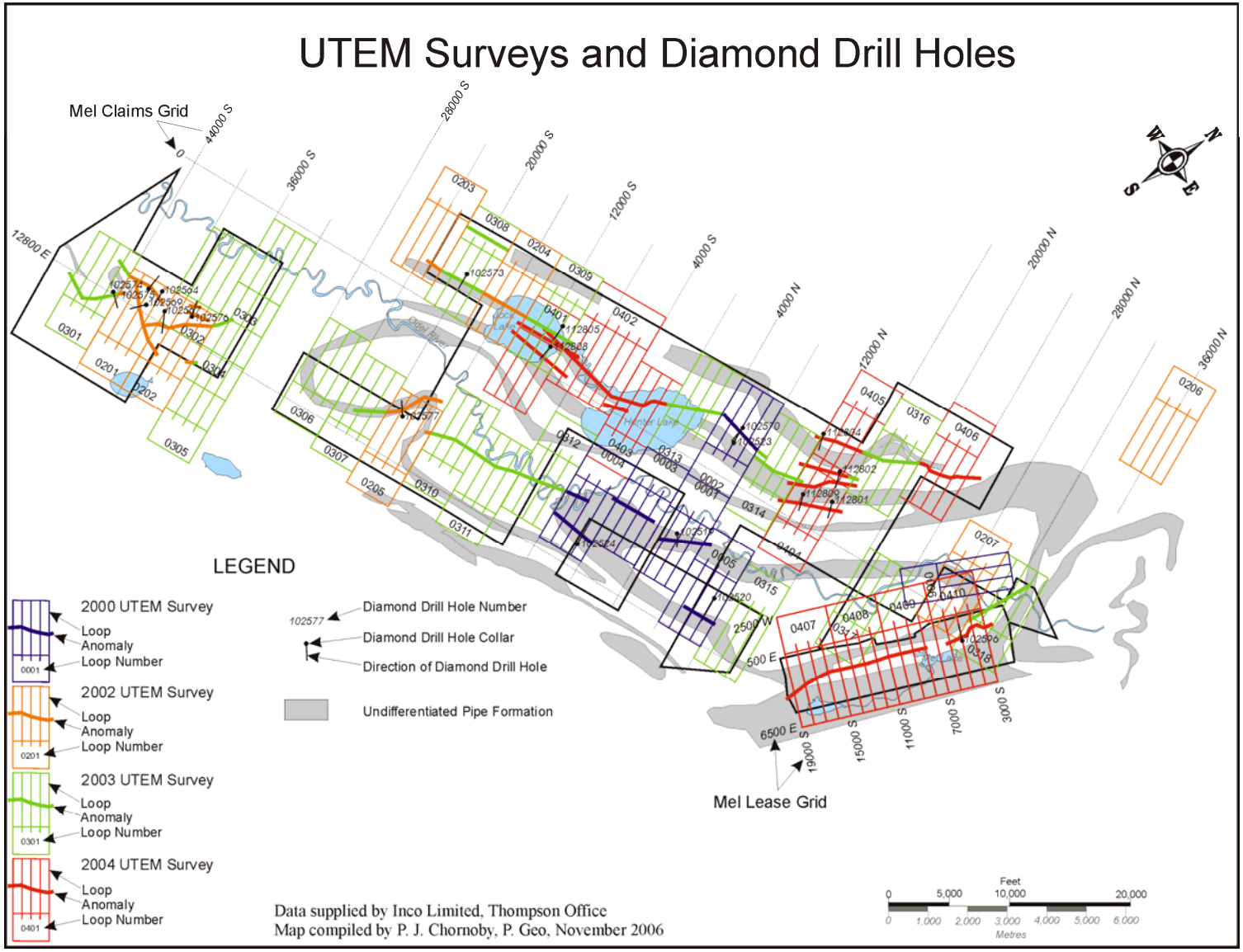


**Figure 10.2 UTEM Surveys and Diamond Drillholes**



# 11.0 DRILLING

## 11.1 INCO 1961 TO 1971

Diamond drilling from 1961 to 1971 was AXT size core except for a few holes of AQ size core drilled at the end of the 1971 campaign. Core from that period has been preserved and is stored by Inco Limited in Thompson as abbreviates only with generally one representative sample approximately 10 cm long collected approximately every three metres in the hole.

Collar locations of diamond drillholes are surveyed. In hole location surveys are limited to acid etch tests. All surveys have been performed by Inco personnel.

## 11.2 VICTORY-INCO 1999 TO 2006

Since 1999 the diamond drilling has been NQ size core. Major Midwest Drilling of Thompson, Manitoba has performed all of the diamond drilling under the supervision of Inco geologists, Scott Mooney P.Geo., Mars Napoli, P. Geo., H. Mahony P. Geo., and L. Larson, P. Geo., (now retired), all based in Thompson.

Collar locations of diamond drillholes are surveyed. Down hole surveys have been conducted on most of the holes using a light-gyroscopic survey instrument. All surveys have been performed by Inco personnel.

Three holes have been auger drilled over the Mel deposit by AMEC Earth & Environmental to determine the geotechnical properties of the overburden.

## 11.3 MEL LEASE DRILLING 1999 TO 2000

In the winter of 1999-2000, twenty-four holes totalling 3,284 m were diamond drilled to verify and better delineate the Mel deposit and to test for the presence of shallow extensions of the mineralization (see Table 11.1 and Figure 11.1).

Permanent and useable survey points did not exist on the Mel lease when the drilling began. A drillhole in the area that had been surveyed in the past was relocated and used as a starting point for a new survey. A traverse was carried from this point and 12 old drillholes in the Mel deposit area were surveyed. All of these boreholes fell within one foot of the known co-ordinates and confirmed the accurate relocation of survey points. All of the 2000 and 2004 diamond drillhole collar locations were based on this survey.

The data was incorporated into a mineral resource estimate completed in May 2000 that does not conform to CIM Standards on Mineral Resources and Reserves, August 20, 2000.

**Table 11.1 Mel Deposit 2000 Diamond Drillholes**

| Drillhole Number | Location Mel Deposit Co-ordinates | Dip (°) | Az. (°) | Length (m) | Gyro Survey |
|---|---|---|---|---|---|
| 89289-0 | 9014 S, 2750 E | -58 | 270 | 149 | Yes |
| 89290-0 | 9014 S, 2750 E | -69 | 270 | 167 | Yes |
| 89292-0 | 9065.S, 2760 E | -62 | 270 | 148 | Yes |
| 89293-0 | 9065.S, 2760 E | -50 | 270 | 125 | Yes |
| 89295-0 | 8965 S, 2740 E | -60 | 270 | 137 | Yes |
| 89296-0 | 8965 S, 2740 E | -45 | 270 | 116 | Yes |
| 89297-0 | 9115 S, 2830 E | -58 | 270 | 149 | Yes |
| 89298-0 | 9115 S, 2830 E | -47 | 270 | 122 | Yes |
| 89299-0 | 8915 S, 2750 E | -60 | 270 | 147 | Yes |
| 89300-0 | 8915 S, 2750 E | -45 | 270 | 124 | Yes |
| 102501-0 | 8865 S, 2720 E | -51 | 270 | 122 | Yes |
| 102502-0 | 8865 S, 2720 E | -68 | 270 | 95 | No |
| 102503-0 | 8860 S, 2720 E | -67 | 270 | 162 | Yes |
| 102504-0 | 9165.S, 2880 E | -54 | 270 | 165 | Yes |
| 102505-0 | 9415 S, 2880 E | -53 | 270 | 69 | No |
| 102506-0 | 9415 S, 2885 E | -54 | 270 | 173 | Yes |
| 102507-0 | 8815 S, 2700 E | -69 | 270 | 153 | Yes |
| 102508-0 | 8915 S, 2810 E | -65 | 270 | 176 | Yes |
| 102509-0 | 9815 S, 2860 E | -56 | 270 | 119 | Yes |
| 102510-0 | 9915 S, 2860 E | -55 | 270 | 113 | Yes |
| 102511-0 | 9315 S, 2917 E | -52 | 270 | 176 | Yes |
| 102512-0 | 9990 S, 2867 E | -59 | 270 | 122 | Yes |
| 102514-0 | 8715 S, 2720 E | -53 | 270 | 127 | Yes |
| 102515-0 | 10115 S, 2930 E | -59 | 270 | 128 | Yes |
| **Total (m)** | | | | **3284** | |

## 11.4 MEL LEASE DRILLING 2004

In February and March of 2004, twenty-one holes totalling 4,366 m were diamond drilled on the Mel lease (see Table 11.2). Twenty of the holes were intended to further delineate the Mel deposit and of these, 19 holes reached their targeted depths.

One drillhole (102596-0) tested a moderate conductivity UTEM anomaly located approximately 760 m north of the Mel deposit drillhole 102596-0 intersected numerous intervals with anomalous nickel content over an interval of 39.56 m (core length). The best interval assayed 1.31% Ni over 0.94 m (core length).

**Figure 11.1 Mel Deposit Longitudinal**

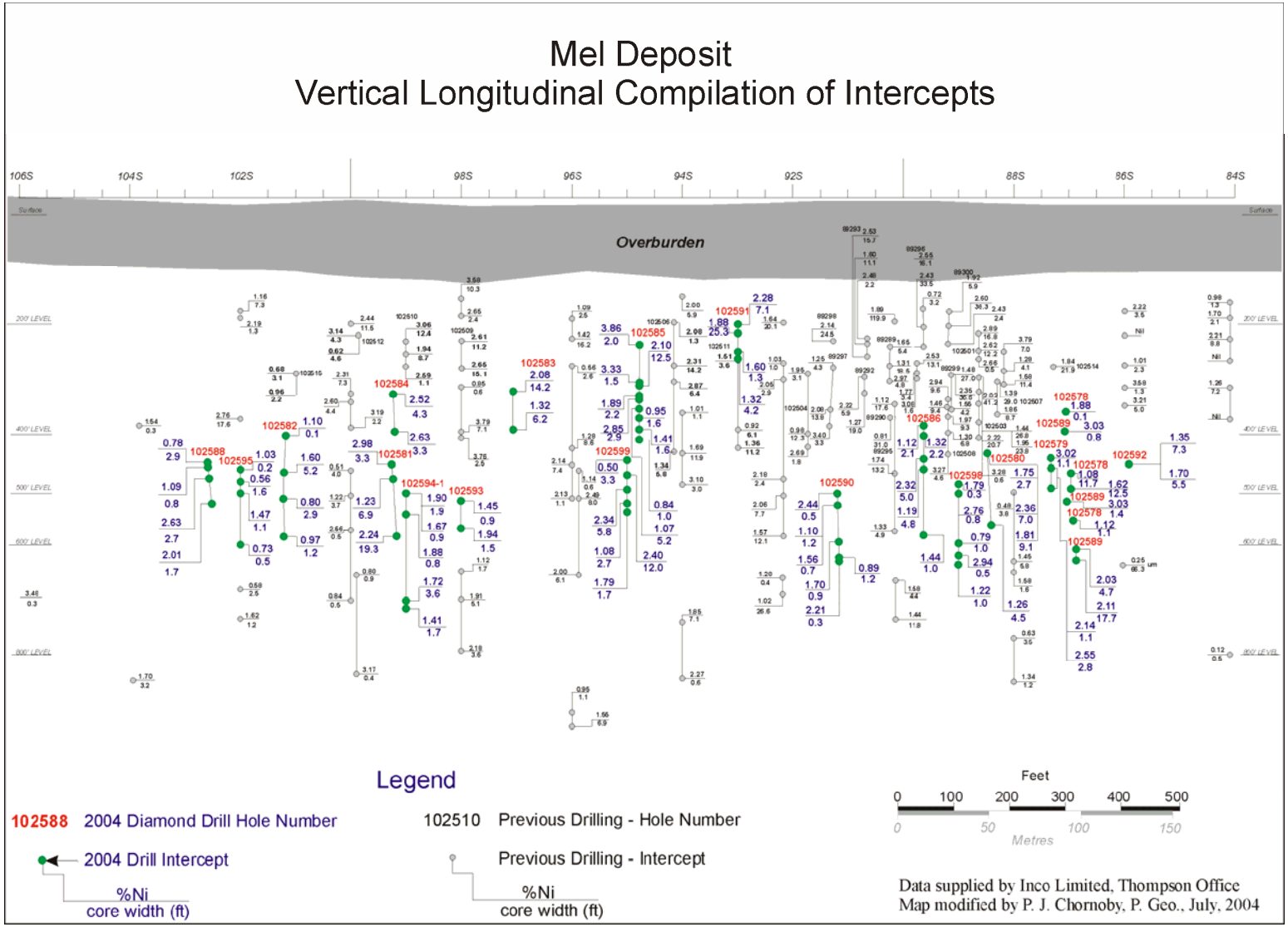


**Table 11.2 Mel Deposit and Lease 2004 Diamond Drillholes**

| Drillhole Number | Location Property Co-ordinates | Dip (°) | Az. (°) | Length (m) | Gyro Survey |
|---|---|---|---|---|---|
| 102578-0 | 8715S, 2722E | -69 | 270 | 164 | Yes |
| 102579-0 | 8750S, 2800E | -62.5 | 270 | 182 | Yes |
| 102580-0 | 8860S, 2830E | -66 | 270 | 200 | Yes |
| 102581-0 | 9915S, 2946E | -67.5 | 270 | 212 | Yes |
| 102582-0 | 10125S, 2932E | -69 | 270 | 227 | Yes |
| 102583-0 | 9700S, 2913E | -54 | 270 | 176 | Yes |
| 102584-0 | 9915S, 2946E | -59 | 270 | 170 | Yes |
| 102585-0 | 9500S, 2883E | -55 | 270 | 179 | Yes |
| 102586-0 | 8965S, 2814E | -71.5 | 270 | 221 | No |
| 102588-0 | 10250S, 2957E | -68 | 270 | 177 | Yes |
| 102589-0 | 8715S, 2727E | -77 | 270 | 215 | Yes |
| 102590-0 | 9115S, 2892E | -66.5 | 270 | 200 | Yes |
| 102591-0 | 9315S,2858E | -48 | 270 | 149 | Yes |
| 102592-0 | 8600S, 2743E | -68 | 270 | 182 | Yes |
| 102593-0 | 9814S, 3003E | -66 | 270 | 212 | Yes |
| 102594-0 | 9915S, 3028E | -70 | 270 | 59 | No |
| 102594-1 | 9915S, 3018E | -70.5 | 270 | 260 | Yes |
| 102595-0 | 10200S, 3057E | -63 | 270 | 212 | Yes |
| 102596-0 | 5000S, 2743E | -65 | 270 | 488 | Yes |
| 102598-0 | 8900S, 2902E | -68 | 270 | 230 | Yes |
| 102599-0 | 9500S, 2941E | -59 | 270 | 251 | Yes |
| | | **2004** | **Total (m)** | **4366** | |

The data were incorporated into a mineral resource estimate completed in July, 2004 that conforms to CIM Standards on Mineral Resources and Reserves, August 20, 2000. The resource estimate was based on an open pit mining concept.

A total of 94 m of overburden drilling was completed in three solid stem auger boreholes on the Mel deposit. Only two of the holes reached suspected bedrock. Nilcon Vane tests were completed in one hole. The drilling encountered approximately four metres of peat and thereafter approximately 29 m of predominantly water saturated clay and some patchy perma frost with weak shear strength. Approximately 1.5 m of sand was encountered at the bottom of one hole.

## 11.5 MEL CLAIMS DRILLING 1999 TO 2000

Four diamond drill holes totalling 2,574 m were drilled to test UTEM anomalies (see Table 11.3). No significant nickel intersections were found.

**Table 11.3 Mel Claims 2000 Diamond Drillholes**

| Drillhole Number | Location Property Co-ordinates | Dip (°) | Az. (°) | Length (m) | Gyro Survey | BHUTEM Survey |
|---|---|---|---|---|---|---|
| 102519 | 5650N, 5900E | -57 | 60 | 410 | Yes | No |
| 102520 | 11038N, 8904E | -66 | 90 | 1112 | Yes | Yes |
| 102523 | 5994N, 2900W | -53 | 270 | 536 | Yes | Yes |
| 102524 | 1000S,10900E | -60 | 270 | 516 | Yes | Yes |
| | | | **2000 Total (m)** | **2574** | | |

## 11.6 MEL CLAIMS DRILLING 2003

Six diamond drillholes totalling 2,498 m were drilled to test UTEM anomalies (see Table 11.4). No significant nickel intersections were found.

**Table 11.4 Mel Claims 2003 Diamond Drillholes**

| Drillhole Number | Location Mel Property Co-ordinates | Dip (°) | Az. (°) | Length (m) | Gyro Survey |
|---|---|---|---|---|---|
| 102564 | 41000S, 10400E | -53 | 90 | 392 | No |
| 102567 | 41000S, 11700E | -55 | 67 | 641 | Yes |
| 102569 | 41600S, 12000E | -57 | 137 | 478 | Yes |
| 102570 | 6100N, 4200W | -60 | 100 | 315 | Yes |
| 102573 | 20000S, 3600W | -55 | 90 | 409 | Yes |
| 102574 | 44500S, 12600E | -55 | 45 | 263 | Yes |
| | | | **2003 Total (m)** | **2498** | |

## 11.7 MEL CLAIMS DRILLING 2004

Three diamond drillholes totalling 804 m were drilled to test UTEM anomalies (see Table 11.5). No significant nickel intersections were found.

**Table 11.5 Mel Claims 2004 Diamond Drillholes**

| Drillhole Number | Location Mel Property Co-ordinates | Dip (°) | Az. (°) | Length (m) | Gyro Survey | BHUTEM Survey |
|---|---|---|---|---|---|---|
| 102575 | 42140S, 10900E | -52.5 | 279 | 194 | Failed | No |
| 102576 | 37850S, 11040E | -47 | 258 | 164 | Failed | Failed |
| 102577 | 18700S, 9200E | -57 | 237 | 446 | Yes | No |
| | | | **2004 Total (m)** | **804** | | |

## 11.8 MEL CLAIMS DRILLING 2005 AND 2006

Six diamond drillholes totalling 2,506 m were drilled to test UTEM anomalies (see Table 11.6). No significant nickel intersections were found.

**Table 11.6 Mel Claims 2005 Diamond Drillholes**

| Drillhole Number | Location Mel Property Co-ordinates | Dip (°) | Az. (°) | Length (m) | Gyro Survey | BHUTEM Survey |
|---|---|---|---|---|---|---|
| 112801 | 15400N, 2900W | -58 | 75 | 458 | Partial | No |
| 112802 | 14700N, 5400W | -58 | 75 | 413 | Failed | No |
| 112804 | 12000N, 7350W | -58 | 77 | 353 | Yes | No |
| 112805 | 11000S, 4000W | -55 | 94 | 381 | Yes | No |
| 112808 | 11000S, 2000W | -62 | 100 | 422 | Yes | No |
| 112809 | 13000N, 2200W | -58 | 75 | 379 | No | No |
| **2005 Total (m)** | | | | **2506** | | |

# 12.0 SAMPLING METHOD AND APPROACH

All of the available lithology and assay information on the Mel property has been obtained from diamond drill core.

## 12.1 1961 TO 1971 INCO

Diamond drilling was AXT size core except for a few holes of AQ size core drilled at the end of the 1971 campaign. Core has been preserved and is stored by Inco Limited in Thompson as abbreviates only with generally one representative sample approximately 10 cm long collected approximately every three metre in the hole.

## 12.2 1999 TO 2006 INCO-VICTORY

The diamond drilling is NQ core size. The core is logged, sampled and stored by Inco in Thompson. Mineralized sections of the core are subdivided into sample intervals not exceeding 1.5 m of core length based on rock type, alteration (style and intensity), sulphide abundance and textural variations. Each sample interval is cut in half lengthwise using a diamond impregnated cutting blade. One half of the sample interval is placed in a sample bag with the appropriate sample tag, closed and shipped for assay. The remaining half of the sample interval is put back into the core box.

# 13.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

## 13.1 1961 TO 1988 INCO

All of the drill core samples from drilling which was completed prior to 1988 was submitted to Inco's own labs, either in Thompson, Manitoba or Copper Cliff, Ontario, for preparation and analysis for Cu, Ni and Co. All pulps were retained and placed in long-term storage.

## 13.2 1999 TO 2006 INCO-VICTORY

Samples were shipped to ALS Chemex in Thunder Bay, Ontario for preparation prior to analysis by weighing, crushing, splitting and pulverizing each sample as follows:

- Each sample was weighted in kilograms;
- Each sample was assigned a unique bar core identifier allowing for complete traceability;
- The entire sample was crushed to 70% < 2 mm (-10 mesh) in two stages;
- The sample was split with a Jones riffle splitter (standard procedure);
- Up to 250 grams (g) of the split for each sample was pulverized to 85% < 75 microns (-200 mesh).

ALS Chemex uses barren wash material between sample preparation batches.

The pulps were then shipped by ALS Chemex to their analytical laboratory in either Mississauga, Ontario or North Vancouver, British Columbia for analyses as follows:

- Assaying for nickel, copper, cobalt, iron (Fe), arsenic (As), lead (Pb), zinc (Zn) and sulphur (S) are performed using fusion sample decomposition and ICP-AES analytical procedures. Typically a prepared sample (0.2 g) is added to sodium peroxide flux (2.6 g), mixed well and then fused in a 670°C furnace. The resulting melt is cooled and then dissolved in 30% hydrochloric acid. This solution is then analyzed by inductively coupled plasma – atomic emission spectrometry and the results are corrected for spectral inter-element interferences.
- Both total carbon and sulphur content are determined by a Leco combustion method.
- When required, samples are also analysed for low-level As and Pb using the ME-AA45 procedure. The samples are digested with aqua regia in a graphite-heating

block. After cooling, the resulting solution is diluted with demineralized water then analysed by atomic absorption spectrometry (AAS).

- Select samples are also analysed for Au, Pt and Pd by a lead collection fire assay/ICP (Optima Induced Couple Plasma) technique on a one assay/ton sample.

Table 13.1 summarizes the detection limits for various elements. Note that any result that exceeds the upper limit is re-assayed.

**Table 13.1 Detection Limits of Various Elements**

| Element or Oxide | Symbol | Assay Method | Detection Limit | Upper Limit |
|---|---|---|---|---|
| Arsenic | As | ICP | 0.01% | 10% |
| Arsenic | As | AAS | 1 ppm | 10,000 ppm |
| Calcium Oxide | CaO | ICP | 0.01% | 30% |
| Cobalt | Co | ICP | 0.00% | 30% |
| Copper | Cu | ICP | 0.01% | 30% |
| Iron | Fe | ICP | 0.05% | 60% |
| Magnesium Oxide | MgO | ICP | 0.01% | 30% |
| Nickel | Ni | ICP | 0.01% | 30% |
| Lead | Pb | ICP | 0.01% | 30% |
| Lead | Pb | AAS | 1 ppm | 10,000 ppm |
| Sulfur | S | Leco Method | 0.01% | 60% |
| Silicon Oxide | $SiO_2$ | ICP | 0.01% | 100% |
| Zinc | Zn | ICP | 0.01% | 30% |
| Gold | Au | Fire Assay | 0.001 opt | 2.92 opt |
| Platinum | Pt | Fire Assay | 0.001 opt | 2.92 opt |
| Palladium | Pd | Fire Assay | 0.001 opt | 2.92 opt |

Chemex employs comprehensive and transparent QA/QC protocols. Control charts for standards assayed at Chemex show routine performance within two standard deviations of the certified values. The relative precision for Cu, Ni, Co, Fe and S meets contract specifications of no more than 7%. The relative precision for As and Pb is within established limits of 10%. The relative precision for Pd is within the contract limit of 15%, but Au (39%) and Pt (19%) are outside this specification. However, it should be noted that Au and Pt are affected by a moderate nugget effect.

The Inco QA/QC program consists of monitoring ALS Chemex's internal quality control samples (reference materials, duplicates and blanks) and randomly selecting samples for check analysis at third party laboratories, including the Inco control lab. Results from external check assays show adequate analytical accuracy and precision in 2003.

The Chief Chemist submitted pulp duplicates and commercial standards within samples shipments going to Chemex, including blanks for the same packages used for the diamond drill core samples.

Wardrop has not reviewed the QA/QC data.

ALS Chemex is ISO 9001:2000 registered. ISO 9001:2000 requires evidence of a quality management system covering all aspects of the registrant. To ensure compliance with this system regular internal audits are undertaken by staff members specially trained in auditing techniques. ALS Chemex Vancouver laboratory is also accredited ISO 17025 by Standards Council of Canada for a number of specific test procedures including fire assay Au by AA, ICP and gravimetric finish, and multi-element ICP and AA Assays for Ag, Cu, Pb, and Zn. In addition to twice yearly proficiency tests, auditors experienced in minerals analysis have performed detailed technical reviews at the laboratory. An audit was last carried out on the Chemex Laboratory in September 2004. In 2005, QC check results did not reveal any material issue (see Appendix A for complete laboratory audit).

# 14.0 DATA VERIFICATION

## 14.1 ASSAYS

Wardrop carried out an internal validation from the original drillhole logs against the Datamine drillhole database on 16 (5.4%) of the 296 drillholes in the total database. Data verification was completed on collar co-ordinates, length of hole, down-the-hole survey measurements (including azimuth and dip), from and to footage measurements of geology and assay sampling intervals, lithological units and nickel percentages as compiled from assay certificates merged into a database.

The two areas of the database that exhibited errors were the assay values; most errors were insignificant (six of the eight errors involved entering 0.005 when the actual value was <0.005) and the survey portion. These survey errors are related to the attempt to compare point measurements taken while drilling as compared to a line segment that was generated from the block model.

Another consideration involved the collar coordinates. The verification process compared the coordinates as determined by the universal INCO grid (grid 11). The coordinates from the database were compared with the coordinates as entered in the drill logs. These checks showed no discrepancies, but it was not possible to verify the coordinates (local grid) as used in the block model.

Details of the verification are set out in the Table 14.1. The data verification had less than 1% errors.

**Table 14.1 Data Verification**

| Database Portion | Total Records | Error Records | % of Records With Errors | Records of Validation |
|---|---|---|---|---|
| Collar | 64 | 0 | 0% | Coordinates (easting, northing, elevation and depth of hole |
| Survey | 63 | 8 | 12.70% | Survey locations down the hole, dip and azimuths |
| Geology | 1115 | 0 | 0% | Lithology units and distance down the hole |
| Assay | 596 | 8 | 1.34% | Nickel values and distance down the hole |
| **Total** | **1838** | **16** | **0.87%** | |

## 14.2 2004 INCO-VICTORY

Victory has not performed any assay data QA/QC but rather relies on the QA/QC program maintained by Inco as described (below) and under the direction of Herb Mackowiak, Area Chemist, Copper Cliff, Ontario, (2004).

> "All of the Inco diamond drill samples, including those from the Mel area, are currently prepared and analysed by ALS Chemex. The samples are analysed for Cu, Ni, Co, Fe, S, As, Pb and Zn by their A6 procedure and designated samples are also analysed for Au, Pt and Pd by fire assay/ICP. The quality control program consists of monitoring ALS Chemex's internal quality control samples, monitoring the Inco lab's internal quality control samples and randomly selecting samples for check analysis.
>
> Periodically (every two weeks) ALS Chemex sends a digital file, which includes all standards that have been used with the Inco samples and the results of any analytical duplicates. The control samples are plotted and compared to the expected values for Cu, Ni, Co, Fe, S, As, Pb and Zn. Any trends and outliers are brought to the attention of ALS Chemex for rectification. The duplicates are examined to ensure that no outliers outside of the contract specifications have occurred.
>
> Every four to six weeks the ALS Chemex analytical data for all Inco samples are combined in a spreadsheet by department. Five percent of the samples are randomly selected for check analysis. A filter (Cu+Ni>0.5%) is used to avoid checking the low-grade samples. ALS Chemex is requested to create a new pulp from the crushed reserve for the selected check samples. The new pulps are sent to the Inco Process Technology lab in Copper Cliff for check analysis using a method similar to the one used at ALS Chemex (Na2O2 fusion/ICP). Any of the samples that were originally analysed for Au, Pt and Pd at ALS Chemex are also analysed for the same at the Inco lab. All the quality control samples (standards and duplicates) are reported by the Inco lab, along with the results of the check samples. The quality controls are compiled to ensure that the Inco results continue to meet the highest standards. In the event of outliers in the check results or the Inco quality controls, a request is sent for the affected samples to be repeated. A comparison of the Inco samples (both graphically and tabular) compares the original ALS Chemex results to the Inco check results for all elements. Any outliers outside of the contract specifications are sent to the attention of the quality control department at ALS Chemex with a request for follow-up. Upon reconciling the differences, corrections are issued by the lab. This program checks both the sampling and assaying procedures of the contract lab and encourages the lab to minimize systematic errors and to eliminate those errors that occur most frequently. Precision and accuracy of these checks are routinely examined to ensure acceptable levels.
>
> Occasional assay checks of the original pulps at the Inco lab ensure that accuracy at the assaying stage is acceptable. However, care must be taken to avoid selecting older samples that have oxidized, thereby introducing a source of error."

## 14.3 SITE VISIT

Shahé Naccashian, P.Geo, visited Inco's exploration office in Thompson, Manitoba from November 16th to 17th, 2006. He met with Boris Shepertycky, P.Geo. and conducted data verification on the Mel deposit at Inco's office. Due to inaccessibility to the property, Shahé visited the site for the second time from January 8th to 10th, 2007. During this visit Shahé performed core review and visited the Mel Property. This visit was intended to fulfil the NI 43-101 requirement of a site visit by a Qualified Person. Site visit photos are in Appendix B.

The Mel deposit diamond drill core is stored at the Thaw Shed building on core racks. The remainder of the drill core boxes were well organized in numeric order on outside racks at the Core Farm. All core boxes are clearly labelled with aluminium tags.

Wardrop carried a complete geological core review on lithology, mineralization and sampling, checking against drill logs and assay database for the holes shown in Table 14.2.

In addition to the two drill holes completely reviewed, Wardrop visually checked the mineralized sections from the drill holes in Table 14.3 and no discrepancies were found.

**Table 14.2 Drill holes Completely Reviewed**

| Drill Hole | Drilling Campaign |
|---|---|
| 102508-0 | March 2000 |
| 102578-0 | February 2004 |

**Table 14.3 Mineralized Zones of Drill holes Reviewed**

| Drill Hole | Drilling Campaign |
|---|---|
| 21956-0 | December 1962 |
| 22538-0 | September 1962 |
| 22539-0 | October 1962 |
| 27831-0 | December 1965 |
| 30220-0 | April 1966 |
| 30226-0 | May 1966 |
| 102501-0 | February 2000 |

# 15.0 ADJACENT PROPERTIES

There are no adjacent properties cited in this report.

# 16.0 MINERAL PROCESSING AND METALLURGICAL TESTING

Victory has not performed mineral processing or metallurgical testing on the property. However, Inco has conducted ore test work on the Mel deposit. This test work provided a quantitative analysis of the nickel recovery of Mel ore samples, as well as generated a recovery equation on the basis of ore grade.

A “time of grind” and float tests were conducted on a high, medium and low grade samples and compared to the sample collection in 2001 from drill hole BT 84 A time of grind was conducted in the lab rod mill for each sample in order to conduct the float test at the current plant setting for Birchtree ore of 18% +100 mesh. Float tests were then carried out using the same quantities of reagents for each run.

**Table 16.1 Summary of Time of Grind and Recoveries**

| | BT 84 | Mel 1.7 | Mel 0.9 | Mel 0.4 |
|---|---|---|---|---|
| Head Grade | 1.8 | 1.73 | 0.91 | 0.43 |
| Grind Time (minutes) | 8.25 | 9 | 15 | 10 |
| Ni Recovery | 83.96 | 75.22 | 74.85 | 71.52 |
| Cu Recovery | 95.32 | 90.53 | 88.40 | 79.07 |
| Fe Recovery | 24.04 | 16.21 | 13.78 | 10.61 |
| Concentrate Grades (%) | 10.84 | 11.90 | 12.24 | 10.59 |

A memo detailing full results and procedures is available in Appendix B.

# 17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

## 17.1 INTRODUCTION

Wardrop conducted a mineral resource estimate of the sediment and magmatic hosted nickel sulphide mineralization at Mel deposit. The estimation was completed for nickel at Mel deposit using data from historic and more recent drilling.

## 17.2 DATABASE

The historic database consisting of cored drilling information in the vicinity of the sulphide mineralization totals 296 drillholes comprised of collar, survey, lithology and assay information and is summarized in Table 17.1.

**Table 17.1 Total Records in Database**

| | DDH Holes | Coordinates | Survey | Lithology | Assays |
|---|---|---|---|---|---|
| Records | 296 | 296 | 2863 | 15164 | 8541 |

## 17.3 EXPLORATORY DATA ANALYSIS

Exploratory data analysis (EDA) is the application of statistical tools to elucidate characteristics of the data such as the shape of the relative frequency distribution and cumulative frequency distributions, as shown on histograms and probability plots, and statistics such as the mean, standard deviation and coefficient of variation.

The coefficient of variation (CV) is the standard deviation divided by the mean. This is a useful tool to measure the relative dispersion of a distribution. A CV, which is less than one generally depicts syngenetic deposits. Coefficients of variation of one to two are typical of hydrothermal processes. The presence of "bonanza" high-grade shoots or veins may cause the CV to reach three. Where the CV is greater than three, the mixture of two or more distinct ore-forming processes (or mineralization) can often be identified.

In polymetallic deposits, scatterplots can be useful in demonstrating correlations (positive and negative) between the assays.

Identification of the spatial continuity by means of variography is an EDA tool which is later used to perform kriging and to adjust frequency distributions for change of support (volume) of units considered.

In general, EDA is done on composite-sized volumes, which are nominally of equal length. This is because the variance of a distribution is inversely proportional to the volume of sample used. Use of unequal length composites can distort the frequency distributions and make variography very noisy.

### 17.3.1 ASSAYS

A total of 4,066 assay intervals from 126 drillholes were selected and defined the zone of mineralization on the deposit. Data analysis was conducted by creating probability and histogram plots of the data (see Table 17.2). Results of complete probability and histogram plots are in Appendix C. Non assayed intervals were assigned a value of zero and are included with the assayed values.

**Table 17.2 Range of Ni Grades and Ni * Length Values**

| | Records | Minimum | Maximum | Mean |
|---|---|---|---|---|
| Ni | 4066 | 0 | 5.21 | 0.65 |
| Ni * Length | 4066 | 0 | 5.21 | 0.4 |

### 17.3.2 CAPPING

When frequency distributions are skewed, a very small number or proportion of samples may represent a large amount of the contained metal in the resource. Frequently these samples may be scattered through the deposit and not restricted to spatially identifiable or continuous zones. Sometimes small clusters of high-grade mineralization may be present, and it may or may not be possible or practical to restrict their influence. Other times the very high-grade samples may be the result of laboratory errors; pulps sometimes segregate high specific gravity materials like electrum or pyrite and may produce biased results if the pulps are not re-homogenized prior to aliquot selection for analysis.

Even when the assays are valid, linear interpolation (weighted average) grade estimation methods can be adversely affected. When these methods are used, the inclusion of a high-grade sample will have a greater influence on the estimate than a lower grade sample. This can lead to undue projection (or smearing) of the effect of high-grade material into areas for which there is no evidence in hand that the high-grade material continues to occur. Under such circumstances, restriction of the influence of the higher grade material is mandatory.

On the basis of a review of probability and histogram plots and a decile analysis of the assays, it was concluded that there is a reasonable justification for capping of the Ni values. Breaks in the slope of the cumulative probability imply that a few higher grade samples are spatially discontinuous from the remainder of the data set. The samples were then further investigated by decile and percentile analysis where often the top decile (greatest 10% of the sample population) contained more than 40% of the metal. Table 17.3 displays the capping limitations of the resource estimation by Ni statistics for the capping exercise. Based on this analysis, capping was applied at 4% Ni, where a total of seven samples were capped.

**Table 17.3 Capping of the Assay Grades**

| | Records | Percentile | Minimum | Maximum | Mean |
|---|---|---|---|---|---|
| Ni | 7 | 99 th | 3.64 | 4.00 | 3.805 |

### 17.3.3 COMPOSITES

The selected assay information was composited into five foot downhole lengths while honouring the interpreted mineralization type boundaries. Commonly the compositing of down hole assays results in a fractional length for the last sample in a given hole. Typically these fractional composites are not used in the resource estimation if they are less than half the composite length. Box plots were created to compare the composite values based on downhole lengths for the deposit (see Appendix D). A decision was made to exclude the fractional composites of less than 2.5 ft down the hole near the edge of the mineralized zones. The fractional composites (54 in total) have no material impact on the resource and were not added to the preceding composites.

**Table 17.4 Summary of Composite Data by Sample Length**

| | Composite Length | Records | Minimum | Maximum | Mean |
|---|---|---|---|---|---|
| Ni | All | 3280 | 0 | 3.826 | 0.390 |
| Ni | >2.5 | 3226 | 0 | 3.826 | 0.396 |
| Ni | <2.5 | 54 | 0 | 0.630 | 0.032 |

## 17.4 BULK DENSITY

The following paragraph has been extracted from A. Aubut's memo, dated July 2004:

Based on Specific Gravity (SG) measurements made at other deposits in the Thompson area it has been shown that there is generally a linear relationship between Ni grade and SG. As such several equations have been used over the years to populate the SG filed in the Thompson drillhole database automatically. Using a polynomial linear regression a formula was determined with which to generate average SG values for the Mel drillholes, based on Ni grade. A maximum value of 4.65 (the SG for pyrrhotite) was used. The regression formula used for the drillhole data set is follows:

SG = Ni * 0.4244 + 2.5440

For the resource estimation Wardrop used a tonnage factor of 0.083009 tn/ft$^3$ as instructed by A. Aubut. Wardrop recommends that Victory carry out SG determination prior to carrying out a Preliminary Economic Assessment of the Mel deposit.

## 17.5 GEOLOGICAL INTERPRETATION

The geological interpretation of the Mel deposit was conducted by A. Aubut. Wardrop verified the interpretation. The wireframe was build using Datamine version 2.1.1633.0. The mineral envelope represents a single domain. The mineralization at Mel based on the

drilling to date cannot be easily broken into multiple domains reflecting differences in either grade (high or low) or mineralization type (massive or disseminated).

The total volume of the wireframe compares very well with the block model volume. The differences between the geological solids and the block model is 1 %. Table 17.5 tabulates the wireframe and the associated volume.

**Table 17.5 Summary of Wireframe Volumes**

| Volume ($ft^3$) | | | |
|---|---|---|---|
| **Wireframe** | **Model within Block** | **Volume Difference** | **Percent Difference** |
| 437,311,026 | 431,746,731 | 5,564,295 | 1.29% |

## 17.6 VARIOGRAPHY

Geostatisticians use a variety of tools to describe the pattern of spatial continuity, or strength of the spatial similarity of a variable with separation distance and direction. The correlogram measures the correlation between data values as a function of their separation distance and direction. If we compare samples that are close together, it is common to observe that their values are quite similar and the correlation coefficient for closely spaced samples is near 1.0. As the separation between samples increases, there is likely to be less similarity in the values and the correlogram tends to decrease toward 0.0. The distance at which the correlogram reaches zero is called the "range of correlation" or simply the range. The range of the correlogram corresponds roughly to the more qualitative notion of the "range of influence" of a sample; it is the distance over which sample values show some persistence or correlation. The shape of the correlogram describes the pattern of spatial continuity. A very rapid increase near the origin is indicative of short scale variability. A more gradual increase moving away from the origin suggests longer scale continuity.

Directional sample correlograms were calculated along horizontal azimuths of 0, 30, 60, 90, 120, 150, 180, 210, 240, 270, 300 and 330 degrees. For each azimuth, sample correlograms were also calculated at dips of 30 and 60 degrees in addition to horizontally. Lastly, a correlogram was calculated in the vertical direction. Using the thirty-seven correlograms an algorithm determined the best-fit model. This model is described by the nugget ($C_0$), two nested structure variance contributions ($C_1$, $C_2$), ranges for the variance contributions and the model type (spherical or exponential). After fitting the variance parameters, the algorithm then fits an ellipsoid to the thirty-seven ranges from the directional models for each structure. The final models of anisotropy are given by the lengths and orientations of the axes of the ellipsoids.

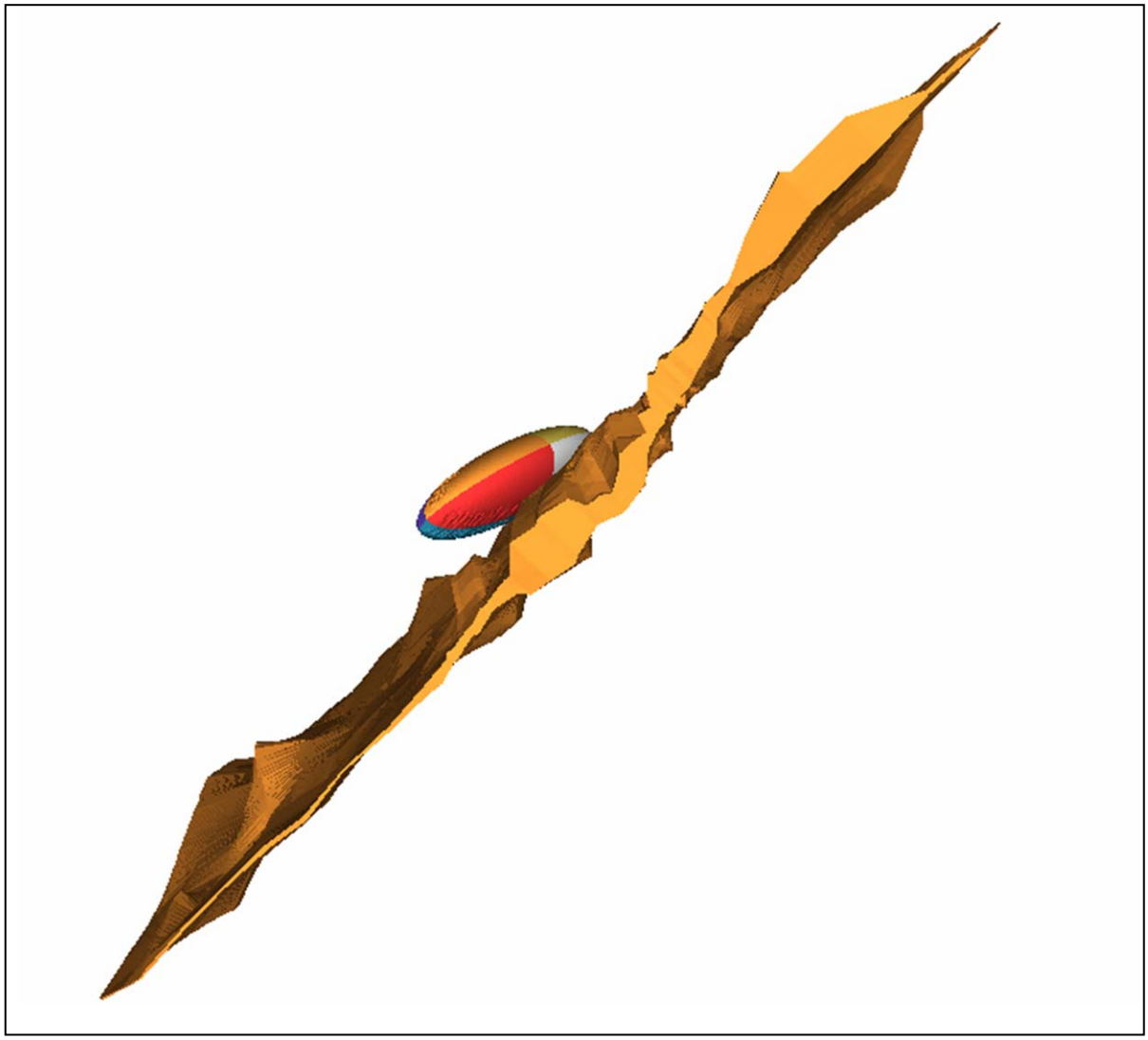
Variography, using Sage 2001 software, was completed on the Mel deposit for Ni. Downhole variogram was created to determine the nugget effect and the correlograms were modeled to determine spatial continuity of the composited mineralization. Table 17.6 summarizes the results of the variography and individual variography plots for Ni is in Appendix E.

**Table 17.6 Mel Deposit Variography**

| | Ellipse Rotation (LLL Rule) | | | | Ellipse Range (ft) | | | Ellipse Rotation (LLL Rule) | | | | Ellipse Range (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nugget (C0) | C1 | Z | X | Z | Z | X | Y | C2 | Z | X | Z | Z | X | Y |
| 0.15 | 0.554 | -4 | 67 | 25 | 15.2 | 21 | 31.8 | 0.296 | -4 | 67 | 25 | 272.3 | 139.4 | 54 |

Figure 17.1 below shows an isometric view of Mel deposit with the search ellipse.

**Figure 17.1 Isometric View of the Mel Deposit**



## 17.7 BLOCK MODEL

The resource block model was created using Datamine version 2.1.1633.0. Table 17.7 summarizes the block model limits of the mine grid system. The block model was not rotated.

**Table 17.7 Resource Block Model**

| Coordinate | Origin | Number of Blocks | Block Side (ft) | Model Extent (ft) |
|---|---|---|---|---|
| X | 2000 | 60 | 25 | 1500 |
| Y | -12500 | 200 | 25 | 5000 |
| Z | 7800 | 124 | 25 | 3100 |

The drillhole spacing varies from 50 to 200 foot across the deposit. A block size of 25 * 25 * 25 foot was selected in order to accommodate the widely spaced drilling and the open pit and underground mining block size.

## 17.8 INTERPOLATION PLAN

The interpolation plan of the Mel deposit resource estimation was completed using the following estimation methods: nearest neighbour (NN), inverse distance squared (ID) and ordinary kriging (OK).

The estimations were designed as a three pass system. Table 17.8 below summarizes search distances and rotations for estimating a block as well as minimum and maximum number of composites required.

**Table 17.8 Search Ellipse Parameters**

| Pass Number | Search Distance (ft) | | | Rotation | | | Number of Composites | | |
|---|---|---|---|---|---|---|---|---|---|
| | X | Y | Z | Z | X | Z | Min. | Max. | Max. per Drillhole |
| Pass 1 | 21 | 32 | 15 | -4 | 67 | 25 | 3 | 6 | 2 |
| Pass 2 | 168 | 256 | 120 | -4 | 67 | 25 | 2 | 6 | 2 |
| Pass 3 | 630 | 960 | 450 | -4 | 67 | 25 | 1 | 6 | 2 |

## 17.9 RESOURCE CLASSIFICATION

Several factors were used in the determination of the mineral resource classification as follows:

- CIM requirements and guidelines;
- Experience with similar deposits;
- Spatial continuity of mineralization.

No known environmental, permitting, legal, title, taxation, socio-economic, marketing or other relevant issues are known to the authors that may affect the estimate of a mineral resource. Mineral reserves can only be estimated on and economic evaluation that is used in a preliminary feasibility or a feasibility study on a mineral project, thus no reserves have been estimated. As per NI 43-101, mineral resources that are not mineral reserves do not have economic viability.

**Table 17.9 Resource Classification Criteria**

| Indicated | Inferred |
|---|---|
| Distance to nearest composite is less than 125 feet | Distance to nearest composite is greater than 125 feet |

Figure 17.2 shows a three dimensional view of Mel Deposit. Red blocks represent the indicated blocks and green blocks represent the inferred blocks.

## 17.10 RESOURCE TABULATION

The mineral resource estimation at Mel is tabulated in Table 17.10 for the Indicated and Inferred resources respectively. Ordinary kriging interpolation is used for the resource tabulation for Mel deposit.

**Table 17.10 Mel Deposit Resource greater than 0.5 % Ni Cut-off**

| Classification | Ni% Cut-off | Tons | Grade | Metal |
|---|---|---|---|---|
| Indicated | 0.5-999 | 4,279,000 | 0.875 | 3,744,125 |
| Inferred | 0.5-999 | 1,010,000 | 0.839 | 847,390 |

## 17.11 MODEL VALIDATION

The Mel deposit resource estimation was validated by the following methods:

- Comparison of global mean grades based on ID and OK estimation methods;
- Visual comparisons of colour coded block grades and drillhole composite for the three estimation methods of NN, ID and OK;
- Swath plot comparisons of estimated methods of NN, ID and OK.

### *17.11.1 GLOBAL COMPARISON*

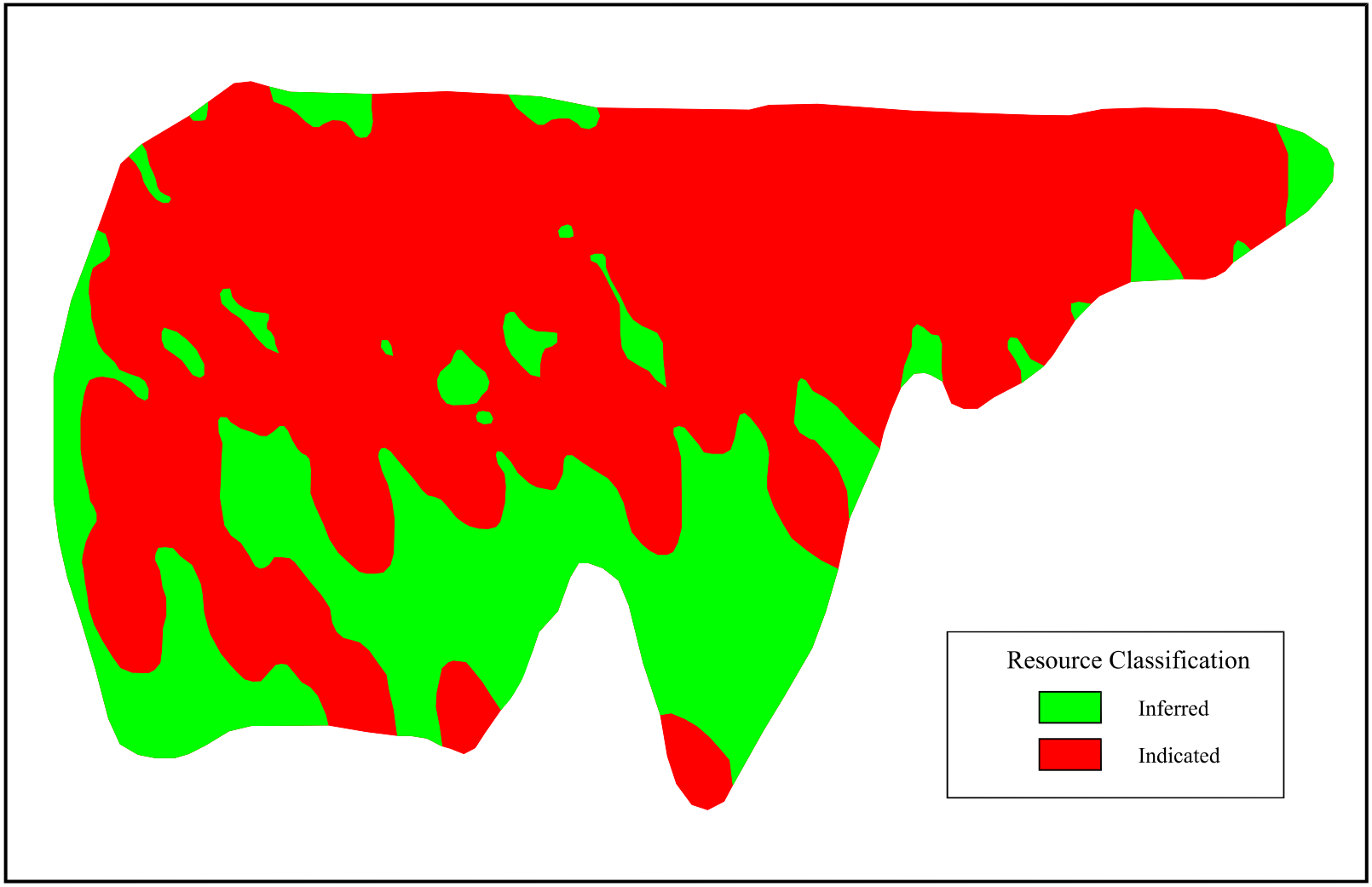
The global block model estimation of the OK method was compared to that of the global estimation of the model values. Table 17.11 shows the comparisons for the three estimation methods using all blocks. The contained metal differences between the methods were 5% between ID and OK.

**Table 17.11 Global Comparison by Estimation Method**

| Estimation Method | Ni% Cut-off | Tons | Grade | Metal | % Tons Difference | Total Metal | % of Difference Total Metal |
|---|---|---|---|---|---|---|---|
| Inverse Distance | 0-0.5 | 30,481,000 | 0.178 | 5,425,618 | | | |
| | 0.5-999 | 5,249,000 | 0.919 | 4,823,831 | 5% | 10,249,449 | 2% |
| Ordinary Kriging | 0-0.5 | 30,442,000 | 0.18 | 5,479,560 | | | |
| | 0.5-999 | 5,289,000 | 0.868 | 4,590,852 | Base Case | 10,070,412 | Base Case |

**Note: Grades below the 0.5 % Ni cut-off do not constitute a mineral resource as defined in NI 43-101, the numbers are only represented here to establish a comparison between the different estimation methods.*

**Figure 17.2 Three Dimensional View of the Mel Deposit**



### 17.11.2 VISUAL COMPARISON

The visual comparison of block model grades against composite grades of the metal display a reasonable correlation between the values (see Figure 17.3). No significant discrepancies were apparent between the sections. Appendix F contains representative sections for the OK model estimates and drillhole composites.

### 17.11.3 SWATH PLOT COMPARISON

Swath plots of the estimated blocks by Easting, Northing and Elevation (see Figures 17.4, 17.5 and 17.6 respectively) were another mode of direct comparison between the models. Generally, OK reflects the greatest smoothing followed by ID and then NN estimation methods. Along the margins of the deposit and in areas of extreme data density the apparent relationship between the drillhole grades and estimated grades may change. This is reflected in the areas of lower number of blocks being estimated in the swath plots.

**Figure 17.3 Vertical Section of Block Model and Drillholes by Nickel Grade**

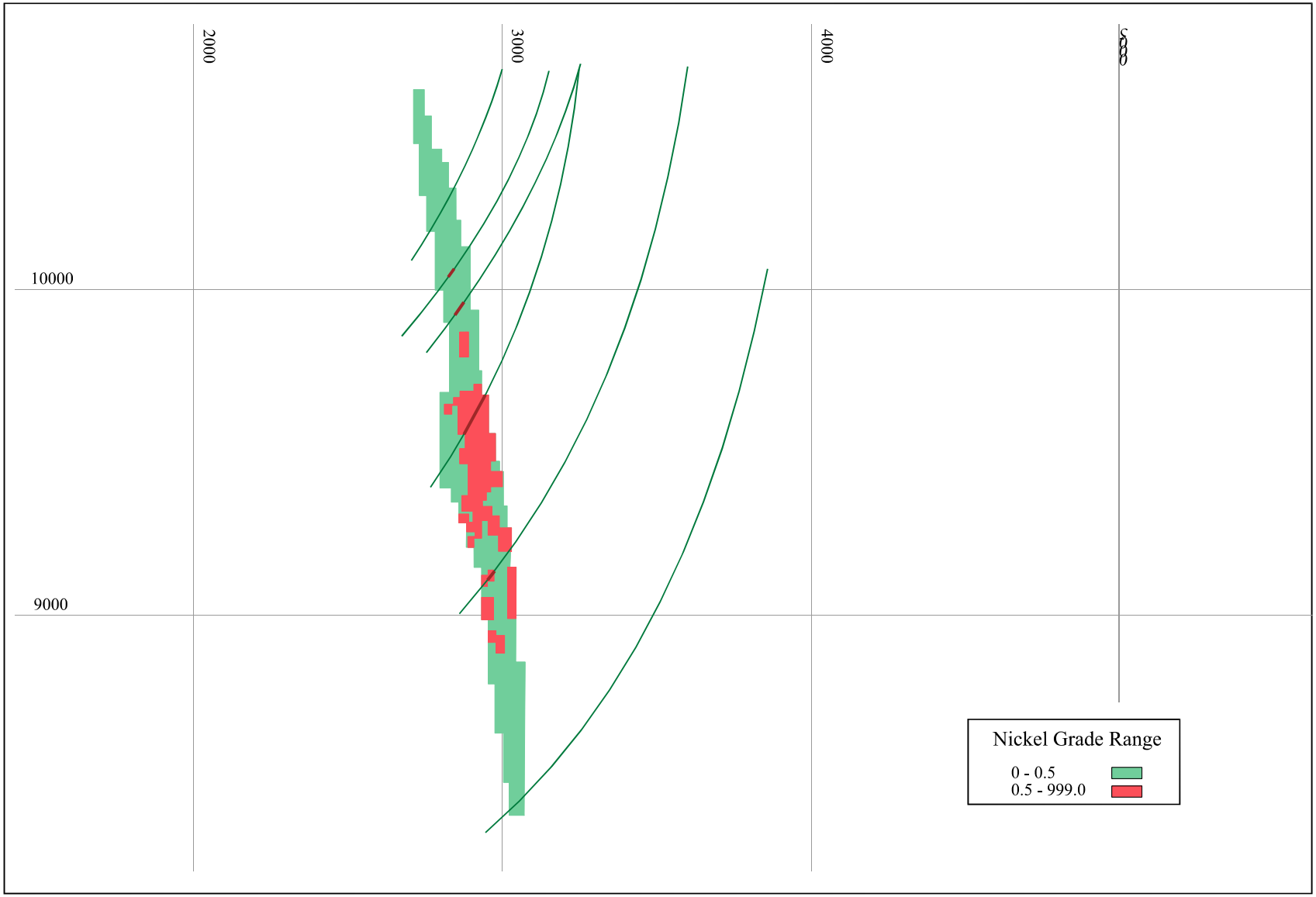


**Figure 17.4 Mel Deposit Comparison of NN, ID, OK and Tons by Easting**

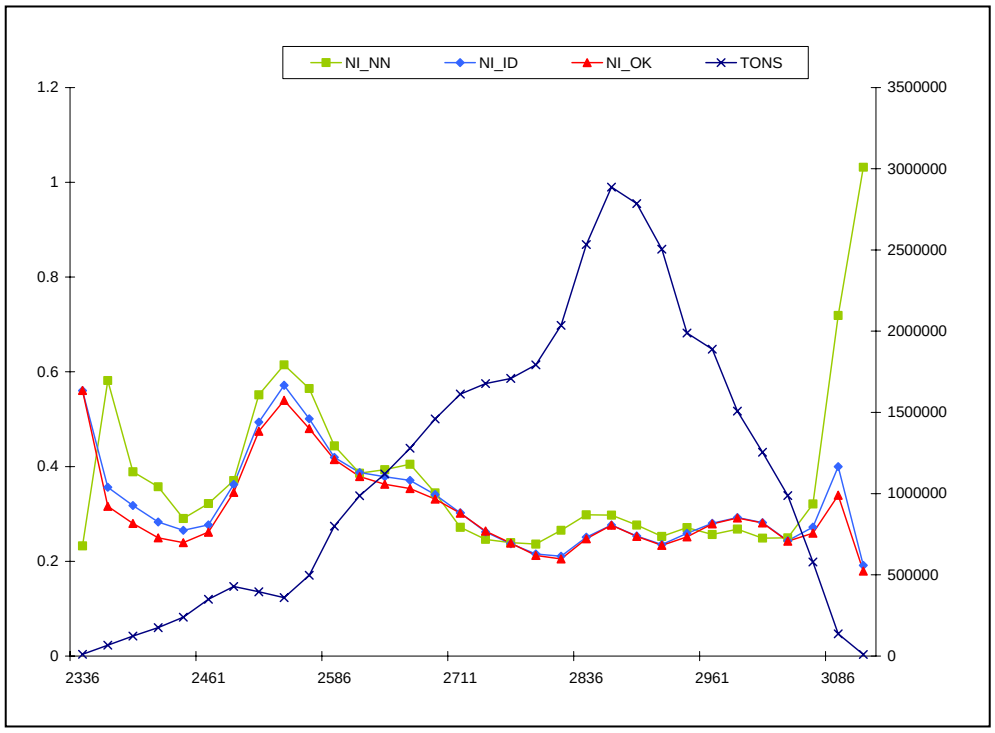



**Figure 17.5 Mel Deposit Comparison of NN, ID, OK and Tons by Northing**

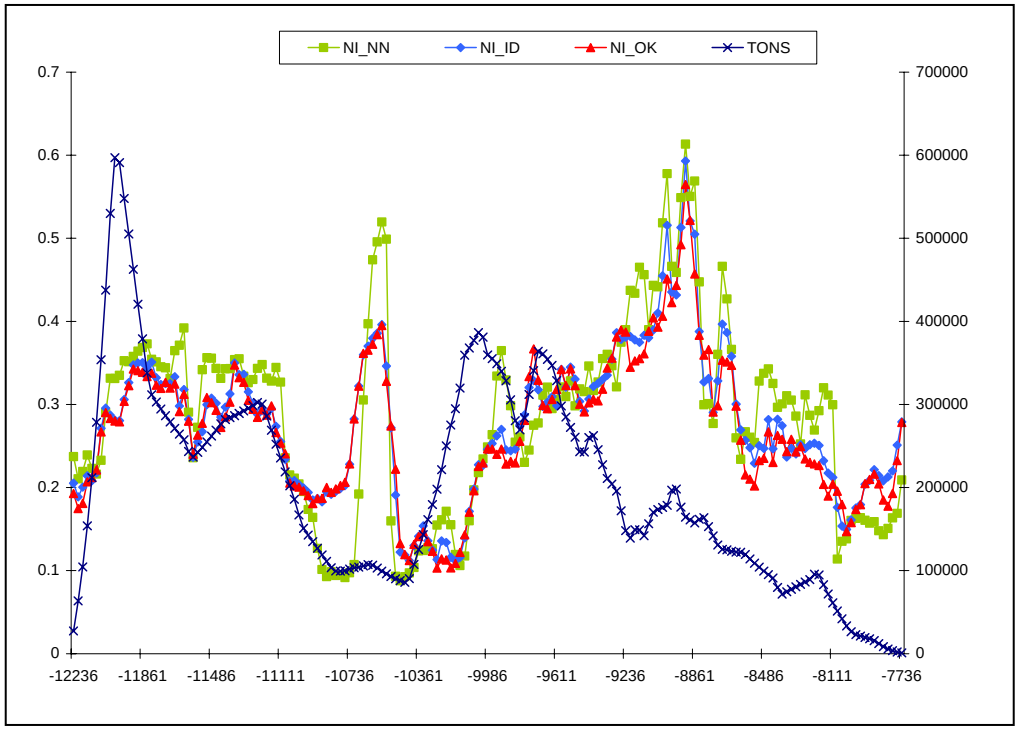
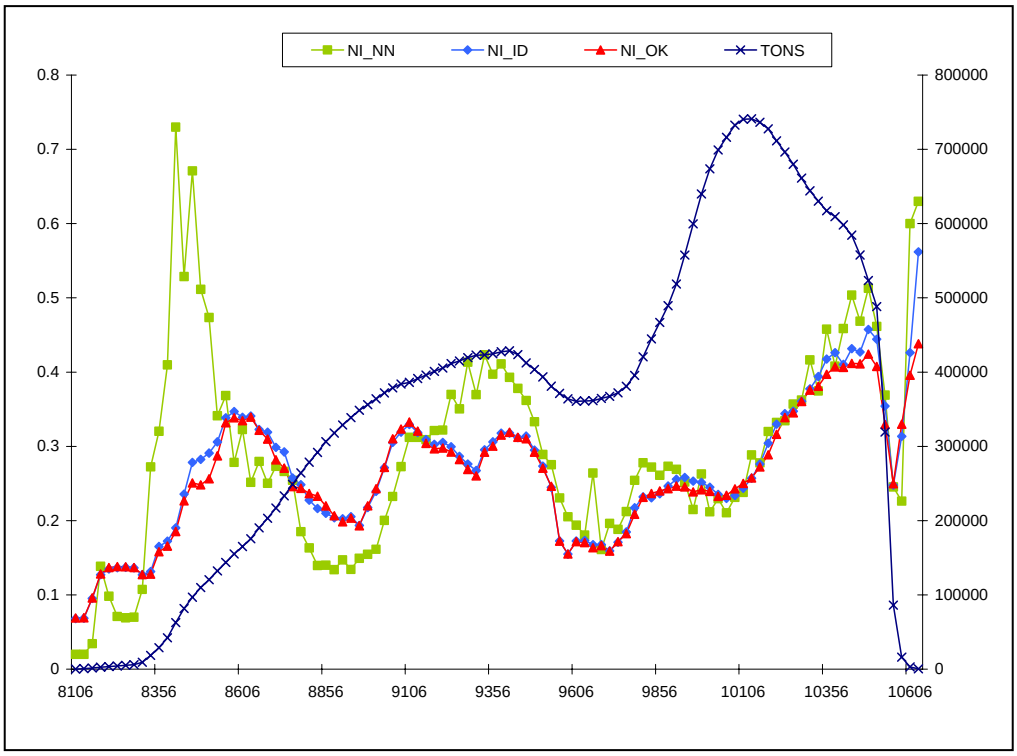


**Figure 17.6 Mel Deposit Comparison of NN, ID, OK and Tons by Elevation**



# 18.0 INTERPRETATION AND CONCLUSIONS

Wardrop has conducted a mineral resource estimate on the Mel deposit. The deposit is sediment and magmatic hosted sulphide deposit consisting mainly of nickel. The resource was based on composited assayed data derived from cored drilling. The estimate was restricted to a 3D wireframe of the interpreted mineralized envelope.

The Mel property is underlain by Opswagan Group rocks notably the lower sections of the Pipe Formation that contains most of the nickel deposits in the Thompson Nickel Belt (TNB). The history of deformation at the Mel deposit is similar to that described at nickel deposits elsewhere in the TNB. The Mel deposit is considered a favourable geological environment for nickel mineralization.

The location, size and shape of the lenses of nickel mineralization of potential economic interest is erratic and somewhat unpredictable at this stage of delineation and additional drilling is required to better define the deposit. As a consequence the Mel deposit remains incompletely delineated and the mineral resource estimates should be upgraded by diamond drilling. Potential exists to modestly increase the tonnage of the Mel deposit within the currently defined limits and to extend the deposit along strike.

The 3D wireframe of the mineralized envelope contains all mineral intersections related to the main mineral zone at Mel.

Data verification of the drillhole database suggested that the information is reliable and adequate for resource estimation.

The specific gravities of the various types of nickel mineralization have not been measured at Mel deposit. For the resource estimation Wardrop used a tonnage factor of 0.083009 as recommended by Inco geologists.

The resource was estimated using three interpolation methods: nearest neighbour, inverse distance and ordinary kriging. No significant discrepancies exist between the methods and ordinary kriging is used for the resource tabulation.

At a cut-off of 0.5 % Ni, the Mel Deposit has resulted in an Indicated resource of 4,279,000 tons grading 0.875 % Ni plus an Inferred resource of 1,010,000 tons grading 0.839 % Ni.

# 19.0 RECOMMENDATIONS

Additional drilling is recommended on the Mel deposit in order to improve the resource classification and to increase confidence in grade continuity. Wardrop suggests performing infill drilling along strike as well as bracket holes at depth where the higher grade material is identified.

Wardrop recommends exploration on the Mel lease to extend the Mel deposit along strike thereby potentially increasing the tonnage estimates and drilling on Mel mineral claims to further explore the lower Pipe Formation.

This resource estimate only included nickel (Ni) values but the assay database includes values for copper (Cu) and cobalt (Co). Wardrop recommends that all samples be assayed for Ni, Cu, Co and Platinum Group Elements (PGE) as well as all potential payable and deleterious elements.

Additional bulk density determinations of the mineralized material should be carried out so that specific gravity data can be incorporated into resource block model for estimation.

Additional drilling is recommended so that samples can be collected for metallurgical testing and mineral processing at Mel deposit.

Wardrop believes that the current resource block model honours the high grade values well and that local grade variations are reasonably well represented. However, more work is required to improve the local grade estimation within the block model estimation, possibly multiple indicator kriging and unfolding to compare with the current estimation method. Globally, the Wardrop resource compares well with previous Inco estimates. For preliminary economic assessment or feasibility type study work, where selective mining methods or detailed engineering design work will be required, Wardrop recommends updating the current resource block model. This exercise will be beneficial once new drilling data becomes available.

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# 21.0 CERTIFICATE OF QUALIFIED PERSONS

## 21.1 CERTIFICATE FOR SHAHÉ NACCASHIAN

I, Shahé Naccashian, P,Geo., of Toronto, Ontario, do hereby certify that as an author of this report titled “Technical Report on the Mel Deposit, Northern Manitoba” dated March 9, 2007, I hereby make the following statements:

- I am a Geologist with Wardrop Engineering Inc. with a business address at 604-330 bay Street, Toronto, Ontario M5H 2S4.
- I am a graduate of Concordia University (B.Sc. Honours, 1997).
- I am a member in good standing of the Association of Professional Geoscientists of Ontario (Registration #1138).
- I have practised my profession in mineral exploration continuously since graduation.
- I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that, by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience, I fulfil the requirements to be a “qualified person” for the purpose of NI 43-101.
- I am responsible for all sections of this technical report titled “Technical Report on the Mel Deposit, Northern Manitoba” dated March 9, 2007. I have visited the property from January 8 to 10, 2007.
- I have not had prior involvement with the Property that is the subject of the Technical Report.
- I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Report misleading.
- I am independent of the issuer applying all of the tests in section 1.4 of the NI 43-101.
- I have read the National Instrument 43-101 and confirm that the Technical Report has been prepared in compliance with the NI 43-101 and Form 43-101F1.
- I consent to the filing of this Technical Report with any stock exchange or other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their web sites accessible by the public of this Technical Report.

Signed and dated, this 9th day of March 2007 at Toronto, Ontario.

*"Original Document, Revision 00 signed and sealed by Shahé Naccashian, P.Geo."*

Signature

# APPENDIX A
# ALS CHEMEX LABORATORY AUDIT

Inco Technical Services Limited
**Exploration**
Highway 17 West, Copper Cliff, Ontario, Canada P0M 1N0

## MEMORANDUM

TO R.W. Grant

FROM H.C. Mackowiak DATE September 28, 2004

SUBJECT **ALS CHEMEX – AUDIT OF SAMPLE PREPARATION AND LABORATORY**

### Introduction

Diamond drill core samples from Sudbury, Thompson and Voisey's Bay are prepared and analysed by ALS Chemex under a three-year contract. That contract was renewed September 1, 2004 for a three-year period. To ensure that the lab is operating in a sound manner, periodic audits are carried out. During the period August 16-18, 2004, Mickael Cabon (Goro Ni chemist) and H. Mackowiak visited the ALS Chemex analytical laboratory at 212 Brooksbank Avenue in North Vancouver, and between August 24 and August 25, Mickael Cabon, Jean-Yves Cloutier (Project Manager, Goro Support) and H. Mackowiak visited the ALS Chemex sample preparation facilities located at 5175 Timberlea Blvd. in Mississauga.

### Executive Summary

This audit identified several significant problems in the ALS Chemex procedures that are being used for Inco samples . The key findings were passed on to ALS Chemex at a closing meeting at each facility and most of this summary will be e-mailed to them for their records.

In the sample preparation area, the following significant problems were identified:

1. Inco (Sudbury Operations) samples continue to arrive with electronic submittals that are either sent several weeks before or several weeks after the samples arrive. This results in ALS Chemex having to constantly update an inventory of forms and samples. This has gone on for some time and requires a change in the way the forms are generated at Inco and sent to ALS Chemex.
2. Most of the Inco samples arrive with the sample numbers written on the outside of the bag, in addition to having the Inco sample tag. Inco should refrain from writing the sample number on the outside of the bag, forcing ALS Chemex to rely on the sample tag. This avoids a possible error on the Inco end resulting in an error at ALS Chemex. We must ensure that the tag is visible without having to take the bag apart.
3. Currently the initial label that ALS Chemex prints for the samples when they arrive (which eventually becomes the tag for the reject) does not identify the Inco sample Id. This is a result of their operating system and a lack of bar codes on our end. Where feasible, we should switch to bar-coded sample tags as soon as possible.
4. The splitting procedure that was witnessed for the Inco samples indicated poor techniques. The material was poured too quickly, which resulted in plugging the riffle and spilling crushed material on the table. The situation would be far worse with the larger Inco samples. It is recommended that ALS Chemex initiate additional training for sample preparation staff, stressing the importance of this step, and increase the supervision in this area until the problem is rectified. A larger riffle may also help to alleviate the problem.
5. Crushed rejects as old as three years are being requested by Inco to be stored in the ALS Chemex freezer. These rejects may be oxidized to the point where the identification of the sample is difficult

and if that is the case the material would be of little use in any mill test. It is recommended that rejects be placed in the freezer as soon as possible after the results are reported and that nothing older than one year be placed in the freezer.

In the laboratory in Vancouver, the following findings were considered significant:

1. The calibration solutions for the ME-ICP81 procedure are being created incorrectly. Although this was rectified by the use of a factor in the program for this analytical package, the procedure for creating the calibration solutions should be corrected and the factor should be taken out. This should also result in a reduction of the allowable limits on the QC solutions for this procedure. It should be stressed that creating the calibration solutions by weight is an excellent idea.
2. The program that controls the weighing of the samples allows a sample to be weighed out of sequence without any warning. Although the computer screen correctly indicates which sample is being weighed, it is not enough to ensure that the technician realizes the sample is out of sequence. This should be rectified.
3. The limits for the elements in the lab's de-ionized water as listed in the document "DI Water Testing 1.00 Jan. 8, 2003" – these limits are too high. The lab should examine these and rectify the document.
4. A large number of documents were found to be out of date with respect to the yearly review. In addition the short document for the ME-ICP81 procedure incorrectly specified the temperature of the furnace.
5. Examination of the ALS Chemex Internal Duplicates found some cases that were failures and were not followed up by the technician. These were noted by Michele Ramshaw and were to be followed up. The ALS Chemex internal duplicates will now be examined on a monthly basis using the ALS Chemex formula to determine if the failures have been followed up. It is also recommended that the follow-up results should be part of the QC certificate so that the customer is aware of the follow-up.

**ALS Chemex, Mississauga**

During the afternoon of August 24 and the morning of August 25, Jean-Yves Cloutier, Mickael Cabon and H. Mackowiak visited ALS Chemex's sample preparation facility in Mississauga. Walter Spooner, Manager of Sample Preparation, accompanied the group for the entire time. These facilities are used for the preparation of all diamond drill samples from Thompson (both Manitoba Division and ITSL Thompson) and Sudbury (both Sudbury Operations and ITSL Basin Exploration). The Voisey's Bay core is prepared at Eastern Analytical in Goose Bay, who then forward a 100 g split of the pulps to ALS Chemex in Mississauga. The ALS Chemex sample preparation lab has seen an increase in the number of samples and is currently operating seven days a week on 10 hour shifts and are processing 2,000-3,000 samples per week.

**Sample Receipt**

Upon receipt of an Inco shipment of core samples, a unique shipment number is assigned to the shipment (Figure 1). The submission forms are used to lay out the samples in the order indicated on the submission forms and to check for extra or missing samples. Once complete, the various groups of samples on the submission form are assigned a unique ALS Chemex work order number, which is controlled by GEMS, their in-house LIMS software which controls all aspects of the sample flow at ALS Chemex.

The work orders assigned to a particular shipment are entered into a log (Figure 2). During the visit examples were given of Sudbury Operations shipments that do not always have a submission sheet. As a result, ALS Chemex cannot proceed with these samples. The problem, a result of the shipping forms being generated by the logging program, can lag behind a shipment by several weeks depending on the length of the hole and whether a technician has completed sampling the hole by the time the form is generated and sent to ALS Chemex. **This must be remedied at our end.**

**Sample Entry**

Labels indicating the work order number and the sequence number of the sample (Figures 3 and 4) are printed for the received samples. There is no reference to the Inco sample number and that is a result of the configuration of the Chemex system and the fact that we do not have bar-coded tags. Implementation of bar-coding at Inco should be actively pursued. The labels are applied to the sample bags, they are then weighed (Figure 5) and logged into the system. The Inco sample Ids are then entered into the system. In addition it was noticed that the technicians do not necessarily check the Inco sample tag, but rely on the sample number written on the bag by Inco. It is recommended that Inco refrain from writing the sample number on the bags. This avoids mistakes at our end and forces ALS Chemex to check the actual sample tag. Once the Inco sample Ids are entered into the system, labels are printed for the Master pulp bag and split pulp that will go to Vancouver for analysis.

**Crushing**

The Inco samples are crushed in two stages, regardless of the sample size. Prior to commencing a work order, the crushers are cleaned by passing through a piece of granite. The two pulp bags, the reject bag and the Inco tag are checked against each other and pinned to the wall next to the crusher (Figure 6). This ensures that the proper bags and Id follow the sample through the preparation process. The Inco samples that were being prepared at the time of our visit were relatively small and virtually no cleaning of the primary crusher was occurring. When queried, the response was that the cleaning of the primary crusher was left to the discretion of the operator. The secondary crusher was also cleaned prior to use. Upon completion of the primary crush, the tray containing the crushed sample was pulled out and the material was fed into the secondary crusher. The bags and tags from the primary station were then transferred to the wall beside the secondary crusher (Figure 7). It was noticed that during the transfer of the material from the secondary crusher to the riffle, that the crusher tray had a pinhole in it that allowed fines to escape. The secondary crusher was cleaned with a minimal amount of air between samples; the airline is turned down to 35 psi in order to minimize airborne dust and to avoid personal injury. The minimal cleaning can be a source of cross contamination, particularly for exploration grab samples that at times can be very small (i.e., 100 g).

The crusher operator does a QC check (screen on 10 mesh) of the quality of the crush within the first three samples of a work order. If the test fails (70% <10 mesh), then the crusher is adjusted. The results are entered onto a slip of paper (Figure 8), which are compiled on a monthly basis and plotted for a visual verification of the crush QC (Figure 9). The crushing of the samples on a work order is also entered onto a crusher log which permits tracing back with respect to samples prepared before and after the samples in question, who prepared the samples, which crusher was used, the day and time the samples were prepared and how many samples were in the work order.

The results of the cleaning material, which are assayed once a month, were examined during the visit. It was found that the black granite used to clean the crusher exhibited elevated levels of Cu (up to 100 ppm), Ni (up to 400 ppm) and S. These elevated levels have been present for most of this year and it still had not been determined if this was a case of the material having elevated levels rather than carry-over from the previous work order or contamination from the preparation equipment. In addition, it was noted that one of the procedures examined in Vancouver implicitly mentioned that crusher cleaning material must be tested prior to being used.

**Splitting**

The crushed sample from the secondary crusher is fed into the Jones riffle. The bags and tags are transferred to the splitting station. The protocol for Inco samples is to recombine the initial split – this is intended to be a homogenizing step. Those directions were visibly posted (Figures 11 and 12). The riffle and pans were cleaned with compressed air between samples. It was noted that the operator was filling the

riffle too quickly, resulting in the chutes becoming plugged and in one case, the crushed material spilled onto the bench top. The poor splitting technique can result in a pulp that is not truly representative of the whole. The reject continues to be split until approximately 250 g of material is obtained. This is then poured into the Master pulp bag for pulverizing. The remaining reject is put into the original reject bag, if it is useable, along with the Inco sample tag for storage.

**Pulping**

The pulverizer (Figure 13) is cleaned with quartz at the beginning of each work order. There are two pots for each pulverizer, each pot a different color, which matches the color of the sample bag holders. The color coding is used to minimize mix-ups in this part of the operation. A squirt of acetone is added to the material in each bowl to minimize plating of the fines. The Inco samples are typically pulverized for 140 seconds. One of the first three samples in a work order is tested at 200 mesh to determine if the pulverization is adequate. Each work order is also entered into a station log (Figure 14), which lists the work order, the client code, the number of samples, name of the operator and the date.

**Storage**

The rejects are stored in one cubic metre wooden boxes with lids in the back of the building (Figure 15).

Rejects that may require mill testing in the future are requested to be stored in ALS Chemex's freezer storage. Recently there have been requests to store some older rejects; Figure 16 is an example of a three year old reject – the sulphides have oxidized to the point where the canvas bag is disintegrating (this also happens with plastic bags) making identification difficult and affecting the integrity of the sample. If rejects are to be stored in the freezer, they must be placed there as soon as possible - there is no point in storing something that is two years old or older (Figure 17, two year old rejects).

Currently the freezer storage is at Imperial Freezers Inc. (Figure 18). Examination of the facilities found the material to be stored at -13°C. All material in the freezer is catalogued by both Imperial and ALS Chemex. The samples are in 5 gallon pails, 27 pails to a shrink-wrapped skid (Figure 19).

**Training**

As in Vancouver, the tasks for a particular area are broken down into jobs. The training is broken down into three categories: "Under Training", "Under Supervision" and "Competent". Figure 20 is a summary of the skills of the sample preparation staff. Although everything seemed to be in order, we did find that one of the technicians was not trained to do so was seen operating the forklift.

**Health and Safety**

In the work area, the workers were all wearing protective eyewear, hearing protection and dust masks, as required. The work area was posted with respect to the required protection. However, during the visit and in a discussion with Walter it was found that:

- No silica program or monitoring of silica is in place.
- No safety talks or meetings have taken place.
- Some of the equipment (crusher and compressor) did not have belt guards.
- The repair area had an open pan of cleaning fluid on the floor, which may pose a fire hazard.
- A 45 gallon drum of acetone was not grounded.

**ALS Chemex, North Vancouver**

During the three-day visit at the facility in North Vancouver, Mickael and Herb were accompanied by Michele Ramshaw, Manager of Quality Systems, ALS Chemex. The first day was spent on a familiarization tour covering the entire facility and then closely examining the documentation. It was apparent that ALS Chemex is in the midst of a massive renovation, which includes reorganizing the various departments so that the samples flow in an orderly fashion. It will also isolate the instrumentation (ICP's, ICP-MS, AA and XRF) from the sample preparation and digestion areas.

ALS Chemex's documentation of their quality system and procedures is extensive. We reviewed the main printed documents held by Michele's Quality group. The most recent amendments were darkened to facilitate identifying new text . The Quality System DOCs are controlled through the Brisbane office and all superseded DOCs must be kept for five years.

Documents examined included the following:

- Management Responsibility
- Management System Review – the system is to be reviewed annually including a system audit and management review meetings. The focus of the system is centered on the customer.
- Record of Person's Competencies
- Section 6.5 specified that the original data is always available
- Non-conformance of quality control has to be recorded on the worksheet and signed
- Amended reports have to be clearly identified as such
- Corrective Action Request
- Quality Management Policy – ALSQM01 (2/12)
- Lab Structure – ALS-QDOC/17
- Quality Assurance Procedures – Feb 16/04
- Data is to be kept for seven years, which includes electronic formats, worksheets, etc.
- Manuals, Procedures and work instructions are to be reviewed annually and noted as such
- Quotations – QAP4 – June 27/03
- Work orders – QAP5
- QAP5.1 specified that ALS Chemex is to contact the client if no instructions are received
- QAP 5.1.13 – the reviewer is to check the data entry of a work order
- QAP6 dealt with sample identification and traceability – specifies that the sample preparation is to ensure that the client identification and the ALS Chemex label match.
- QAP6.3.2.0 – sample preparation quality control is to be a minimum of one per shift per station
- The Quality Control Department is to do a monthly summary of the sample preparation QC
- QAP6.3.4.0 – the cleaning material used in sample preparation (i.e., quartz, sand, granite) must be tested prior to being used
- QAP7 deals with analytical methods, instrumentation, maintenance of instrumentation, calibration of instrumentation
- QAP7.4 Measurement Traceability and Calibration – calibrations are maintained for one week
    - Balances are to be checked by an external group once every three years
    - Sample preparation balances are to checked with traceable weights once per year
    - Furnaces and ovens are to be checked once per year and is to be recorded on the maintenance sheet
- QAP7.5 dealt with Quality Control and Assessment
    - Procedural Blank – control limit of ±2 times Limit of Reporting (LOR)
    - Digested Reference Material – control limit of ± (precision X concentration)+2LOR
    - Sample Duplicates – difference < (precision X Average)+2LOR
    - "Precision" defined degree of agreement of repeated measurements of same parameter expressed as the standard deviation

- QAP8 dealt with data
  - worksheets are retained for 10 years
  - defines the role of the "Reviewer"
  - Technical Quality Assurance Management Review Meeting
- QAP8.5 dealt with Revised Data and Client Incidents
  - All incidents stored in incident database
  - Dealt with who can make changes to the data once it has been finalized
  - On a yearly basis the QA manager is to review and summarize the incident logs
  - Log is kept for three years
- QAP9 – Quality Assessment and Review
  - Quality Assessment meetings are to be held quarterly
  - Round robin exchanges within ALS Chemex
- QAP10 – Quality Audits – results for both internal and external audits

In general all aspects of the lab appear to be covered by documentation. However, there were a substantial number of documents that had not been reviewed in the past year. Although this is critical with respect to documents for procedures, the bench apparently has the most recent version, which is obtained from the server. Comparison of these methods to the abbreviated methods available for customers found that the abbreviated version could also be out of date and incorrect – an example is the incorrect temperature of the furnace for the abbreviated method for ME-ICP81.

During the examination of the documentation, a document (DI Water Testing 1.00 Jan. 8, 2003) was encountered where a procedure was put in place to ensure that the water used in the lab was of sufficient quality to allow determination of trace elements. However, examination of the table found the limits to be excessively high, i.e., Zn 2 ppm, Cu 0.2 ppm, Co 0.1 ppm, Ni 0.2 ppm. This was brought to the attention of the lab.

**Procedures Used on Inco Samples**

The entire ALS Chemex operation is controlled by an internally developed Laboratory Information Management System (LIMs) known as GEMS. The software controls the entry of samples into the lab, the procedures required, scheduling of the samples for the various procedures, handling and evaluation of the data from the instruments and invoicing. It allows a customer to view live all of their work orders and their current status including the parameters being determined, current results, the lab's internal QC including standards and duplicates and the performance of a particular parameter with respect to the QC currently obtained for this customer and others. This software and the use of bar coding at the sample's entry to the lab has allowed the lab to efficiently handle the current elevated levels of sample submissions (~50,000 samples/week, which is double last year's volume).

A split of ~100 g is sent from Toronto by courier to Vancouver and automatically tracked by Vancouver. The Inco samples usually go straight into the process – they do not need to be opened and/or examined at reception (Figure 21). All samples are weighed in one central weighing room. Each weighing station is equipped with a scanner, since all samples are bar coded by the time they reach this stage in the lab. Weigh sheets (Figure 22) accompany the boxes of samples indicate the client code, the work order, the procedure, the desired weight range and the sample Id, which is the sequence number of that sample in that work order. As each sample is taken out of its box, the sample is scanned and then weighed. The weight is electronically captured. When examining this area of the lab, I requested that the technician weigh a sample out of sequence – the program automatically entered the weight into the appropriate slot but it now was up to the technician to recognize that the sample was out of sequence and that the weighed sub-sample did not belong in the next crucible. This is a weakness in the process and a possible source of mix-ups. The lab was requested to examine the process.

The maintenance sheet for one of the balances (Figure 29) was examined; it had been routinely checked and all was in order. The balance was being checked on a monthly basis for two weight ranges (30 g and 200 g) appropriate for that particular task (weighing fire assay sub-samples).

**ME-ICP81 Procedure**

This procedure involves the fusion of the samples to determine Cu, Ni, Co, Fe, S, As, Pb, Zn, Mg, Ca and Si in ore grade samples. Other elements that are also determined but not reported to Inco include Al, Cr, Mn, K, Ti, Zr and Eu. The Europium (10 ppm final solution) is used as an internal standard and is introduced at the nebulization stage by the use of a peristaltic pump as the solutions are introduced to the ICP. The procedure entails the following steps:

- Each set of samples consists of 40 positions. The first position is a reagent blank followed by the certified standard SU1a. The second weighing of SU1a is randomly selected by the program followed by another standard at the end of the set.
- Weigh ~0.2 g of sample into zirconium crucible. If the sample weight is outside of the allowable range (allowable range of 0.15-0.25), the program will not allow the entry of the sample until the weight has been appropriately adjusted.
- Add 1 scoop (~2 g) of $Na_2O_2$ into each crucible (Figure 23). Homogenize by slowly shaking.
- Load crucibles into crucible tray. Place a lid on each crucible.
- Fuse at 670°C in a furnace for 40-50 minutes.
- Cool and place each crucible and lid into a covered 250 ml beaker.
- Leach fused cake with warm deionized water.
- Rinse twice with warm deionized water and 10% HCl.
- Add 75 mls of concentrated HCl.
- Transfer to 250 ml flask. Cool and bulk up to volume and "bubble".
- Transfer solutions to 20 mm x 150 mm plastic test tubes.

The entire procedure was observed. The samples are weighed into the crucibles on a flat tray and after homogenizing the $Na_2O_2$ and sample, the crucibles are transferred to a metal tray for insertion into the furnace (Figure 24). Again this could be another source of mix-ups and it is suggested that there be enough trays so that the weighing stage is done with the crucibles in the fusion trays. Discussion with the technician handling the fusion and dissolution of the cakes (Figure 25) did not leave a comfortable feeling regarding the outcome of samples that exhibited a poor fusion, i.e., residue in the bottom of the flask. Although it was suggested that the method of questioning did not elicit the correct response, solutions were present where a residue was clearly present. It was also noted that for the set of samples observed through the procedure no visible check of the solutions for residue was made. The technician did indicate that when they encounter crucibles that had leaked during the fusion stage due to a pinhole in the crucible, the samples were redone. It had been noted that in the official methods, a document labelled "Vancouver Advanced Spectroscopy Weighing Table – April 22, 2002" indicated that the sample weight for the ME-ICP81 was 0.199-0.201 grams and that the standards to be used were SU1a and GS2305. The current weight range used is 0.15-0.25 g and the standard GS2305, which was an internal Inco standard, has been exhausted and is no longer available.

A unique part of the procedure was the "bubbler" (Figure 26), which is the present method of homogenizing the bulked up solution, replacing manually mixing of the 250 ml volumetrics. The solution is then decanted into plastic test tubes and logged into the network as ready for the ICP determination. The entire procedure appeared to be tuned and able to handle large volumes of samples.

The instrument room, which was crowded, is to be moved to one of the upper floors. ALS Chemex currently has 13 new Vista Pro ICPs (Figure 28) with several of the older Optimas. The Optimas were on their last legs. Two more Vistas were on order. Each instrument had a vented enclosure for the solutions

being analysed – this avoids excessive corrosion of the instruments. For the ME-ICP81 determination the testing of the Vistas with respect to response and linearity was examined. Mickael, who also operates a Varian Vista in the Pilot Plant lab in Goro, indicated that the operating parameters were in order.

The preparation of the calibration solutions for the ME-ICP81 was observed. In order to ensure accurate creation of the calibration solutions the aliquot of the stock solution is done based on weight rather than pipetting a set volume (50 mls in this case). However, closer examination of the procedure found that the method was flawed – the final solution was brought up to 500 g. Since the solution was not pure water, the 500 g did not equate to 500 mls. A theoretical calculation of the five calibrations solutions used for the ME-ICP81 procedure indicated that they were probably high by a range of 7.7% relative to 9.3% relative, which would have resulted in results low by the same amounts. When confronted, ALS Chemex admitted that they realized that something wasn't right but couldn't see their error. In any case they inserted a hidden factor of roughly 7.5% to compensate for the error in creating the calibration solutions. During the examination of several runs on the ICP, it was found that the factor applied to a run based on the QC solution did not match the results of the QC solution. The reason was the hidden factor for the calibration solutions. During the analytical run, if GEMS encounters a result for the QC solution outside set limits it automatically recalibrates and reruns the samples. GEMS also color codes any outliers for the QC solutions and samples simplifying the reviewer's task of ensuring the results can be released. The QC solution has 200 ppm Fe, 100 ppm S, 50 ppm of Cu and Ni and 1 ppm of Co. Given that we are routinely getting results for Mg, it is suggested that the QC solution include Mg.

A system is in place to automatically check new calibration solutions. It includes determining if a bias is developing over time in the new solutions, thus ensuring the highest accuracy possible. The attention paid to creating the calibration solutions is a welcome sight, given that all of the final results depend on this critical process. The results of the checks of the solutions are documented and retained.

**PGM-ICP27 Procedure**

The samples are weighed (~30 g) and the weight is electronically captured as in the ME-ICP81 procedure. The weighed sample is placed in small coin envelopes and forwarded to the fire assay department. The fire assay facility then adds the pre-made flux and any other required reagent (flour, niter) according to what the technician perceives as being required for the samples on hand. Crucibles are automatically cleared by GEMS at a cut-off of 1 ppm for either Au, Pt or Pd. The fire assay facility uses three gas furnaces for fusions and three gas furnaces for cupelling. Eighty-four samples are fused at 1,050°C for 45-50 minutes. A fusion set includes one blank, two in-house standards, three sample duplicates and three Cu markers. The Cu markers, which are randomly placed, ensure that one set cannot be mixed with the sheet of another set. The fusion set is loaded with pneumatic forks that load the entire set at once (Figure 27). At the completion of the fusion, each column (seven fusion pots) is poured at once. Once the lead button is extracted, the samples are cupelled for one hour to one hour and 10 minutes at 980°C. Again the entire set is loaded into the furnace. The fire assay supervisor maintains a board indicating which person is to load and unload which furnace at a particular time. It is the only way that you can get eight people to handle 4,000 fire assays in one shift. The fire assay department relies heavily on those that pour the fusions and pick the beads in the cupelling stage. It's at these points in the procedure that problems with the process for a given sample would be noticed. However, it depends heavily on complete co-operation amongst the staff. In the entire lab, this is probably the weakest link.

The Ag beads containing the PMs are digested in a microwave with 0.5 mls of 50% $HNO_3$ for 2 minutes. Then 0.5 mls of concentrated HCl is added and heated in the microwave for another 2 minutes. The solution is bulked up to a total of 4 mls. The bulk up solution contains Europium, which is used as an internal standard. The QC solution for the PMs is a 7 ppm concentration of Au, Pt and Pd.

**AA45 Procedure – Trace Pb and As**

The last procedure that was examined was the AA45 method used for both trace Pb and As. A sub-sample of 0.5 g is digested with a mixture of aqua regia and Aerosol OT-B solution. After sitting for 60-90 minutes the mixture is digested at 110°C on a hot block for 45 minutes. De-ionized water is used to bulk up the solutions to 12.5 mls. The Pb is determined on an AA with the following parameters: lamp = 4 ma; slit = 0.5 nm; $\lambda$ = 283.3; background corrected; air-acetylene flame. The As is determined on an AA with the following parameters: lamp = 10 ma; slit = 0.5 nm; $\lambda$ = 193.7; background corrected; nitrous oxide-acetylene flame. It was noted that the room for the AA determination for Pb-AA45 was next to the fire assay room. Although I was assured that they were under separate air systems, it still is a little too close for comfort given the pure PbO that is used in fire assaying.

**Fire Assay Training**

Given the high volume of samples, a discussion focused on employee turn around, how the lab maintains a trained staff and their training program. An example of the records kept is attached as Figure 30. A given department is broken down into jobs or tasks. There are three levels of training assigned to each task: "Initiated", "Under supervision" and "Competent". All staff must undergo training to ensure that they work in a safe manner. During the visit all of the workers that required personal protective were wearing them (eyewear, dust masks, gloves and hearing protection). Workers in the fire assay area were wearing separate workwear that was laundered by a contract firm for ALS Chemex.

**Database**

Some time was spent examining the database from the perspective of the employee. In addition, some time was spent looking at samples that had failed Inco's check program and cases where the Chemex internal duplicates indicated a significant difference. In the case of poor duplicates, where it appeared that the run was approved without any reason given, a follow up was requested. In addition, a closer examination of all Chemex internal duplicates was initiated. The formula that ALS Chemex uses to determine a failure for the duplicates is:

> IF abs (Assay1 – Assay2) > Average (Assay1 & Assay2) X Precision / 100 + 2* LOR then FAILURE
> where LOR = limit of reporting

It was also recommended that in cases where follow up was carried out, the follow-up results should be reported to the customer as evidence of good QA practices. One incident found that the P channel had failed (with the loss of the ICP purge gas, the P results which are measured in the UV region become excessively elevated and erratic). This also results in noisy S results, particularly at lower concentrations.

/dl/rwg

Figure 1: Received Samples Shipment #

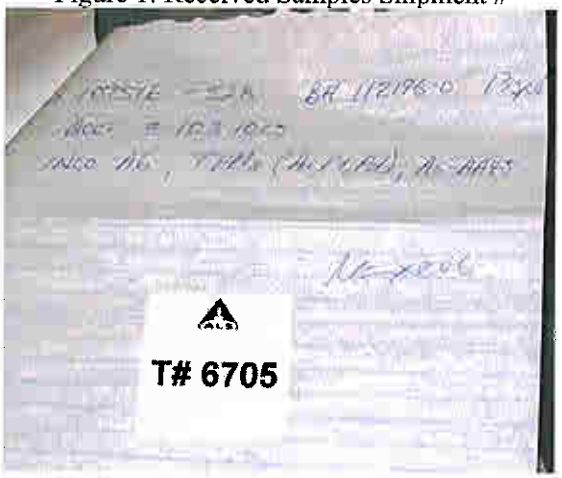



Figure 2: Log of Received Samples




Figure 3: Label for Received Samples




Figure 4: Labels for Pulp Shipment and Pulps



Figure 5: Weighing Samples In




Figure 6: Primary Crusher



Figure 7: Secondary Crusher



Figure 8: Crushing QC Results

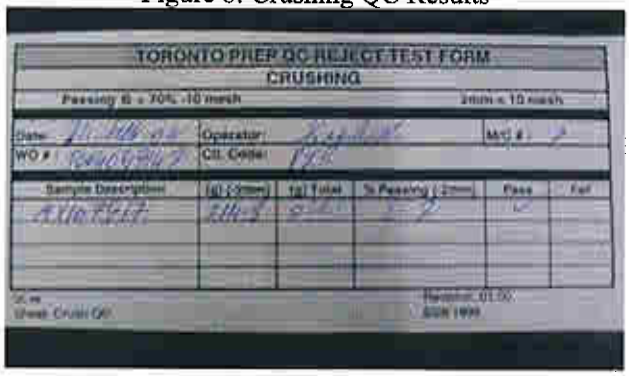


Figure 9: Monthly Summary of Crush QC

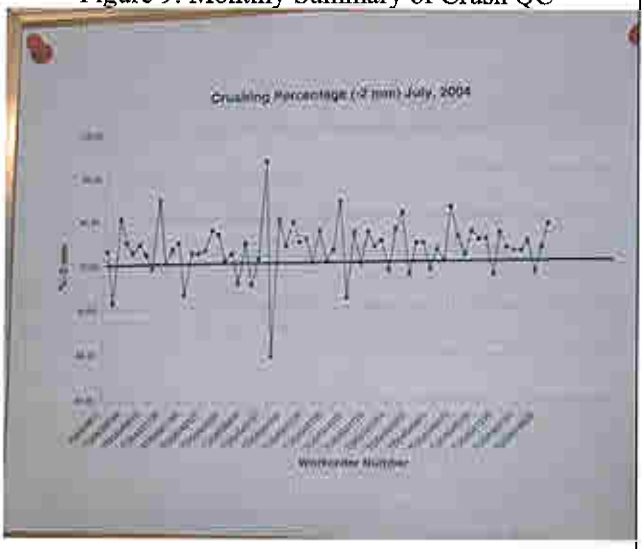



Figure 10: Log for Crushing Station

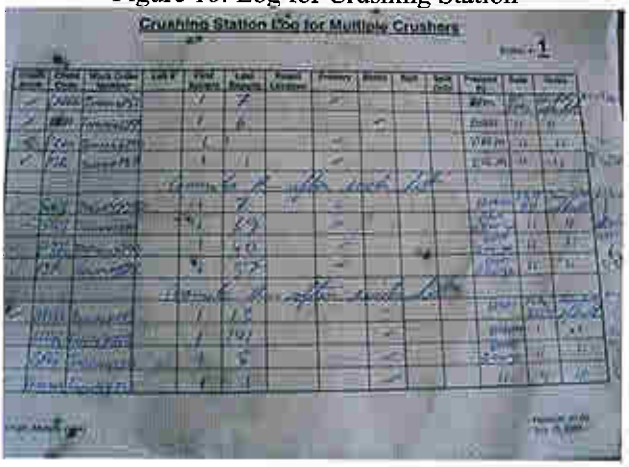



Figure 11: Splitting Instructions for Inco Samples



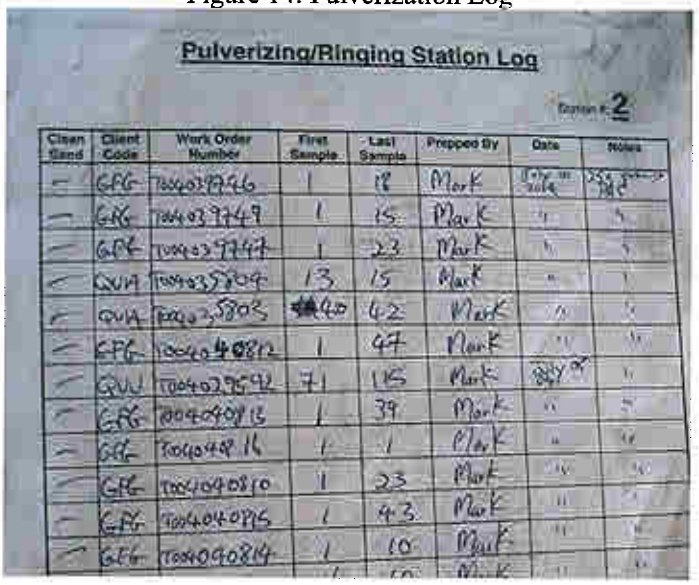
Figure 12: Splitting Station



Figure 13: Pulverizing Station



Figure 14: Pulverization Log



Pulverizing/Ringing Station Log

Station #: 2

| Clean Hand | Client Code | Work Order Number | First Sample | Last Sample | Prepped By | Date | Notes |
|---|---|---|---|---|---|---|---|
| ~ | GPG | T004037946 | 1 | 18 | Mark | | |
| ~ | GPG | T004037949 | 1 | 15 | Mark | " | " |
| ~ | GPG | T004037947 | 1 | 23 | Mark | " | " |
| ~ | QUV | T004035809 | 13 | 15 | Mark | " | " |
| ~ | QUV | T004035805 | 40 | 42 | Mark | " | " |
| ~ | GPG | T004040812 | 1 | 47 | Mark | " | " |
| ~ | QUV | T004029592 | 71 | 115 | Mark | " | " |
| ~ | GPG | T004040816 | 1 | 39 | Mark | " | " |
| ~ | GPG | T004040818 | 1 | 1 | Mark | " | " |
| ~ | GPG | T004040810 | 1 | 23 | Mark | " | " |
| ~ | GPG | T004040815 | 1 | 43 | Mark | " | " |
| ~ | GPG | T004040814 | 1 | 10 | Mark | " | " |

Figure 15: Reject Storage



Figure 16: Older Reject



Figure 17: Selection of Samples for Freezer

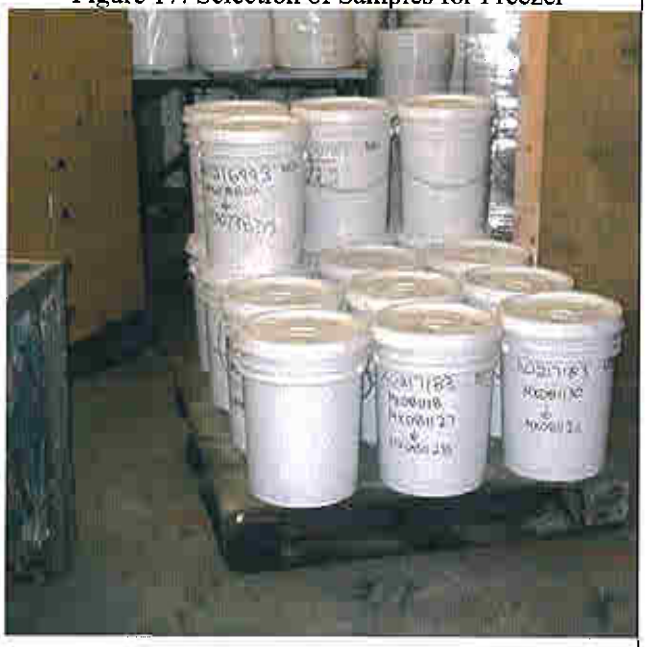


Figure 18: Freezer Storage

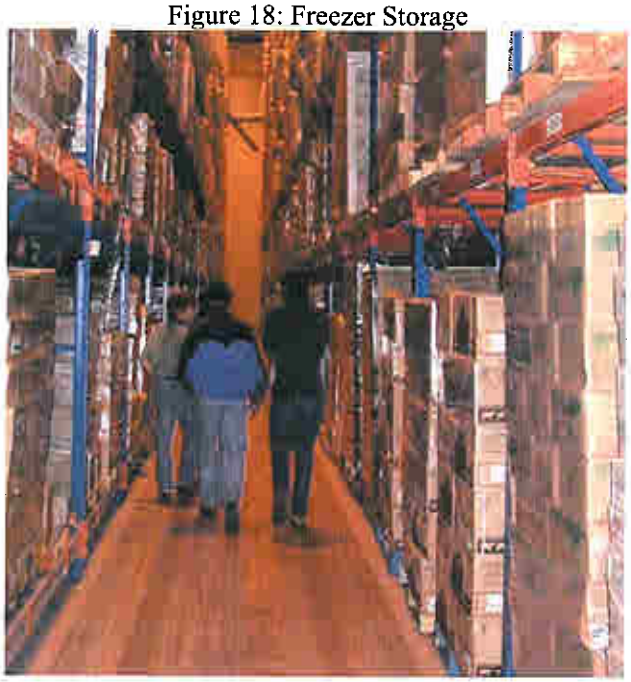


Figure 19: Sudbury Basin Samples in Freezer Storage



Figure 20: Sample Preparation Training Record



Departmental Skills Matrix
Sample Preparation

Department: Toronto Prep

| Item | Skills/Tasks/Duties | Operator Trainer | Manager/Lab Chief | Alfred Mare | Ashish Gaik | Sam Dhillon | Sharon Hill | Barbara Hill | Olivier Jamieson |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Safety | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | Sample Pre-Preparation | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 3 | Crushing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 4 | Ringing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | Sieving | 1 | 1 | 1 | 1 | 2 | 2 | 1 | |
| 6 | Composing | 1 | 1 | 1 | | | | | |
| 7 | Splitting | 1 | 1 | 1 | | 1 | 1 | 1 | |
| 8 | Special Prep Procedures | 1 | 1 | 1 | | | | 1 | |
| 9 | Quality Control Testing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | Sample Shipment | 1 | 1 | 1 | | | | | |
| 11 | Pulp and Reject | 1 | 1 | 1 | | 2 | 1 | 1 | |
| 12 | Basic Equipment Maintenance | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 13 | Facility Operation | 1 | 1 | 2 | | | | | |
| 14 | Sample Pickup/Driving | 1 | 1 | | | | | | |
| 15 | Floor Supervision | 1 | 1 | 1 | | | | | |
| 16 | Trains New Staff | 1 | 1 | 1 | | | | | |

Legend: 1 = Competent, 2 = Under Supervision, 3 = Under Training

Authorized By:

Date:

Sample Prep Matrix

Revision: 02.00
April 5, 2005
Page 1 of 1

Figure 21: Sample Receiving at Vancouver




Figure 22: Weighing Sheet

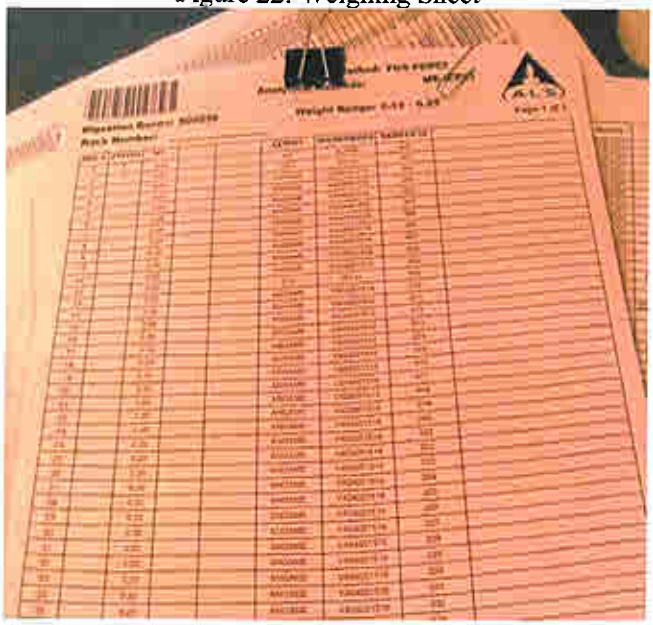


Figure 23: Sample and $Na_2O_2$ prior to Fusion



Figure 24: Samples after Fusion



Figure 25: Dissolving Fused Cake

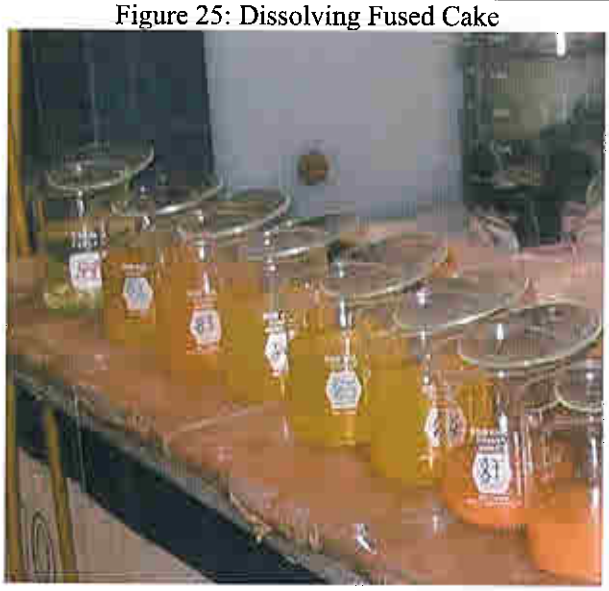


Figure 26: Solution "Bubbler"



Figure 27: Loading fire assay furnace

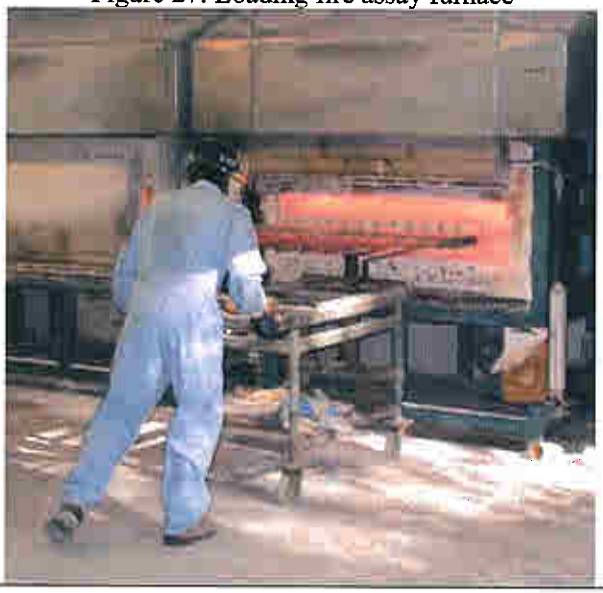


Figure 28: ICPs



Figure 29: Example of Balance Check

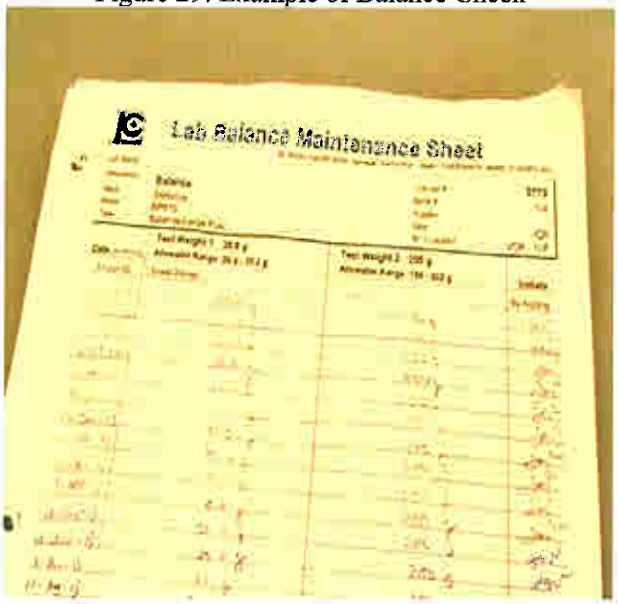
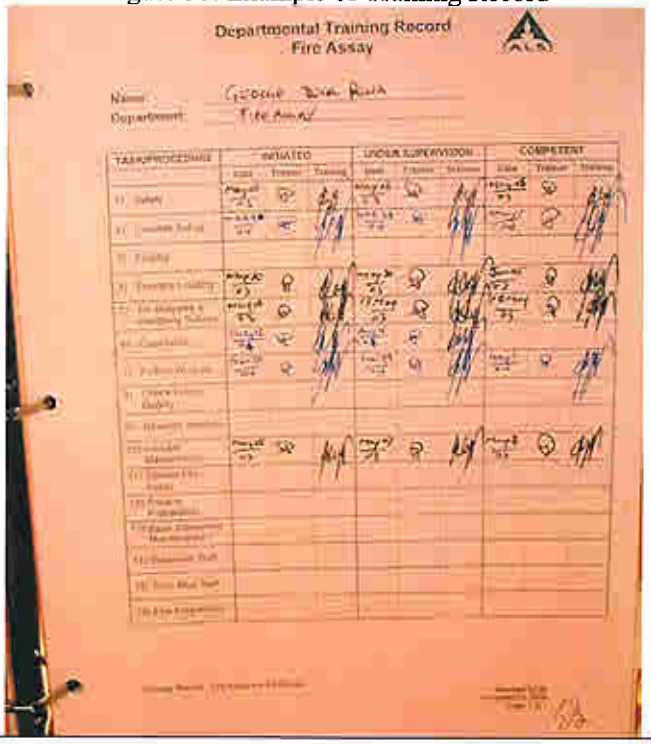



Figure 30: Example of Training Record



# APPENDIX B
# SITE VISIT PHOTOS



**Photo #1  Thaw Shed indoor drill core storage facility in Thompson.**



**Photo#2  Core Farm outdoor drill core storage facility in Thompson.**



**Photo#3  Drill hole 102578-0**




**Photo#4  Drill hole 30220-0 massive sulphide interval.**




**Photo#5  Drill hole 102589-0 collar location**



**Photo#6  General Mel site picture.  Gridline pickets in the background.**

# APPENDIX C
# MEL ORE TEST WORK SUMMARY

INCO

Manitoba Division

# Memorandum

**To :** Brad Keiser **Date :** Feb. 8/05

**From :** Allan Barr

**Subject :** Mel Ore Test Work Summary

## Objective

To provide a quantitative analysis of the nickel recovery of the Mel ore samples provided and generate a recovery equation on the basis of ore grade. Also, to provide some qualitative assessment of any observations that could have an effect on the economics on the project.

## Summary

The following is a summary of 'time of grind' and float test data for a comparison of the three Mel ore's of differing grades to the BT 84 (Dec 2001) ore in the mill sample lab freezer. A time of grind was conducted in the lab rod mill for each ore in order to conduct the float test at the current plant setting for Birchtree ore of 18% +100 mesh. Float tests were then carried out using the same quantities of reagents for each run.

| | *BT 84* | *Mel 1.7* | *Mel 0.9* | *Mel 0.4* |
|---|---|---|---|---|
| Head Grade | 1.8 | 1.73 | 0.91 | 0.43 |
| Grind Time [min] | 8.25 | 9 | 15 | 10 |
| Ni Recovery | 83.96 | 75.22 | 74.85 | 71.52 |
| Cu Recovery | 95.32 | 90.53 | 88.40 | 79.07 |
| Fe Recovery | 24.04 | 16.21 | 13.78 | 10.61 |
| Concentrate Grade [%] | 10.84 | 11.90 | 12.24 | 10.59 |

## Notes:

Reagents were added as per the standard flotation test procedure:

- 0.4 g CMC/kg ore
- 0.05 g PAX/kg ore
- 0.03 g MIBC/kg ore

For the low grade Mel Ore (0.4% Ni) a higher air flow was necessary to achieve the same froth level as for the higher grade ores. If this was not done, no concentrate would have been produced resulting in 0% recovery.

The grind times shown are not a good indication of ore hardness, as there was no initial size distribution. As per the standard grinding procedure, the ores were made up to a 66% solids slurry. However, after grinding the Mel 0.9% could not be described as a slurry, and would actually be more along the lines of a wet cake. This could create some viscosity issues if significant quantities are to be processed through the mill. This viscosity issue at least in part accounts for the longer grind time needed to achieve the 18% +100 mesh grind target for the 0.9% head grade ore as shown in Figure 1 below. An experiment was conducted to confirm this as shown in Figure 2 below, of % +100 mesh after a ten minute grind versus solids percent.

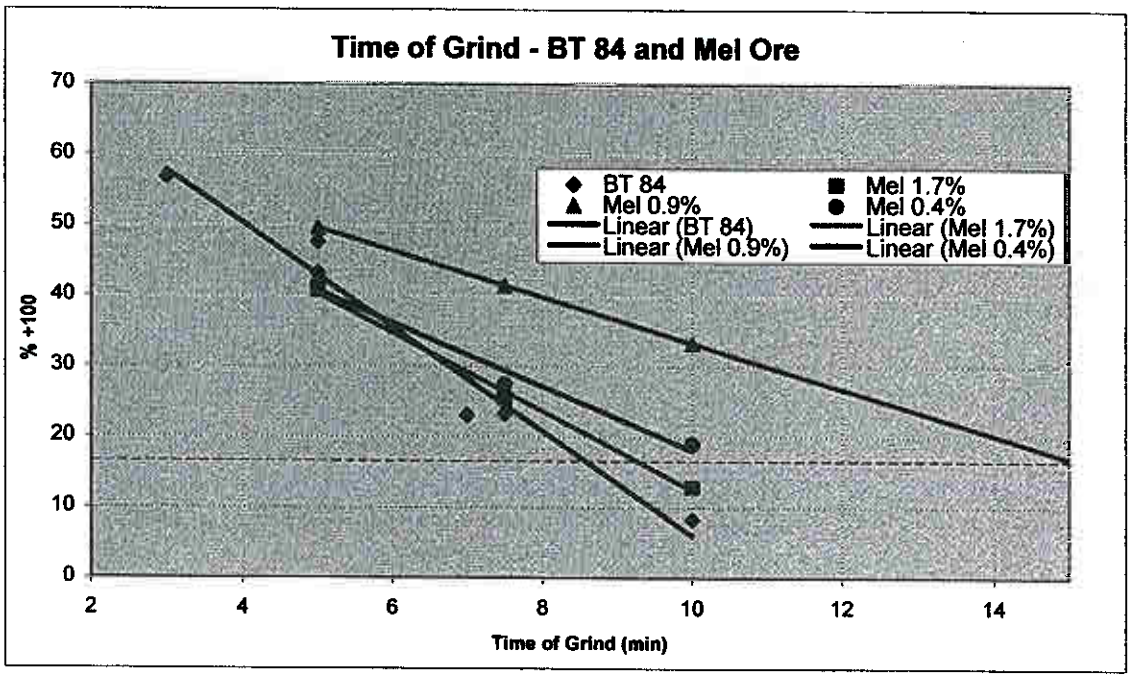



**Figure 1. Time of Grinds**

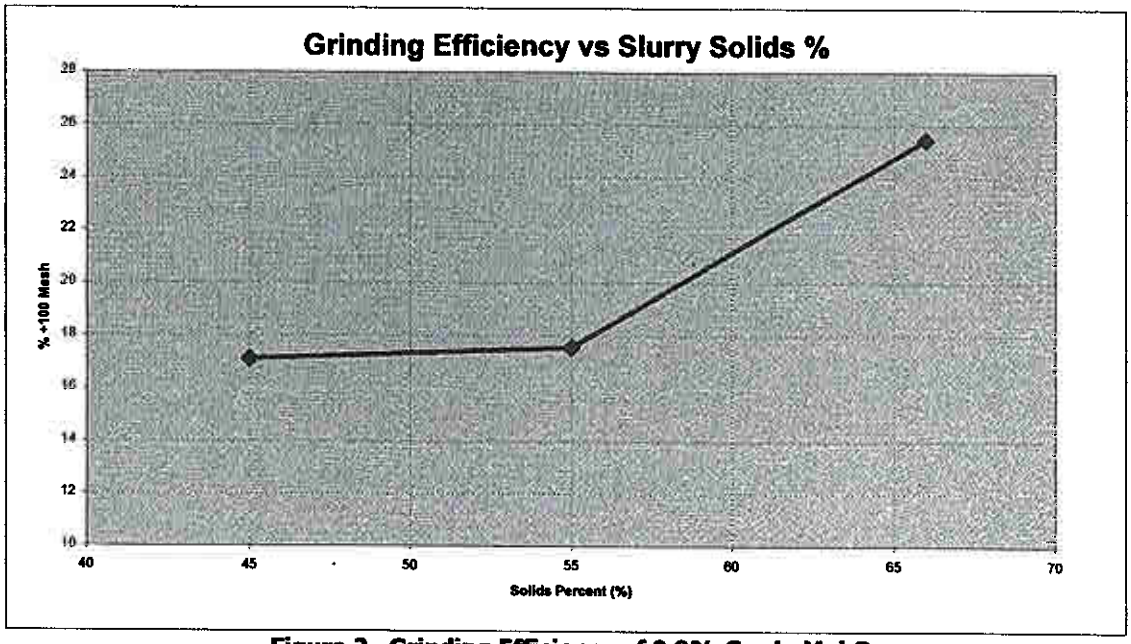



**Figure 2. Grinding Efficiency of 0.9% Grade Mel Ore**

## Ni Recovery Regression

Three float tests were conducted for the each of the representative ores provided. The following table lists the average nickel recovery values of these floats along with the standard deviation to give an idea of the variability in the results.

| *Ore* | *Average Ni Recovery* | *Standard Deviation* |
|---|---|---|
| 1.7% | 75.22 | 2.27 |
| 0.9% | 74.85 | 5.37 |
| 0.4% | 71.52 | 2.03 |

As can be seen by the standard deviation value for the 0.9% ore, the variability of the data was quite large as compared to the other two ores. Conceivably, some of this variability could be attributed to the longer grinding times and viscosity issues associated with them.

A recovery equation was generated for the data points collected on the basis of the nickel head grade in the ore, resulting in the equation:

$$\text{Ni Recovery} = 76.86 - \frac{2.26}{\%Ni}$$

The corresponding plot of this information is shown in Figure 3 below:

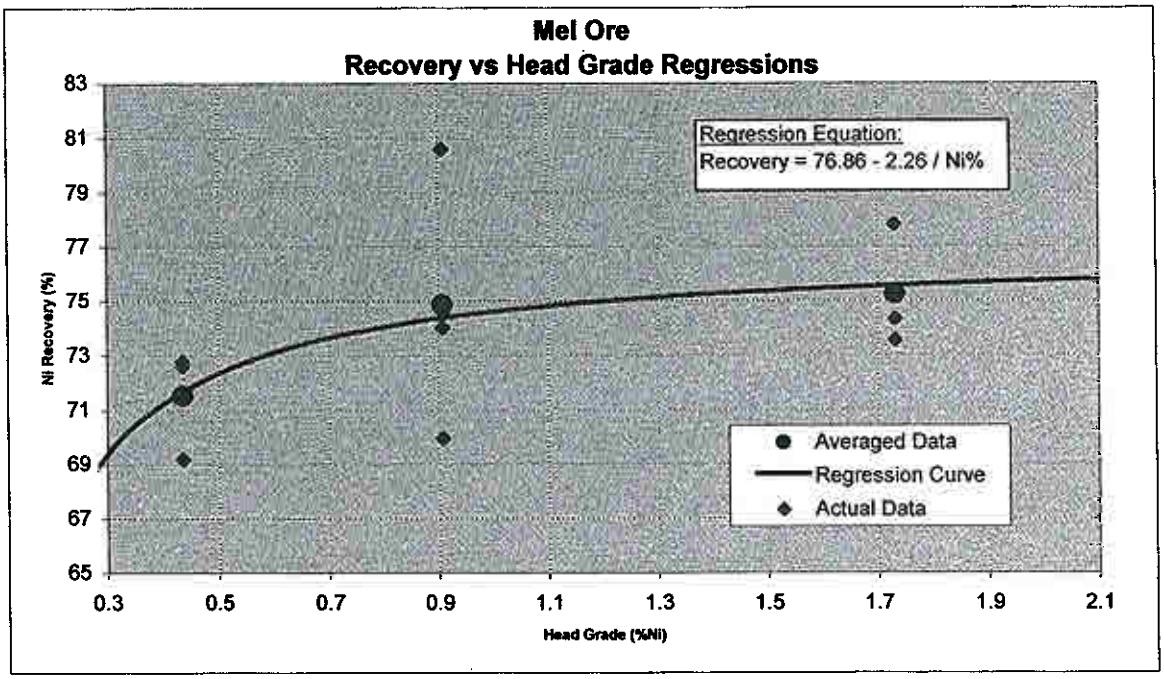



**Figure 3. Ni Recovery vs Ore Grade**

## Pyrrohotite Recovery

Lack of pyrrohotite recovery with the Mel ores had been flagged as a potential issue in the preliminary test work, due to the possibility of a lack of fuel for the smelter. However, in analyzing the data, although the iron recovery was significantly lower for the Mel ores compared to the Birchtree ore, the resulting concentrate grades of both iron and sulphur were in line with the Birchtree results, which would result in similar fuel loads per tonne of concentrate that would be fed to the smelter.

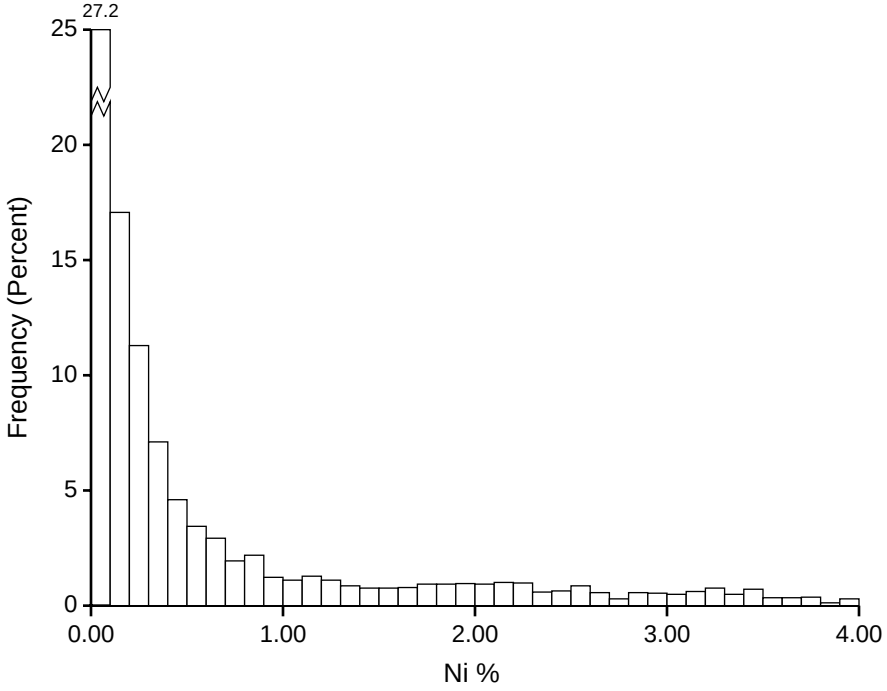
| *Ore* | *BT 84* | *Mel 1.7* | *Mel 0.9* | *Mel 0.4* |
|---|---|---|---|---|
| Fe Recovery | 24.04 | 16.21 | 13.78 | 10.61 |
| Fe Conc Grade | 46.26 | 45.35 | 44.83 | 43.74 |
| S Recovery | 31.09 | 22.72 | 20.91 | 23.52 |
| S Conc Grade | 30.35 | 35.18 | 32.85 | 30.84 |

## 0.9% Mel Ore Viscosity

It was shown in the test work discussed above that by decreasing the slurry solids percent that the 0.9% Mel ore can achieve similar grind times to the other ores. However, this would require a change in operating parameters for the Mill and could lead to operational upsets or require the need for batch processing for Mel ore.

# APPENDIX D
# BOXPLOTS, HISTOGRAMS AND PROBABILITY PLOTS OF ASSAY DATA

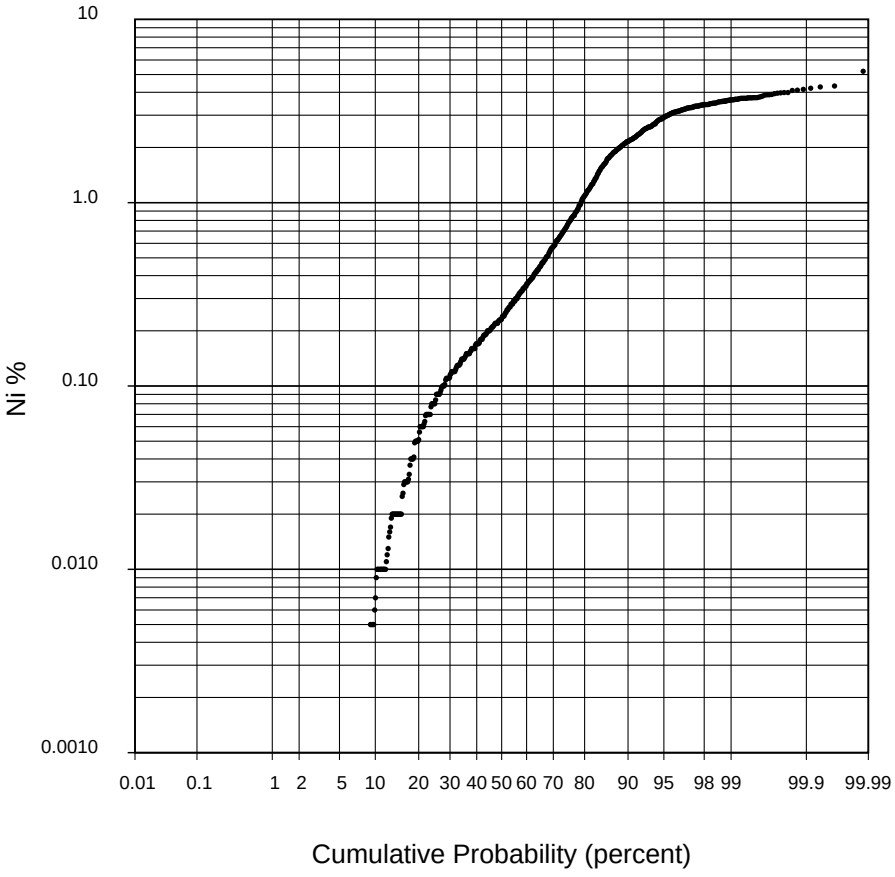
## Mel deposit Nickel Assays



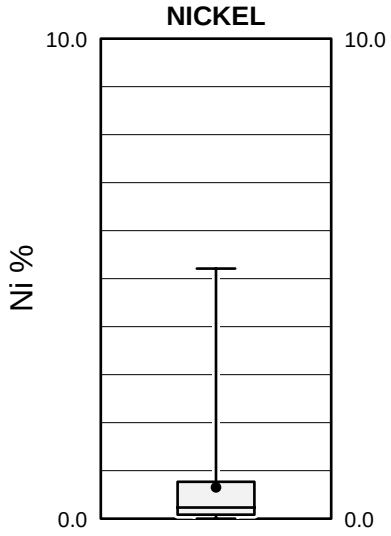

| | |
|---|---|
| N | 4066 |
| m | 0.65 |
| $\sigma^2$ | 0.83 |
| $\sigma$/m | 1.40 |
| min | 0.00 |
| $q_{0.25}$ | 0.08 |
| $q_{0.50}$ | 0.23 |
| $q_{0.75}$ | 0.76 |
| max | 5.21 |

Class width = 0.10
The last class contains
all values ≥ 3.90

## Mel deposit Nickel Assays



# *MEL DEPOSIT NICKEL ASSAYS*

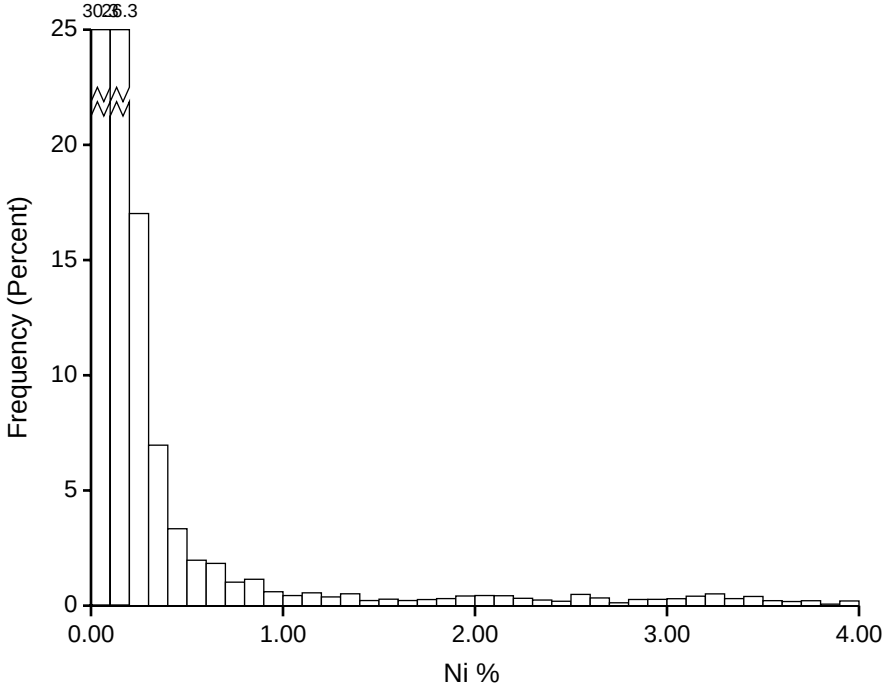



| | | |
|---|---|---|
| Number of data | 4065 | Number of data |
| Mean | 0.653 | Mean |
| Maximum | 5.21 | Maximum |
| Upper quartile | 0.768 | Upper quartile |
| Median | 0.232 | Median |
| Lower quartile | 0.083 | Lower quartile |
| Minimum | 0.0 | Minimum |
| Variance | 0.835 | Variance |
| CV | 1.398 | CV |
| Skewness | 1.845 | Skewness |

Variable: Ni %
Acceptable range: 0.0 to 10.0
Weights: --equal--

NICKEL file: NI_Assays.prn

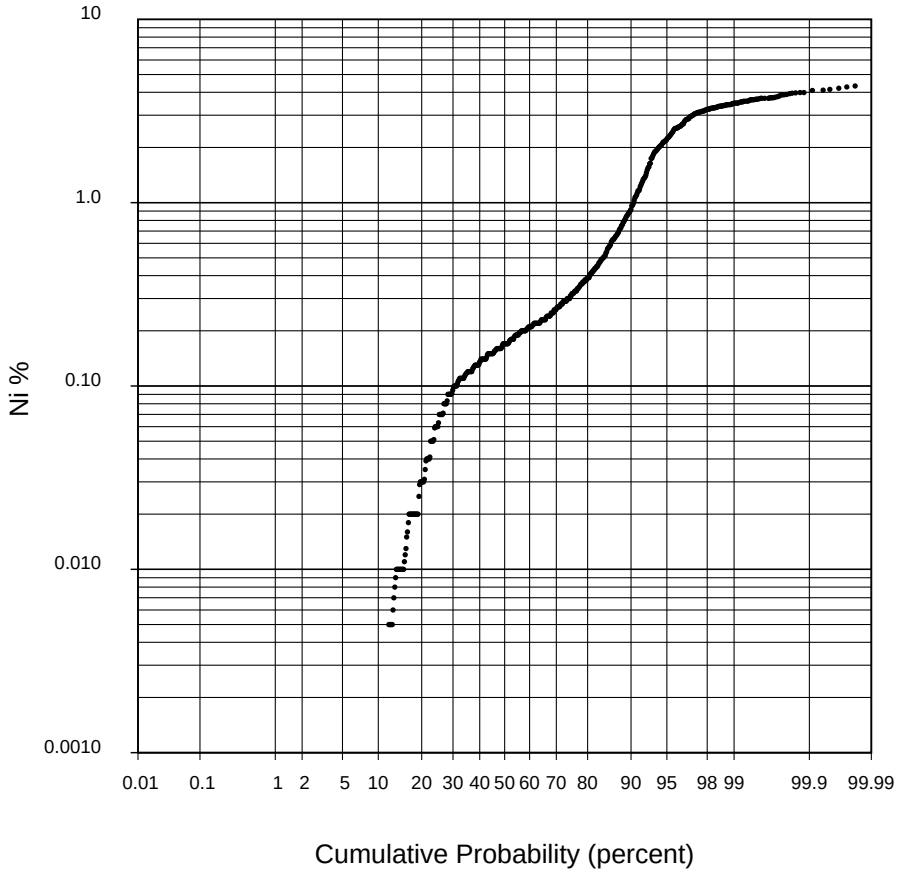
## Mel deposit Nickel Assays by Length Weighted Average




| | |
|---|---|
| N | 4066 |
| m | 0.40 |
| $\sigma^2$ | 0.51 |
| σ/m | 1.80 |
| min | 0.00 |
| $q_{0.25}$ | 0.06 |
| $q_{0.50}$ | 0.17 |
| $q_{0.75}$ | 0.31 |
| max | 5.21 |

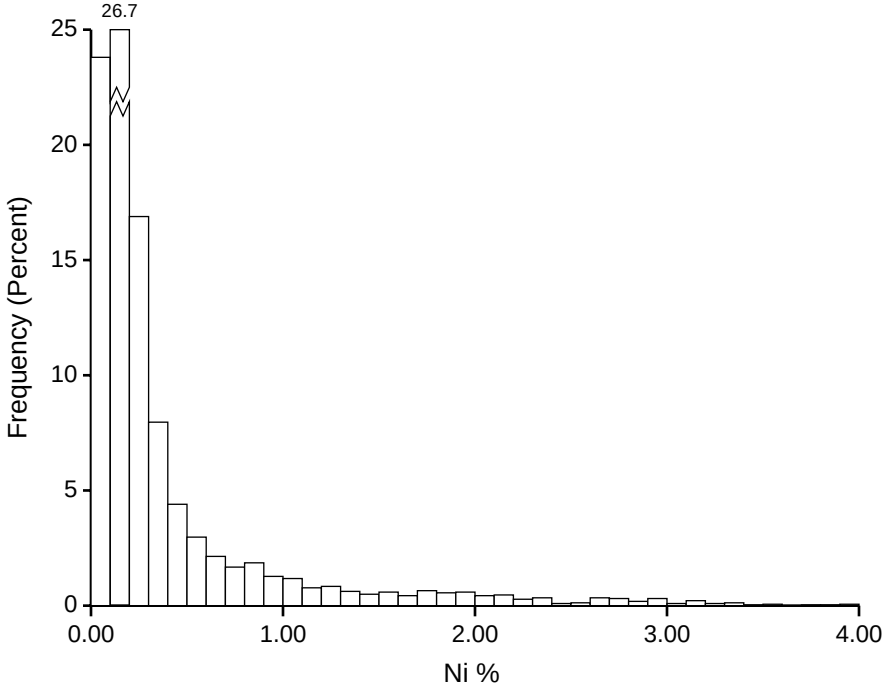
Class width = 0.10
The last class contains all values ≥ 3.90

## Mel deposit Nickel Assays by Length Weighted Average



# APPENDIX E
# BOX PLOTS, HISTOGRAMS AND PROBABILITY PLOTS OF COMPOSITE DATA

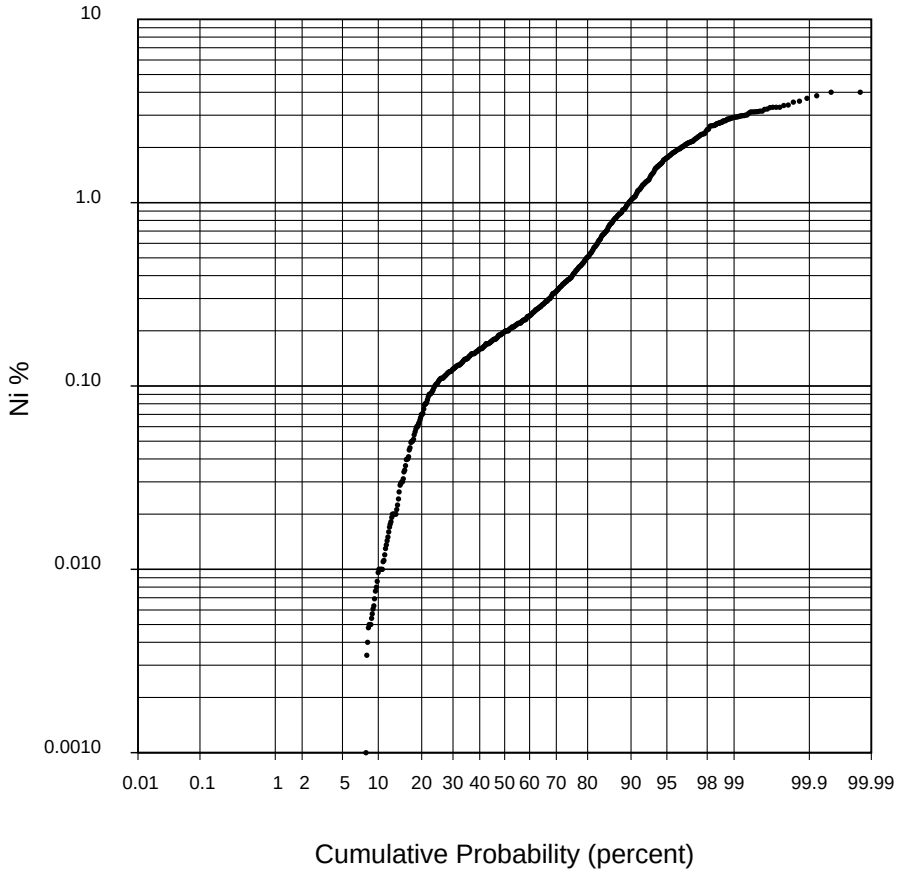
## Mel deposit Capped Nickel Composites



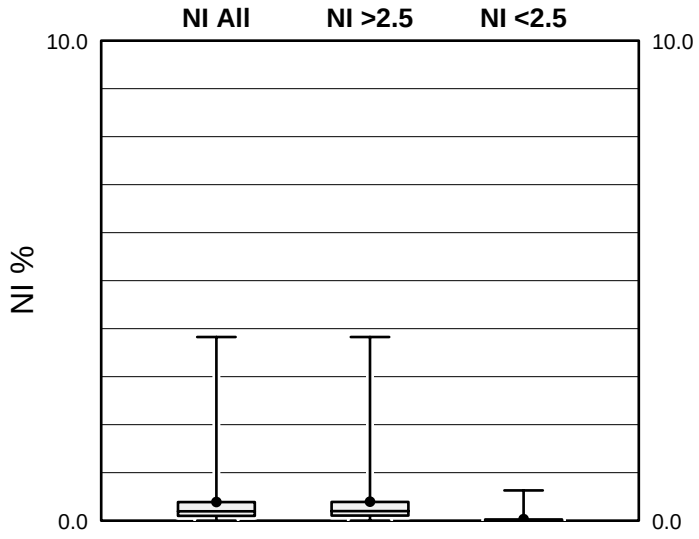

| | |
|---|---|
| N | 3227 |
| m | 0.40 |
| $\sigma^2$ | 0.33 |
| σ/m | 1.46 |
| min | 0.00 |
| $q_{0.25}$ | 0.11 |
| $q_{0.50}$ | 0.20 |
| $q_{0.75}$ | 0.39 |
| max | 4.00 |

Class width = 0.10
The last class contains all values ≥ 3.90

## Mel deposit Capped Nickel Composites



# *MEL DEPOSIT NICKEL COMPOSITES*

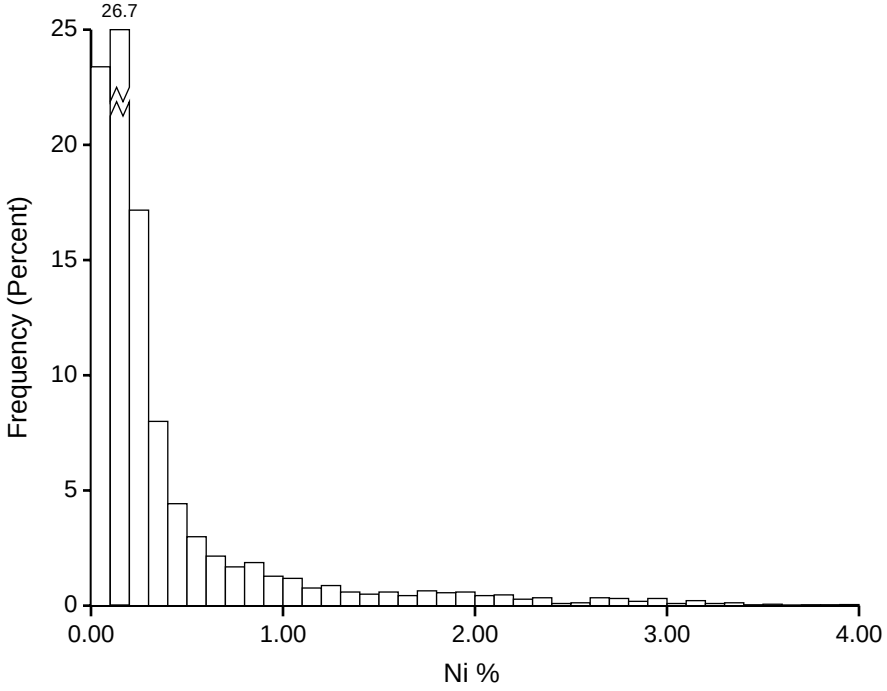



| | NI All | NI >2.5 | NI <2.5 | |
|---|---|---|---|---|
| Number of data | 3280 | 3226 | 54 | Number of data |
| Mean | 0.39 | 0.396 | 0.032 | Mean |
| Maximum | 3.826 | 3.826 | 0.63 | Maximum |
| Upper quartile | 0.387 | 0.39 | 0.025 | Upper quartile |
| Median | 0.195 | 0.199 | 0.005 | Median |
| Lower quartile | 0.1 | 0.106 | 0.0 | Lower quartile |
| Minimum | 0.0 | 0.0 | 0.0 | Minimum |
| Variance | 0.3229 | 0.326 | 0.0085 | Variance |
| CV | 1.459 | 1.443 | 2.857 | CV |
| Skewness | 2.793 | 2.773 | 5.307 | Skewness |

Variable: NI %
Acceptable range: 0.0 to 10.0
Weights: --equal--

NI All file: NI_Comps_All.prn
NI >2.5 file: NI_Comps_GreaterThan2.5.prn
NI <2.5 file: NI_Comps_LessThan2.5.prn

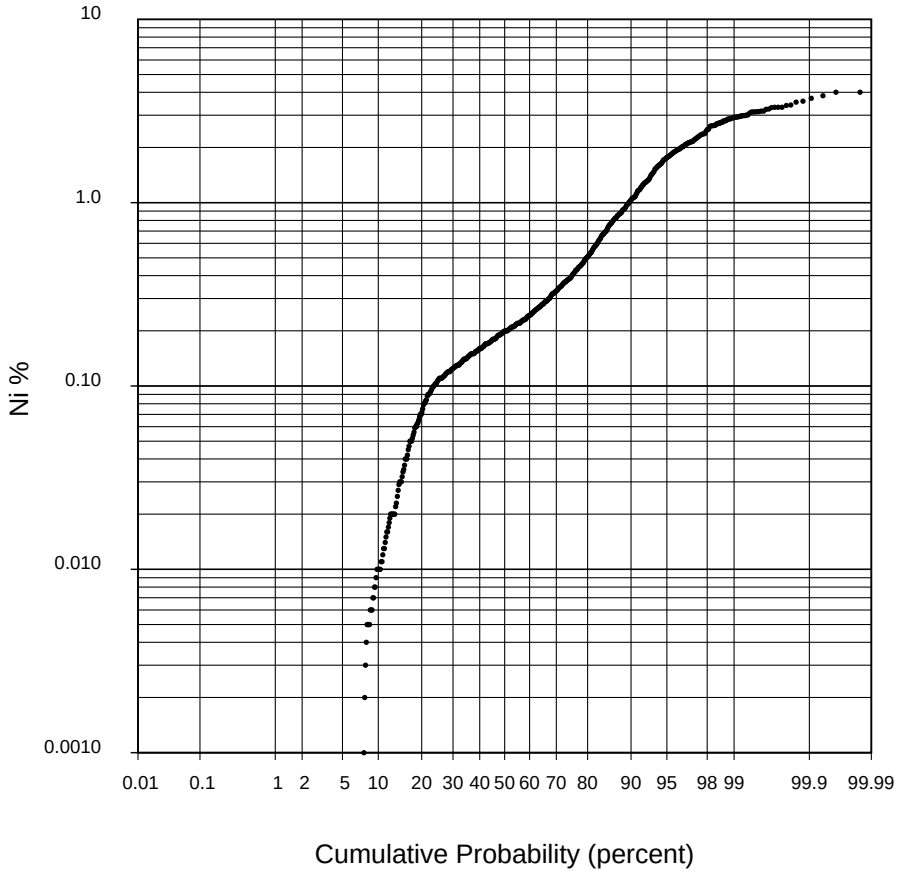
## Mel deposit Nickel Composites by Length Weighted Average




| | |
|---|---|
| N | 3228 |
| m | 0.40 |
| $\sigma^2$ | 0.33 |
| σ/m | 1.45 |
| min | 0.00 |
| $q_{0.25}$ | 0.11 |
| $q_{0.50}$ | 0.20 |
| $q_{0.75}$ | 0.39 |
| max | 4.00 |

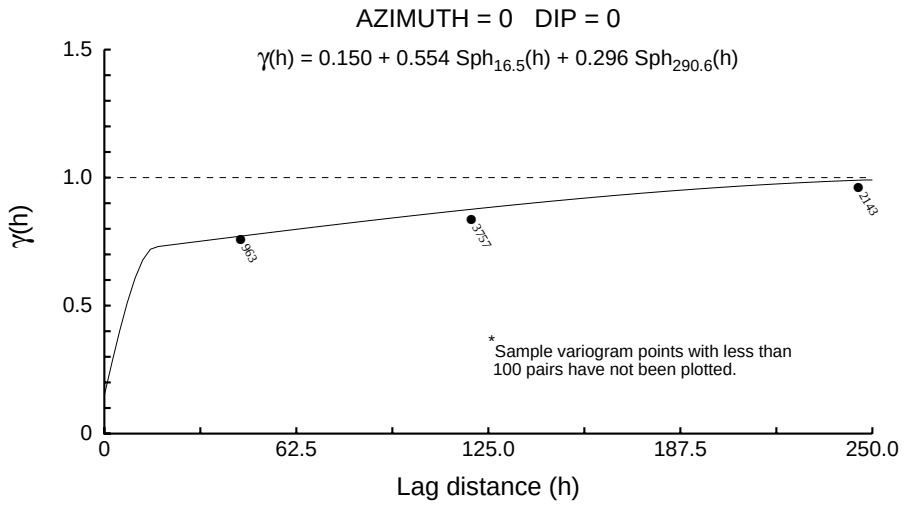
Class width = 0.10
The last class contains all values ≥ 3.90

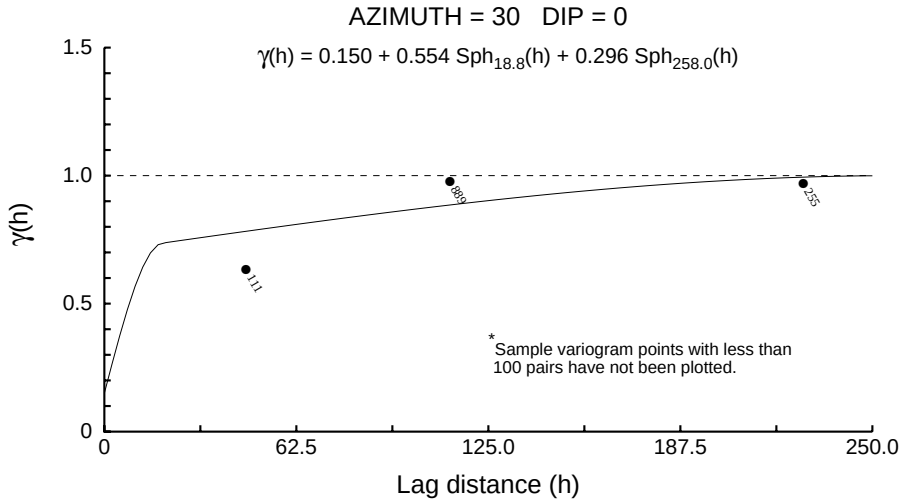
## Mel deposit Nickel Composites by Length Weighted Average

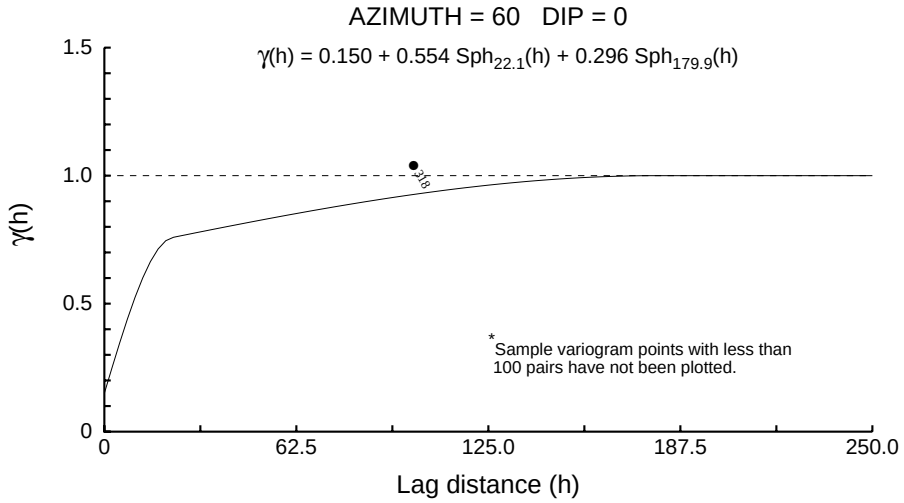


# APPENDIX F
# VARIOGRAPHY

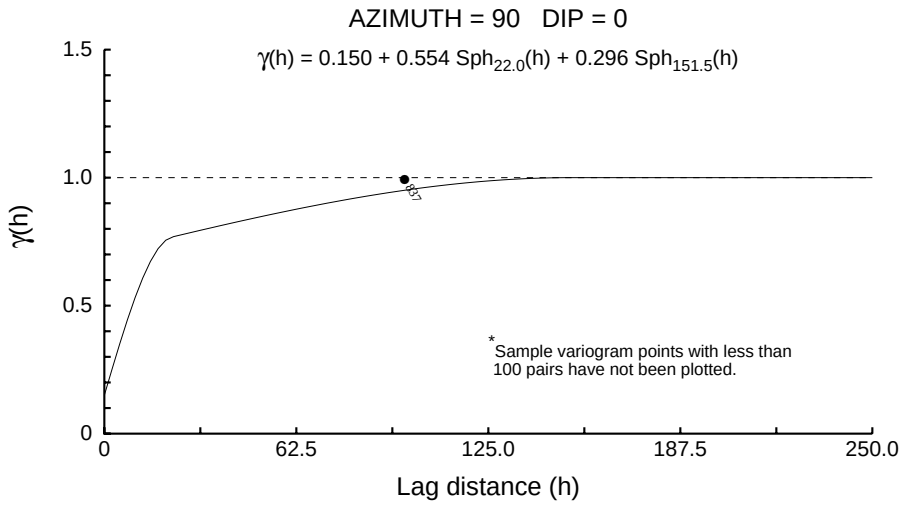
# Mel Deposit Nickel Variogram

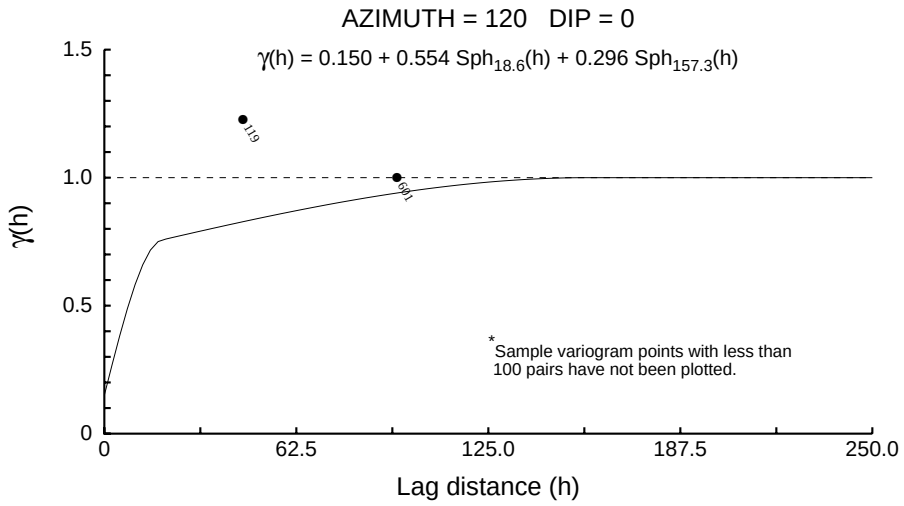


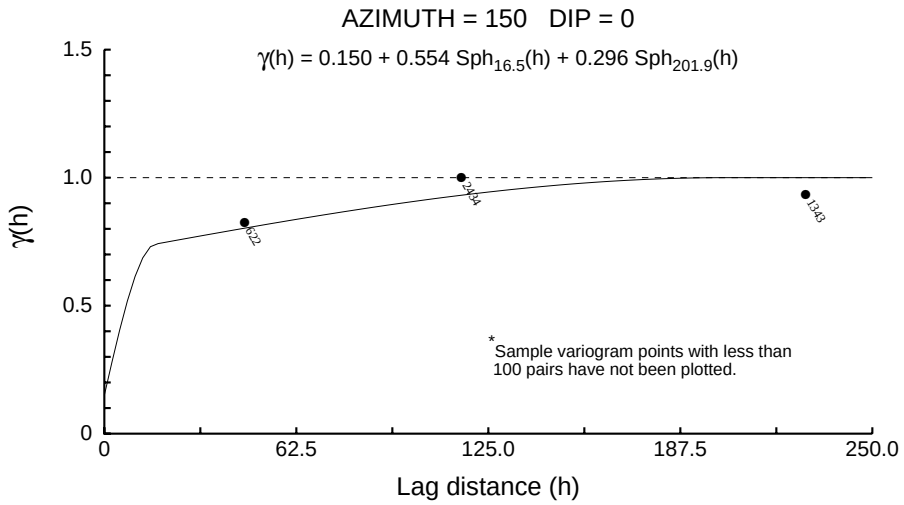



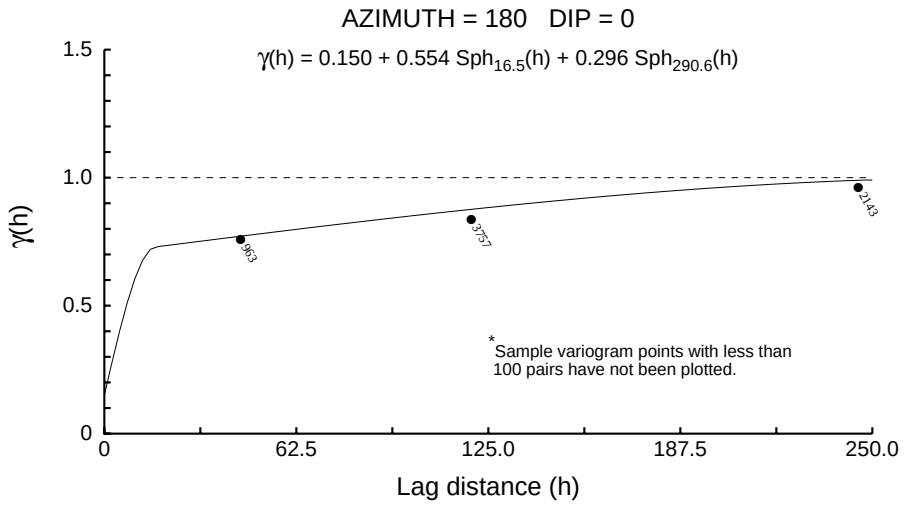
# Mel Deposit Nickel Variogram

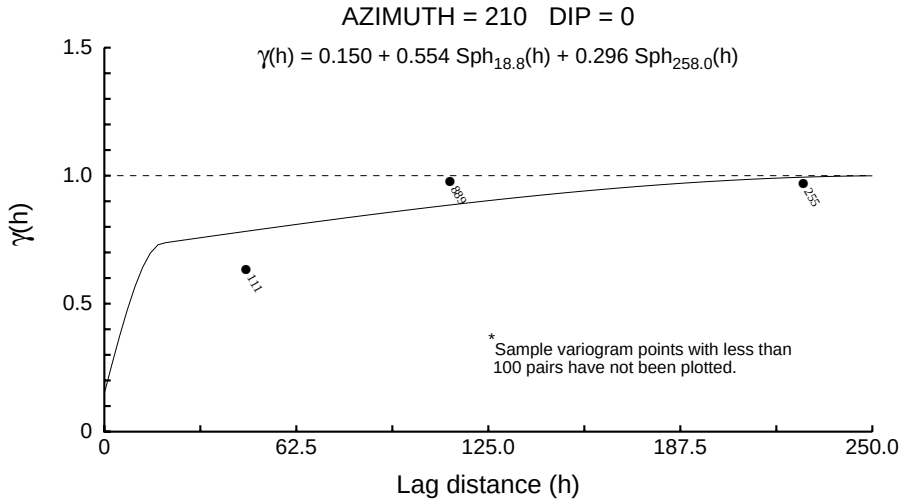


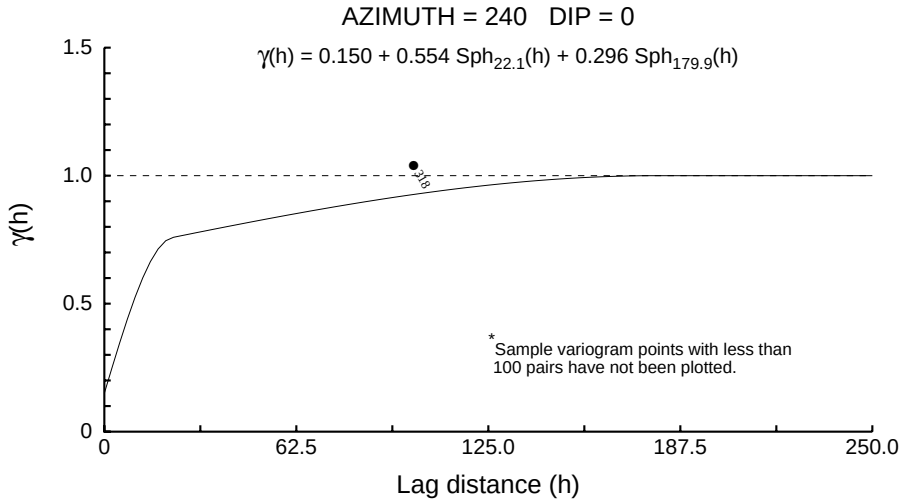



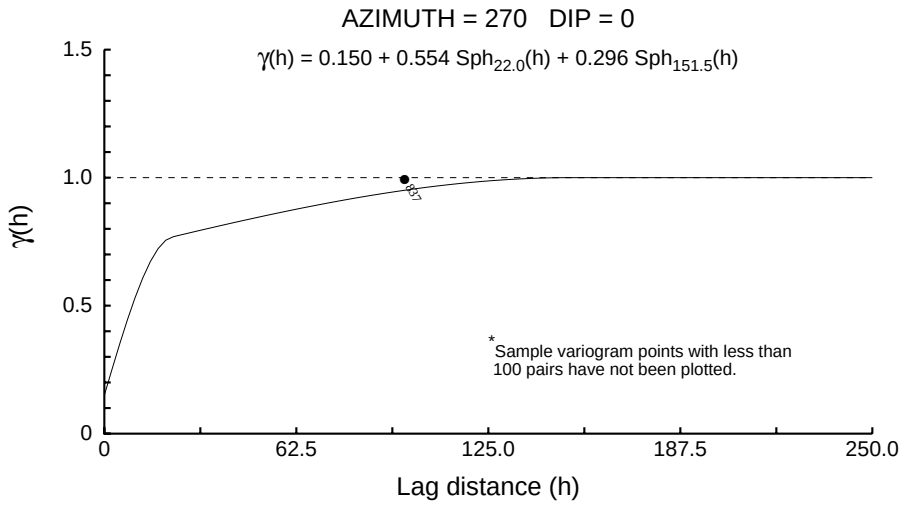
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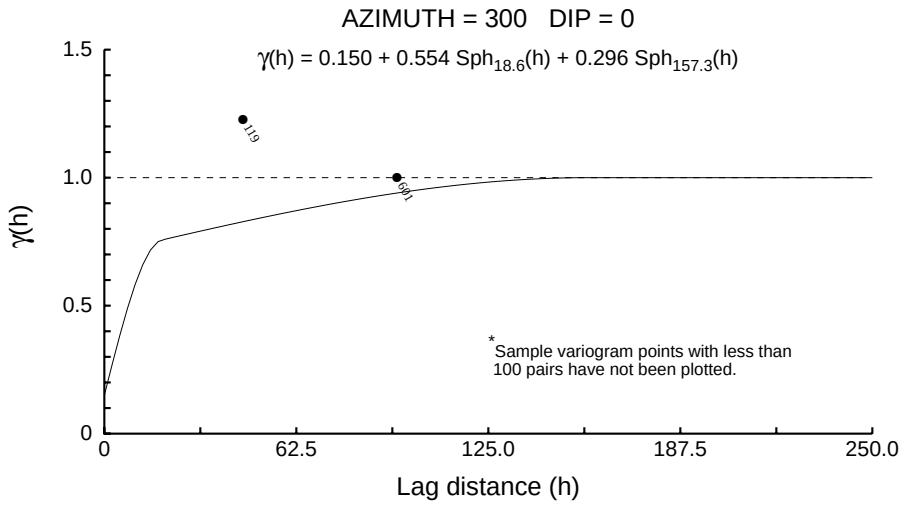


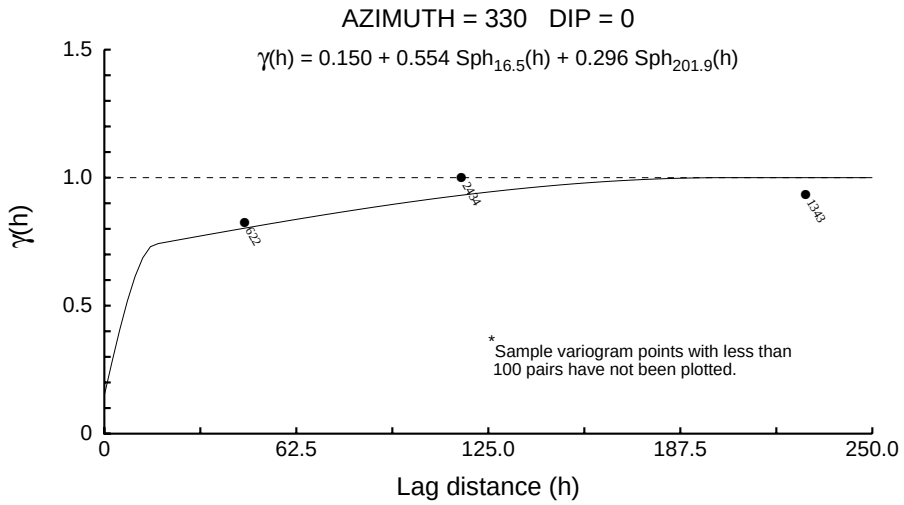



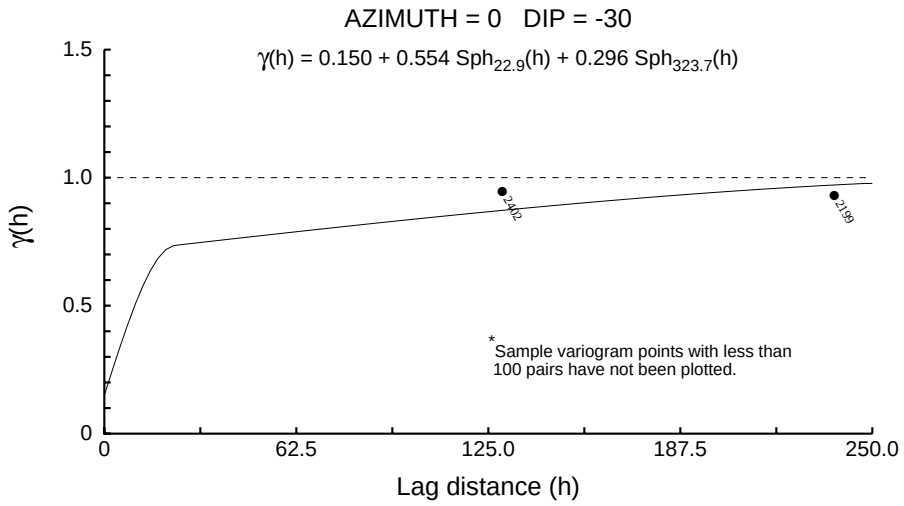
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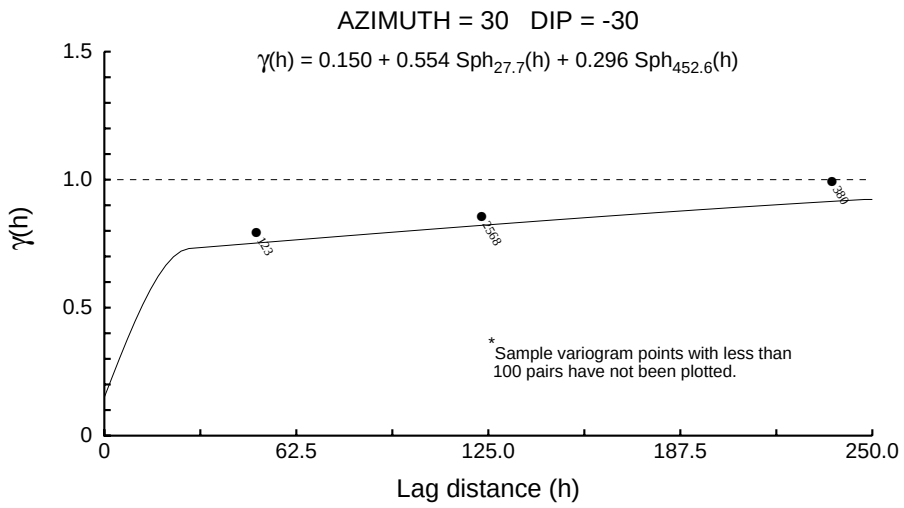


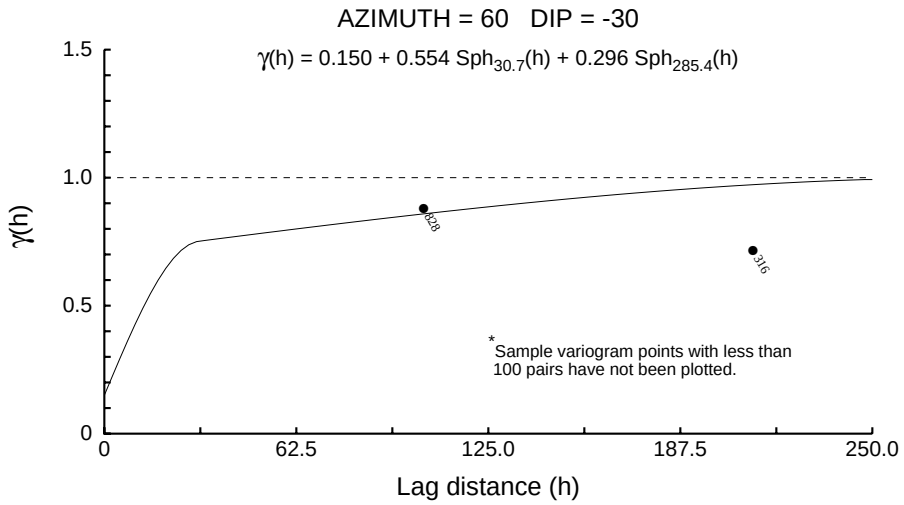



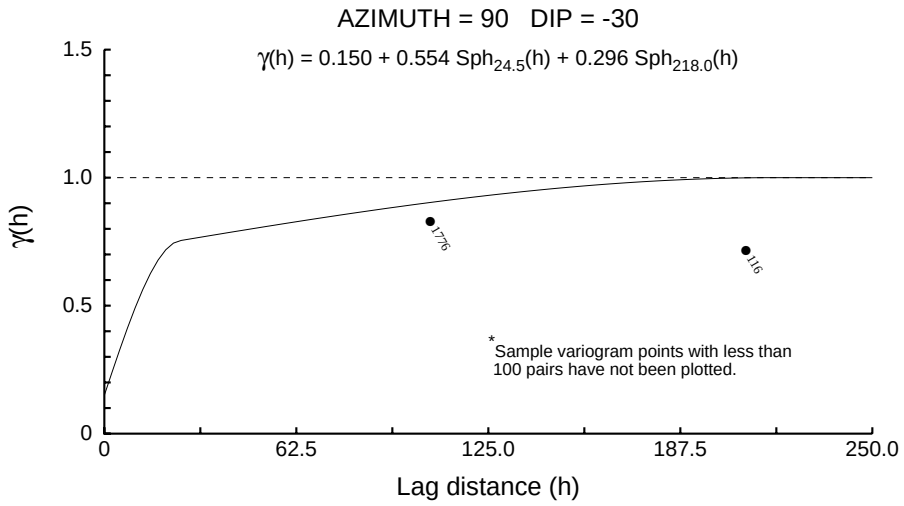
# Mel Deposit Nickel Variogram

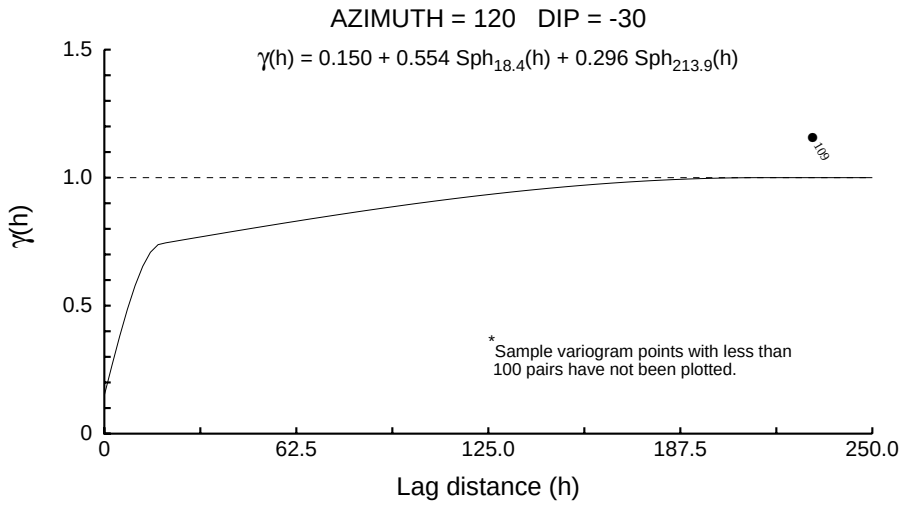


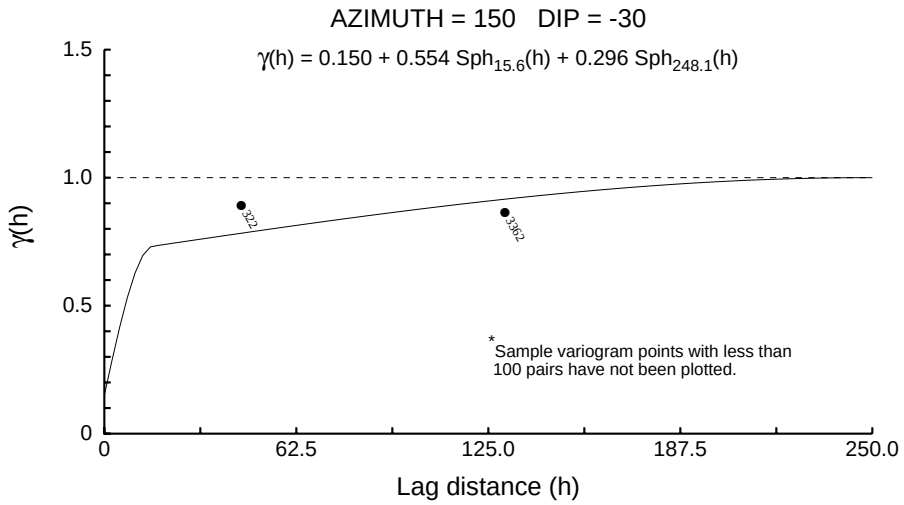



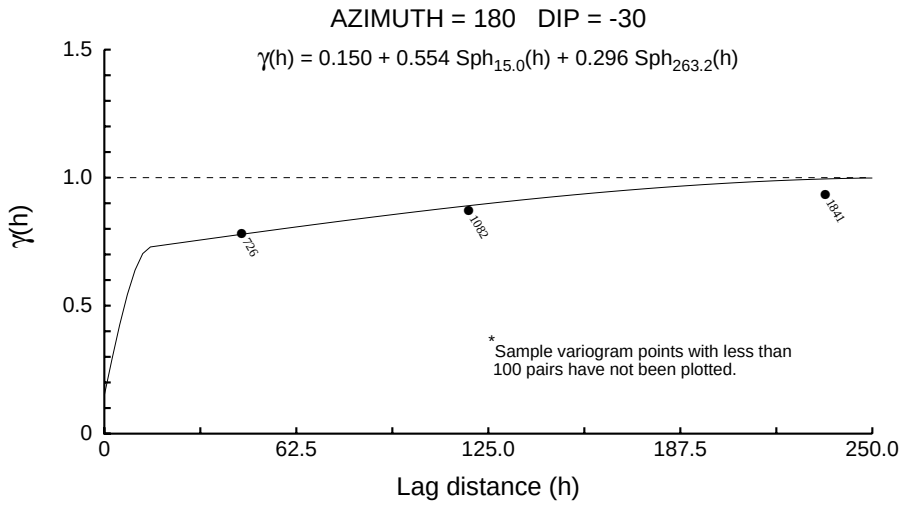
# Mel Deposit Nickel Variogram

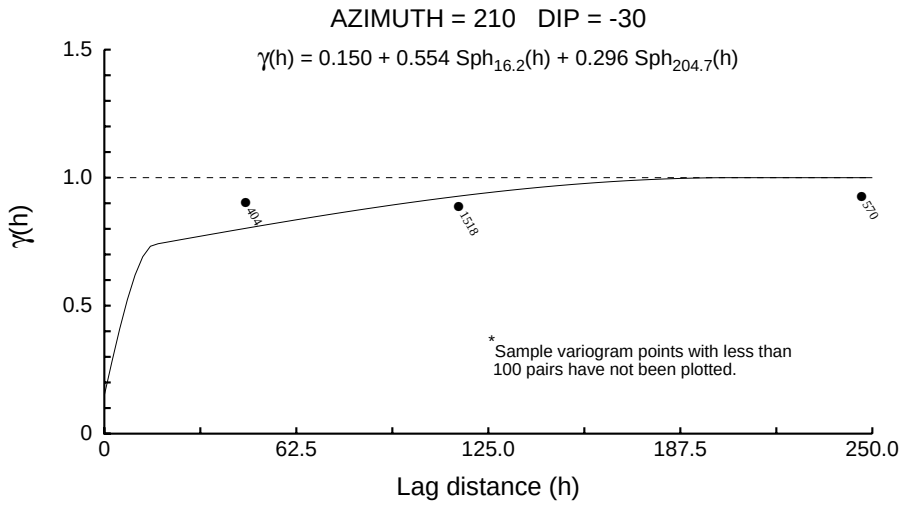


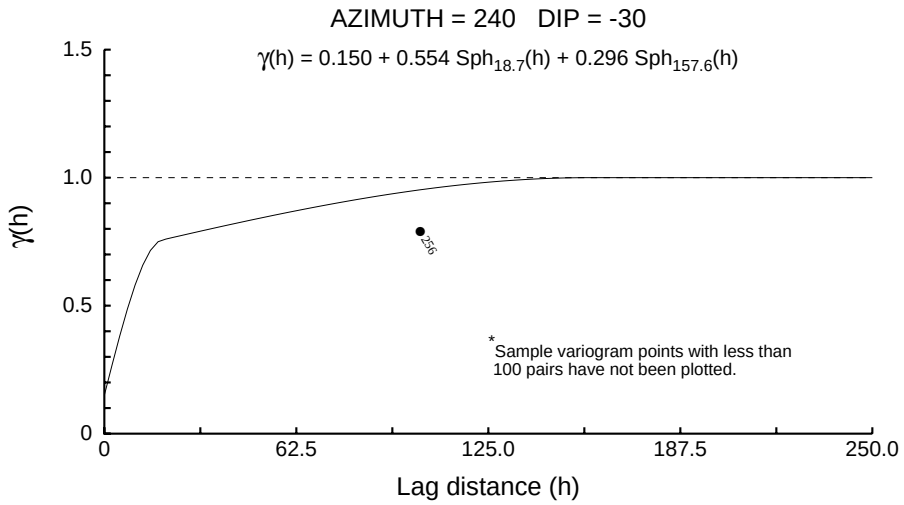



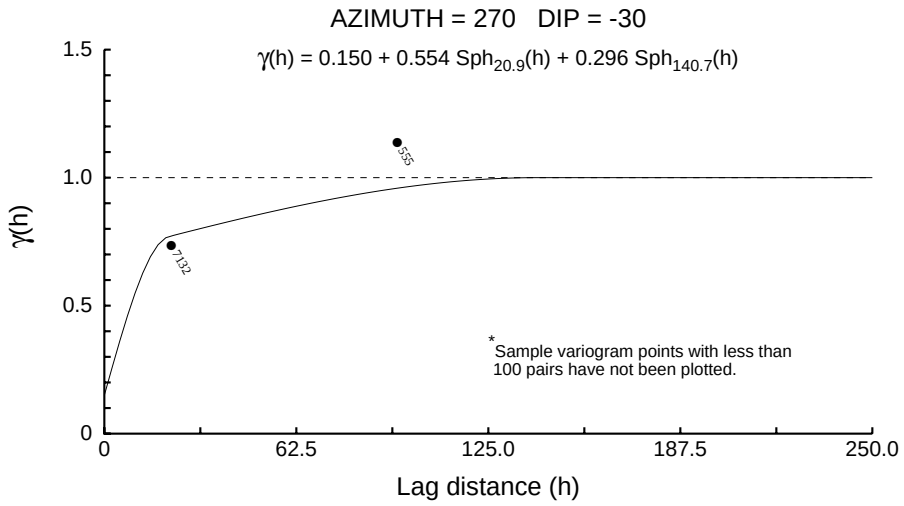
# Mel Deposit Nickel Variogram

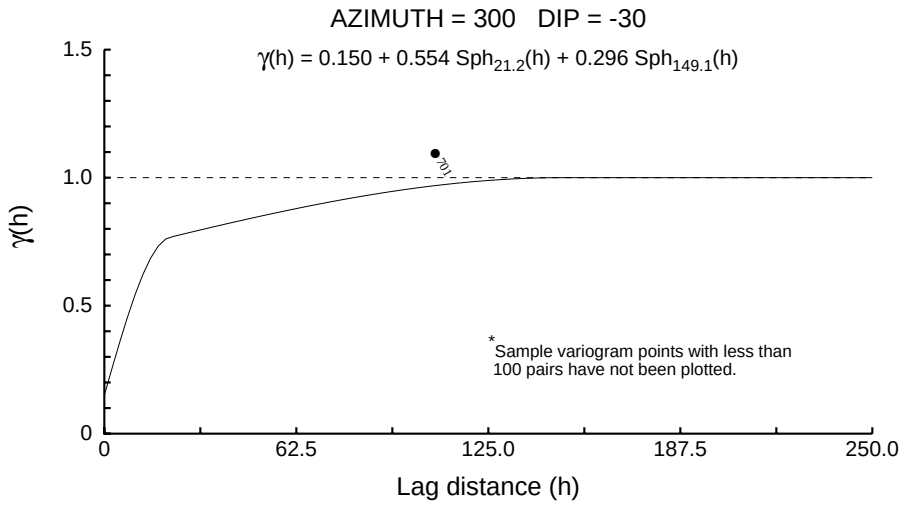


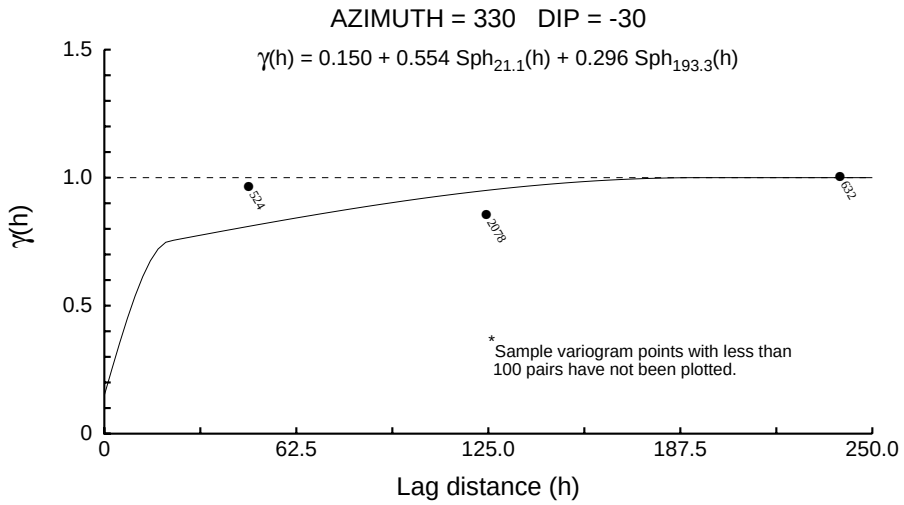



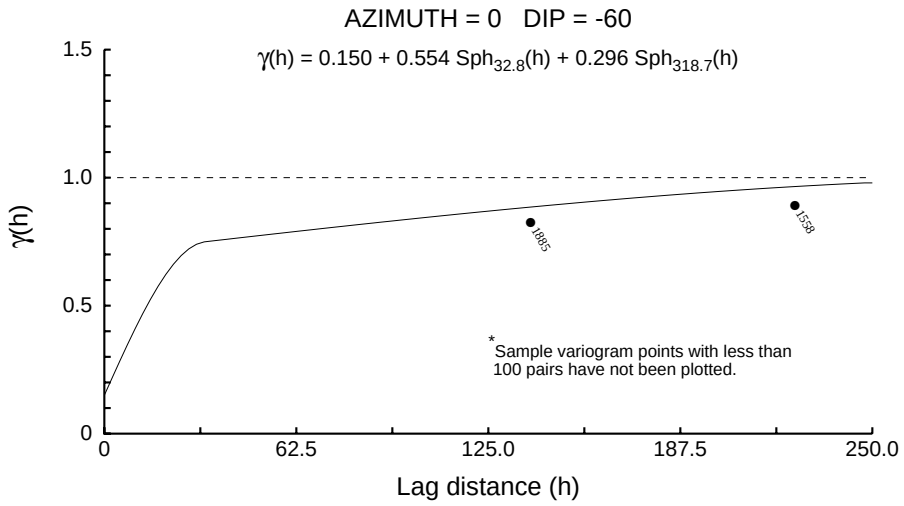
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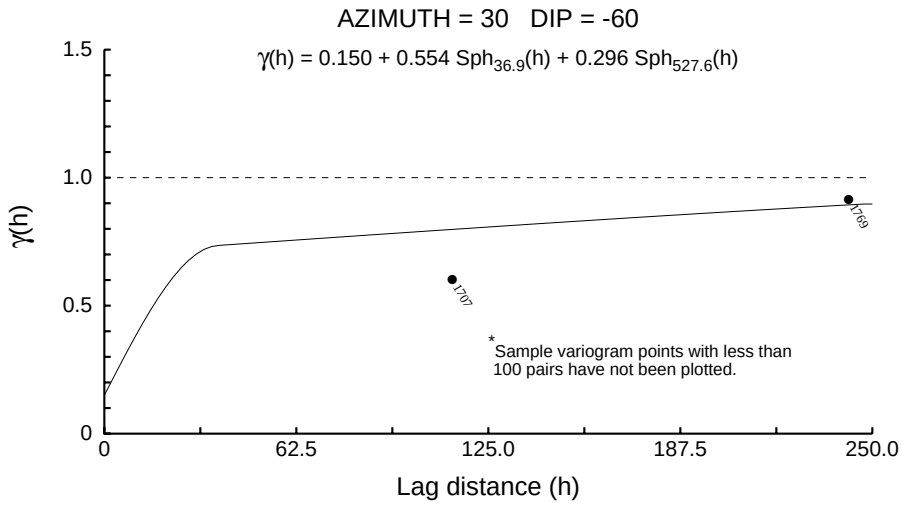


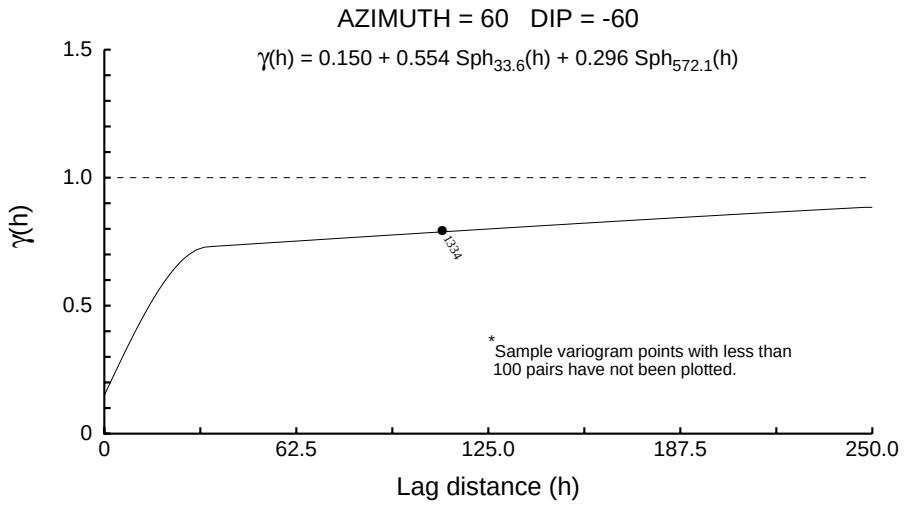



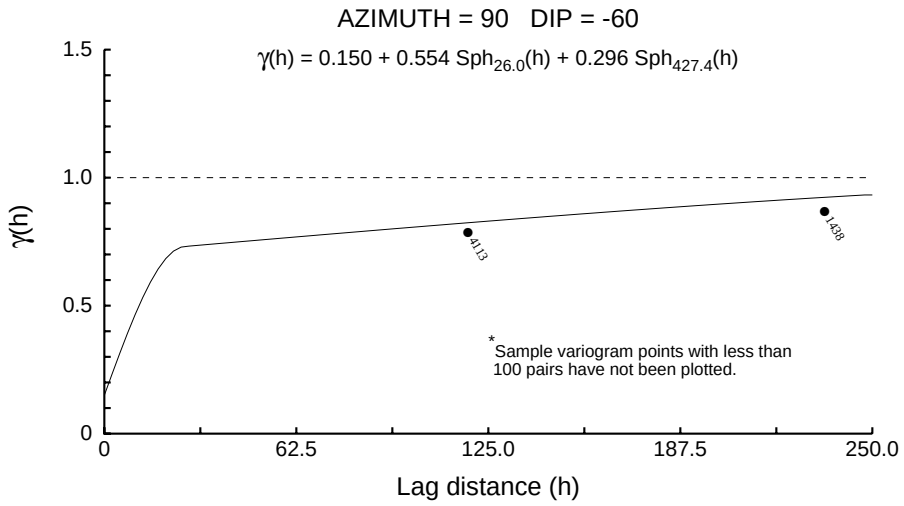
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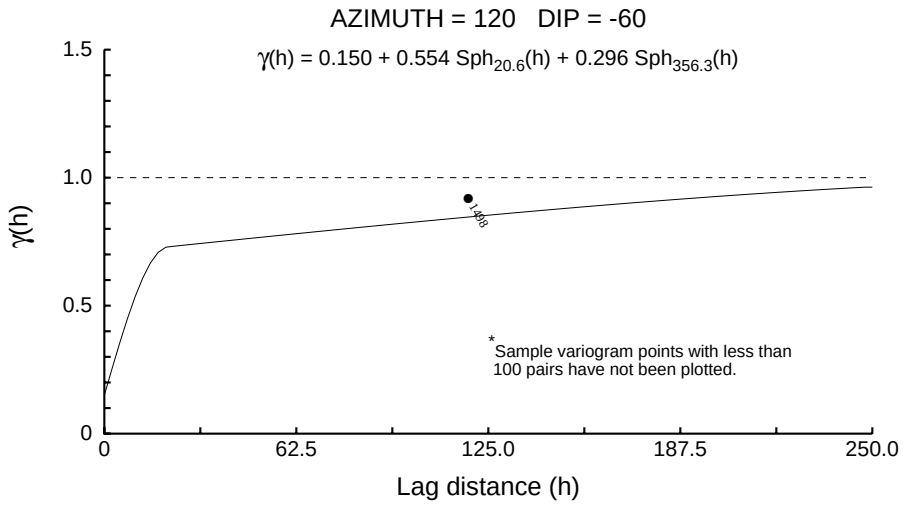


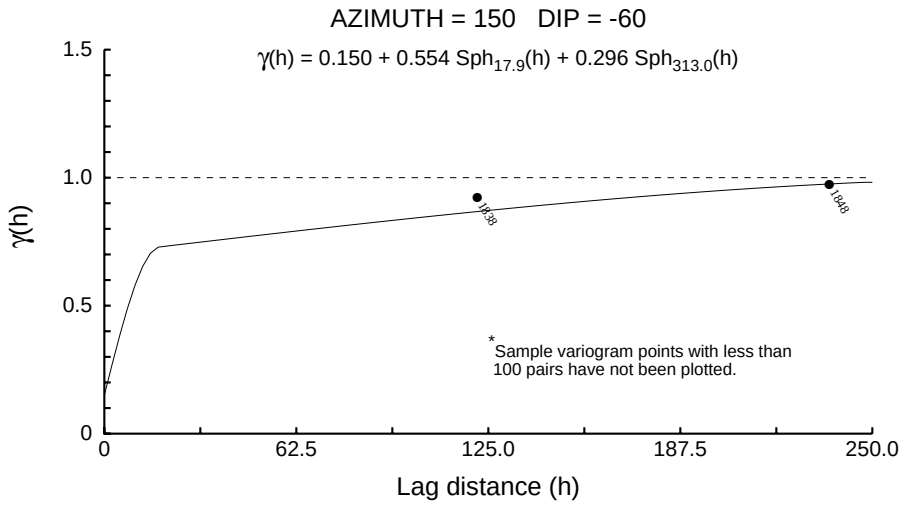



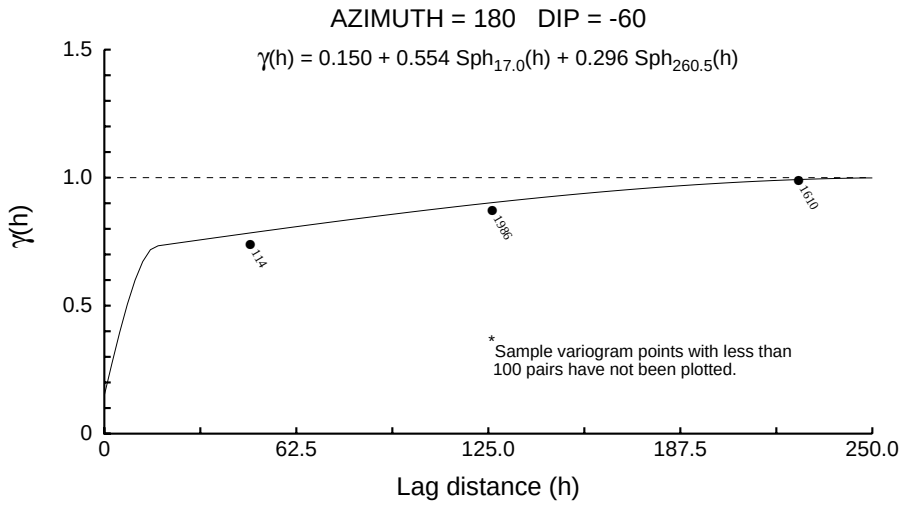
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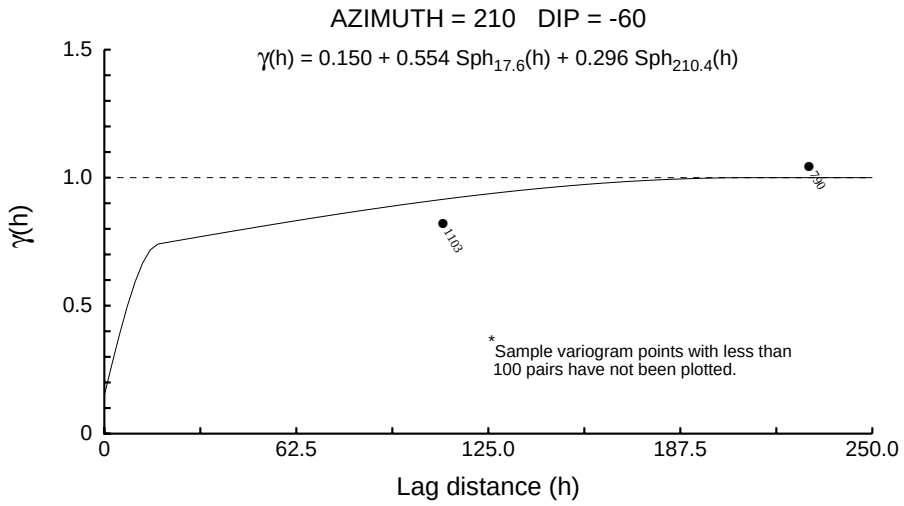


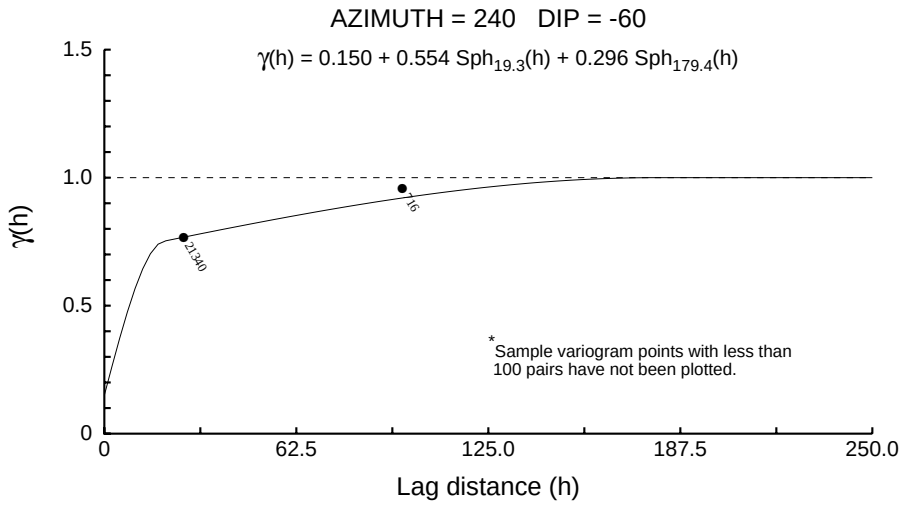



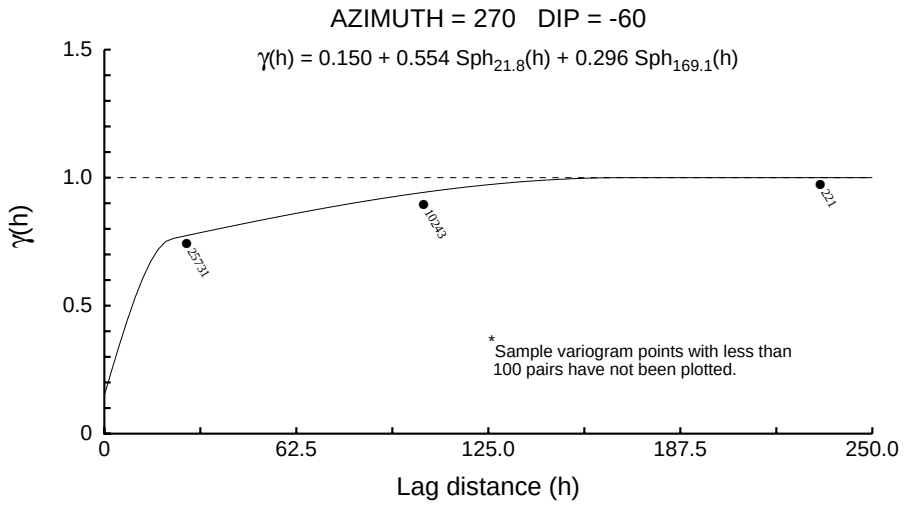
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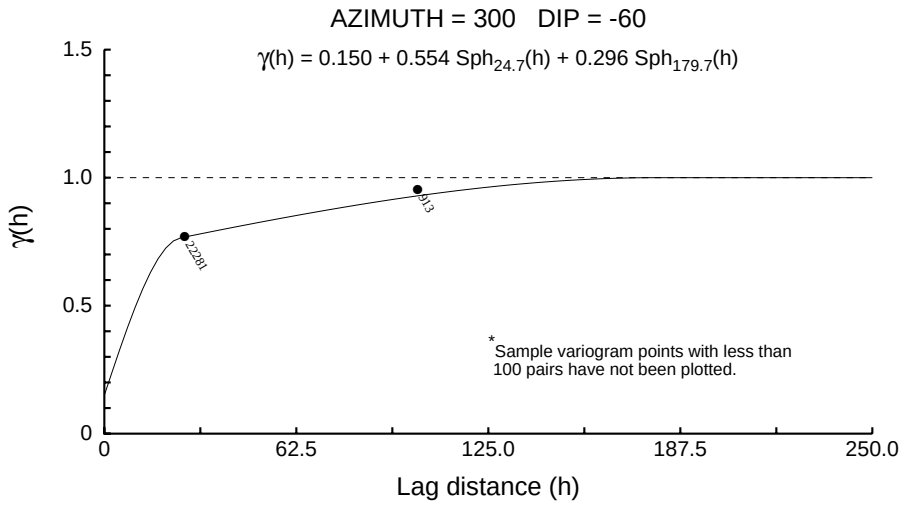


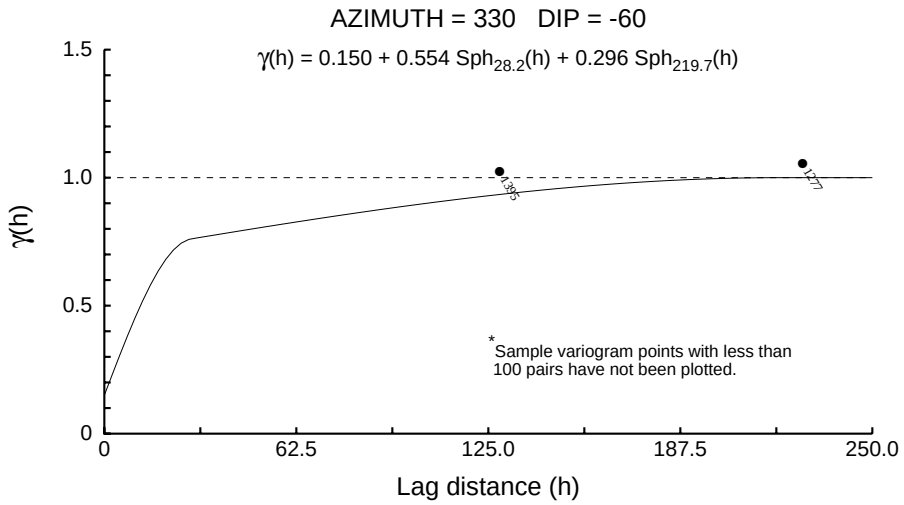



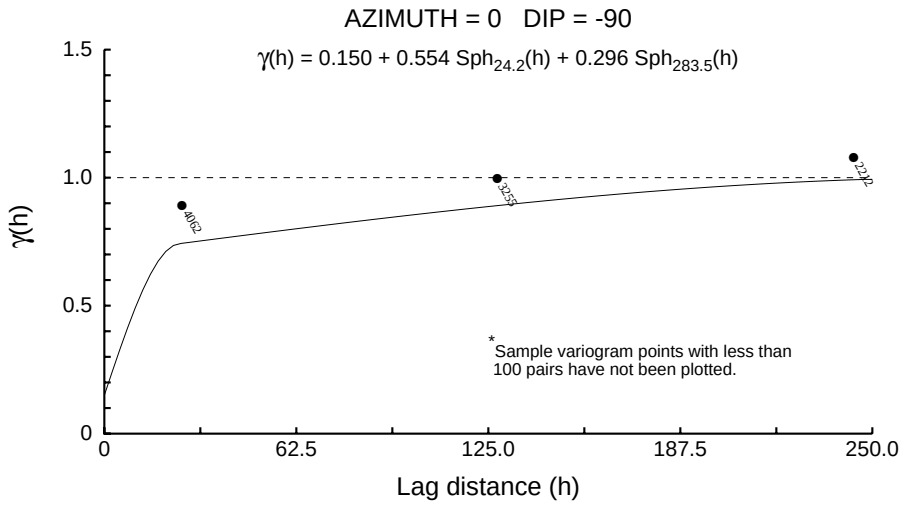
# Mel Deposit Nickel Variogram



# Mel Deposit Nickel Variogram



# Mel Deposit Nickel Variogram

User Defined Rotation Conventions

Nugget ==> 0.150
C1 ==> 0.554
C2 ==> 0.296

First Structure -- Spherical

LH Rotation about the Z axis ==> -4
LH Rotation about the X' axis ==> 67
LH Rotation about the Z' axis ==> 25
Range along the Z axis ==> 15.2 Azimuth ==> 356 Dip ==> 23
Range along the X' axis ==> 21.0 Azimuth ==> 96 Dip ==> 23
Range along the Y' axis ==> 31.8 Azimuth ==> 46 Dip ==> -56

Second Structure -- Spherical

LH Rotation about the Z axis ==> -4
LH Rotation about the X' axis ==> 67
LH Rotation about the Z' axis ==> 25
Range along the Z axis ==> 272.3 Azimuth ==> 356 Dip ==> 23
Range along the X' axis ==> 139.4 Azimuth ==> 96 Dip ==> 23
Range along the Y' axis ==> 541.0 Azimuth ==> 46 Dip ==> -56

Modeling Criteria

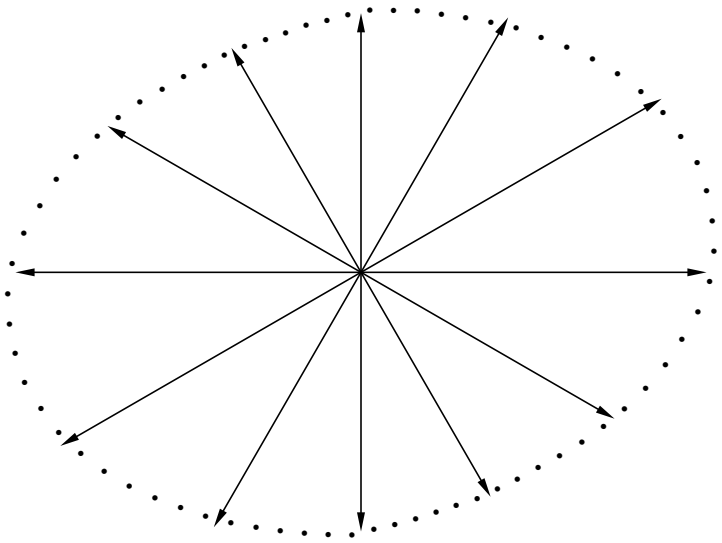
Minimum number pairs req'd ==> 100
Sample variogram points weighted by # pairs
Max allowable drift on head and tail means ==> 0.5

# Mel Deposit Nickel Variogram

Structure Number 1

Rose Diagram of Ranges Dipping 0 Degrees
Scale:

40 Units

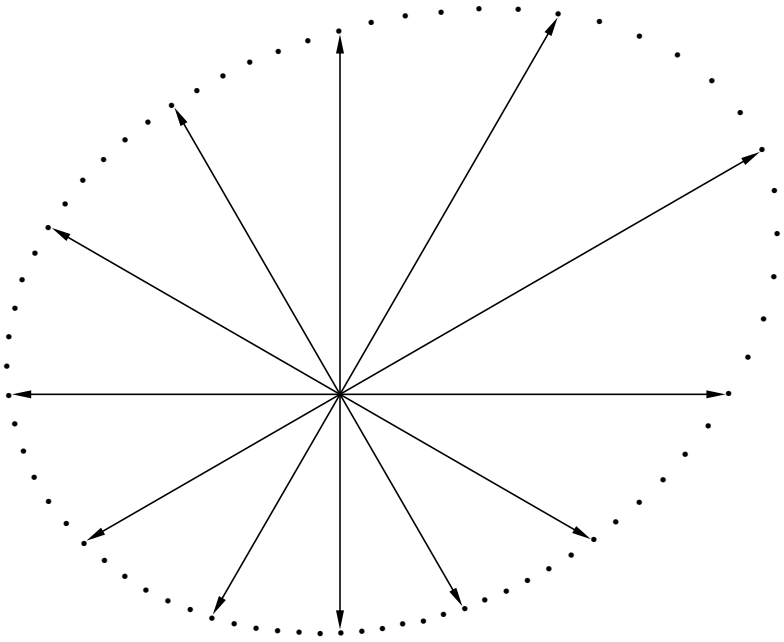


# Mel Deposit Nickel Variogram

Structure Number 1

Rose Diagram of Ranges Dipping 30 Degrees
Scale:

40 Units

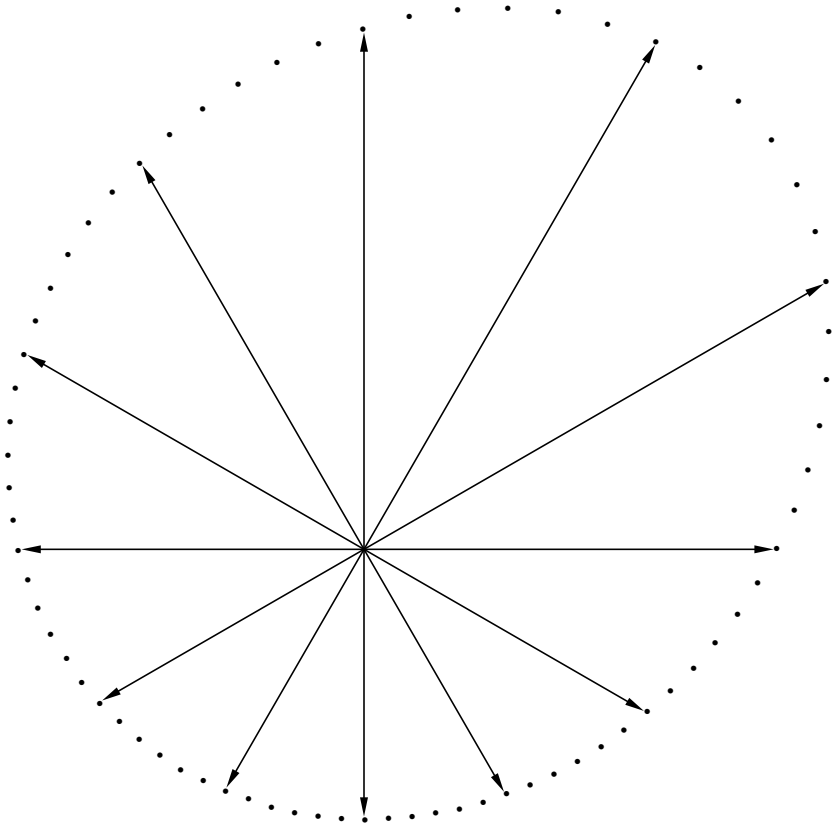


# Mel Deposit Nickel Variogram

Structure Number 1

Rose Diagram of Ranges Dipping 60 Degrees
Scale:

40 Units

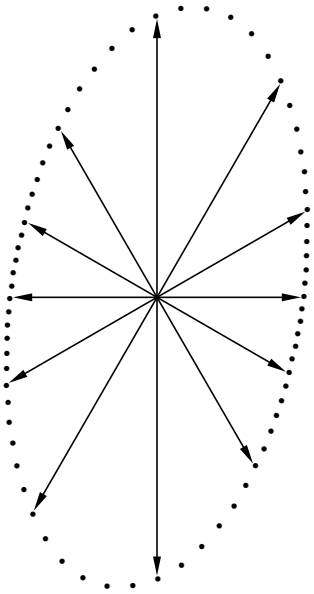


# Mel Deposit Nickel Variogram

Structure Number 2

Rose Diagram of Ranges Dipping 0 Degrees
Scale:

600 Units

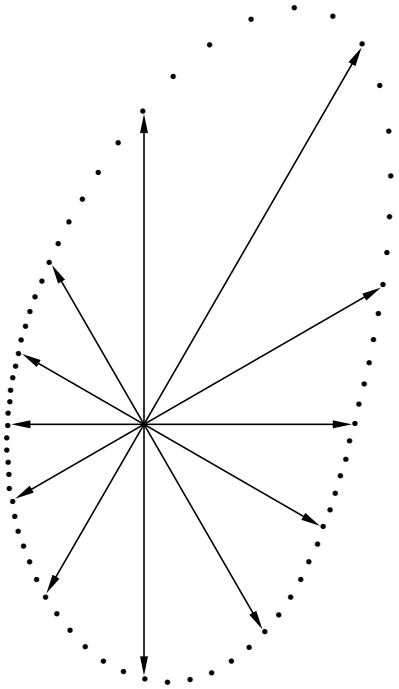


# Mel Deposit Nickel Variogram

Structure Number 2

Rose Diagram of Ranges Dipping 30 Degrees
Scale:

600 Units

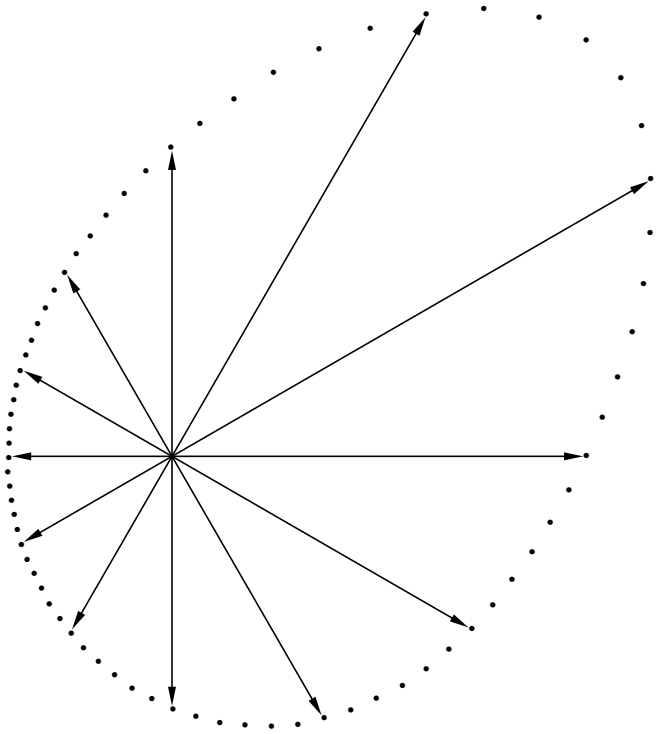


# Mel Deposit Nickel Variogram

## Structure Number 2

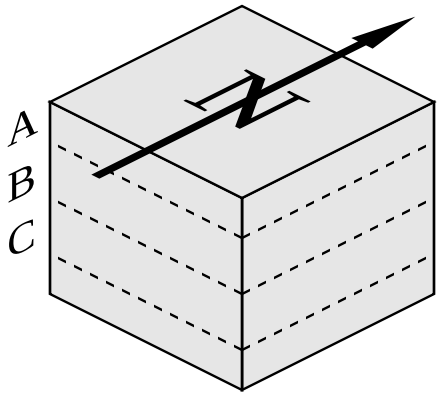
Rose Diagram of Ranges Dipping 60 Degrees
Scale:

600 Units

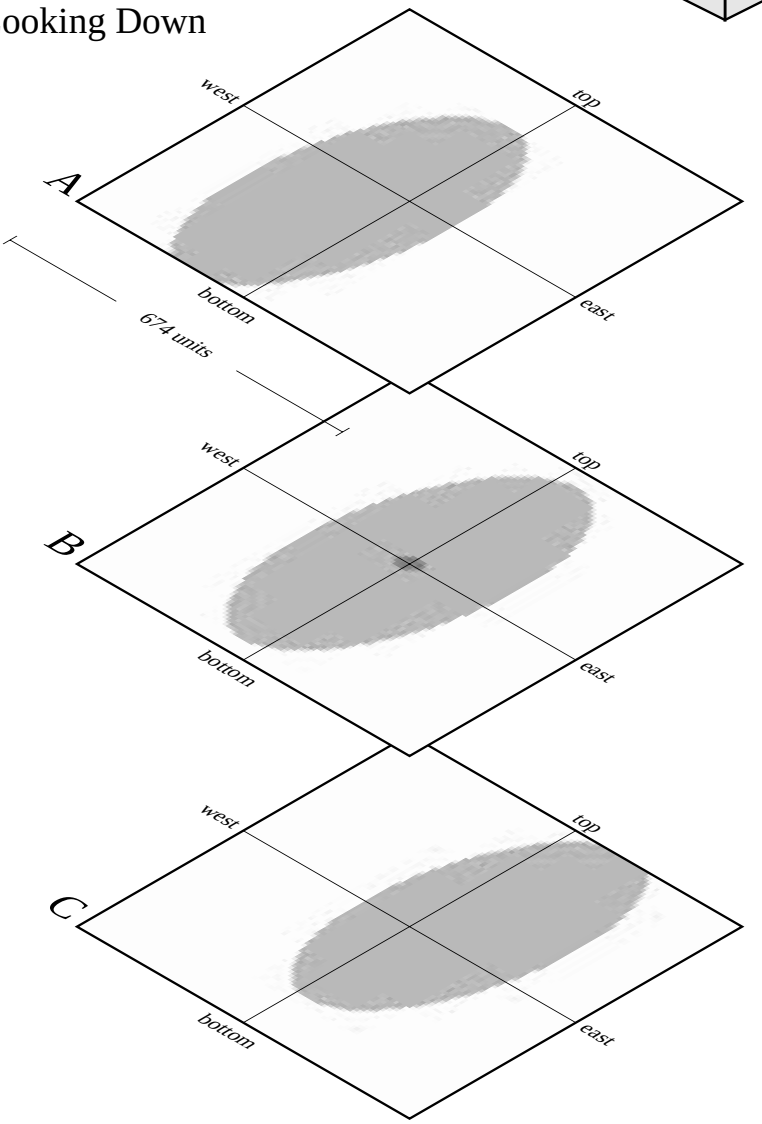


# Horizontal Slices Through the Ellipsoids

Reference Cube



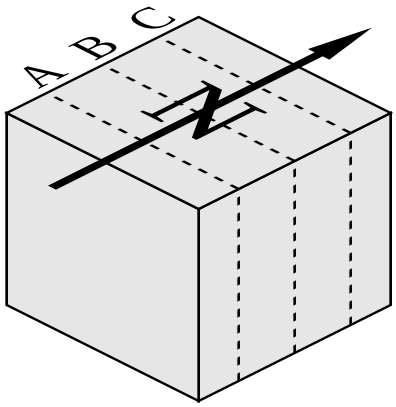

X-Y Planes Looking Down



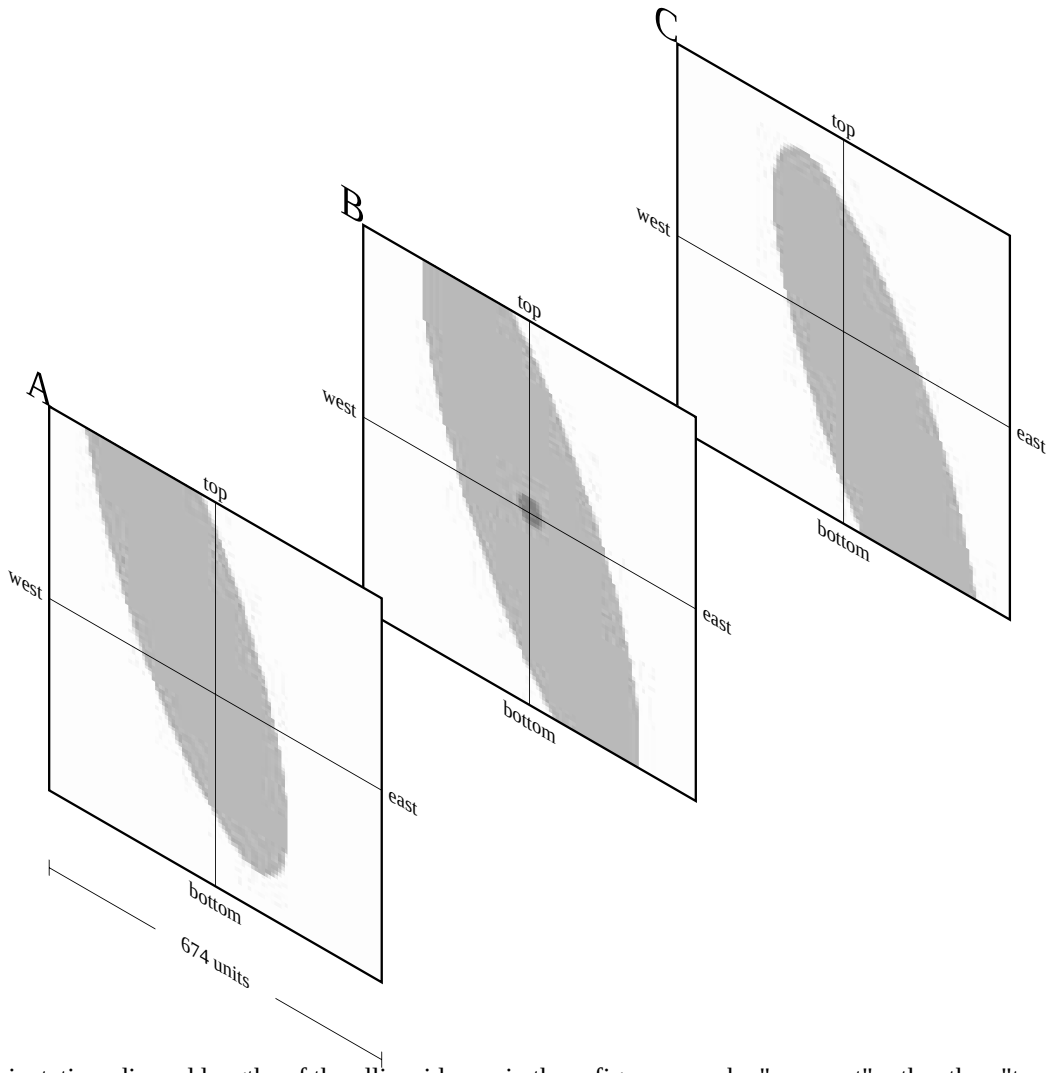

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".

# Cross Section Views Through the Ellipsoids

Reference Cube



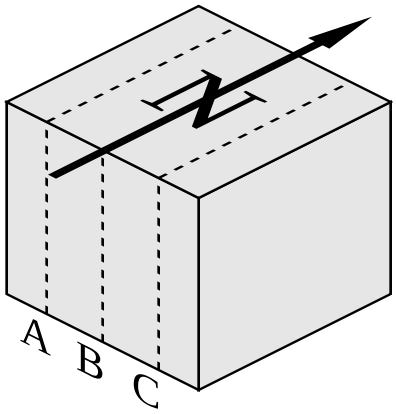

X-Z Planes Looking North



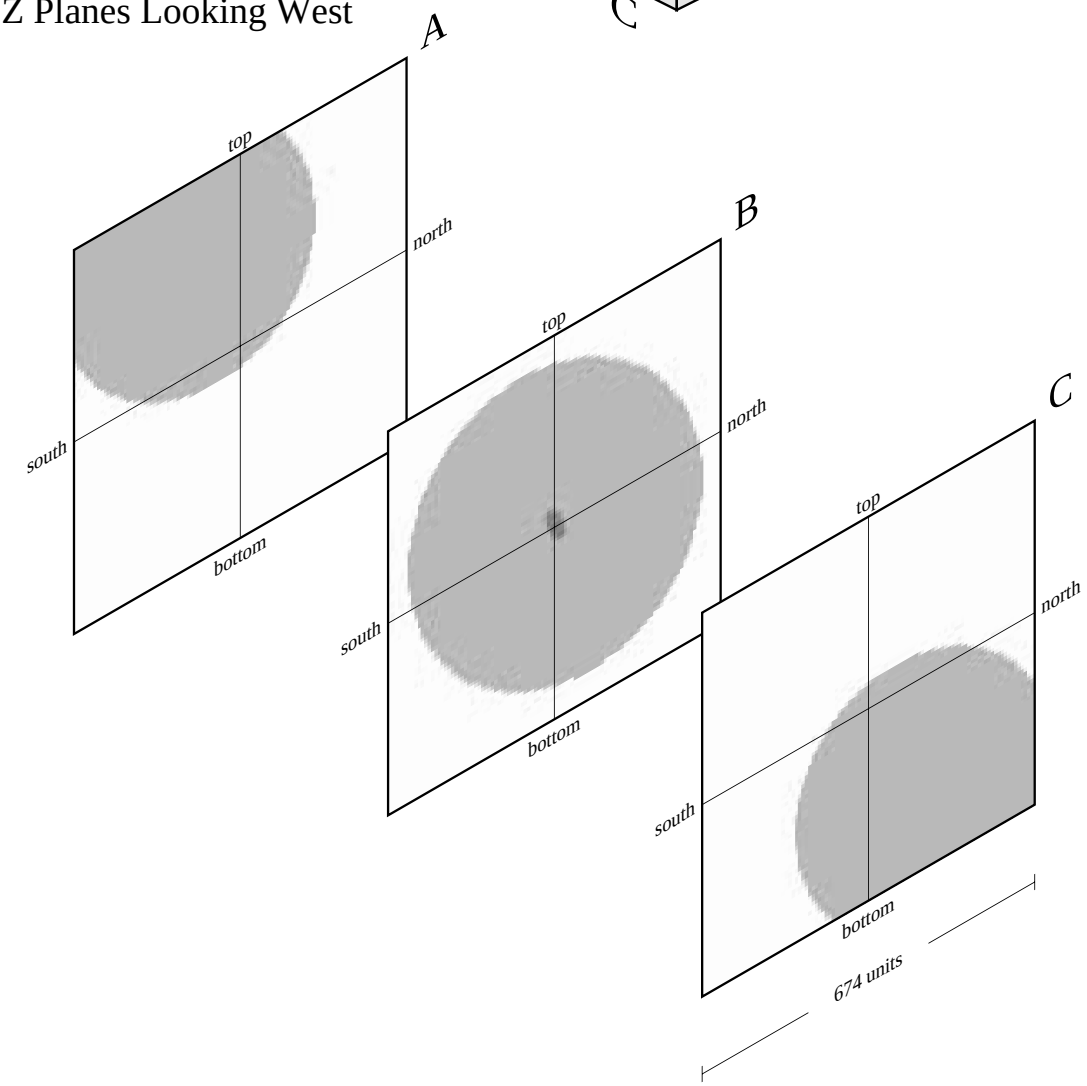

Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".

# Long Section Views Through the Ellipsoids

Reference Cube

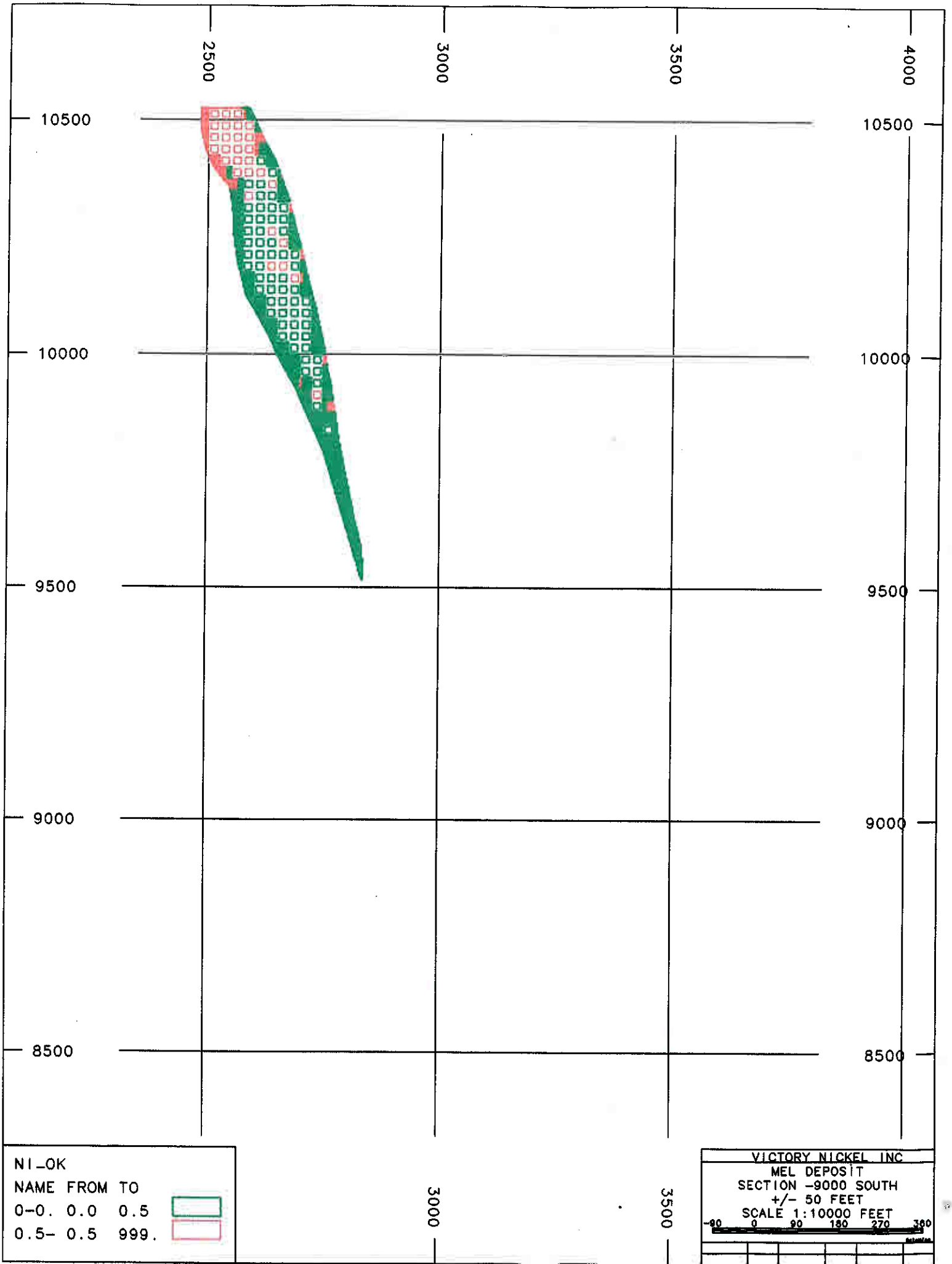


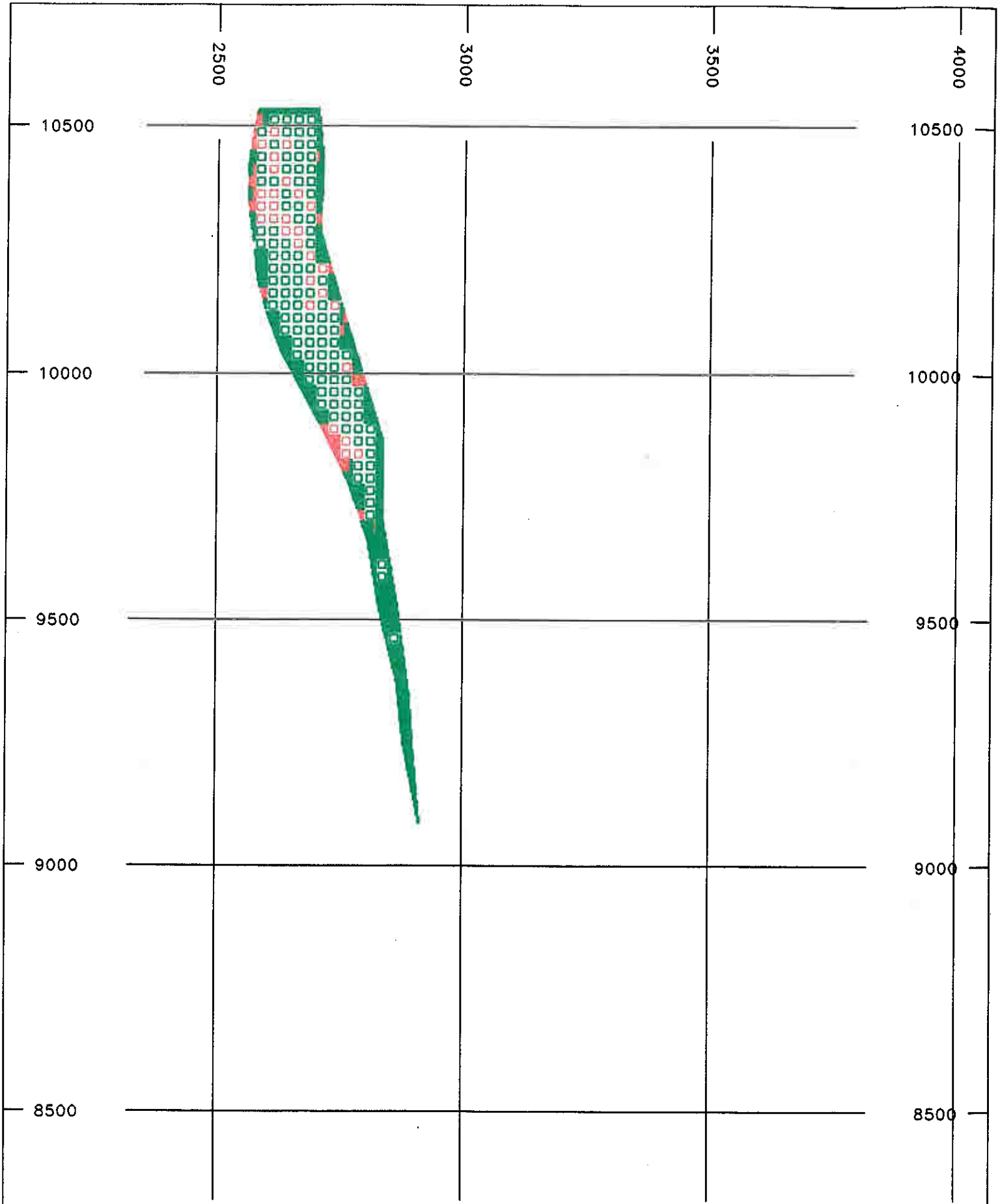

Y-Z Planes Looking West




Note -- the orientation, dip and lengths of the ellipsoid axes in these figures may be "apparent" rather than "true".

# APPENDIX G
# BLOCK MODEL SECTIONS

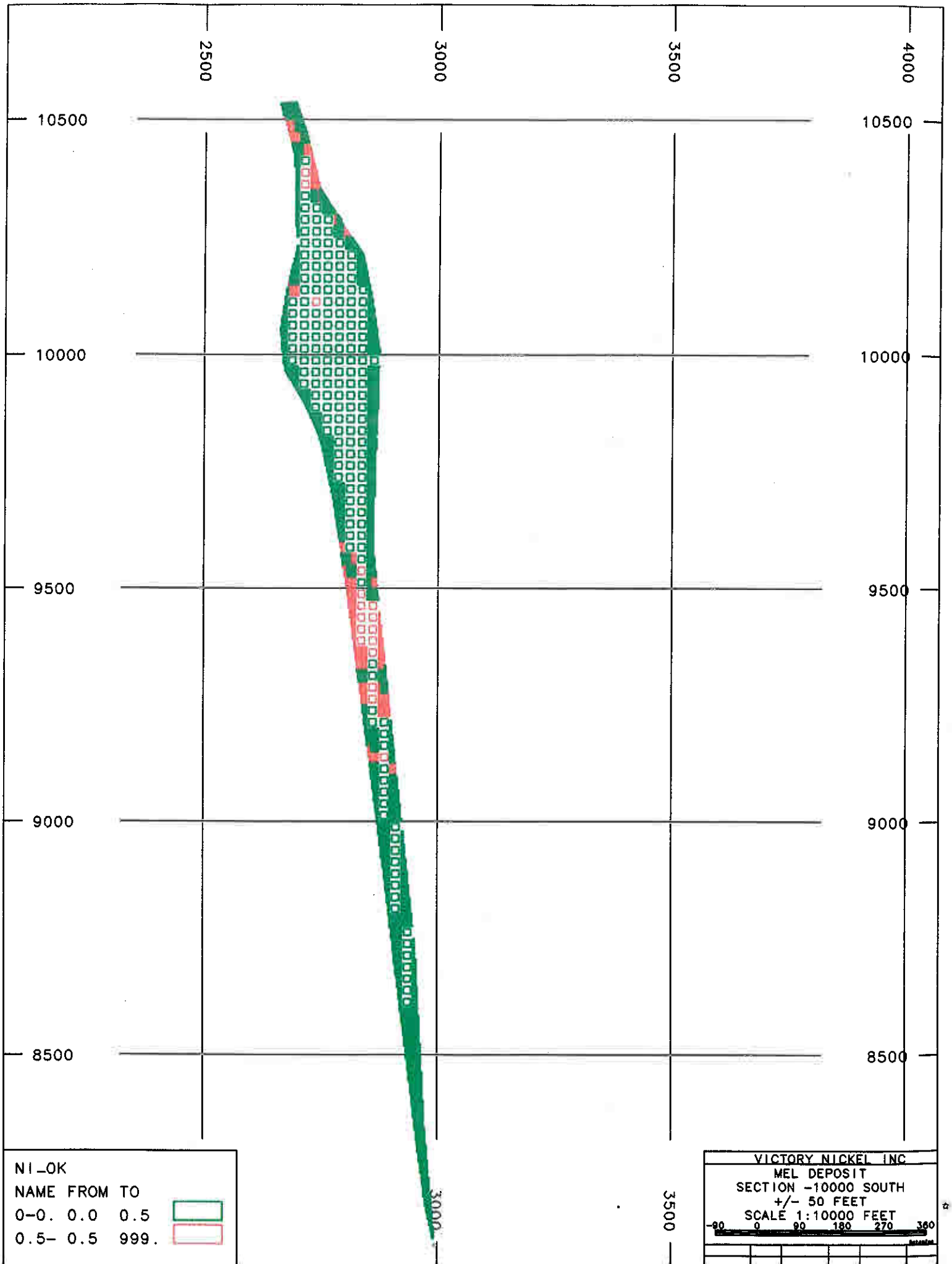

2500
3000
3500
4000
10500
10000
9500
9000
8500
NI_OK
NAME FROM TO
0-0. 0.0 0.5
0.5- 0.5 999.
VICTORY NICKEL INC
MEL DEPOSIT
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+/- 50 FEET
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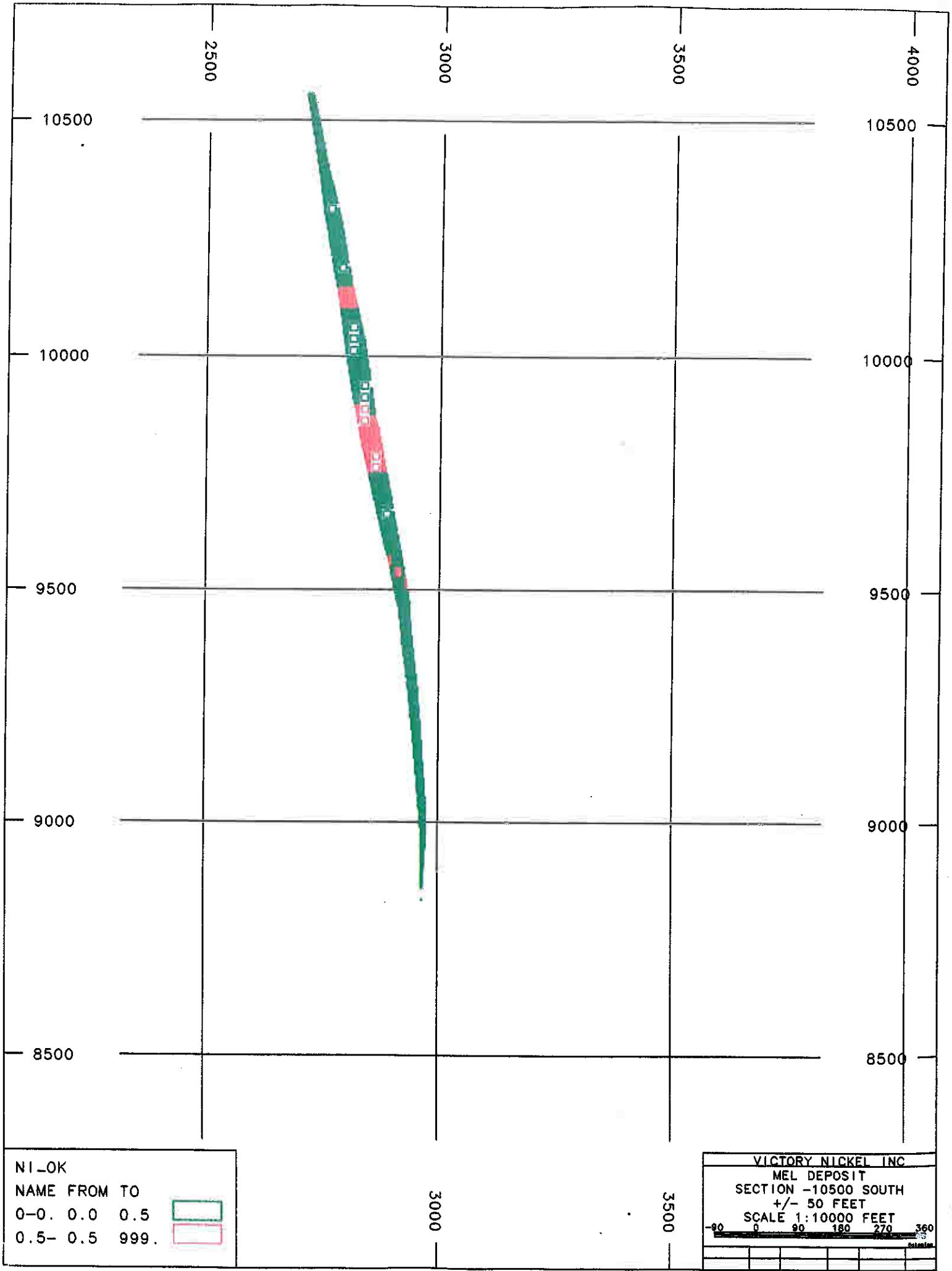


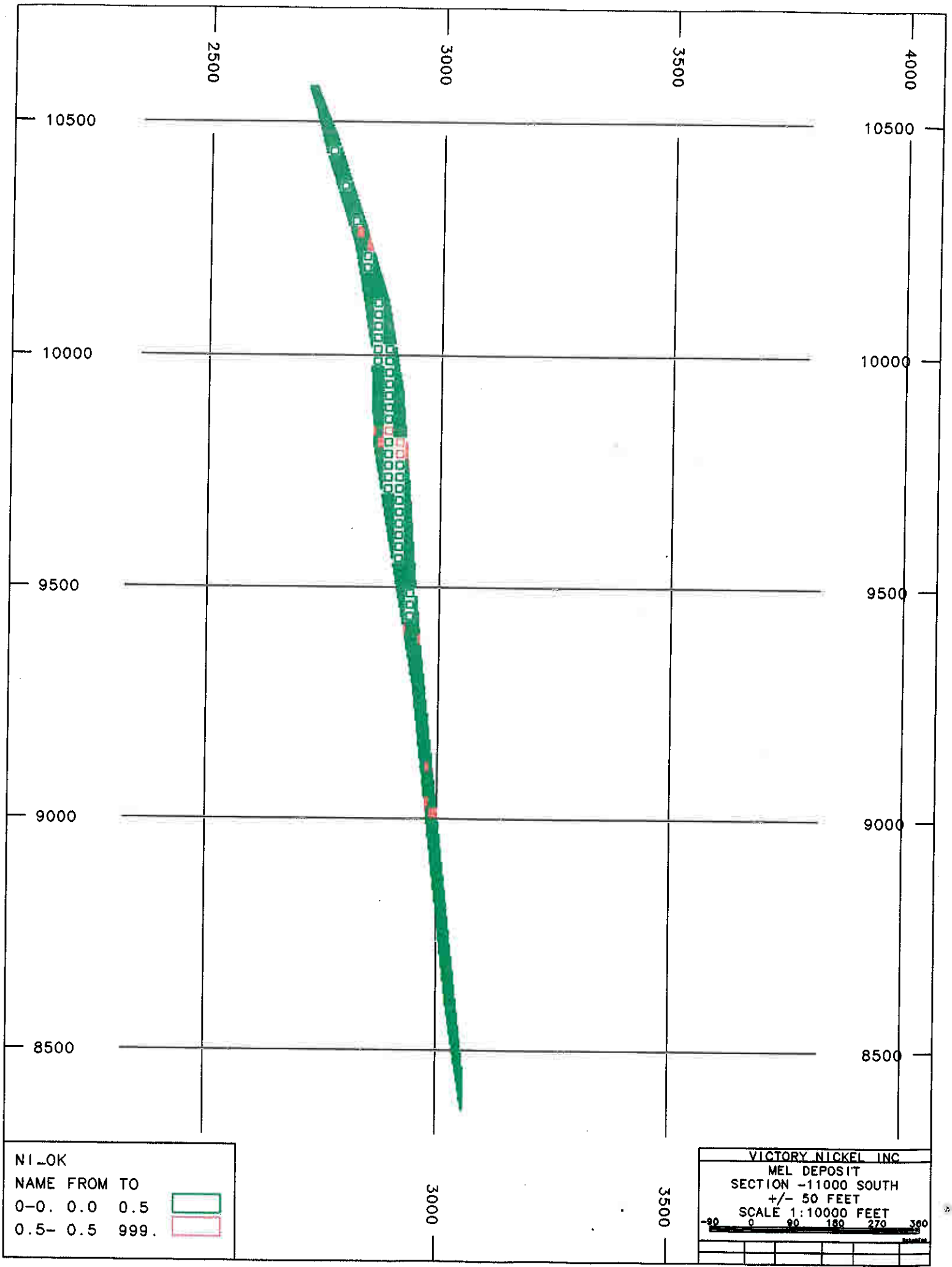

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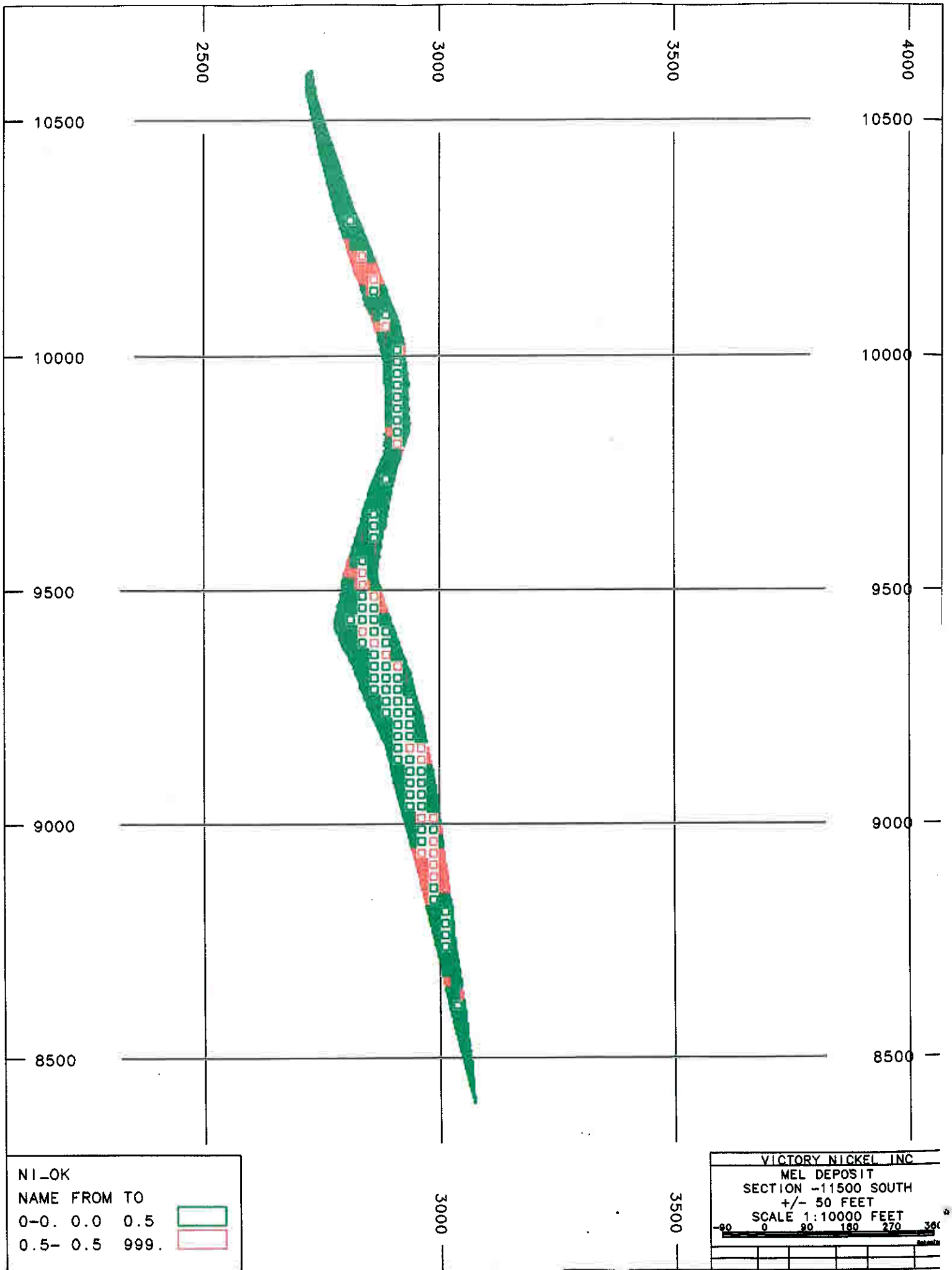
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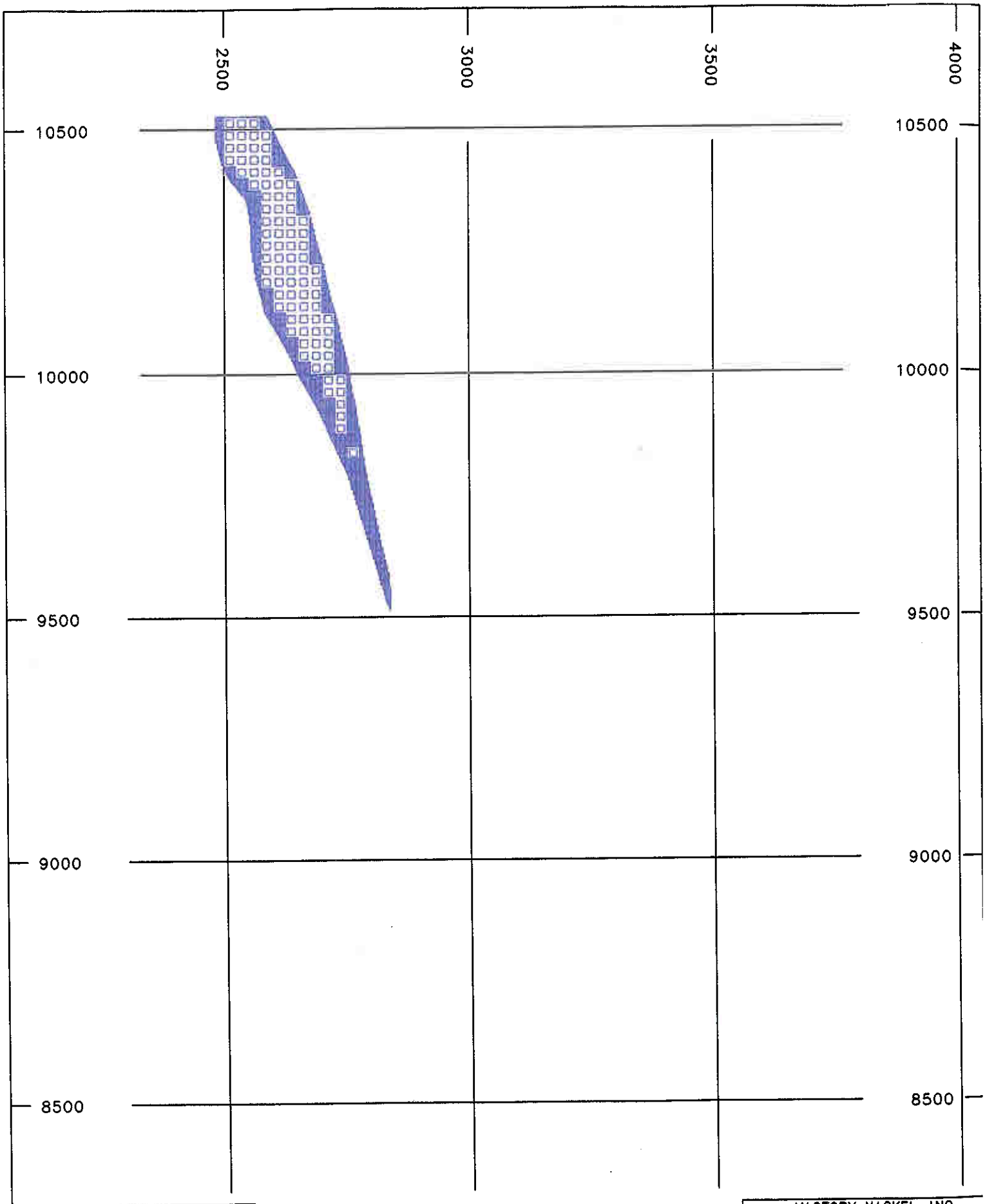
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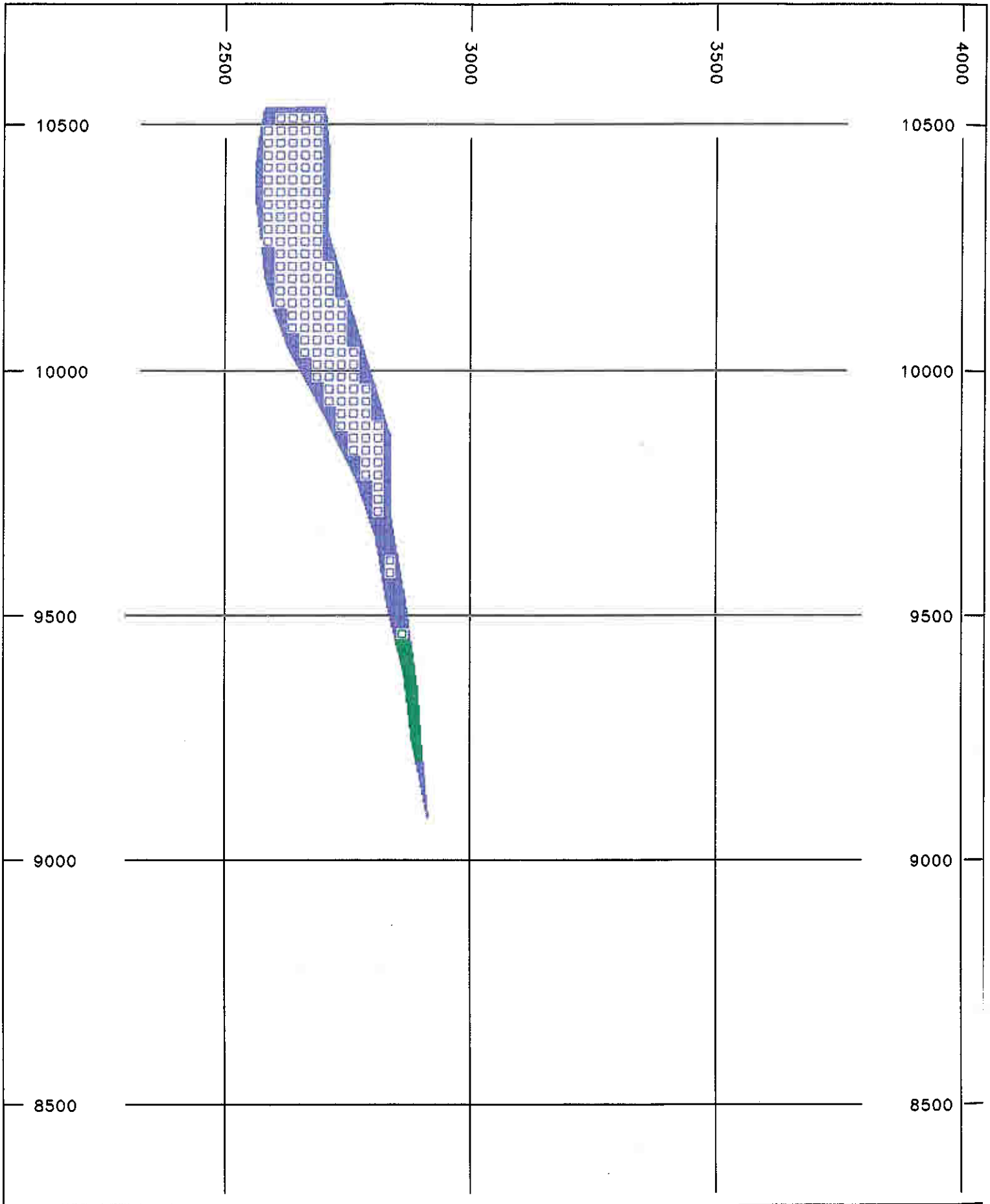

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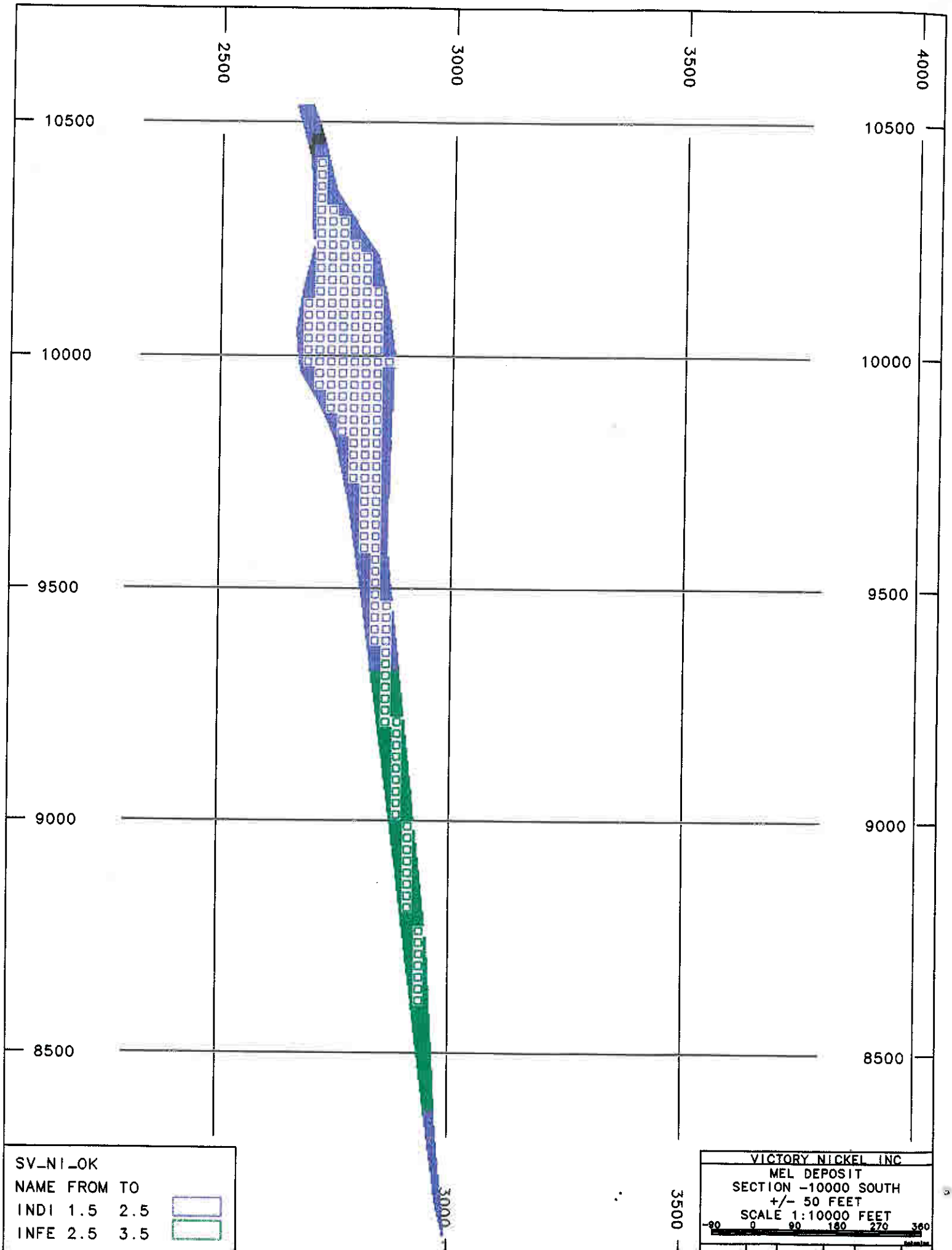
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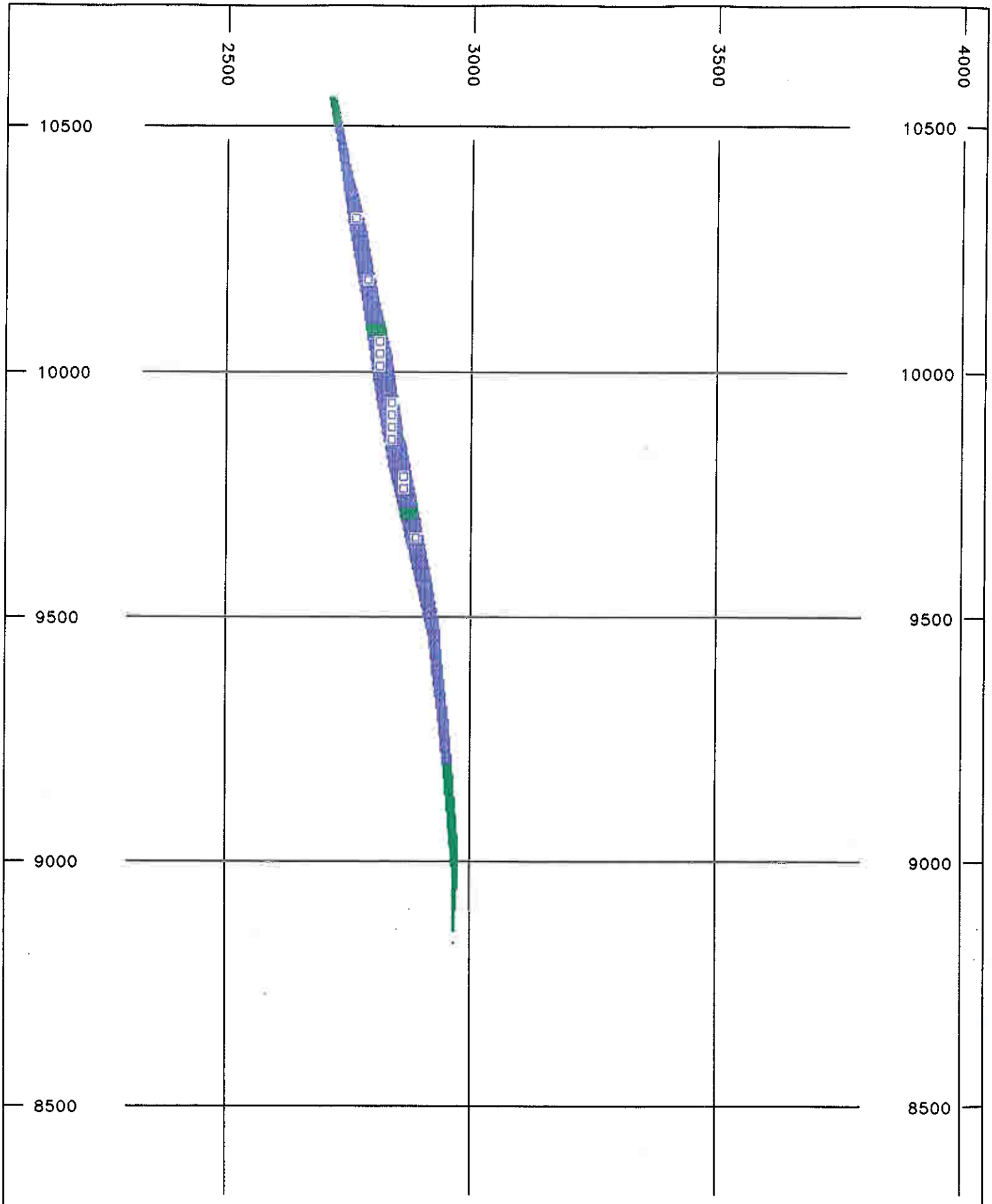



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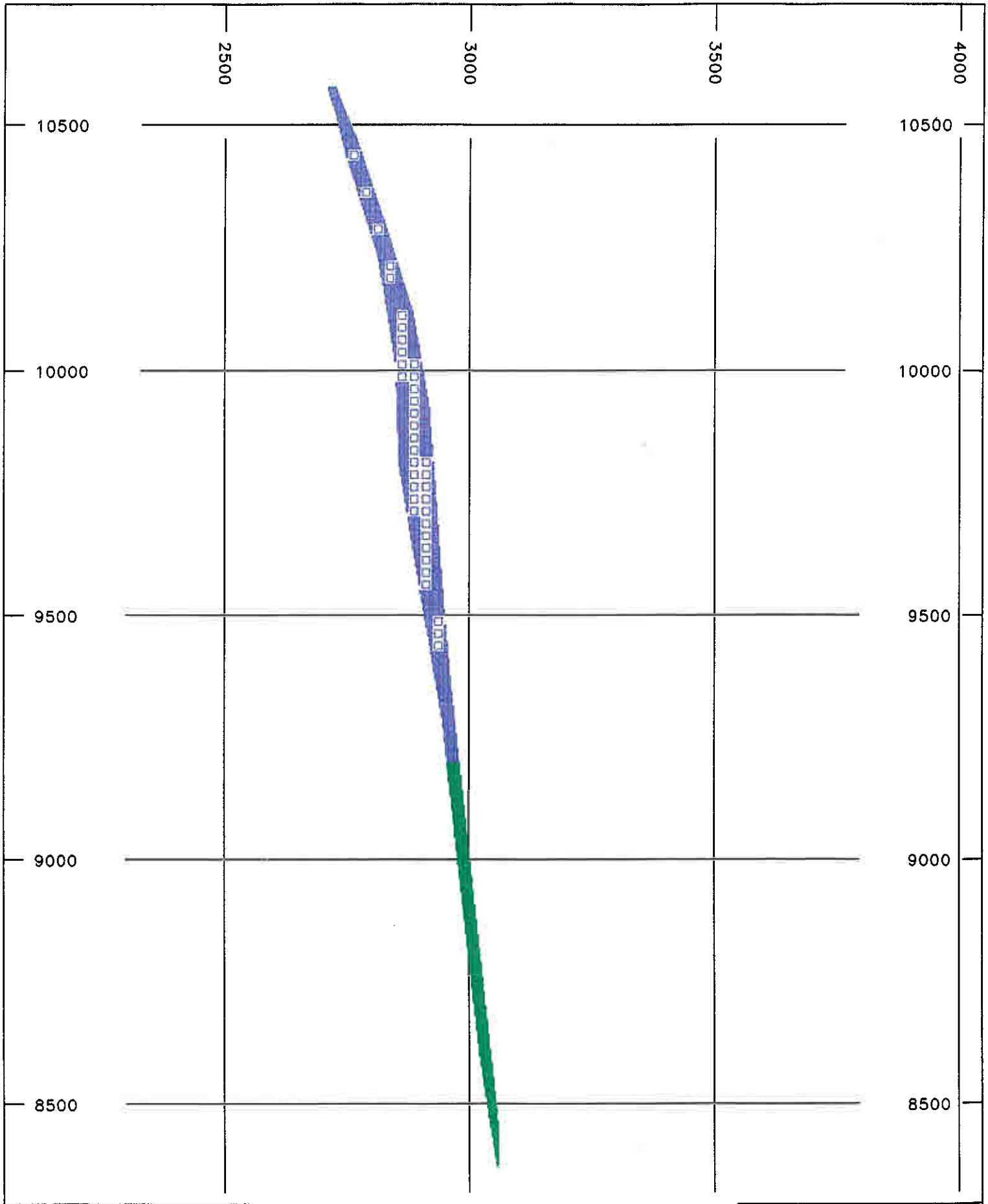

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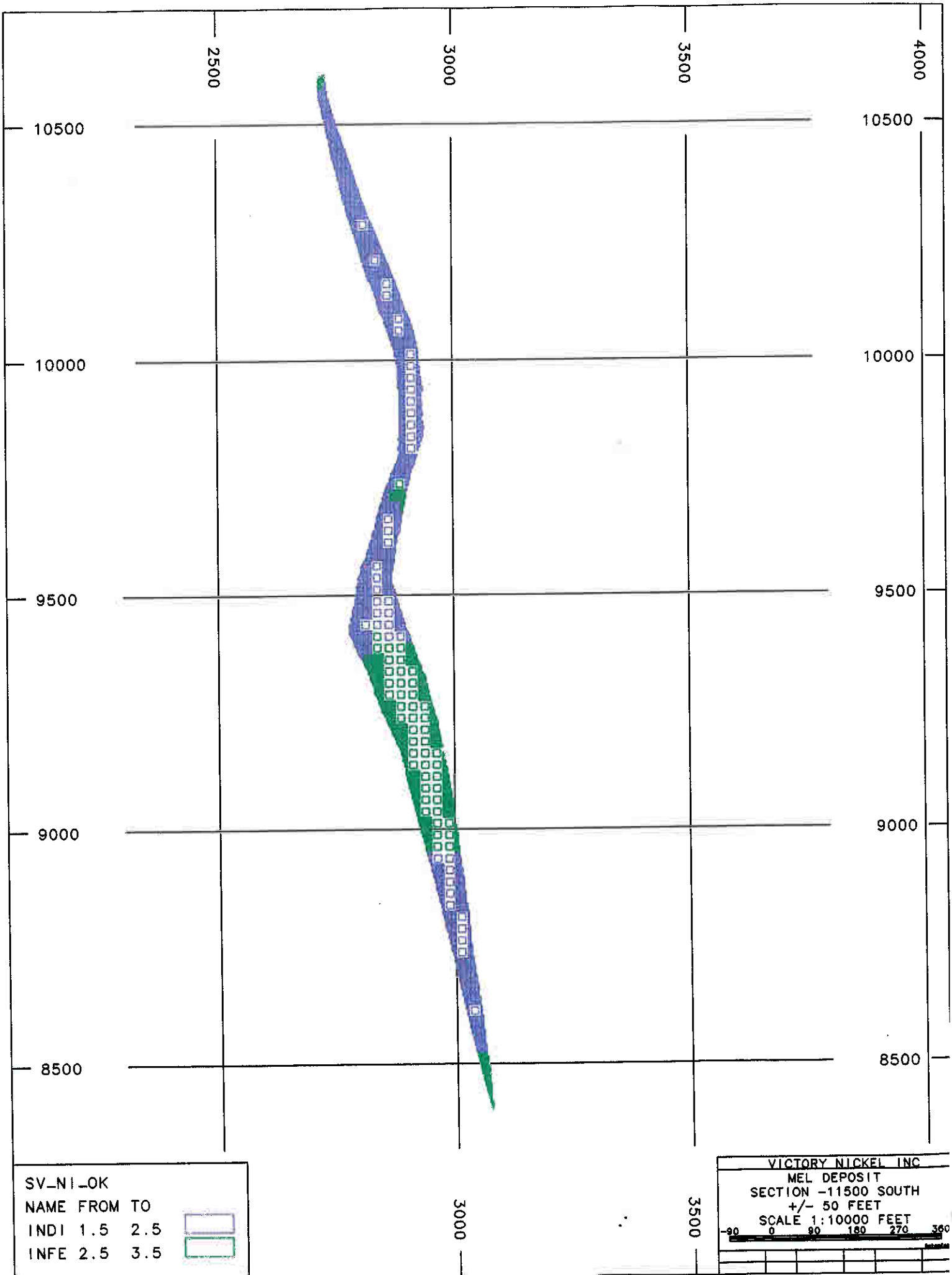
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Report

# Preliminary Economic Assessment
Lac Rocher Nickel Project, Quebec

Submitted to

**Victory Nickel inc.**

ROCHE

O/Ref. : 46946-100

Report

# Preliminary Economic Assessment
## Lac Rocher Nickel Project, Quebec

O/Ref. : 46946-100

Submitted to

**Victory Nickel inc.**


**PREPARED BY :**

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Effective date: November 5, 2008

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# Important Information

This Preliminary Economic Assessment (PEA) has been prepared as a National instrument 43-101 Technical Report, for Victory Nickel Inc.

The information, estimates and conclusions are based on information available at the time of publication, on some data obtained from third parties, and estimations or assumptions described in this report.

The results presented in the PEA are preliminary in nature. The preliminary assessment is based on mineral resources that do not have demonstrated economic viability. The assessment includes resources in the Inferred Category. These are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the preliminary assessment will be realized or that these resources could be upgraded to the Reserves Category upon further analysis of the project.

Note to the reader: unless otherwise specified, costs and values in this report are expressed in the Canadian currency.

# 1. Summary

This report constitutes a Preliminary Economic Assessment (PEA) of the Lac Rocher Nickel Project. The project is based on developing a shallow underground mine (ramp access), extraction of the ore by a mining contractor, and transportation of the ore for custom milling in a processing facility in Chibougamau, Quebec. Metallurgical testing was performed on a low grade sample of material as part of the PEA, and the results used to define a process flowsheet and to estimate concentrate grades and recoveries.

The scenario retained involves the extraction, in two phases, of some 317,730 diluted tonnes of ore, at a grade of 1.57% nickel (Ni). 0.58% copper (Cu) and about 0.053% cobalt (Co), with expected recoveries of respectively 81% (Ni), 91% (Cu) and 95% (Co). This would result in the production of about 38,400 tonnes of a mixed nickel-copper-cobalt concentrate containing some 4,040 tonnes of nickel (8.9 million pounds), 1,680 tonnes of copper (3.7 million pounds), and some 160 tonnes of cobalt (0.35 million pounds).

A pre-tax, 100% equity based cash flow analysis, for base case prices of 8.00 $US/lb Ni, 3.00 $US/lb Cu and 25 $US/lb Co, indicates that the project is not economical at such metals prices, with a Net Present Value (NPV) of about – 13.9 M S

***Location and Access***

The Lac Rocher Property (the property) of Victory Nickel Inc. is located in the northwest quadrant of the Canton 115 area of north-western Quebec. It is 160 kilometres ENE of the town of Matagami. The claims lie 50 km east of Highway 109 (known as the James Bay Route), connecting Val-d'Or with the James Bay hydroelectric installations. The claims are centered on approximately 76°21'W, 50°35'N. To the authors' knowledge, the property has not been legally surveyed at the time this PEA was completed. Access is by all season logging roads extending to approximately 3 km of the property, and then through a winter road to be upgraded as part of the project.

The property is located within the James Bay Lowland, with maximum topographic relief of about 150 metres. At Lac Rocher, a maximum relief of 45 m is present, and overburden is relatively thin, in the order of several metres. The main discovery area lies within the Reservoir Quenonisca, a Hydro-Québec reserve district which could be flooded if a hydroelectric dam is constructed to create this reservoir.

The property is comprised of sixty nine (69) contiguous claim units covering a total area of 1,088 ha. Victory Nickel has obtained a 100% interest in the property. The 20 original claims, which comprise the deposit to be mined, are subject to a production royalty calculated at the rate of 0.50 $ (fifty cents) per ton on all ore mined and milled from the claims for the life of any mine developed.




***Deposit Type and Mineralization***

The property lies near the eastern termination of the 1,000 km long Opatica Subprovince of the Superior Province of the Canadian Shield.

The deposit type targeted at the Lac Rocher Property is a mafic-ultramafic-iron-nickel-copper sulphide association (magmatic hosted nickel sulphide mineralization). Mineralization occurs as disseminated sulphides and as massive sulphide lenses, within a mafic to ultramafic body and within fractures adjacent to its contacts. This type of mineralization is a common source of much of the world's nickel production.

The main geological feature hosted on the claims is a circular mafic intrusion, referred to as the Lac Rocher Pluton. This pluton is a multiphase intrusion composed of gabbro, pyroxenite and peridotite. Contacts of the intrusion with the host rock are relatively sharp, displaying little evidence of *in-situ*

hybridization. The intrusion is pervasively hydrated and displays no penetrative fabric. Pyroxenite and peridotite phases are relatively well defined, indicating that they may be petrogenetically related, and the product of fractional crystallization of a single parent.

The nickel-copper mineralization is associated with both gabbroic and lower pyroxenitic horizons. Disseminated sulphides occur as scattered blebs, generally in the millimetre to one centimetre size range, although rare clasts of massive sulphide up to 10 centimeter are present. In general, percent sulphide increases from 1-5% to 15-20%, and is locally massive at the base. The massive sulphides are especially nickel-rich and copper-poor.

***Exploration and Drilling***

Exploration in the immediate area dates back to 1959, with various companies conducting surveys and drilling on claims within a few kilometres from the property. The nickel-copper-bearing sulphides were first identified in 1994. The claims covering the deposit were acquired by Nuinsco Resources in 1998, and transferred to Victory Nickel inc. upon its creation, in February 2007.

Nuinsco conducted exploration work on the property in 1998, 1999, 2000, 2006 and Victory Nickel did in 2007. This work includes IP, Pulse EM, magnetometer, ground magnetic readings, MaxMin readings, gravity surveys, scan resistivity surveys, and drilling. Drilling was conducted in each of these campaigns.

A total of 97 diamond drill holes have been implemented on the property, for a total length of 19,458 m. A number of those holes were targeted at anomalies in the area and were not used to characterise the Lac Rocher Discovery intrusion. A total of 64 drill holes targeted the Discovery intrusion and were used to estimate the mineral resources in this study. All drill holes were surveyed for both their location and their deviation.

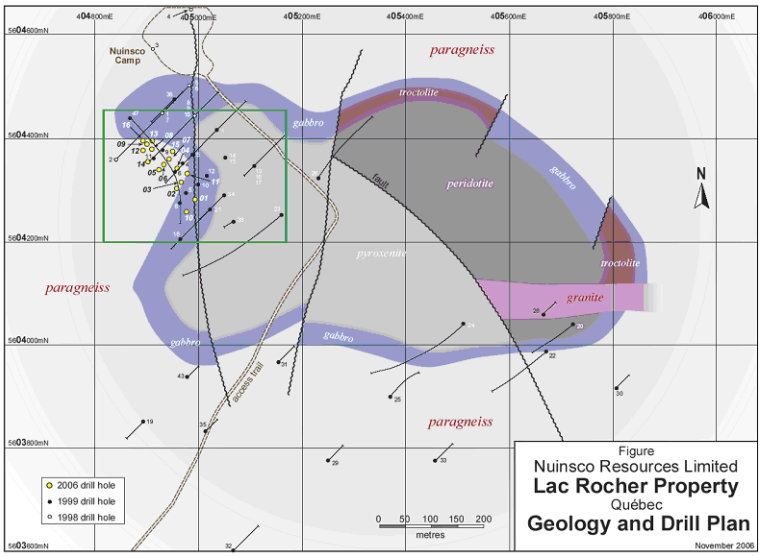
The drill hole database available for this study consists of:

- 64 diamond drill holes;
- 814 down hole survey records;
- 3,750 assay records (Ni, Cu), and 1,157 records for Co;
- 1,453 lithology records.

Drilling outlined a mafic to ultramafic intrusion which is compositionally zoned, roughly ovate in surface plan, and composed predominantly of pyroxenite and peridotite. It has the dimensions of approximately one kilometre along an east-west axis and 450 m in a north-south direction.

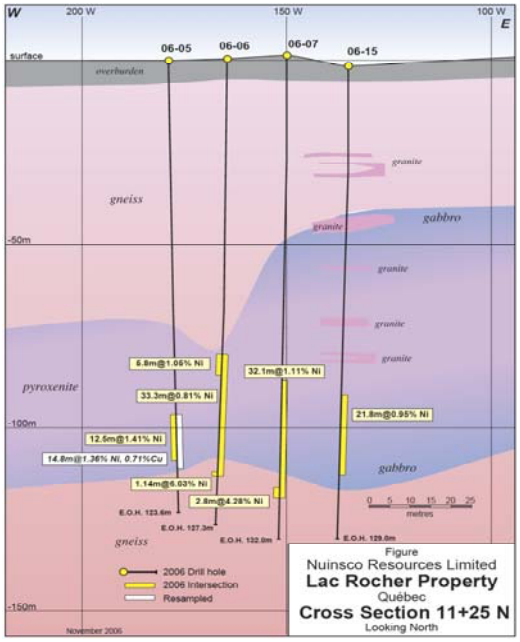
Sulphide mineralization of significance occurs as broad domains of disseminated and intercumulate aggregates of pyrrhotite, pentlandite, chalcopyrite and minor pyrite. Massive sulphide mineralisation has been intersected in 12 drill holes.

Higher concentrations of sulphide occur predominantly within pyroxenite, while gabbro hosts disseminated sulphide. In general, the sulphide content increases towards the footwall contact of the pyroxenite intrusion. Massive sulphides occur as lenses within the pyroxenite, at its footwall contact or within the paragneiss at close proximity with the pyroxenite contact. The massive sulphide intervals are composed of a fine grained pyrrhotite-rich groundmass enveloping coarse grained rosettes of pentlandite, irregular, small aggregates of chalcopyrite, and rare irregular pyrite aggregates.




Outside of the discovery intrusion, diamond drilling of airborne E.M., magnetic, Induced Polarisation and gravity anomalies failed to intersect any mineralization of any type. The representative cross-section illustrates the relationship between geology, drill-hole locations and mineralization.

### *Sampling and Analyses*




Sampling focused on mineralised mafic to ultramafic units. Sample intervals ranged from less than 1 m to 1.5 m. Depending on the year, some of the core is split and other is sawed. The geologist logging the core marks it and places a sample tag in the core box. Tags are also made for blanks and standards to be placed in the sample stream (approximately 5% of the samples). Blanks were placed immediately after massive sulphide samples. The core is then cut and half of the core is placed into a bag with the tag. The samples would then be taken to a laboratory for assay. Standard control procedures have been followed, including a duplicate analysis every 12$^{th}$

sample. Blanks were introduced after massive sulphide samples, in order to reduce the potential for contamination.

***Data verification***

No data verification was performed as part of this Preliminary Assessment. This was described in a mineral resource Technical Report by Ted Goettel, geol., December 6, 2006.

***Metallurgical Testing***

A mineralogical study and flotation test work program was conducted by Corem on a composite of drill core sample representative of the lower grade part of Victory Nickel's Lac Rocher deposit. As part of the PEA project, engineers from Bumigeme Inc. were involved in the follow-up of Corem's testwork, and provided technical assistance.

The ~50 kg composite was prepared by Mr. Chris Wagg, a Qualified Person. The composite of uncrushed samples of diamond drill core intersections was prepared to represent the lower grade part of the Lac Rocher resource.

Independently of the PEA, a mineralogical investigation and metallurgical test work program was conducted by Xstrata Nickel on behalf of Victory Nickel. The program was conducted on a composite sample prepared from drill core intersections in the higher grade part of the Lac Rocher resource. Results obtained showed that the composite was readily amenable to the Xstrata flotation process.

The purpose of the test work on the lower grade sample was to generate the information required to develop the flowsheet of a flotation process permitting to recover the highest possible percentage of nickel and copper content of the resource into a mixed concentrate grading a minimum of 10% Ni and meeting all specifications generally set forth in nickel concentrates smelting contract specifications. This objective was met by conducting 14 grinding-flotation tests.

***Head Sample for Grinding-Flotation testing***

The material used for metallurgical testing was assayed at 1.36% Ni, 0.47% Cu and 0.04% Co. Its Bond Work Index was determined at 13.4 kWh/t.

***Mineralogical Investigation***

Pentlandite is the major nickel-bearing phase identified. It mainly occurs as contact grains as well as ex-solution flames within pyrrhotite. Chalcopyrite was the only copper-bearing phase observed. Other sulphides minerals present are mostly pyrrhotite, with some pyrite present. The liberation particle size for pentlandite has been estimated to be around 50-60 μm.

Major gangue minerals are silicates, mostly actinolite (amphibole), phlogopite and chlorite.

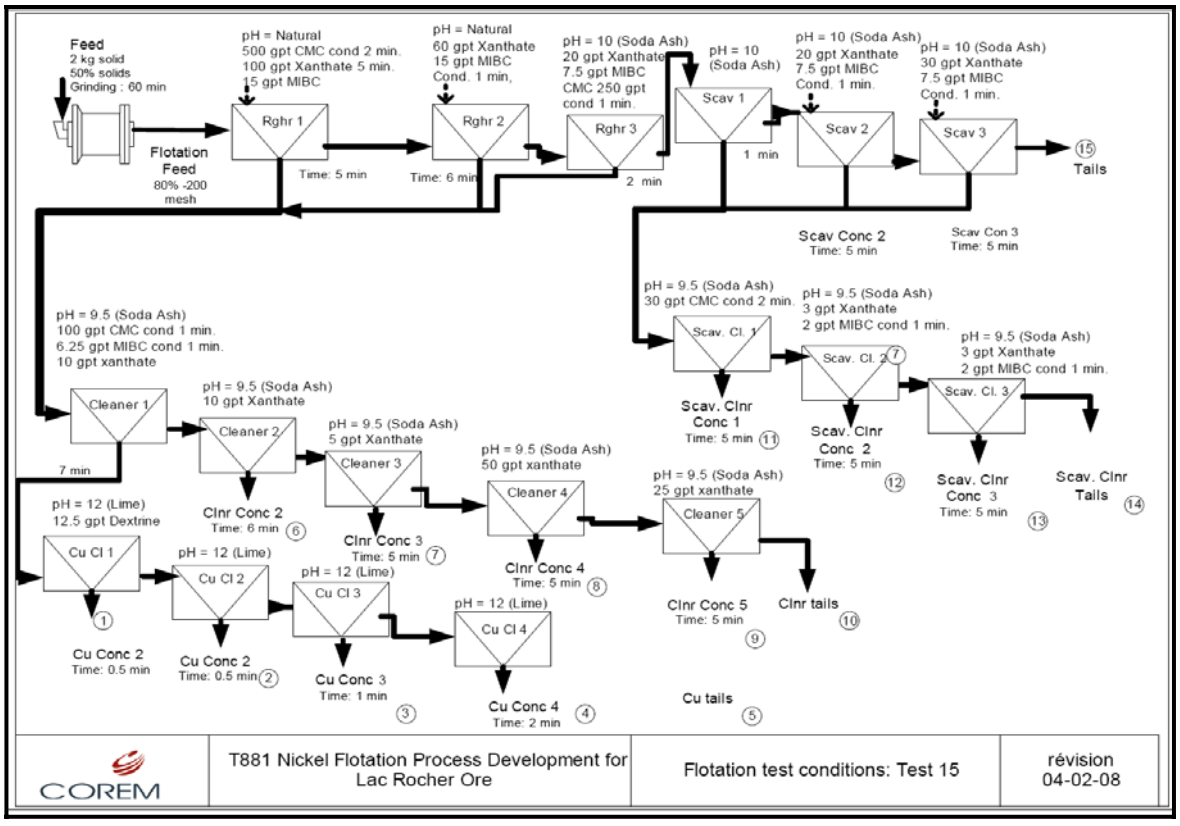
Magnetic testing indicated that the pyrrhotite has a very low magnetic susceptibility and that there is negligible nickel enrichment in the magnetic fraction. Therefore, magnetic separation cannot contribute to improve the overall efficiency of the flotation process.

### *Flotation Testwork*

The primary objective of the flotation testwork was to develop the flowsheet of a process capable of recovering the highest possible percentage of the nickel in concentrate grading a minimum of 10% Ni. Preflotation and direct flotation tests were conducted on 2 kg samples. Some tests also verified the possibility of extracting a high-grade copper concentrate from the mixed Ni-Cu concentrate. With high copper grades but low recoveries, this option was deleted from the process.

Direct flotation was determined to be the best process approach, with a rougher-cleaner configuration producing a mixed concentrate respecting the testing objectives.

Final tests provided concentrates assaying between 10% Ni and 11.6% Ni, 3.9% Cu to 4.3% Cu, and 0.32% Co to 0.38% Co. Recoveries ranged from 77% and 83% for nickel, 91% to more than 94% for copper, and more than 95% for cobalt. The impurities present in the final concentrates were all below typical penalty levels in smelter specifications.



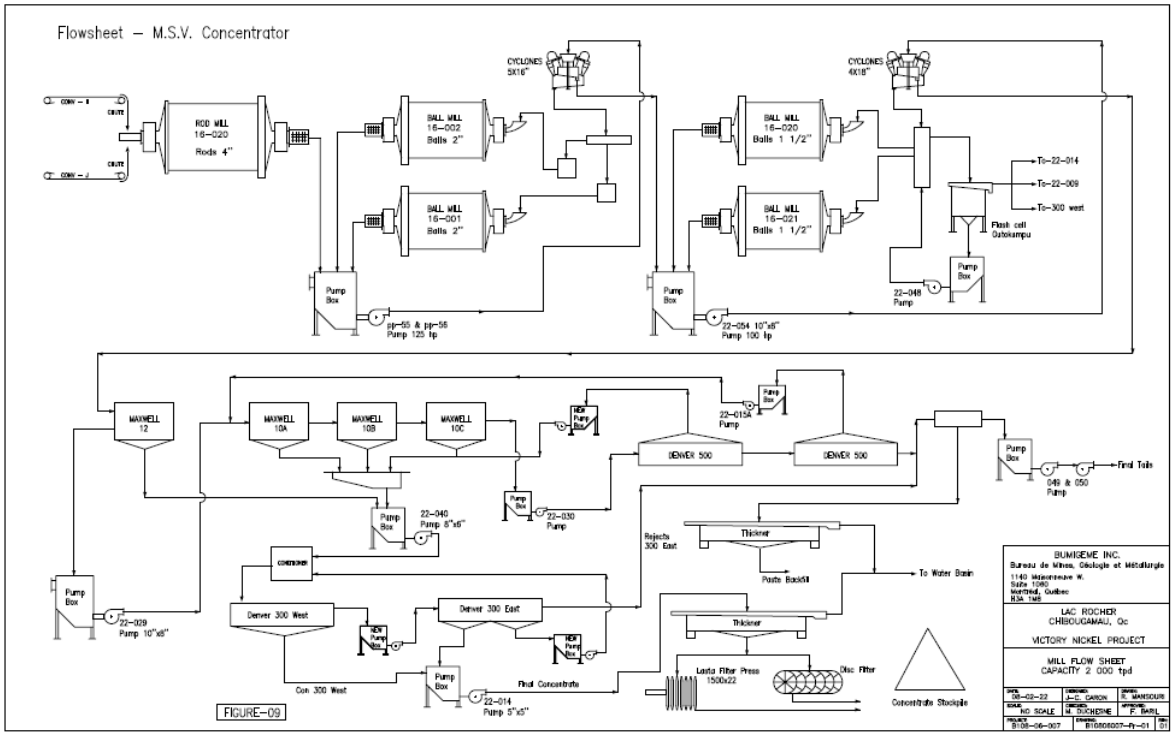
### *Mill Flowsheet*

The proposed flowsheet was developed on the basis of the results of the test work program as well as on the hypothesis that the Lac Rocher resource would be custom milled in the Copper Rand (MSV) concentrator, modified to meet the process requirements.

The proposed flowsheet includes modifications to the testwork flowsheet to: convert the fourth rougher stage into a scavenger stage and recirculation of the scavenger concentrate ahead of the rougher circuit; convert the fifth cleaner stage into a scavenger-cleaner stage and recirculation of its concentrate ahead of the cleaner circuit; and deleting the scavenger stages used during testing.

### *Process Criteria*

Required modifications to the Copper Rand processing plant in Chibougamau are not important. They include an exterior ore pad, two new steel bins (total capacity of 3,000 t) with ore feeders and a scale, two conditioners with pumps and associated piping, two reagent feeders, and modifications to the concentrate storage area for separate storage of the Lac Rocher concentrate.




Primary crushing of the ore will be performed at the mine site, to facilitate handling and transportation. The nominal feed rate to the processing circuit will be about to 2,200 t/d (91 t/h). The mill will process Lac Rocher ore on a seven days per month basis, for a total of 14,000 – 16,000 t/ month.

Crushing and grinding will be performed in existing circuits, with crushed ore stored in the two new ore silos. Grinding fineness will be 80% passing 74 μm.

Flotation will also use existing equipment. Reagents for flotation are potassium amyl xanthate (PAX) as collector, CMC as a gangue depressant, MIBC (frother) and some flocculent. Soda ash was used during metallurgical testing for pH control, when lime was found to have a slowing effect on flotation kinetics. Additional testing is recommended to assess the possibility of achieving the target grades and recoveries using lime, which is the current pH control reagent used in the Copper Rand mill.

Flotation tailings of the Lac Rocher ore will be acid-generating, with an average sulphur content of about 1.7%. Tailings will be disposed of in the same fashion as already practised at the Copper Rand facility, which is by rejecting in the downstream section of the existing tailings disposal facility, so they are submerged at all times.

Tailings tonnage produced by the processing of some 317,730 t of ore will be approximately 285,000 t, occupying about 190,000 $m^3$ after settling. Underwater spare storage capacity of the existing tailings disposal facility is estimated at 2.3 $Mm^3$ (end of December 2007). This is sufficient to accommodate the Lac Rocher tailings, in addition to the estimated 450,000 $m^3$ to be produced from processing the ore from the Copper Rand mine.

***Mill and Processing Costs***

The cost of modifications to the existing mill, including two new ore bins, is estimated at 864,000 $. Total processing costs are estimated at 24.18 $/t, including ore re-handling from the stockpiling area at the processing facility, concentrate loading and tailings disposal.

***Expected Metallurgical Performance***

The Lac Rocher flowsheet process was developed on the basis of the results obtained from open circuits. To the three rougher stages in the flowsheet of the last laboratory test, a $4^{th}$ stage is recommended, which will slightly pull a pentlandite scavenger concentrate recirculated to the rougher circuit. Similarly, the $5^{th}$ stage of the laboratory cleaning circuit will scavenge a concentrate recirculated to the head of the cleaning circuit.

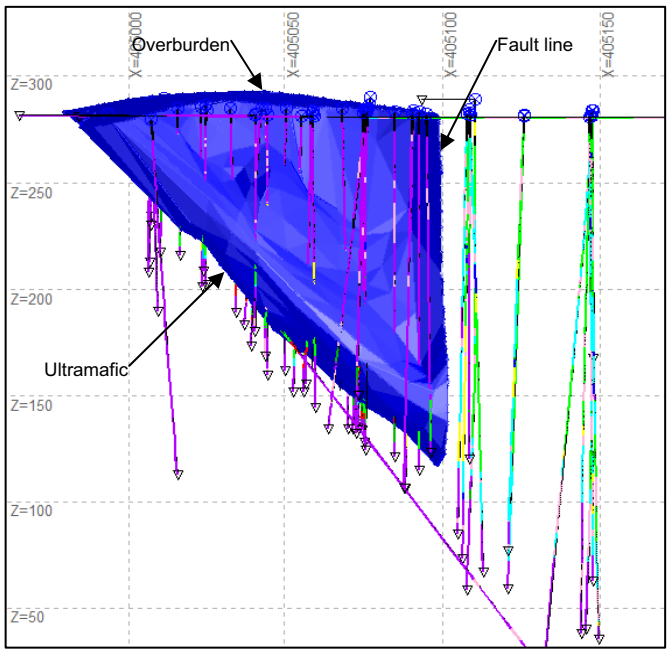
Based on results obtained from the last two laboratory tests, Bumigeme Inc. (responsible for the metallurgical aspects in the PEA) concludes that:

*"The milling of that part of the Lac Rocher resource having grade and mineralogical characteristics similar to those of the composite tested by Corem will recover a minimum of 81% of the nickel, 91% of the copper and 95% of the cobalt, in a concentrate grading 10.5% Ni, 3.9% Cu and 0.33% Co, and meeting the specifications set forth in the proposed Smelting Contract for being penalty free."*

The milling of higher grade sections of the resource at Lac Rocher is likely to result into a higher nickel recovery with similar grades of concentrate. This remains to be confirmed by actual processing of a bulk sample or additional testing. Some testing is recommended in the areas of grinding, stage addition of the gangue depressant, substitution of soda ash by lime, and laboratory testing using the existing Copper Rand flowsheet.

***Mineral Resources – Geological Interpretation***

Mineral resources were estimated for the first time in 2006 and were reported in the Technical Report, Goettel, 2006. Within the scope of this Preliminary Economic Assessment, it was decided to update the resource model previously made with the new 2007 drilling results, and incorporate copper and cobalt data in the model. It is important to note that there are no mineral reserves estimated within the scope of this study.




Using lithologic information from the drill hole logs, the contact between the gneiss host rocks and the ultramafics has been modeled in the form of a contact surface delineating the intrusion to the west. To the east, a major fault limits the extent of the mineralised envelope. These features form a sort of cone opening up toward the surface. The approximate volume of the mineralised envelope is 958,200 $m^3$.

Massive sulphide mineralization, very different from the bulk of the Ni-Cu mineralization in the ultramafic intrusion, has been identified. The massive sulphide lens lies directly on the contact between the gneiss and the ultramafic intrusion. It is relatively small in size. The volume of the massive sulphide lens is approximately 5,500 $m^3$.

The ultramafic intrusion is cut by several granitic dykes whose location and size are very erratic. The dykes are totally barren. The current geological interpretation of these dykes needs to be refined. They do not intersect the massive sulphide lens. The volume occupied by the interpreted granitic dykes is currently estimated at approximately 58,000 $m^3$.

### *Mineral Resources – Block Model Interpretation*

The mineral resources of Lac Rocher have been estimated using 3D block modelling with Inverse Distance interpolation. Composites 1.5m in length were created from the drill hole assay data, and separated by mineral type (massive sulphide and ultramafic intrusion) for estimation in 2 x 2 x 3 m blocks.

### *Classified Mineral Resources*

The mineral resources are derived from the accumulation of the resource model blocks, by category, above certain cut-off grades. The estimated mineral resources are categorised into the Measured, Indicated or Inferred categories, for a variety of Ni cut-off grades. This classification is based on the proximity of available drill holes and samples within given elliptical radii. Mineral resources related to cobalt have been classified separately from those related to nickel and copper. Cobalt mineral resources have been classified solely in the Inferred Category. Cobalt has been added to the scope of this study at the very end and no documentation or QA/QC was available. Cobalt mineral resources and related assumptions must be treated with caution.

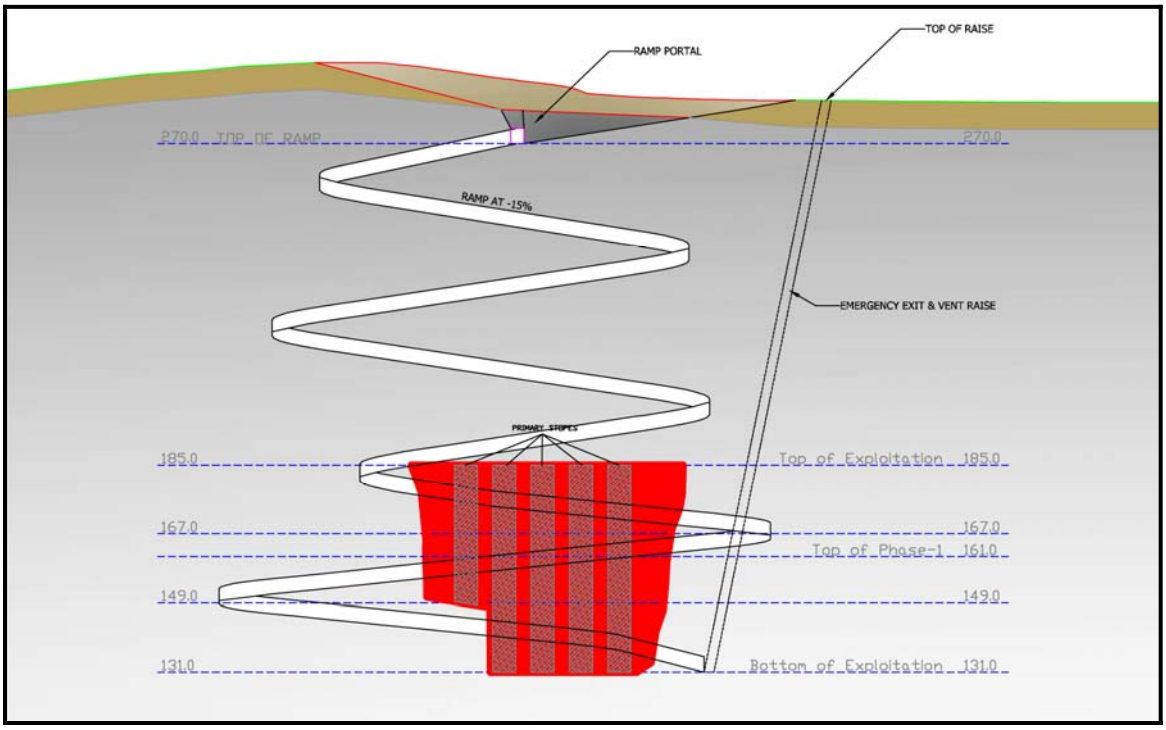
| | Measured | | | Indicated | | | Measured + Indicated | | | Inferred | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ni % cutoff | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % |
| 0.5 | 285,918 | 1.23 | 0.77 | 513,183 | 1.05 | 0.62 | 799,101 | 1.12 | 0.68 | 439,279 | 0.65 | 0.41 |
| 0.75 | 170,392 | 1.65 | 0.98 | 241,041 | 1.56 | 0.85 | 411,433 | 1.60 | 0.90 | 56,927 | 1.18 | 0.55 |
| 1 | 106,669 | 2.12 | 1.16 | 139,278 | 2.08 | 1.04 | 245,946 | 2.10 | 1.09 | 22,337 | 1.67 | 0.59 |
| 1.25 | 75,150 | 2.55 | 1.31 | 96,164 | 2.51 | 1.18 | 171,314 | 2.53 | 1.24 | 12,943 | 2.10 | 0.62 |
| 1.5 | 56,822 | 2.93 | 1.45 | 71,426 | 2.91 | 1.29 | 128,248 | 2.92 | 1.36 | 10,117 | 2.30 | 0.67 |
| 1.75 | 44,808 | 3.28 | 1.57 | 54,489 | 3.31 | 1.39 | 99,296 | 3.29 | 1.47 | 6,531 | 2.64 | 0.80 |
| 2 | 36,620 | 3.60 | 1.67 | 43,315 | 3.68 | 1.48 | 79,935 | 3.64 | 1.57 | 3,549 | 3.32 | 1.03 |
| 2.25 | 30,444 | 3.90 | 1.72 | 36,285 | 3.98 | 1.55 | 66,729 | 3.94 | 1.63 | 3,074 | 3.50 | 1.09 |
| 2.5 | 26,287 | 4.14 | 1.76 | 30,637 | 4.28 | 1.61 | 56,924 | 4.22 | 1.68 | 2,772 | 3.62 | 1.12 |
| 2.75 | 22,522 | 4.40 | 1.80 | 25,221 | 4.63 | 1.67 | 47,742 | 4.52 | 1.73 | 2,386 | 3.79 | 1.15 |
| 3 | 19,020 | 4.68 | 1.83 | 21,878 | 4.90 | 1.74 | 40,898 | 4.80 | 1.78 | 1,969 | 3.98 | 1.21 |
| 3.25 | 16,722 | 4.89 | 1.88 | 19,558 | 5.12 | 1.78 | 36,280 | 5.01 | 1.83 | 1,571 | 4.21 | 1.24 |
| 3.5 | 14,493 | 5.12 | 1.89 | 17,259 | 5.35 | 1.81 | 31,751 | 5.25 | 1.85 | 1,130 | 4.53 | 1.28 |
| 3.75 | 12,368 | 5.38 | 1.90 | 15,116 | 5.59 | 1.82 | 27,484 | 5.50 | 1.86 | 1,009 | 4.63 | 1.30 |
| 4 | 10,555 | 5.64 | 1.88 | 13,660 | 5.78 | 1.81 | 24,214 | 5.72 | 1.84 | 927 | 4.70 | 1.31 |
| 4.25 | 9,286 | 5.85 | 1.89 | 12,221 | 5.97 | 1.80 | 21,507 | 5.92 | 1.84 | 728 | 4.85 | 1.37 |
| 4.5 | 8,393 | 6.01 | 1.91 | 10,537 | 6.22 | 1.82 | 18,929 | 6.13 | 1.86 | 566 | 5.01 | 1.44 |
| 4.75 | 7,326 | 6.20 | 1.88 | 9,033 | 6.49 | 1.83 | 16,359 | 6.36 | 1.85 | 398 | 5.19 | 1.49 |
| 5 | 6,087 | 6.47 | 1.78 | 7,726 | 6.76 | 1.78 | 13,813 | 6.63 | 1.78 | 267 | 5.32 | 1.52 |
| 5.25 | 5,343 | 6.66 | 1.78 | 6,970 | 6.94 | 1.75 | 12,313 | 6.82 | 1.76 | 180 | 5.42 | 1.54 |
| 5.5 | 4,761 | 6.82 | 1.75 | 6,078 | 7.16 | 1.67 | 10,839 | 7.01 | 1.70 | 45 | 5.62 | 1.53 |
| 5.75 | 4,185 | 6.99 | 1.69 | 5,204 | 7.42 | 1.55 | 9,389 | 7.23 | 1.61 | | | |

| | Inferred | | |
|---|---|---|---|
| **Ni % cutoff** | **Tonnage** | **Co ppm** | **Co Metal (lb)** |
| 0.5 | 1,238,380 | 289 | 790,098 |
| 0.75 | 468,360 | 432 | 446,252 |
| 1 | 268,283 | 529 | 312,684 |
| 1.25 | 184,257 | 590 | 239,699 |
| 1.5 | 138,365 | 629 | 191,961 |
| 1.75 | 105,828 | 662 | 154,351 |
| 2 | 83,484 | 708 | 130,216 |
| 2.25 | 69,803 | 748 | 115,092 |
| 2.5 | 59,696 | 783 | 102,987 |
| 2.75 | 50,129 | 826 | 91,327 |
| 3 | 42,867 | 867 | 81,964 |
| 3.25 | 37,850 | 898 | 74,933 |
| 3.5 | 32,881 | 919 | 66,631 |
| 3.75 | 28,493 | 924 | 58,069 |
| 4 | 25,141 | 937 | 51,931 |
| 4.25 | 22,235 | 931 | 45,614 |
| 4.5 | 19,495 | 942 | 40,470 |
| 4.75 | 16,756 | 927 | 34,258 |
| 5 | 14,080 | 922 | 28,625 |
| 5.25 | 12,493 | 915 | 25,197 |
| 5.5 | 10,884 | 922 | 22,123 |
| 5.75 | 9,389 | 921 | 19,057 |

***Mining - Development***

The Lac Rocher deposit appears as a continuous concentration of nickel and copper sulphides calling for a mining method that will recover the maximum of ore and have a minimum of dilution. Core examination suggests very good rock qualities, with core recovery of almost 100% and very little visible alteration.

Most of the higher nickel values are sitting along a clean footwall contact with gneissic rocks, at an angle of ± 50º. Because of the rather low tonnage and the fact that the known bottom of the deposit is less than 150 m from surface, a ramp is the logic choice of access for exploitation. Sinking a shaft is not economically feasible in the current context. The portal of the ramp is located at elevation 270 m.




Based on the resources estimation, a number of mining scenarios has been examined. The retained scenario proposes to extract approximately 297,000 t of Measured and Indicated resources, at a grade of 1.60% Ni and 0.60% Cu, plus 21,000 t of Inferred resources at a grade of 1.07% Ni and 0.35% Cu. All cobalt resources, in the total 318,000 diluted tonnes, have been classified as Inferred, at a grade of 0.053% Co.

The addition of Inferred category resources in the mining scenario of this PEA is explained by the fact that the mining method proposed is based on a complete extraction of the resources inside the portion of mineralized deposit targeted for mining. Inferred resources represent 6% of the resources to be extracted.

The project would be realized in two phases. During Phase 1, a portal and a main ramp with cross-cuts would provide access to the lower levels of the mine, and allow for a definition drilling program that will better delineate the resources. Approximately 65,000 t would be mined out to confirm the process flowsheet and metal recoveries, the operating costs and the mining method. The remaining 253,000 t of ore would be extracted during Phase 2.

The proposed minus 15%, 1,100 m long, 5 m wide by 4 m high ramp will start at elevation 270 m and terminate at the elevation of the first mining lift, which is at the 131 m elevation. A 170 m long ventilation-escapeway raise (3 m x 3 m) will connect the bottom of the ramp to the surface. Secondary ramping accesses will be provided at every 6 meters.

### *Mining Method*

The selected mining method retained in this PEA study is mechanized cut and fill, with delayed rock fill. Development waste and sand/gravel material will be used as backfill, and cement will be added for consolidation when required.

Primary stopes (6 m wide by 6 m high) will be excavated starting from the bottom of the orebody. They will be backfilled with cemented fill after each lift. The 4-m wide pillars of left between the primary stopes will later be extracted and backfilled only on the top section to avoid dilution when mucking out the broken ore. Average ore production rate has been assumed to be 500 t per day during Phase 1 and 750 t per day during Phase 2.

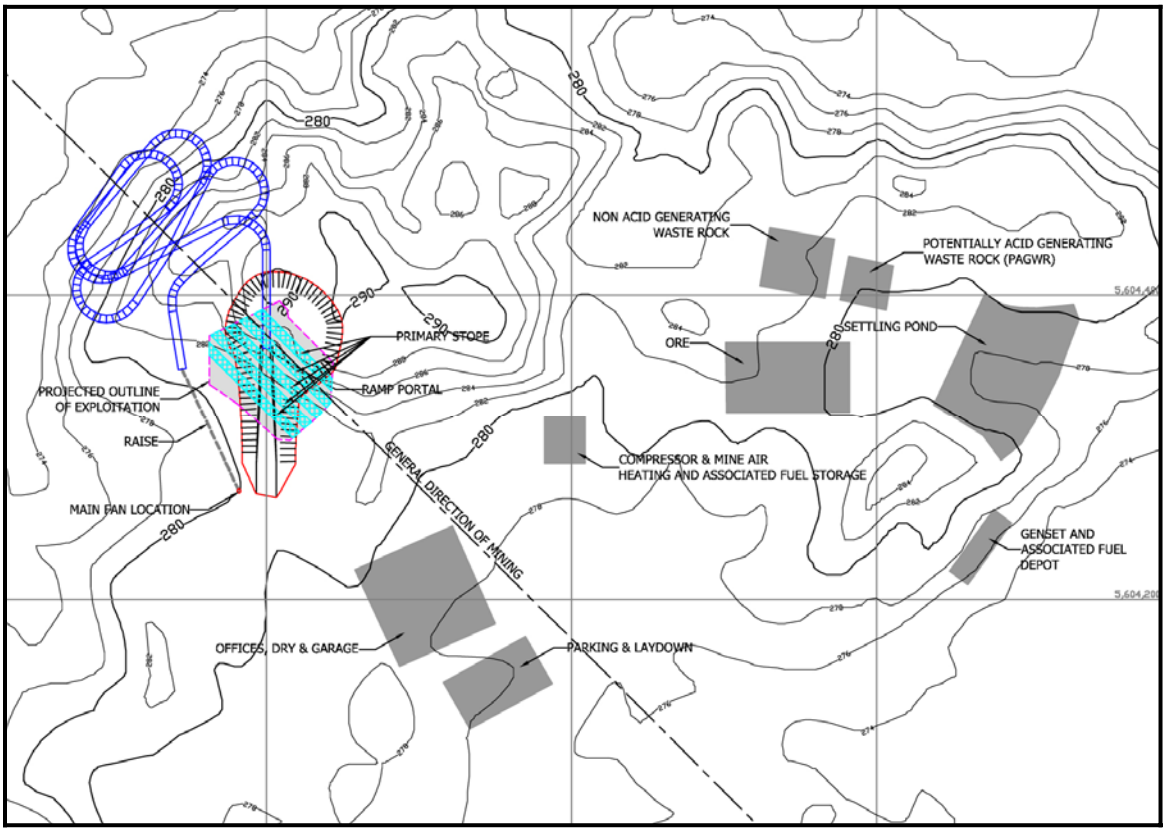
### *Infrastructure and Services*

The site around the proposed portal location is relatively flat, and permits a compact general arrangement of the mine facilities.

With no ore processing facility at the mine site and the short duration of the project, power will be produced on-site by diesel-powered generators, eliminating the need to build a power line and associated facilities. The availability of camp accommodations less than 40 km from Lac Rocher also eliminates the need to build such an installation at the mine site.

Site development will mostly consist in upgrading an existing winter access to the mine site, implementing some site roads, parkings and laydown areas. Temporary buildings will consist in an office accommodation for the owner's team (rented trailers), a mining contractor-supplied shop and dry complex, gensets, a fuel station, a compressor station and a mine air-heating installation.

Four stockpile pads will be provided, two each for ore and waste rock. A control basin will be installed downstream of the stockpiling area, to treat mine water and drainage from the stockpile.

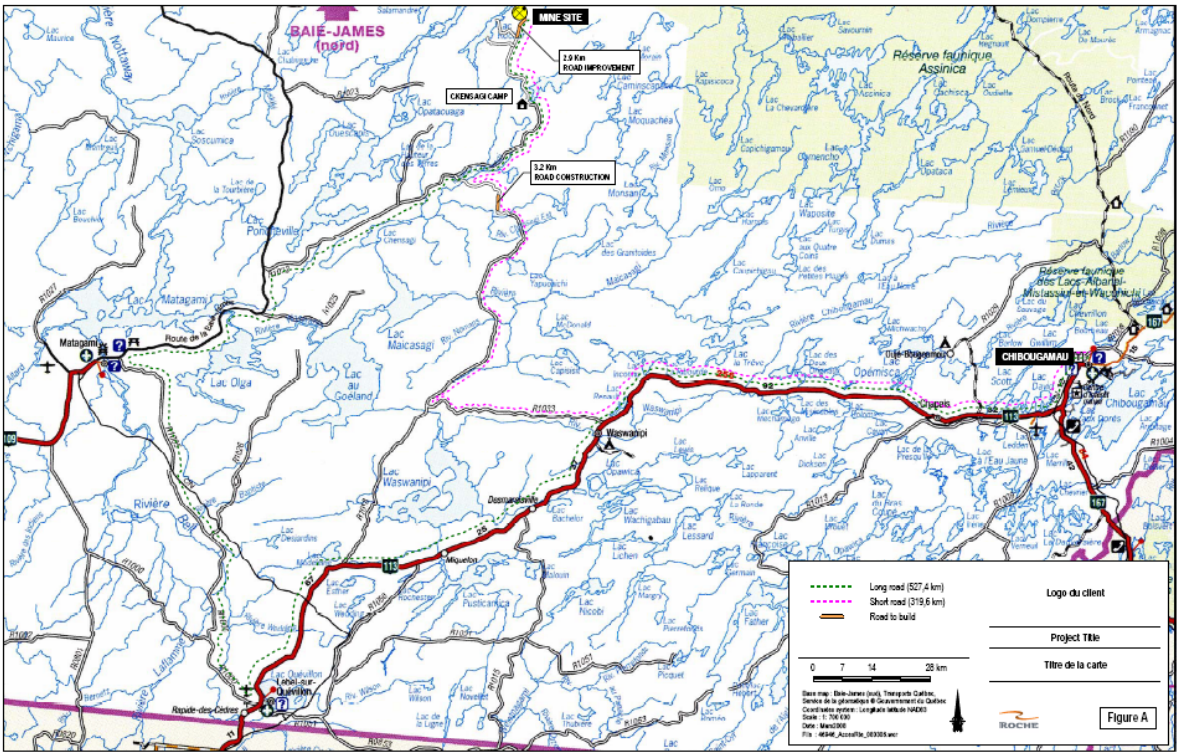



***Roads and Transportation***

The existing road to Matagami will be the main access for personnel and supplies. Its last 2.9 km portion (winter road) will be upgraded. Using this route to drive to Matagami and then on to Chibougamau to transport ore to the processing facility would represent a total distance of about 540 km.

Another shorter route will be used for the transportation of the ore to the Copper Rand mill in Chibougamau. It involves the building of a new 3.6 km segment and some upgrading to link with an existing logging road. This road leads south to the village of Waswanipi, to reach Route 113 extending to Chibougamau. Total distance is about 325 km. Transportation cost over this road option is estimated at 35 $ per ton of ore.

The nickel-copper concentrate produced at the Copper Rand mill in Chibougamau has been assumed to be sent to a nickel smelter in the Sudbury area, in Ontario. A quotation for rail transportation was obtained form CN. Including the fuel surcharge as of January 2008, the estimated cost per ton of concentrate is 60$.




***Ore and Waste Rock Storage***

Assays and leaching tests performed on ore (core) samples confirm that ore is to be considered as leaching under applicable rules in Quebec.

Favourable areas for storing waste rock and ore are available close to ramp and upstream of the proposed control pond.

Two areas have been designed for the temporary storage of ore. They would provide the option of separating different types of ore upon hauling from the mine, and the subsequent separate transportation of each type to the milling facility. Both areas have a capacity of some 20,000 t each.

Samples of waste rock from the future ramp area have a sulphide content lower than 0.3% and a ratio of neutralization potential/acidifying potential large enough to be considered as environmentally safe, i.e. not acid-generating.

A 9,000 t capacity storage area has been provided. Most of this type of waste rock should be used for site preparation (stockpile pads, site roads). It will also be needed to backfill stopes in the underground workings when mining begins, and none should be left at the end of Phase 1 of the project. All remaining waste rock would be used as backfill when mining proceeds to Phase 2.

Any waste rock from within the mineralised envelope would be acid-generating and would have to be treated with appropriate protection measures for storage and treatment of drainage. With the current

mining plan, any material extracted from the mineralised envelope will very likely have a high enough nickel content to be considered as ore. Little or no acid-generating waste rock should therefore have to be managed. A stockpiling area with a capacity of 5,000 t has been provided to temporarily store any acid-generating waste rock, until it is returned underground as rockfill.

***Site Water Management***

A 2,300 $m^3$ control pond will provide a 3.5 to 4-day retention time for the settling of suspended solids from mine water and runoff from the upstream area used for storage of ore and waste rock. A treatment facility will be available to control the quality of the pond's effluent to applicable criteria.

***Markets and Smelter***

The Lac Rocher project is a short-term one. As defined within this PEA, development of the mine and mining would extend over about 24 - 26 months, with first ore potentially extracted about mid-2009, and mining proceeding until the fall of 2010.

Based on current trends for prices for nickel and copper, Victory Nickel recommends that the cash flow analysis be conducted with prices of 8 $US/lb for nickel, 3 $US/lb for copper and 25 $US/lb for cobalt, for the duration of the project.

Victory Nickel had preliminary discussions with various nickel smelters. A final choice remains to be finalised upon negotiations when more project information and a final timeline have been developed.

The cash flow analysis has been conducted with smelting terms provided by Victory Nickel. The exact nature of the smelter's specifications and charges must remain confidential. For the sake of estimation, transportation of the mixed nickel-copper concentrate produced in Chibougamau has been assumed to be by train to the Sudbury area.

***Environmental Considerations***

An Environmental Baseline Study (EBS) of the Lac Rocher has been initiated in 2007. Its objective is to gather environmental data to be used to develop the Environmental and Social Impact Assessment (ESIA) on the basis of available information and field surveys. Field surveys were conducted within a study area of about 260 $km^2$ in order to obtain relevant information on environmental components.

The region is characterized by a continental sub-polar and sub-humid climate with a short plant-growing season (140 to 150 days). The site is in a region of low topographic relief with low-lying hills primarily covered with glacial deposits consisting of undifferentiated till. The Lac Rocher property is located within a Spruce-Moss forest bioclimatic domain, at the bottom of a small

valley covered primarily by peat bog, except for the mine site itself which is on slightly higher and dry ground.

There is no sensitive physical or biological component of the environment in the project area.

The project is located in a territory governed by the *James Bay and Northern Quebec Agreement* (JBNQA). The project area falls entirely within Category II lands, which belong to the province, but where Native governments share management for hunting, fishing and trapping, tourism development and forestry. Native people have exclusive hunting, fishing and trapping rights on these lands.

An Archaeological Potential Study was conducted and revealed no areas of interest in the proposed mining sector.

As it lies within Category II lands, any loss of area due to the Lac Rocher project will have to be financially compensated to the Native peoples.

Victory Nickel Inc. met with the tallymen supervising the Waswanipi Cree Community's trapline in the project area, to present the Lac Rocher Project and gather Native People concerns with respect to the project. A Memorandum of Understanding has already been established between Victory Nickel Inc. and the Waswanipi Cree First Nation.

***Permitting***

In accordance with the James Bay and Northern Quebec Agreement, signed by the Native peoples of the northern regions, Chapter II of the Environmental Quality Act contains specific provisions applicable to the authorization of projects in James Bay and Northern Quebec.

Mining exploitation projects are automatically subject to an environmental and social impact assessment (ESIA) and review procedure. An exemption may be requested for exploration projects. An application for such an exemption has been filed by Victory Nickel Inc. for Phase 1 of the project (bulk sampling and advanced exploration). The exemption was granted to Victory Nickel by MDDEP in March 2008.

The ESIA needs to be filed for authorization of Phase 2 of the project, involving the following activities:

- Submittal of a notice of intent along with preliminary information;
- Review of the preliminary information by an Evaluating Committee (COMEV) which defines the nature and extent of the impact (ESIA) study;
- Preparation of the impact study in accordance with the administrator's guidelines;

- Submittal of the ESIA to a review committee (COMEX). Native administrations and the public can make representations to the committee, which may also hold public hearings or any other type of consultation;
- COMEX recommends whether to reject or authorize the development project.

Regional authorizations are then required from MDDEP under various provisions of the Environmental Quality Act for a few project components, mainly basic mining installations, waste management, waterworks and sewage system and atmospheric emissions.

Federal government representatives are only involved in the environmental review of a project in a few instances. In the case of the Lac Rocher project, it very unlikely that water bodies would be directly affected by the mining activities. The federal environmental review procedures should therefore not apply.

***Economic Analysis***

The financial analysis of the Lac Rocher has been conducted on a pre-tax, 100% equity basis. All costs used in the analysis are also before any applicable tax. Costs include a royalty payable by Victory Nickel as per the terms of an Option Agreement applicable to the 20 original claims, which contain the resource to be mined. The agreement involves a 0.50 $/t royalty payable for all ore mined and milled for the life of any exploitation of the Lac Rocher deposit.

Costs have been regrouped in four separate categories:

- Expenses directly incurred by the owner (engineering, supervision, accounting, room and board);
- All charges eventually billed by a mining contractor; request for proposals were obtained from four mining contractors for the development and the operation of the mine under the supervision of Victory Nickel;
- Charges for ore transportation to the processing plant; and
- Costs for ore handling and ore treatment at the processing plant site.

The base case scenario is for mining a total of 317,730 t of ore (diluted) in two phases:

- An initial phase of 65,000 t at 1.75% Ni, 0.57% Cu and 0.062% Co, followed by;
- A second phase of 252,730 t at 1.52% Ni, 0.59% Cu and 0.051% Co;
- For a total project of 317,730 at 1.57% Ni, 0.58% Cu and 0.053% Co.

All ore is transported to the Copper Rand processing plant of Campbell Resources, in Chibougamau. Revenues (NSR values) were calculated on the basis of smelting terms provided by Victory Nickel for a mixed nickel-copper concentrate. Calculations were based on the following parameters:

- Concentrate grading 10.5% Ni, 3.9% Cu, and 0.33% Co;
- Nickel recovery of 81%;
- Copper recovery of 91%;
- Cobalt recovery of 95%;
- Prices of 8 $US/lb for nickel, 3 $US/lb for copper and 25 $US/lb for cobalt;
- An exchange rate of 1.00 $CDN : 0.95 $US;
- Transportation of the concentrate by train from Chibougamau to the Sudbury area, at a cost of 60 $CDN per tonne.

Phase 1 of advanced exploration entails a cost for development and extraction/milling of 27.2 M$ for the 65,000 t bulk sample. It would generate estimated revenues of 11.6 M$, for a net present value (NPV) of minus 15.7 M$. Expenses during the 9-month pre-production period are estimated at 18.1 M$. Extraction and processing of the bulk sample would cost an estimated 9.1 M$.

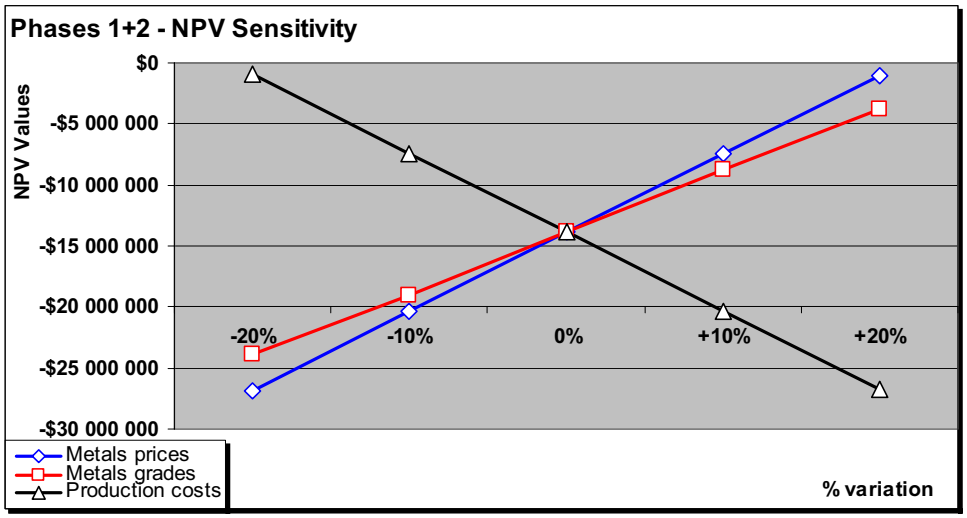
With greatly reduced development costs, production and general costs account for most of the 37.3 M$ expenses for mining the remaining 272,530 t. With estimated revenues of about 39.1 M$, Phase 2 would end up with a positive pre-tax cash flow of some 1.7 M$, for a NPV of 6.71 $/t of ore, equivalent to 0.25 $ per pound of recoverable nickel.

The combination of the two phases of mining, for a base case of 317,730 diluted tons, provides estimated revenues of 50.8 M$. Total costs, including demobilization, are about 64.7 M$, for a pre-tax cash flow of – 13.9 M$, for a NPV of - 43.64 $/t of ore, or - 1.56 $ per pound of recoverable nickel.

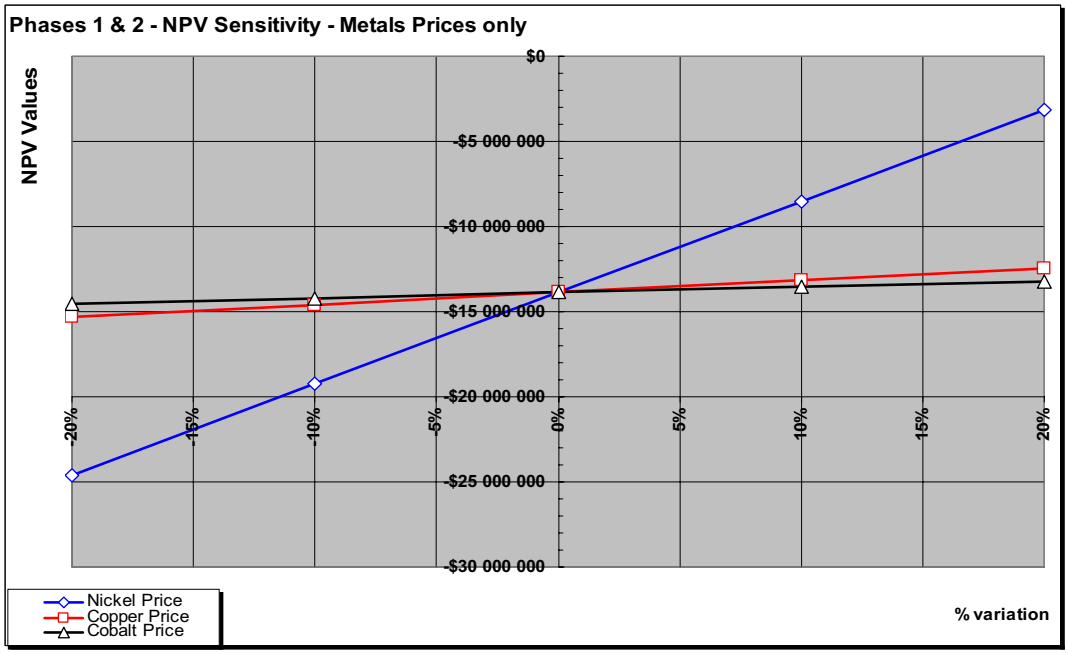
Maximum project sensitivity is for variations in metal prices and production costs, followed by changes in metals grades.

| NPV Values | | | |
|---|---|---|---|
| **Variation** | **Metals prices** | **Metals grades** | **Production costs *** |
| -20% | -$26 827 331 | -$23 901 037 | -$961 925 |
| -10% | -$20 285 270 | -$19 046 123 | -$7 414 524 |
| **0%** | **-$13 867 124** | **-$13 867 124** | **-$13 867 124** |
| +10% | -$7 452 155 | -$8 688 125 | -$20 319 723 |
| +20% | -$1 037 186 | -$3 833 210 | -$26 772 323 |

* Excluding royalties




Sensitivity to the prices of metals is mostly for nickel, with variations in copper or cobalt prices having much lower effects.




Break-even conditions are obtained at a NSR value of 203.58 $/t, corresponding to the following values when calculated for each of the variables in the sensitivity analysis:

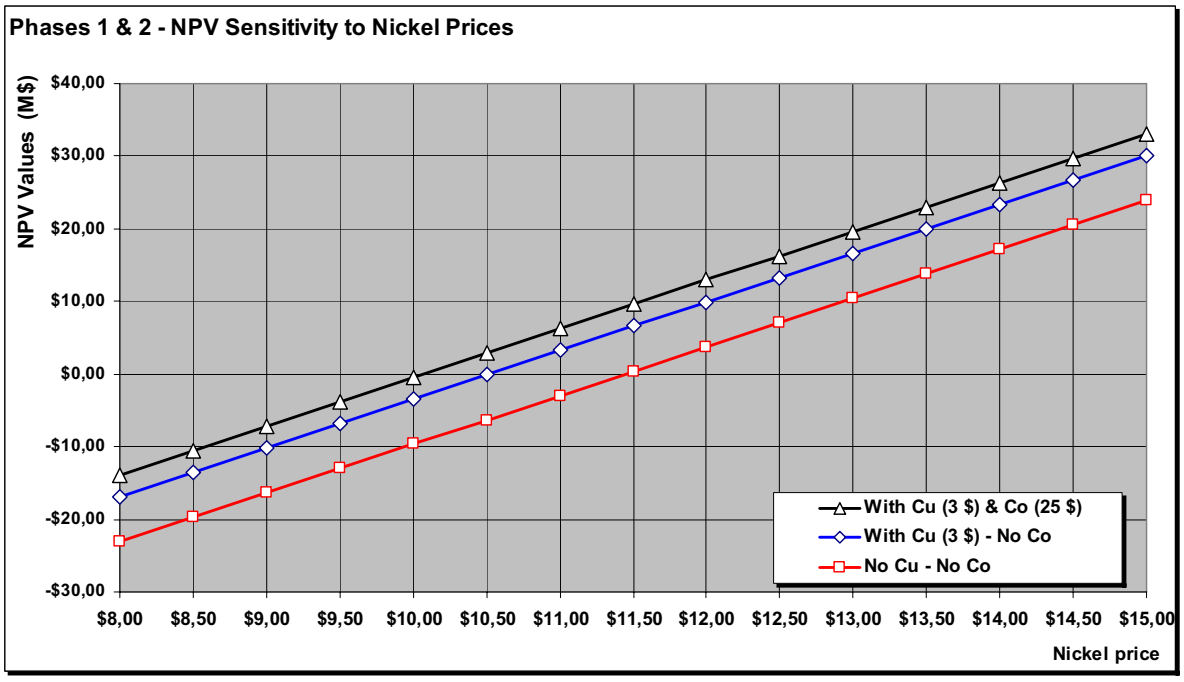
- Prices of metals: plus 21.7%, corresponding to 9.74 $ US/lb for nickel, 3.65 $ US/lb for copper and 30.43 $ US/lb for cobalt;
- Metal grades: plus 28%, corresponding to an ore grade of 2.00% Ni, 0.74% Cu and 0.068% Co;

- Production costs: minus 21.0%, corresponding to a decrease from 203.58 $/t to 159.94 $/t (- 43.64 $/t).

A further analysis of project sensitivity to nickel prices, in increments of 0.50 $US/lb, between 8.00 $ US/lb and 15.00 $ US/lb, indicates that:

- With revenues gained from copper, at a constant 3.00 $ US/lb, and cobalt, at a constant 25.00 $ US/lb, project breakeven is at a nickel price of 10.07 $ US/lb;
- With revenues gained from copper, at a constant 3.00 $ US/lb, but no revenues gained from cobalt, NPV is reduced by 3.0 M$, and project breakeven is at a nickel price of 10.51 $ US/lb;
- If no revenues from copper and cobalt are considered, NPV is reduced by a further 6.2 M$, and project breakeven is at a nickel price of 11.43 $ US/lb.

Each change of 0.50 $ US/lb in the price of nickel results in a NPV variation of 3.35 M$.




***Schedule***

First ore would be available by the end of Month-9, with Phase 1 of advanced exploration lasting till about the end of Month-14. With no delay for permitting or any other event between the two phases, additional mining of the remaining 252,730 t, at a rate of some 750 t/d, would require about 11 additional months. Unless additional reserves are identified as a result of any combination of

variables (new findings, lower production costs, higher metals prices, etc.), demobilization would take place during Month-26.

***Recommendations***

Given current the current context of nickel prices, which are below the break even point of this project, it is not recommended to proceed with the Lac Rocher Project at this time.

In a situation where nickel prices would firm up to a value of the order of 12 $ US/lb, the estimated NPV of the project would be of the order to 12 – 13 M $. In such a context, further negotiations or assessments are recommended to update or increase the precision of some estimates. The main ones are:

- **Geology and Resources**

Several barren granitic dykes cut across the mineralised envelope. Their spatial description is only preliminary. A more accurate interpretation of the dykes should be obtained for the purpose of mine design.

- **Mining and Infrastructure**

A detailed (topographical) site survey is recommended to assess conditions in the area designated for ore storage and the control basin. This will confirm the preliminary design of these facilities.

An assessment of rock surface profile and rock quality at the portal location is also recommended, this could be performed by a seismic profile in the portal axis, and trenching.

A local/regional inventory for sources of borrow materials is also suggested, to locate potential sources of rockfill material to complement waste rock uses for underground support.

A preliminary rock mechanics study is recommended to provide an evaluation of stopes stability and provide an input to the mine design (stope and pillars dimensions).

- **Metallurgy**

The flowsheet developed during testing on a low grade sample is fairly straightforward. It can easily be set up in the Copper Rand mill of Campbell Resources, in Chibougamau. Additional laboratory and/or in-plant testing during Phase 1 of advanced exploration could lead to an optimisation of metallurgical performance. Areas of recommended testing are:

  - Experimenting a coarser grind;
  - Testing CMC addition at multiple points;

- Replacing soda ash with lime;
- Determination of sedimentation and filtration characteristics;
- Assessing the performance of the current mill flowsheet on the Lac Roche ore.

Metallurgical testing was performed on a single blended sample, whose grade (1.30% Ni) is reasonably close to the average concentration of the ore to be extracted according to the proposed mining plan. This mining plan, however, indicates that actual grade, on a bench by bench basis, may fluctuate from about 0.9% Ni to 2.3% Ni. The effect of such variations on metallurgical performance and flowsheet conditions (reagents dosage, residence time) is not known, and could warrant some additional testing.

Gold and silver content of the concentrate was not assayed during metallurgical testing. Confirming the content of these precious metals is recommended to assess the potential for revenues.

- **Costs**

About three-quarters of the project costs are related to activities to be performed by contractors. These activities are: mine development, mining, ore transportation, ore processing. Mine development and mining alone account for almost half of estimated costs.

Roche recommends negotiations with mining and transportation contractors to firm up estimated prices and confirm availability of the required resources.

- **Ore transportation**

Project economics require that the hauling of the ore to Chibougamau can be done by using a road shortcut leading from Lac Rocher to the village of Waswanipi.

Having to use a longer route passing through Matagami would increase trucking distance by more than 200 km (one-way distance). The resulting cost would lower the project NPV by more than 6 M$, and would also require more equipment and drivers to maintain the appropriate trucking rate. This would seriously affect project profitability.

An authorisation will have to be negotiated with the Waswanipi Cree First Nation to use this road shortcut. This is a critical condition for project profitability.

# 2. Introduction

The services of Roche Ltd (Roche) have been retained by Victory Nickel Inc. to prepare a Preliminary Economic Assessment (PEA) of the Lac Rocher nickel project.

The analysis was done using NI 43-101 compliant resources. The resources were compiled by Mr. Robert de l'Étoile, Eng., of Geostat Systems International Inc. The mining aspects and financial analysis were done by Mr. Gaston Gagnon, Eng., also from Geostat Systems International Inc. Mr. Normand Grégoire, Eng., collaborated to the financial analysis activity. MM. de l'Étoile and Gagnon visited the property in the second week of November 2007 and have inspected Lac Rocher core on site and at the Copper Rand property in Chibougamau.

Mr. Florent Baril, Eng., of Bumigeme Inc., was responsible for the supervision of metallurgical testing on a Lac Rocher low grade sample. The metallurgical testing was conducted at Corem's facility in Quebec City. Mr. Baril was responsible for the preparation of the "Mineral Processing and Metallurgical Testing" section of the PEA. He made two visits to the Copper Rand ore processing facility of Campbell Resources in Chibougamau, the intended site for the processing of the Lac Rocher ore.

An assessment of nickel and copper prices was not in Roche Ltd's scope of work. The cash flow analysis was conducted with prices provided by Victory Nickel Inc. Roche Ltd only conducted a brief review of recent prices, complemented by the presentation of a few forecasts identified through a quick search. This later information shall be considered as general information. Roche Ltd and Geostat Systems International Inc. (responsible for the financial analysis) do not make any guarantee that the prices used in the analysis have any probability of being realised during the execution period of this mining project.

All other assessments of the property were conducted by Roche Ltd personnel under the coordination of Normand Grégoire, Eng.

Unless otherwise specified, all costs are expressed in the Canadian currency and units of the International System.

# 3. Reliance on Other Experts

This report has been prepared by Roche Ltd, Consulting Group (Roche), for Victory Nickel Inc., with the collaboration of Geostat Systems International Inc. (Geostat) and Bumigeme Inc. (Bumigeme). Specific responsibilities of the authors are specified in their respective Certificate of Qualifications.

The most critical information in the preparation of this report is in the areas of:

- Estimation of the mineral resources, and
- The metallurgical information.

The estimation of the mineral resources was conducted by Mr. Robert de l'Étoile, Eng., from Geostat. He had to use information provided by others in the course of his work. This information was provided by Qualified Persons, and is referenced in this report. Roche and Geostat cannot make any guarantee on the validity and reliability of such third party information, except as noted in this report, if applicable.

The metallurgical information was generated during the course of this project by metallurgical testing on a Lac Rocher low grade sample. Testing was conducted at Corem's facility in Quebec City from July 2007 to January 2008. The sample provided to Corem was prepared on behalf of Victory Nickel Inc. by C. A. Wagg, geol., of WAGG Mineral Exploration and Consulting Inc., of Denbridge Ontario.

Metallurgical testing was followed and oriented by Bumigeme personnel, under the direction of Mr. Florent Baril, Eng. Mr. Baril is the Qualified Person responsible for Chapter 16 of this report, which is based on Corem's results for the tested sample. Roche and Bumigeme did not carry any independent validation of Corem's experimental results.

Some other information developed for Chapter 18 of the PEA was obtained as quotations by various contractors (mining – transportation – camp accommodations). Other data related to the site and environmental considerations was developed by Roche's personnel, under the direction of Mr. Normand Grégoire, Eng. Several employees of Roche spent time on the property and the region to assess environmental and ground conditions, ant to review and analyse alternatives for access to the property and transportation of ore to Chibougamau.

The authors of this report have carefully reviewed all technical information collected. However, Roche, Geostat and Bumigeme have not proceeded with any independent sampling or assaying during the course of their mandate.

# 4. Property Description and Location

The Victory Nickel Inc. Lac Rocher Property (the property) is located in the northwest quadrant of the Canton 115 area of north-western Québec. It is 160 km ENE of the town of Matagami (Figure 4.1). The claims are approximately centered on 76°21'W, 50°35'N. To the author's knowledge, the property has not been legally surveyed.

On February 2, 1998 Nuinsco signed an Option Agreement with three individuals permitting the Company to obtain a 100% interest in the Lac Rocher property that initially consisted of 20 claims (Table 4.1). The property is comprised of sixty nine (69) contiguous claim units covering a total area of 1,088 ha (Table 4.2). These 20 original claims are subject to a production royalty calculated at the rate of 0.50 $ (fifty cents) per ton on all ore mined and milled from the claims for the life of any mine developed.

In February 2007, Nuinsco created Victory Nickel Inc. and transferred all its nickel properties into it. Nuinsco retained 25% of Victory Nickel shares.

Other than the Option Agreement on the original 20 claims, with the exception of assessment work requirements pursuant to the Québec Mining Act, there are no further commitments and Victory holds 100% interest in the property, to the author's knowledge.

Figure 4.2 presents the location of the Lac Rocher property group of claims.

**Table 4.1 Original Claim Group of the Lac Rocher Property (updated from Gestim, MRNF, February 18, 2008)**

| Claim Number | ($) Filed | Number Claims | Size (Hectares) | Renewal Dates |
|---|---|---|---|---|
| 5218971 | 0 | 1 | 16 | 8/19/2011 23:59 |
| 5218972 | 0 | 1 | 16 | 8/19/2011 23:59 |
| 5218973 | 19,390.49 | 1 | 16 | 8/19/2011 23:59 |
| 5218974 | 16,592.11 | 1 | 16 | 8/19/2011 23:59 |
| 5218975 | 0 | 1 | 16 | 8/19/2011 23:59 |
| 5218976 | 0 | 1 | 16 | 8/19/2011 23:59 |
| 5218977 | 20,131.39 | 1 | 16 | 8/19/2011 23:59 |
| 5218978 | 220,232.14 | 1 | 16 | 8/19/2011 23:59 |
| 5218979 | 20,678.57 | 1 | 16 | 8/19/2011 23:59 |
| 5218980 | 12,370.11 | 1 | 16 | 8/19/2011 23:59 |
| 5218981 | 47,800.87 | 1 | 16 | 8/19/2011 23:59 |
| 5218982 | 20,678.57 | 1 | 16 | 8/19/2011 23:59 |
| 5218983 | 695,552.22 | 1 | 16 | 8/19/2011 23:59 |
| 5218984 | 102,389.57 | 1 | 16 | 8/19/2011 23:59 |
| 5218985 | 73,225.65 | 1 | 16 | 8/19/2011 23:59 |
| 5218986 | 0 | 1 | 16 | 8/19/2011 23:59 |
| 5218987 | 7,927.05 | 1 | 16 | 8/19/2011 23:59 |
| 5218988 | 211,270.76 | 1 | 16 | 8/19/2011 23:59 |
| 5218989 | 208,177.39 | 1 | 16 | 8/19/2011 23:59 |
| 5218990 | 47,346.19 | 1 | 16 | 8/19/2011 23:59 |

**Table 4.2 List of all Active Claims of the Lac Rocher Property (updated from Gestim, MRNF, February 18, 2008) (in green, list of the original claim group)**

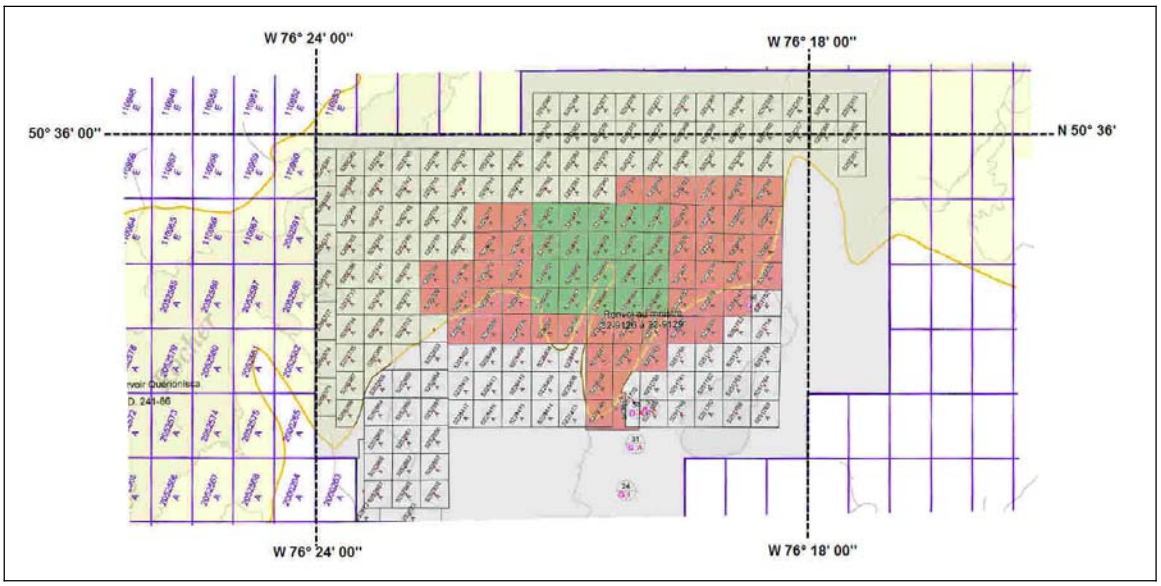
| Claim Nb | Status | Expiry date | Size (Ha) | ($) Filed |
|---|---|---|---|---|
| 5208783 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208784 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208785 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208786 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208787 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208788 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208801 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208802 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208812 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208813 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208819 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5208820 | Active | 7/27/2009 23:59 | 16 | 0.00$ |
| 5218971 | Active | 8/19/2011 23:59 | 16 | 0.00$ |
| 5218972 | Active | 8/19/2011 23:59 | 16 | 0.00$ |
| 5218973 | Active | 8/19/2011 23:59 | 16 | 19,390.49$ |
| 5218974 | Active | 8/19/2011 23:59 | 16 | 16,592.11$ |
| 5218975 | Active | 8/19/2011 23:59 | 16 | 0.00$ |
| 5218976 | Active | 8/19/2011 23:59 | 16 | 0.00$ |
| 5218977 | Active | 8/19/2011 23:59 | 16 | 20,131.39$ |
| 5218978 | Active | 8/19/2011 23:59 | 16 | 220,232.14$ |
| 5218979 | Active | 8/19/2011 23:59 | 16 | 20,678.57$ |
| 5218980 | Active | 8/19/2011 23:59 | 16 | 12,370.11$ |
| 5218981 | Active | 8/19/2011 23:59 | 16 | 47,800.87$ |
| 5218982 | Active | 8/19/2011 23:59 | 16 | 20,678.57$ |
| 5218983 | Active | 8/19/2011 23:59 | 16 | 695,552.22$ |
| 5218984 | Active | 8/19/2011 23:59 | 16 | 102,389.57$ |
| 5218985 | Active | 8/19/2011 23:59 | 16 | 73,225.65$ |
| 5218986 | Active | 8/19/2011 23:59 | 16 | 0.00$ |
| 5218987 | Active | 8/19/2011 23:59 | 16 | 7,927.05$ |
| 5218988 | Active | 8/19/2011 23:59 | 16 | 211,270.76$ |
| 5218989 | Active | 8/19/2011 23:59 | 16 | 208,177.39$ |
| 5218990 | Active | 8/19/2011 23:59 | 16 | 47,346.19$ |
| 5223673 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5223674 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5223675 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5223676 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5223677 | Active | 3/29/2008 23:59 | 16 | 3,245.52$ |
| 5223678 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5223679 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5223680 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226001 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226002 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226003 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226004 | Active | 3/29/2008 23:59 | 16 | 18,421.31$ |

| Claim Nb | Status | Expiry date | Size (Ha) | ($) Filed |
|---|---|---|---|---|
| 5226005 | Active | 3/29/2008 23:59 | 16 | 70,347.16$ |
| 5226006 | Active | 3/29/2008 23:59 | 16 | 29,565.76$ |
| 5226007 | Active | 3/29/2008 23:59 | 16 | 55,205.06$ |
| 5226008 | Active | 3/29/2008 23:59 | 16 | 61,135.03$ |
| 5226009 | Active | 3/29/2008 23:59 | 16 | 176.03$ |
| 5226010 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226011 | Active | 3/29/2008 23:59 | 16 | 176.53$ |
| 5226012 | Active | 3/29/2008 23:59 | 16 | 176.03$ |
| 5226013 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226014 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226015 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226016 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226017 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226018 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226019 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226026 | Active | 3/29/2008 23:59 | 16 | 47,495.12$ |
| 5226027 | Active | 3/29/2008 23:59 | 16 | 0.00$ |
| 5226028 | Active | 3/29/2008 23:59 | 16 | 176.03$ |
| 5274041 | Active | 8/16/2009 23:59 | 16 | 0.00$ |
| 5274042 | Active | 8/16/2009 23:59 | 16 | 0.00$ |
| 5274043 | Active | 8/16/2009 23:59 | 16 | 0.00$ |
| 5274044 | Active | 8/16/2009 23:59 | 16 | 0.00$ |
| 5274045 | Active | 8/16/2009 23:59 | 16 | 0.00$ |
| 5274046 | Active | 8/16/2009 23:59 | 16 | 0.00$ |
| 5274047 | Active | 8/16/2009 23:59 | 15.3 | 0.00$ |

**Figure 4.1 General Location Map of the Lac Rocher Property**



**Figure 4.2 Location Map of the Lac Rocher Property Group of Claims**




(updated from Gestim, MRNF, February 18, 2008) (in green, original claim group)

# 5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Lac Rocher Property is located within the James Bay Lowland. Maximum topographic relief in this region is approximately 150 m. At Lac Rocher, a maximum relief of 45 m is present. The main discovery area lies within the Reservoir Quenonisca[1], a Hydro-Québec reserve district which could be flooded if a hydroelectric dam is constructed to create this reservoir (MRNF constraint number 17141 issued March 26, 1986).

Map 32K/09 (1:50,000 scale) encompasses the property area. The claims lie 50 km east of Highway 109 that connects Val-d'Or with the James Bay Hydro-Electric installations. Access is attained by all season logging roads that extend to approximately 3 km of the property.

Typical for this part of Québec, outcrops occur as ridges and knobs surrounded by low-lying, marshy terrain. Overburden in the area of the discovery is relatively thin, in the order of several metres. Elsewhere on the property, overburden has been found to be in excess of 45 m.

Vegetation is typical boreal forest. The majority of the area is wooded with jack pine, black spruce, birch, and poplar. There are several small swampy areas. Permanent wildlife populations include moose, fox, hare, wolf, black bear, beaver, marten, mink, otter and woodland caribou. The region is subject to a cold continental climate featuring long cold winters and short warm summers.

The Nipukatasi River and smaller unnamed watercourses provide local drainage while the Broadback River to the north drains the region.

[1] Hydro-Québec N/D 970066-010 Reservoir Quenonisca (Feuillet 32K/09)

# 6. History

A review of the assessment files in the Rouyn-Noranda office of the Québec Ministry of Natural Resources, by Victory Nickel Vice-President Exploration, P. Jones, produced very little information on past exploration in the Lac Rocher area.

In 1959, Osisko Lake Mines drilled four short drill holes on claims located on Scott Lake approximately 5 km north of Lac Rocher, outside the boundary of Victory's property (file GM-11638-c). The reason for drilling these holes is unclear; presumably they were collared to verify results of geophysical surveys. The drill holes intersected greywacke with minor granite and granite-pegmatite. Patches of disseminated pyrrhotite and chalcopyrite were sampled with the best result reported being 2.1 m grading 1.00% copper, 0,22 opt [2] silver and 0,005 opt gold from hole no. 4.

Osisko Lake Mines drilled a single drill hole to assess a magnetic response on the northwest shore of Lac Rocher (filed as GM-11570 and GM-11578). This 30 m hole was drilled to test an exposed pyrrhotite occurrence at the contact of greywacke and amphibolite. A 0.9 metre core section of massive sulphides from this hole assayed 2% nickel. The showing was later examined by Nuinsco but was found to be of limited size.

In 1962, Osisko Lake Mines drilled a further 15 holes on the Scott Lake Property (filed as GM-12656 and GM-25282). These drill holes were collared to assess ground magnetometer and horizontal loop responses obtained from a survey conducted in 1961. Lithologies intersected consist predominantly of greywacke with subordinate granitoid dykes. Pyrrhotite with chalcopyrite was intersected over narrow intervals in most drill holes. The best reported result was 2.6 m grading 1.41% copper.

Between the summer of 1959 and March 1962, Canscope Mining Limited conducted airborne and ground geophysical surveys on ten claims in the Broadback River – Lac Rocher (previously named Keniapiscau Lake) area. Two of these claim groups, the Carol and Michelle, partially covered ground previously occupied by the Victory claim group; a third, the Donna Group, was sited on the shore of Lac Rocher approximately 2 km west of the current property.

Canscope carried out an airborne magnetic/electromagnetic survey over an area measuring 1,550 $km^2$. Numerous conductive zones were located, some with coincident magnetic responses. Ground verification of the airborne responses followed using a vertical loop electromagnetic system. No reported follow-up work was reported.

[2] Opt : ounces per ton

In 1994 Monopros carried out a broad survey in the search for kimberlites, examining circular airborne magnetic features in the James Bay Lowlands. Monopros' work on one magnetic anomaly led to the discovery of nickel-copper-bearing sulphides in a mafic intrusive host rock.

In 1997 their claims expired and were restaked by the prospectors who optioned the property to Nuinsco in 1998.

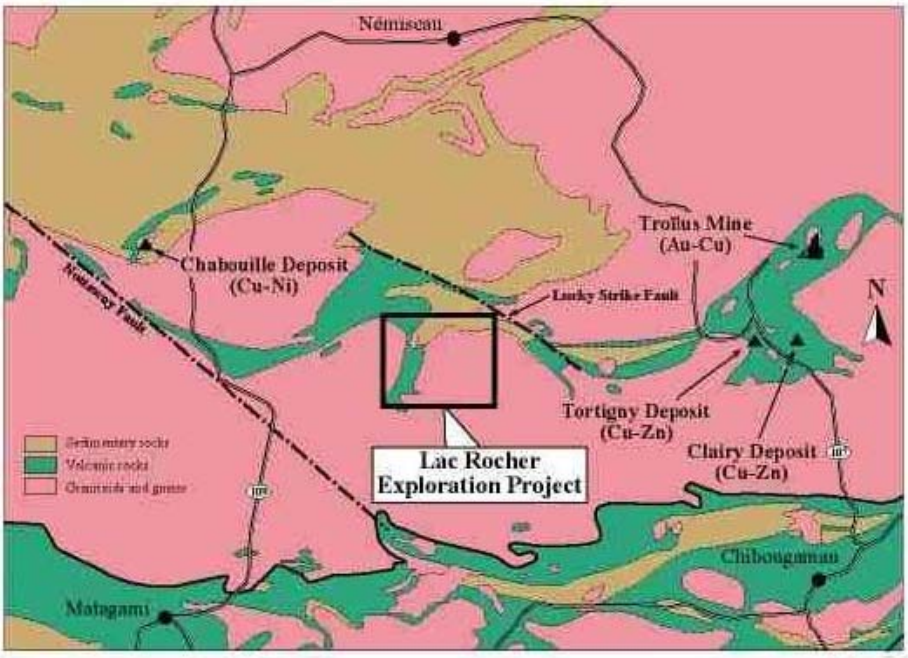
Under a Québec Government sponsored prospecting assistance program, the prospectors carried out a program of channel sampling over zones of sulphide mineralization, gridding and a magnetic survey across their claim group. The averaged value from chip sampling across 15 m from two of these channels was 0.29% copper and 0.53% nickel.

# 7. Geological Setting

The Frotet-Evans area of the James Bay Region has been the subject of only limited study by the Québec Government. The most recent publication is RG 98-05, “Géologie de la Region du Lac Rocher” by Brisson et al, 1998. This report covers the entire NTS map sheet 32K/9 (1:50,000) and is the source from which much of this summary is referenced. (Figure 7.1)

The Property lies near the eastern termination of the Opatica Subprovince of the Superior Province of the Canadian Shield. The Opatica-Quetico Subprovince is approximately 1,000 km long and traverses north-western Québec and nearly the width of Ontario before being covered by the Palaeozoic rocks of the Williston Basin in Minnesota. The Lac Rocher area is located immediately to the south of an irregular belt of Archean aged metasedimentary and subordinate metavolcanic rocks. The supracrustal rocks are enveloped by large areas of granitoid and gneissic rock (that underlie most of the Lac Rocher Property).

**Figure 7.1 Lac Rocher Regional Geology**




**Lac Rocher Exploration Project**
**Regional Geology**

## 7.1 Regional Setting - Volcano-Sedimentary Sequence

### 7.1.1 Evans Group - Rabbit Formation

The lowermost member of the volcano-sedimentary succession is the Evans Group. It consists of three formations but only a portion of one of these units, the Rabbit Lake Formation, occurs in the Lac Rocher area where this formation outcrops in the extreme northwest. It is composed principally of massive theoleiitic basalts with subordinate calc-alkaline andesites and local iron formations.

### 7.1.2 Broadback Group

The Broadback Group underlies much of the north part of the region and overlies the Evans Group. It is composed principally of metasedimentary rocks and has been subdivided into eight units. The nature of the contact between the Broadback Group and the Evans Group varies regionally from abrupt and concordant to interbedded and gradual.

Lowermost horizons in the Broadback Group are composed of polymictic conglomerates derived from erosion of the Evans Group. The remainder of the succession is composed of horizons of wacke, feldspathic wacke, mudstone, siltstone and conglomerates. Minor tholeiitic andesite and iron formations have been mapped regionally and have been assigned to this Group near the top of the succession but they are of uncertain affinity.

### 7.1.3 Rocher Complex

The strongly metamorphosed Rocher Complex is in contact with the Rabbit Formation to the north and the Nipukatasi Granite to the south. Rocks of this complex are considered to be equivalent to the Broadback Group. This complex is composed principally of quartzo-feldspathic paragneiss. Local domains of migmatite are mapped north of Lac Rocher, and amphibolite, speculated to be of effusive, tholeiitic origin, occurs principally in the southwest of the region. Thin iron formation is also present, and small masses of diorite are associated with the complex that is interpreted to be pretectonic in origin.

## 7.2 Regional Setting - Intrusive Rocks

Archean synvolcanic-pretectonic intrusions are composed of small gabbro bodies associated with the Rabbit Formation and small diorite masses in the Rocher Complex. To the west of the region the syntectonic, tonalitic Salamander Batholith is in contact with the Rocher-Quenonisca Intrusive Suite and the Rocher Complex. Several classes of Archean post-tectonic intrusions have been identified-gabbro, monzonite, granite and pegmatite. The Gabbro and Monzonite intrusions comprise the Rocher-Quenonisca Intrusive Suite.

The Nipukatasi Batholith underlies much of the southeast part of the region. This Batholith is composed primarily of granite and granite pegmatite. Proterozoic diabase dykes, oriented NW-SE (Mistassini Swarm) and NE-SW (Otish Swarm) traverse the area.

## 7.3 Regional Structural Geology

Deformation in the supracrustal rocks varies considerably from weak to intense. In the northwest of the region, weakly deformed supracrustal rocks give way to strongly deformed rocks of amphibolite facies adjacent to the Nipukatasi Batholith. The structural history of the region has been subdivided into seven events – D1 through D7. Events D1 through D6 are considered to be part of a tectonic continuum, while event D7 is thought to be temporally distinct. Events D1 and D3 do not occur in the immediate Lac Rocher area. The regional penetrative fabric is associated with the D2 event. The schistosity varies in orientation from northeast-southwest to east-southeast-west-northwest, the result of folding associated with the D4 event.

D5 produced a northeast-southwest fault at the contact of the Rocher Complex and the Broadback group northwest of the Nipukatasi Batholith. Event D6 resulted in two faults oriented northwest-southeast in the northeast of the region and is associated with the regionally extensive Lucky Strike Fault. The final event, D7, resulted in the development of the Lake Quenonisca Fault, an interpreted structure that corresponds to a topographic lineament occupied by Lake. Quenonisca. This fault has juxtaposed the Broadback Group metasediments with the basal units of the Evans Group.

## 7.4 Lac Rocher Property Geology

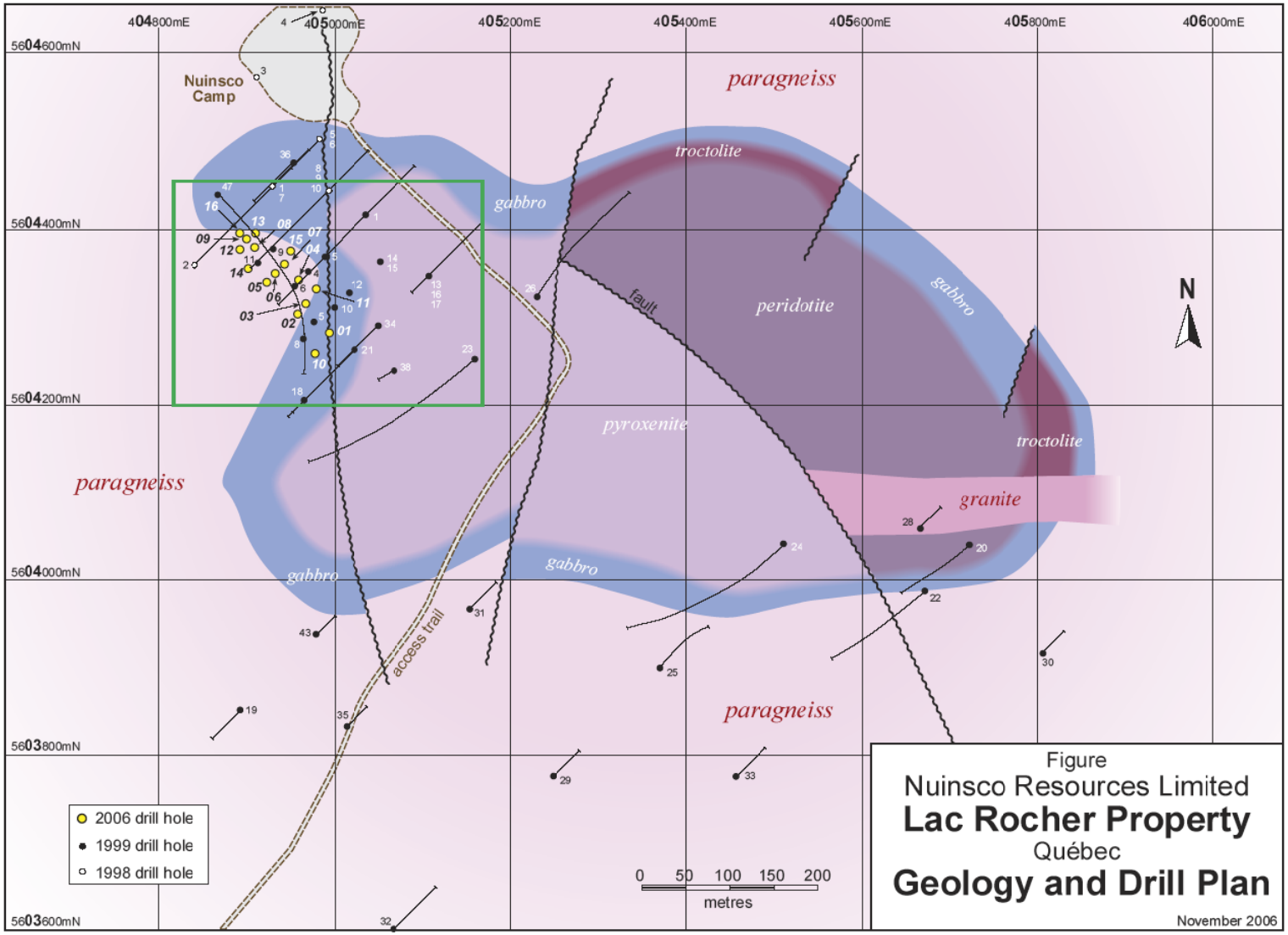
There are no detailed published geological maps covering the Lac Rocher property. Reconnaissance work by Nuinsco and geophysical interpretation of airborne magnetic data suggest a rough framework for the geological setting of the Lac Rocher mafic-ultramafic intrusion. The one published map, a government of Québec geoscientific compilation at a scale of 1: 50,000 (ref: S1-32K09-C3G-96k) did not make note of the mafic-ultramafic intrusion hosting the Nuinsco discovery.

The main sources of geological information are airborne EM and magnetic maps which suggested, prior to drill testing, that there were four mafic intrusive bodies within the claim group (Figure 7.2).

The main geological feature hosted on the claims is a circular mafic intrusion, referred to as the Lac Rocher Pluton. This pluton is a multiphase intrusion composed of gabbro, pyroxenite and peridotite hosted by the Rocher Complex gneisses of the Frotet-Evans greenstone belt. Contacts of the intrusion with the host rock are relatively sharp, displaying little evidence of in-situ hybridization. The intrusion is pervasively hydrated and displays no penetrative fabric. Pyroxenite and peridotite phases

are relatively well defined indicating that they may be petrogenetically related, and the product of fractional crystallization of a single parent. A full description of this mafic-ultramafic body is presented in the section describing the exploration results.

**Figure 7.2 Lac Rocher Property Geology**




(from Goettel, December 2006)

# 8. Deposit Types

The deposit type targeted at the Lac Rocher Property is of the mafic-ultramafic-iron-nickel-copper sulphide association (magmatic hosted nickel sulphide mineralization). Mineralisation occurs as disseminated sulphides and as massive sulphide lenses within a mafic to ultramafic body and within fractures adjacent to its contacts. This type of mineralization is a common source of much of the world's nickel production.

# 9. Mineralization

The nickel-copper mineralization is associated with both the gabbroic and lower pyroxenitic horizons of the mafic-ultramafic intrusion. Disseminated sulphides occur as scattered blebs, generally in the millimetre to one centimetre size range, although rare clasts of massive sulphide up to 10 cm are present. In general, percent sulphide increases from 1-5%, to 15-20%, and is locally massive at the base. The blebs comprise a typical pyrrhotite-pentlandite-chalcopyrite assemblage along with several varieties of pyrite as cross-cutting veins, porphyroblasts and aggregates. The massive sulphides are especially nickel-rich and copper-poor. There is, however, extensive chalcopyrite in the immediate hanging wall gabbro and gneiss. All of the mineralised rock is strongly magnetic. Growth of abundant secondary magnetite developing from olivine has added a strong magnetism to the uppermost intrusive member.

# 10. Exploration

## 10.1 Nuinsco 1998 Exploration Program

In February, the grid previously cut by the prospectors was extended to 2+00S and 16+00N with lines at 100 m spacing (oriented 045°) and picketed at 25 m interval. An Induced Polarisation (I.P.) survey was conducted by Remy Belanger Geophysics of Rouyn-Noranda and interpreted by G. Lambert, Eng, (Gérard Lambert Geosciences) of Rouyn-Noranda. A dipole-dipole array was employed using a 50 m dipole spacing with successive separations at multiples of n=1 through n=6 times the dipole dimension. In normal circumstances, this array is capable of detecting sulphides to vertical depths of about 100 m. Approximately 19 line kilometres were surveyed. The survey produced several anomalous I.P. responses, either as isolated anomalies or along more or less continuous trends.

During April, a total of ten BQ diamond drill holes were completed using Forages Garant & Frères Inc. of Evain Québec. The holes were collared on lines 11+50N and 12+00N. The purpose of this drilling was to test a portion of the I.P. zone which extended approximately east-west from line 7+00N to 16+00N and traversed the area of the sulphide mineralised discovery outcrop near line 12+00N. A total of 1,209 m of core was produced.

Drill holes NLR-9-01, and 05 through 10 (collared on lines 11+50 and 12+00) intersected a mixed pyroxenite-gabbro intrusion, the host rock to the nickel-copper sulphide mineralisation. Substantial core widths of disseminated nickel-copper mineralisation were obtained from drill holes NLR-98-01, 05 and 07 through 09. Where drilled, the pyroxenite-gabbro complex appears to be trough shaped and has an apparent width of at least 150 m at surface. Locally, sulphide content was noted to be up to 25% over one metre intervals. Petrographic determinations on 14 thin sections described sulphide species proportions as 38% pyrrhotite, 33% pentlandite, 14% pyrite and 13% chalcopyrite (Schendl, 1998). An average weight of all mineralised intercepts from this drill programme assayed approximately 0.5% nickel and 0.2% copper. Precious metal values (PGE, gold) and cobalt tenor are low. The remaining three drill holes, NLR-98-02 through 04, intersected granite, granite pegmatite and quartzo-feldspathic gneiss of the Nipukatasi Batholith as well as barren portions of the Lac Rocher mafic complex. No significant base metal values were obtained from these holes.

In June 1998, an in-loop Pulse E.M. geophysical survey was conducted over 34 km of grid line. A 2 km square loop was laid out by Val d'Or Sagax Geophysics of Val d'Or and an in-loop configuration was employed on the survey (Lambert, 1998b). This survey produced three anomalous conductive zones.

## 10.2 Nuinsco 1999 Exploration Program

In early January, 582 m of 36.5 mm (BQ) sized core from three diamond drill holes were drilled to assess the Pulse EM responses obtained from the geophysical survey noted above. The upper portions of the first and discovery drill hole, NLR-99-01, intersected similar disseminated sulphide mineralisation within a pyroxenite-gabbro.

However, at the footwall contact of the layered intrusion with the quartzo-feldspathic gneiss, 3.2 m of massive sulphide grading 10.8% nickel were intersected. This massive zone is part of a 61.5 m interval that grades 1.69% nickel and is composed of disseminated and net textured sulphides that grade into the basal massive sulphide mineralisation. NLR-99-02, drilled from the same set-up but at 180° to NLR-99-01, intersected the upper-gabbro portion of the mafic complex with limited sulphide mineralisation (typically 2 to 4%). Low values were obtained from this hole with the highest values obtained being 0.28% nickel and 0.15% copper. The third drill hole, NLR-99-03, was collared approximately 600 m northeast of the first two holes to test a broad Pulse EM response. The hole intersected quartzo-feldspathic gneiss and granite dykes. No causative source to the Pulse EM response was noted. TMC Geophysics of Val d'Or carried out a down-hole Pulse EM survey on holes NLR-99-01 and 02 as well as NLR-98-09.

In February Remy Belanger Geophysics of Rouyn-Noranda carried out additional IP surveys using both a 25 and 100 m dipole spacing as well as a mise-en-masse survey on hole NLR-99-01.

Following financing, completed by Nuinsco in February, the Company proceeded with a major diamond drilling program that started on 10th March and continued to the end of August. A total of 46 diamond drill holes were completed, comprising 10,528.2 m. The drill contractor was Bradley Brothers Diamond Drilling of Rouyn-Noranda. Two diamond drills were employed on the discovery intrusion and a smaller helicopter transported machine elsewhere on the property. Thirty-six drill holes were collared to test in and around the discovery intrusion and associated nickel sulphide mineralisation, totalling 9 157.2 m.

Line cutting was extended, followed by I.P. and magnetometer surveys carried out by Mr. Remy Belanger Geophysics of Rouyn-Noranda, with results interpreted by Gérard Lambert Geosciences of Rouyn-Noranda. No grid was established on anomaly "D", as it is the least intriguing of the five airborne targets initially identified, and is suspected to be due to features within the Rocher Complex gneisses. Three diamond drill holes totalling 511 m were collared on the "A Grid" anomaly, four holes totalling 473 m tested the "B Grid" anomaly, and three holes totalling 387 m tested the "E Grid" anomaly. During this drilling program accessible diamond drill holes were surveyed with the Crone borehole pulse EM method by TCM Geosciences of Val-d'Or and interpretation of the results done by Mr. Gérard Lambert of Rouyn-Noranda.

Late in 1999, a gravity survey, carried out by TMC Geophysics of Val d'Or and interpreted by Mr. Gérard Lambert of Rouyn-Noranda, was initiated and completed in late February 2000.

An additional six diamond drill holes were drilled during the autumn totalling 2,336.9 m. Five holes targeted the Anomaly A Intrusion and associated airborne and ground geophysical responses. One hole was collared approximately 350 m to the north of the Discovery Intrusion to test an E-Scan resistivity response obtained from a E-Scan 3-D resistivity survey conducted by Premier Geophysics of Vancouver B.C.

In total 122 km of ground magnetic readings, 22 km of MaxMin readings done by Sevices Explorations Enr. Of Rouyn-Noranda and 75 km of I.P. surveys were completed over the grids. Two airborne survey companies (Geoterrex-Dighem of Milton Ont. and Aeroquest of Ottawa, Ont.) were contracted to fly geophysical surveys over the Lac Rocher claims.

## 10.3 Nuinsco 2000 Exploration Program

Following the gravity survey which ended in February, a third drilling phase was carried out from March to April, 2000. This work consisted of four diamond drill holes totalling 1,031.12 m which tested a defined gravity anomaly, an E-Scan resistivity response and further drilling of Anomaly "C".

## 10.4 Nuinsco 2006 Exploration Program

During the summer of 2006, the grid in the immediate area of the Discovery Intrusion was refreshed and a sixteen NQ hole diamond drilling program totalling 2,087 m was executed. The drilling contract was awarded to Orbit Drilling of Val d'Or and the analysis to Laboratoire Expert of Rouyn-Noranda. The drill program was designed as infill drilling within the Discovery Intrusion. The drilling was accomplished during the month of July. T. Goettel, geol. supervised the drilling program and logged holes NLR06-01 through NLR06-11. C. A. Wagg, geol. of WAGG Mineral Exploration and Consulting Inc. of Denbridge Ontario logged holes NLR06-12 through NLR06-16. Most of the mafic-ultramafic units encountered were sawed and sent for analyses.

## 10.5 Victory Nickel 2007 Exploration Program

During the summer of 2007, Victory executed 12 diamond drill holes mainly targeted at the massive sulphide lens. The massive sulphide intersections were used for metallurgical testing. C. A. Wagg of WAGG Mineral Exploration and Consulting Inc. of Denbridge Ont. logged the 12 holes.

# 11. Drilling

Drilling activity that took place on the property over the years is described in detail in Section 10, Exploration. Table 11.1 presents a summary of drill holes per drilling campaign.

**Table 11.1 Summary of Diamond Drilling Activity**

| Year | Nb of holes | Size | Length (m) |
|---|---|---|---|
| 1998 | 10 | BQ | 1,209 |
| 1999 | 3 | BQ | 582 |
| 1999 | 46 | | 10,528 |
| 1999 | 6 | | 2,337 |
| 2000 | 4 | | 1,031 |
| 2006 | 16 | NQ | 2,087 |
| 2007 | 12 | | 1,684 |
| **Total** | **97** | | **19,458** |

A number of those holes were targeted at anomalies in the area and were not used to characterise the Lac Rocher Discovery intrusion. A total of 64 drill holes targeted the Discovery intrusion and were used to estimate the mineral resources in this study.

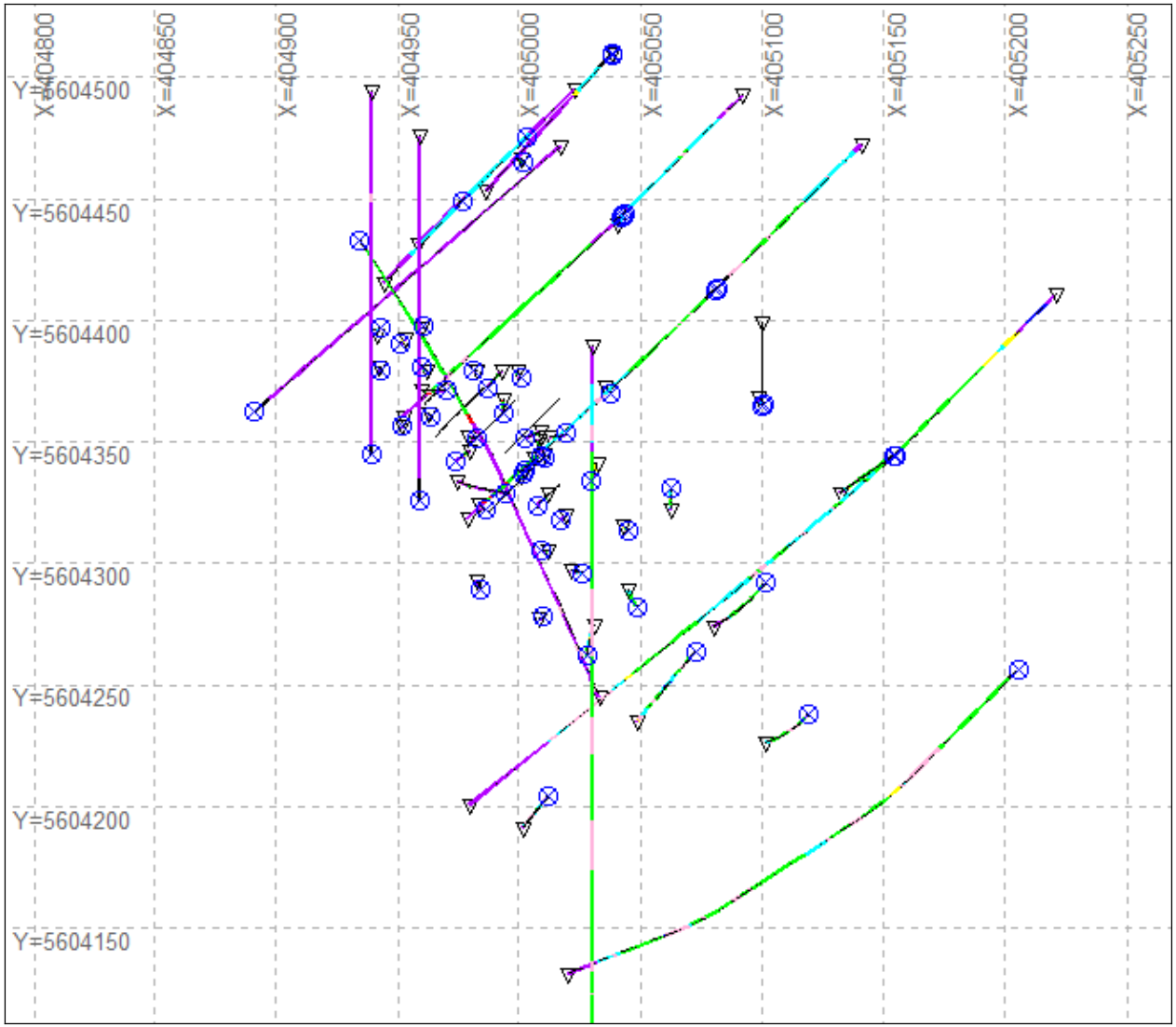
All drill holes were surveyed for both their location and their deviation.

In summary, the drill hole database available for this study consists of:

- 64 diamond drill holes;
- 814 down hole survey records;
- 3,750 assay records (Ni, Cu). And 1,157 records for cobalt;
- 1,453 lithology records.

Figure 11.1 presents the location map of the Lac Rocher drill holes used in this study.

**Figure 11.1 Location Map of the Lac Rocher Drill Holes**



## 11.1 Results of Exploration Work

A total of 64 drill holes focused on the delineation and possible extension of the nickel-copper sulphide mineralisation discovered in hole NLR-99-01. Initially, the locations of the holes were predicated by the assumption of continuous sulphide mineralisation extending from the intersection in hole NLR-99-01. As such, the drill pattern was closely spaced between lines 10+00N and 12+50N where the known sulphide mineralisation occurs; and it was more widely spaced between lines 9+00N and 2+00N where drillholes were collared to test the intrusion as delineated by surface magnetics. During the summer of 2006, 16 infill holes were drilled between lines 10+25N and 11+88N for the purpose of a resource calculation.

Tables 11.2 to 11.4 summarise only the holes where significant mineralization was encountered. Figure 7.2 presents the drill plan and surface geology of the Lac Rocher Pluton before the 2007 drilling campaign.

Drilling outlined a mafic to ultramafic intrusion which is compositionally zoned, roughly ovate in surface plan, and composed predominantly of pyroxenite and peridotite. It has the dimensions of approximately one kilometre along an east-west axis and 450 m in a north-south direction. On line 12+00N erosion of the intrusion has produced a shallow bowl shaped morphology extending to a maximum depth of 50 m. From lines 10+50N through 11+75N the intrusion has the appearance of a trough or keel, 175 m deep, dipping (apparently) 50° southwest. It deepens towards grid south and on line 10+00N attains a maximum depth of almost 250 m, forming a near vertical trough. East of 10+00N, drilling on 7+00N, 5+00N and 3+50N indicate that the intrusion plunges south beneath a cap of paragneiss country rock where it extends to a vertical depth of more than 525 m. Near the north termination of the intrusion, magnetic data and drill profiles suggest that the intrusive contact is irregular.

Sulphide mineralization of significance has been intersected on lines 12+00N through 10+75N, where the sulphides occur as broad domains of disseminated and intercumulate aggregates of pyrrhotite, pentlandite, chalcopyrite and minor pyrite. Massive sulphide mineralisation has been intersected in 12 drill holes: the extension of NLR-98-09, and NLR-99-01, 04, 06, 11, 47, 50, NLR-06-04, 06, 07, 08, NLR-07-05, 06.

Higher concentrations of sulphide occur predominantly within pyroxenite, while gabbro hosted disseminated sulphide. In general, the sulphide content increases towards the footwall contact of the pyroxenite intrusion. Massive sulphides occur as lenses within the pyroxenite, at its footwall contact or within the paragneiss at close proximity with the pyroxenite contact. The massive sulphide intervals are composed of a fine grained pyrrhotite rich groundmass enveloping coarse grained

rosettes of pentlandite, irregular, small, aggregates of chalcopyrite, and rare irregular pyrite aggregates.

**Table 11.2 1999 Diamond Drill Results - Significant Assay Intervals**

| Hole No. | From (m) | To (m) | Length (m) | % Copper | % Nickel |
|---|---|---|---|---|---|
| NLR-99-01 | 123.50 | 147.00 | 23.50 | 0.20 | **0.47** |
| | 147.00 | 166.00 | 19.00 | 0.41 | **1.20** |
| | 166.0 | 180.50 | 14.00 | 1.15 | **2.34** |
| | 180.50 | 183.70 | 3.20 | 0.25 | **10.8** |
| NLR-99-04 | 66.45 | 117.00 | 50.55 | 0.31 | **0.76** |
| | 117.00 | 119.35 | 2.35 | 1.59 | **9.59** |
| | 119.35 | 128.35 | 9.00 | 0.31 | **0.92** |
| NLR-99-05 | 154.55 | 159.40 | 4.85 | 0.74 | **1.48** |
| NLR-99-06 | 96.65 | 143.72 | 47.07 | 0.57 | **1.59** |
| including | 96.65 | 141.15 | 44.50 | 0.60 | **1.03** |
| including | 141.15 | 143.72 | 2.57 | 0.76 | **11.24** |
| NLR-99-07 | 20.45 | 31.75 | 11.30 | 0.22 | **1.05** |
| including | 23.25 | 28.00 | 4.75 | 0.31 | **1.82** |
| NLR-99-09 | 36.07 | 102.40 | 66.33 | 0.28 | **0.70** |
| including | 91.05 | 102.40 | 10.90 | 0.4 | **1.08** |
| NLR-99-09ext | 138.20 | 145.60 | 7.40 | 0.12 | **0.24** |
| | 145.60 | 148.55 | 2.95 | 0.46 | **6.36** |
| NLR-99-34 | 107.00 | 115.20 | 8.20 | 0.58 | **1.89** |
| NLR-99-36 | 1.90 | 53.25 | 51.30 | 0.23 | **0.54** |
| NLR-99-47* | 11.50 | 136.30 | 124.80 | 0.18 | **0.39** |
| | 136.30 | 143.10 | 6.80 | 1.63 | **8.00** |

**Oriented to parallel the discovery sulphide mineralization to collect metallurgical samples.*

**Table 11.3 2006 Diamond Drill Results - Significant Assay Intervals**

| Hole No. | | From (m) | To (m) | Length (m) | % Copper | % Nickel |
|---|---|---|---|---|---|---|
| NLR0603 | | 140.92 | 156.50 | 15.58 | 0.41 | **1.25** |
| | including | 147.56 | 156.50 | 8.94 | 0.48 | **1.63** |
| NLR0604 | | 83.80 | 140.00 | 56.20 | 0.47 | **1.24** |
| | including | 123.00 | 140.00 | 17.00 | 0.65 | **2.04** |
| NLR0605 | | 96.53 | 111.33 | 14.80 | 0.71 | **1.36** |
| NLR0606 | | 80.50 | 113.76 | 33.26 | 0.61 | **0.81** |
| | including | 80.50 | 86.30 | 5.80 | 0.64 | **1.05** |
| including | | 112.62 | 113.76 | 1.14 | 0.61 | **6.03** |
| NLR0607 | | 88.50 | 120.63 | 32.13 | 0.77 | **1.11** |
| | including | 117.80 | 120.63 | 2.83 | 4.20 | **4.28** |
| NLR060841.40 | | 41.40 | 45.10 | 3.70 | 1.46 | **2.72** |
| | | 84.95 | 86.90 | 1.95 | 0.66 | **3.02** |
| NLR061264.84 | | 64.84 | 67.96 | 3.12 | 1.04 | **1.46** |
| NLR061469.12 | | 69.12 | 80.02 | 10.90 | 0.66 | **3.14** |
| NLR061589.51 | | 89.51 | 111.32 | 21.81 | 0.39 | **0.95** |

**Table 11.4 2007 Diamond Drill Results - Significant Assay Intervals**

| Hole No. | From (m) | To (m) | Length (m) | % Copper | % Nickel |
|---|---|---|---|---|---|
| NLR0706 | 143.61 | 145.90 | 2.29 | 1.52 | 9.51 |
| NLR0703 | 119.86 | 124.77 | 4.91 | 1.09 | 1.49 |
| NLR0709 | 126.98 | 132.77 | 5.79 | 1.35 | 5.68 |
| NLR0709 | 141.17 | 145.17 | 4.00 | 2.10 | 4.45 |
| NLR0704 | 116.00 | 125.19 | 9.19 | 1.29 | 3.61 |
| NLR0705 | 125.56 | 130.62 | 5.06 | 1.90 | 5.74 |

Within the intrusion, the dominant lithology is an unfoliated, often homogeneous, medium to dark green, medium to coarse grained pyroxenite. Although predominantly composed of altered clinopyroxene, brown pyroxene (bronzite?) has been observed locally. All of the massive sulphide intersected within the intrusion is restricted to a magnetic pyroxenite phase while non-magnetic pyroxenite phases are barren.

Peridotite is also a substantial phase within the discovery intrusion. Strong magnetic responses on lines 9+00N and 4+00N (verified by drill holes NLR-99-26 and 28) were found to be caused by intensely magnetic, but unmineralised peridotite. Contacts between the peridotite and the pyroxenite are similar to that observed between other lithologies within the intrusion, that is, gradational over several metres.

The peridotite is texturally distinct from the pyroxenite. This unit is predominantly blue-grey to black in colour, occasionally showing magmatic layering. It is composed of serpentinised olivine and clinopyroxene with fine magnetite, and trace of sulphides.

Zones of mixing between the pyroxenite and gabbro and between both of these lithologies and the enveloping gneiss are commonly observed. These hybrid zones may comprise a substantial volume on any given cross-section. This unit has a heterogeneous texture reflecting the diverse nature of the protoliths. Typically, this rock contains little sulphides.

The intrusion is in sharp contact with the foliated and compositionally banded host feldspathic-gneiss. Gneiss xenoliths and pendants have been observed within the pyroxenite intrusion.

Figure 11.2 illustrates the relationship between the geology, drill-hole locations and mineralization for a representative cross-section. Figure 11.3 presents the location of surrounding anomalies and exploration grids. Claims outlines in this figure are not up-to-date, as the figure was produced in December 2006 (Goettel, December 2006).

Outside of the Discovery intrusion, diamond drilling of airborne E.M., magnetic, Induced Polarisation and gravity anomalies failed to intersect any mineralization of any type. On Grid ”A”, a strongly magnetic, very coarse grained mafic intrusion barren of mineralization was intersected in two holes. Bedded siliceous sediments with low sulphide content were encountered in holes NLR-99-42 and 44, which are the probable cause of the I.P. response. On Grids ”B” and “E” drilling intersected sulphide bearing iron formations which explained the geophysical responses on these grids.

Claims covering the Grids ”A” through “E” have been dropped and are no longer a part of the Lac Rocher Property.

**Figure 11.2 Drill Hole Cross-Section 11+25N**

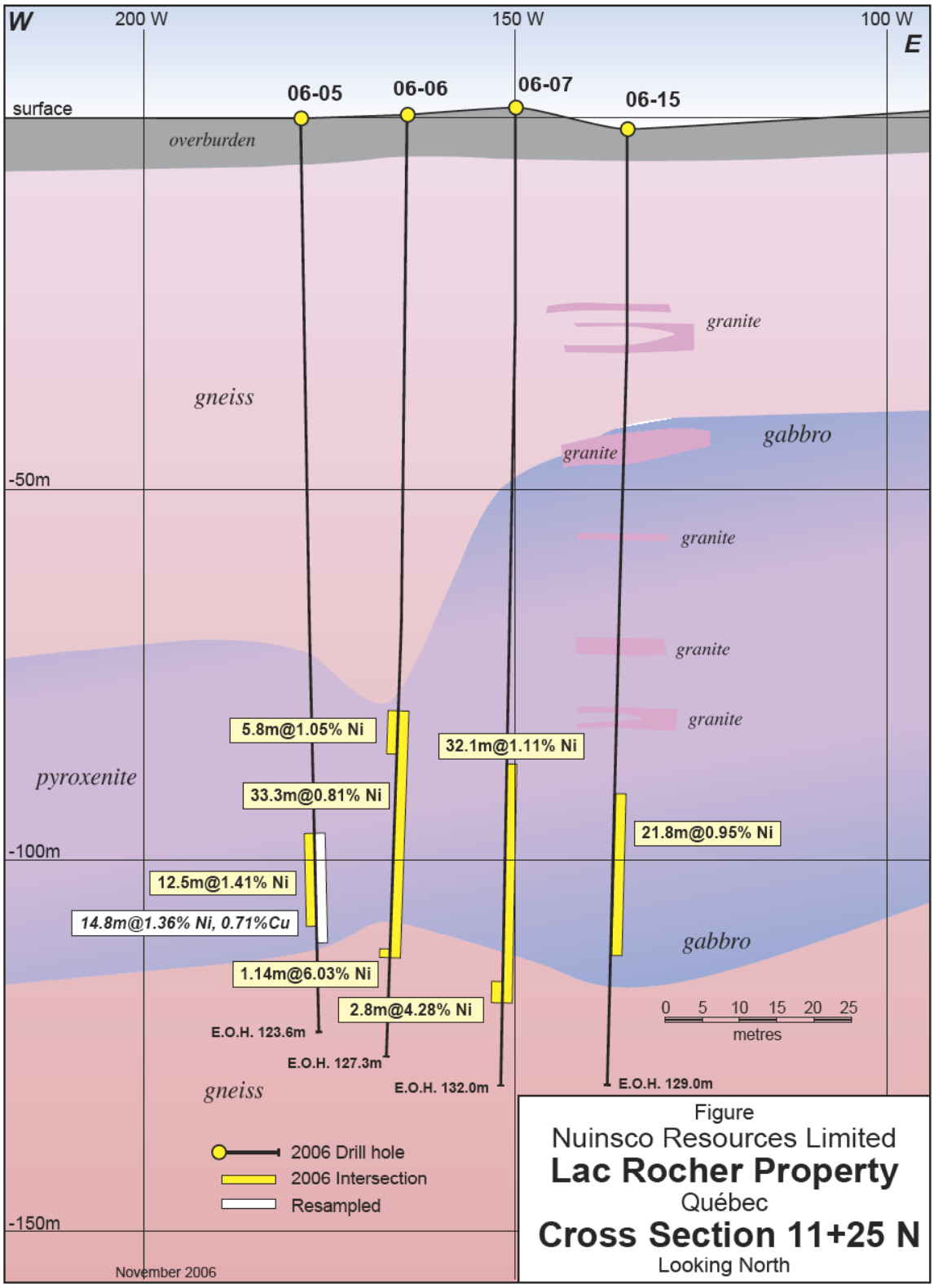
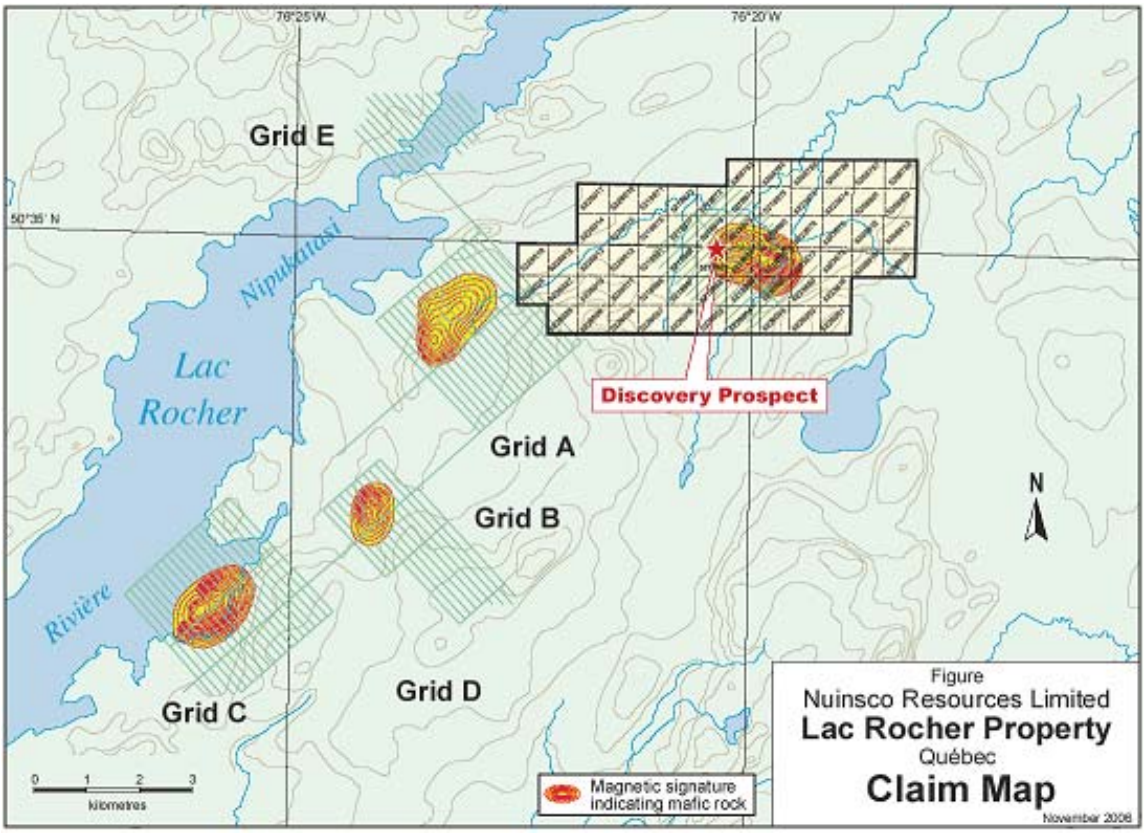


**Figure 11.3 Location of Surrounding Anomalies and Exploration Grids**



# 12. Sampling Method and Approach

Sampling focused on mineralised mafic to ultramafic units. Sample intervals ranged from less than 1 m to 1.5 m. Core from the 1998 drilling program was split, while for core from the 1999-2000 programs, some was split and other was sawed. The entire core from the 2006 drilling program was sawed. Half of the core was bagged on site (with blanks and standards introduced into the sample stream, for the 2006 program) and sent to the laboratory for analyses. The 1998 to 2000 core was analysed by Les Laboratoires XRAL, a Division of SGS Canada Inc. of Rouyn-Noranda. The 2006 core was sent to Laboratoire Expert of Rouyn-Noranda.

# 13. Sample Preparation, Analyses and Security

The geologist logging the core determines what is to be sampled. The core is marked and a sample tag is placed in the core box. Tags are also made for blanks and standards to be placed in the sample stream (approximately 5% of the samples). Blanks were placed immediately after massive sulphide samples. The core is then cut by an employee of Services Exploration of Rouyn-Noranda, and half of the core is placed into a bag with the tag. The samples would then be taken by an employee of Services Exploration directly to the laboratory in Rouyn-Noranda

At the laboratory, the following procedure is followed. Upon receipt, samples are placed in numerical order and compared with the client packing list to verify receipt of all samples. If the samples received do not correspond to the client list, the client is notified.

Samples are dried if necessary and then reduced to -1/4 inch with a jaw crusher. The jaw crusher is cleaned with compressed air between samples and barren material between sample batches. The sample is then reduced to 90% -10 mesh with a roll crusher. The roll crusher is cleaned between samples with a wire brush and compressed air and barren material between sample batches. The first sample of each sample batch is screened at 10 mesh to determine that 90% passes 10 mesh. Should 90% not pass, the roll crusher is adjusted and another test is done. Screen test results are recorded in the logbook provided for this purpose. The sample is then riffled using a Jones type riffle to approximately 300 g. Excess material is stored for the client as a crusher reject. The 300 g portion is pulverised to 90% -200 mesh in a ring and puck type pulveriser, the pulveriser is cleaned between samples with compressed air and silica sand between batches. The first sample of each batch is screened at 200 mesh to determine that 90% passes 200 mesh. Should 90% not pass, the pulverising time is increased and another test is done. Screen test results are recorded in the logbook provided for this purpose.

The samples were analysed using atomic absorption techniques on a 0.5 g pulverized sample with detection limits of 0.01%. Internal laboratory quality control consists of duplicate analyses of every $12^{th}$ sample.

The results of the duplicates, standards and blanks in general are well within acceptable limits. In one case, a blank returned a value of 0.16% nickel with the previous sample in the stream returning a value of 6.86% nickel, which indicates slight contamination at the crushing stage of the samples. By introducing blanks after massive sulphide samples, the contamination is greatly reduced.

# 14. Data Verification

Data verifications were carried out and documented prior to this Preliminary Assessment. The mineral resource Technical Report by Ted Goettel, geol., December 6, 2006 has already described this aspect.

# 15. Adjacent Properties

Information from adjacent properties is not deemed relevant to the present report.

# 16. Mineral Processing and Metallurgical Testing

## 16.1 Introduction

The Lac Rocher deposit consists of a continuous, disseminated to massive, sulphide mineralization. Its nickel-copper sulfides resource comprises a lower grade part and a higher grade part; most of the later being located near the footwall contact.

Ore will be mined from underground at the rate of about 22,500 t/month, crushed to -15 cm and stockpiled on surface.

From the stockpile, ore will be trucked to Chibougamau as required to be stockpiled on surface at the Copper Rand mine where it will be custom milled at the minimum rate of 2,000 t per day for periods of 7 days per month.

This section of the report, produced by Mr. Florent Baril, Eng., of Bumigeme Inc., describes and presents the results of the mineralogical study and flotation test work program conducted by Corem on a composite drill core sample representative of the lower grade part of Victory Nickel's Lac Rocher nickel – copper deposit.

The purpose of the test work was to generate the information required to develop the flowsheet of a flotation process permitting to recover the highest possible percentage of Ni and Cu content of the resource into concentrate grading a minimum of 10% Ni and meeting all specifications generally set forth in nickel concentrates smelting contract specifications. This objective was met through conducting 14 grinding-flotation tests. No specific work was conducted on cobalt during the testwork program, but cobalt grades and recoveries were compiled during testing.

This report also describes the additions and modifications to be brought to the Copper Rand installations to allow for the efficient custom milling of the Lac Rocher resource according to the flowsheet developed at Corem.

### 16.1.1 Terms of Reference

Bumigeme services were retained by Roche Ltd, Consulting Group to carry out the following assignments:

- Supervise Corem’s test work and provide technical assistance;
- Develop the process flowsheet for the milling of the Lac Rocher resource and estimate its metallurgical performance;

- Carry out preliminary process design and engineering related to additions and modifications to be brought to the Copper Rand installations to allow efficient custom milling of the Lac Rocher resource;
- Estimate cost of additions and modifications as well as the milling cost.

## 16.1.2 Content of the Report

This Ni 43-101 technical report describes and presents results of the test work program conducted by Corem as well as the description and estimated performance of the Lac Rocher process flowsheet developed there from by Bumigeme.

It also includes the description and estimated cost of the modifications and additions which would have to be brought to the Copper Rand installations for the custom milling of the Lac Rocher resource.

## 16.1.3 Sources of Information

### 16.1.3.1 Corem's Technical Report – Low grade Sample

This technical note, dated April 08, 2008, describes and presents the results of the mineralogical and grinding-flotation tests conducted on the Lac Rocher drill core composite under the supervision of Bumigeme representative. Bumigeme process flowsheet development is primarily based on the content of this technical note appended to the present report (Appendix A).

### 16.1.3.2 Xstrata Testing – High Grade Sample

This report, which cannot be published, presents the results of a mineralogical investigation as well as of a metallurgical test work program conducted on a composite sample prepared from drill core intersections in the higher grade part of the Lac Rocher resource. Results obtained showed that the composite was readily amenable to the Xstrata flotation process.

### 16.1.3.3 Visit of the Copper Rand Installations

Bumigeme representatives visited the Copper Rand milling and ancillary installations on two occasions to evaluate the status of these installations as well as to identify the modifications and additions required to allow efficient custom milling of the Lac Rocher resource.

### 16.1.3.4 Meeting with Copper Rand Management

Bumigeme met with Copper Rand authorized representative to discuss the terms of an eventual custom milling agreement.

### 16.1.4 Participants to the Technical Report

Chapter 16 of this technical report was prepared under the management and active participation of Mr. Florent Baril, Eng. who cumulates 50 years of experience in the development of mining projects.

Mr. Baril occupied the function of Mill superintendent of the SOMEX Ni-Cu concentrator and was in charge of a site visit of the MSF nickel milling installations in Brazil followed by a Technical Report on process modifications to increase the Ni recovery and the quality of the Ni concentrate. In 1970, he accepted the position of mill superintendent at Copper Rand and during that period he supervised the installation of the 2.9 x 3.65 m rod mill to increase the mill tonnage to 2,200 short tons per day. Mr. Baril visited the installations of the Copper Rand mill on January 11, 2008.

Mr. Jean Claude Caron, Eng., a qualified person with over 50 years of experience in mineral dressing, supervised the test work program at Corem and contributed his know-how to the flowsheet development and preliminary process design. Mr. Caron was in charge of the process design, engineering, construction and start-up of the SOMEX Ni-Cu concentrator at the Bickerdyke mine in Lac Edouard, Quebec.

He supervised the test work conducted by the CRM on samples from the Dumont Nickel mining property and carried out the preliminary process design of the proposed mill. He also participated to the technical evaluation of the MSF concentrator in Brazil.

Mr. Marcel Duchesne is a metallurgical technician with over 35 years of experience as mill metallurgist, mill foreman and mill superintendent in different mining operations in Quebec. His experience covers the treatment of several base metals by flotation, as well as the treatment of precious metals and industrial minerals.

Mr. Duchesne visited the installations of Copper Rand on February 12 and 13, 2008 to identify the modifications necessary to the Copper Rand mill to treat the nickel ore of Lac Rocher.

### 16.1.5 Units and Abbreviations

All units used by Bumigeme in this report are in the metric system. The abbreviations used are as follows:

| | | |
|---|---|---|
| g | = | gram |
| g/t | = | gram per metric ton |
| kg | = | kilogram |
| t | = | metric ton |
| µm | = | micron = 0.000 001 meter |
| $d_{80}$ | = | screen size opening in µ that 80% by weight of sample grains pass through |

| | | |
|---|---|---|
| WI | = | work index |
| kW | = | kilowatt |
| kWh/t | = | kilowatt hour per metric ton |
| G | = | Gauss |
| $ | = | Canadian Dollar |
| $ US | = | US Dollar |

## 16.2 Mineralogical Study

### 16.2.1 Objectives

The objectives of Corem's mineralogical study conducted at the start of the testwork program were as follows:

- Identify and investigate the principal nickel bearing minerals as well as the major gangue minerals;
- Evaluate the liberation size of the nickel bearing minerals.

The report of this mineralogical study is included in Corem's Technical Note.

### 16.2.2 Sample Investigated

The ~50 kg composite was prepared by Mr. Chris Wagg, a qualified person and Victory's consulting geologist, who made a composite of given weights of uncrushed samples of diamond drill core intersections. The composite sample was prepared to represent the lower grade part of the Lac Rocher resource. For its shipment to Corem, the composite was put into two bags.

Mr. Wagg's Memorandum covering the composite sample preparation, its representativeness and shipment to Corem is presented in Appendix B, together with the mode of preparation of the composite.

A 1 kg sample extracted from the composite was stage crushed to -20 mesh and split in halves. One half was screened on a series of 6 screens (28, 35, 48, 65, 100, 200 and 325 mesh), and a sample from each screen fraction was mounted in polished sections.

### 16.2.3 Methodology

The identification and investigation of the major phases were made by XRD, EDAX, SEM and optical microscope.

## 16.2.4 Mineralogical Investigation

### 16.2.4.1 Sulphides

Following are the major sulphides identified:

- Pyrrhotite $Fe_{1-x}$ S
- Pentlandite $(Ni, Fe)_9 S_8$ (contains 34.2% Ni)
- Chalcopyrite $CuFeS_2$
- Pyrite $FeS_2$

Pentlandite was the major Ni bearing phase identified. It mainly occurs as contact grains as well as ex-solution flames within pyrrhotite. Violarite ($Ni_2FeS_4$), with a 38.9% Ni content, was also observed as a minor Ni bearing phase in association with pyrrhotite.

Chalcopyrite was the only Cu-bearing phase observed. EDAX and SEM investigations did not identify Ni in the grains of pyrrhotite investigated.

### 16.2.4.2 Silicates Phases

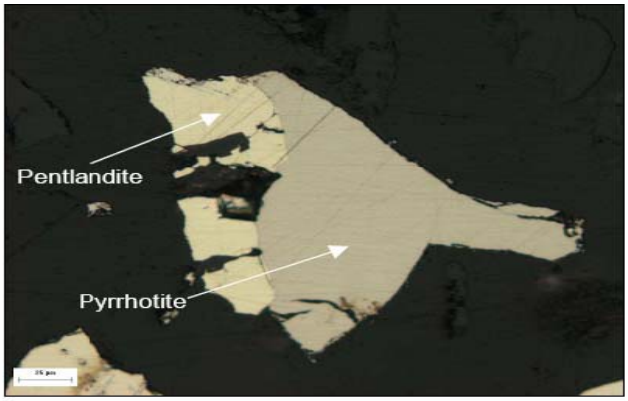
The major silicate phases observed in the gangue are actinolite (amphibole), phlogopite and chlorite. No EDAX or SEM investigations were made to detect the presence of Ni in the silicate phases.

### 16.2.4.3 Liberation Size

Following is the content of Corem's mineralogical report on "Liberation Size for Nickel Bearing Phases".

The liberation particle size for pentlandite is between 325 and 200 mesh, around 50-60 μm. The majority of pentlandite is liberated with some association with pyrrhotite. The chalcopyrite (the copper bearing phase) is completely liberated at this size.

Since the screen fractions were not assayed for Ni, nor grain counting of pentlandite made, the mass distribution of free grains of pentlandite was not evaluated. Therefore the optimum grinding size ($d_{80}$) could be coarser than that indicated by the liberation size evaluation.




Particle of pentlandite (in light yellow) with pyrrhotite (in brown).

#### 16.2.4.4 Complementary Mineralogical Study

In the course of the test work program, Corem realized a second SEM and optical microscope investigation on samples of cleaner and scavenger concentrates of test 6 to evaluate the degree of liberation of pentlandite. The main conclusions derived from the study were as follows:

- Over 90% of the pentlandite is either liberated or in exsolution with pyrrhotite (Figure 16.1);
- A vast majority of the pentlandite is liberated at 50% or over (Figure 16.2);
- Figures 16.3 and 16.4 show the distribution of pentlandite by liberation class;
- From the +200 mesh to the -325 mesh fractions, the degree of liberation of pentlandite goes up from 74 to 79% in the cleaner concentrate, and from 61 to 64% in the scavenger concentrate (Table 16.1).

**Figure 16.1 Pentlandite Associations in Test #6 Cleaner 2 Concentrate Sample**

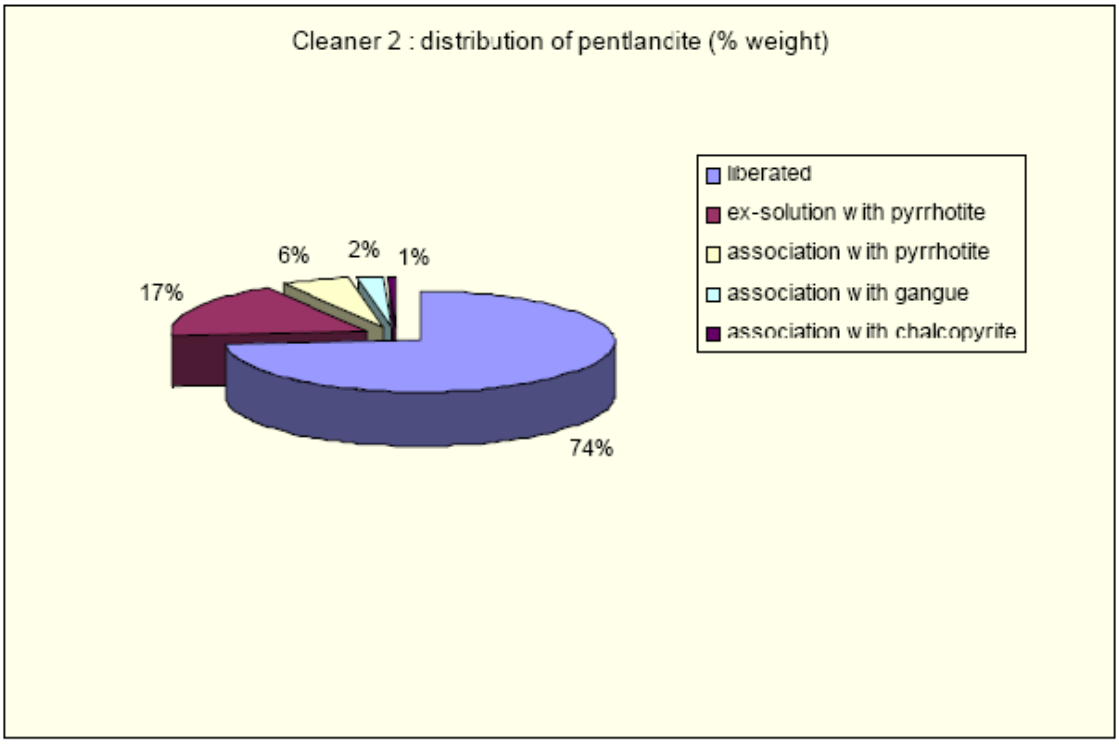



**Figure 16.2 Pentlandite Associations in Test #6 Scanvenger 2 Concentrate Sample**

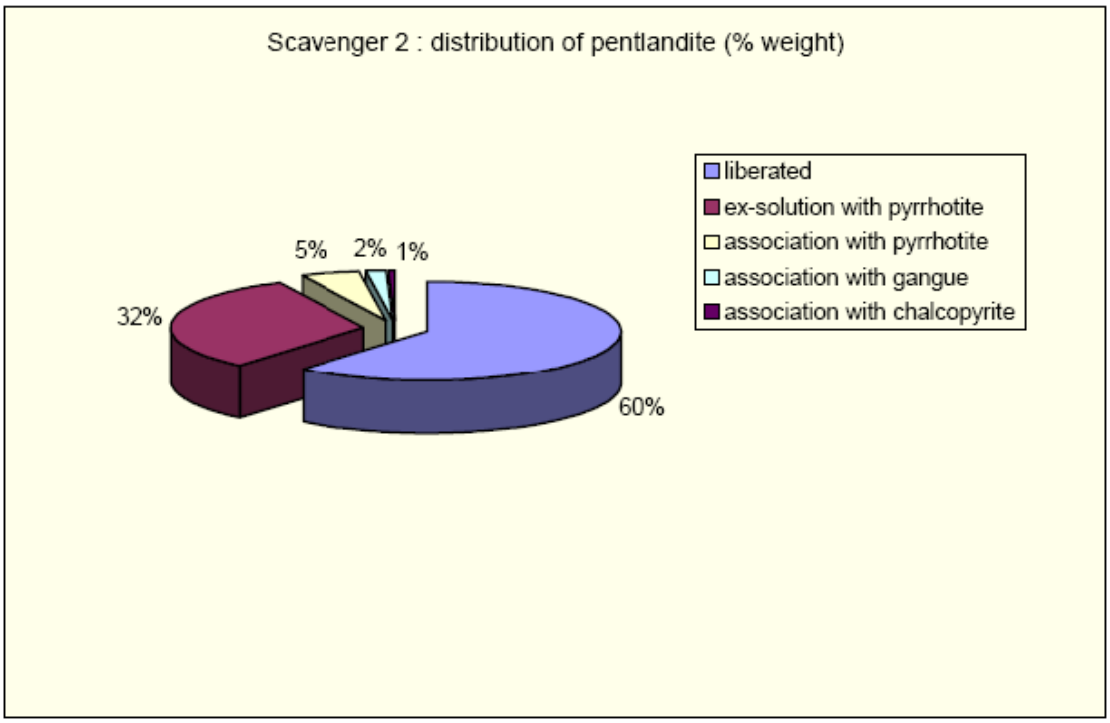


**Figure 16.3** **Distribution of pentlandite according to its degree of liberation class in cleaner 2 concentrate**

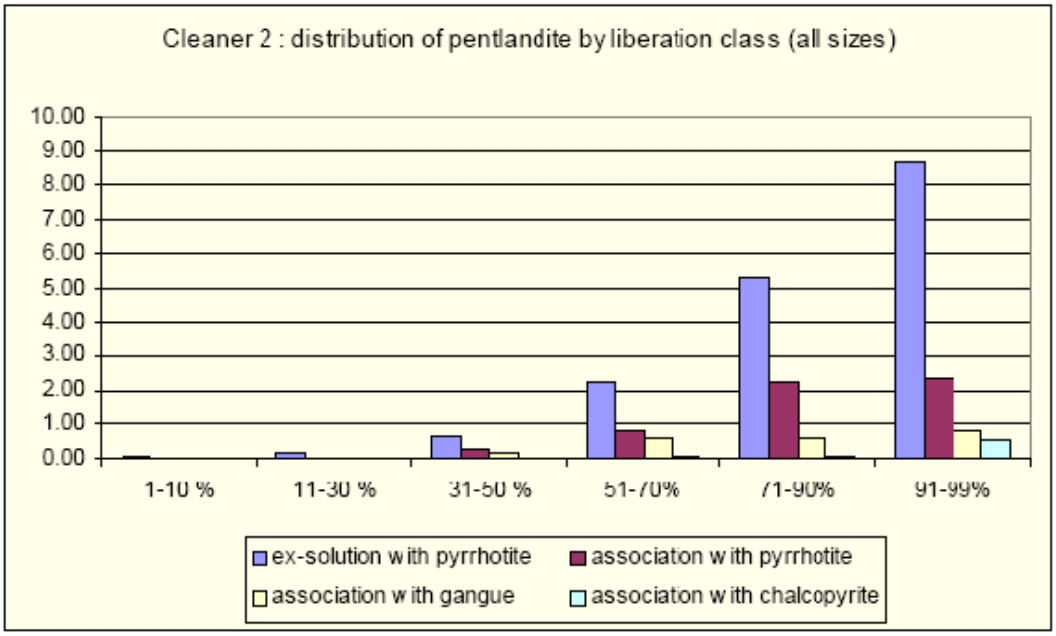



**Figure 16.4** **Distribution of pentlandite according to its degree of liberation class in scavenger 2 concentrate**

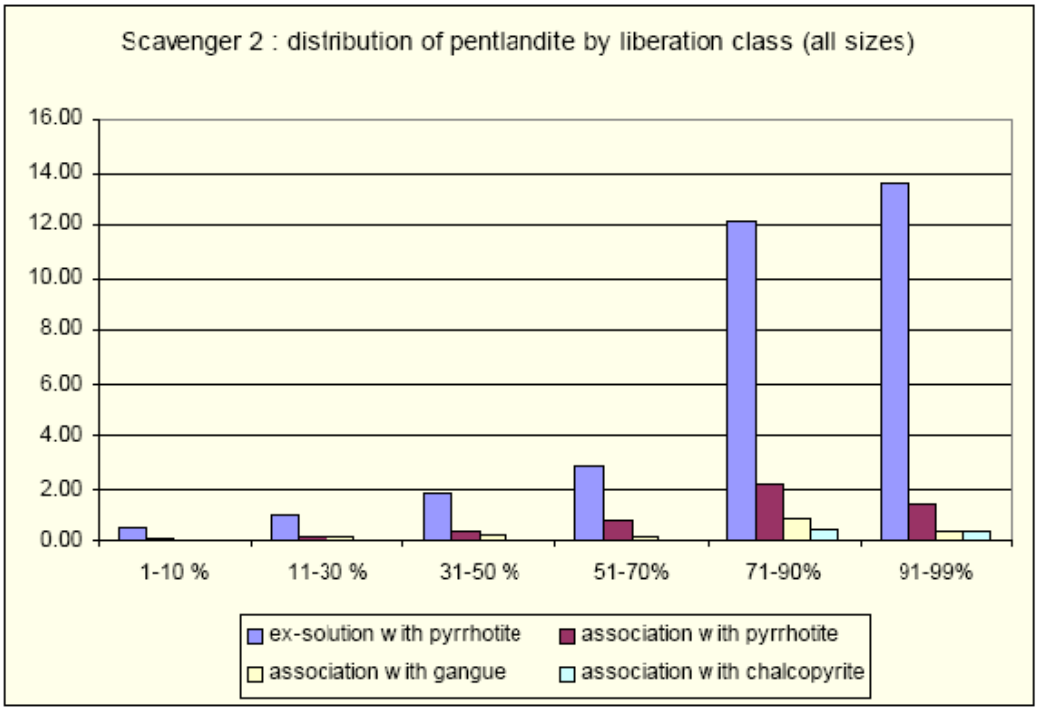


**Table 16.1 Degree of Liberation - Decreasing Class Size (Cleaner 2 and Scavenger 2 Concentrate)**

| | Cleaner 2 | Scavenger 2 |
|---|---|---|
| Total Sample | **74.1** | **61.1** |
| -200 mesh | **74.3** | **61.6** |
| -270 mesh | **76.1** | **62.9** |
| -325 mesh | **79.0** | **64.1** |

## 16.2.5 Characterization of the Composite

### 16.2.5.1 Sample Preparation

At Bumigeme's recommendation, Corem stage crushed the whole composite (~50 kg) to -10 mesh and used a rotary type splitter to subdivide the crushed product into 1 kg samples, which were bagged, sealed and stored frozen.

### 16.2.5.2 Head Samples and Assays

Three head samples were split out, each from a different 1 kg sample, and assayed by XRF. Results are presented in Table 16.2.

**Table 16.2 Summary of the Head Assay**

| (%) | Sample 1 | Sample 2 | Sample 3 | Average |
|---|---|---|---|---|
| $SiO_2$ | 43.92 | 44.03 | 44.12 | 44.02 |
| $Al_2O_3$ | 6.27 | 6.27 | 6.36 | 6.33 |
| MgO | 15.07 | 14.99 | 15.00 | 15.02 |
| CaO | 5.75 | 5.65 | 5.70 | 5.70 |
| $K_2O$ | 0.33 | 0.33 | 0.33 | 0.33 |
| $TiO_2$ | 0.19 | 0.19 | 0.19 | 0.19 |
| MnO | 0.14 | 0.14 | 0.14 | 0.14 |
| $P_2O_5$ | 0.05 | 0.05 | 0.06 | 0.05 |
| Co | 0.04 | 0.04 | 0.04 | **0.04** |
| Cr | 0.20 | 0.20 | 0.20 | 0.20 |
| Cu | 0.47 | 0.47 | 0.48 | **0.47** |
| Fe | 12.08 | 12.28 | 12.19 | 12.18 |
| Ni | 1.39 | 1.34 | 1.36 | **1.36** |
| Pb | 0.01 | 0.01 | 0.01 | 0.01 |
| S | 5.21 | 5.28 | 5.00 | 5.16 |
| Zn | 0.02 | 0.02 | 0.02 | 0.02 |
| Na | 0.49 | 0.51 | 0.47 | 0.49 |
| LOI | 5.50 | 5.58 | 6.14 | 5.75 |
| **Sub-total** | **97.1** | **97.5** | **97.8** | **97.5** |

### 16.2.5.3 Bond Work Index (WI)

The 13.4 kWh/t Bond Work Index of the composite was determined trough conducting a standard series of grinding tests using the -10 mesh samples as "new feed" rather than a -6 mesh fraction which was not available. It was originally planned to conduct the testwork program in two phases and

to determine the WI in the course of the second phase. Results of the grinding tests are presented in Table 16.3.

**Table 16.3 WI Results of Grinding Tests**

| | | | Undersize (g) 100 mesh | | | | |
|---|---|---|---|---|---|---|---|
| **Cycle** | **New Feed (g)** | **Revolutions** | **In Product** | **In Feed** | **In New Product** | **Per mill Revolution** | **To be Ground** |
| **1** | # | 100 | 465.0 | 290.0 | 175.0 | 1.75 | 72.1 |
| **2** | 465.0 | 146 | 414.8 | 106.4 | 308.4 | 2.11 | 255.7 |
| **3** | 414.8 | 126 | 360.0 | 94.9 | 285.1 | 2.10 | 267.2 |
| **4** | 360.0 | 132 | 365.4 | 82.4 | 283.0 | 2.14 | 279.7 |
| **5** | 365.4 | 129 | 365.7 | 83.6 | 282.1 | 2.19 | 278.5 |
| **6** | 365.7 | 127 | 364.0 | 83.7 | 280.3 | 2.21 | 278.4 |

Cycles 4 to 6 g/Rev 2.18 Circulating load (%): 247.18

$p_{80}$ (µm): 125.3

$f_{80}$ (µm): 1265

22.88% minus 100 mesh (feed) Ideal weight (g): 362.1

2.18 per mill revolutions WI (kWh/ metric ton): 13.4

1267.3 g for 700 ml.

#### 16.2.5.4 Specific Gravity

The composite has a specific gravity of 3.14 as determined by two air pycnometer tests conducted on a representative sample.

#### 16.2.5.5 Davis Tube Tests

Three Davis Tube tests were conducted at different field intensities to evaluate the possible advantage of integrating a magnetic separation stage in the Lac Rocher flowsheet.

Results obtained (Table 16.4) show that the pyrrhotite has a very low magnetic susceptibility and that there is a negligible enrichment in Ni of the magnetic fraction. Therefore magnetic separation cannot contribute to improve the overall efficiency of the flotation process.

The 0.07% weight of the magnetic fraction pulled at 1,000 Gauss intensity confirms that the composite contains only traces of magnetite.

**Table 16.4 Davis Tube Tests Results**

| **Field Intensity** | **1000 G** | **5000 G** | **4000 G** | | |
|---|---|---|---|---|---|
| | **Weight** | **Weight** | **Weight** | **Ni** | |
| | **%** | **%** | **%** | **%** | **Dist** |
| **Magnetic Fraction** | 0,07 | 5,32 | 5,71 | 1.81 | 7.72 |
| **Non- Magnetic Fraction** | 99.93 | 94.68 | 94.29 | 1.31 | 92.28 |
| **Heads Calculated** | 100.00 | 100.00 | 100.00 | 1.34 | 100.00 |

### 16.2.5.6 Grindability Tests

A first grindability test was conducted in the rod mill turning at 40% of its critical speed. In the course of the flotation testwork program, Bumigeme requested that the rod mill gear arrangement be modified to have it turn at ~70% of its critical speed, which also called for the realization of a second grindability test. The results of the two grindability tests are presented in Table 16.5 and illustrated graphically in Figure 16.5.

In presence of micas (phlogopite), the Microtrac determinations are biased as reflected by the Microtrac vs Sieving curves at 70% of critical speed. Bumigeme estimates at 60 µm the $d_{80}$ of the 40% critical speed ground product which would be obtained by sieving.

Table 16.6 presents the grinding parameters and the fineness of grind ($d_{80}$) of the samples used for the flotation tests.

**Table 16.5 $d_{80}$ as Function of Time and % Critical Speed**

| 70% of Critical Speed | | | 40% of Critical Speed | |
|---|---|---|---|---|
| **Time** | **Sieving $p_{80}$ (µm)** | **Microtrac™ $p_{80}$ (µm)** | **Time** | **Microtrac™ $p_{80}$ (µm)** |
| 40 | 92.4 | 139.8 | 10 | 377 |
| 62 | 70.7 | 86.5 | 20 | 259 |
| 90 | 57.4 | 73.9 | 40 | 145 |
| 110 | 50.4 | 58.7 | 60 | 117 |
| | | | 120 | 76.1 |
| | | | 180 | 60.1 |

**Figure 16.5 Grinding Curve - Microtrac™ and Sieving - Ore Milled at 40% and 70% of Critical Speed**

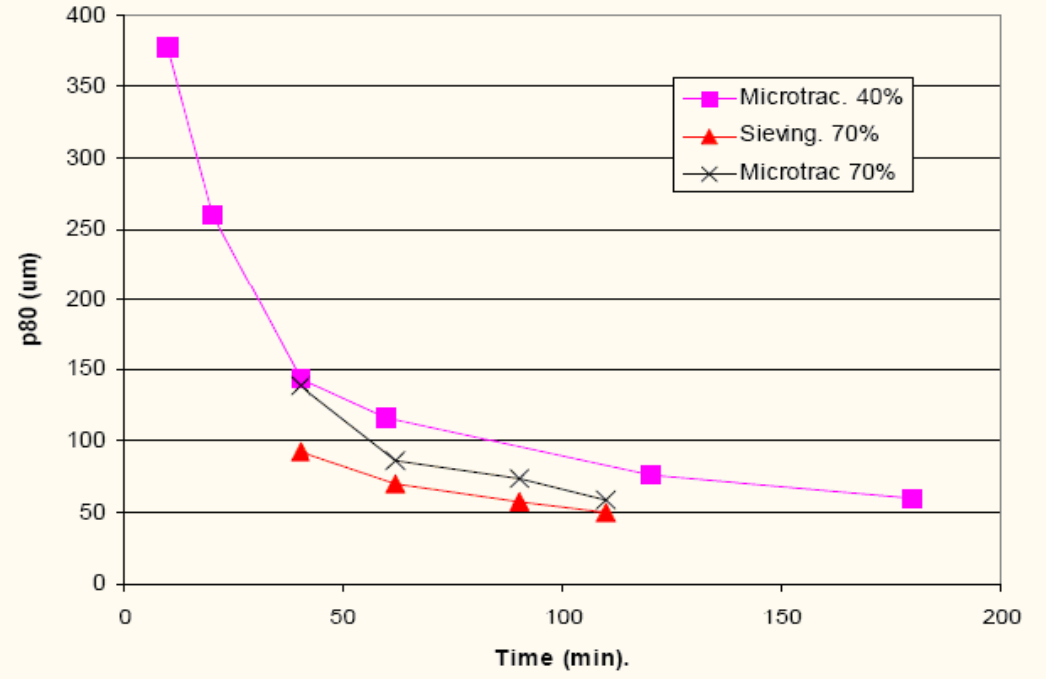



**Table 16.6 $d_{80}$ of Flotation Feed Samples**

| | | Grinding | | | |
|---|---|---|---|---|---|
| **Test N°** | **Process tested** | **Critical speed %** | **Time min** | **$d_{80}$** | |
| | | | | **Sieve µm** | **Microtrac™ µm** |
| **1 to 4** | Direct | 40 | 120 | 60 * | 76.1 |
| **5 to 8** | Preflotation | 40 | 120 | 60 * | 76.1 |
| **9** | Preflotation | 70 | 90 | 57.4 | 73.9 |
| **10** | Direct | 70 | 90 | 57.4 | 73.9 |
| **11 to 15** | Direct | 70 | 60 | 72 | 86.5 |

*Bumigeme estimate

# 16.3 Metallurgical Test Program

## 16.3.1 Flotation Test Work

### 16.3.1.1 Summary

The primary objective of the flotation test work was to develop the flowsheet of a process capable of recovering the highest possible percentage of the nickel in concentrate grading a minimum of 10% Ni and meeting the specifications set forth in Smelting contracts for concentrates to be "penalty free" (Table 16.7).

**Table 16.7 Concentrate Grade Objective**

| Ni<br>% | S<br>% | $SiO_2$<br>% | MgO<br>% | Zn<br>ppm | As<br>ppm | Cr<br>ppm |
|---|---|---|---|---|---|---|
| **≥ 10** | **≥ 27** | **< 25** | **< 4** | **< 500** | **< 500** | **< 500** |

Preflotation and direct flotation tests (Figures 16.6 and 16.7) were conducted on 2 kg samples, each made up of 2 x 1 kg samples which had been kept frozen until their use for a test. The objective of the program was met in the course of the last series of 5 direct flotation tests.

#### 16.3.1.2 Rougher Flotation Stage

Results obtained at the rougher stage of each test are presented in Table 16.8.

**Figure 16.6 Pre-flotation Flowsheet**

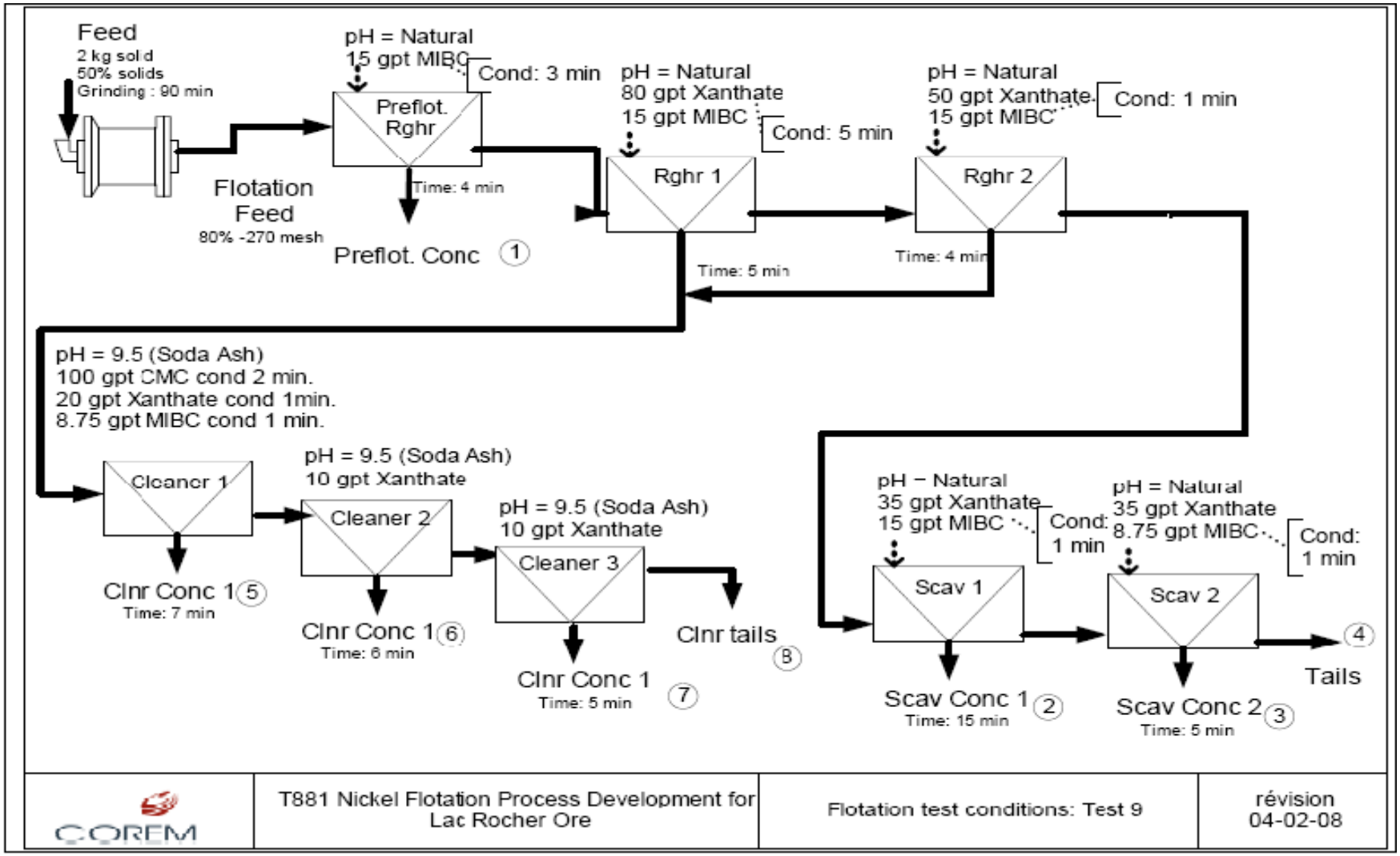


**Figure 16.7 Direct Flotation Flowsheet**

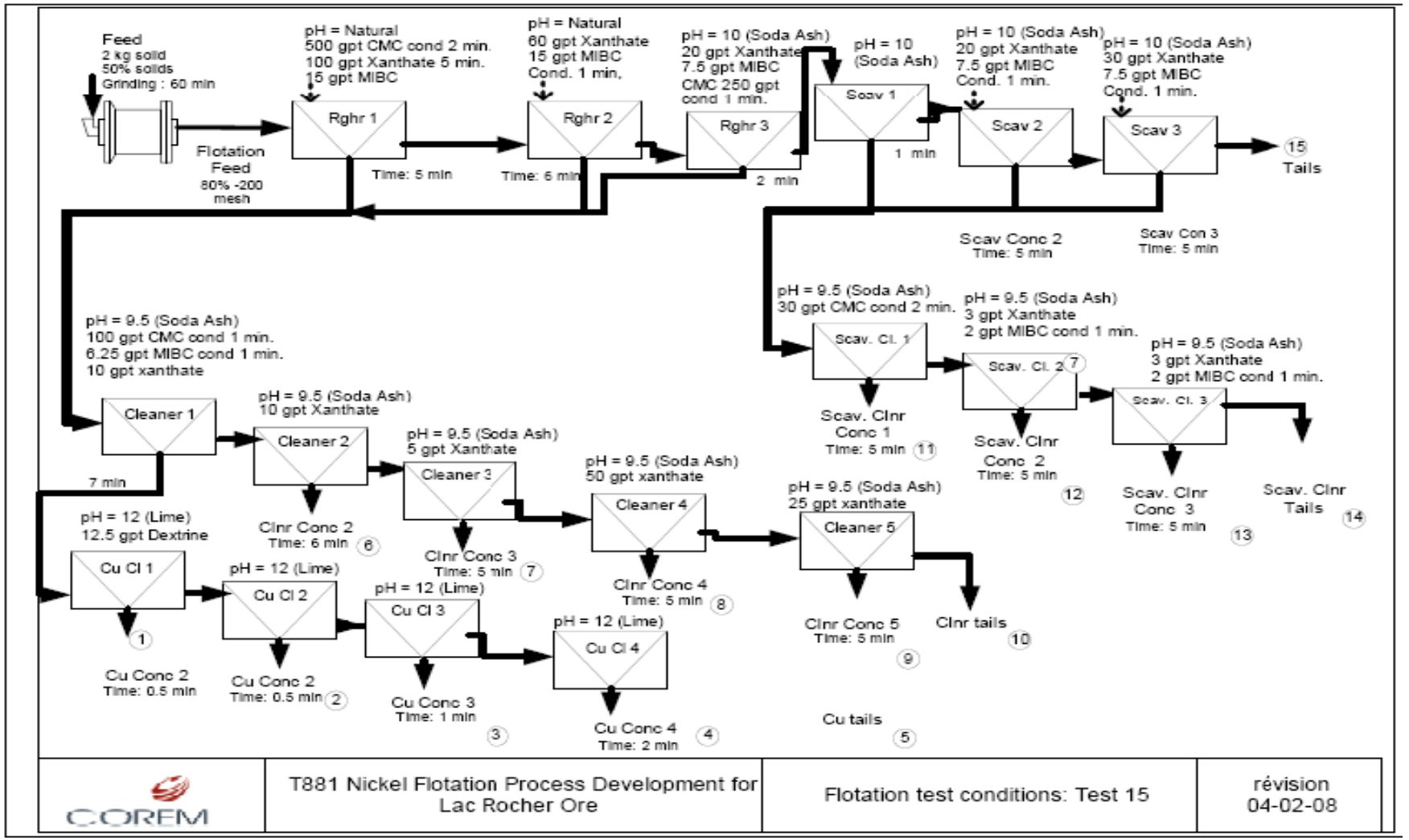


**Table 16.8 Summary of Open Circuit Rougher Flotation Results**

| | Grinding | | | Flotation Parameters | | | | | | | | Rougher Concentrate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test N° | C.S % | Time Minute | $d_{80}$ µ | Process | Cells N° | pH | Modifier | KAX g/t | CMC g/t | $CuSO_4$ g/t | Time min | W % | Ni % | Ni % Dist |
| **1** | 40 | 120 | 60 | Direct | 1 | 10 | Soda ash | 60 | - | - | 5 | 13.76 | 4.165 | 44.22 |
| **2** | 40 | 120 | 60 | Direct | 1 | 10 | Lime | 60 | - | - | 5 | 10.24 | 2.58 | 20.97 |
| **4** | **Kinetic Test** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **5** | **Kinetic Test** | | | | | | | | | | | | | |
| **6** | 40 | 120 | 60 | Preflotation | 1 | Nat | - | 150 | - | - | 5 | 10.5 | 5.64 | 45.88 |
| **7** | 40 | 120 | 60 | Preflotation | 1 | 8,3 | $H_2SO_4$ | 175 | - | 100 | 23.5 | 10.09 | 5.66 | 44.27 |
| **8** | 40 | 120 | 60 | Preflotation | 2 | Nat | - | 130 | - | - | 9 | 12.24 | 6.03 | 56.56 |
| | | | | | | | | | | | | | | |
| **9** | 70 | 90 | 57 | Preflotation | 2 | Nat | - | 130 | - | - | 9 | 20.15 | 5.65 | 85.207 |
| **10** | 70 | 90 | 57 | Direct | 2 | Nat | - | 130 | - | - | 9 | 14.46 | 4.68 | 62.23 |
| | | | | | | | | | | | | | | |
| **11** | 70 | 60 | 72 | Direct | 2 | Nat | - | 160 | 500 | - | 9 | 18.67 | 5.81 | 83.02 |
| **12** | 70 | 60 | 72 | Direct | 2 | Nat | - | 160 | 500 | - | 11 | 22.10 | 5.15 | 87.318 |
| **13** | 70 | 60 | 72 | Direct | 2 | Nat | - | 160 | 500 | - | 11 | 17.54 | 6.18 | 83.174 |
| **14 (1)** | 70 | 60 | 72 | Direct | 4 | Nat | Lime (1) | 170 | 750 | - | 14 | 18.60 | 5.73 | 86.294 |
| **15 (2)** | 70 | 60 | 72 | Direct | 3 | Nat | Lime (2) | 170 | 750 | - | 13 | 17.66 | 6.17 | 83.10 |

**Note:** **1: pH raised to 10.0 with lime and 250g/t of CMC added after Cell #2**

**2: pH raised to 10.0 with lime and 250g/t of CMC added after Cell #2**

#### 16.3.1.3 Lime Addition

Results of test 2 reflect the slowing effect of lime addition on the kinetic of the Ni flotation.

#### 16.3.1.4 Grinding Mode

The detrimental effect of grinding at 40% of the critical speed is put in evidence by the results of flotation tests 8 and 9 which were conducted under exactly the same conditions (Table 16.9), except for the sample grinding.

Test 8, from a sample ground at 40% of the critical speed, recovered 57% of the Ni compared with the 85% recovery obtained from test 9 conducted on a sample ground at 70% of the critical speed.

**Table 16.9 Effect of the Grinding Mode on the Efficiency of the Rougher Flotation**

| | Test 8 | | | Test 9 | | |
|---|---|---|---|---|---|---|
| | Wt | Ni | | Wt | Ni | |
| | % | % | % Dist | % | % | % Dist |
| **Prefloat Concentrate** | 5.31 | 0.37 | 1.52 | 6.29 | 0.61 | 2.87 |
| **Prefloat Tails** | 94.6 | 1.36 | 98.48 | 93.71 | 1.38 | 97.13 |
| **Rougher Concentrate** | 12.24 | 6.03 | 56.56 | 20.15 | 5.65 | 85.21 |
| **Rougher Tails** | 82.45 | 0.66 | 41.91 | 73.56 | 0.22 | 11.92 |
| **Heads Calculated** | | 1.30 | | | 1.34 | |

### 16.3.1.5 Fineness of Grind: $d_{80}$

Table 16.10 compares the results of the two direct flotation tests N° 10 and 12 which were respectively conducted on a $d_{80}$ = 57 µ and $d_{80}$ = 72 µ ground sample.

**Table 16.10 Influence of the Sample Coarseness on the Efficiency of the Rougher Flotation**

| | Test 10: $d_{80}$ = 57µm | | | Test 12: $d_{80}$ = 72µm | | |
|---|---|---|---|---|---|---|
| | Wt | Ni | | Wt | Ni | |
| | % | % | % Dist | % | % | % Dist |
| **Rougher Concentrate** | 14.46 | 4.68 | 62.23 | 14.98 | 7.14 | 82.07 |
| **Rougher Tails** | 85.54 | 0.48 | 37.77 | 85.02 | 0.28 | 17.93 |
| **Heads Calculated** | | 1.09 | | | 1.30 | |

The table only compares the performance of rougher 1 and 2 flotations. Test 12 included a kinetic determination using eight rougher samples, which provided a total of 22.10% weight concentrate carrying 87.32% of the nickel (at a 5.15% Ni grade).

The coarser grind and the CMC addition contributed to the higher selectivity, while the combination of coarser grind + higher rate of xanthate addition accounted for the much higher % Ni recovered in test 12 as well as in the last 5 tests.

### 16.3.1.6 Rougher–Cleaner Flotation Stage

Results of the open circuit cleaner flotation are presented in Table 16.11 and illustrated graphically in Figure 16.8.

After the modification of the grinding mode from 40% to 70% of the critical speed, and of the grind fineness (from -57 µm up to -72 µm $d_{80}$), the addition of CMC as a depressant of high gangue minerals was the third most important and beneficial move made in the course of the test work program.

The first addition of CMC was made at the rougher-cleaner stage of test 9 which returned a 10.6% Ni concentrate. For the last 5 tests, CMC was added at the rougher and at the rougher-cleaner stages and all concentrates produced assayed over 10% Ni.

**Table 16.11 Summary of Open Circuit Cleaner Flotation Results**

| | Flotation Parameters | | | | | | | | Cleaner Flotation | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Cleaner Concentrate | | | Cleaner Tail | |
| Test N° | Grind | Process | Cells N° | pH | Modifier | KAX g/t | CMC g/t | Time min | Wt % | Ni % | Ni % Dist | Ni % | Ni % Dist |
| **Phase 1- Direct flotation** | | | | | | | | | | | | | |
| **1** | **A** | Direct | 1 | 9.5 | $H2SO_4$ | - | - | 7.5 | 5.6 | 1.45 | 6.27 | 6.03 | 37.95 |
| **2** | **A** | Direct | 1 | 9.7 | $H2SO_4$ | - | - | 5 | 4.64 | 0.91 | 3.37 | 3.96 | 17.6 |
| **4** | **Kinetic Test** | | | | | | | | | | | | |
| **Phase 1- Pre- flotation** | | | | | | | | | | | | | |
| **5** | **Kinetic Test** | | | | | | | | | | | | |
| **6** | **A** | Preflotation | 1 | 8.3 | $H2SO_4$ | 10 | - | 12.5 | 7.54 | 6.58 | 38.45 | 3.24 | 7.44 |
| **7** | **A** | Preflotation | 1 | 8.3 | $H2SO_4$ | 10 | - | 19.5 | 8.18 | 6.41 | 40.7 | 2.42 | 3.57 |
| **8** | **A** | Preflotation | 1 | Nat | - | 10 | - | 19.5 | 9.12 | 7.25 | 50.74 | 2.45 | 5.84 |
| **Phase 2- Pre- Flotation and Direct Flotation** | | | | | | | | | | | | | |
| **9** | **B** | Preflotation | 3 | 9.5 | Soda ash | 30 | 100 | 18 | 7.89 | 10.62 | 62.7 | 2.45 | 22.5 |
| **10** | **B** | Direct | 4 | 9.5 | Soda ash | 30 | 100 | 23 | 8.36 | 7.8 | 59.93 | 0.41 | 2.3 |
| **Phase3- Direct Flotation** | | | | | | | | | | | | | |
| **11** | **C** | Direct | 4 | 9.5 | Soda ash | 75 | 100 | 22.5 | 8.8 | 11.65 | 78.45 | 0.61 | 4.61 |
| **12** | **C** | Direct | 5 | 9.5 | Soda ash | 110 | 100 | 27.5 | 9.12 | 11.49 | 80.45 | 0.36 | 1.62 |
| **13** | **C** | Direct | 5 | 9.5 | Soda ash | 100 | 100 | 27.5 | 8.71 | 11.53 | 77.07 | 0.34 | 1.88 |
| **14** | **C** | Direct | 5 | 9.5 | Soda ash | 105 | 100 | 27.5 | 10.2 | 10.02 | 83.26 | 0.45 | 3.04 |
| **15** | **C** | Direct | 5 | 9.5 | Soda ash | 105 | 100 | 27.5 | 10.04 | 10.57 | 80.89 | 0.38 | 2.21 |

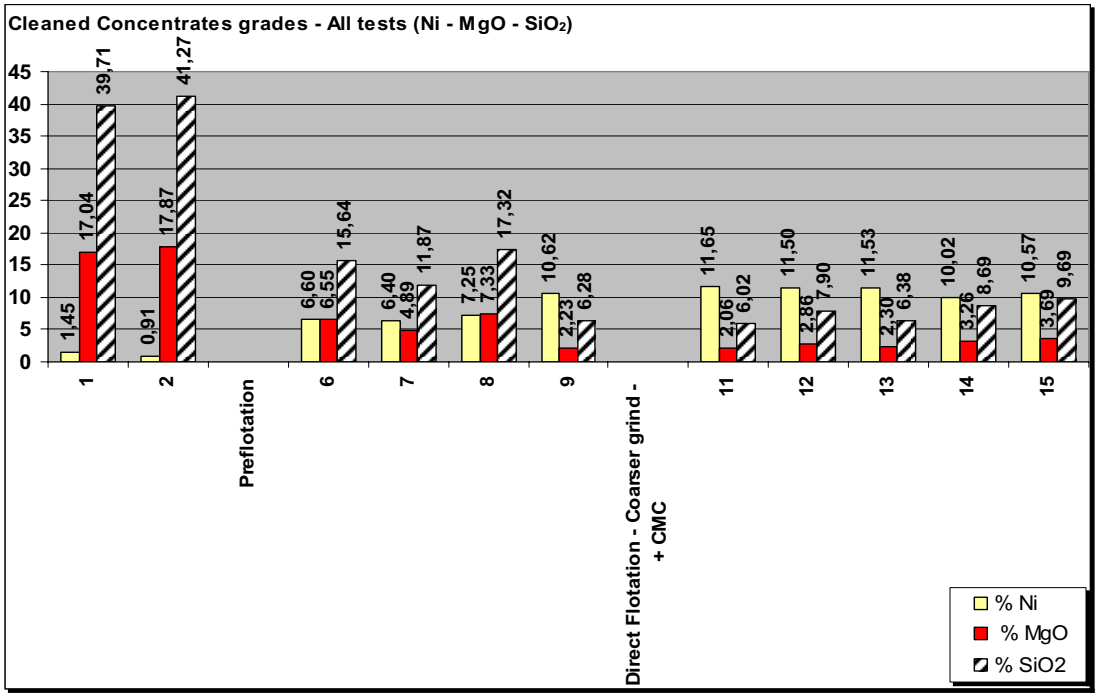
**Note:** **Grind A: 120 minutes at 40% of critical speed; $d_{80}$=60 µm**

**Grind B: 90 minutes at 70% of critical speed; $d_{80}$=57.4µm**

**Grind C: 60 minutes at 70% of critical speed; $d_{80}$=72 µm**

The Bar chart in Figure 16.8 reflects the depressing effect of the CMC on the magnesium bearing silicates, beginning in test 11.

**Figure 16.8 Depressant Effect of CMC on Magnesian Silicates**




### 16.3.1.7 Scavenging Circuit

A granulometric – XRF analysis conducted on the scavenger tails of test 6 revealed that over 73% of the Ni was contained in the - 32 µm (-450 mesh) fraction. It was concluded that the very fine pentlandite contained in the tailings accounts for the low kinetic and selectivity of the scavenger nickel flotation stage (Table 16.12).

**Table 16.12 Test 6 Size by Size Analysis of Scavenger Flotation Tails**

| Size Fraction | Weight (%) | Nickel | |
|---|---|---|---|
| | | Grade (%) | Distribution (%) |
| + 150 µm | 0.34 | 0.17 | 0.3 |
| +106 | 1.71 | 0.17 | 1.3 |
| +75 | 3.97 | 0.15 | 2.6 |
| +53 | 12.91 | 0.13 | 7.5 |
| +45 | 10.55 | 0.12 | 5.7 |
| +38 | 10.81 | 0.13 | 6.0 |
| +32 | 5.71 | 0.12 | 3.1 |
| -32 | 53.99 | 0.31 | 73.6 |
| **Combined** | **100.00** | **0.23** | **100.00** |

This is also well reflected by the results of the scavenging stages of test 14 which, after 17 minutes of scavenging followed by 15 minutes of cleaning, returned a concentrate grading 2% Ni with a 0.20% Ni recovery (Table 16.13).

**Table 16.13 Performance of the Scavenging Stage of Test 14**

| | | | | | | | Ratio | | |
|---|---|---|---|---|---|---|---|---|---|
| | Wt | Ni | | S | Fe | MgO | S / Ni | Fe / Ni | MgO / Ni |
| | % | % | % Dist | % | % | % | | | |
| **Final Conc.** | 10.27 | 10.02 | 83.26 | 35.71 | 33.02 | 3.26 | 3.56 | 3.30 | 0.33 |
| **Scav. Tails** | 76.50 | 0.14 | 8.67 | 0.43 | 8.45 | 16.40 | 3.07 | 60.36 | 117.14 |
| **Scav.-Clean. Conc.** | 0.12 | 2.00 | 0.20 | 28.50 | 42.30 | 5.03 | 14.25 | 21.15 | 2.52 |
| **Scav.-Clean. Tails** | 4.77 | 1.25 | 4.83 | 18.60 | 30.80 | 10.50 | 14.88 | 24.64 | 8.40 |

The ratio of % S, % Fe and % MgO to the % Ni contained in flotation products leads to the following observations:

Pyrrhotite is by far the major sulphide mineral occurring in the scavenger cleaner concentrate, cleaner tails and the scavenger tails.

Therefore recirculation of scavenger concentrates ahead of the rougher or cleaner circuit would result into a build up of pyrrhotite in the circuit.

Under the flotation conditions of tests 11 to 15, the scavenging of the rougher tails is inefficient and would not be economical.

#### 16.3.1.8 Copper Flotation Tests

The flowsheets of tests 12 to 15 included copper flotation tests on the 1st cleaner concentrate. With the addition of dextrine, concentrates grading over 20% Cu were obtained but at a very low % Cu recovery (less than 20%).

#### 16.3.1.9 Development Tests

Further to the results of test 10 which confirmed the potential of the direct flotation flowsheet, the last five tests focused on the development of this flotation process.

- **Test 11**

Test 11 was conducted to verify that results obtained from tests 9 and 10 could be improved through:

- Applying the direct flotation flowsheet;
- Increasing the coarseness (d80) of the flotation feed;
- Adding CMC at the rougher and cleaner- rougher stages.

Test 11 recovered 78.4% of the Ni in a concentrate grading 11.65% Ni, compared with the 62.7% Ni recovery and 10.6% Ni grade of test 9 concentrate, where preflotation was used.

- **Test 12**

Based on the results of tests 10 and 12, Bumigeme considered that an open circuit, with the same rougher-cleaner configuration, could be used to efficiently process the Lac Rocher resource.

Since the concentrate of the fourth and last rougher-cleaner stage of test 11 was still assaying a high 10.1% Ni, the conditions of the Cleaner flotation of test 12 were modified to pull a higher mass of concentrate. A fifth cleaning stage was therefore added and the parameters (xanthate rate of addition, flotation time and air flow) were increased.

But in a commercial operation, a two-stage rougher circuit, as used in test 11, would be vulnerable to fluctuations in mill feed grade. Therefore it was decided to conduct the rougher flotation step of test 12 under exactly the same conditions as those of test 11, but to carry out a kinetic flotation test on the rougher tails with the addition of six additional rougher stages.

The 83.02% Ni recovery of test 11 (with two rougher stages) was maintained in test 12, with 83.12% Ni recovery after the first two stages. The extra six rougher stages recovered an additional 7.1% by weight, for a 5.2% extra recovery, with most of this supplemental nickel recovered in the first two of these six stages.

Test 12 returned an 11.5% Ni concentrate with an 80.45% Ni recovery, including an additional 0.72% Ni recovery obtained from the fifth cleaning stage.

- **Test 13**

Based on the results of tests 11 and 12, Bumigeme considered that an open flotation circuit, similar to that of the rougher and rougher-cleaner circuit of tests 11 and 12 could be used to efficiently process the Lac Rocher resource.

Based on test 12 kinetic, test 13 retained a total of four rougher stages. Cleaner flotation kept the five-stage configuration.

Nickel recovery at rougher was preserved (83.2%), but with a 1% Ni grade increase (Table 16.8). Cleaner grade was maintained, with a slight drop in recovery (Table 16.11).

- **Tests 14 and 15**

Tests 14 and 15 were a repeat of test 13 except for the use of only three rougher stages in test 15. All rougher concentrates were combined for cleaning.

At the rougher stage, results were equal to or slightly better than those projected from results of test 13 (Table 16.8).

Cleaning also provided better nickel recoveries (test 13: 77.07% Ni, test 14: 83.26% Ni, test 15: 80.89% Ni), in concentrates grading over 10% Ni (Table 16.11).

- **Performance of the developments tests**

Results of the development tests are summarized in Table 16.14 for nickel, copper and cobalt.

**Table 16.14 Summary of the Metallurgical Performance at the Cleaner Flotation**

**Grades**

| | | Metal grades | | | Grade ratios | | |
|---|---|---|---|---|---|---|---|
| Test | Weight % | % Ni | % Cu | % Co | Cu/Ni | Co/Cu | Co/Ni |
| 11 | 8,8 | 11,64 | 4,34 | 0,38 | 0,37 | 0,09 | 0,03 |
| 12 | 9,12 | 11,50 | 4,31 | 0,36 | 0,38 | 0,08 | 0,03 |
| 13 | 8,71 | 11,53 | 4,28 | 0,37 | 0,37 | 0,09 | 0,03 |
| 14 | 10,27 | 10,02 | 3,90 | 0,32 | 0,39 | 0,08 | 0,03 |
| 15 | 10,04 | 10,57 | 3,93 | 0,33 | 0,37 | 0,08 | 0,03 |

**Recoveries**

| | | Test Recovery (%) | | | Stage Recovery (%) | | |
|---|---|---|---|---|---|---|---|
| Test | Weight % | Ni | Cu | Co | Ni | Cu | Co |
| 11 | 8,8 | 78,45 | 94,13 | 95,99 | 94,40 | 98,50 | 100,00 |
| 12 | 9,12 | 80,45 | 91,44 | 98,53 | 98,00 | 99,00 | 100,00 |
| 13 | 8,71 | 77,07 | 92,77 | 93,83 | 97,60 | 99,40 | 100,00 |
| 14 | 10,27 | 83,26 | 90,68 | 64,62 | 96,50 | 87,77 | 95,71 |
| 15 | 10,04 | 80,89 | 94,46 | 96,82 | 97,30 | 99,40 | 100,00 |

- **Quality of concentrates**

All concentrates produced meet the grade objective set forth at the beginning of the test work program. All ratios between the different metals are significantly constant.

Results of semi-quantitative XRF assays conducted on concentrates from test 11 are presented in Table 16.15, in comparison with testing objectives.

A sample of the rougher cleaner concentrate from test 11 was analysed for platinum group metals (PGM). Platinum content was 1,135 ppb (parts per billion) and palladium content was 1,075 ppb. No credit for PGM was included in NSR calculations.

**Table 16.15 Concentrate Assay**

| | % Ni | % Cu | % Co | % S | % MgO | % $SiO_2$ | % Zn | % Cr | % As |
|---|---|---|---|---|---|---|---|---|---|
| **Test 11** | 11.64 | 4.34 | 0.38 | 38.02 | 2.06 | 6.03 | 0.04 | 0.02 | 0.003 |
| **Test 12** | 11.50 | 4.31 | 0.36 | 36.87 | 2.86 | 7.90 | 0.04 | 0.02 | |
| **Test 13** | 11.53 | 4.28 | 0.37 | 37.82 | 2.30 | 6.38 | 0.03 | 0.01 | |
| **Test 14** | 10.02 | 3.90 | 0.32 | 35.71 | 3.26 | 8.69 | 0.04 | 0.03 | |
| **Test 15** | 10.57 | 3.93 | 0.33 | 35.14 | 3.68 | 9.69 | 0.04 | 0.02 | |
| ***Objective** | **≥ 10** | **-** | **-** | **≥ 27** | **< 4** | **< 25** | **< 0.05** | **< 0.05** | **< 0.05** |

Objective: according to specifications of smelter contract.

- **Stability of the Cleaner Stage**

The proportion of metals recovered from the rougher concentrate (stage % recovery) is rather high and stable, typically higher than 95% (Table 16.14). After the addition of either one or two roughing stages, the 80% Ni recovery objective reached in test 12 was also met in tests 14 and 15 (Tables 16.14 and 16.16).

Table 16.16 also indicates that most copper, at the cleaner stage, is recovered after about 12 minutes of flotation time. Good nickel recovery, however, typically requires more than 20 minutes of flotation. Most of the high cobalt recovery (not shown in Table 16.16) is also achieved with less than 20 minutes of flotation.

**Table 16.16 Ni & Cu Kinetics - Cleaner Flotation**

| Test # 11 Conc. | Time min | % Weight | % Nickel | | % Ni Distr. | | % Cu | | % Cu Distr. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Direct | Cum. | Direct | Cum. | Direct | Cum. | Direct | Cum. |
| 1 | 6.5 | 7.63 | 11.20 | 11.20 | 65.43 | 65.43 | 4.79 | 4.79 | 90.02 | 90.02 |
| 2 | 6 | 0.81 | 16.50 | 11.709 | 10.23 | 75.67 | 1.57 | 4.48 | 3.13 | 93.15 |
| 3 | 5 | - | - | 11.709 | - | 75.67 | - | 4.48 | - | 93.15 |
| 4 | 5 | 0.36 | 10.10 | 11.643 | 2.78 | 78.45 | 1.10 | 4.343 | 0.98 | 94.13 |

| Test # 12 Conc. | Time min | % Weight | % Nickel | | % Ni Distr. | | % Cu | | % Cu Distr. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Direct | Cum. | Direct | Cum. | Direct | Cum. | Direct | Cum. |
| 1 | 6.5 | 6.37 | 9.47 | 9.473 | 46.33 | 46.33 | 5.37 | 5.37 | 79.62 | 79.62 |
| 2 | 6 | 1.87 | 20.90 | 12.065 | 29.98 | 76.31 | 2.37 | 4.69 | 10.30 | 89.92 |
| 3 | 5 | 0.28 | 10.00 | 11.997 | 2.16 | 78.47 | 1.02 | 4.57 | 0.67 | 90.59 |
| 4 | 5 | 0.28 | 6.01 | 11.809 | 1.27 | 79.74 | 0.80 | 4.45 | 0.51 | 91.10 |
| 5 | 5 | 0.32 | 2.91 | 11.495 | 0.72 | 80.45 | 0.45 | 4.312 | 0.34 | 91.44 |

| Test # 13 Conc. | Time min | % Weight | % Nickel | | % Ni Distr. | | % Cu | | % Cu Distr. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Direct | Cum. | Direct | Cum. | Direct | Cum. | Direct | Cum. |
| 1 | 6.5 | 6.24 | 10.045 | 10.045 | 48.08 | 48.08 | 5.06 | 5.06 | 78.60 | 78.60 |
| 2 | 6 | 1.84 | 18.00 | 11.857 | 25.41 | 73.49 | 2.82 | 4.55 | 12.92 | 91.52 |
| 3 | 5 | 0.17 | 13.70 | 11.896 | 1.81 | 75.30 | 1.40 | 4.48 | 0.60 | 92.12 |
| 4 | 5 | 0.18 | 7.79 | 11.806 | 1.10 | 76.40 | 0.85 | 4.40 | 0.39 | 92.51 |
| 5 | 5 | 0.28 | 3.15 | 11.532 | 0.66 | 77.07 | 0.37 | 4.276 | 0.25 | 92.77 |

| Test # 14 Conc. | Time min | % Weight | % Nickel | | % Ni Distr. | | % Cu | | % Cu Distr. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Direct | Cum. | Direct | Cum. | Direct | Cum. | Direct | Cum. |
| 1 | 6.5 | 6.13 | 8.51 | 8.512 | 42.25 | 42.25 | 5.58 | 5.58 | 77.48 | 77.48 |
| 2 | 6 | 2.54 | 16.90 | 10.967 | 34.71 | 76.96 | 1.99 | 4.53 | 11.44 | 88.92 |
| 3 | 5 | 0.39 | 9.08 | 10.887 | 2.83 | 79.79 | 0.77 | 4.37 | 0.67 | 89.59 |
| 4 | 5 | 0.65 | 4.75 | 10.476 | 2.50 | 82.29 | 0.44 | 4.10 | 0.65 | 90.24 |
| 5 | 5 | 0.56 | 2.12 | 10.017 | 0.97 | 83.26 | 0.34 | 3.896 | 0.43 | 90.68 |

| Test # 15 Conc. | Time min | % Weight | % Nickel | | % Ni Distr. | | % Cu | | % Cu Distr. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Direct | Cum. | Direct | Cum. | Direct | Cum. | Direct | Cum. |
| 1 | 6.5 | 7.53 | 10.82 | 10.818 | 62.12 | 62.12 | 4.93 | 4.93 | 89.02 | 89.02 |
| 2 | 6 | 1.05 | 15.70 | 11.415 | 12.56 | 74.68 | 1.43 | 4.51 | 3.59 | 92.61 |
| 3 | 5 | 0.34 | 9.88 | 11.357 | 2.53 | 77.21 | 0.95 | 4.37 | 0.76 | 93.38 |
| 4 | 5 | 0.57 | 6.15 | 11.043 | 2.69 | 79.90 | 0.54 | 4.14 | 0.74 | 94.12 |
| 5 | 5 | 0.55 | 2.38 | 10.570 | 0.99 | 80.89 | 0.26 | 3.928 | 0.34 | 94.46 |

## 16.4 Flowsheet Development

The flowsheet illustrated in Figure 16.9 was developed by Bumigeme on the basis of the results of the test work program conducted by Corem as well as of the hypothesis that the Lac Rocher resource would be custom milled in the Copper Rand (MSV) concentrator modified to meet the process requirements.

It corresponds more specifically to the flowsheet of test 14 modified as follows:

- Conversion of the fourth rougher stage into a scavenger stage and recirculation of the scavenger concentrate ahead of the rougher circuit;
- Conversion of the fifth cleaner stage into a scavenger-cleaner stage and recirculation of its concentrate ahead of the cleaner circuit;
- Deleting the scavenger stages shown in the flowsheet of test 14.

The metallurgical balance of test 14, presented in Table 16.16, shows that the first four cleaner stages recovered 82.3% of the nickel in concentrates grading 10.5% Ni.

The existing MSV flowsheet is illustrated in Figure 16.10.

**Figure 16.9 Mill Flowsheet – Victory Nickel**

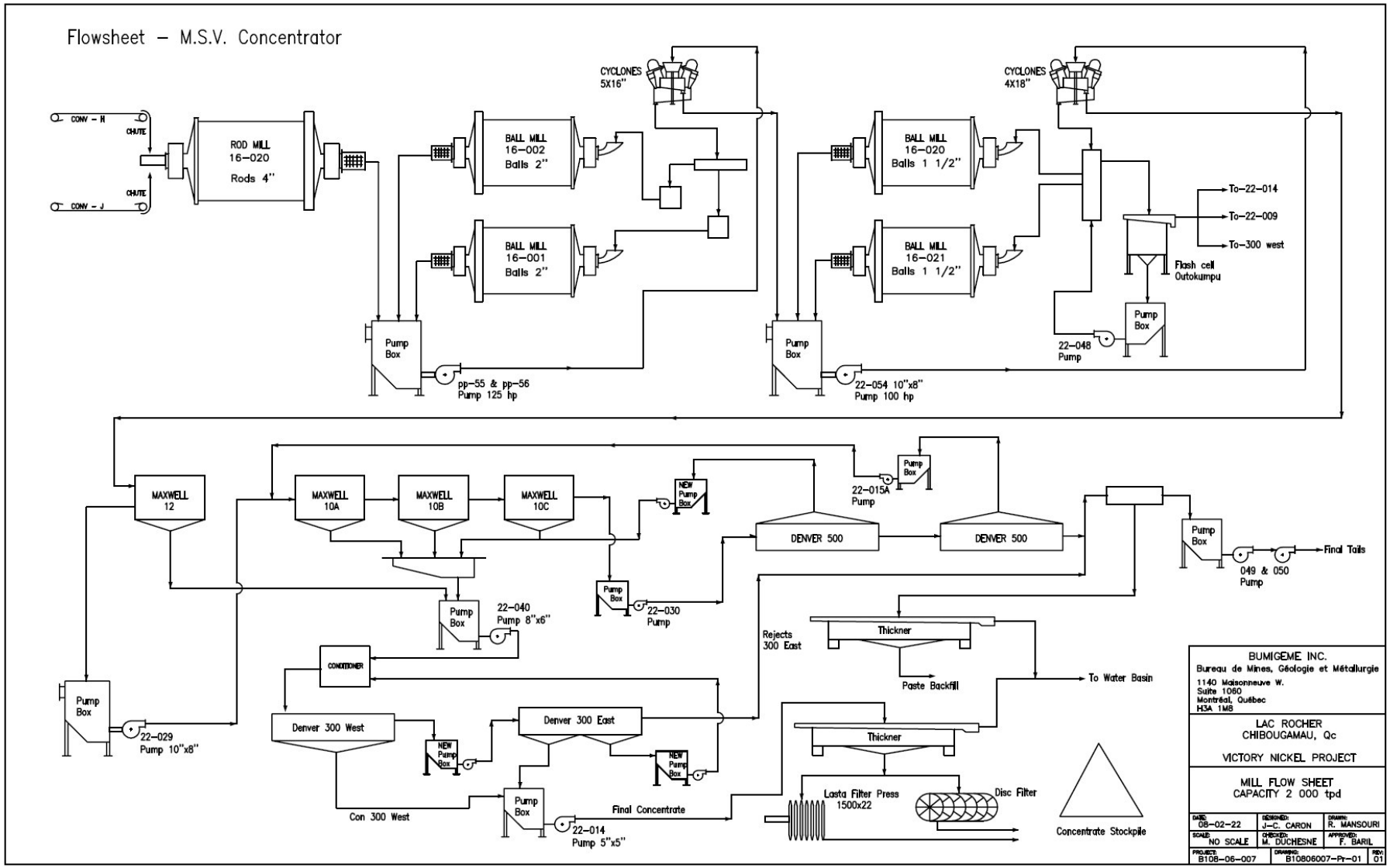
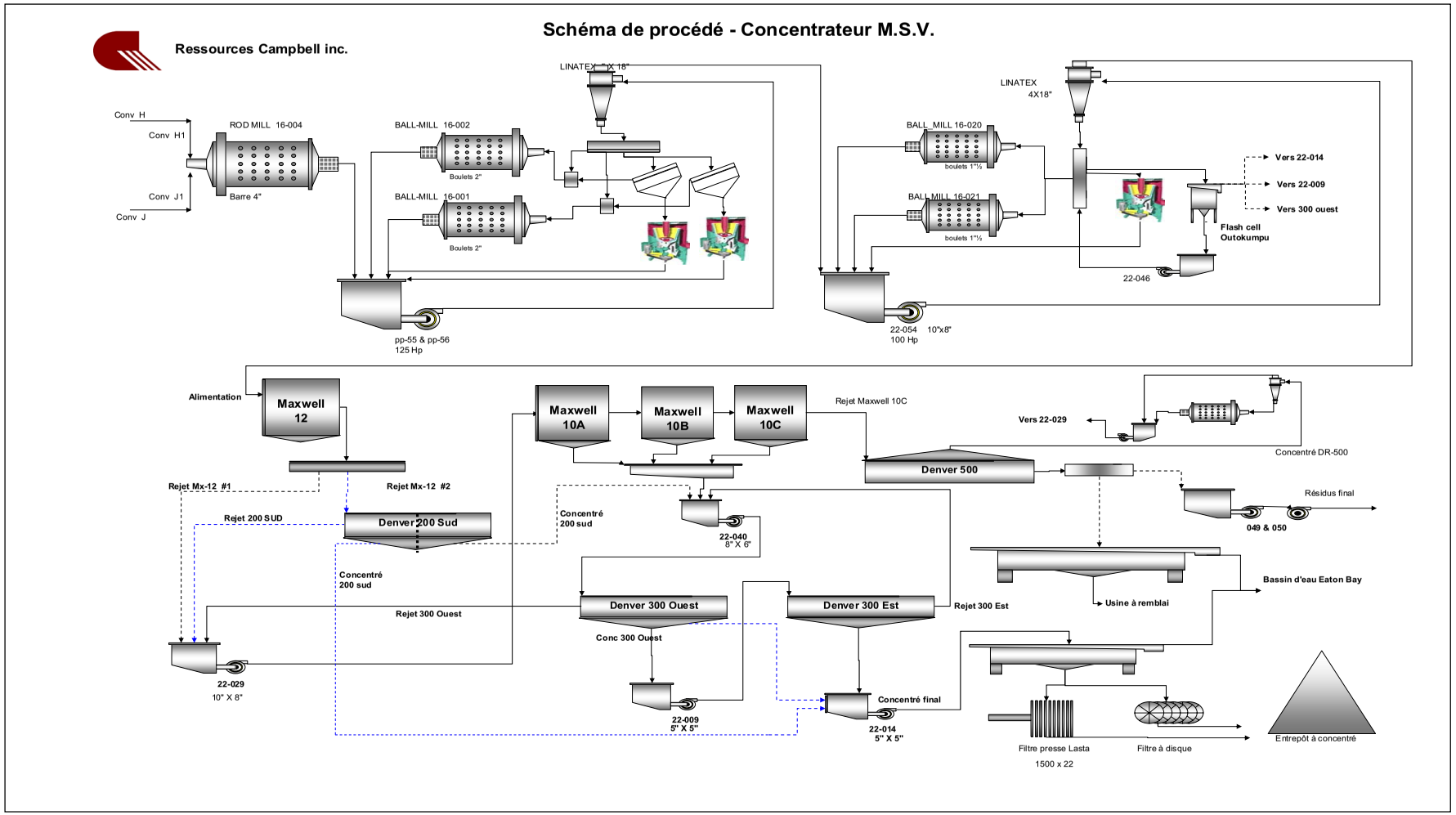


**Figure 16.10 M.S.V Concentrator Flowsheet**



### 16.4.1 Flash Cell

The flash cell, which is an integral part of the Copper Rand grinding–flotation circuit, could be easily bypassed. Although processing only 50% of the secondary ball mill cyclone underflow, keeping the flash cell in the Lac Rocher process can only improve its overall performance. The flash cell is likely to pull out a final grade concentrate but piping will also permit to send it to the cleaner circuit.

### 16.4.2 Rougher Circuit

Since the CMC and the xanthate will be added at the grinding stage, no conditioner is needed ahead of the rougher circuit.

The first stage will consist of one Maxwell-12 and the second stage of 3 Maxwell-10 cells in series providing a total flotation time of 25 minutes.

The third and fourth stages will consist of 2 DR-500 flotation cells, with a partition box in between, providing a total retention time of 22 minutes. The concentrate from the second section of the DR cell will return to the head of the Maxwell-10. Referring to results of test-13, this circulating load will correspond to less than 3% of the mill feed.

### 16.4.3 Cleaner Circuit

A conditioner will be added ahead of the cleaning circuit to provide a conditioning time of 3 minutes for the conditioning of CMC as systematically applied in flotation tests 11 to 15.

The nickel kinetic of flotation at the cleaner stage of test 14 is shown in Table 16.17. It should be noted that 98.8% of the nickel is floated in the first four cleaning stages.

**Table 16.17 Kinetic of Ni Flotation at the Cleaner Stage of Test 14**

| | Flotation Time min. | Test | | | | | Stage | |
|---|---|---|---|---|---|---|---|---|
| | | Weight % | % Ni | | % Ni Distribution | | % Ni Distribution | |
| Cleaner | | | % Direct | % Cum. | % Direct | % Cum. | % Direct | % Cum. |
| **1** | **6.5** | 6.13 | 8.51 | 8.51 | 42.25 | 42.25 | 50.75 | 50.75 |
| **2** | **6** | 2.54 | 16.90 | 10.97 | 34.71 | 76.96 | 41.69 | 92.44 |
| **3** | **5** | 0.39 | 9.08 | 10.89 | 2.83 | 79.79 | 3.40 | 95.84 |
| **4** | **5** | 0.65 | 4.75 | 10.48 | 2.5 | 82.29 | 3.00 | 98.84 |
| **5** | **5** | 0.56 | 2.12 | 10.02 | 0.97 | 83.26 | 1.16 | 100.00 |
| **Combined** | **27.5** | 10.27 | 10.02 | | 83.26 | | | |

In the Copper Rand mill, the cleaning circuit will consist of 2 DR-300 cells providing a total flotation time of 45 minutes. The concentrate of the first cell and that from the first part of the second cell will be pumped to the final concentrate thickener. The pentlandite scavenger concentrate from the second half of the second DR-300 will be recirculated to the conditioner.

## 16.5 MSV Concentrator Description and Modifications

### 16.5.1 Process Design Criteria

The design criteria used for the development of the flowsheet have been based on the flotation tests program conducted by Corem and Bumigeme's in-house experience for similar operations.

**General**

| | | |
|---|---|---|
| Daily Ore processing | >2,000 | t |
| Mill Head | 1.30% | Ni |
| | 0.47% | Cu |
| | 0.053% | Co |
| Recovery of Nickel | 81 | % |
| Recovery of Copper | 91 | % |
| Recovery of Cobalt | 95 | % |
| Operation Schedule | 7 | days/month |
| Operating Time | 92 | % |
| Daily Design Capacity | 2,175 | t |
| Milling Rate | 90.6 | t/h |
| Ore Specific Gravity | 3.14 | t/m³ |
| Ni - Cu Concentrate Specific Gravity | 3.6 | t/m³ |
| Ni - Cu Concentrate Grade | 10.5% | Ni |
| | 3.9% | Cu |
| Ni - Cu Concentrate Weight | 10.4 | % |

**Coarse Ore Storage**

| | | |
|---|---|---|
| Coarse Ore Storage Bin Live Capacity (existing) | 4,100 | t |
| Coarse Ore Storage Bin Live Capacity (2 new silos) | 3,000 | t |
| Coarse Ore Storage Bin Capacity (in treatment days) | 1.5 | d |
| Ore Moisture | 3-4 | % |

| | | |
|---|---|---|
| **Grinding** | | |
| Fineness of Grinding (passing 74 µ) | 80 | % |
| Rod Mill Feed (passing 125,000 µ) | 80 | % |
| Ball Mill Work Index | 13.4 | kWh/t |
| Ball Mill Circulating Load | 300 | % |
| Ball Mill Discharge Pulp Density | 75 | % |
| **Flotation Circuit** | | |
| Conditioning Time (cleaner) | 3 | min |
| Flotation Time | | |
| Roughers (Maxwell cells) | 25 | min |
| Roughers (DR-500) | 22 | min |
| Cleaners (DR-300) | 45 | min |
| pH | 9 – 9.5 | |
| Flotation Pulp Solids Density | | |
| Roughers | 35 | % |
| Cleaners | 20 | % |
| **Ni – Cu Concentrate Filtration** | | |
| Filter Type | Pressure | Lasta |
| Filtration Rate | N/A | $kg/m^2/h$ |
| Filter Cake Moisture Content | 8 | % |
| **Ni – Cu Concentrate Storage Capacity** | | |
| Current Capacity | 500 | t |
| Capacity Modified | 870 | t |
| **Chemical Reagent Consumption** | | |
| Soda Ash | 0.21 | kg/t |
| CMC | 0.85 | kg/t |
| Potassium Amyl Xanthate | 0.20 | kg/t |
| M.I.B.C. | 0.045 | kg/t |
| Flocculent | 0.02 | kg/t |

## 16.5.2 Process Description

The main process steps for treating the Lac Rocher nickel ore have been described in Section 16.4 and consists mainly in crushing ore at mine site at between 200 and 150 mm (8 and 6 inches), trucking to Copper Rand mill site, crushing, grinding and flotation of a bulk nickel-copper concentrate, loading in wagons and shipping to a Sudbury smelter.

The ore will be treated in the 2,200 t per day mill of Copper Rand and this section describes the circuit of the mill and the modifications necessary to adapt that mill for the treatment of Lac Richer ore.

### 16.5.2.1 Primary Crushing and Transportation

At mine site, the ore will be crushed between 8 to 6 inches and transported to the Copper Rand mill in Chibougamau by trucks and dumped in a new outside stockpile located near the crushing facilities. The ore will be picked up and carried by a front end loader to the Copper Rand crushing plant.

### 16.5.2.2 Crushing and Ore Stockpiling

The crushing plant at Copper Rand consists mainly of a jaw crusher of 762 mm by 1,219 mm, a 1,676 mm standard cone crusher and a 1,676 mm short head cone crusher. The final crushed ore (14 mm) will be conveyed to two new steel ore bins that will have to be installed (see Figure 16.11) close to the existing bins. Each bin has a live load capacity of approximately 1,500 t.

From the stockpile, ore will be trucked as required to be stockpiled on surface at the Copper Rand mine where it will be custom milled at the minimum rate of 2,000 t per day for periods of 7 days per month, for a monthly total of 14,000 to 16,000 t of ore. At the end of the mining and trucking of ore from the mine, the processing will continue until the ore accumulated on the stockpile has been treated.

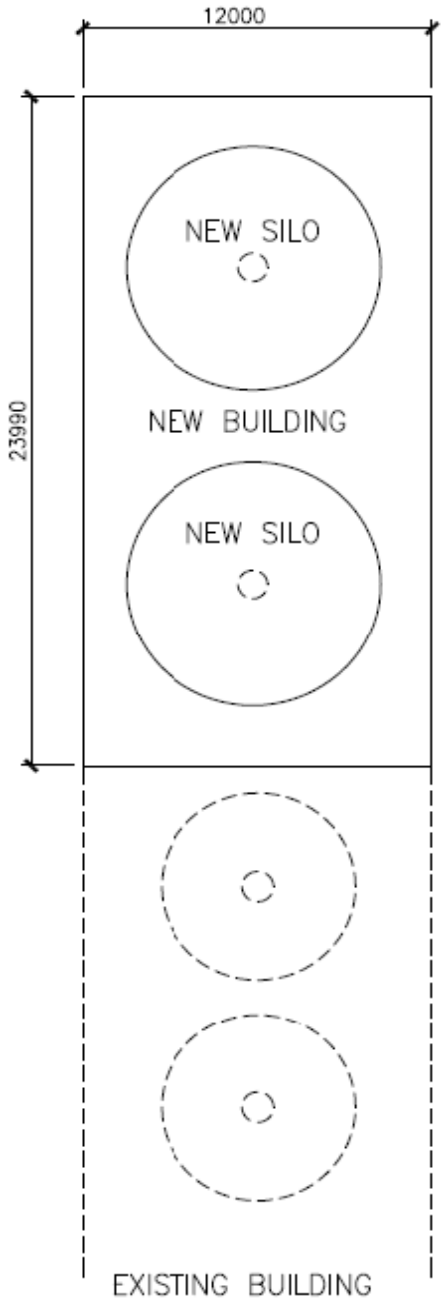
But the crushing of Lac Rocher ore will be done on two shifts as Copper Rand will continue to hoist ± 700 t of ore per day, from underground, until the existing three 1,500 t ore bin are full. Consequently, two new steel bins will be required at Copper Rand to treat the Lac Rocher ore.

On two 7-hour day shifts, the crushers will have to operate at 145 t/hour, which exceeds the existing rate reported by plant's management. To improve the crushing rate, Bumigeme suggests two modifications:

a) Reduce the jaw crusher opening to 100 mm.

b) Replace the rubber screens by steel ones to reduce circulating load

**Figure 16.11 New Ore Bins**



#### 16.5.2.3 Grinding

The ore is withdrawn from the coarse ore bins by vibrating feeders and conveyed to the 2,896 x 3,658 mm rod mill driven by a 412 kW motor. The feed rate to the rod mill is monitored by a scale.

The rod mill discharge is pumped to 5 Linatex cyclones of 457 mm diameter. The underflow of the cyclones feed two 2,743 x 3,048 mm ball mills driven by 300 kW motors each that are in closed circuit with the 5 cyclones.

The cyclones overflow is pumped to 3 Linatex cyclones of 457 mm diameter. Fifty percent of the underflow feeds two secondary ball mills, one of 2,896 x 3,656 mm and the other one of 2,438 x 3,658 mm driven by motors of 375 and 300 kW respectively. The other 50% feeds by gravity the Flash flotation cell. The tailings of that cell are pumped to the secondary ball mill circuit. These secondary ball mills operate in closed circuit with the 3 Linatex cyclones. The concentrate of the Flash flotation cell is pumped to the conditioner prior to cleaners DR-300. The overflow feeds the N°12 Maxwell cell.

The Tyler screens and the Knelson concentrator are bypassed for the treatment of Lac Rocher ore.

#### 16.5.2.4 Flotation

The 3 Linatex cyclones overflow are combined and feed the N°12 Maxwell cell and the rejects are pumped to three N°10 Maxwell cells in series as rougher. The rejects of the three Maxwell cells are pumped to a bank of DR-500 and the concentrates from the four Maxwell cells and the first DR-500 cells are pumped to the conditioner of 1.8 m diam. and the concentrates are fed to two banks of 4 DR-300 cells, as cleaning stages.

The tailings of the first bank of DR-500 cells feed by gravity the similar second bank of Denver DR-500 cell. The concentrate of this second bank of DR-500 cell is pumped to the first N°10 Maxwell cells. The rejects are pumped to the existing tailings pond.

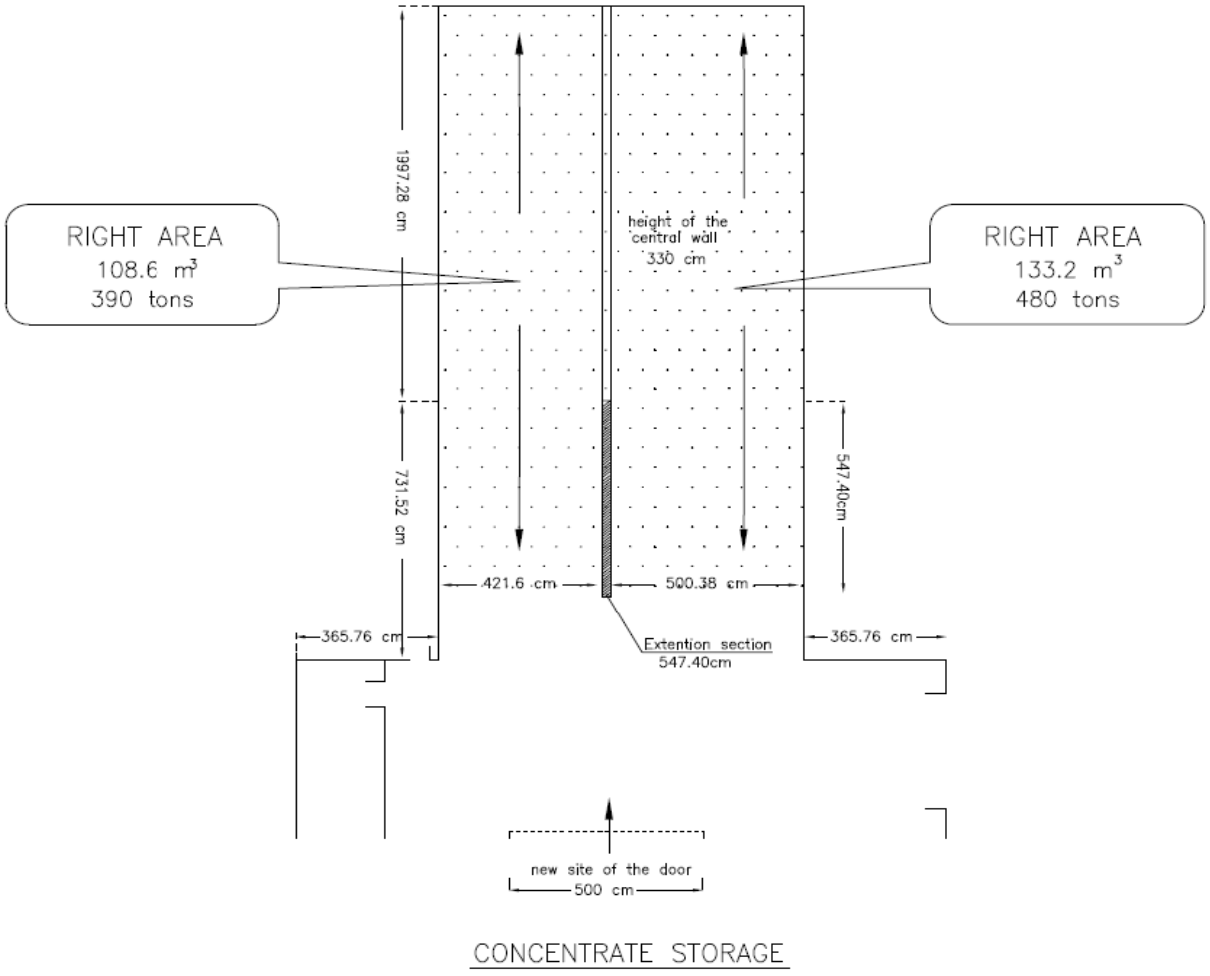
The concentrate of the first bank of DR-300 and 50% of the concentrate of the second bank goes to the thickener and to the Lasta press filter. The other 50% of the concentrate of the second DR-300 bank is pumped to the 1.8 m diam. conditioner. The cleaner tails of the second DR-300 bank are pumped to the tailing pump.

The modified flowsheet is illustrated in Figure 16.9 and the existing MSV flowsheet in Figure 16.10. The list of equipment to modify the concentrator is summarized in Table 16.22, with corresponding costs.

### 16.5.2.5 Concentrate Storage

To avoid the contamination of MSV copper concentrate with Lac Rocher nickel-copper concentrate, Bumigeme suggests to raise and extend a concrete wall separating two storage bays as shown in Figure 16.12. This modification will increase the current concentrate storage capacity from 500 t to approximately 870 t.

**Figure 16.12 Concentrate Storage**




### 16.5.2.6 Tailings Disposal

Tailings produced by processing the Lac Rocher ore will be acid-generating, like those obtained from treating the Copper Rand ore. Combined tails from the last metallurgical tests conducted at Corem, without any recirculation, averaged 1.68% S.

These tailings will be disposed of in the same fashion as already practised at the Copper Rand facility, which is by rejecting them in the downstream section of the existing tailings disposal facility, so they are submerged at all times.

Tailings tonnage produced by the processing of some 317,730 t of ore will be approximately 285,000 t, occupying about 190,000 $m^3$ after settling.

Underwater spare storage capacity of the existing tailings disposal facility is estimated at 2.3 $Mm^3$ (end of December 2007). This is sufficient to accommodate the Lac Rocher tailings, in addition to the estimated 450,000 $m^3$ to be produced from processing the ore from the Copper Rand mine.

## 16.6 Operating Costs

The estimated operating costs are based on data obtained from MSV (number of employees and salary), quotations from suppliers for consumables, and in-house data.

The operating costs has been estimated at 24.18 $/t and detailed in the following Table 16.18.

Tables 16.19 to 16.21 provide details for labour costs, consumables and grinding.

**Table 16.18 Summary Milling Cost**

| Description | $/t | $/t |
|---|---|---|
| **Ore Handling:** | | **2.00** |
| **Crushing:** | | |
| - consumables | 1.50 | |
| - electricity | 0.35 | |
| - manpower | 0.84 | **2.69** |
| **Grinding:** | | |
| - consumables | 2.59 | |
| - electricity | 1.10 | |
| - manpower | 0.42 | **4.11** |
| **Flotation:** | | |
| - reagent | 4.15 | |
| - electricity | 1.03 | |
| - manpower | 0.42 | |
| - parts | 0.20 | **5.80** |
| **Pumping:** | | |
| - parts + pipe | 0.55 | |
| - electricity | 0.18 | **0.73** |
| **Filtration and Thickening:** | | |
| - consumables + electricity | 0.32 | |
| - man power | 0.42 | **0.74** |
| **Cleaning and Safety:** | | |
| - supplies | 0.15 | |
| - manpower | 0.42 | **0.57** |
| **Laboratory:** | | |
| - consumables | 0.20 | |
| - manpower | 0.40 | **0.60** |
| **Maintenance:** | | |
| - manpower | 0.60 | |
| - supply | 0.50 | **1.10** |
| **Tailings and Water Supplies** | 0.65 | **0.65** |
| **Concentrate Loading** | 0.10 | **0.10** |
| **Supervision (Staff) and Shift Boss** | 1.06 | **1.06** |
| | **Sub-total** | **20.15** |
| **Overhead and Benefits 20%** | | **4.03** |
| | **Total** | **24.18** |

**Table 16.19 Detailed Labour costs**

| STAFF EMPLOYEES | | |
|---|---|---|
| **Description** | **$/week** | **$/t** |
| **1 mill superintendent**<br>100 000 x 1.2= 120 000 / 52 w | **2 308** | |
| **1 general foreman**<br>37 $/h x 40 x 1.2 | **1 776** | |
| **1 mechanic foreman**<br>32 $/h x 40 x 1.2 | **1 536** | |
| **1 metallurgist**<br>35 $/h x 40 x 1.2 | **1 680** | |
| **1 technician**<br>32 $/h x 40 x 1.2 | **1 536** | |
| **Weekly cost** | **8 836** | |
| **Monthly tonnage**<br>2 000 t/d x 7 days = 14 000 t<br>8 836$ / 14 000 t **Sub-tot** | **-** | **0.63** |

| HOURLY PAID EMPLOYEES | | |
|---|---|---|
| **Description** | **$/day** | **$/t** |
| **4 shift boss**<br>24 h x 30 $/h x 1.2 / 2 000 t/ day | **864.00** | **0.43** |
| **8 crusher operators = 2/shift**<br>2 x 24 h x 27 $/h x 1.3 | **1684.80** | **0.84** |
| **4 grinding operators = 1/shift**<br>24 h x 27 $/h x 1.3 | **842.40** | **0.42** |
| **4 flotation operators = 1/shift** | **842.40** | **0.42** |
| **4 filter operators = 1/shift** | **842.40** | **0.42** |
| **4 Labours = 1/shift** | **842.40** | **0.42** |
| **Maintenance (mechanical and electrical)**<br>(6 operators x 27 $/h x 40 h x 1.3 / 7) / 2 000 t | **1 203.00** | **0.60** |
| **Laboratory**<br>(4 operators x 27 $/h x 40 h x 1.3 / 7) / 2 000 t | **802.28** | **0.40** |
| **Sub-total** | | **3.95** |
| **TOTAL LABOUR COSTS** | | **4,58** |

**Table 16.20 Consumables**

| Description | $/kg | $/t |
|---|---|---|
| Soda ash = 0.45 kg/t | 0.47 | 0.21 |
| CMC = 1.0 kg/t | 2.34 | 2.34 |
| Xanthate = 0.3 kg/t | 4.30 | 1.29 |
| M.I.B.C = 0.045 kg/t | 4.70 | 0.21 |
| Flocculent = 0.020 kg/t | 4.25 | 0.10 |
| **TOTAL** | | **4.15** |

**Table 16.21 Grinding Costs**

| Description | $/t |
|---|---|
| Rods = 0.66 pound/t x 0.65$/pound | 0.43 |
| Balls 2" = 1.27 pound/t x 0.45$/pound | 0.57 |
| Balls 1 ½" = 1.44 pound/t x 0.48$/pound | 0.69 |
| **Sub-total** | **1.69** |
| | |
| Rod mill liners | 0.35 |
| Primary Ball mill liners | 0.28 |
| Secondary Ball mill liners | 0.27 |
| **Sub-total** | **0.90** |
| **TOTAL** | **2.59** |

## 16.7 New Equipment and Modifications Investment Costs

The investment costs for new equipment and modifications to the mill are estimated at 864,400 $, divided as follows:

- Two steel bins and auxiliaries (Table 16.22) 764,400$
- Mill modifications (Table 16.23) 100,000$
- Total 864,400$

**Table 16.22 Costs for New Ore Bins (2) from Campbell Resources**

| Description | Unit Cost $ | Cost $ |
|---|---|---|
| 2 Bins Campbell | 50,000 | 100,000 |
| 12 Ciment Legs 6.9 m³ - concrete | 350 | 29,000 |
| Ground preparation + crushed rock | | 11,000 |
| Lighting | | 8,000 |
| Heating | | 24,000 |
| Steel Building ( 24 m x 12 m) | | 231,000 |
| Floor & Structure | | 15,000 |
| Conveyor (above and under bins) (140 feet) | 500 | 70,000 |
| 2 Feeders | | 40,000 |
| 1 Scale | | 12,000 |
| Bottom Floor 12 x 24 x 0.2 m - concrete | 350 | 21,000 |
| Wall 36 m³ - concrete | 350 | 12,000 |
| Sump Pump | | 15,000 |
| **Sub-total** | | **588,000** |
| EPCM 15% | | 88,200 |
| Miscellaneous | | 88,200 |
| **TOTAL** | | **764,400** |

**Table 16.23 Mill Modifications Costs**

| Description | | Cost $ |
|---|---|---|
| Ore pad | | 5,000 |
| Reagent feeder CMC | | 15,000 |
| Reagent feeder Soda ash | | 5,000 |
| | **Sub-total** | **25,000** |
| Concentrate warehouse | | |
| Elevating existing wall | | 2,000 |
| Extra length existing wall | | 2,500 |
| Relocate the existing door | | 2,000 |
| | **Sub-total** | **6,500** |
| Piping + 3 Pumps | (5 x 4) | 55,000 |
| Conditioners – 2 | (4 x 4) | 13,500 |
| | **Sub-total** | **68,500** |
| | **TOTAL** | **100,000** |

## 16.8 Conclusions

The flowsheet of the Lac Rocher flotation process was developed on the basis of the results obtained from open circuits corresponding to the configuration of the rougher and cleaner stages of tests 14 and 15. To the three rougher stages in the flowsheet of test 15, Bumigeme has added the 4$^{th}$ stage of test 14, which will very slightly pull a pentlandite scavenger concentrate recirculated to the rougher circuit. Similarly, the 5$^{th}$ stage of the cleaning circuit will scavenge a concentrate recirculated to the head of the cleaning circuit.

Results obtained from tests 14 and 15 back up Bumigeme conclusion that:

> *"The milling of that part of the Lac Rocher resource having grade and mineralogical characteristics similar to those of the composite tested by Corem will recover a minimum of 81% of the nickel, 91% of the copper and 95% of the cobalt, in a concentrate grading 10.5% Ni, 3.9% Cu and 0.33% Co, and meeting the specifications set forth in the proposed Smelting Contract for being penalty free."*

The milling of the higher grade parts of the resource at Lac Rocher is likely to result into a higher % Ni recovery with similar grade of concentrate.

# 16.9 Recommendations

## 16.9.1 Laboratory Test Work

Bumigeme recommends that additional test work be conducted in the plant's laboratory to optimize the parameters of the Lac Rocher process:

- **Grinding**

On top of a saving in power cost, a coarser grind might result into a higher nickel recovery and grade of concentrate as it was the case when going from a $d_{80}$ of 57 µm in test 10 to a $d_{80}$ of 72 µm in test 11.

- **CMC**

The cost of CMC is relatively high (2.34 $/kg) and the effect of its addition at the rougher stage is not obvious. On the other hand, adding CMC at multiple points at the cleaner stage, instead of the first cleaner stage as practised during testing may result into a higher % Ni in the concentrate without affecting nickel recovery.

- **Lime Test**

Bumigeme recommends more laboratory flotation tests with lime in comparison with soda ash. At Copper Rand mill, lime only is used. New equipment would be required to feed soda ash to the circuit.

- **Reagents**: (collectors, frothers, etc.)

More tests are suggested to optimize the flotation time, the grade of concentrate and the recoveries.

- **Gold and Silver Recoveries**

Bumigeme recommends to assay the concentrates produced by Corem for gold and silver.

- **Lac Rocher Ore Treatment Adapted to Copper Rand Mill**

To reduce investment cost and to simplify the flotation circuit, laboratory tests should be conducted, based on the Copper Rand flowsheet and existing capacities.

# 17. Mineral Resource and Mineral Reserve Estimates

Mineral resources were estimated for the first time in 2006 and were reported in the Technical Report, Goettel, 2006. Within the scope of this Preliminary Economic Assessment, it was decided to update the resource model previously made with the new 2007 drilling results.

It is important to note that there are no mineral reserves estimated within the scope of this study.

## 17.1 Geological Interpretation of the Mineralised Envelope

The mineralised envelope defines the volume of rock within which mineral resources are estimated. By definition, whatever lies outside this envelope is considered barren. The geological interpretation of the ultramafic intrusion is the basis for the mineralised envelope. Using the lithology information available in the drill hole logs, the contact between the gneiss host rocks and the ultramafics has been modelled in the form of a contact surface. This surface delineates the intrusion to the west. To the east, a major fault limits the extent of the mineralised envelope and everything to the east of this fault is considered barren (Figure 17.1). Those two features together form a sort of cone that opens up toward the surface (Figure 17.2). The overburden surface caps this cone to produce a closed volume. The approximate volume of the mineralised envelope is 958,200 $m^3$.

**Figure 17.1 Plan View Showing the Mineralised Envelope**

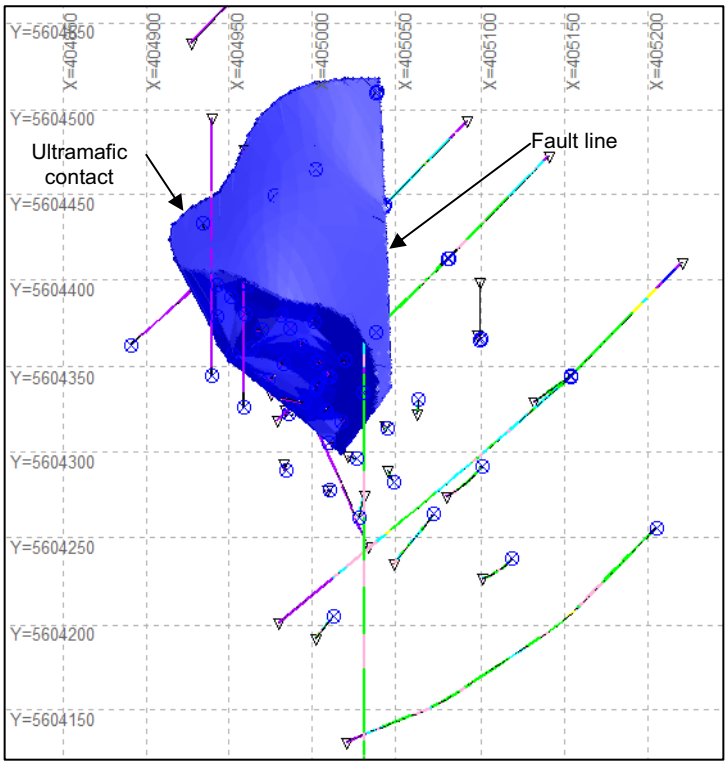
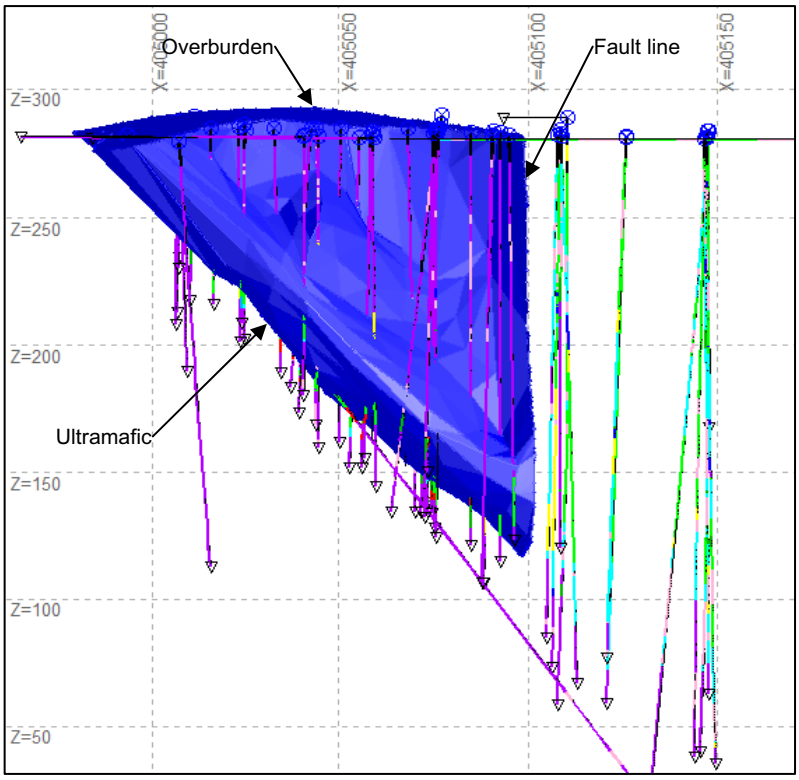



**Figure 17.2 Vertical Cross-Section Looking North-East, Showing the Mineralised Envelope**



## 17.2 Geological Interpretation of the Massive Sulphide Lens.

Massive sulphide mineralization has been identified along the drill hole core. This type of mineralization is very different from the bulk of the Ni-Cu mineralization in the ultramafic intrusion. The shape of the lens has been interpreted and modelled in order to estimate it separately from the rest of the deposit. The geological interpretation has been done on vertical cross-sections and further meshed into a solid. The massive sulphide lens lies directly on the contact between the gneiss and the ultramafic intrusion (Figure 17.3). It is relatively small in size. The volume of the massive sulphide lens is approximately 5,500 $m^3$.

## 17.3 Geological Interpretation of the Granitic Dykes

The ultramafic intrusion is cut by several granitic dykes. The location and size of the dykes is very erratic. It does not appear to be possible to correlate them from section to section. The dykes are totally barren. The current geological interpretation of the dykes is done on vertical cross-sections. They are not linked together and it is not possible to construct a reasonable solid model. In order to take into account the presence of the dykes in the resource model, Geostat has elected to strictly use the interpretation done on section and extrude it to the width of the sections (Figure 17.4). This has the advantage of taking the dykes into consideration even though the current interpretation fails to correctly locate them in 3D space. The current interpretation of the dykes is not likely to help the design of eventual mine openings and a more accurate interpretation will be needed then. The granitic dykes do not intersect the massive sulphide lens.

The current volume occupied by the interpreted granitic dykes is approximately 58,000 $m^3$.

**Figure 17.3 Geological Interpretation of the Massive Sulphide Lens**

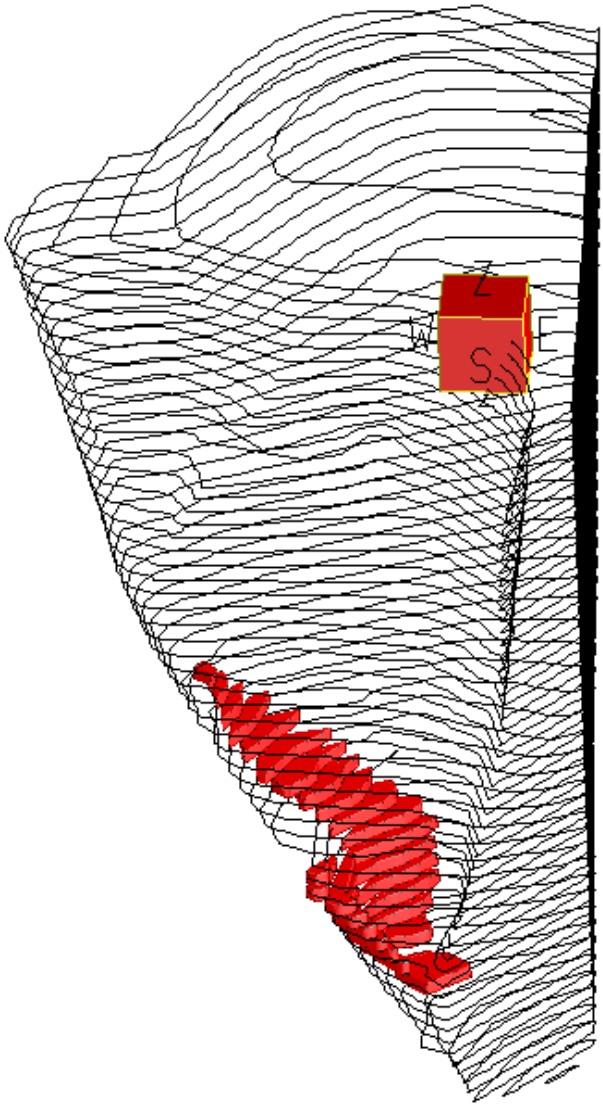
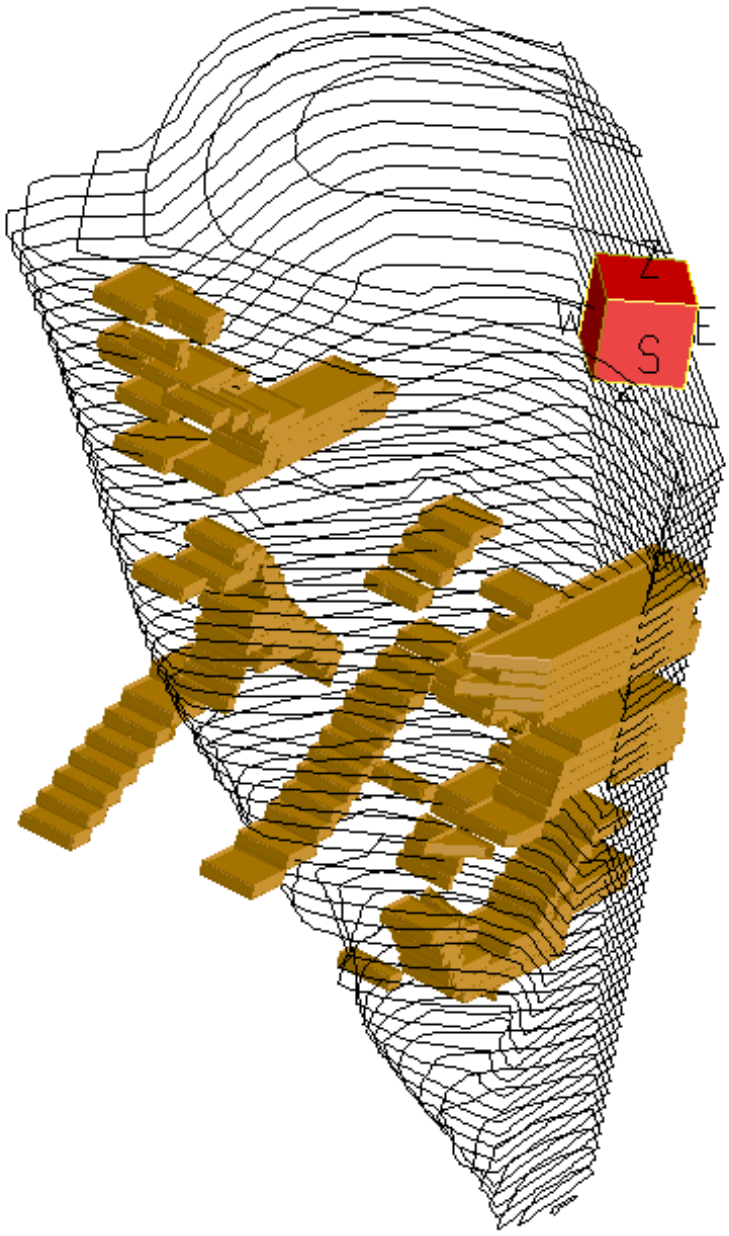


**Figure 17.4 Geological Interpretation of the Granitic Dykes**



## 17.4 Drill Hole Composites

The mineral resources of Lac Rocher are estimated using block modelling with Inverse Distance interpolation. In order to properly estimate the block grades, composites are created from the drill hole assay data. Composites 1.5 m in length are used. Moreover, the composites are separated by mineral type such that the massive sulphide (MS) lens is estimated independently from the utlramafic (UM) intrusion. Table 17.1 presents the basic statistics of the drill hole composites per mineral type.

**Table 17.1 Basic Statistics of 1.5 m Composites per Mineral Type (Ni and Cu)**

| Zone | Element | Minimum % | Maximum % | Average % | Std. Dev. % | COV % | Count |
|---|---|---|---|---|---|---|---|
| MS | Ni | 0.03 | 11.29 | 4.24 | 3.97 | 94% | 25 |
| | Cu | 0.07 | 3.93 | 1.19 | 1.10 | 92% | 25 |
| | | | | | | | |
| UM | Ni | 0.00 | 9.60 | 0.66 | 0.82 | 124% | 1,198 |
| | Cu | 0.00 | 9.60 | 0.30 | 0.43 | 143% | 1,198 |

Cobalt was added to the drill hole database late in the study. To the author's knowledge, cobalt was not previously discussed or documented. The author has not verified cobalt assays and no QA/QC is available. The author recommends that cobalt-related information and estimates be treated separately from nickel and copper and with a lower level of confidence. Table 17.2 presents the basic statistics of cobalt in the 1.5 m composites

**Table 17.2 Basic Statistics of 1.5 m Composites per Mineral Type (Co)**

| Element | Minimum ppm | Maximum ppm | Average ppm | Std. Dev. ppm | COV % | Count |
|---|---|---|---|---|---|---|
| Co | 2 | 2,510 | 126 | 209 | 166% | 1,157 |

## 17.5 Specific Gravity

Specific gravity measurements were taken in the early stages of exploration. Due to the fact that we are in the presence of massive sulphide mineralization, the specific gravity varies throughout the orebody. In the previous resource estimation (Goettel, December 2006), the specific gravity measurements were used to derive a regression function expressing the specific gravity as a

function of the nickel grade. The details of the function are given in Goettel, December 2006. In summary, the massive sulphide material was assigned a constant specific gravity of 4.733. The ultramafics were assigned the following SG equation:

**SG = 3.011 + 0.222 * Ni %**

The density of the gneisses and granitic dykes was set to 2.75. No other density measurements were taken in 2007; hence the author considers that this information is still current.

## 17.6 Block Model Geometry

The mineral resources of Lac Rocher are estimated using a 3D block modelling method. The parameters of the 3D block matrix are as follows:

| | Co-ordinate of origin | Block size | Extent |
|---|---|---|---|
| East | 404,914.5 | 2 m | 404,914.5 – 405,046.5 (132 m) |
| North | 5,604,299.5 | 2 m | 5,604,299.5 - 5,604,519.5 (220 m) |
| Elevation | 111.5 | 3 m | 111.5 - 285.5 (174 m) |

## 17.7 Estimation Parameters

The mineral resources of Lac Rocher are estimated using the Inverse Distance interpolation method (power of 1.0). The estimation is done in 2 steps. First, the massive sulphide envelope is estimated using only the composites that fall inside the MS envelope. Second, the remaining ultramafic envelope is estimated with only the composites of the same type (excluding the massive sulphide composites). This method aims at limiting the smearing of grades across the geological boundary.

Since the density varies significantly throughout the orebody, we have estimated the products Ni*SG, Cu*SG and Co*SG in addition to the SG itself. The composite grades themselves were not estimated. Hence, for each block of the model, 3 variables were estimated. The resulting Ni, Cu and Co grade in each block is then derived by dividing the estimated products (Ni*SG, Cu*SG, Co*SG) by the estimated SG.

The search ellipse and estimation parameters used to estimate both mineral types were: 50 m by 25 m by 12 m oriented such that the long axis (50 m) has an azimuth of 130° and a dip of -45°. This orientation is such that the ellipse follows the general contact between the gneiss and the ultramafics. The actual size of the ellipse was set so that the entire envelopes could be estimated.

Octant search technology was used with the following parameters:

- Minimum number of composites needed to interpolate: 1;

- Maximum number of composites used: 10;
- Maximum number of composites per octant: 4;
- Minimum number of composites per octant: 0;
- Maximum number of composites per drill hole: 3.

## 17.8 Mineral Resource Classification Parameters

The estimated mineral resources are categorised into the Measured, Indicated or Inferred categories based on a proximity scheme. A block is categorised according to the presence of a certain number of composites in its neighbourhood. In this study, the classification parameters used are as follows:

**Measured category**: A block is classified as Measured if at least 4 composites are found inside an ellipse of 15 m by 8 m by 8 m, with the long axis oriented azimuth 130°, with a dip of -45°. A limit of 3 composites coming from the same hole is imposed.

**Indicated category**: A block is classified as Indicated if at least 4 composites are found inside an ellipse of 30 m by 18 m by 8 m, with the long axis oriented azimuth 130°, with a dip of -45°. A limit of 3 composites coming from the same hole is imposed.

**Inferred category**: A block is classified is Inferred if it can be estimated inside the mineralised envelope but does not classify as either Measured or Indicated.

**IMPORTANT NOTE**

Cobalt was added late to the scope of this study. Since, to the author's opinion, it was never documented before nor was any QA/QC documentation available, the author has elected to classify all cobalt related estimates in the inferred category regardless of the classification parameters above.

## 17.9 Classified Mineral Resources

The mineral resources are derived from the accumulation of the blocks of the resource model, by category, above certain cut-off grades. Table 17.3 presents the estimated nickel and copper mineral resources for a variety of Ni cut-off grades. Table 17.4 presents the estimated cobalt inferred resources. Figure 17.5 presents the mineral resources at selected elevations. For each slice, the figure on the top shows the Ni grade layout and the figure on the bottom presents the resource classification.

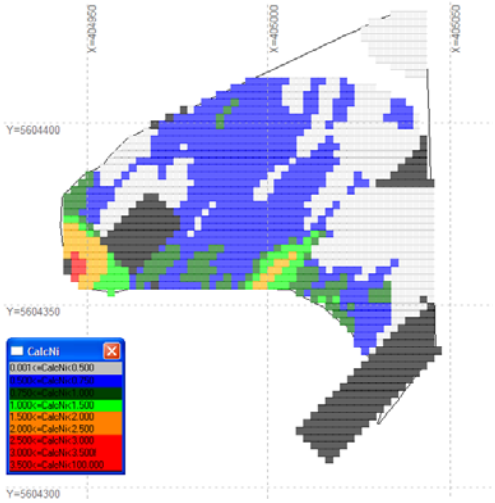
**Table 17.3 Estimated Mineral Resource of the Lac Rocher Deposit (Ni and Cu)**

| | Measured | | | Indicated | | | Measured + Indicated | | | Inferred | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ni % cutoff | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % | Tonnage | Ni % | Cu % |
| 0.5 | 285,918 | 1.23 | 0.77 | 513,183 | 1.05 | 0.62 | 799,101 | 1.12 | 0.68 | 439,279 | 0.65 | 0.41 |
| 0.75 | 170,392 | 1.65 | 0.98 | 241,041 | 1.56 | 0.85 | 411,433 | 1.60 | 0.90 | 56,927 | 1.18 | 0.55 |
| 1 | 106,669 | 2.12 | 1.16 | 139,278 | 2.08 | 1.04 | 245,946 | 2.10 | 1.09 | 22,337 | 1.67 | 0.59 |
| 1.25 | 75,150 | 2.55 | 1.31 | 96,164 | 2.51 | 1.18 | 171,314 | 2.53 | 1.24 | 12,943 | 2.10 | 0.62 |
| 1.5 | 56,822 | 2.93 | 1.45 | 71,426 | 2.91 | 1.29 | 128,248 | 2.92 | 1.36 | 10,117 | 2.30 | 0.67 |
| 1.75 | 44,808 | 3.28 | 1.57 | 54,489 | 3.31 | 1.39 | 99,296 | 3.29 | 1.47 | 6,531 | 2.64 | 0.80 |
| 2 | 36,620 | 3.60 | 1.67 | 43,315 | 3.68 | 1.48 | 79,935 | 3.64 | 1.57 | 3,549 | 3.32 | 1.03 |
| 2.25 | 30,444 | 3.90 | 1.72 | 36,285 | 3.98 | 1.55 | 66,729 | 3.94 | 1.63 | 3,074 | 3.50 | 1.09 |
| 2.5 | 26,287 | 4.14 | 1.76 | 30,637 | 4.28 | 1.61 | 56,924 | 4.22 | 1.68 | 2,772 | 3.62 | 1.12 |
| 2.75 | 22,522 | 4.40 | 1.80 | 25,221 | 4.63 | 1.67 | 47,742 | 4.52 | 1.73 | 2,386 | 3.79 | 1.15 |
| 3 | 19,020 | 4.68 | 1.83 | 21,878 | 4.90 | 1.74 | 40,898 | 4.80 | 1.78 | 1,969 | 3.98 | 1.21 |
| 3.25 | 16,722 | 4.89 | 1.88 | 19,558 | 5.12 | 1.78 | 36,280 | 5.01 | 1.83 | 1,571 | 4.21 | 1.24 |
| 3.5 | 14,493 | 5.12 | 1.89 | 17,259 | 5.35 | 1.81 | 31,751 | 5.25 | 1.85 | 1,130 | 4.53 | 1.28 |
| 3.75 | 12,368 | 5.38 | 1.90 | 15,116 | 5.59 | 1.82 | 27,484 | 5.50 | 1.86 | 1,009 | 4.63 | 1.30 |
| 4 | 10,555 | 5.64 | 1.88 | 13,660 | 5.78 | 1.81 | 24,214 | 5.72 | 1.84 | 927 | 4.70 | 1.31 |
| 4.25 | 9,286 | 5.85 | 1.89 | 12,221 | 5.97 | 1.80 | 21,507 | 5.92 | 1.84 | 728 | 4.85 | 1.37 |
| 4.5 | 8,393 | 6.01 | 1.91 | 10,537 | 6.22 | 1.82 | 18,929 | 6.13 | 1.86 | 566 | 5.01 | 1.44 |
| 4.75 | 7,326 | 6.20 | 1.88 | 9,033 | 6.49 | 1.83 | 16,359 | 6.36 | 1.85 | 398 | 5.19 | 1.49 |
| 5 | 6,087 | 6.47 | 1.78 | 7,726 | 6.76 | 1.78 | 13,813 | 6.63 | 1.78 | 267 | 5.32 | 1.52 |
| 5.25 | 5,343 | 6.66 | 1.78 | 6,970 | 6.94 | 1.75 | 12,313 | 6.82 | 1.76 | 180 | 5.42 | 1.54 |
| 5.5 | 4,761 | 6.82 | 1.75 | 6,078 | 7.16 | 1.67 | 10,839 | 7.01 | 1.70 | 45 | 5.62 | 1.53 |
| 5.75 | 4,185 | 6.99 | 1.69 | 5,204 | 7.42 | 1.55 | 9,389 | 7.23 | 1.61 | | | |

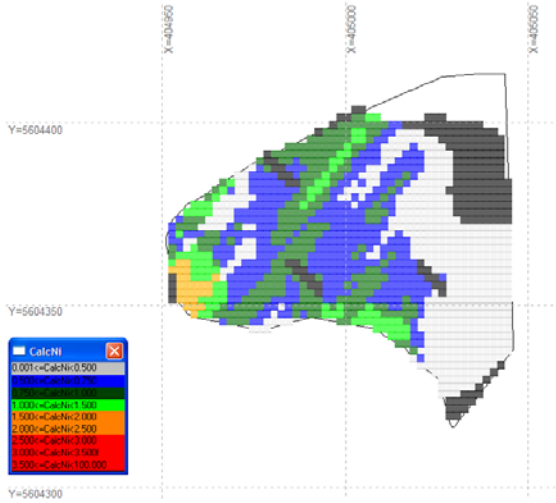
## Table 17.4 Estimated Mineral Resource of the Lac Rocher Deposit (Co)

| | Inferred | | |
|---|---|---|---|
| Ni % cutoff | Tonnage | Co ppm | Co Metal (lb) |
| 0.5 | 1,238,380 | 289 | 790,098 |
| 0.75 | 468,360 | 432 | 446,252 |
| 1 | 268,283 | 529 | 312,684 |
| 1.25 | 184,257 | 590 | 239,699 |
| 1.5 | 138,365 | 629 | 191,961 |
| 1.75 | 105,828 | 662 | 154,351 |
| 2 | 83,484 | 708 | 130,216 |
| 2.25 | 69,803 | 748 | 115,092 |
| 2.5 | 59,696 | 783 | 102,987 |
| 2.75 | 50,129 | 826 | 91,327 |
| 3 | 42,867 | 867 | 81,964 |
| 3.25 | 37,850 | 898 | 74,933 |
| 3.5 | 32,881 | 919 | 66,631 |
| 3.75 | 28,493 | 924 | 58,069 |
| 4 | 25,141 | 937 | 51,931 |
| 4.25 | 22,235 | 931 | 45,614 |
| 4.5 | 19,495 | 942 | 40,470 |
| 4.75 | 16,756 | 927 | 34,258 |
| 5 | 14,080 | 922 | 28,625 |
| 5.25 | 12,493 | 915 | 25,197 |
| 5.5 | 10,884 | 922 | 22,123 |
| 5.75 | 9,389 | 921 | 19,057 |

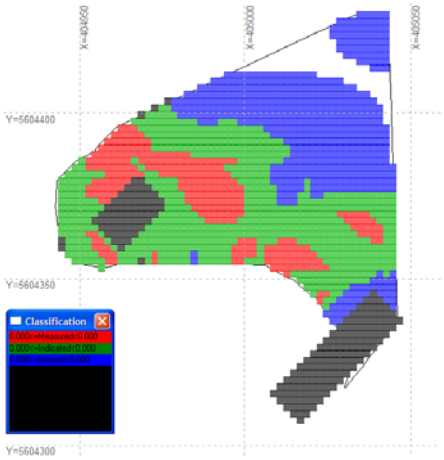
**Figure 17.5 Estimated Mineral Resources at Various Elevations**



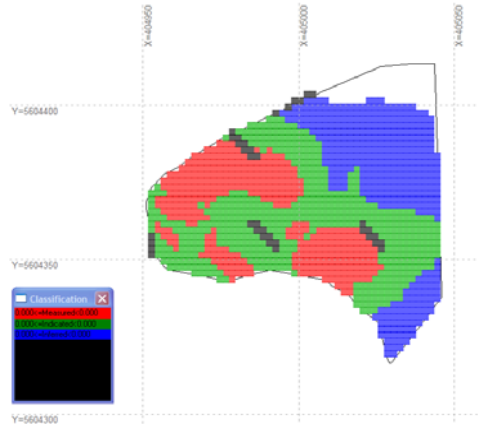

Estimated Ni grade at elevation 213.5m



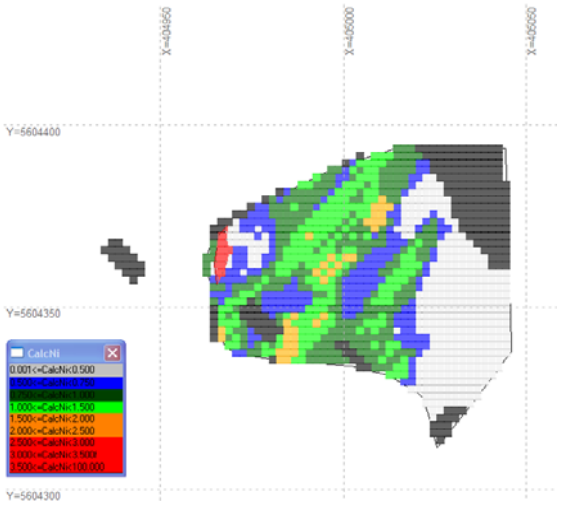

Estimated Ni grade at elevation 198.5m



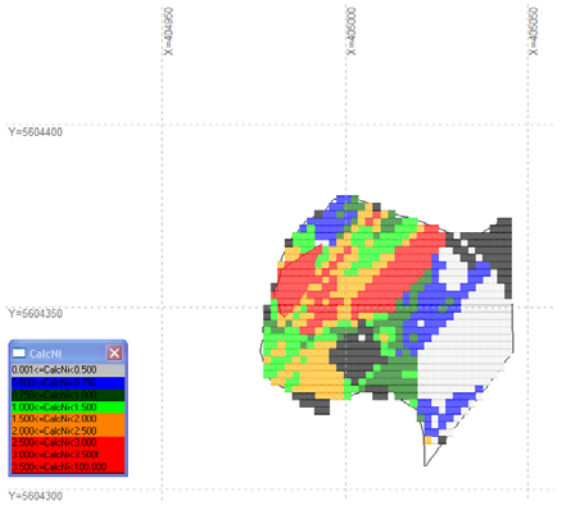

Resource classification at elevation 213.5m



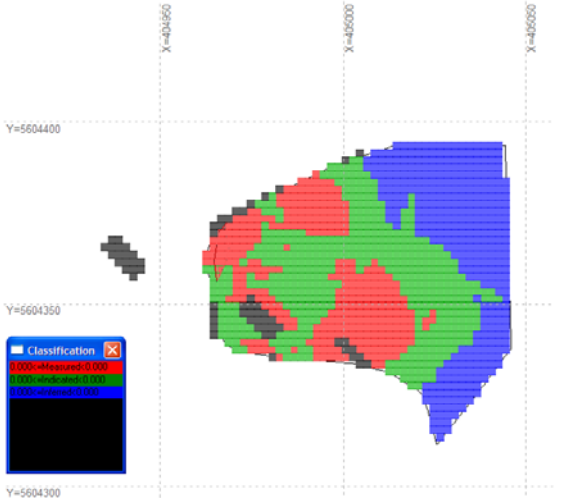

Resource classification at elevation 198.5m



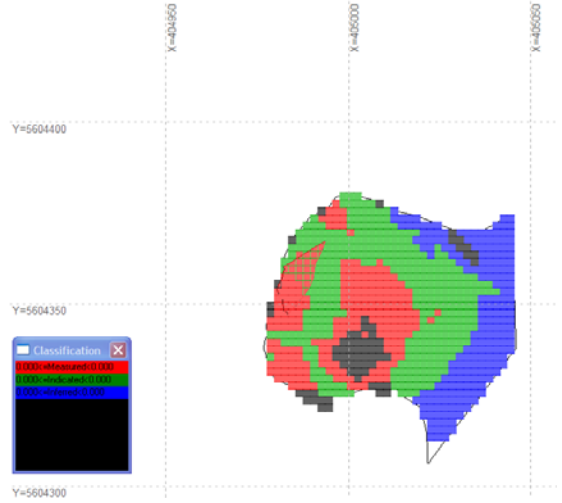

Estimated Ni grade at elevation 183.5m



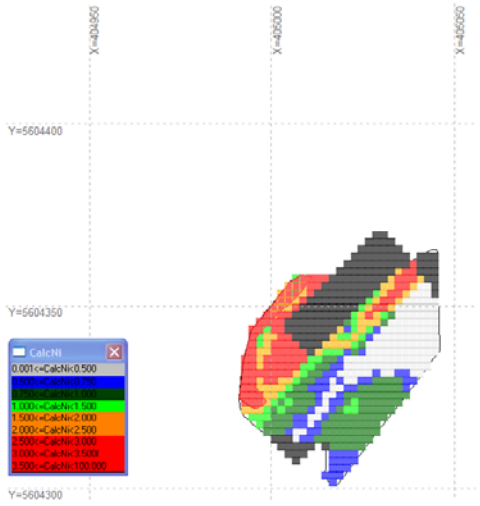

Estimated Ni grade at elevation 168.5m



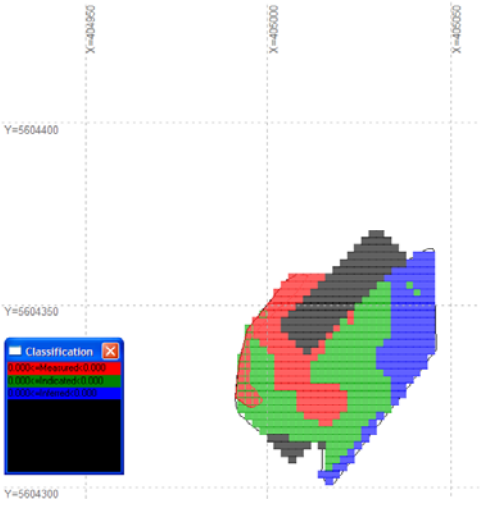

Resource classification at elevation 183.5m




Resource classification at elevation 168.5m




Estimated Ni grade at elevation 153.5m




Resource classification at elevation 153.5m

# 18. Other Relevant Data and Information

## 18.1 Mining

### 18.1.1 Introduction

The Lac Rocher deposit appears as a continuous concentration of nickel and copper sulphides calling for a mining method that will recover the maximum of ore and have a minimum of dilution. The core visualisation reveals very good looking rock qualities; the recovery is almost 100% and there is very little alteration.

Most of the higher nickel values are contained in the massive sulphides lens sitting along a clean footwall contact with gneissic rocks, at an angle of ± 50º, and are located between 50 to 135 m elevations. The portal of the ramp is located at elevation 270 m. Depending on the cut-off grades, the amount of resources is estimated at between 300,000 and 700,000 t. Because of the rather low tonnage of this deposit and the fact that the known bottom of the deposit is less than 150 m from surface, a ramp is the logic choice of access for exploitation. Sinking a shaft is not economically feasible in the current context.

Based on the resources estimation prepared by Geostat, a number of mining scenarios has been examined. The retained scenario proposes to extract approximately 297,000 t of (diluted) Measured and Indicated resources, at a grade of 1.60% Ni and 0.60% Cu, plus 21,000 t (diluted) at a grade of 1.07% Ni and 0.35% Cu. All cobalt resources are classified as Inferred. Diluted grade, in the 318,000 t targeted for exploitation, is 0.053% Co.

The project would be realised in two (2) phases. During Phase 1, a portal and a main ramp with cross-cuts would provide access to the lower levels of the mine, and allow for a definition drilling program that will better delineate the resources. Approximately 65,000 t would be mined out to confirm the process flowsheet and metal recoveries, the operating costs and the mining method. The remaining 253,000 t of ore would be extracted during Phase 2. Table 18.1 summarises the estimated Measured, Indicated and Inferred resources involved in the economic analysis. The quantities in the table include dilution.

This preliminary assessment includes about 6.6% of Inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be characterised as mineral reserves, and there is no certainty that the preliminary assessment will be realised.

The addition of Inferred category resources in the mining scenario is explained by the fact that the mining method proposed is based on a complete extraction of the resources inside the mineralized

deposit. In other words, all material inside the selected deposit is mined out, including the barren granite dykes.

**Table 18.1 Estimated Diluted Resources for Exploitation**

**Lac Rocher estimated diluted Ni & Cu resources for exploitation**

| Category | Tonnes metric | Grade Ni - % | Grade Cu - % | Grade Co - % | Ni metal tonnes | Cu metal tonnes | Co metal tonnes |
|---|---|---|---|---|---|---|---|
| Measured | 123 000 | 1,78 | 0,69 | | 2 189 | 849 | |
| Indicated | 174 000 | 1,47 | 0,53 | | 2 558 | 922 | |
| Measured + Indicated | **297 000** | **1,60** | **0,60** | | **4 752** | **1 782** | |
| Inferred | **21 000** | **1,07** | **0,35** | | **225** | **74** | |

**Lac Rocher estimated diluted Co resources for exploitation**

| Category | Tonnes metric | Grade Co - % | Co metal tonnes |
|---|---|---|---|
| Inferred | **318 000** | **0,053** | **169** |

Notes:

- Nickel and copper metals tonnage may not add due to rounding of grade values
- Metal content as expressed in the table is the metals contained in the resource, before ore processing

## 18.1.2 Development

### 18.1.2.1 Portal

The location of the portal takes into account the thickness of the overburden and the quality of the underlying rock. It is estimated that approximately 7 m of soil mostly made of gravel and sand will be removed before reaching solid rock. Depending of the quality of the rock, a face of approximately 9 m high is required to start the 5 m wide by 4 m high decline, leaving a brow of 5 m thick.

The estimated volume of overburden and rock excavation is:

- Overburden removal: 20,240 $m^3$;
- Rock excavation: 1,200 $m^3$ (about 3,500 t).

Figure 18.1 shows the surface arrangement of the portal and ramp in relation to the projected outline of the exploitation zone.

Figure 18.2 shows two sections (longitudinal and cross-section) of the ramp and parts of the outline of the exploitation zone.

**Figure 18.1 Portal and Ramp Arrangement**

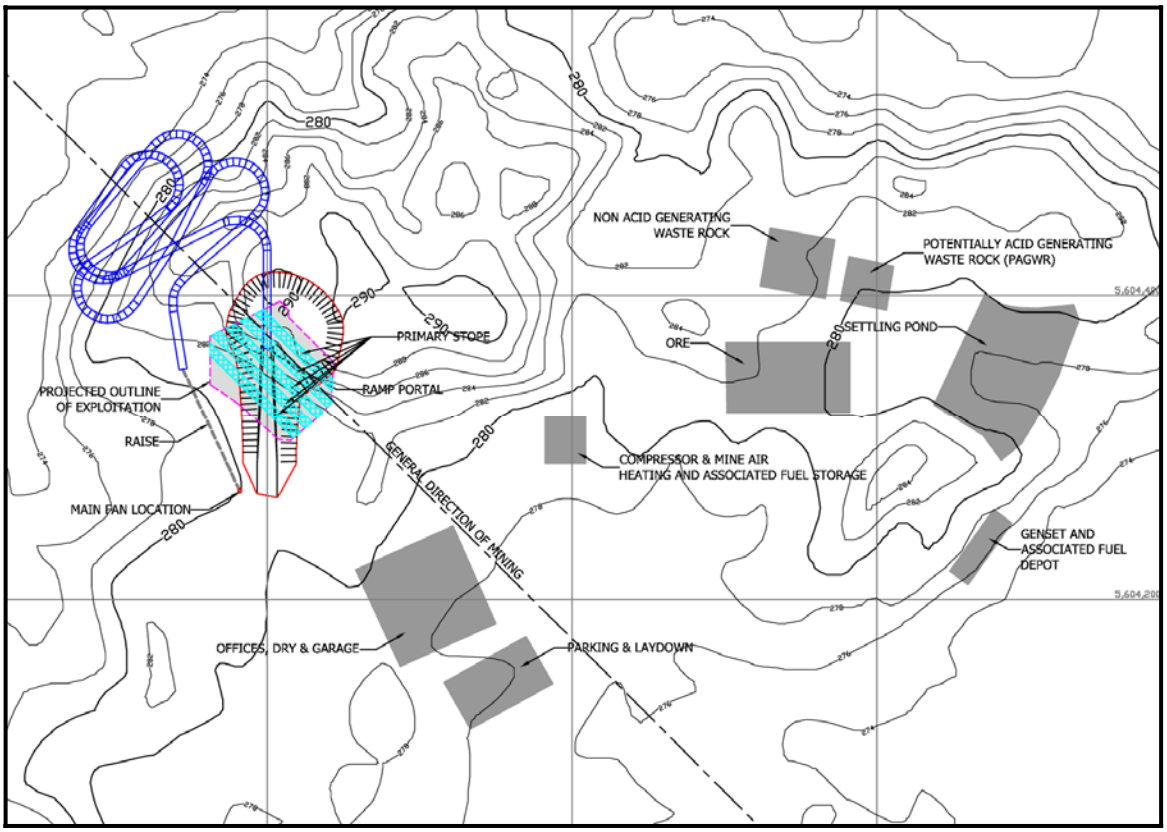
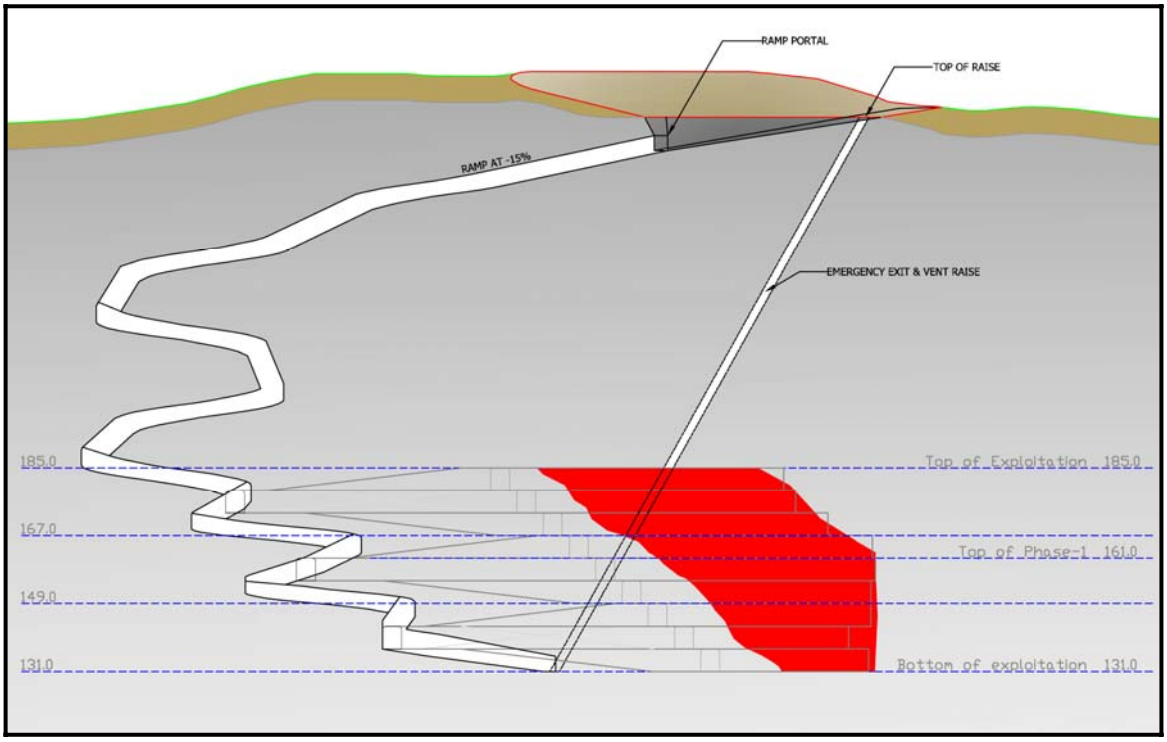
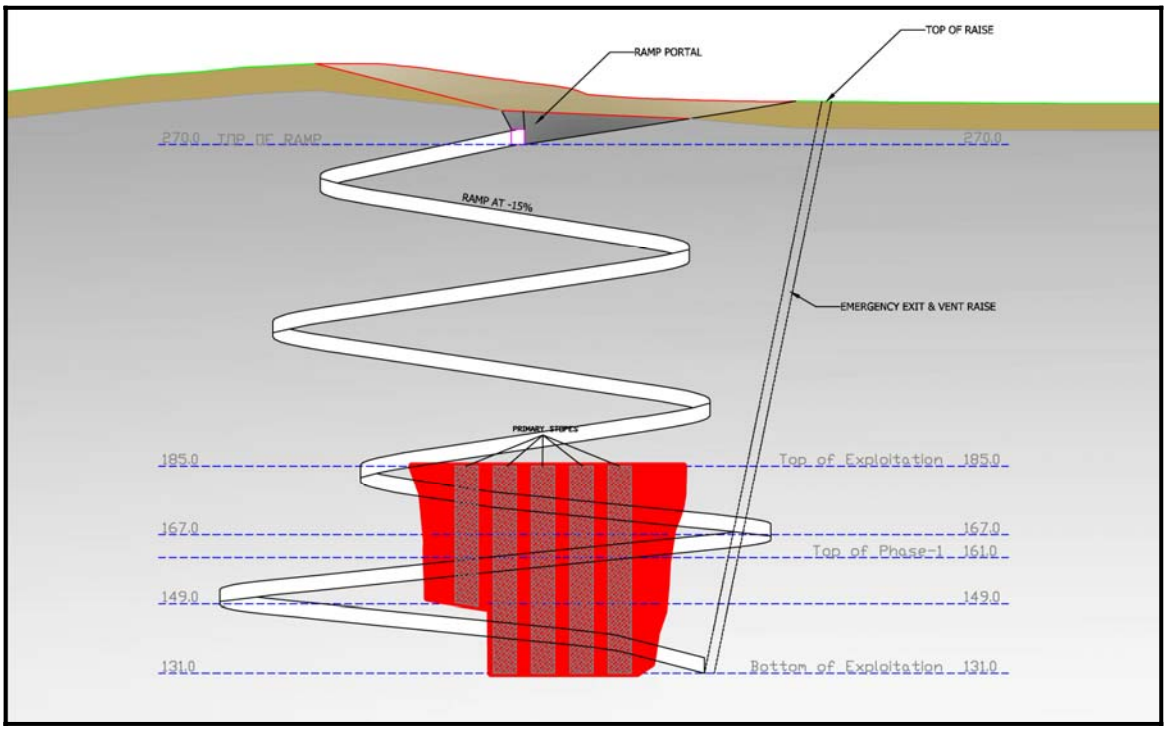


**Figure 18.2 Typical Sections – Ramp and Orebody**



Appendix C shows a typical plan arrangement and two sections where the mine infrastructure is shown on block models, with the outline of the exploitation zone indicated for reference.

#### 18.1.2.2 Main Access Ramp

The proposed 5 m wide by 4 m high ramp will consist of a decline driven in the footwall zone of the deposit at minus 15%. The ramp will start at elevation 270 m and terminate at the elevation of the first mining lift which is at 131 m elevation. When taking into account design specifications for reduced grade (12%) in curves and additional excavation at the bottom for water sump area the total length of the ramp will be 1,100 m. The estimated quantity of waste rock produced by ramp development is some 22,000 $m^3$ (66,600 t).

The unit price used in the costs estimate includes all the regular charges: excavation, bolting and screening, safety bays, remuck bays, air and water pipes and air heating during winter time.

The rate of ramp excavation is assumed to be 3.65 m/day for the first 100 m, and the rest at 6.65 m/day, for a total estimated time of 180 days, or 26 weeks.

An important part of the waste material from the ramp will be used on surface to build the required waste/ore pads and the dykes of the water pond.

#### 18.1.2.3 Ventilation Raise and Emergency Exit

In accordance with Quebec's regulations respecting occupational health and safety in mines, a second exit is required for all mining workings except during development. Thus a raise of 3.0 m x 3.0 m will connect the bottom of the ramp to the surface. The raise will be used for ventilation purposes and, being equipped with a manway, as an emergency escape way. The ventilation raise will be about 170 m long, and will generate some 4,600 t of waste rock.

#### 18.1.2.4 Secondary Accesses to Ore

The mine design will enable Victory Nickel to extract ore over a vertical height of 54 m, requiring secondary ramping accesses at every 6 m. These developments will consist of driving a decline, then taking the back down and filling the first excavation to move to the next lift and so on. The same sequence will be repeated 9 times during each of the two mining phases. Each lift of 6 m will correspond to the mining of two blocks (3 m high) of the block model created by Geostat. The quantity of waste development, not including the raise, will be about 1,450 m, for an estimated quantity of waste rock of 88,000 t.

A summary of secondary waste development is shown in Table 18.2.

**Table 18.2 Waste Development**

**Waste Development**

| Preliminary stoping design: Primary stopes of 6 m, secondary stopes of 4 m with mechanical backfill. Ore between 131m to 185 is retained | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Undiluted resources | | | | | | Phase - 1 | | | | | | | Phase - 2 | | | | | | Cumul |
| Bench # | Elev. m | Tonnes | Tonnes cumul | Ni % | Cu % | Down m | Flat m | Up m | X-Cut m | Drift m | Total m | Acccess to ramp | Down m | Flat m | Up m | X-Cut m | Drift m | Total m | Total m |
| 8 | 132.5 | 6,277 | 21,209 | 0.99 | 0.38 | | | | | | | | | | | | | | |
| 9 | 135.5 | 8,010 | 29,219 | 0.96 | 0.41 | | | | | | | | | | | | | | |
| 10 | 138.5 | 9,606 | 38,825 | 1.82 | 0.53 | | | | | | | | | | | | | | |
| 11 | 141.5 | 9,648 | 48,473 | 2.28 | 0.62 | 67 | 25 | 25 | 40 | 48 | 205 | 20 | 67 | 25 | 25 | 40 | 68 | 225 | 450 |
| 12 | 144.5 | 10,056 | 58,529 | 1.78 | 0.61 | | | | | | | | | | | | | | |
| 13 | 147.5 | 14,157 | 72,686 | 1.47 | 0.53 | | | | | | | | | | | | | | |
| | | **57,755** | | **1.60** | **0.52** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 14 | 150.5 | 13,756 | 86,442 | 1.60 | 0.54 | | | | | | | | | | | | | | |
| 15 | 153.5 | 14,311 | 100,753 | 1.88 | 0.58 | | | | | | | | | | | | | | |
| 16 | 156.5 | 17,033 | 117,786 | 1.98 | 0.60 | | | | | | | | | | | | | | |
| 17 | 159.5 | 17,504 | 135,289 | 2.03 | 0.73 | 67 | 25 | 25 | 50 | 60 | 227 | 20 | 67 | 25 | 25 | 50 | 85 | 252 | 499 |
| 18 | 162.5 | 18,533 | 153,822 | 2.03 | 0.75 | | | | | | | | | | | | | | |
| 19 | 165.5 | 19,816 | 173,639 | 1.94 | 0.78 | | | | | | | | | | | | | | |
| | | **100,952** | | **1.92** | **0.68** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 20 | 168.5 | 22,785 | 196,424 | 1.77 | 0.72 | | | | | | | | | | | | | | |
| 21 | 171.5 | 25,205 | 221,629 | 1.66 | 0.70 | | | | | | | | | | | | | | |
| 22 | 174.5 | 26,241 | 247,870 | 1.58 | 0.62 | | | | | | | | | | | | | | |
| 23 | 177.5 | 26,381 | 274,250 | 1.33 | 0.54 | 67 | 25 | 25 | 50 | 60 | 227 | 20 | 67 | 25 | 25 | 50 | 85 | 252 | 499 |
| 24 | 180.5 | 25,708 | 299,958 | 1.10 | 0.45 | | | | | | | | | | | | | | |
| 25 | 183.5 | 26,406 | 326,364 | 0.91 | 0.40 | | | | | | | | | | | | | | |
| | | **152,726** | | **1.38** | **0.57** | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| **Total** | | **311,433** | | **1.60** | **0.60** | | | | | | 659 | 60 | | | | | | 729 | **1448** |

## 18.1.3 Fill-in Diamond Drilling for Ore Definition

The current geological interpretation is based on diamond drill holes (DDH) that are at a minimum 12.5 m apart. Measured and Indicated mineral resources have been calculated with this criterion. As stated earlier, the waste-ore footwall contact with the gneissic rocks is well defined, but in other areas more diamond drilling will be needed to better define the mineable ore limits.

To do so, a provision of 50 holes, about 60 m long each, is provided in the development budget. At a unit cost of 100 $/m, the aggregate amount of 3,175 m of DDH totals 317,730 $.

## 18.1.4 Mining Approach

### 18.1.4.1 Mining Method

The selected mining method retained in this study is mechanised cut and fill, with delayed rock fill. Development waste and sand and gravel material will be used as backfill and cement will be added when required. Mining will be done in two steps. At first, primary stopes of 6 m wide by 6 m high will be excavated starting from the bottom of the orebody. These stopes will be backfilled with cemented fill after each lift. The remaining pillars of 4 m wide left between the primary stopes will be extracted during the second phase of mining, and backfilled only on the top section to avoid dilution when mucking out the broken ore.

Due to the geometry of the orebody, the general direction of mining will be south-east. Continuous vertical pillars will be temporally left in between the primary stopes to ensure the mine overall stability

#### 18.1.4.2 Mining Rate

The mechanised cut and fill mining method will allow a relatively high mining rate. However, the availability of the Campbell's mill will be limited to a maximum of 16,000 t per month and the daily ore trucking capacity to the concentrator, especially during winter time, will also affect the mining rate. In this study the average ore production is assumed to be 500 t per day in the Phase 1 and 750 t per day during Phase 2.

For each horizontal lift of 6 m, there will be a minimum of 4 stopes available. Consequently, with a proper scheduling, backfill placement should not delay regular daily production.

#### 18.1.4.3 Surface Ore Crushing

The run-of-mine ore will be first hauled and stockpiled on surface close by the portal. The ore will later be transported by trucks to Chibougamau. Local contractors were asked to submit quotations for this transportation activity. After discussions with them, it was concluded that it would be best to crush the ore in order to limit damages to the aluminium trailer boxes. A portable crushing and screening plant will therefore be available on site. Alternatively a "grizzly screen" coupled with a rock breaker could do the job.

The same equipment will be used to prepare the backfill material required underground.

#### 18.1.4.4 Backfilling and Ore Dilution

It was estimated that waste coming from the ramp excavation and from the stopes accesses will provide approximately 33% of the required backfill (rockfill). The remaining could come from gravel and sand pits located along the return road of the trucks hauling the ore to Chibougamau.

A study will be needed to select the best type of cemented rockfill that will ensure the local stability of the primary stopes, and will allow the extraction of the pillars left behind. A provision was made in the budget for this study and for assessment of general rock mechanics and hydrogeological conditions.

The ore production haulage trucks will be used to bring the backfill underground. On their way down, the trucks will move the fill material to the empty stopes, where it will be put in place by smaller units of a ± 2 cu. yd. capacity.

During the excavation of the primary stopes, there will be very limited dilution. The footwall contact along the gneissic rocks is very well defined, and mining should easily follow it. Most of the primary stopes are located inside the interpreted deposit where stope walls are within the ore limits and next

to lower grade material. The dilution during the primary stope mining will come from the interface between the broken ore and the backfill of the lower lift.

The mining of the secondary stopes will have both side walls exposed to the cemented backfill material.

The estimated cost of cemented backfill in various cement proportions has been compared to the impact of having variable dilution. It shows that lower dilution resulting from the use of cemented rockfill provides an estimated saving of about 800,000 $, as detailed in Section 18.6.4.

## 18.1.5 Mining Phases

### 18.1.5.1 Phase 1 Resources

Approximately 65,000 t of Measured + Indicated and Inferred categories resources will be mined during Phase 1. This ore will be extracted from the bottom part of the mine, between elevations 131 m to 161 m. This quantity represents 60% of the total resources calculated in the first 10 lowermost horizontal layers (3 m high each) of the block model produced by Geostat. Table 18.3 presents the details of Phase 1 (undiluted) resources.

**Table 18.3 Phase 1 (Bulk Sample) Mining Resources Location and Grades**

| Bench Reference | Elevation m | Tonnes by bench | Tonnes Cumulative | Ni % | Cumul Ni % | Cu % | Cumul Cu % | Co % | Cumul Co % |
|---|---|---|---|---|---|---|---|---|---|
| 8 | 132,5 | 6 277 | 6 277 | 0,99 | 0,99 | 0,38 | 0,38 | 0,056 | 0,056 |
| 9 | 135,5 | 8 010 | 14 287 | 0,96 | 0,97 | 0,41 | 0,39 | 0,070 | 0,064 |
| 10 | 138,5 | 9 606 | 23 893 | 1,82 | 1,32 | 0,53 | 0,45 | 0,078 | 0,070 |
| 11 | 141,5 | 9 648 | 33 541 | 2,28 | 1,59 | 0,62 | 0,50 | 0,068 | 0,069 |
| 12 | 144,5 | 10 056 | 43 598 | 1,78 | 1,64 | 0,61 | 0,52 | 0,063 | 0,068 |
| 13 | 147,5 | 14 157 | 57 755 | 1,47 | 1,60 | 0,53 | 0,52 | 0,056 | 0,065 |
| 14 | 150,5 | 14 024 | 71 778 | 1,62 | 1,60 | 0,56 | 0,53 | 0,061 | 0,064 |
| 15 | 153,5 | 14 311 | 86 089 | 1,88 | 1,65 | 0,58 | 0,54 | 0,063 | 0,064 |
| 16 | 156,5 | 17 033 | 103 122 | 1,98 | 1,70 | 0,60 | 0,55 | 0,058 | 0,063 |
| 17 | 159,5 | 17 504 | 120 626 | 2,03 | 1,75 | 0,73 | 0,57 | 0,056 | 0,062 |
| | **Phase 1** | **65 000** | | **1,75** | | **0,57** | | **0,062** | |
| | | (54 % of total resources in benches 8 to 17) | | | | | | | |

**Note: all of the cobalt resources are classified as Inferred**

Out of the 65,000 t described above, the cumulative Measured and Indicated resources are 61,190 t (94.1%) at a grade of 1.80% Ni and 0.59% Cu; cobalt resources for Phase 1, all classified as Inferred, have a grade of 0.062 % Co. Less than 6% of nickel and copper resources targeted for mining during Phase 1 are in the Inferred category. However, the proposed DDH underground program will improve the understanding of the mineralised zone.

During Phase 1 there will be no or very little dilution because all mining activities will be conducted inside the ore contacts. Since cement will be added to the rockfill used in the primary stopes, this will provide a solid clean interface between the fill and the broken ore.

#### 18.1.5.2 Phase 2 Resources

The resources to be mined during Phase 2 will come from the remaining primary stopes left between elevation 161 m and 185 m, and from all of the secondary stopes located between 131 m and 162 m elevation. In this later case a dilution factor of 5% will be applied. Measured and Indicated resources represent 93.5% of the total undiluted resources to be extracted in the two phases. Phase 2 resources (diluted tonnage and grade) are presented in Table 18.4.

**Table 18.4 Phase 2 Resources**

| Resources | From | To | Tonnes | Dilution | Total tonnes | Ni % | Cu % | Co % |
|---|---|---|---|---|---|---|---|---|
| Rest of primary stopes | 161 m | 185 m | 121,900 | 0% | 121,900 | | | |
| Secondary stopes | 131 m | 185 m | 124,600 | 0% | 124,600 | | | |
| Secondary stopes dilution | 131 m | 185 m | 6,230 | 5% | 6,230 | | | |
| **Phase 2 Resources** | | | **252,730** | | **252,730** | **1.52** | **0.59** | **0.051** |

## 18.2 Infrastructure and Services

### 18.2.1 Mine Site General Arrangement

The general location of the areas reserved for the various infrastructure elements is shown on Figure 18.3. Figure 18.4 shows an aerial view of the future mining site, looking approximately North.

The site arrangement is based on an optimisation from both operational and environmental standpoints.

The portal location may be modified slightly based on further geotechnical considerations, but should remain very close to the location shown. The selected location is based on:

- Relatively shallow depth of overburden to get access to rock;
- Minimum quantity of rock to excavate in order to get access to the mineralised zones;
- Easier topography for access, machinery movements and stockpiling the hauled ore; ore and waste rock pads are located to provide a minimum haulage distance from mine portal to the pads;
- Sufficient space in the vicinity of the portal to implement other infrastructure elements;
- Remoteness from the wet area west of the deposit.

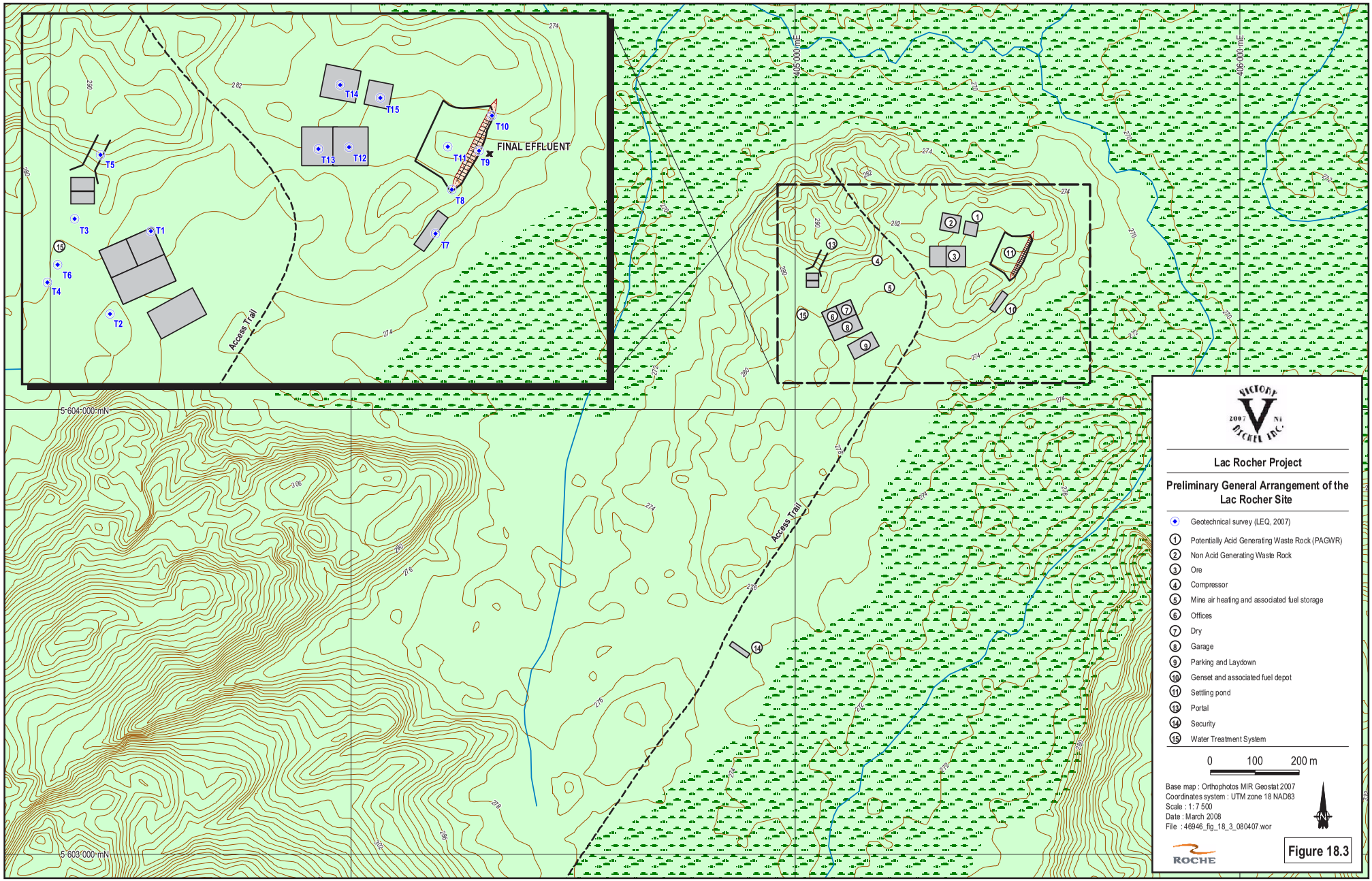

T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
FINAL EFFLUENT
Access Trail
Access Trail
5 604 000 mN
5 603 000 mN
405 000 mE
406 000 mE
Lac Rocher Project
Preliminary General Arrangement of the Lac Rocher Site
Geotechnical survey (LEQ, 2007)
1 Potentially Acid Generating Waste Rock (PAGWR)
2 Non Acid Generating Waste Rock
3 Ore
4 Compressor
5 Mine air heating and associated fuel storage
6 Offices
7 Dry
8 Garage
9 Parking and Laydown
10 Genset and associated fuel depot
11 Settling pond
13 Portal
14 Security
15 Water Treatment System
0 100 200 m
Base map : Orthophotos MIR Geostat 2007
Coordinates system : UTM zone 18 NAD83
Scale : 1: 7 500
Date : March 2008
File : 46946_fig_18_3_080407.wor
ROCHE
Figure 18.3

**Figure 18.4 Aerial View of the Exploration Site**



## 18.2.2 Mine Site Development

The site around the proposed portal location is relatively flat, and permits a compact general arrangement of the mine facilities.

Development of the mine site is going to be simple, since the ore will be transported to Chibougamau, so no ore processing facility is required. Since the duration of the project is fairly short, power will be produced on-site by diesel-powered generators, eliminating the need to build a power line and associated facilities. The availability of camp accommodations near Lac Rocher also eliminates the need to build such an installation at the mine site.

Site development will mostly consist in upgrading an access to the mine site, implementing some site roads, parkings and laydown areas. Temporary buildings will consist in an office accommodation for the owner's team (rented trailers), a mining contractor-supplied shop and dry complex, gensets, a fuel station, a compressor station and a mine air-heating installation.

Four stockpile pads will be provided, two each for ore and waste rock. A control basin will be installed downstream of the stockpiling area, to treat mine water and drainage from the stockpile.

Some tree cutting has already been realised in the immediate vicinity of the future mining site, totalling approximately 1.4 ha (Figure 18.4).

Additional tree cutting for the preparation of the site and the upgrading of the access road is estimated to cover respectively 3.2 and 5 ha, with most of the trees being black spruce.

## 18.2.3 Roads and Transportation

### 18.2.3.1 Access Road

The Lac Rocher project site is accessible by R-1022, a road starting at km 60 of the James Bay road, north of Matagami. The successive forest operation roads followed to access the site are then PE-8400.00, PE-8414.00 and PE-8414.20. The exploration site is located at the end of PE-8414-20.

Road PE-8414.20 marks the end of the existing summer forest operation road. A last segment providing access to the site is a winter operation road opened 8 years ago. This 2.9 km segment will need maintenance in order to be used on a permanent basis. This winter road is visible on the right side of Figure 18.4. No significant improvement of the existing road, up to the end of PE-8414-20, is necessary.

A detailed field investigation of this last 2.9 km portion was performed in September 2007. Most of this access trail is on flat topography and the soil is essentially 20-100 cm humus over heavy clay, with short sections of peat more than 1 m thick. Trees have been harvested, but no forming of the road has been done, due to the topography and the winter-only use of the road.

This portion of the access road will be upgraded to allow for a maximum speed of 50 km/h over a 4 m-wide traffic lane. It will be formed by placing fill material and gravel over the existing winter road course, with geogrid and geotextile reinforcement where needed. Only culverts are required for drainage along this 2.9 km segment.

This road to Matagami will be the main access for personnel and supplies. Another shorter route will be used for the transportation of the ore to the Copper Rand mill in Chibougamau (Section 18.2.3.6).

### 18.2.3.2 Site Roads

Various road segments will be necessary to reach the various areas or the property. They will reach the portal, the office/dry/shop area, the ore pads, the control basin, and the gensets/fuel depot location.

Total length has been estimated at about 1,000 m. They will be partly formed with soils excavated at the portal location and at the control basin, complemented with waste rock from ramp development. Only inert (non acid generating) waste rock will be used to prepare roads, parkings and stockpile pads.

#### 18.2.3.3 Parking

A parking will implemented south of the office/dry/shop area. It will be built with material excavated during site preparation, complemented with crushed stone or any suitable local material.

#### 18.2.3.4 Gate and Fencing

Given the remoteness of the mining site, no site fencing will be necessary, except for the main gate and the explosives storage area (contractor-owned and operated).

The gate could be a remotely-operated installation with a communication line to the office.

#### 18.2.3.5 Ore Weighing Installation

It is anticipated that truck loading would be handled by the transportation contractor personnel. The loader would be equipped with a load cell system for weight detection. No truck scale would be necessary on site.

#### 18.2.3.6 Transportation of Ore and Concentrate

The Lac Rocher ore will be processed at the Copper Rand mill of Campbell Resources, in Chibougamau.

Two options are available to haul the ore to Chibougamau without constructing significant lengths of new road (Figure 18.5).

**Long Route Option – Ore Hauling**

The longer route to Chibougamau, over a set of existing roads, would involve hauling over the following sequence of roads: current access road (R-1022) to the James Bay Road – James Bay Road to a few kilometres before Matagami - Route 1005 to Lebel-sur-Quévillon – Route 113 to Chibougamau. Total hauling distance (one-way) is 540 km, and the round-trip duration (driving time only) is estimated at 14 hours.

Based on a price quotation by Transport Nord-Ouest (Val-d'Or) and rates used by Quebec Ministry of Transports for bulk trucking of aggregates in this region[3], the estimated transportation cost is 55 $/ton of ore.

**Short Route Option – Ore Hauling**

A shorter alternative would be available to Victory Nickel by using a shortcut to Waswanipi. This involves:

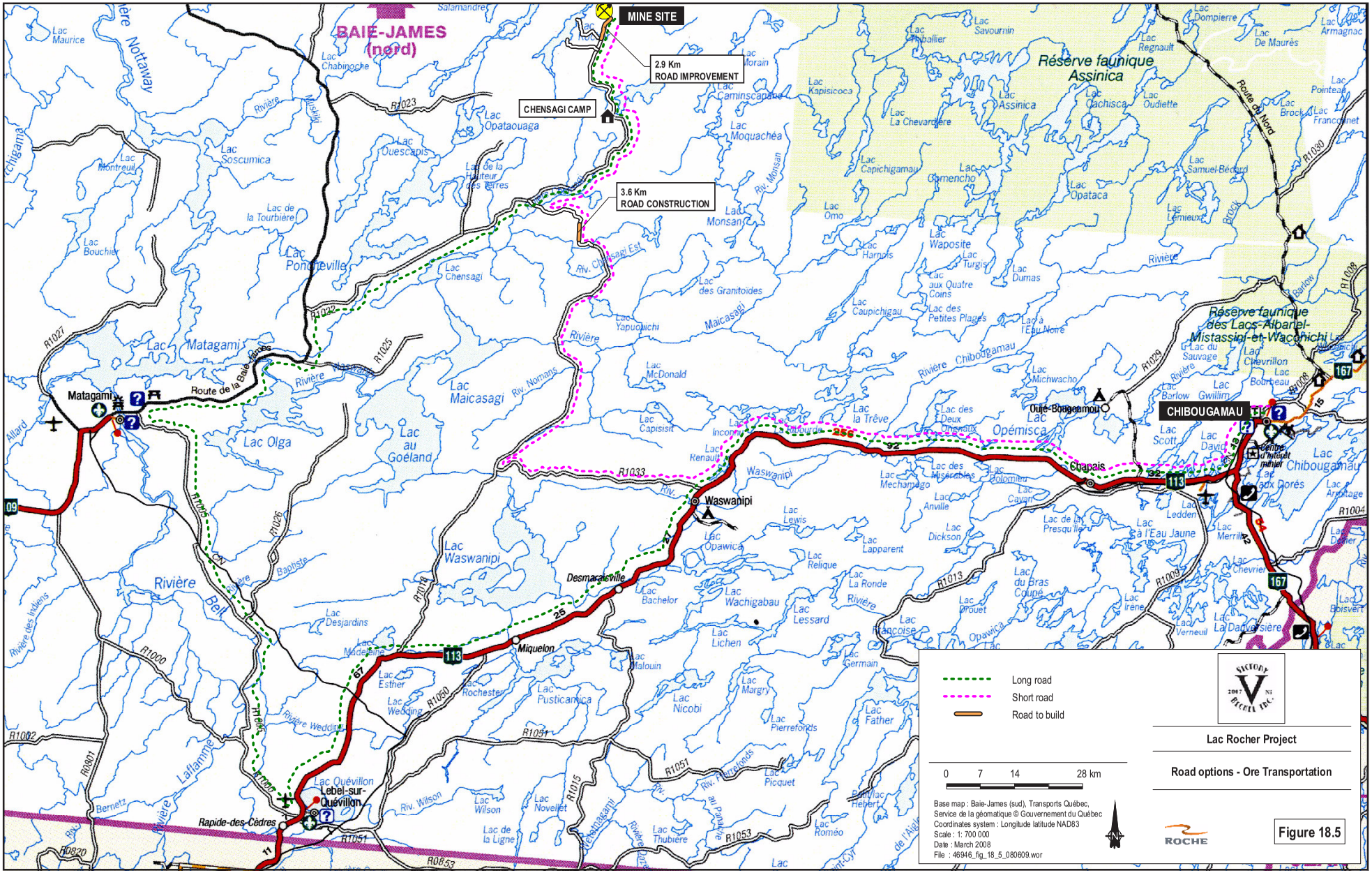
- Driving on R-1022 for about 60 km, to a junction point with the next road segment; this is about 25 km before reaching Lake Chensagi;
- Taking an existing logging road to the south, for about 14 km;
- Building a new 3.6 km segment to link with an existing logging road leading south;
- Upgrading or repairing a few segments of this logging road, for a distance of about 7.8 km. The construction and upgrade would be for a Class III single lane road;
- Following the logging road down to the intersection with Route 1018 and Route 1033;
- Following Route 1033 to Waswanipi;
- Following Route 113 to Chibougamau.

This shorter route is about 325 km long, with an estimated round-trip (driving only) duration of 11 hours.

A possible alternative to this scenario is the high probability that a local logging operator will build the missing segment and upgrade the road to a Class II double lane that can accommodate megaload logging trucks. This alternative is under study by the forest operator.

Transportation cost over this road option is estimated at 35 $/ton of ore.

[3] The Ministry of Transports publishes a schedule of rates payable for bulk trucking; rates can be calculated on the basis of $/hour or $/t per kilometre (rates used are for bulk trucking of aggregates, Region 8)


MINE SITE
2.9 Km
ROAD IMPROVEMENT
CHENSAGI CAMP
3.6 Km
ROAD CONSTRUCTION
BAIE-JAMES
(nord)
Réserve faunique
Assinica
Réserve faunique
des Lacs-Albanel-
Mistassini-et-Waconichi
Matagami
Route de la Baie-James
Waswanipi
Desmaraisville
Miquelon
Lebel-sur-
Quévillon
Rapide-des-Cèdres
Ouje-Bougoumou
CHIBOUGAMAU
Chapais
Long road
Short road
Road to build
0 7 14 28 km
Base map : Baie-James (sud), Transports Québec,
Service de la géomatique © Gouvernement du Québec
Coordinates system : Longitude latitude NAD83
Scale : 1: 700 000
Date : March 2008
File : 46946_fig_18_5_080609.wor
Lac Rocher Project
Road options - Ore Transportation
ROCHE
Figure 18.5

### Road Construction Costs

Upgrading the last 2.9 km of the existing access road, as described in Section 18.2.3.1, has been estimated at 260,000 $. This estimate is based on a detailed field inspection by Roche Ltd, and discussions with three regional contractors.

The 3.6 km segment to be constructed to interconnect existing roads towards Waswanipi was also field-inspected by Roche Ltd's personnel. No bridge is required for the crossing of a small watercourse, and adequate fill material is considered available in the vicinity of this road segment.

Preliminary construction cost has been estimated at 434,000 $.

### Road Maintenance Costs

Provincial roads like Route 113 and the James Bay Road are maintained respectively by Provincial authorities and SDBJ[4]. For users of other roads between Lac Rocher and Waswanipi, users are responsible for summer and winter maintenance, including snow clearing.

When several users are present (forest companies are the main users when logging activities are conducted in this area), the maintenance costs are normally negotiated at a pro-rata on an "intensity-of-use" basis. We have assumed a worst-case scenario where Victory Nickel Inc. would be the sole user of the 231 km long route section between Lac Rocher and Waswanipi.

A typical maintenance cost for such unpaved roads is 275 $/km per month in summer, and 550 $ in winter. The estimated cost, over the duration of the project, is about 2.15 M$ (Section 18.6.8). This worst-case scenario includes the maintenance of the access road from James Bay Route to the mine site, and the maintenance of the shortcut to Route 113, near the village of Waswanipi.

If the road shortcut to Waswanipi was to be built and used by a local logging operator, Victory would become a secondary user of this road segment. Maintenance costs might then be reduced significantly, with Victory Nickel sharing the cost on a pro rata of use basis. Potential savings in maintenance costs are important, but cannot be confirmed at this time.

### Transportation of Concentrate

The nickel-copper concentrate produced at the Copper Rand mill in Chibougamau has been assumed to be sent to a nickel smelter in the Sudbury area, in Ontario.

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[4] Société de Développement de la Baie James

Trucking the concentrate would involve a road distance of approximately 870 km (one-way trip) for a round-trip (driving only) of about 21 hours. Estimated cost is 80 $/ton of concentrate.

A quotation for rail transportation was obtained form CN. Including the current fuel surcharge (as of January 2008), the estimated cost per ton of concentrate is about 60 $.

### 18.2.4 Soils and Foundations

The project area is primarily covered in glacial deposits consisting of undifferentiated till. Most of the immediate area is made of poorly drained sections with organic (>1 m thick) cover. Most of it is colonised by wet resinous stands such as black spruce moss stands. Better drained portions consist mostly of low-elevated plateaux (190-220 m elevation) covered by tills and fluvio-glacial sands. These plateaux are usually colonised by an open conifer forest. Black spruce moss stands colonise depressions filled with marine clay and silt and can be, in some cases, covered by peat deposit which can be up to 1 m thick.

A preliminary geotechnical assessment was performed at all sites selected for the implementation of infrastructure elements[5].

Trenching or post hole auger borings was performed at 15 locations (Figure 18.3) for observation and soil sampling. *In situ* vane testing was also performed in the field to check soil shear strength.

At all locations, the preliminary geotechnical assessment confirmed that the proposed infrastructure elements could be implemented without major difficulties. Simple continuous footings (strip foundations) were deemed sufficient to support the buildings, Soils at the locations of the ore and waste rock pads, as well as at the control basin, were also estimated as permitting the implementation of the proposed infrastructure.

In the general area selected for the office/dry/shop facilities, underground water was observed at less than 0.5 m deep. Some drainage of this area will be required.

A more detailed geotechnical investigation will be necessary to provide final data for drainage and foundation design.

Any topsoil excavated for the preparation of the site will be temporarily stockpiled close by. Quantities should be small, and this material will be re-used for site rehabilitation at the end of the project.

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[5] ÉTUDE GÉOTECHNIQUE PRÉLIMINAIRE - Projet du Lac Rocher; Laboratoires d'Expertises de Québec ltée, November 2007, 39 p.

## 18.2.5 Buildings and Services

A set of facilities to be used as dry, offices (owner and mining contractor) and garage will be grouped in an area located:

- Close to portal; this results in the dry being as close as possible to the portal. This also provides sufficient space for an adjacent parking and laydown area as well as for a fuel supply facility for vehicles, next to a maintenance shop;
- West of the gensets and associated fuel depot, so the facilities will be generally away from noise and wind-borne odours.

Since the Lac Rocher ore will be transported to a custom milling installation, no assay laboratory will be provided on site. Samples prepared within the owner's office facility will be sent to outside laboratories.

### 18.2.5.1 Offices and Dry

Office space for an 8-person owner's team will be provided by two rented trailer units of 3.7 x 18.3 m.

The selected mining contractor will supply its own office space and associated communications and computer systems.

The contractor will also supply its own dry facility to be located adjacent to his offices and shop units.

### 18.2.5.2 Shop/Warehouse

The mining contractor will supply, maintain and operate its own modular shop. It will be a Quonset style building erected adjacent to the dry facility.

The shop facility will include the required warehousing space for the mining contractor.

## 18.2.6 Services

### 18.2.6.1 Air Heating and Ventilation

The mine heating plant will be provided by the selected mining contractor. Capacity and details of installation remain to be finalised. The heating and ventilation plant would be constructed above or as close as possible to the headwall of the portal. The location shown on Figure 18.3 is for illustration purpose.

#### 18.2.6.2 Fuel Storage and Distribution

The genset installation and associated fuel depot is located on the Eastern side of property to take advantage of the following considerations:

- Downwind from most other activities;
- Close to the access road (incoming fuel);
- Remote from the mine ventilation intake.

Diesel storage tanks and associated piping and fuelling station will be supplied by the mining contractor. They will conform to applicable regulation for the storage of petroleum products.

#### 18.2.6.3 Compressed Air Supply

The compressor plant and associated distribution piping will be supplied by the mining contractor, and located as close as practicable to the ramp entrance. The location shown may be optimised, upon actual implementation, by the mining contractor. The compressors will be installed inside a dedicated building. Two 2,500 $m^3$/hr (1,500 cfm) units are likely to be required.

#### 18.2.6.4 Explosives Storage

Explosives and associated storage facilities could be contractor or supplier-supplied. Their locations in secure areas respecting applicable regulations will be determined during final engineering analysis.

#### 18.2.6.5 Electrical Power

Power will be produced by one or two diesel-fuelled gensets supplied as containerised packages by the mining contractor. Switching gear will also be containerised, providing for fast mobilisation and demobilisation, as well as not requiring significant rehabilitation work.

Typical power demand for mining and surface installations should be around 1,000 kW. An excess capacity of 50% - 60% may be expected. The generator will come with a step-up transformer and be capable of powering up the whole mine site including the surface infrastructure, ventilation plant, pumping system and jumbo drilling equipment.

#### 18.2.6.6 Water Services

Given the short duration of the mining project, drinking water will be supplied to workers as bottled water.

At least for the initial months of mine development, a standard well drilled from the surface will be used for water supply to the dry and shop. A precise location cannot be determined at this stage of planning, but would be in the immediate vicinity of the proposed dry location. Water for the dry (toilets and showers) will not be treated to drinking standards. Location of the well is to be assessed during design for Phase 1 activities.

Drilling water will be provided by one or two wells implemented by the mining contractor in the vicinity of the portal. It the longer term, water supply could be from a source located within the underground workings. The feasibility of obtaining water from the underground workings will have to be assessed during Phase 1 development, from a quantity and quality standpoint. An alternative for an underground supply is to make use of any significant water occurrence encountered during underground development. This is a fairly frequent occurrence, with veins or "water arteries" tapped to provide good quality water.

Information from Victory's geological team indicate that underground water is abundant in the deposit area, as there was enough of it in all exploration drill holes to permit diamond drilling without resorting to the usual external water supply. Therefore, the availability of underground water should not be an issue.

The water system for the dry would include, if necessary, a heat-traced buried line leading to a water reservoir and distribution system located next to the office/dry/garage facilities.

The small quantity of water required (approximately 8,000 L/d[6]) will not result in an issue with the phreatic decline in the vicinity of a well. There is no potential user close enough to be affected by this decline, and since water is very abundant in the area (lake, various watercourses and bogs), water replenishment may well be sufficient so that little phreatic decline to be actually observed.

#### 18.2.6.7 Telecommunications and Computer System

Satellite phones will provide communications for the site personnel. A network system with PC units will permit the owner's team to accomplish typical tasks related to accounting, reporting, planning and control of production.

The mining contractor will supply underground control and communications systems.

[6] 60 persons at 130 L/d each

## 18.2.7 Camp Accommodations

An existing camp accommodation, known as the Chensagi camp, is located approximately 38 km from the mine along the access road from Matagami. Victory Nickel Inc. has obtained a quotation form the camp operator (Modulabec Inc. from Senneterre) to accommodate personnel from Victory Nickel Inc. and the mining contractor.

Using this camp instead of building a new dedicated one would result in several advantages, from an economic as well as an environmental standpoint. The main benefits are:

- There is no need for tree cutting and earthwork, nor for the implementation of a water supply and septic installations;
- Immediate availability of an already permitted accommodation for the workers;
- No initial investment cost for this facility;
- Remoteness from the mining and transportation activities, resulting in a quieter resting environment for the workers;
- There is no need for rehabilitation work at the end of the project.

The downside in the use of the Chensagi camp is the time required to transport workers to and from the mine, with the impact as lost time and fuel consumption. Overall, the use of the Chensagi camp is deemed to be much more advantageous.

## 18.2.8 Rock Storage

### 18.2.8.1 Ore Storage

Core samples representative of sulphide ore were analysed for their total metal content, acid-generating potential and leaching potential.

Sulphides content are higher than the 0.3% threshold indicated in Directive (Guidelines) 019[7] for the definition of acid-generating, and the ratio between neutralisation potential and acidification potential is from 0.004 and 0.248. A ratio lower than 3 is not considered as environmentally safe. These samples should therefore be considered as acid-generating, since their acidifying potential exceeds their buffering capacity. Leaching tests also confirmed that the analysed ore samples are considered as leaching under Directive 019 terms.

[7] Directive 019 sur l'industrie minière; Ministère du Développement durable, de l'Environnement et des Parcs, Direction des politiques de l'eau, Service des eaux industrielles - Envirodoq : ENV/2005/0120

Favourable areas for storing waste rock and ore are available close to the ramp and upstream of the proposed control pond, presenting the following advantages:

- As close as possible to portal;
- Upstream of control pond with easy drainage towards the pond;
- Easy access from road;
- Fairly flat topography.

Two areas have been designed for the temporary storage of ore. They would provide the option of separating different types of ore upon hauling from the mine, and the subsequent transportation of each type to a milling facility. Both areas are roughly 80 m x 45 m, for a capacity of some 20,000 t each at a 2 m height.

During Phase 1 of the project, ore would be extracted at a low rate beginning in month 9, with most of it produced from months 10 to 14. Production rate of this ore will be at an average rate of 500 t/d during the mining period of advanced exploration phase (Phase 1). Mining during Phase 2, with the mine fully developed, would proceed at about 750 t/d.

Typical storage duration for ore will be less than one month, as it will be trucked to the processing plant when ore production has begun. Quick removal to the processing plant is especially important in cold weather, to prevent freezing within the pile, with attendant handling problems. Storage duration in cold weather should therefore be reduced as much as possible.

#### 18.2.8.2 Waste Rock Storage

Waste rock will mostly be produced during the implementation of the ramp. Five core samples collected by Victory Nickel Inc. as part of its drilling program within different types of rocks and zones were analyzed for their total metal content, their acid-generating potential and their leaching potential following the Directive 019. Three of the samples originate from the future ramp area, while the two other ones were collected within the mineralised envelope area.

The samples originating from the ramp area have a sulphide content lower than the 0.3% threshold indicated in the Directive 019's definition of acidifying tailings. The ratio between their neutralisation potential and their acidifying potential varies between 8.1 and 143. Based on Directive 019, a ratio higher than 3 is considered as environmentally safe. Therefore, samples from the ramp area are clearly not acid-generating.

The two samples originating from within the mineralised envelope showed sulphides levels higher than the 0.3% threshold with a ratio between their neutralisation potential and their acidifying

potential varying between 0.5 and 0.2. These samples should therefore be considered as acid-generating as their acidifying potential exceeds their buffering capacity.

Metal content analyses were performed on all five waste rock samples according to the *Soil Protection and Rehabilitation of Contaminated Sites Rehabilitation Policy*[8]. Results interpreted as per Directive 019 enable the classification of waste rock from the ramp area as a low-risk tailing, so waste rock from the future ramp area is considered as low-risk.

Waste rock samples originating from within the mineralised envelope showed metals concentrations clearly higher than applicable criteria for several compounds, and produced lixiviates with concentrations exceeding MDDEP's groundwater criteria. Therefore, with regards to nickel concentrations, according to Directive 019, waste rock from the mineralised envelope has to be considered as leachable.

Any waste rock from within the mineralised envelope would be acid-generating and would have to be treated with appropriate protection measures for storage and treatment of drainage. With the current mining plan, any material extracted from the mineralised envelope will very likely have a high enough nickel content to be considered as ore. Little or no acid-generating waste rock should therefore have to be managed. A stockpiling area with a capacity of 5,000 tonnes has been provided.

From months 1 to about 8, no acid-generating material will be produced. Potentially acid generating waste rock (PAGWR) will be produced towards the end the development period, which corresponds to about month 9 of Phase 1.

PAGWR and ore stockpiled during the colder season, from mid-October to April, will not generate acid drainage, since the cold temperature prevents any oxidation of the sulphide minerals, so no acid leaching may occur. Depending on the actual schedule of mining activities during Phase 1, minimal acid drainage may have to be treated at the exit of the collecting pond.

Two stockpiling areas are provided for waste rock. Both are to be used for temporary storage of waste rock, and would be rehabilitated at the end of mining.

The area for PAGWR is 30 m x 30 m, and would hold 5,000 tons at an accumulation height of about 2.8 m.

The area for Non Acid Generating Waste Rock (NAGWR) is 40 m x 40 m, and would hold some 9,000 t at the same height. This type of waste rock can be used as crushed stone for the preparation of the site, especially for the construction of the stockpile pads and site roads. It will also be needed

[8] Soil Protection and Contaminated Sites Rehabilitation Policy; Ministère du Développement durable, de l'Environnement et des Parcs

to backfill stopes in the underground workings when mining begins. It is probable that there will not be any NAGWR left at the end of Phase 1 of the project. Any remaining waste rock would be used as backfill when mining proceeds to Phase 2.

## 18.2.9 Waste Management

### 18.2.9.1 Sanitary Wastewater

Sewage from the dry and office facilities will be treated in a BNQ[9] certified treatment unit.

### 18.2.9.2 Residual Materials

All non-dangerous waste will be collected in a container and shipped to an authorised landfill periodically. All dangerous waste (mostly from equipment maintenance) will be shipped to an authorised disposal facility by the mining contractor. Victory Nickel will implement a strict Waste Management Plan to be enforced at Lac Rocher.

## 18.2.10 Site Water Management

A typical average consumption of service water for an underground mine of this size is estimated at about 115 L per ton of ore mined per day. This is equal to or less than 40 L per minute by the end of Phase 1, and about 80 L/min for the rest of the mining period. This service water would be used mostly for drilling, and, as needed, for dust control and washing.

Given the small size and depth of the orebody (less than 130 m deep), the amount of mine drainage is estimated at some 400 - 450 L/min (105 - 120 US gallons per minute) including drilling water if supplied from a surface source. Actual pumping capacity will be larger, since underground systems are typically designed to operate at this capacity a few times per hour (4 to 6 times per hour).

Underground drainage from the sump will be pumped to the surface control pond. Additional runoff to the pond, from the small upstream area used for stockpiling, will be variable, from none during cold or dry weather to variable quantities in wet periods. Given the small footprint of the stockpiling area, this additional water volume will be easily treated by the proposed facility.

The control pond will be located at the North-eastern corner of site to use the following favourable conditions:

- Use of topography to minimise dike volume;

[9] BNQ : Bureau de Normalisation du Québec

- Use of topography to collect drainage/runoff from upstream stockpiles;
- Close to an existing watercourse (± 300 m) running north for effluent reject, with effluent passing through a bog area before reaching the watercourse;
- ± 3,000 $m^2$ available, providing for a high potential capacity (retention time);
- Small watershed upstream of the basin, resulting in a low dilution of mine water by run-off.

The pond's capacity is about 2,300 $m^3$, which will provide a 3.5 to 4-day retention time for the settling of suspended solids.

The location of all stockpiling areas has been specifically selected to prevent any risk of acid drainage. Ore and PAGWR may generate acid drainage in warmer periods, but all drainage will be directed to the control pond by diversion ditches built around the two stockpiling area. The storage area is sloping to the East, towards the control pond, so no pumping installation will be necessary.

Diversion ditches will be built upstream and around the stockpile area, to intercept and divert runoff from the upstream area. This undisturbed water will be released to the environment, so inflow to the stockpile area and the control pond will be reduced.

The pads under the PAGWR and the ore will be engineered for impermeability. Local materials (tills and clay) will be characterised in detail during site preparation, to be used for the construction of these pads. If necessary, impermeable liners will be used to ensure that no leachate can permeate ground, but is rather collected and sent to the control pond.

A treatment facility will be used to control the quality of the pond's effluent to applicable criteria.

Some well water will be used in the shop facility for equipment washing. This water will be sent to a pit for the separation of suspended solids. Clarified water will be passed through an oil separator and then an activated carbon filter for the capture of hydrocarbons. Treated water will be released to surface drainage in the vicinity of the repair shop.

### 18.2.11 Mobile Equipment

It is assumed that the contractor selected for ore haulage to Chibougamau will provide a wheel-loader at the mine site for truck loading.

The mining contractor will bring in all its required mobile equipment to excavate ore and waste rock and haul it to the stockpiling area.

An allocation for the purchase of three pick-up trucks has been included to cover transportation needs for the owner's personnel.

## 18.3 Markets and Smelter

### 18.3.1 Markets

The Lac Rocher project is a short-term one. As defined within this PEA, development of the mine and mining would extend over about 24 – 26 months. First ore could be extracted about mid-2009, with mining proceeding until the fall of 2010.

Following ore processing and transportation of concentrate to a smelter, payments of metals would likely be made in 2010 and 2011.

Victory Nickel recommends that the cash flow analysis be conducted with prices of 8 $US/lb for nickel, 3 $US/lb for copper and 25 $US/lb for cobalt, for the duration of the project.

Table 18.5 presents a few past and forecast prices collected (Spring 2008) through a summary search conducted by Roche Ltd. This information is not intended as a verification or confirmation of prices, but only as a back-up for prices recommended by Victory Nickel for use in the cash flow analysis.

The data shows that prices for nickel have been higher than 12 $US/lb most of the time over the last two years, for an average value of about 13.75 $US/lb, while copper was also above 3 $US/lb most of the time, for an average value of 3.14 $US/lb over the last two years. Cobalt has been higher than 25 $US/lb since December 2006, for an average value of 21 $US/lb over 2006 and 2007, increasing to a current value of about 50 $US/lb.

A few forecasts for 2009 and 2010, found through the brief research, indicates declining short-term prices of about 10.90 - 12.60 $US/lb for nickel, and possibly 4 $US/lb or more for copper.

However, prices for nickel and copper began to decrease sharply in the second half of 2008, resulting in the lower value recommended by Victory Nickel for the financial analysis.

**Table 18.5 Recent and Forecast Prices for Nickel, Copper and Cobalt**

| | Nickel $ US/lb | | Copper $ US/lb | | Cobalt $ US/lb |
|---|---|---|---|---|---|
| 2005 price | $6,69 | | $1,67 | | $16,00 |
| 2006 price | $11,01 | | $3,05 | | $17,00 |
| 2007 price | $16,55 | | $3,23 | | $25,00 |
| Current (Apr. 1, 2008) | $13,08 | | $3,77 | | $52,25 |
| 1 year average | $16,55 | | $3,23 | | $25,00 |
| 2 year average | $13,78 | | $3,14 | | $21,00 |
| 3 year average | $11,40 | | $2,65 | | $19,30 |
| % of time > 12 $US/lb | | | | | |
| One year | 90% | | | | |
| Two years | 80% | | | | |
| % of time > 3 $US/lb | | | | | |
| One year | | | 95% | | 95% |
| Two years | | | 75% | | 75% |
| Forecast 2009 | $12,63 | (1) | $4,00 | (3) | $4,00 |
| Forecast 2010 | $10,91 | (2) | $4,50 | (4) | $4,50 |

Notes

(1) Average of forecasts by Merrill Lynch, Lehman Brothers, Dundee Securities and UBS Securities, as reported by: *http://www.estainlesssteel.com/zmetalsandstockcharts.shtml*

(2) Average of forecasts by Merrill Lynch, Dundee Securities and UBS Securities, as reported by: *http://www.estainlesssteel.com/zmetalsandstockcharts.shtml*

(3) UBS Securities forecast, March 27, 2008, as reported by Reuters on: *www.reuters.com/article/idCABNG20046720080327* "UBS raises copper price forecasts"

(4) UBS Securities, March 28, 2008,as reported by the Financial Post on: *http://www.financialpost.com/money/story.html?id=405742* Copper price to soar as surpluses turn to deficits"

## 18.3.2 Smelter

Victory Nickel had preliminary discussions with various nickel smelters. A final choice remains to be finalised upon negotiations when more project information and a final timeline have been developed.

The cash flow analysis in Section 18.6.8 has been conducted with smelting terms provided by Victory Nickel. The exact nature of the smelter's specifications and charges must remain confidential. For the sake of estimation, transportation of the mixed nickel-copper concentrate produced in Chibougamau has been assumed to be by train to the Sudbury area.

# 18.4 Environmental Considerations

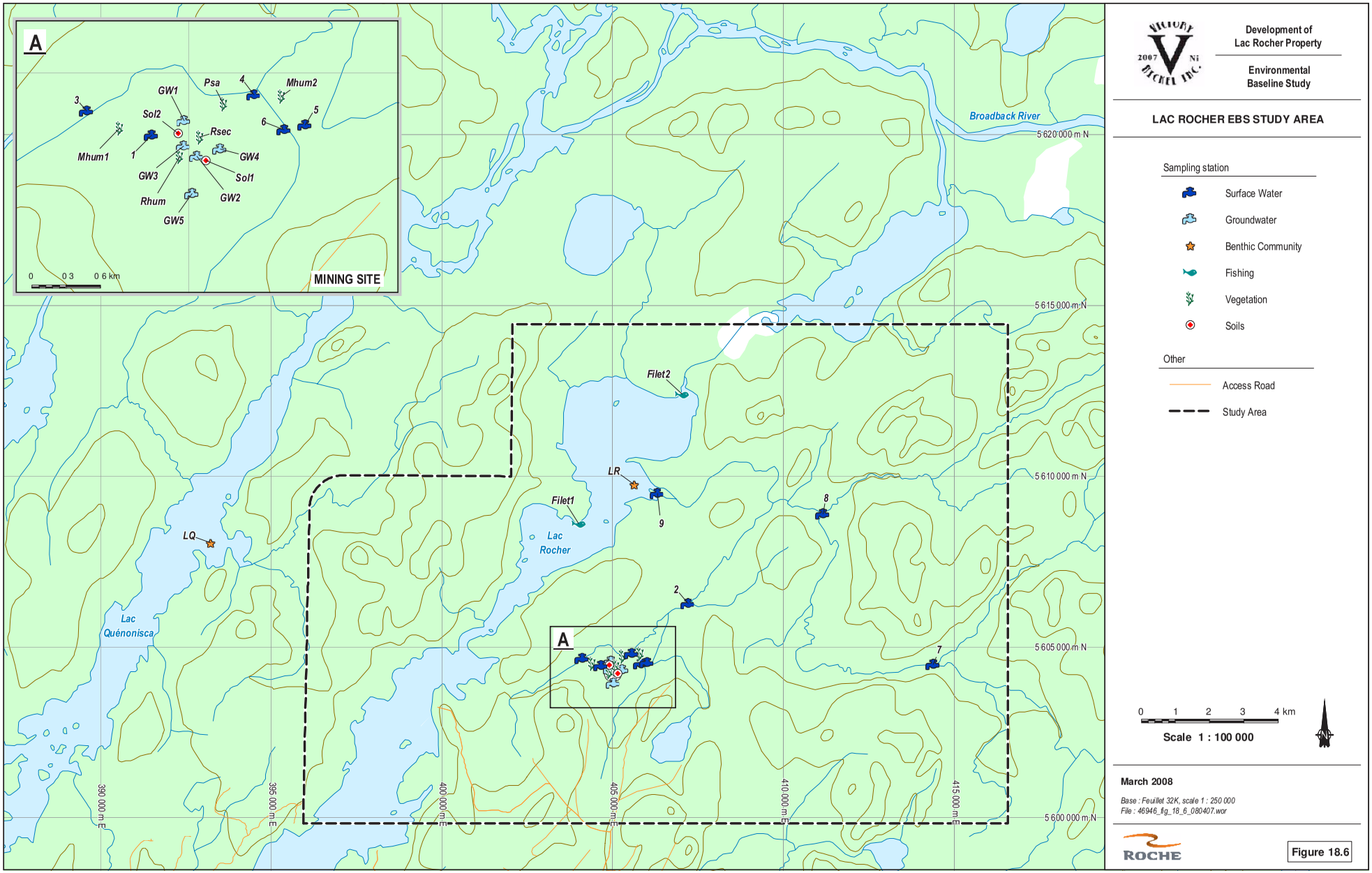
## 18.4.1 Baseline Study

An Environmental Baseline Study (EBS) of the Lac Rocher has been initiated in 2007. Its objective is to gather environmental data to be used to develop the Environmental and Social Impact Assessment (ESIA) on the basis of available information and field surveys. Sampling was conducted within a study area of about 260 $km^2$ in order to:

- Gather vegetation cover information to develop a map of the study area;
- Assess background soil, groundwater, surface water and sediment quality;
- Characterise fish and benthic invertebrates communities;
- Determine if any environmental issue is linked with the management of waste rock and ore.

Information was collected from multiple sources on physiography, climate, hydrology, vegetation and wildlife. Field surveys included the collection and analysis of surface water, sediments, soils and groundwater. Samples of fish and benthic communities were also obtained.

The study area is centered on the Lac Rocher nickel deposit, and extends for about 10 km to the North, 4 km to the South, 9 km to the West, and 11 km to the East. The area includes most of Lac Rocher, as well as all watercourses that could be affected by the project (Figure 18.6).


A
GW1
Psa
Mhum2
3
4
5
6
Sol2
Rsec
Mhum1
1
GW4
GW3
Sol1
Rhum
GW2
GW5
0 0 3 0 6 km
MINING SITE
Broadback River
5 620 000 m N
5 615 000 m N
5 610 000 m N
5 605 000 m N
5 600 000 m N
Filet2
LR
Filet1
9
8
LQ
Lac Rocher
Lac Quénonisca
2
7
A
390 000 m E
395 000 m E
400 000 m E
405 000 m E
410 000 m E
415 000 m E
Development of Lac Rocher Property
Environmental Baseline Study
LAC ROCHER EBS STUDY AREA
Sampling station
Surface Water
Groundwater
Benthic Community
Fishing
Vegetation
Soils
Other
Access Road
Study Area
0 1 2 3 4 km
Scale 1 : 100 000
March 2008
Base : Feuillet 32K, scale 1 : 250 000
File : 46946_fig_18_6_080407.wor
ROCHE
Figure 18.6

#### 18.4.1.1 Physical Aspects

The project area is located near the Lac Rocher, which ultimately flows, via the Nipukatasi River, into the Broadback River, in northern Québec. The area is located between latitudes 50° 33' N and 50° 40' N and longitudes 76° 23' W and 76° 00' W[10]. The Lac Rocher is the largest water body within the study area, but several smaller lakes and rivers are also present.

The project is located in the Canadian Shield physiographic unit, specifically on the Radissonie lowlands in the *Lac Poncheville* regional landscape unit. The Lac Rocher Property is located at an elevation of about 274 m above sea level, and the maximum relief at the Property is 45 m (Goettel 2006). The rocky substratum consists of granitic and gneissic rock (Goettel 2006).

The region is characterized by a continental sub-polar and sub-humid climate with a short plant-growing season (140 to 150 days).

Climate data (Environment Canada 2007) primarily used to characterize the study area was provided by the nearest weather station, Matagami A (49º 46' N and 77º 49' W), located 140 km to the SW of the mine Property. The mean annual temperature is -0.7°C. Mean monthly temperature varies from 23°C in July and -27°C in January.

Annual mean precipitation is about 900 mm, with 34% falling as snow. Snow falls from September to June, with heavier precipitations from October to April and a maximal snow cover in February.

The river system in the region consists of many long southwest to northeast lakes, such as Lac Rocher, which drains to the Nipukatasi River. This river, in turn, flows northward into Broadback River, which drains the entire region. Broadback River, located north of the Lac Rocher Property, flows from east to west over a total of at least 400 km before discharging into James Bay near Waskaganish.

The future mining site is drained by a number of small streams to the north, west and east. These streams also drain the peat bogs surrounding the site before merging into one stream flowing southwest to northeast and eventually draining into Lac Rocher. The watershed for the streams surrounding the deposit is estimated to be 51.5 km², and the Lac Rocher project site is at the head of the watershed.

The low topographic relief typically consists of low-lying hills (Robitaille and Saucier, 1998). According to the Regional Ecoforest Map, the sector is primarily covered with glacial deposits

[10] All coordinates in this document referred to NAD83 geodetic reference system

consisting of undifferentiated till (MRNF, 2005). However, the project area itself is characterized by the presence of poorly drained areas with organic material (>1 m thick).

Baseline levels of surface water, sediment, soil and groundwater were assessed from the various samples collected in the study area. Results indicate that surface waters are oligotrophic[11], a characteristic typical of waters in the northern Québec region. These waters:

- Are slightly acidic and have low alkalinity. Due to its softness and low alkalinity, surface water is aggressive and will tend to corrode metal;
- Are poorly mineralized;
- Have low concentrations of major ions and dissolved solids, as well as a low conductivity;
- Have no buffering capacity and are thus susceptible to significant fluctuations in pH;
- Have low metal concentrations (except for aluminum).

According to data gathered as part of the 2007 EBS, sediments presented a low metal content, exception made of chromium, which exceeded the Canadian sediment quality guidelines for the protection of aquatic life.

Soil samples collected as part of the soil quality program all show values corresponding to criteria A, so, based on Québec's *Soil Protection and Rehabilitation of Contaminated Sites Policy*'s recommendations, these soils could be used as fill material for residential, commercial or industrial land use, as long as their use does not increase site-specific contamination.

However, fluorene, a semi-volatile organic compound, slightly exceeded criteria A at two soil sampling stations located near old core shacks. The concentrations, however, are still being by far lower than criteria B, so they could be used for residential, commercial and industrial land uses.

Overall, groundwater generally presented a low metal content, with only manganese and nickel exceeding consumption criteria. For one sample, total sulphide concentration was two times higher than consumption criteria. This one groundwater sample was collected roughly above the center of the nickel deposit.

[11] Oligotrophic water is deficient in plant nutrient, but has abundant dissolved oxygen with no marked stratification (low nutrients inputs and low organic matter content).

#### 18.4.1.2 Biological Aspects

The Lac Rocher Property is located within the Spruce-Moss Forest bioclimatic domain. Being surrounded by low hills, the Property is located at the bottom of a small valley covered primarily by peat bog.

The planned mining site itself is not located in a peat bog, but is entirely surrounded by peat bog, with the exception of the southwest side which opens up onto non-boggy land leading to the lake. Indeed, the project zone is mostly characterised by the presence of poorly drained areas with organic (>1 m thick) cover. A large part of the area is covered by non-productive stands. Black spruce is by far the most abundant vascular species, especially in badly drained environments, where it creates black spruce moss stands.

Most of the plant species traditionally used by the James Bay Crees' are abundant in the Lac Rocher area. However, based on data provided by the *Centre des données sur le patrimoine naturel du Québec* (CDPNQ), there is no known occurrence of any special-status plant species within the study area.

An estimated 131 bird species are likely to occur in the Spruce-Moss Forest bioclimatic domain, including small forest birds, birds of prey, wildfowl and shorebirds. No threatened or vulnerable species or species likely to be designated as such have been reported by the CDPNQ in the study area. However, the boreal caribou ecotype, a "vulnerable" species as stated by the MDDEP, and an endangered species according to the COSEWIC, is likely to be present in the study area.

Moose, caribou, black bear and wolf are the largest of the mammals found in the project area. All, except wolf, have been sited near the exploration camp on a regular basis. No specific habitat was identified in the proposed mine area itself.

No plant or wildlife species of special interest were observed during the inventory conducted throughout the study area in 2007, exception made of the lake sturgeon which was captured thrice during the fishing campaign.

Lac Rocher constitutes a fish habitat for at least six species, namely northern pike, walleye, white sucker, lake whitefish, mooneye and goldeye. However, its tributaries draining the future mining site are not considered as fish habitats since there haven't been any fish caught in these streams during the fishing campaigns. Twenty-five percent of the fishes had mercury tissue concentrations that exceeded the Health Canada's acceptable level (0.5 mg/kg).

Benthic invertebrate communities were also described in two lakes, namely Lac Rocher and Lac Quenonisca located about 8 km west of Lac Rocher. A total of 23 families and one phylum were identified, with no unusual or threatened species observed.

#### 18.4.1.3 Human Environment

The project is located in a territory governed by the *James Bay and Northern Québec Agreement* (JBNQA). The project area falls entirely within Category II lands, which belong to the province, but where Native governments share management for hunting, fishing and trapping, tourism development and forestry. Native people have exclusive hunting, fishing and trapping rights on these lands. As it lies within Category II lands, any loss of area due to the Lac Rocher project will have to be financially compensated to the Native peoples.

The project is also located within the territory of the Municipality of Baie-James, which encompasses, among others, the town of Matagami.

An Archaeological Potential Study was conducted and revealed no areas of interest in the proposed mining sector.

The Waswanipi Cree community's W5D trap line includes the property, and is supervised by tallyman Malcolm Saganash. The trapline is located in the northernmost portion of the territory of Waswanipi and has a total surface of 51,782 ha. W5D is entirely located on Category II lands and has been occupied by the family for several generations. In order to provide Victory Nickel with baseline information on how the trapline is occupied by the main Cree land users, Dr. Catherine Lussier spent a number of days with the tallymen to obtain a preliminary description of main land use features for trapline W5D. This information will be used as a foundation to assess potential mitigation and compensation measures.

Victory Nickel Inc. met the tallymen (Messrs. Phillip Saganash and Malcolm Saganash) a number of times to present the Lac Rocher Project and gather their concerns with respect to the project. A Memorandum of Understanding has already been established between Victory Nickel Inc. and the Waswanipi Cree First Nation.

Victory Nickel Inc. is committed to negotiate an Impact and Benefit Agreement (IBA) with the Waswanipi Cree First Nation for the benefit of both parties. Among other things, the IBA will provide effective mechanisms to ensure that the Lac Rocher Project provides positive social or economic impacts for the Cree, and particularly the tallymen. Where negative environmental, social and economic impacts might be determined, they will be mitigated.

### 18.4.2 Environmental Scoping Study

The environmental issues associated with mine operations on the Lac Rocher property primarily entail:

- Management of waste rock and ore;

- Mine water management;
- Compliance with Environmental Discharge Objectives (EDO) to be established by the Department of Sustainable Development, Environment and Parks (MDDEP).

#### 18.4.2.1 Waste Rock and Ore Management

Determination of total metal content, acid-generating and leaching tests were conducted according to Guideline (Directive) 019[12].

The results of the total metal concentration tests were compared with criteria set forth in the *Soil protection and contaminated sites rehabilitation Policy*. Those tests define the maximum daily percolation rate with which the accumulation area will need to comply and indicate if leak-proofing measures are needed for storage areas.

Based on Guideline 019, tests results for waste rock from the ramp area indicate that it is environmentally-safe and could be used for various construction activities (dike, roads, earthworks, etc.). However, waste rock from the mineralised envelope and ore are both acid-generating and leachable, and will therefore need adequate protection measures for storage. Waste rock from the mineralised envelope is leachable for copper and nickel, while ore is leachable for copper, lead and nickel. In addition, leaching tests indicate that water percolating through waste rock from the mineralised envelope or through ore does not present environmentally-safe nickel concentrations.

It is estimated that ramp and portal excavation will generate some 70,000 t of waste rock. All of this waste rock will be produced by excavating the ramp down to the mineralised shell and will not be acid-generating. The development of the ventilation raise will produce an additional 4,600 t of non-acid-generating waste rock. In addition, secondary development from the ramp up to the mineralised envelope will generate about 88,000 t of non acid-generating waste rock, for a total of about 162,600 t. All of this development material is in gneissic rock, to the West of the deposit (Figure 7.2) and considered as sulphide-free.

This waste rock will be stockpiled on the surface in a separate pile and will be used for site preparation or as underground fill material. Any non acid-generating waste rock (NAGWR) remaining at the end of mining would be used during final site restoration work. Portal excavation will also generate an estimated 40,500 t (20,250 $m^3$) of overburden which can be used for site preparation.

Any waste rock from the mineralized envelope which would be considered as potentially acid-generating (PAGWR) would be stockpiled in a separate pile on an impervious pad to prevent

[12] Directive 019 sur l'industrie minière; Ministère du Développement durable, de l'Environnement et des Parcs, Direction des politiques de l'eau - Service des eaux industrielles; Envirodoq : ENV/2005/0120

rainwater from percolating through the waste rock down into the water table. Furthermore, this waste rock will be returned underground as rockfill as mining progresses.

Field investigation (borings and trenches) has shown that soils are made of a thin layer of organic material (0.25 m to 0.40 m) over a mixture of clays and silt. Field testing (*in situ* vane testing) has shown that the soils have the required properties to support the stockpiles as planned at this stage.

The location of all stockpiling areas has been specifically selected to prevent any risk of acid drainage. Ore and PAGWR may generate acid drainage in warmer periods, but all drainage will be directed to the control pond by diversion ditches built around the two stockpiling areas.

No ore processing will take place on site, as it will all be processed off site. The ore brought to the surface will be stored in a buffer pad near the ramp, until it is loaded into trucks for transportation to the processing site. The pads under the PAGWR and the ore stockpiling areas will be engineered for impermeability. Local materials (tills and clay) will be characterised in detail during site preparation, to be used for the construction of these pads. If necessary, impermeable liners will be used to ensure that no leachate can permeate ground, but is rather collected and sent to the control pond. Closure consideration for waste rock piles are detailed in Section 18.4.4.2.

#### 18.4.2.2 Mine Water Management

Guideline 019 prohibits the discharge of toxic effluent into the environment. The location of the waste rock and ore stockpiles has been planned so that any drainage is directed to a control pond where it can be controlled and treated if necessary. Diversion ditches will be built upstream and around the stockpile area, to intercept and divert runoff from the upstream area. This undisturbed water will be released to the environment, so inflow to the stockpile area and the control pond will be reduced.

A treatment system with a metering pump will be incorporated into the pumping system. In the event of a mine water quality problem, the appropriate product (sodium hydroxide, flocculent, iron sulphate) and its dosage can be quickly identified and applied. The bottom and walls of the basin will be sealed to prevent percolation losses. With all mine water and stockpile drainage passing through the control pond, there is no risk of acid mine drainage outside of the property.

Effluent from the mine water basin will be the final effluent. This final effluent will be monitored and related parameters established by MDDEP's Regional Directorate through an authorisation process in keeping with Guideline 019 and the characteristics of this mining project.

## 18.4.3 Permitting

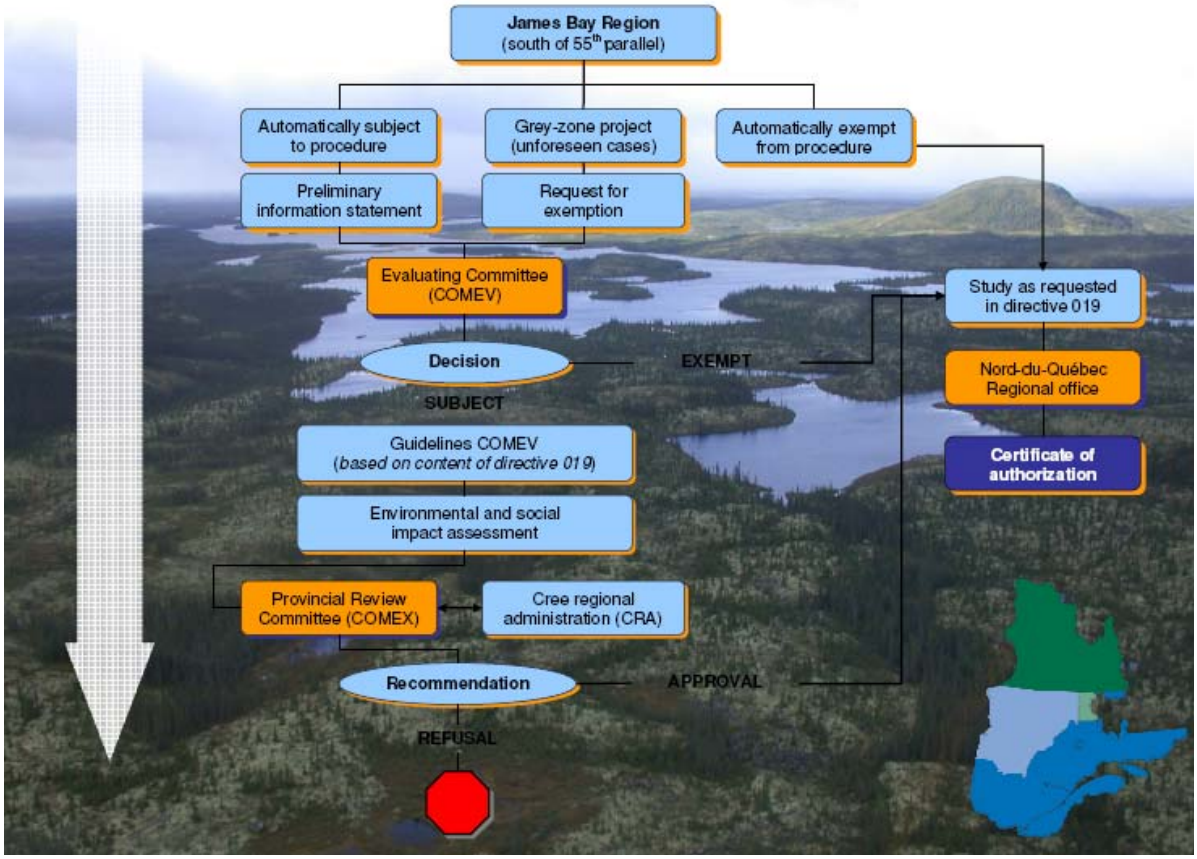
### 18.4.3.1 Provincial Government

***Project Authorization***

In accordance with the James Bay and Northern Québec Agreement, signed by the Native peoples of the northern regions, Chapter II of the Environmental Quality Act contains specific provisions applicable to projects in James Bay and Northern Québec.

Figure 18.7 outlines the various authorisation processes. Mining exploitation projects are automatically subject to the environmental and social impact assessment (ESIA) and review procedure. An exemption may be requested for exploration projects. An application for such an exemption has been filed by Victory Nickel Inc. for Phase 1 of the project (bulk sampling and advanced exploration). The exemption was granted to Victory Nickel by MDDEP in March 2008.

**Figure 18.7 Permitting Process - James Bay and Northern Quebec**



The first step in the ESIA process involves the proponent gathering preliminary information on the project. The proponent must submit a notice of intent to the government administrator along with this preliminary information. The information covers in particular the objectives, nature and scope of the project, in addition to identifying the various sites under consideration or the various possible development alternatives.

The administrator sends this preliminary information to an Evaluating Committee (COMEV) which is responsible for defining the nature and extent of the impact (ESIA) study. COMEV formulates guidelines outlining the extent of the impact study to be prepared by the proponent. The guidelines are submitted to the administrator who transmits them to the proponent.

The proponent prepares the impact study in accordance with the administrator's guidelines. The Regulation respecting the Environmental and Social Impact Assessment and Review Procedure, applicable to the Territory of James Bay and Northern Quebec (Q-2, r. 11), defines the elements to be incorporated into an impact study. Included among these are:

- A description of the project;
- A description of affected biophysical and social environments;
- An assessment of the project's probable repercussions;
- A description of project alternatives; and
- A description and assessment of remedial measures.

The proponent submits its ESIA to the Administrator who forwards the studies to a review committee (COMEX). Native administrations and the public can make representations to the committee, which may also hold public hearings or any other type of consultation.

COMEX recommends whether to reject or authorise the development project. In keeping with the recommendation by COMEX, the Administrator grants or refuses authorisation for the project.

***Regional Authorisations***

In addition to the Administrator's authorisation, regional authorisations are required from the Abitibi-Témiscamingue and Northern Quebec regional branches of the MDDEP under various provisions of Chapter 1 of the Environmental Quality Act.

The major sections of Chapter 1 of the Environmental Quality Act relevant to the application for certificates of authorisation or environmental authorisation for the Lac Rocher project are:

- Section 22 (general case) (e.g., mining installations and waste management);

- Section 32 (waterworks and domestic system); and
- Section 48 (atmospheric emissions).

#### 18.4.3.2 Federal Government

The object of and the various steps in the federal environmental assessment and review procedure are similar to the Québec procedure.

In most cases, Quebec's environmental review process is the only one that applies to projects within provincial boundaries. Federal government representatives are only involved in the environmental review of a project in a few cases.

The federal environmental review procedures are dealt with in the Act to Establish a Federal Environmental Assessment Process (1992, C. 37). The Fisheries Act is one judicial element that could trigger the federal procedure.

In the case of the Lac Rocher project, it very unlikely that water bodies would be directly affected by the mining activities. The federal environmental review procedures should therefore not apply.

In the case where some federal involvement would be required, the procedure would still be simplified by the fact that there is an agreement, signed in 2004 between the federal and provincial governments, regarding the simultaneous review of environmental impact studies for projects in the northern Quebec. This generally involves the use of the same impact assessment material, as filed with Provincial authorities.

### 18.4.4 Mine ESIA

The ESIA will include a surveillance program for the construction and the operation periods of Phase 2 of the project, as summarised in the next section. The ESIA must also include a preliminary restoration plan. This plan must be approved by the Ministry of Natural Resources, and its salient facts are presented in Section 18.4.4.2.

#### 18.4.4.1 Surveillance Program during Construction and Operation Phases

A surveillance program, including monitoring plans, will be developed. Its objective is to monitor environmental performance against objectives and regulatory requirements. The specific objectives are to monitor process emissions and effluents from industrial and mining activities and to monitor environmental conditions and compare them with baseline conditions. This will permit to identify trends or impacts that could be the results of natural events or project activities.

According to provincial (Guideline 019) and federal Metal Mining Effluent Regulation (MMER) requirements, the following aspects have to be monitored during both the construction and/or operation phases:

- Groundwater and surface water quality;
- Final effluent;
- Fish populations;
- Benthic invertebrate communities; and
- Sediment quality.

Quality assurance and quality control (QA/QL) measures will be implemented to ensure the accuracy and reliability of the monitoring programs data.

#### 18.4.4.2 Rehabilitation Activities

The Mining Act (L.R.Q., c. M-13.1) is another important piece of provincial legislation concerning the management of mining activities in the province of Quebec.

> *"The object of this Act is to promote prospecting, mineral exploration, development and operation of underground reservoirs, taking into account other possible uses of the land in the territory" (s.17).*

Section 232.1 of the Act states that:

> *"land rehabilitation and restoration work must be carried out, in accordance with the plan approved by the Minister. The obligation shall subsist until the work is completed or until a certificate is issued by the Minister under Section 232.10".*

The land rehabilitation and restoration work to be conducted must be planned and approved by MRNF (Department of Natural Resources and Wildlife - Section 232.2 of the Mining Act).

The rehabilitation and restoration plan should be elaborated in accordance with the provincial *Guidelines for Preparing a Mining Site Rehabilitation Plan*, and *General Mining Site Rehabilitation Requirements* (MRNF and MDDEP, 1997). The Guideline indicate how a rehabilitation plan is to be presented, its technical contents and the general mining site rehabilitation requirements involved.

According to Section 111 of the *Regulation Respecting Mineral Substances Other than Petroleum, Natural Gas and Brine*, a guarantee amounting to 70% of the expected costs of rehabilitation work on accumulation areas is to be deposited. Its form and the schedule of payment may vary, for example as a function of the expected duration of the project. In the case of the Lac Rocher project,

the accumulation areas to be covered by the financial guarantee are the control pond, the waste rock and ore stockpiling areas.

The focus of the rehabilitation work will be to restore the site to a satisfactory condition by:

- Eliminating unacceptable health hazards and ensuring public safety;
- Limiting the production and circulation of substances that could negatively impact the environment, and, in the long term, trying to eliminate maintenance and monitoring;
- Restoring the site to a condition in which it is visually acceptable to the community; and
- Reclaiming the areas where infrastructures are located (excluding accumulation areas) for future use.

According to the *Guidelines for Preparing a Mining Site Rehabilitation Plan* and *General Mining Site Rehabilitation Requirements* (Rehabilitation Guide), all areas affected by mining activities (building sites, tailings pond, waste rock piles, etc.) must be re-vegetated to control erosion and restore the site to its natural condition.

In the case of the Lac Rocher project, no acid-generating ore or waste rock will remain on the site after the cessation of operations. The ore will have been trucked off site for processing and the waste rock with acid generating potential will be returned underground during the mining phase. The areas used to stockpile these materials will be covered with overburden, and re-vegetated. The control basin will be emptied, and its surface filled by spreading the dyke material prior to re-seeding.

Any non-acid-generating waste rock would be used in the rehabilitation process. Any remaining waste rock piles would be covered with overburden and re-vegetated, but it is very probable that all waste rock will be required for placement as rockfill in empty stopes before the end of the mining period.

As a preliminary estimation, rehabilitation cost for the stockpiling areas and the control basin is estimated at 8,750 $, for a 0.875 ha area. The closure costs for the remainder of the site have been assumed to be 6,450 $ for a 1.29 ha area, for a total cost of 15,200 $. This small cost is related to the very small footprint of the Lac Rocher Project.

The exploration program (Phase 1) constitutes a unique opportunity to assess, under real conditions the environmental risks associated with ore and waste rock management. The results of this testing will provide a better indication of the risks associated with managing these materials during Phase 2 of the project.

## 18.5 Taxes and Royalties

The financial analysis in Section 18.6.8 has been conducted on a pre-tax, 100% equity basis. All costs used in the economic analysis are also before any applicable tax.

As specified in Section 4, Victory has signed an Option Agreement applicable to the 20 original claims, which contain the resource to be mined. The agreement involves a 0.50 $/t royalty payable for all ore mined and milled for the life of any exploitation of the Lac Rocher deposit.

## 18.6 Economic Analysis

### 18.6.1 Introduction

This section summarises the estimated costs of all expenses which are regrouped in four separate categories in the cash flow analysis of Section 18.6.8:

- Expenses directly incurred by the owners;
- All charges eventually billed by a mining contractor;
- Charges for ore transportation to the processing plant; and
- Costs for ore handling and ore treatment at the processing plant site.

No allowance has been included for future agreements with First Nations. However, Victory Nickel has signed a Memorandum of Understanding (MOU) with the Waswanipi Cree First Nation for the mutual benefit of both parties.

### 18.6.2 Base Case Scenario

The base case scenario is for mining a total of 317,730 tonnes of ore (diluted) in two phases:

- An initial phase of 65,000 t at 1.75% Ni, 0.57% Cu and 0.062% Co, followed by;
- A second phase of 252,730 t at 1.52% Ni, 0.59% Cu and 0.051% Co;
- For a total project of 317,730 t at 1.57% Ni, 0.58% Cu and 0.053% Co.

All ore is transported to the Copper Rand processing plant of Campbell Resources, in Chibougamau.

### 18.6.3 Bid Prices for Development and Mining

Request for proposal were sent to four mining contractors. They were asked provide bids for the development and the operation the mine under the supervision of Victory Nickel. Unit costs used in

the cash flow analysis are extracted from their quotations. In general, unit costs provided by bidders for ramping, secondary development, raising and mining were within similar ranges.

Portal development costs were estimated on the basis of quantities and unit prices from the bidders. Table 18.6 presents the estimated cost, for a total of 518,587 $. Overburden and rock quantities were estimated by Geostat with a 4:1 slope assumption.

**Table 18.6 Ramp Portal Cost Estimation**

| Description | Unit | Quantity | Unit price | Cost |
|---|---|---|---|---|
| Overburden Removal - 7 m thick | $m^3$ | 20,240 | 19.97$ | 404,193$ |
| Portal Excavation - Rock | $m^3$ | 1,200 | 15.82$ | 18,984$ |
| Portal Ground Support (Shotcrete) | $m^2$ | 500 | 190.82$ | 95,410$ |
| **Total** | | | | **$518,587** |

Mining cost, including backfilling and room & board provided by a mining contractor, has been established at 57 $/t. This cost includes production of the electrical energy for all contractor-related activities, mine ventilation and air heating, mechanical shop and warehouse facility, fuel supply, explosives supply and storage, shop & dry complex, etc.

### 18.6.4 Economic Impact of Dilution

In order to fully evaluate the benefit of the cemented rockfill, its cost has been compared to the cost of mining diluted ore. The analysis considered various dilution levels, and the associated additional costs of mining, transportation to the ore processing plant, and milling. Since there is no drilling and blasting cost associated with the dilution material, the mining cost used in the analysis was reduced to 50 $/t. The dilution material was considered as barren.

Table 18.7 presents two options that were analysed:

- Option 1 is for primary stopes 6 m wide with 4 m wide secondary stopes;
- Option 2 is for primary stopes 4 m wide with 6 m wide secondary stopes.

Both alternatives consider that only the top 0.5 m of each 6 m vertical lift in secondary stopes is cemented. The cost of using 3% to 5% cement has been calculated.

It was estimated that without cement in the rockfill, the overall dilution would be around 7%, incurring an extra mining cost 2,381,000 $. With the addition of 4% cement in the fill, at a cost of 874,600 $, we assume a reduction of overall dilution to 2%. This reduced dilution represents an extra mining cost of 680,200 $.

**Table 18.7 Comparative Analysis of Cemented Rockfill Alternatives**

| Description | Volume | Backfill (2 t/m$^3$) | 3% Cement | 4% Cement | 5% Cement |
|---|---|---|---|---|---|
| **Option-1** | **(m$^3$)** | (t) | (t) | (t) | (t) |
| Primary stopes – 100% cemented | 60,000 | 120,000 | 3,600 | 4,800 | 6,000 |
| Secondary stopes – 10% cemented | 4,000 | 8,000 | 240 | 320 | 400 |
| Total | 64,000 | 128,000 | 3,840 | 5,120 | 6,400 |
| Cement cost: $/t | | | $220 | $220 | $220 |
| Total cement cost | | | $844,800 | $1,126,400 | $1,408,000 |
| Silo, transport and set-up - lump sum | | | $65,000 | $65,000 | $65,000 |
| **Total cost – Option 1** | | | **$909,800** | **$1,191,400** | **$1,473,000** |
| | | | | | |
| **Option-2** | (m$^3$) | (t) | (t) | (t) | (t) |
| Primary stopes – 100% cemented | 40,000 | 80,000 | 2,400 | 3,200 | 4,000 |
| Secondary stopes – 10% cemented | 6,000 | 12,000 | 360 | 480 | 600 |
| Total | 46,000 | 92,000 | 2,760 | 3,680 | 4,600 |
| Cement cost: $/t | | | $220 | $220 | $220 |
| Total cement cost | | | $607,200 | $809,600 | $1,012,000 |
| Silo, transport and set-up - lump sum | | | $65,000 | $65,000 | $65,000 |
| **Total cost – Option 2** | | | **$672,200** | **$874,600** | **$1,077,000** |

The final result is summarised in Table 18.8, which indicates a potential saving of some 825,000 $ with the use of cemented rockfill.

**Table 18.8 Potential Saving with Cemented Rockfill**

| Description | Amount in $ |
|---|---|
| Extra cost of mining without cement at 7% dilution | 2,381,000 $ |
| Less: purchase and placing of cement in the backfill | 874,600 $ |
| Less: mining the reduced amount of dilution | 680,200 $ |
| **Potential saving with cemented rockfill** | **825,200 $** |

Our recommendation is to assume that cement should be used both for both economy and safety reasons when mining.

### 18.6.5 General Administration

Adequate supervision and monitoring of the work program will be ensured by a project team of 12 persons directly working for the owner. The group will also take charge of the surface installations. Safety and security on site will also be the responsibilities of the project team.

A monthly budget cost of 147,470 $ will be allocated for this activity. This amount includes salaries, fringe benefits, all on site office expenses, transportation plus room and board.

Table 18.9 presents the details for salaries and general expenses.

**Table 18.9 General Mine Administration Costs**

| Description | Quantity | Monthly Salary | Total |
|---|---|---|---|
| **Mine Management** | | | |
| Mine manager | 1 | $12 000 | $12 000 |
| Accounting clerk | 1 | $5 000 | $5 000 |
| Safety and personnel | 1 | $7 000 | $7 000 |
| **Sub-total** | **3** | | **$24 000** |
| **Engineering** | | | |
| Mine engineer | 1 | $9 000 | $9 000 |
| Mine surveyor and technician | 2 | $5 000 | $10 000 |
| Mine geologist | 1 | $7 000 | $7 000 |
| **Sub-total** | **4** | | **$26 000** |
| **Surface Services** | | | |
| Loader & truck operator | **1** | $4 500 | **$4 500** |
| **Mining** | | | |
| Mechanics/Electrician | 1 | $8 000 | $8 000 |
| Substitutes | 3 | $6 000 | $18 000 |
| **Sub-total** | **4** | | **$26 000** |
| **Total - Personnel** | **12** | | **$80 500** |
| Fringe Benefits (34 %) | | | $27 370 |
| **Total Salaries** | | | **$107 870** |
| **General Expenses** | | | |
| Energy | | $5 000 | $5 000 |
| Insurance - QMA * - Mine rescue | | $2 000 | $2 000 |
| Communications & Office material | | $2 000 | $2 000 |
| Room & Board | **12** | $2 550 | $30 600 |
| | | | **$39 600** |
| | | **Monthly total** | **$147 470** |

* QMA: Quebec Mining Association

### 18.6.6 Ore Transportation

The Lac Rocher property is relatively remote, and without a concentrator on site, ore transportation to the nearest practical concentrator becomes an important issue. A survey of the concentrators currently in operation, and being able to process this type of nickel/copper ore, was conducted. As a result, only the Campbell's mill would be available. The mill is located in Chibougamau and the (one way) trucking distance is 325 km (Section 18.2.3.6).

The estimated cost for ore transportation is 35 $/t, based on the shortest haulage distance. However, this option requires upgrading or building a few kilometres of new forestry type roads and maintaining existing ones. The alternative would be to drive on Provincial roads, through the towns of Matagami and Lebel-sur-Quevillon, for a total distance of 540 km. In this later option the cost would increase to 55 $/t of ore.

### 18.6.7 NSR Values

The revenues are expressed under the conventional NSR term. Revenues were calculated on the basis of smelting terms provided by Victory Nickel. The terms are for a mixed nickel-copper concentrate, and should remain confidential at the request of the issuer.

NSR calculations were based on the following parameters:

- Concentrate grading 10.5% Ni, 3.9% Cu and 0.033% Co;
- Nickel recovery of 81%;
- Copper recovery of 91%;
- Cobalt recovery of 95%;
- Nickel price: 8 $US/lb;
- Copper price: 3 $US/lb;
- Cobalt price: 25 $ US/lb;
- An exchange rate of 1.00 $CDN : 0.95 $US;
- Transportation of the concentrate by train from Chibougamau to the Sudbury area, at a cost of 60 $ per tonne.

Table 18.10 presents the range of NSR values for each phase and the total project.

**Table 18.10 Range of NSR Values**

| Nickel price ($US/lb) | Copper price ($US/lb) | Cobalt price ($US/lb) | Phase 1 NSR ($CDN/t) | Phase 2 NSR ($CDN/t) | Total NSR ($CDN/t) | Total NSR (Distribution) |
|---|---|---|---|---|---|---|
| $8,00 | $2,00 | $25,00 | $169,84 | $147,52 | $152,37 | |
| **$8,00** | **$3,00** | **$25,00** | **$178,27** | **$154,84** | **$159,94** | **Base case** |
| $8,00 | $4,00 | $25,00 | $186,71 | $162,17 | $167,50 | |
| $9,00 | $2,00 | $25,00 | $193,35 | $167,94 | $173,46 | |
| $9,00 | $3,00 | $25,00 | $201,79 | $175,27 | $181,03 | |
| $9,00 | $4,00 | $25,00 | $210,22 | $182,59 | $188,60 | |
| $10,00 | $2,00 | $25,00 | $216,86 | $188,36 | $194,56 | |
| $10,00 | $3,00 | $25,00 | $225,30 | $195,69 | ***$202,12*** | ***Break even*** |
| $10,00 | $4,00 | $25,00 | $233,73 | $203,01 | $209,69 | |
| $11,00 | $2,00 | $25,00 | $240,38 | $208,78 | $215,65 | |
| $11,00 | $3,00 | $25,00 | $248,81 | $216,11 | $223,22 | |
| $11,00 | $4,00 | $25,00 | $257,25 | $223,44 | $230,79 | |
| $12,00 | $2,00 | $25,00 | $263,89 | $229,21 | $236,75 | |
| $12,00 | $3,00 | $25,00 | $272,32 | $236,53 | $244,31 | |
| $12,00 | $4,00 | $25,00 | $280,76 | $243,86 | $251,88 | |
| $13,00 | $2,00 | $25,00 | $287,40 | $249,63 | $257,84 | |
| $13,00 | $3,00 | $25,00 | $295,74 | $256,95 | $265,41 | |
| $13,00 | $4,00 | $25,00 | $304,27 | $264,28 | $272,98 | |

| **Base case breakdown** | | | | | **Base case** |
|---|---|---|---|---|---|
| **Nickel contribution** | **$145,98** | **$126,79** | **$130,97** | **81,9%** | |
| **Copper contribution** | **$21,79** | **$18,93** | **$19,55** | **12,2%** | |
| **Cobalt contribution** | **$10,50** | **$9,12** | **$9,42** | **5,9%** | |
| | **$178,27** | **$154,84** | **$159,94** | **100,0%** | |

**Note: break-even, at Cu $3 and Co $25, is for a nickel price of US $10**
**Base case is for:**

| | t | % Ni | % Cu | % Co | |
|---|---|---|---|---|---|
| Phase 1 | 65 000 | 1,75 | 0,57 | 0,062 | |
| Phase 2 | 252 730 | 1,52 | 0,59 | 0,051 | |
| | 317 730 | 1,57 | 0,58 | 0,053 | |
| | | **Ni** | **Cu** | **Co** | |
| | $US/lb | **8,00 $** | **3,00 $** | **25,00 $** | |
| | | | Exchange rate | **0,95** | **$CDN/$US** |

The base case scenario is considered to be a price of 8.00 $US per pound of nickel, 3.00 $US per pound of copper and 25.00 $US per pound of cobalt. Its NSR value for the whole project (Phases 1 and 2) is 159.94 $, with nickel contributing 82% of revenues (130.97 $) and copper 12% of revenues (19.55 $). Revenues from the Inferred resource of cobalt represent about 6% of total revenues, at 9.42$/t.

### 18.6.8 Summary of Cash Flows and Sensitivity

A pre-tax, 100% equity based, model has been developed for the Lac Rocher project. All costs are in 2008 Canadian dollars, with no allowance for inflation or escalation. The following tables and graphs are showing the results for each phase and the cumulative results from the two phases of mining.

**Phase 1**

With preparation, development and production costs of 27.2 M$ plus royalties, and estimated revenues of about 11.6 M$, Phase 1 would end up with a negative pre-tax cash flow of around -15.7 M$, for a NPV of minus 241 $/t, or – 7.71 $ per pound of nickel (Table 18.11).

Estimated costs, for the 9-month Pre-production period, are 18.1 M$, spent for site preparation and mine development. Production costs for the 65,000 t bulk sample are estimated at 9.1 M$. Total Phase 1 costs, at 27.2 M$, represent 13.40 $ per pound of nickel produced during this advanced exploration phase.

The main costs components during Phase 1 of advanced exploration, including royalties, are summarized in Table 18.12. The cost per pound of nickel is per pound of metal recoverable from the 65,000 tonnes extracted as a bulk sample.

## Table 18.11 Cash Flow Analysis – Phase 1

**65,000 tonnes at 1.75% Ni, 0.57% Cu and 0,062% Co.**
**From elevation 131 m to 162 m**

| Description | Qty | Units | Unit Cost | Total cost | Unit Cost $/t of ore | Unit Cost $/lb Ni ** | Pre-production 9 months | Production 5 months |
|---|---|---|---|---|---|---|---|---|
| **EXPENSES** | | | | | (65 000) | (2 031 263) | | |
| **Owner's Costs** | | | | | | | | |
| Access Roads | | Estimate | | $694 000 | $10.68 | $0.34 | $694 000 | $0 |
| Site Preparation | | Estimate | | $1 200 000 | $18.46 | $0.59 | $1 200 000 | $0 |
| Road Maintenance | | Estimate | | $849 475 | $13.07 | $0.42 | $677 600 | $171 875 |
| Personnel Salaries and Benefits | 14 | Month | $107 870 | $1 510 180 | $23.23 | $0.74 | $970 830 | $539 350 |
| Room & Board & General Expenses | 14 | Month | $39 600 | $554 400 | $8.53 | $0.27 | $356 400 | $198 000 |
| Ore Definition (D. Drilling) | 65 000 | Tonne | $1.00 | $65 000 | $1.00 | $0.03 | $0 | $65 000 |
| Rockfill Purchase, Crushing and Screening | 0 | Tonne | $7.50 | $0 | $0.00 | $0.00 | $0 | $0 |
| Cement Purchase | 920 | Tonne | $290.65 | $267 400 | $4.11 | $0.13 | $0 | $267 400 |
| Waste Crushing and Sreening | 35 000 | Tonne | $2.50 | $87 500 | $1.35 | $0.04 | $0 | $87 500 |
| Permitting and Studies * | | Lump sum | | $650 000 | $10.00 | $0.32 | $650 000 | $0 |
| 3 Pick-up (Purchase) | 3 | Units | $45 000 | $135 000 | $2.08 | $0.07 | $135 000 | $0 |
| 3 Pick-up (fuel+ maintenance) | 14 | Month | $700 | $29 400 | $0.45 | $0.01 | $18 900 | $10 500 |
| Concentrator modifications | | Lump sum | | $864 000 | $13.29 | $0.43 | $864 000 | $0 |
| Sub-total | | | | $6 906 355 | $106.25 | $3.40 | $5 566 730 | $1 339 625 |
| Contingencies | | 5% | | $345 318 | $5.31 | $0.17 | $278 337 | $66 981 |
| **Sub Total-1** | | | | **$7 251 673** | **$111.56** | **$3.57** | **$5 845 067** | **$1 406 606** |
| **Mining Contractor** | | | | | | | | |
| Mobilization | | Lump sum | | $275 000 | $4.23 | $0.14 | $275 000 | $0 |
| Ramp Portal | | Lump sum | | $518 587 | $7.98 | $0.26 | $518 587 | $0 |
| Ramp Excavation - 5m x 4m | 1 100 | Meter | $5 000 | $5 500 000 | $84.62 | $2.71 | $5 500 000 | $0 |
| Ventilation Raise & Manway - 3m x 3m | 165 | Meter | $4 500 | $742 500 | $11.42 | $0.37 | $742 500 | $0 |
| Waste Development - 5m x 4m | 1 000 | Meter | $4 100 | $4 100 000 | $63.08 | $2.02 | $4 100 000 | $0 |
| Contingencies on Development | | 10% | | $1 113 609 | $17.13 | $0.55 | $1 113 609 | $0 |
| Production Mining (includes backfilling) | 65 000 | Tonne | $57 | $3 705 000 | $57.00 | $1.82 | $0 | $3 705 000 |
| Demobilization | | Lump sum | | | $0.00 | $0.00 | $0 | $0 |
| **Sub Total-2** | | | | **$15 954 696** | **$245.46** | **$7.85** | **$12 249 696** | **$3 705 000** |
| **Transportation to Concentrator** | | | | | | | | |
| Ore Crushing & Truck Loading | 65 000 | Tonne | $2.50 | $162 500 | $2.50 | $0.08 | $0 | $162 500 |
| Ore Transportation to Concentrator | 65 000 | Tonne | $35.00 | $2 275 000 | $35.00 | $1.12 | $0 | $2 275 000 |
| **Sub Total-3** | | | | **$2 437 500** | **$37.50** | **$1.20** | **$0** | **$2 437 500** |
| **Ore Processing** | | | | | | | | |
| Site Handling | 65 000 | Tonne | $2.00 | $130 000 | $2.00 | $0.06 | $0 | $130 000 |
| Concentrator Charges | 65 000 | Tonne | $22.18 | $1 441 700 | $22.18 | $0.71 | $0 | $1 441 700 |
| **Sub Total-4** | | | | **$1 571 700** | **$24.18** | **$0.77** | **$0** | **$1 571 700** |
| **TOTAL Production Cost** | 65 000 | Tonne | | **$27 215 568** | **$418.70** | **$13.40** | **$18 094 762** | **$9 120 806** |
| **REVENUES** | | | | | | | | |
| **TOTAL NSR - Ni US$8 & Cu US$3 & Co $25** | 65 000 | Tonne | | **$11 587 550** | **$178.27** | **$5.70** | **$0** | **$11 587 550** |
| **Royalties** | 65 000 | Tonne | $0.50 | **$32 500** | **$0.50** | **$0.02** | **$0** | **$32 500** |
| **NPV (Net Present Value)** | 65 000 | Tonne | | **-$15 660 518** | **-$240.93** | **-$7.71** | **-$18 094 762** | **$2 434 244** |

*** Studies for rock support - backfill study - water control**
**** Cost per pound of recoverable nickel**

## Table 18.12 Phase 1 Costs Distribution

| | Total cost | Distribution | $/t ore | $/lb Ni |
|---|---|---|---|---|
| Ramp & Portal | $6,018,587 | 22.1% | $92.59 | $2.96 |
| Waste Development | $4,100,000 | 15.0% | $63.08 | $2.02 |
| Production Mining | $3,705,000 | 13.6% | $57.00 | $1.82 |
| Ore Transportation | $2,275,000 | 8.3% | $35.00 | $1.12 |
| Concentrator Charges | $1,571,700 | 5.8% | $24.18 | $0.77 |
| Other costs | $9,577,781 | 35.2% | $147.35 | $4.72 |
| | $27,248,068 | 100% | $419.20 | $13.41 |

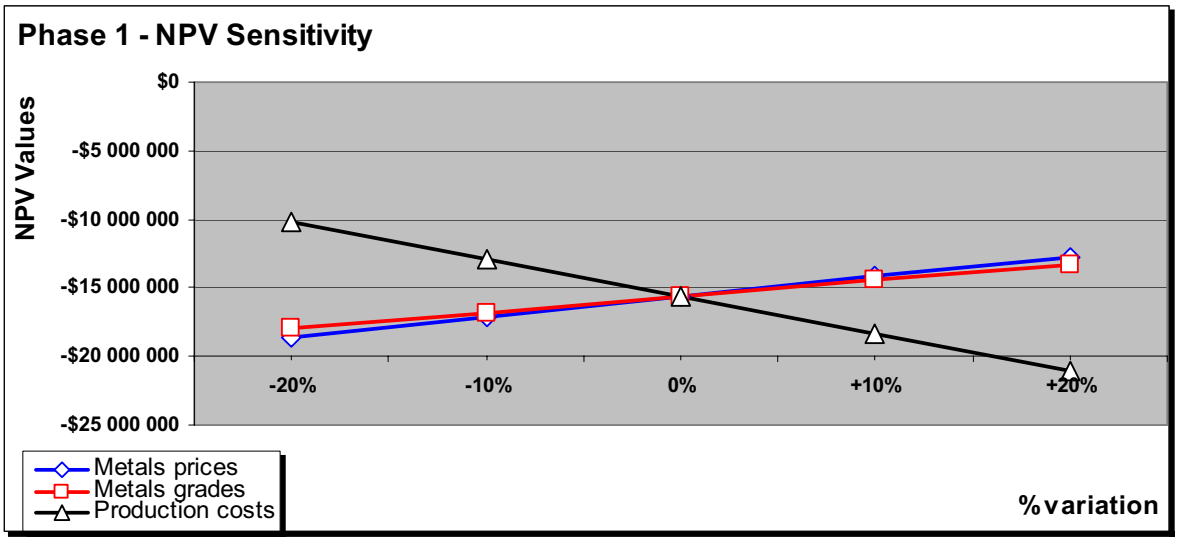
A sensitivity analysis was prepared for a variation of plus and minus 20% of the metal prices, metal grades and all operating costs. Phase 1 net present values (NPV) in relation to those parameters are presented in Table 18.13 and Figure 18.8.

**Table 18.13 Phase 1 Sensitivity Data (NPV Values)**

| NPV Values - Phase 1 | | | |
|---|---|---|---|
| **Variation** | **Metals prices** | **Metals grades** | **Production costs *** |
| -20% | -$18 586 168 | -$17 977 768 | -$10 217 404 |
| -10% | -$17 123 018 | -$16 785 668 | -$12 938 961 |
| **0%** | **-$15 660 518** | **-$15 660 518** | **-$15 660 518** |
| +10% | -$14 197 368 | -$14 468 418 | -$18 382 075 |
| +20% | -$12 734 218 | -$13 342 618 | -$21 103 632 |

* Excluding royalties

**Figure 18.8 Phase 1 Sensitivity Analysis (NPV Values)**




## Phase 2

Phase 2 does not involve development costs, except for some development in waste to access new ore zones. Mining and processing of 252,730 tonnes, over some 11 months, will cost an estimated 37.3 M$ (148 $per tonne of ore, or 5.44 $ per pound of recoverable nickel - Table 18.14). The main costs components during Phase 2 of mining, including royalties, are summarized in Table 18.15.

Phase 2 NPV is slightly positive, at an estimated plus 1.7 M$ (6.71 $ per tonne of ore, or 0.25 $ per pound of recoverable nickel).

## Table 18.14 Cash Flow Analysis – Phase 2

**252,730 tonnes at 1.52% Ni, 0.59% Cu and 0,051% Co.**
**From elevation 131 m to 185 m**

| Description | Qty | Units | Unit Cost | Total cost | Unit Cost $/t of ore | Unit Cost $/lb Ni ** | Production 11 months | Closure 1 month |
|---|---|---|---|---|---|---|---|---|
| **EXPENSES** | | | | | (252 730) | (6 859 859) | | |
| **Owner's Costs** | | | | | | | | |
| Access Roads | | Estimate | | | $0.00 | $0.00 | $0 | $0 |
| Site Preparation | | Estimate | | | $0.00 | $0.00 | $0 | $0 |
| Road Maintenance | | Estimate | | $1 299 925 | $5.14 | $0.19 | $1 238 325 | $61 600 |
| Personnel Salaries and Benefits | 12 | Month | $107 870 | $1 294 440 | $5.12 | $0.19 | $1 186 570 | $107 870 |
| Room & Board & General Expenses | 12 | Month | $39 600 | $475 200 | $1.88 | $0.07 | $435 600 | $39 600 |
| Ore Definition (D. Drilling) | 252 730 | Tonnes | $1.00 | $252 730 | $1.00 | $0.04 | $252 730 | $0 |
| Rockfill Purchase, Crushing and Screening | 92 000 | Tonnes | $7.50 | $690 000 | $2.73 | $0.10 | $690 000 | $0 |
| Cement Purchase | 2 760 | Tonnes | $220.00 | $607 200 | $2.40 | $0.09 | $607 200 | $0 |
| Waste Crushing and Sreening | 80 000 | Tonnes | $2.50 | $200 000 | $0.79 | $0.03 | $200 000 | $0 |
| Permitting and Studies * | | Lump sum | | | $0.00 | $0.00 | $0 | $0 |
| 3 Pick-up (Purchase) | | Units | $45 000 | $0 | $0.00 | $0.00 | $0 | $0 |
| 3 Pick-up (fuel+ maintenance) | 12 | Month | $700 | $25 200 | $0.10 | $0.00 | $23 100 | $2 100 |
| Concentrator modifications | | Lump sum | | | $0.00 | $0.00 | $0 | $0 |
| Sub-total | | | | $4 844 695 | $19.17 | $0.71 | $4 633 525 | $211 170 |
| Contingencies | | 5% | | $242 235 | $0.96 | $0.04 | $242 235 | $0 |
| **Sub Total-1** | | | | **$5 086 930** | **$20.13** | **$0.74** | **$4 875 760** | **$211 170** |
| **Mining Contractor** | | | | | | | | |
| Mobilization | | Lump sum | | | $0.00 | $0.00 | $0 | $0 |
| Ramp Portal | | Lump sum | | | $0.00 | $0.00 | $0 | $0 |
| Ramp Excavation - 5m x 4m | | Meter | $5 000 | $0 | $0.00 | $0.00 | $0 | $0 |
| Ventilation Raise & Manway - 3m x 3m | | Meter | $4 500 | $0 | $0.00 | $0.00 | $0 | $0 |
| Waste Development - 5m x 4m | 450 | Meter | $4 100 | $1 845 000 | $7.30 | $0.27 | $1 845 000 | $0 |
| Contingencies on Development | | 10% | | $184 500 | $0.73 | $0.03 | $184 500 | $0 |
| Production Mining (includes backfilling) | 252 730 | Tonnes | $57.00 | $14 405 610 | $57.00 | $2.10 | $14 405 610 | $0 |
| Demobilization | | Lump sum | | $200 000 | $0.79 | $0.03 | $0 | $200 000 |
| **Sub Total-2** | | | | **$16 635 110** | **$65.82** | **$2.42** | **$16 435 110** | **$200 000** |
| **Transportation to Concentrator** | | | | | | | | |
| Ore Crushing & Truck Loading | 252 730 | Tonnes | $2.50 | $631 825 | $2.50 | $0.09 | $631 825 | $0 |
| Ore Transportation to Concentrator | 252 730 | Tonnes | $35.00 | $8 845 550 | $35.00 | $1.29 | $8 845 550 | $0 |
| **Sub Total-3** | | | | **$9 477 375** | **$37.50** | **$1.38** | **$9 477 375** | **$0** |
| **Ore Processing** | | | | | | | | |
| Site Handling | 252 730 | Tonnes | $2.00 | $505 460 | $2.00 | $0.07 | $505 460 | $0 |
| Concentrator Charges | 252 730 | Tonnes | $22.18 | $5 605 551 | $22.18 | $0.82 | $5 605 551 | $0 |
| **Sub Total-4** | | | | **$6 111 011** | **$24.18** | **$0.89** | **$6 111 011** | **$0** |
| **TOTAL Production Cost** | 252 730 | Tonnes | | **$37 310 426** | **$147.63** | **$5.44** | **$36 899 256** | **$411 170** |
| **REVENUES** | | | | | | | | |
| **TOTAL NSR - Ni US$8 & Cu US$3 & Co $25** | 252 730 | Tonnes | | **$39 132 713** | **$154.84** | **$5.70** | **$39 132 713** | **$0** |
| **Royalties** | 252 730 | Tonnes | $0.50 | **$126 365** | **$0.50** | **$0.02** | **$126 365** | **$0** |
| **NPV (Net Present Value)** | 252 730 | Tonnes | | **$1 695 922** | **$6.71** | **$0.25** | **$2 107 092** | **-$411 170** |

*** Studies for rock support - backfill study - water control**
**** Cost per pound of recoverable nickel**

## Table 18.15 Phase 2 Costs Distribution

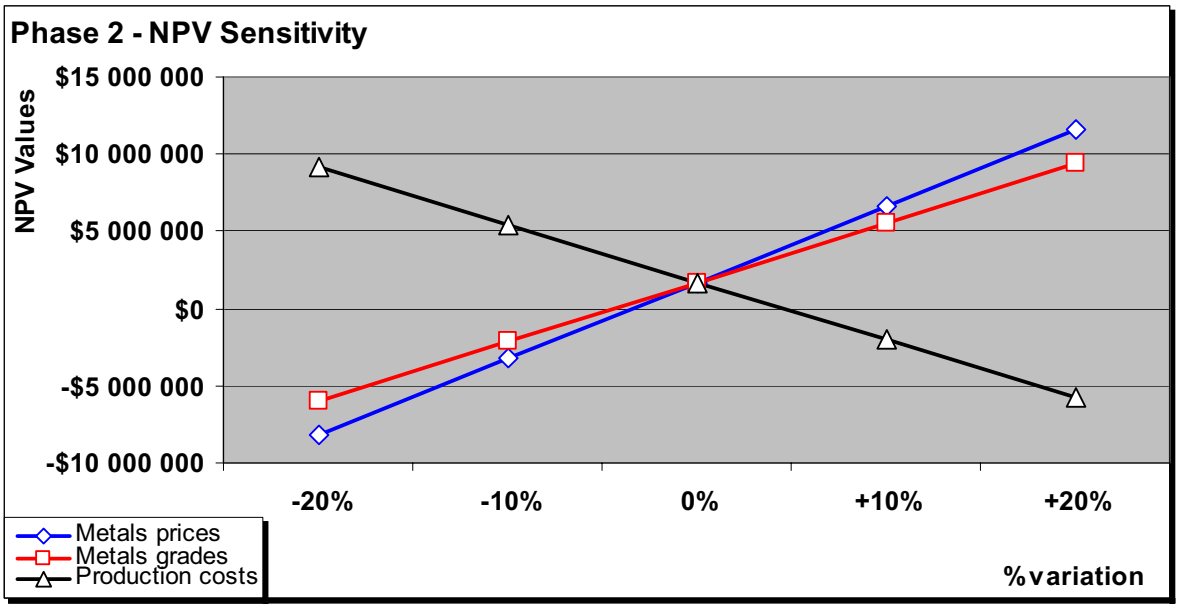
| | Total cost | Distribution | $/t ore | $/lb Ni |
|---|---|---|---|---|
| Waste Development | $1,845,000 | 4.93% | $7.30 | $0.27 |
| Production Mining | $14,405,610 | 38.48% | $57.00 | $2.10 |
| Ore Transportation | $8,845,550 | 23.63% | $35.00 | $1.29 |
| Concentrator Charges | $6,111,011 | 16.32% | $24.18 | $0.89 |
| Other costs | $6,229,620 | 16.64% | $24.65 | $0.91 |
| | $37,436,791 | 100% | $148.13 | $546 |

The sensitivity analysis for Phase 2 is presented in Table 18.16 and Figure 18.9.

**Table 18.16 Phase 2 Sensitivity Data (NPV Values)**

| NPV Values | | | |
|---|---|---|---|
| **Variation** | **Metals prices** | **Metals grades** | **Production costs *** |
| -20% | -$8 185 821 | -$6 027 507 | $9 158 007 |
| -10% | -$3 244 949 | -$2 165 792 | $5 426 965 |
| **0%** | **$1 695 922** | **$1 695 922** | **$1 695 922** |
| +10% | $6 636 794 | $5 557 637 | -$2 035 120 |
| +20% | $11 577 665 | $9 419 351 | -$5 766 163 |

**Figure 18.9 Phase 2 Sensitivity Analysis (NPV Values)**




## Combined Phases

The combination of the two phases of mining, for a base case of 317,730 diluted tons, provides estimated revenues of about 50.82 M$ (5.70 $/lb Ni). Total costs, including royalties and demobilization, are about 64.68 M$ (7.26 $/lb Ni), for a negative pre-tax cash flow of around -13.9 M$, for a NPV of about - 44 $/t (- 1.56 $ per pound of nickel - Table 18.17).

The distribution of the main costs for the whole project is summarised in Table 18.18.

**Table 18.17**

**317,730 tonnes at 1.57% Ni, 0.58% Cu and 0,053% Co**

| Description | Qty | Volume $m^3$ | Units | Unit Cost | Total cost | Unit Cost $/t of ore | Unit Cost $/lb Ni ** | Pre-production 9 months | Production 16 months | Closure 1 month |
|---|---|---|---|---|---|---|---|---|---|---|
| **EXPENSES** | | | | | | (317 730) | (8 907 846) | | | |
| **Owner's Costs** | | | | | | | | | | |
| Access Roads | | | Estimate | | $694 000 | $2.18 | $0.08 | $694 000 | $0 | $0 |
| Site Preparation | | | Estimate | | $1 200 000 | $3.78 | $0.13 | $1 200 000 | $0 | $0 |
| Road Maintenance | | | Estimate | | $2 149 400 | $6.76 | $0.24 | $677 600 | $1 410 200 | $61 600 |
| Personnel Salaries and Benefits | 26 | | Month | $107 870 | $2 804 620 | $8.83 | $0.31 | $970 830 | $1 725 920 | $107 870 |
| Room & Board & General Expenses | 26 | | Month | $39 600 | $1 029 600 | $3.24 | $0.12 | $356 400 | $633 600 | $39 600 |
| Ore Definition (D. Drilling) | 317 730 | | Tonnes | $1.00 | $317 730 | $1.00 | $0.04 | $0 | $317 730 | $0 |
| Rockfill Purchase, Crushing and Screening | 92 000 | | Tonnes | $7.50 | $690 000 | $2.17 | $0.08 | $0 | $690 000 | $0 |
| Cement Purchase | 3 680 | | Tonnes | $237.66 | $874 600 | $2.75 | $0.10 | $0 | $874 600 | $0 |
| Waste Crushing and Sreening | 115 000 | | Tonnes | $2.50 | $287 500 | $0.90 | $0.03 | $0 | $287 500 | $0 |
| Permitting and Studies * | | | Lump sum | | $650 000 | $2.05 | $0.07 | $650 000 | $0 | $0 |
| 3 Pick-up (Purchase) | 3 | | Units | $45 000 | $135 000 | $0.42 | $0.02 | $135 000 | $0 | $0 |
| 3 Pick-up (fuel+ maintenance) | 26 | | Month | $700 | $54 600 | $0.17 | $0.01 | $18 900 | $33 600 | $2 100 |
| Concentrator modifications | | | Lump sum | | $864 000 | $2.72 | $0.10 | $864 000 | $0 | $0 |
| Sub-total | | | | | $11 751 050 | $36.98 | $1.32 | $5 566 730 | $5 973 150 | $211 170 |
| Contingencies | | | 5% | | $587 553 | $1.85 | $0.07 | $278 337 | $309 216 | $0 |
| **Sub Total-1** | | | | | **$12 338 603** | **$38.83** | **$1.39** | **$5 845 067** | **$6 282 366** | **$211 170** |
| **Mining Contractor** | | | | | | | | | | |
| Mobilization | | | Lump sum | | $275 000 | $0.87 | $0.03 | $275 000 | $0 | $0 |
| Ramp Portal | | | Lump sum | | $518 587 | $1.63 | $0.06 | $518 587 | $0 | $0 |
| Ramp Excavation - 5m x 4m | 1 100 | 22 000 | Meter | $5 000 | $5 500 000 | $17.31 | $0.62 | $5 500 000 | $0 | $0 |
| Ventilation Raise & Manway - 3m x 3m | 165 | 1650 | Meter | $4 500 | $742 500 | $2.34 | $0.08 | $742 500 | $0 | $0 |
| Waste Development - 5m x 4m | 1 450 | 29 000 | Meter | $4 100 | $5 945 000 | $18.71 | $0.67 | $4 100 000 | $1 845 000 | $0 |
| Contingencies on Development | | | 10% | | $1 298 109 | $4.09 | $0.15 | $1 113 609 | $184 500 | $0 |
| Production Mining (includes backfilling) | 317 730 | | Tonnes | $57.00 | $18 110 610 | $57.00 | $2.03 | $0 | $18 110 610 | $0 |
| Demobilization | | | Lump sum | | $200 000 | $0.63 | $0.02 | $0 | $0 | $200 000 |
| **Sub Total-2** | | | | | **$32 589 806** | **$102.57** | **$3.66** | **$12 249 696** | **$20 140 110** | **$200 000** |
| **Transportation to Concentrator** | | | | | | | | | | |
| Ore Crushing & Truck Loading | 317 730 | | Tonnes | $2.50 | $794 325 | $2.50 | $0.09 | $0 | $794 325 | $0 |
| Ore Transportation to Concentrator | 317 730 | | Tonnes | $35.00 | $11 120 550 | $35.00 | $1.25 | $0 | $11 120 550 | $0 |
| **Sub Total-3** | | | | | **$11 914 875** | **$37.50** | **$1.34** | **$0** | **$11 914 875** | **$0** |
| **Ore Processing** | | | | | | | | | | |
| Site Handling | 317 730 | | Tonnes | $2.00 | $635 460 | $2.00 | $0.07 | $0 | $635 460 | $0 |
| Concentrator Charges | 317 730 | | Tonnes | $22.18 | $7 047 251 | $22.18 | $0.79 | $0 | $7 047 251 | $0 |
| **Sub Total-4** | | | | | **$7 682 711** | **$24.18** | **$0.86** | **$0** | **$7 682 711** | **$0** |
| **TOTAL Production Cost** | 317 730 | | Tonnes | | **$64 525 995** | **$203.08** | **$7.24** | **$18 094 762** | **$46 020 062** | **$411 170** |
| **REVENUES** | | | | | | | | | | |
| **TOTAL NSR - Ni US$8 & Cu US$3 & Co $25 *** ** | 317 730 | | Tonnes | | **$50 817 736** | **$159.94** | **$5.70** | **$0** | **$50 720 263** | **$0** |
| **Royalties** | 317 730 | | Tonnes | $0.50 | **$158 865** | **$0.50** | **$0.02** | **$0** | **$158 865** | **$0** |
| **NPV (Net Present Value)** | 317 730 | | Tonnes | | **-$13 867 123** | **-$43.64** | **-$1.56** | **-$18 094 762** | **$4 541 336** | **-$411 170** |

*** Studies for rock support - backfill study - water control**

**** Cost per pound of recoverable nickel**

***** Slight difference betwee total NSR values is due to rounding of ore grades and NSR per ton**

**Table 18.18 Project Costs Distribution**

| | Total cost | Distribution | $/t ore | $/lb Ni |
|---|---|---|---|---|
| Ramp & Portal | $6,018,587 | 9.3% | $18.94 | $0.68 |
| Waste Development | $5,945,000 | 9.2% | $18.71 | $0.67 |
| Production Mining | $18,110,610 | 28.0% | $57.00 | $2.03 |
| Ore Transportation | $11,120,550 | 17.2% | $35.00 | $1.25 |
| Concentrator Charges | $7,682,711 | 11.9% | $24.18 | $0.86 |
| Other costs | $15,807,401 | 24.4% | $49.75 | $1.77 |
| | $64,684,860 | 100% | $203.58 | $7.26 |

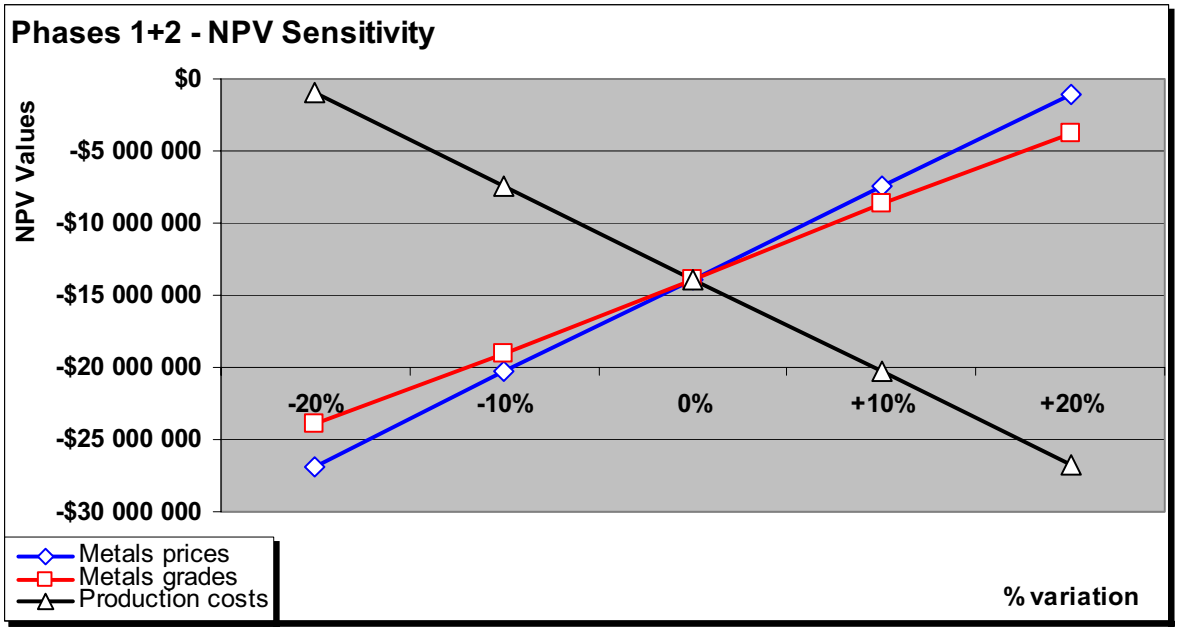
The sensitivity analysis for Phase 2 is presented in Table 18.19 and Figure 18.10.

**Table 18.19 Phases 1 & 2 Sensitivity Data (NPV Values)**

| NPV Values | | | |
|---|---|---|---|
| **Variation** | **Metals prices** | **Metals grades** | **Production costs *** |
| -20% | -$26 827 331 | -$23 901 037 | -$961 925 |
| -10% | -$20 285 270 | -$19 046 123 | -$7 414 524 |
| **0%** | **-$13 867 124** | **-$13 867 124** | **-$13 867 124** |
| +10% | -$7 452 155 | -$8 688 125 | -$20 319 723 |
| +20% | -$1 037 186 | -$3 833 210 | -$26 772 323 |

* Excluding royalties

**Figure 18.10 Phases 1 & 2 Sensitivity Analysis (NPV Values)**



Maximum project sensitivity is for variations in metal prices, followed by changes in metals grades, and then changes in production costs.

Variations of 20% in various prices or costs generate the NPV variations (expressed in millions dollars) shown in Table 18.20.

**Table 18.20 Phases 1 & 2 Sensitivity Data (Variations in NPV Values – 000,000$)**

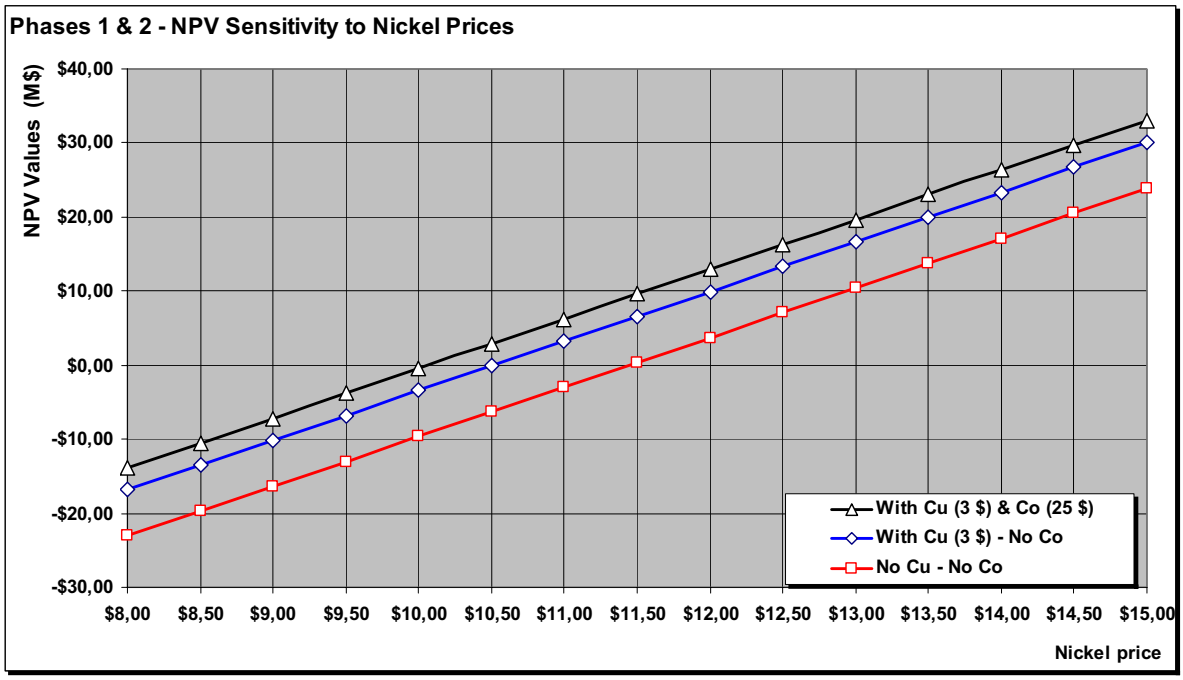
| Variation of parameters | NPV Values (M $) | | |
|---|---|---|---|
| | Metal price | Metal grade | Production Cost |
| -20% | -$12,96 | -$10,03 | -$12,91 |
| -10% | -$6,42 | -$5,18 | -$6,45 |
| **0%** | $0,00 | $0,00 | $0,00 |
| +10% | $6,41 | $5,18 | $6,45 |
| +20% | $12,83 | $10,03 | $12,91 |

Break-even conditions are obtained at a NSR value of 203.58 $/t, corresponding to the following values when calculated for each of the variables sensitivity analysis:

- Prices of metals: plus 21.7%, corresponding to 9.74 $ US/lb for nickel, 3.65 $ US/lb for copper and 30.43 $ US/lb for cobalt;
- Metal grades: plus 28%, corresponding to an ore grade of 2.00% Ni, 0.74% Cu and 0.068% Co;
- Production costs: minus 21%, corresponding to an decrease from 203.58 $/t to 159.94 $/t (- 43.64 $/t).

A further analysis of project sensitivity to nickel prices, in increments of 0.50 $US/lb, between 8.00 $ US/lb and 15.00 $ US/lb, is presented in Figure 18.11. NPV values are also presented for scenarios where no revenues from copper and no revenues from copper/cobalt would be available.

**Figure 18.11 Project Sensitivity to Metals Prices**

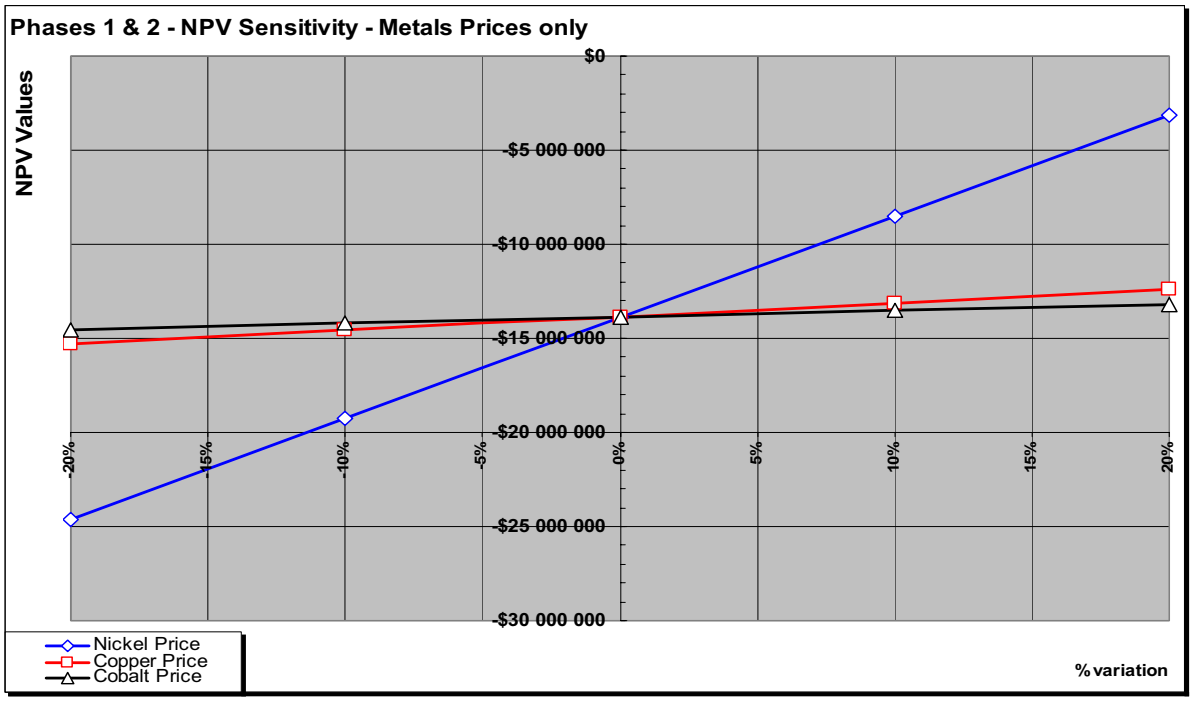



- With revenues gained from copper, at a constant 3.00 $ US/lb, and cobalt, at a constant 25.00 $ US/lb, project breakeven is at a nickel price of 10.07 $ US/lb;
- With revenues gained from copper, at a constant 3.00 $ US/lb, but no revenues gained from cobalt, NPV is reduced by 3.0 M$, and project breakeven is at a nickel price of 10.51 $ US/lb;
- If no revenues from copper and cobalt are considered, NPV is reduced by a further 6.2 M$, and project breakeven is at a nickel price of 11.43 $ US/lb.

Each variation in the price of nickel of 0.50 $ US/lb results in a NPV variation of 3.35 M$.

Nickel price is the one having the largest influence on sensitivity against metals prices (Figure 18.12).

**Figure 18.12 NPV Sensitivity – by Metal**




## 18.7 Schedule

A simplified Gantt-type schedule has been prepared to illustrate the estimated duration for the development and exploitation periods of the proposed option of mining, in two phases totalling 317,730 diluted tonnes. No delay for permitting or any other event has been indicated between the two phases, as shown in Figure 18.13.

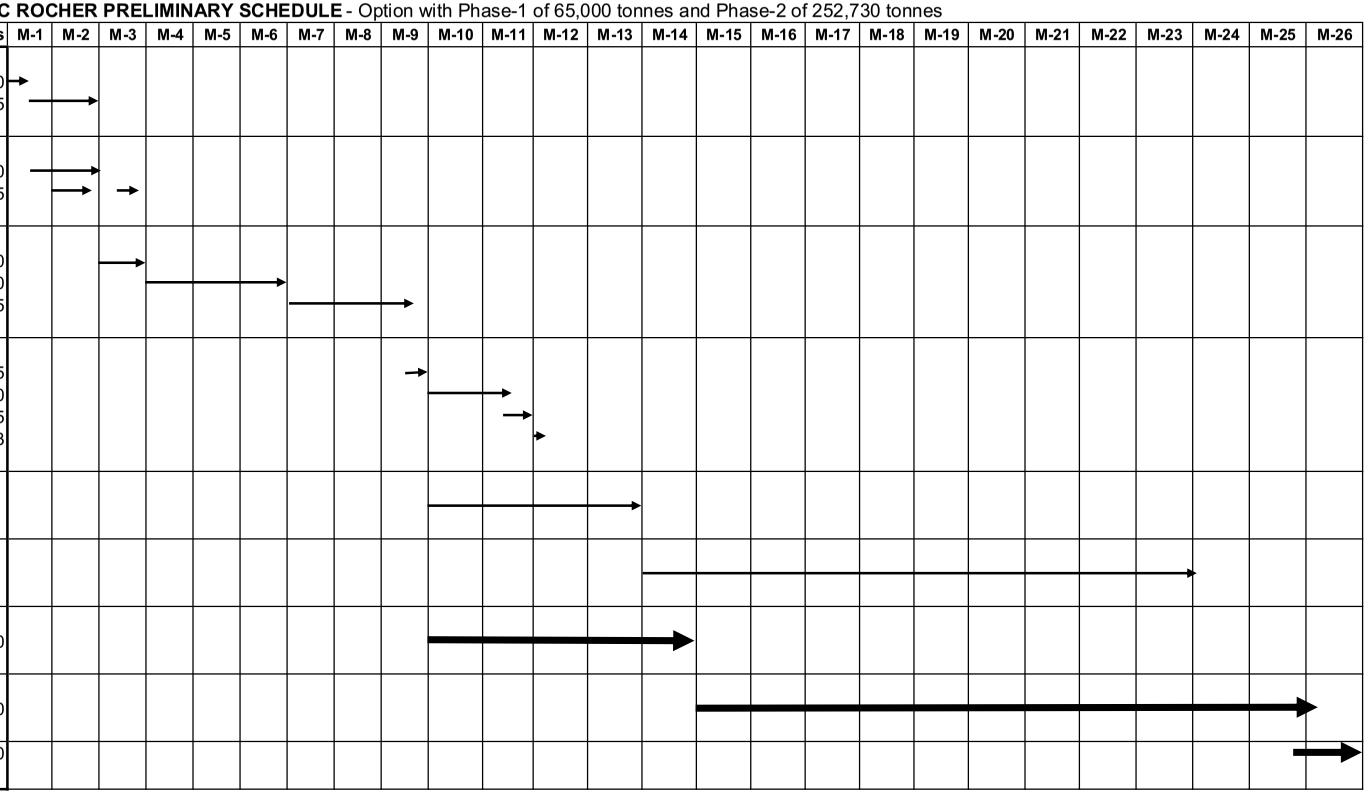
First ore would be available by the end of Month-9, with Phase 1 of advanced exploration lasting till about the end of Month-14.

Additional mining of the remaining 252,730 t, at a rate of some 750 t/d, would require about 11 months. Unless additional reserves are identified as a result of any combination of variables (new findings, lower production costs, higher metals prices, etc.), demobilization would take place during Month-26.

**Figure 18.13 Preliminary Project Schedule**

**LAC ROCHER PRELIMINARY SCHEDULE** - Option with Phase-1 of 65,000 tonnes and Phase-2 of 252,730 tonnes

| Description | Quantity | Units | Days |
|---|---|---|---|
| **Site Preparation** | | | |
| Mobilization | 1 | Lump | 10 |
| Site Set up | 1 | Lump | 45 |
| **Portal** | | | |
| Overburden removal | 20 240 | m3 | 30 |
| Rock excavation & support | 1 200 | m3 | 25 |
| **Main Ramp** | | | |
| First phase | 100 | m | 30 |
| Second phase | 520 | m | 80 |
| Third phase | 480 | m | 75 |
| **Alimak Raise** | | | |
| Phase-1: Set up | 1 | Lump | 5 |
| Excavation | 170 | m | 50 |
| Manway | 170 | m | 15 |
| Demobilization | 1 | Lump | 3 |
| **Waste Development: Phase-1** | | | |
| Ongoing Development | 1 000 | m | |
| **Waste Development: Phase-2** | | | |
| Ongoing Developmnet | 450 | m | |
| **Ore Mining: Phase-1** | | | |
| Drift & Fill - 500 tpd | 65 000 | tonnes | 130 |
| **Ore Mining: Phase-2** | | | |
| Drift & Fill - 750 tpd | 252 730 | tonnes | 340 |
| **Demobilization** | | | 30 |



# 19. Interpretation and Conclusions

The Lac Rocher deposit is a small but fairly high grade nickel resource. It is easily accessible by existing roads, except for the last 3 km, presently available as a winter road to be upgraded as part of the mining project.

The nickel sulphides resource lies at low depth, and contains a zone of high grade massive sulphides.

The geological interpretation of the Lac Rocher is of sufficient quality and detail to support mineral resource estimation and a preliminary assessment. To proceed with detailed mine design, the author (resource item) considers that the interpretation of the granitic dykes located within the mineralized body will need to be better known and located.

Geologically, the Lac Rocher orebody as it is known now is interpreted as being closed by geological contacts and faulting. There seems to be no potential for expanding its extent. Regionally, limited geological exploration has not indicated the presence of distinct mineralization of interest.

The mineral resources estimated are of sufficient quality and precision to support a preliminary assessment and a pre-feasibility study. The author considers that, for mine design purposes, a detailed mapping of the granitic dykes located within the mineralized body will be necessary. The Inferred mineral resources are principally located in the lower grade, disseminated parts of the orebody. The massive sulphides and high grade areas of the deposit are well drilled and mostly classified as Measured and Indicated (Table 17.2).

Total resource, at a 0.5% Ni cut-off grade, is 1.238 Mt, at 0.95% Ni and 0.58% Cu. Cobalt content, at this nickel cut-off grade, is 289 ppm (0.0289%).

The economic resource, as defined in the PEA, is to be exploited in two phases, the first one as an advanced underground exploration activity. Total diluted economic resource has been estimated, in the PEA, at 317,730 diluted tonnes at a grade of 1.57% Ni, 0.58% Cu and 0.053% Co.

| | Tonnes (Diluted) | % Ni | % Cu | % Co |
|---|---|---|---|---|
| **Phase 1** | 65,000 | 1.75 | 0.57 | 0.062 |
| **Phase 2** | 252,730 | 1.52 | 0.59 | 0.051 |
| | **317,730** | **1.57** | **0.58** | **0.053** |

Measured and Indicated resources (diluted) represent 297,000 tonnes of this total, or 93.4%. A total of 21,000 tonnes of Inferred resources, at a grade of 1.07% Ni and 0.35% Cu, has been considered in the mining plan, since it lies within the zone targeted for mining. All cobalt resources are considered as Inferred.

Underground mining will be by mechanized cut and fill, with part of the rockfill cemented for optimum ground support. A 1,100 m long, 139 m deep ramp will provide the access to the mine. A 170 m raise will be implemented for ventilation and providing an escape way.

The development of the mine and the extraction of the ore will be carried out by a specialized contractor. The ore will be transported to Chibougamau for custom milling.

The financial analysis of the project was conducted on a pre-tax, 100% equity basis, using the following parameters as a base case:

- Price of nickel: 8 $ US/lb;
- Price of copper: 3 $ US/lb;
- Price of cobalt: 25 $ US/lb;
- Exchange rate: 1.00 $ US : 0.95 $ CA;
- Mixed concentrate grade: 10.5% Ni, 3.9% Cu and 0.33% Co;
- Metal recoveries: 81% of the nickel, 91% of the copper and 95% of the cobalt.

Expected metallurgical performance is based on results from metallurgical testing, conducted at Corem's facility, on a low grade sample of the Lac Rocher resource.

The base case scenario, for the two phases of the project, entails total expenses, including royalties, estimated at some 64.7 M$ (203.58 $/t of ore, or 7.26 $ per pound of recoverable nickel), against NSR revenues of 50.8 M$ (159.94 $/t or 5.70 $/lb Ni):

| Expense Category | Cost ($) | $/t - ore | $/lb Ni * |
|---|---|---|---|
| **Mining (Development - Mining - Services)** | $44 928 408 | $141,40 | $5,04 |
| **Ore Transportation** | $11 914 875 | $37,50 | $1,34 |
| **Ore Processing** | $7 682 711 | $24,18 | $0,86 |
| **Royalties** | $158 865 | $0,50 | $0,02 |
| **Total Costs** | **$64 684 860** | **$203,58** | **$7,26** |
| **NSR Revenues** | **$50 817 736** | **$159.94** | **$5.70** |
| **Net Present Value** | **- $13 867 126** | **- $43.64** | **- $1.56** |

* Per pound of recoverable nickel

The project is mostly sensitive to metal prices and production costs, followed by metals grades. Break-even conditions are obtained at a NSR value of 203.58 $/t, corresponding to the following values when calculated for each of the variables in the sensitivity analysis:

- Prices of metals: plus 21.7%, corresponding to 9.74 $ US/lb for nickel, 3.65 $ US/lb for copper and 30.43 $ US/lb for cobalt;
- Metal grades: plus 28%, corresponding to an ore grade of 2.00% Ni, 0.74% Cu and 0.068% Co;
- Production costs: minus 21.0%, corresponding to an decrease from 203.58 $/t to 159.94 $/t (- 43.64 $/t).

Roche Ltd concludes that a the level of precision of costs estimated in this PEA, the Lac Rocher project of Victory Nickel is technically feasible, but only offers a potential of economic viability if, including estimated revenues gained from copper and cobalt, the price of nickel is in the range of 10 $US/lb and more. NPV value is modified by 3.35 M$ for each change of 0.50 $US/lb for nickel, which makes this project very sensitive to the price of this metal.

In the event that metals prices would firm up to levels observed before the summer of 2008, i.e. in the range of 12 $ US/lb or more, Phase 1 of advanced exploration would be a very important activity, as mine development and bulk sampling would permit to:

- Confirm resources and upgrade them to reserves;
- Confirm the feasibility of the mining method, and rock mechanics and hydrogeological conditions;
- Confirm mining costs;
- Confirm and optimise the flotation process;
- Improve the economic analysis of Phase 2 of the project.

Victory Nickel has already obtained an exemption from the Environmental and Social Environmental Study (ESIA) for Phase 1 of the project, so permitting delays for this phase will be minimal.

# 20. Recommendations

The Preliminary Assessment of the Lac Rocher project indicates negative results if nickel prices remain in the range of 10 $ US/lb range or less, as currently observed.

In the eventuality that nickel prices would return to a value of 12 $ US/lb, the potential NPV of the project would be about 12 – 13 M$, increasing or decreasing by 3.35 M$ for each variation of 0.50 $ US/lb.

In such a situation, some additional negotiations and assessments are suggested in order to update some costs, as well as mining, milling and smelting parameters. Specific recommendations are grouped below for geology and resources, mining, metallurgy and costs.

### *1. Geology and Resources*

- **Exploration Drilling**

The current resource estimate, at a 0.5% Ni cutoff grade, is 1.238 Mt. About 35% of this resource is in the Inferred category. However, the Inferred resources targeted for exploitation in the PEA mining plan represent only about 6% of the 318,000 diluted tonnes, or some 20,000 tonnes.

No additional surface drilling is recommended to upgrade these Inferred resources to the Indicated or Measured categories.

It is rather proposed to use the advanced exploration stage of Phase 1 to proceed with underground diamond drilling. A provision for about fifty 60-m long holes has been included in the cost estimate.

- **Geological Interpretation of Granitic Dykes**

There are several granitic dykes cutting across the mineralized envelope. The current assessment of their spatial distribution is only preliminary, and has assumed all occurrences to extend to the whole width of the vertical cross-sections used for the interpretation.

A more accurate interpretation of these dykes is desirable for the purpose of mine design.

### *2. Mining and Infrastructures*

- **Site Layout**

The map used for the definition of a site general arrangement was produced by restitution from aerial photos. No detailed site surveying is available at this stage.

It is recommended to proceed with a detailed topographical survey of the project site, in order to assess topography and slopes in the rock storage and control basin area. This will confirm the feasibility of the preliminary design for these facilities.

- **Geotechnical Investigation**

A preliminary geotechnical investigation confirmed that soils are mostly found as sand and silty clay. The field investigation, at 15 different sites, was generally limited to a depth of less than one meter. In all cases, it was judged that soils have a sufficient bearing capacity to support the planned elements of infrastructure.

However, no specific search and characterisation of construction materials was performed. Such an investigation (availability and suitability) is recommended in the specific case of materials for the construction of the control pond dyke.

- **Portal Location**

The location retained for the location of the portal has been determined on the basis of overburden depth, as shown by exploration data.

No assessment of rock quality and rock surface profile has been conducted. It is recommended to proceed with such an assessment prior to mobilisation of the mining contractor team.

- **Rockfill Material**

It is estimated that rockfill material will have to be sourced outside of the mine. In the course of the PEA, no search (aerial photos or field surveys) was conducted to locate and assess the availability and quality of fill material.

A local/regional study is recommended to locate and characterise suitable material to mix with waste rock and cement for the production of an adequate rockfill. Priority should be given to potential areas along the return route of the ore transportation trucks, to favour a backhaul situation.

- **Rock Mechanics**

Other than visual observation of the core, there is no evaluation of ground conditions available.

Ramp development will provide some information on ground conditions outside of the mineralized envelope, which is made of paragneiss. However, conditions in the ore zones may be very different.

A preliminary rock mechanics study[13], using logging information and inspection of the core, is recommended prior to accessing the mineralised zone.

The study would provide a preliminary estimation of the stability of stopes (walls and back) to establish safe dimensions for the primary stopes and temporary pillars. A particular attention should be given to the massive sulphides zone.

- **Hydrogeology**

There is no available data on the hydrogeology in the deposit area. Mine water pumping rate and control basin size have been estimated from typical values for shallow underground mines.

A hydrogeological investigation is recommended to assess conditions for more detailed planning of the control basin and underground development.

### *3. Metallurgy*

The mill flowsheet was developed by testing a sample roughly representative of the PEA ore. The testwork only involved preliminary work on grinding and flotation, but no specific tests for concentrate sedimentation and filtration.

Roche Ltd and Bumigeme therefore recommend that some early testwork be conducted, on additional core material or during Phase 1 of the project, to optimize the parameters of the Lac Rocher process. Much of this testing could be performed in the laboratory facility of the ore processing plant, and/or in-plant using initial ore samples. The testwork may include a locked cycle flotation test to provide a confirmation of the expected metallurgical performance.

- **Grinding**

On top of a saving in power cost, a coarser grind might result into a higher nickel recovery and grade of concentrate, as was observed, during testing, when going from a $d_{80}$ of 57 µm in test 10 to a $d_{80}$ of 72 µm in test 11.

- **CMC**

The cost of CMC, used as a depressant, is relatively high (2.34 $/kg). The effect of its addition at the rougher stage is not obvious yet. On the other hand, adding CMC at multiple points at the cleaner stage, instead of the first cleaner stage as practised during testing may result into a higher nickel grade in the concentrate without affecting nickel recovery.

[13] RQD, fracture frequencies, joints orientation and characteristics, alteration, some actual testing for compressive strength

- **Lime Testing**

More laboratory flotation tests with lime are recommended, in comparison with soda ash. At the Copper Rand mill, only lime is currently used for pH control. New equipment would be required to feed soda ash to the circuit.

- **Reagents**: (collectors, frothers, etc.)

More tests are suggested to optimise the flotation time, the grade of concentrate and the recoveries.

- **Sedimentation and Filtration**

No testing of concentrate sedimentation and filtration characteristics was conducted. Basic testing is recommended to confirm the suitability of existing equipment at the Copper Rand processing facility.

- **Lac Rocher Ore Treatment Adapted to Copper Rand Mill**

Laboratory tests are recommended based on the existing Copper Rand flowsheet and existing capacities. Acceptable performance with this flowsheet applied to Lac Rocher material would reduce mill modifications costs and may result in a simplified flotation circuit.

- **Precious metals**

Except for one assay of platinum and palladium, no assays of precious metals were performed during the preliminary metallurgical testing, since ore grades were reported as low (Section 10.1). It is however recommended that samples of concentrates from representative tests are analysed for gold and silver.

### *4. Costs*

Among the variables that can affect project profitability (metal prices, metals grades and production costs), costs are the main ones offering some possibility of control and increased precision of the estimate.

- **Mining Contractor Costs**

About 76% of estimated project costs are for the five expense categories in the table below, with production mining alone accounting for more than 18.1 M$, or 28% of total costs. Costs directly related to underground development of the ramp and waste rock development to access the orebody amount to another 12 M$ (18.5%). These contractor-related expenses total 30.1 M$, or 46.5% of project costs.

**Main expenses categories**

| Project Component | Cost | % | Cumul. | Cumul. |
|---|---|---|---|---|
| Ramp & Portal | $6 018 587 | 9,30% | $6 018 587 | 9,3% |
| Waste Development | $5 945 000 | 9,19% | $11 963 587 | 18,5% |
| Production Mining | $18 110 610 | 28,00% | $30 074 197 | 46,5% |
| Ore Transportation | $11 120 550 | 17,19% | $41 194 747 | 63,7% |
| Concentrator Charges | $7 682 711 | 11,88% | $48 877 458 | 75,6% |
| Sub-total | $48 877 458 | 75,56% | | |
| Other costs | $15 807 401 | 24,44% | | |
| | $64 684 860 | 100% | | |

Roche Ltd recommends pursuing negotiations with mining contractors, using the more detailed information now available for mine configuration, tonnage, and schedule. Such negotiation is not only important to refine contractor-related costs, but also to confirm the availability of a contractor with the relevant capabilities in a period where mining-related services are heavily solicited by a busy mining sector.

- **Ore transportation Costs**

Ore transportation to Chibougamau is also a high cost item, with expenses for 317,730 tonnes estimated at 11.1 M$, or 17.2% of total estimated costs.

Further discussions with trucking contractors are recommended, to confirm availability of equipment, and, if applicable, update costs possibly increasing with recent higher fuel surcharges.

Using the shorter transportation route towards the Village of Waswanipi involves building and upgrading a few kilometres of road to interconnect existing logging road networks. These networks are on Cree First Nation (Waswanipi) lands. An authorisation will be required to build this road segment. No confirmation on the probability of obtaining such an authorisation has been sought by Roche Ltd in the course of the PEA study. Victory Nickel has been responsible for all matters related to First Nations issues in this project.

Roche recommends that the road shortcut issue is discussed and negotiated to confirm the feasibility of the recommended route.

The only alternative is a longer route passing through Matagami, involving a distance of some 540 km, for an added cost of about 6.35 M$ (20 $/t). This reduces the base case NPV from 17.2 M$ to 10.8 M$. Trucking over the longer distance would also require a larger fleet of trucks, with the added possibility that the required services would not be totally available.

- **Ore Treatment Costs and Performance**

The estimated cost of processing ore at the Copper Rand mill in Chibougamau probably has a higher degree of reliability than other costs estimated at the PEA level, based on the information available. The milling cost is based on discussions with the mill operators and on the knowledge of the proposed and fairly straightforward flowsheet, as defined after metallurgical testing. Milling costs nonetheless represent some 7.7 M$ (11.9%).

The additional testing recommended under the "*3. Metallurgy*" section above may offer possibilities of cost reductions, for example:

- Possibility of using a coarser grind;
- A reduction of CMC depressant usage;
- Substitution of soda ash by lime for pH control;
- Using the existing mill arrangement without modifications to successfully treat the Lac Rocher ore.

The flowsheet developed during metallurgical testing was for a small sample assaying about 1.30% Ni, which is reasonably close to the grade of the ore to be extracted according to the mining plan, which will average some 1.60% Ni. However, on a bench by bench basis, ore grade may fluctuate between about 0.9% Ni and 2.3% Ni, and from 0.4% Cu and 0.8% Cu. In the massive sulphides zone, grades may reach much higher values for short periods.

It will therefore be important to maximise ore blending at the mine and at the ore processing plan, to avoid too large fluctuations in head grade. Where possible, mining could be planned to smooth out too large grade variations. Such grade variations might also have an adverse effect on processing performance, especially with higher metals grades.

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| (Original signed and sealed) | November 5, 2008 |
|---|---|
| Florent Baril, Eng. | Signature date |

**Effective Date: November 5, 2008**

# 23. Certificates of Qualification

## CERTIFICATE OF QUALIFIED PERSONS

I, Normand Grégoire, Eng., do hereby certify that:

1. I am a Senior Mining Engineer and Project Manager for Roche Ltée, Groupe-Conseil (Roche Ltd., Consulting Group), 3075, chemin des Quatre-Bourgeois, Suite 300, Quebec G1W 4Y4;

2. The title and date of the technical report to which this certificate applies is the "Preliminary Economic Assessment, Lac Rocher Nickel Project, Quebec, prepared for Victory Nickel Inc. dated November 5, 2008" (the "**Technical Report**");

3. I am a graduate of Laval University with a Baccalaureate in Applied Sciences, Mining Engineering, obtained in 1974. I have worked as a consultant in mine engineering on a continuous basis since 1986, mostly providing consulting services to the mining industry. I am a registered member of the Ordre des ingénieurs du Québec (OIQ License No. 25710); I am a Member of the Canadian Institute of Mining, Metallurgy and Petroleum.

4. I did not visit the Lac Rocher property, which is the subject of the Technical Report;

5. I am responsible for sections 2, 3, 18.2, 18.3 and 18.4, parts of section 18.6, and the corresponding sections of 1-Summary, 19-Interpretation and Conclusions, 20-Recommendations, and 21-References, of this Technical Report;

6. I have read the definition of "qualified person" for the purposes of National Instrument 43-101 - *Standards of Disclosure for Mineral Projects* ("**NI 43-101**"); I certify that I meet the requirements of the definition in NI 43-101 due to my experience and current affiliation with a professional organization, the Ordre des ingénieurs du Québec;

7. I am independent of Victory Nickel Inc. as per the terms of Section 1.4 (Independence) of NI 43-101;

8. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with that instrument and form; and

9. That, as of the date of the certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

**DATED** the 5th day of November, 2008.

(Original signed and sealed)

**NORMAND GRÉGOIRE, ENG.**

## CERTIFICATE OF QUALIFIED PERSONS

I, Robert de l'Étoile, Eng., do hereby certify that:

1. I am a Senior Engineer with Systèmes Géostat International Inc. ("**Geostat**"), 10 boul. de la Seigneurie Est., Suite 203, Blainville, Québec, J7C 3V5;

2. The title and date of the technical report to which this certificate applies is the "Preliminary Economic Assessment, Lac Rocher Nickel Project, Quebec, prepared for Victory Nickel Inc. dated November 5, 2008" (the "**Technical Report**");

3. I am a graduate from the École Polytechnique de Montréal, Québec in 1980, with a B.Sc.A. in geological engineering, and in 1982 with an M.Sc.A. in geological engineering from the same institution and I have practised my profession continuously since that time. I am a registered member of the Ordre des ingénieurs du Québec (Registration Number 35543). I am a Member of the Canadian Institute of Mining, Metallurgy and Petroleum. I have worked as an engineer for a total of 25 years since my graduation. My relevant experience for the purposes of the Technical Report is over 20 years of consulting in the field of geostatistical mineral resource estimation, orebody modelling and mineral resource auditing;

4. I visited the site of the property and looked at part of the diamond drill core in November 2007;

5. I collaborated on the preparation of items in sections 4 to 15, 17, the corresponding sections of 1-Summary, 19-Interpretation and Conclusions, 20-Recommendations, and 21-References, of this Technical Report;

6. I have read the definition of "qualified person" for the purposes of National Instrument 43-101 - *Standards of Disclosure for Mineral Projects* ("**NI 43-101**"); I certify by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be an independent qualified person for the purposes of NI 43-101;

7. I am independent of Victory Nickel Inc. as per the terms of Section 1.4 (Independence) of NI 43-101;

8. I have read NI 43-101 and Form 43-101F1 and have prepared the Technical Report in compliance with NI 43-101 and Form 43-101F1; and have prepared the report in conformity with generally accepted Canadian mining industry practice; and

9. That, as of the date of the certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

**DATED** the 5th day of November, 2008.

(Original signed and sealed)

**ROBERT DE L'ÉTOILE, ENG.**

## CERTIFICATE OF QUALIFIED PERSONS

I, Gaston Gagnon, Eng., do hereby certify that:

1. I am a mining engineer with Systèmes Géostat International Inc. ("**Geostat**"), 10 boul. de la Seigneurie Est., Suite 203, Blainville, Québec, J7C 3V5;

2. The title and date of the technical report to which this certificate applies is the "Preliminary Economic Assessment, Lac Rocher Nickel Project, Quebec, prepared for Victory Nickel Inc. dated November 5, 2008" (the "**Technical Report**");

3. I graduated with a mining engineering degree from Laval University in 1964. I am a member of the Ordre des Ingénieurs du Québec (#15918) and I have worked as a mining engineer for Geostat since 2006 and mainly as an underground mining engineer before that date;

4. I visited the site of the property and looked at part of the diamond drill core in November 2007;

5. I collaborated on the preparation of items in the sections 18 and the corresponding sections of 1-Summary, 19-Interpretation and Conclusions, and 20-Recommendations of this Technical Report;

6. I have read the definition of "qualified person" set out in National Instrument 43-101 - *Standards of Disclosure for Mineral Projects* ("**NI 43-101**") and certify that by reason of my education, affiliation with a professional association, as defined in NI 43-101, and past relevant work experience, I fulfill the requirements to be a "qualified person for the purpose of NI 43-101;

7. I have not had any prior involvement with the property that is the subject of the Technical Report. I am independent of Victory Nickel Inc. as per the terms of Section 1.4 (Independence) of NI 43-101;

8. I have read NI 43-101 and Form 43-101F1 and have prepared the Technical Report in compliance with NI 43-101 and Form 43-101F1; and have prepared the report in conformity with generally accepted Canadian mining industry practice; and

9. That, as of the date of the certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

**DATED** the 5th day of November, 2008.

(Original signed and sealed)

**GASTON GAGNON, ENG.**

## CERTIFICATE OF QUALIFIED PERSONS

I, Florent Baril, Eng., do hereby certify that:

1. I am a Senior Metallurgical Engineer and President of Bumigene Inc., located at 1140 De Maisonneuve Blvd. West, Suite 1060, Montreal, Quebec H3A 1M8. I am the owner and President of Bumigeme Inc., a firm of consulting engineers which was incorporated in 1994.

2. The title and date of the technical report to which this certificate applies is the "Preliminary Economic Assessment, Lac Rocher Nickel Project, Quebec, prepared for Victory Nickel Inc. dated November 5, 2008" (the "**Technical Report**");

3. I am a member of the "Ordre des ingénieurs du Québec" (O.I.Q.) (Quebec Order of Engineers) (Membership Number 6972);

4. I did not visit the Lac Rocher property, which is the subject of the Technical Report, but made a visit to the ore processing plant, in Chibougamau, which would process the ore extracted from the Lac Rocher property;

5. I collaborated to and supervised the preparation of chapter 16 of the Technical Report; I also followed up, on behalf of Victory Nickel, the metallurgical testwork described in chapter 16, that resulted in the definition of a process flowsheet;

6. I have read the definition of "qualified person" set out in National Instrument 43-101 - *Standards of Disclosure for Mineral Projects* ("**NI 43-101**") and certify that by reason of my education, affiliation with a professional association, as defined in NI 43-101, and past relevant work experience, I fulfill the requirements to be a "qualified person for the purpose of NI 43-101;

7. I am independent of Victory Nickel Inc. as per the terms of Section 1.4 (Independence) of NI 43-101;

8. I have read NI 43-101 and Form 43-101F1 and have prepared the Technical Report in compliance with NI 43-101 and Form 43-101F1; and have prepared the report in conformity with generally accepted Canadian mining industry practice; and

9. That, as of the date of the certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

**DATED** the 5th day of November, 2008.

(Original signed and sealed)

**FLORENT BARIL, ENG.**

# Appendix A

Corem's Technical Report

# VICTORY NICKEL INC.

## NICKEL FLOTATION PROCESS DEVELOPMENT OF LAC ROCHER ORE

FINAL REPORT

NO: T881

For: Victory Nickel Inc.
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Date: April 8, 2008

## SUMMARY

Ore processing tests were conducted on a nickel ore from the Lac Rocher Deposit. The ore grade was 1.36% Ni and 0.47% Cu while the Bond work index was 13.4 kW/t. Good pentlandite liberation is achieved at a p80 of 75 µm. A total of 15 flotation tests were performed. It was possible to obtain a concentrate with more than 11% Ni and 4% Cu with respective recoveries greater than 80 and 90%.

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# 1 INTRODUCTION

Victory Nickel Inc. owns the Lac Rocher ore body near Chibougamau. COREM was contracted by Victory Nickel Inc. to perform characterization of the ore and to develop a preliminary flotation flowsheet. The following report is a summary of the results obtained. This work includes:

1- Ore characterization and mineralogical analysis
2- Grinding curve
3- Bond work index determination
4- Magnetic separation
5- Flotation

# 2 CONCLUSIONS AND RECOMMENDATIONS

## 2.1 Conclusions

- Grinding at 80% -200 mesh (-74 µm) is sufficient to obtain proper liberation of the pentlandite.
- It was possible to obtain, from an ore grading 1.36% Ni and 0.47% Cu, a concentrate with more than 11% Ni and 4% Cu with respective recoveries greater than 80 and 90%.
- The flowsheet suggested for processing of Lac Rocher ore is the one used in Test 15 (c.f. Appendix A), which was operated in open-circuit.
- The reagent addition for Test 15 were as follows:

  KAX 51: 330 g/t
  MIBC: 63 g/t
  CMC: 850 g/t
- Dextrin was used to depress pentlandite in Cu/Ni separation. However, the dosage used was probably too high and depressed an important fraction of Cu.
- Iron grade of the final concentrates shows that some pyrite and/or pyrrhotite is still recovered.

### 2.2 Recommendations

- Lock-cycle tests should be conducted to assess the benefits of performing flotation in a closed-circuit.
- Additional testwork should be carried out with the copper-nickel separation where the following options could be tested:
    - Lower dosage of dextrin.
    - Regrind of cleaner concentrate in order to refresh the surfaces before depression of Ni.
    - Aeration (15 to 30 minutes) of the ore prior to flotation of chalcopyrite, as pentlandite is more readily oxidized than chalcopyrite. This oxidation should depress pentlandite and favor copper-nickel separation.
    - Use sodium cyanide instead of dextrin as a depressant to compare their performance.

Other depressants could also be tested to decrease pyrite and pyrrhotite flotation, namely $SO_2$, DETA (diethyl triamine), sodium methabisulfate.

## 3 METHODOLOGY

### 3.1 Ore characterization and mineralogical analysis

Core samples received from Victory Nickel Inc. were crushed to 10 mesh (1.6 mm), homogenized and divided into 1 kg samples. One sample was sent to the mineralogy laboratory for identification of major phase and determination of the liberation size of pentlandite. Each sample was sealed, packed and frozen. Three different sub-samples were also sent to the laboratory for assaying. They were taken from the following 1 kg samples:

Sub-sample 1: Sample used for mineralogical analysis

Sub-sample 2: Sample used for grinding curve determination, 60 minutes grinding

Sub-sample 3: Sample used for grinding curve determination, 120 minutes grinding

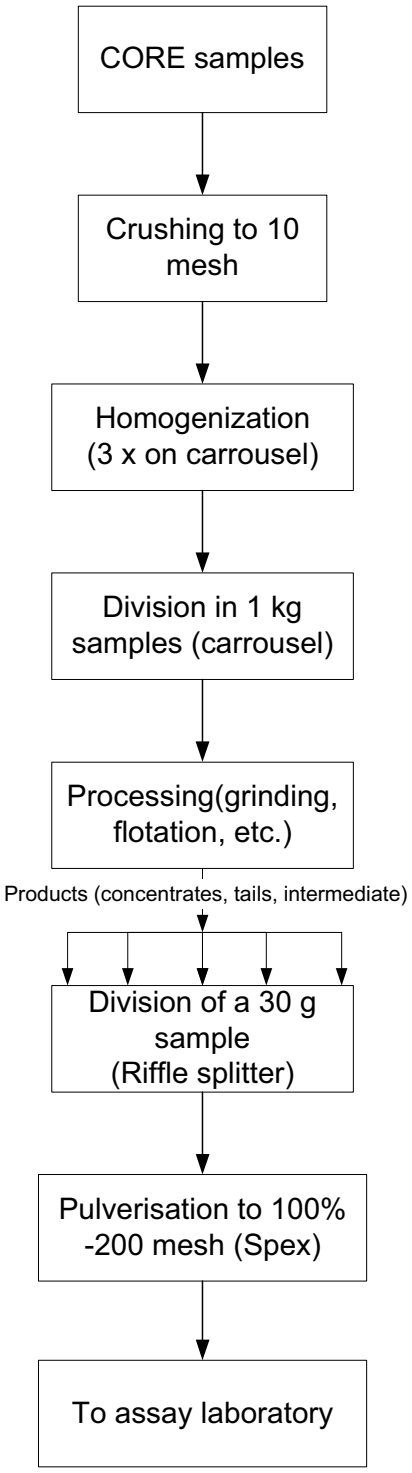



Figure 1: Sample preparation from core sample to assay laboratory

### 3.2 Grinding curve determination

Two grinding curves were obtained from two different mills. The first grinding curve was obtained from a slow rotating mill, at 40% of its critical speed (Mill #1). Two kilograms samples were ground at different grinding times and the product size distribution was measured with a Microtrac® size analyser. The second curve was obtained from a faster rotating mill, operating at 70% of its critical speed (Mill #2). First, a sample was ground for 40 minutes to compare the size distribution produced by the two mills. Then a second grinding curve was produced with the new mill. In order to minimize the amount of ore used, the second grinding curve was produced according to the following procedure:

1. Grinding of 2 kg of ore for 60 minutes.
2. Filtration and drying of ore.
3. Determination of size distribution via the Microtrac® (laser light diffraction) and sieving.
4. Recombination of the size fractions.

Steps 1 to 4 were repeated on the recombined size fraction using the following additional grinding times: 30 and 20 minutes. Thus, the following points were available for the two curves:

70% of critical speed: 40, 62, 90, 110 minutes

40% of critical speed: 10, 20, 40, 60, 120, 180 minutes

### 3.3 Bond work index determination

The procedure for the Bond work index is normally performed with an ore ground at 6 mesh. However, the client, at the beginning of the project, asked COREM to prepare the ore at 10 mesh. When the Bond work index determination was added to the program, it was thus decided to measure it using the 10 mesh ore and following the standard procedure.

### 3.4 Magnetic separation test

Magnetic separation tests were performed in order to determine if pyrrhotite could be removed from the ore using magnetic separation in a Davis Tube. A sample was ground to the determined liberation size of pentlandite at a p80 of 60 µm. Three samples of

approximately 25 g were divided and submitted to magnetic separation at 1000, 4000 and 5200 Gauss under the conditions shown in Table 1.

Table 1: Operating parameters of Davis Tube

| | |
|---|---|
| Feed | 12 g |
| Oscillation | 90 osc/min. |
| Water flow rate | 400 ml/min. |
| Test time | 10 minutes |

### 3.5 Flotation test

A total of 15 flotation tests were performed during this project. All test conditions are described in Appendix A. The reagent used in the project are identified as follows:

Xanthate: KAX 51 (Charles Tennant)
Dextrine: WC9524 (Archer Daniels and Midland Company)
CMC: Carboxymethyl cellulose, molecular weight 250 000 (Acros Organics)
SMBS: Sodium methabisulfite

The first 8 tests were used to establish a preliminary flowsheet. The second series of tests (9 to 12) was used to optimize the flotation of a bulk Cu-Ni concentrate. The final tests (13 to 15) were performed in order to confirm the results obtained in Test 12 and to investigate the separation of Cu and Ni.

# 4 RESULTS

## 4.1 Ore characterization and mineralogical analysis

The results are shown in Table 2. The ore grade is 1.36% Ni and 0.47% Cu.

Table 2: Results of head analysis

| Analysis | Sample 1 | Sample 2 | Sample 3 | Average |
|---|---|---|---|---|
| $SiO_2$ (%) | 43.92 | 44.03 | 44.12 | 44.02 |
| $Al_2O_3$ (%) | 6.27 | 6.37 | 6.36 | 6.33 |
| MgO (%) | 15.07 | 14.99 | 15.00 | 15.02 |
| CaO (%) | 5.75 | 5.65 | 5.70 | 5.70 |
| $K_2O$ (%) | 0.33 | 0.33 | 0.33 | 0.33 |
| $TiO_2$ (%) | 0.19 | 0.19 | 0.19 | 0.19 |
| MnO (%) | 0.14 | 0.14 | 0.14 | 0.14 |
| $P_2O_5$ (%) | 0.05 | 0.05 | 0.06 | 0.05 |
| Co (%) | 0.04 | 0.04 | 0.04 | 0.04 |
| Cr (%) | 0.20 | 0.20 | 0.20 | 0.20 |
| Cu (%) | 0.47 | 0.47 | 0.48 | 0.47 |
| Fe (%) | 12.08 | 12.28 | 12.19 | 12.18 |
| Ni (%) | 1.39 | 1.34 | 1.36 | 1.36 |
| Pb (%) | 0.01 | 0.01 | 0.01 | 0.01 |
| S (%) | 5.21 | 5.28 | 5.00 | 5.16 |
| Zn (%) | 0.02 | 0.02 | 0.02 | 0.02 |
| Na (%) | 0.49 | 0.51 | 0.47 | 0.49 |
| PAF (%) | 5.50 | 5.58 | 6.14 | 5.74 |
| Total (%) | 97.1 | 97.5 | 97.8 | 97.5 |

A sample was also sent for mineralogical determination of the liberation size of pentlandite. The results are shown in Appendix B. Good liberation of pentlandite is achieved between 75 and 55 µm. A specific gravity of 3.14 g/cm$^3$ was also measured from a head sample using a gas pychnometer.

### 4.2 Grinding curve results

Tables 3 and 4 and Figure 2 show the grinding curve obtained with both grinding speeds as determined by Microtrac® and the grinding curve for the mill at 70% of its critical speed as determined by sieving. The complete size distributions are also shown in Appendix C. These curves show that grinding is more efficient at higher speed. As a p80 of 75 µm was initially wanted, a grinding time of 120 minutes was chosen for Mill #1 and a grinding time of 90 minutes for Mill #2. Table 4 also shows that the measured by sieving is lower than the p80 measured by Microtrac®. This was expected and can be explained by the fact that the aspect ratio of the particles is low. Since the Microtrac® measures an average diameter of the particles while sieving tends to measure the smallest diameter of a particle, sieving thus gives a finer size distribution. The first 10 flotation tests were then performed with a p80 of 60 µm as measured by sieving. For the other subsequent flotation tests, the desired p80 was raised to 75 µm as measured by sieving and the grinding time was decreased to 60 minutes.

Table 3: p80 as a function of time for grinding mill at 40% of its critical speed

| | *Microtrac®* |
|---|---|
| ***Time*** | ***p80 (µm)*** |
| **10** | 377 |
| **20** | 259 |
| **40** | 145 |
| **60** | 117 |
| **120** | 76.1 |
| **180** | 60.1 |

Table 4: p80 as a function of time for grinding mill at 70% of its critical speed

| | *Sieving* | *Microtrac®* |
|---|---|---|
| ***Time*** | ***p80 (µm)*** | ***p80 (µm)*** |
| **40** | 92.4 | 139.8 |
| **62** | 70.7 | 86.5 |
| **90** | 57.4 | 73.9 |
| **110** | 50.4 | 58.7 |

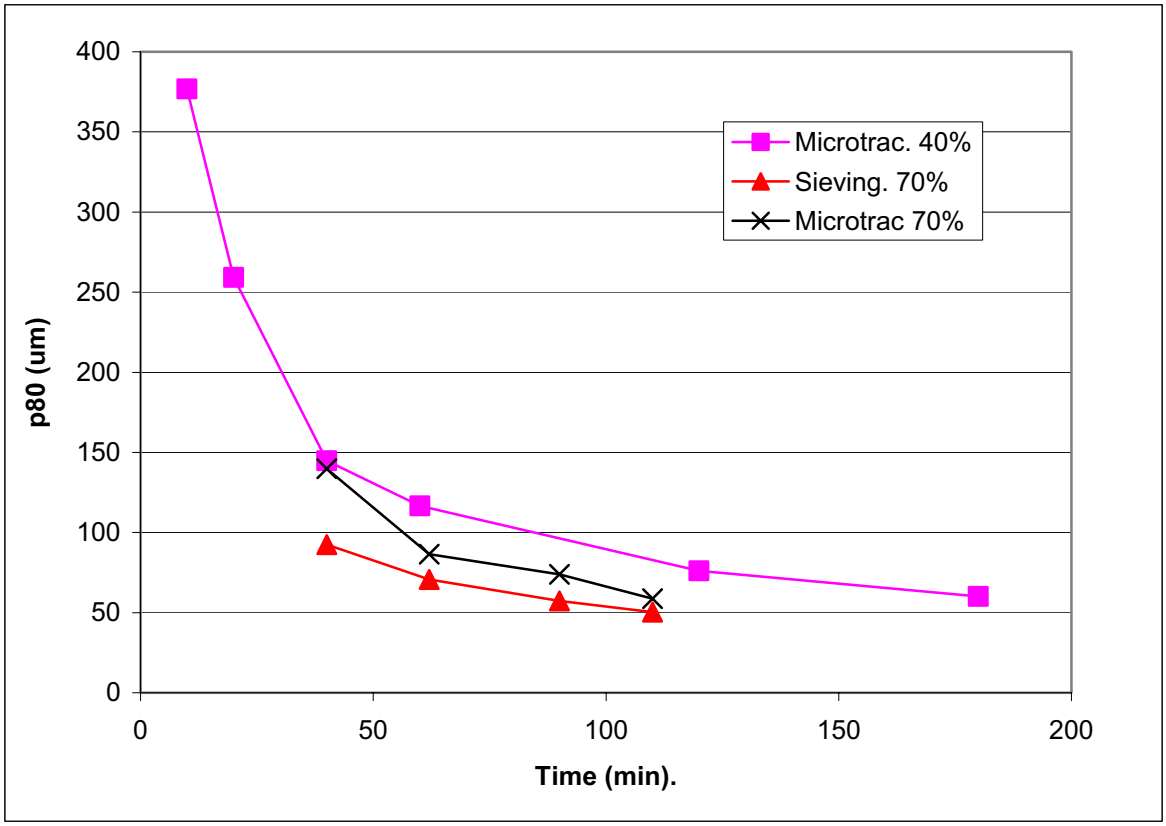



Figure 2: Grinding curve as determined by Microtrac® and sieving for Lac Rocher ore milled in a grinding mill at 40 and 70% of its critical speed

### 4.3 Bond Work Index determination results

The obtained WI is 13.4 KW/t. The complete results from the different cycles are given in Appendix D.

### 4.4 Magnetic separation results

The results of the magnetic separation tests results are shown in Tables 5 and 6. Recovery was negligible under 1000 G intensity. Some mass was removed at 4000 G, but Table 6 shows that a significant amount of Ni is lost to the magnetic concentrate.

Table 5: Mass recovery in magnetic separation test at different intensities

| Magnetic Field Intensity | 1000 G | | 4000 G | | 5200 G | |
|---|---|---|---|---|---|---|
| | Weight (g) | % | Weight (g) | % | Weight (g) | % |
| Magnetic portion | 0.01 | 0.07 | 0.6 | 5.32 | 0.8 | 5.71 |
| Non-magnetic portion | 14.2 | 99.93 | 10.67 | 94.68 | 13.2 | 94.29 |
| Total | 14.21 | 100 | 11.27 | 100 | 14 | 100 |

Table 6: Mass distribution of elements in magnetic separation test performed at 4000 Gauss

| | Mag | N-mag | Calculated feed |
|---|---|---|---|
| $SiO_2$ | 10.27 | 45.81 | 43.92 |
| $Al_2O_3$ | 1.43 | 6.68 | 6.40 |
| MgO | 4.73 | 15.43 | 14.86 |
| CaO | 3.72 | 5.91 | 5.80 |
| $K_2O$ | 0.10 | 0.34 | 0.33 |
| $TiO_2$ | 0.06 | 0.20 | 0.19 |
| MnO | 0.12 | 0.15 | 0.15 |
| $P_2O_5$ | 0.21 | 0.06 | 0.07 |
| Co | 0.04 | 0.04 | 0.04 |
| Cr | 0.06 | 0.21 | 0.21 |
| Cu | 0.21 | 0.48 | 0.47 |
| Fe | 40.55 | 10.36 | 11.97 |
| Ni | 1.81 | 1.31 | 1.34 |
| Pb | 0.01 | 0.01 | 0.01 |
| S | 24.64 | 3.67 | 4.79 |
| Zn | 0.01 | 0.03 | 0.03 |

### 4.5 Flotation test results

The complete results of these tests are given in Appendix A.

In order to help the optimization of the flotation conditions, size-by-size and mineralogical analyses were performed on flotation products of Test 6. Results (Table 7) show that most of the Ni losses are in the –32 µm fraction. This indicates that a longer flotation time or a coarser grind could increase the recovery. Moreover, from the mineralogical study, it was found that:

1- The ore is highly liberated and a coarser grind could reduce the losses of pentlandite fines.
2- Some silicates are entrained in the concentrate. A depressant such as a carboxy-methyl cellulose (CMC) could possibly be used to depress them.

The complete results of the size-by-size analysis are given in Appendix E and the mineralogical analysis in Appendix F.

Table 7: Size-by-size analysis of flotation tailings (Test 6)

| Size fraction | Weight (%) | Nickel | |
|---|---|---|---|
| | | Grade (%) | Distribution (%) |
| + 150 µm | 0.34 | 0.17 | 0.3 |
| + 106 µm | 1.71 | 0.17 | 1.3 |
| + 75 µm | 3.97 | 0.15 | 2.6 |
| + 53 µm | 12.91 | 0.13 | 7.5 |
| + 45 µm | 10.55 | 0.12 | 5.7 |
| + 38 µm | 10.81 | 0.13 | 6.0 |
| + 32 µm | 5.71 | 0.12 | 3.1 |
| -32 µm | 53.99 | 0.31 | 73.6 |
| Combined | 100.00 | 0.23 | 100.0 |

A coarser grind and the use of CMC were tested in Tests 9 to 11. Copper/nickel separation was tested in Tests 12 to 15 with depression of nickel by dextrine. These results are summarized in Appendix A.

Figure 3 shows that the kinetics of Ni flotation is faster when soda ash is used as opposed to lime. This figure refers to Test 1 and 2 recoveries for rougher and scavenger stages. Figures 4 and 5 illustrate the selectivity curve for Tests 11, 14 and 15 (for Ni and for bulk Ni/Cu concentrate).

The best results were obtained in Tests 11 to 15. The suggested final flowsheet for the bulk concentration of copper and nickel is the one used in Test 15. Table 8 shows the bulk concentrate grade and recoveries for Ni and Cu for Test 15 (final flowsheet).

Table 8: Grade and recoveries of bulk concentrate obtained with the final flowsheet (Test 15)

| | Nickel | | Copper | |
|---|---|---|---|---|
| | Grade (%) | Recovery (%) | Grade (%) | Distribution (%) |
| Test 15 | 11.04 | 79.9 | 4.14 | 94.2 |

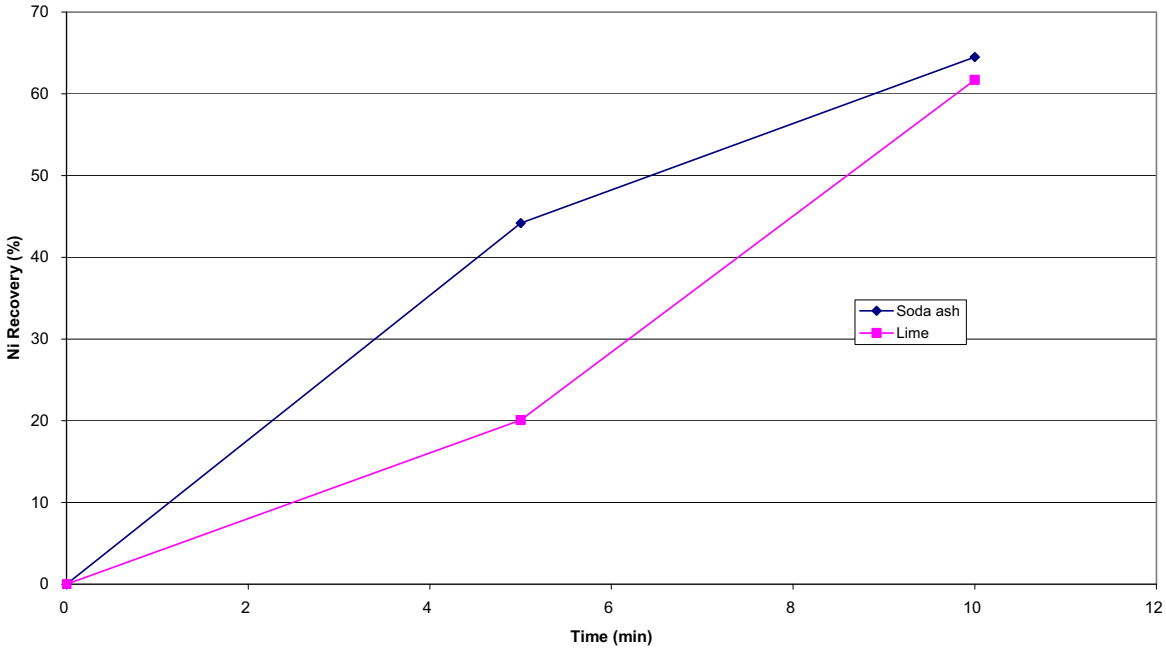



Figure 3: Kinetic of Ni flotation with lime and soda ash as pH controller

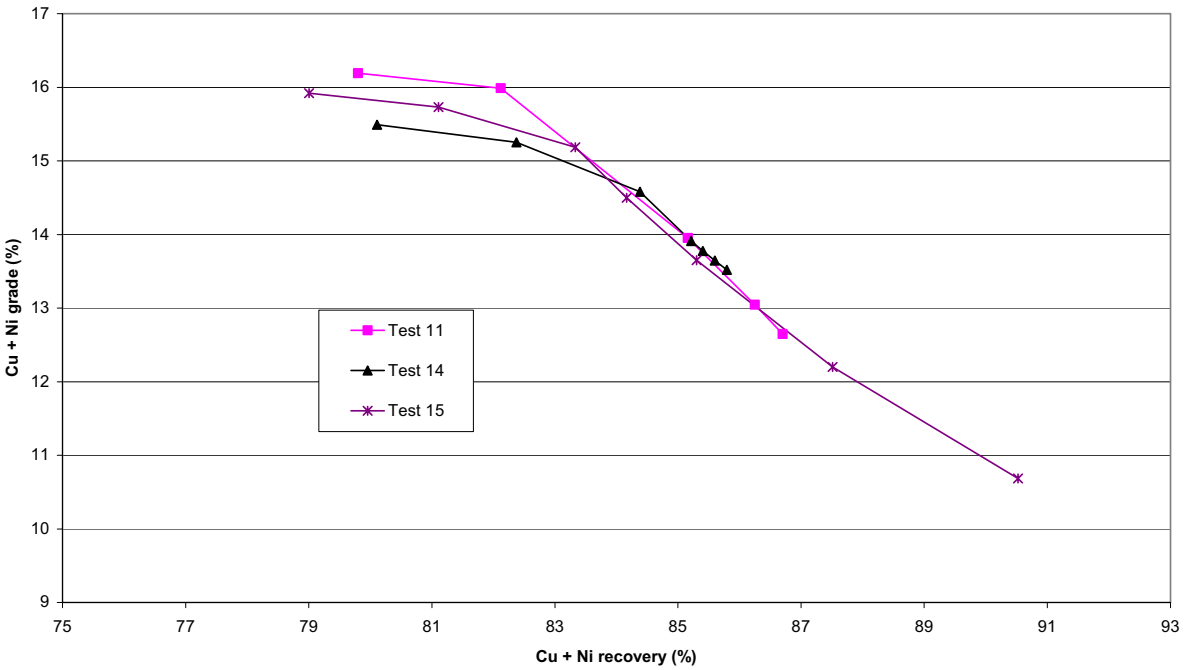



Figure 4: Selectivity curve for Cu/Ni flotation

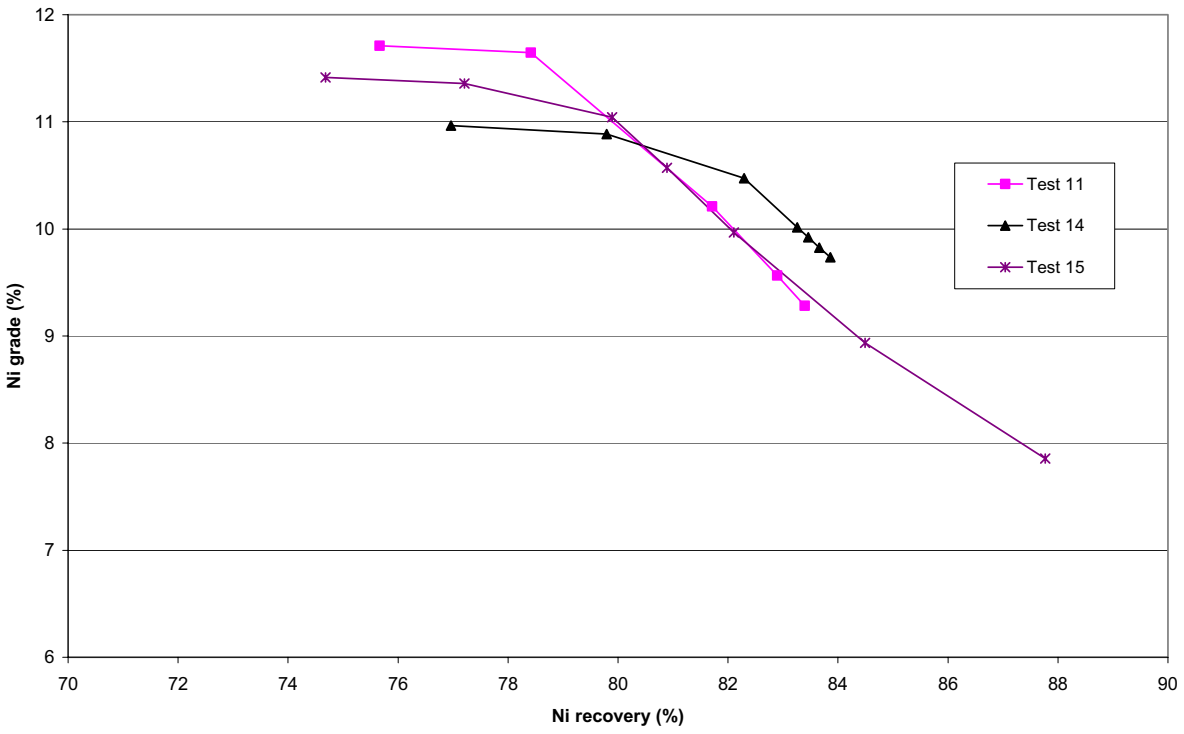



Figure 5: Selectivity curve for Ni flotation

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## 5 ACKNOWLEDGEMENTS

The author wants to acknowledge the effort of COREM team, Carolyn Lavoie, Massoud Agamirian and Marylène Renaud. A great part of the work was also performed under the good counseling of Jean-Claude Caron from Protech, and Normand Grégoire from Roche.

## 6 REFERENCES

AGAR, G.E., KIPKIE, W.B., and WELLS, P.F. (1982). *The separation of chalcopyrite and pentlandite from Inco metals' Sudbury area ores*, Proceedings of the 14th International Mineral Processing Congress, vol. 1, *Toronto, Canada*, pp. 1-14.

# Appendix A:

# Flotation Test Results

COREM

**Test pameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 1 |
| TEST DESCRIPTION | Studying the effect of soda ash and xanthate/ frother dosages |
| | |
| SAMPLE | Nickel and copper |
| TECHNICIAN | C.L and A.L. |
| DATE | 2007-07-10 |

| | Rougher | Scavenger 1 | Scavenger 2 | Cleaner |
|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | 900 |
| Weight of ore (kg) | 2006.87 | | | |
| Solid density (g/cm$^3$) | 3.8 | | | |
| Pulp Density, (% solids) | 31 | | | |

| Reagents concentration (% mass) | | | | |
|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Soda ash | H2SO4 |
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagent addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | Cu2SO4 | Soda ash | H2SO4 | pH | ORP(mV) | dO(%sat) | T(℃) | T total | Cond.(min.) | Flot. (min.) | pH |
| **cond. 1** | **6** | | | | | | | | | **0.00** | **3** | | **10.0** |
| Cond. 2 | | **6** | | | | | | | | **3.00** | **1** | | **10.0** |
| **Rougher** | | | | | | **10.06** | **-26.9** | **46.1** | | **4.00** | | **5** | **10.0** |
| cond. 3 | **4** | | | | | | | | | **9.00** | **3** | | **10.0** |
| cond. 4 | | **4** | | | | **10.06** | **-60.1** | **28.7** | | **12.00** | **1** | | **10.0** |
| **scavenger 1** | | | | | | | | | | **13.00** | | **5** | **10.0** |
| cond. 5 | | | **3** | | | **8.35** | **-91.8** | **3.5** | | **18.00** | **3** | | **8.3** |
| cond.6 | **5** | | | | | | | | | **21.00** | **3** | | **8.3** |
| cond.7 | | **4** | | | | **8.01** | **-103.8** | **14.1** | | **24.00** | **1** | | **8.3** |
| **pyrite-pyrrhotite conc.1** | | | | | | **8.07** | **-123** | **2.6** | | **25.00** | | **5** | **8.3** |
| **pyrite-pyrhotite conc. 2** | | | | | | **8.18** | **42.8** | **90.3** | **27.5** | **30.00** | | **4** | **8.3** |
| **cleaner 1** | | | | | | **9.9** | **38.8** | **97.3** | **23.5** | **34.00** | | **1.5** | **9.5** |
| **cleaner 2** | | | | | | **9.76** | **51.8** | **82.1** | **23.9** | **35.50** | | **6** | **9.5** |
| **cleaner 3** | | | | | | | | | | **41.50** | | | **9.5** |
| **Used (mL)** | | | | **100** | **50** | | | | | | | | |

Comments

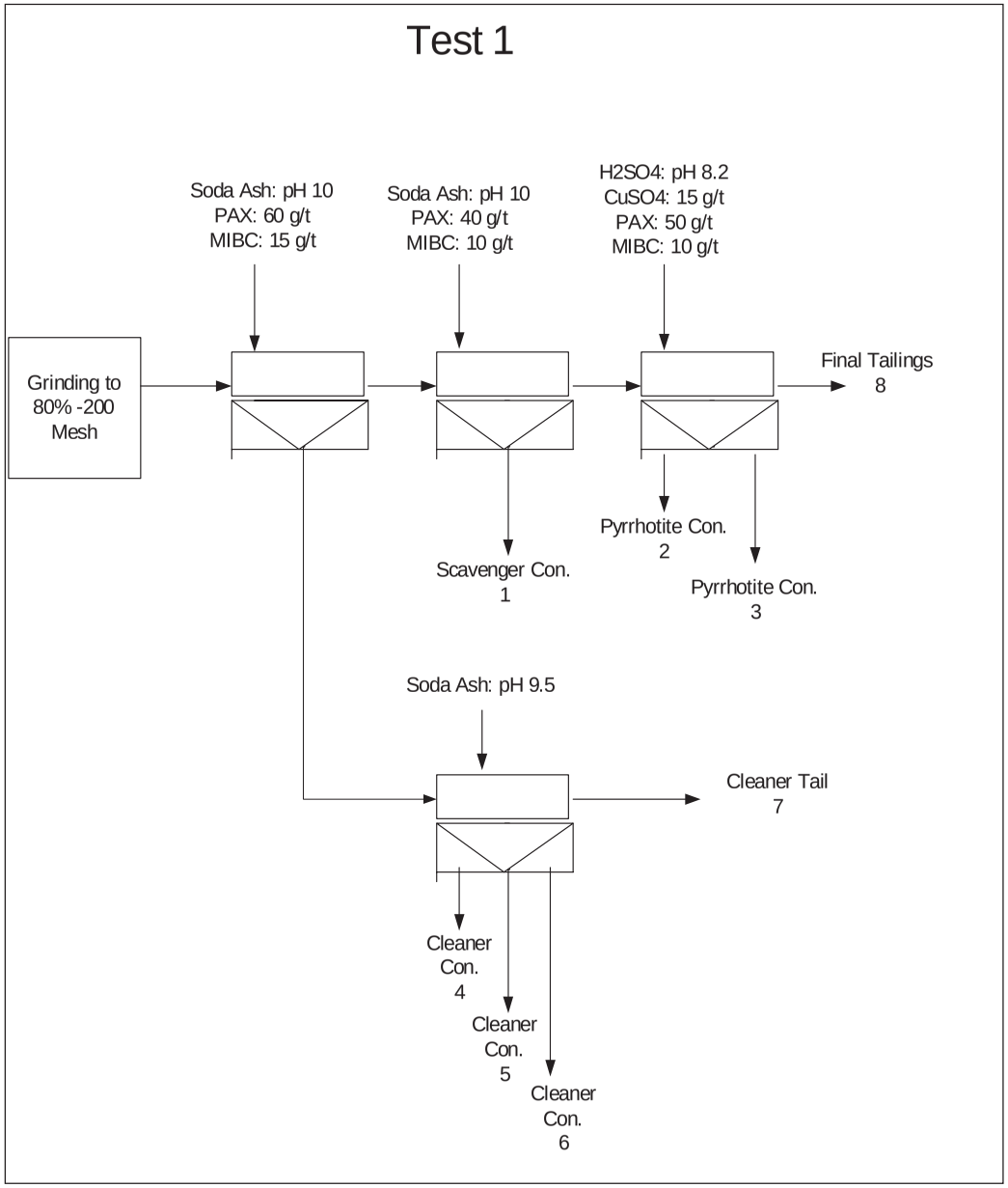
Froth load was high in first rougher. Loading was lower afterward. During pyrite-pyrrhotite flotation stage, froth was grayish.

COREM

| **Flotation test 1** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Scavenger conc. 1 | 3.41 | 30.79 | 3.17 | 11.90 | 2.38 | 0.15 | 0.11 | 0.08 | 0.05 | 0.13 | 0.12 | 3.69 | 17.17 | 7.70 | 0.01 | 14.55 | 0.04 | 92.03 |
| Pyrite-pyrrhotite conc. 1 | 3.26 | 40.10 | 3.72 | 15.70 | 3.05 | 0.19 | 0.13 | 0.11 | 0.03 | 0.08 | 0.16 | 0.60 | 14.28 | 5.15 | 0.01 | 8.64 | 0.16 | 92.10 |
| Pyrite-pyrrhotite conc. 2 | 7.35 | 29.44 | 2.77 | 11.52 | 2.71 | 0.16 | 0.11 | 0.09 | 0.01 | 0.02 | 0.16 | 0.11 | 27.72 | 1.70 | 0.01 | 16.17 | 0.06 | 92.77 |
| cleaner 1 | 4.20 | 38.69 | 1.47 | 16.64 | 1.02 | 0.07 | 0.06 | 0.05 | 0.02 | 0.09 | 0.07 | 5.73 | 15.02 | 1.43 | 0.01 | 12.69 | 0.02 | 93.09 |
| cleaner 2 | 1.10 | 43.25 | 1.74 | 18.52 | 1.25 | 0.08 | 0.06 | 0.06 | 0.04 | 0.08 | 0.09 | 3.21 | 12.89 | 1.31 | 0.01 | 9.54 | 0.03 | 92.17 |
| cleaner 3 | 0.30 | 40.96 | 2.25 | 17.16 | 1.68 | 0.12 | 0.09 | 0.07 | 0.02 | 0.11 | 0.10 | 2.41 | 14.45 | 2.20 | 0.01 | 11.18 | 0.05 | 92.86 |
| cleaning tails | 8.16 | 25.54 | 3.29 | 9.26 | 2.62 | 0.19 | 0.10 | 0.07 | 0.02 | 0.25 | 0.15 | 0.14 | 23.45 | 6.03 | 0.02 | 22.80 | 0.02 | 93.96 |
| final tails | 72.21 | 48.30 | 7.87 | 16.00 | 7.00 | 0.39 | 0.22 | 0.17 | 0.06 | 0.01 | 0.23 | 0.02 | 9.18 | 0.23 | 0.01 | 0.90 | 0.01 | 90.60 |
| **Feed calculated** | **100.00** | **43.71** | **6.47** | **15.03** | **5.71** | **0.33** | **0.18** | **0.14** | **0.05** | **0.04** | **0.21** | **0.46** | **12.44** | **1.30** | **0.01** | **5.15** | **0.02** | **91.3** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Scavenger conc. 1 | 3.41 | 2.4 | 1.7 | 2.7 | 1.4 | 1.6 | 2.0 | 1.9 | 3.1 | 10.5 | 2.0 | 27.2 | 4.7 | 20.3 | 3.1 | 9.6 | 7.1 |
| Pyrite-pyrrhotite conc. 1 | 3.26 | 3.0 | 1.9 | 3.4 | 1.7 | 1.9 | 2.3 | 2.4 | 2.0 | 6.0 | 2.6 | 4.2 | 3.7 | 12.9 | 3.6 | 5.5 | 24.6 |
| Pyrite-pyrrhotite conc. 2 | 7.35 | 5.0 | 3.1 | 5.6 | 3.5 | 3.5 | 4.6 | 4.8 | 1.4 | 4.1 | 5.6 | 1.8 | 16.4 | 9.7 | 6.7 | 23.1 | 21.6 |
| cleaner 1 | 4.20 | 3.7 | 1.0 | 4.7 | 0.8 | 1.0 | 1.5 | 1.5 | 1.6 | 9.3 | 1.5 | 52.1 | 5.1 | 4.6 | 5.3 | 10.4 | 3.8 |
| cleaner 2 | 1.10 | 1.1 | 0.3 | 1.4 | 0.2 | 0.3 | 0.4 | 0.5 | 0.8 | 2.2 | 0.5 | 7.6 | 1.1 | 1.1 | 1.2 | 2.0 | 1.6 |
| cleaner 3 | 0.30 | 0.3 | 0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.1 | 1.6 | 0.4 | 0.5 | 0.4 | 0.7 | 0.8 |
| cleaning tails | 8.16 | 4.8 | 4.1 | 5.0 | 3.7 | 4.7 | 4.5 | 4.2 | 2.9 | 49.6 | 5.8 | 2.5 | 15.4 | 37.9 | 14.1 | 36.1 | 6.2 |
| final tails | 72.21 | 79.8 | 87.8 | 76.9 | 88.5 | 86.9 | 84.7 | 84.7 | 88.1 | 17.4 | 81.9 | 3.0 | 53.2 | 12.9 | 65.6 | 12.6 | 34.3 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |




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**Test pameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 2 |
| TEST DESCRIPTION | Studying the effect of lime |
| | |
| SAMPLE | Nickel and copper |
| TECHNICIAN | C.L and A.L. |
| DATE | 2007-07-11 |

| | Rougher | Scavenger 1 | Scavenger 2 | Cleaner 1 | Cleaner 2 |
|---|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | 2.5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | 900 | 900 |
| Weight of ore (kg) | 2 | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 31 | | | | |
| Air flowrate (l/min) | 3 | 3 | 3 | 1.5 | 1.5 |

| Reagents concentration (% mass) | | | | |
|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Soda ash | H2SO4 |
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagent addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | Cu2SO4 | Soda ash | H2SO4 | pH | ORP(mV) | dO(%sat) | T(°C) | T total | Cond.(min.) | Flot. (min.) | pH |
| cond. 1 | **6** | | | | | **10.03** | | **0.4** | | **3.00** | **3** | | **10.0** |
| Cond. 2 | | **6** | | | | **10.06** | | **0.3** | | **4.00** | **1** | | **10.0** |
| **Rougher** | | | | | | **10.04** | | **71.5** | | **9.00** | | **5.0** | **10.0** |
| cond. 3 | **4** | | | | | **10.11** | | **17.4** | | **13.00** | **3** | | **10.0** |
| cond. 4 | | **4** | | | | | | | | **14.00** | **1** | | **10.0** |
| **scavenger** | | | | | | **10.2** | | **85.5** | | **19.00** | | **5.0** | **10.0** |
| cond. 5 | | | **3** | | | **10.15** | | **51.4** | | **24.00** | **3** | | **10.0** |
| **pH adjustment** | | | | | | | | | | **25.00** | | | **8.3** |
| cond.6 | **5** | | | | | **8.17** | | **11** | | **29.50** | **3** | | **8.3** |
| cond.7 | | **4** | | | | | | | | **30.50** | **1** | | **8.3** |
| **Pyrrhotite Con. 1** | | | | | | | | | | **35.50** | | **5.0** | **8.3** |
| **Pyrrhotite Con. 2** | | | | | | **8** | | **80** | **27.2** | **45.50** | | **10.0** | |
| **pH adjustment** | | | | | | | | | | | | | |
| **cleaner 1** | | | | | | **9.6** | **30.9** | **73.6** | **23.9** | | | **1.5** | **9.5** |
| **cleaner 2** | | | | | | **8.94** | **83.3** | **96.6** | **24.9** | | | **3.5** | |
| **Used (mL)** | | | | **113.1** | **57.8** | | | | | | | | |

Comments
Addition of CuSO4 before pH adjustment

COREM

| **Flotation test 2** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Scavenger conc. 1 | 5.20 | 27.95 | 2.12 | 11.30 | 1.55 | 0.11 | 0.09 | 0.06 | 0.02 | 0.19 | 0.09 | 2.11 | 18.78 | 9.89 | 0.01 | 17.26 | 0.03 | 91.56 |
| Pyrite-pyrrhotite conc. 1 | 2.30 | 34.98 | 3.27 | 14.00 | 2.48 | 0.18 | 0.12 | 0.10 | 0.01 | 0.11 | 0.14 | 0.42 | 17.40 | 6.36 | 0.01 | 12.29 | 0.11 | 91.97 |
| Pyrite-pyrrhotite conc. 2 | 4.66 | 29.18 | 2.80 | 11.51 | 2.50 | 0.17 | 0.11 | 0.09 | 0.02 | 0.04 | 0.14 | 0.12 | 26.46 | 2.99 | 0.01 | 16.14 | 0.10 | 92.39 |
| Cleaner 1 | 2.33 | 37.55 | 1.20 | 16.16 | 0.81 | 0.06 | 0.06 | 0.04 | 0.04 | 0.04 | 0.07 | 10.58 | 14.80 | 0.67 | 0.02 | 12.86 | 0.02 | 94.97 |
| Cleaner 2 | 2.31 | 45.02 | 1.75 | 19.60 | 1.24 | 0.08 | 0.07 | 0.06 | 0.03 | 0.07 | 0.11 | 3.01 | 11.98 | 1.16 | 0.02 | 8.51 | 0.01 | 92.70 |
| Cleaning tails | 5.60 | 22.03 | 1.92 | 8.81 | 1.53 | 0.11 | 0.07 | 0.05 | 0.02 | 0.31 | 0.08 | 0.19 | 27.10 | 3.96 | 0.06 | 28.36 | 0.01 | 94.59 |
| Final tails | 77.59 | 48.19 | 7.86 | 15.70 | 6.87 | 0.38 | 0.23 | 0.17 | 0.04 | 0.01 | 0.23 | 0.03 | 9.82 | 0.26 | 0.01 | 1.43 | 0.01 | 91.24 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Feed calculated** | **100.00** | **44.16** | **6.59** | **14.95** | **5.72** | **0.32** | **0.20** | **0.15** | **0.04** | **0.04** | **0.20** | **0.47** | **12.37** | **1.26** | **0.01** | **5.13** | **0.02** | **91.6** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Scavenger conc. 1 | 5.20 | 3.3 | 1.7 | 3.9 | 1.4 | 1.8 | 2.3 | 2.2 | 3.3 | 23.2 | 2.4 | 23.2 | 7.9 | 40.8 | 4.0 | 17.5 | 6.7 |
| Pyrite-pyrrhotite conc. 1 | 2.30 | 1.8 | 1.1 | 2.2 | 1.0 | 1.3 | 1.4 | 1.5 | 0.6 | 6.0 | 1.6 | 2.1 | 3.2 | 11.6 | 1.8 | 5.5 | 11.7 |
| Pyrite-pyrrhotite conc. 2 | 4.66 | 3.1 | 2.0 | 3.6 | 2.0 | 2.4 | 2.6 | 3.0 | 2.3 | 4.8 | 3.2 | 1.2 | 10.0 | 11.0 | 3.6 | 14.7 | 22.9 |
| Cleaner 1 | 2.33 | 2.0 | 0.4 | 2.5 | 0.3 | 0.4 | 0.7 | 0.6 | 2.6 | 2.2 | 0.8 | 52.1 | 2.8 | 1.2 | 2.9 | 5.8 | 2.7 |
| Cleaner 2 | 2.31 | 2.4 | 0.6 | 3.0 | 0.5 | 0.6 | 0.8 | 0.9 | 1.8 | 3.9 | 1.2 | 14.7 | 2.2 | 2.1 | 3.2 | 3.8 | 1.4 |
| Cleaning tails | 5.60 | 2.8 | 1.6 | 3.3 | 1.5 | 1.9 | 1.9 | 1.9 | 2.7 | 41.4 | 2.2 | 2.2 | 12.3 | 17.6 | 24.0 | 31.0 | 2.7 |
| Final tails | 77.59 | 84.7 | 92.5 | 81.5 | 93.2 | 91.6 | 90.2 | 89.8 | 86.7 | 18.6 | 88.5 | 4.6 | 61.6 | 15.7 | 60.4 | 21.6 | 51.9 |
| | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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**Test parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | Test 3 |
| TEST DESCRIPTION | Studying the effect of DETA and SMBS |
| | |
| SAMPLE | Copper and nickel |
| TECHNICIAN | C.L and A.L |
| DATE | 2008-04-10 |

| | Rougher | Scavenger 1 | Scavenger 2 | Cleaner 1 | Cleaner 2 | Cleaner 3 |
|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | 900 | 900 | 900 |
| Weight of ore (kg) | 2000 | | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 35.4 | | | | | |
| Air flowrate (l/min) | 3 | 3 | 3 | 1.5 | 1.5 | 1.5 |

| Reagents concentration (% mass) | | | | | | |
|---|---|---|---|---|---|---|
| Kax 51 | SMBS | DETA | MIBC | Cu2SO4 | Lime | H2SO4 |
| **2** | **5** | **1** | **0.5** | **0.5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | SMBS | DETA | MIBC | Cu2SO4 | Lime | H2SO4 | pH | ORP(mV) | dO(%sat) | T(°C) | T total | Cond.(min.) | Flot. (min.) | pH |
| cond. 1 | | | | | | | | **9.38** | | | **24.1** | **0.00** | **3** | | **9.5** |
| Cond. 2 | | **38** | **40** | | | | | **8.08** | **396** | **0.9** | **24.1** | **3.00** | **3** | | **9.5** |
| Cond. 3 | **6** | | | | | | | **9.6** | **-502.4** | **1** | **24.4** | **6.00** | **3** | | **9.5** |
| Cond. 4 | | | | **6** | | | | | | | | **9.00** | **1** | | **9.5** |
| **Rougher** | | | | | | | | | | | | **10.00** | | **5.00** | **9.5** |
| cond. 5 | **4.0** | | | | | | | **9.56** | **-203.8** | **6** | **26** | **15.00** | **3** | | **9.5** |
| cond. 6 | | | | **4.0** | | | | | | | | **18.00** | **1** | | **9.5** |
| **scavenger 1** | | | | | | | | **9.52** | **-64** | **84.4** | | **19.00** | | **5.00** | **9.5** |
| cond. 7 | | | | | **6** | | | **8.1** | **-180.7** | **1.1** | **27.7** | **24.00** | **3** | | **8.3** |
| cond.8 | **5** | | | **4** | | | | **8.19** | **-180.7** | **1.1** | **27.7** | **27.00** | **3** | | **8.3** |
| **pyrite-pyrrhotite conc.1** | | | | | | | | | | | | **30.00** | | **5.00** | **8.3** |
| cond. 9 | | | | | | | | **10.67** | **-26.4** | **69.6** | **24** | **35.00** | **3** | | **9.5** |
| **cleaner 1** | | | | | | | | | | | | **38.00** | | **2.00** | **9.5** |
| **cleaner 2** | | | | | | | | **10.3** | **-3.6** | **94.2** | **24.4** | **40.00** | | **2.00** | **9.5** |
| **cleaner 3** | | | | | | | | | | | | **42.00** | | **2.00** | **9.5** |
| **Used (mL)** | | | | | | **0.7** | **23.6** | | | | | | | | |

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| Flotation test 3 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Scavenger | 7.15 | 20.68 | 1.91 | 8.51 | 1.38 | 0.13 | 0.08 | 0.06 | 0.02 | 0.27 | 0.09 | 3.55 | 24.05 | 9.31 | 0.01 | 24.40 | 0.03 | 94.45 |
| Pyrite-pyrhotite conc. | 3.25 | 55.52 | 1.97 | 24.25 | 1.41 | 0.08 | 0.08 | 0.07 | 0.01 | 0.01 | 0.11 | 0.46 | 6.48 | 0.44 | 0.01 | 1.06 | 0.01 | 91.97 |
| Cleaner 1 | 3.95 | 25.94 | 2.65 | 10.31 | 2.25 | 0.18 | 0.10 | 0.09 | 0.03 | 0.10 | 0.13 | 0.38 | 28.06 | 2.39 | 0.01 | 19.48 | 0.36 | 92.46 |
| Cleaner 2 | 1.73 | 50.30 | 2.31 | 21.31 | 1.85 | 0.12 | 0.10 | 0.09 | 0.02 | 0.04 | 0.13 | 1.14 | 8.82 | 1.07 | 0.01 | 3.63 | 0.02 | 90.97 |
| Cleaner tails | 5.50 | 32.43 | 2.80 | 12.66 | 2.44 | 0.16 | 0.11 | 0.08 | 0.02 | 0.15 | 0.13 | 2.18 | 18.40 | 4.83 | 0.05 | 16.23 | 0.02 | 92.68 |
| Final tails | 78.43 | 45.91 | 7.56 | 15.29 | 6.72 | 0.39 | 0.21 | 0.16 | 0.05 | 0.01 | 0.22 | 0.02 | 10.92 | 0.35 | 0.01 | 2.09 | 0.01 | 89.93 |
| **Feed calculated** | **100.00** | **42.96** | **6.43** | **14.86** | **5.67** | **0.34** | **0.19** | **0.14** | **0.05** | **0.04** | **0.20** | **0.44** | **12.77** | **1.33** | **0.01** | **5.14** | **0.03** | **90.6** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Scavenger | 7.15 | 3.4 | 2.1 | 4.1 | 1.7 | 2.7 | 2.9 | 3.1 | 3.5 | 47.4 | 3.4 | 57.9 | 13.5 | 49.9 | 5.9 | 34.0 | 8.0 |
| Pyrite-pyrhotite conc. | 3.25 | 4.2 | 1.0 | 5.3 | 0.8 | 0.8 | 1.4 | 1.6 | 0.7 | 0.8 | 1.9 | 3.4 | 1.6 | 1.1 | 3.5 | 0.7 | 1.3 |
| Cleaner 1 | 3.95 | 2.4 | 1.6 | 2.7 | 1.6 | 2.1 | 2.2 | 2.5 | 2.4 | 9.9 | 2.5 | 3.4 | 8.7 | 7.1 | 3.3 | 15.0 | 55.1 |
| Cleaner 2 | 1.73 | 2.0 | 0.6 | 2.5 | 0.6 | 0.6 | 0.9 | 1.1 | 0.9 | 1.6 | 1.2 | 4.5 | 1.2 | 1.4 | 2.0 | 1.2 | 1.0 |
| Cleaner tails | 5.50 | 4.1 | 2.4 | 4.7 | 2.4 | 2.7 | 3.1 | 3.2 | 2.1 | 20.7 | 3.6 | 27.4 | 7.9 | 19.9 | 20.5 | 17.4 | 4.3 |
| Final tails | 78.43 | 83.8 | 92.2 | 80.7 | 93.0 | 91.2 | 89.5 | 88.5 | 90.5 | 19.6 | 87.5 | 3.4 | 67.1 | 20.6 | 64.9 | 31.8 | 30.4 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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**Test pameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 4 |
| TEST DESCRIPTION | Studying the effect of lime |
| SAMPLE | Nickel and copper |
| TECHNICIAN | C.L and A.L. |
| DATE | 2007-07-19 |
| | |

| | Rougher | Scavenger 1 | Scavenger 2 | Cleaner |
|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | None |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | |
| Weight of ore (kg) | 2 | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | |
| Pulp Density, (% solids) | 31 | | | |
| Air flowrate (l/min) | | | | |

| Reagents concentration (% mass) | | | | |
|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 |
| **2** | **0.5** | **0.5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagent addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 | pH | ORP(mV) | dO(%sat) | T(°C) | T tot al | Cond.(min.) | Flot. (min.) | pH |
| Cond. 1: pH adjustment | | | | | | | | | | **0.00** | **3** | | **10.0** |
| Cond. 2 | **6** | | | | | **10.35** | **-562.7** | **0.7** | **23.9** | **3.00** | **3** | | **10.0** |
| Cond. 3 | | **6** | | | | | | | | **3.00** | **1** | | **10.0** |
| **Rougher** | | | | | | **9.9** | **-144.4** | **28.4** | **24.5** | **4.00** | | **5.0** | **10.0** |
| cond. 3 | **4** | | | | | **10.04** | **-251.4** | **3.1** | **25.3** | **9.00** | **3** | | **10.0** |
| cond. 4 | | **4** | | | | **10** | **-335** | **1.2** | **25.4** | **12.00** | **1** | | **10.0** |
| **scavenger 1** | | | | | | **10.08** | **-58.9** | **86.4** | **25.7** | **13.00** | | **5.0** | **10.0** |
| cond. 5 | **3** | | | | | **10.13** | **-92.9** | **81.3** | **26.1** | **18.00** | **3** | | **10.0** |
| cond.6 | | **4** | | | | **10.06** | **-213.8** | **5** | **26.4** | **21.00** | **1** | | **10.0** |
| **scavenger 2** | | | | | | | | | | **22.00** | | **6.0** | **10.0** |
| cond.7 | **3** | | | | | **10** | **-76.7** | **48.6** | **26.9** | **28.00** | **3** | | **10.0** |
| cond.8 | | **4** | | | | **10.1** | **-104.3** | **20.3** | **27.1** | **31.00** | **1** | | **10.0** |
| **scavenger 3** | | | | | | **10.07** | **-39.2** | **87.7** | **27.2** | **32.00** | | **10.0** | **10.0** |
| Cond. 9: pH adjustment | | | | | | | | | | **42.00** | | | **8.3** |
| cond.10 | | | **10** | | | | | | | **42.00** | **3** | | **8.3** |
| cond.11 | **5** | **6** | | | | | | | | | | | **8.3** |
| **pyrite-pyrrhotite conc.1** | | | | | | | | | | **45.00** | | **5.0** | **8.3** |
| cond.12 | **3** | **4** | | | | | | | | | | | **8.3** |
| **pyrite-pyrhotite conc. 2** | | | | | | | | | | **50.00** | | **10.0** | **8.3** |
| **Used (mL)** | | | | **65** | **52.1** | | | | | | | | |

Comments
Air was adjusted to 25 psi instead of 30 psi.

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| **Flotation test 4** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Rougher | 12.05 | 30.82 | 1.838 | 12.82 | 1.437 | 0.084 | 0.073 | 0.054 | 0.022 | 0.19 | 0.086 | 2.828 | 20.62 | 3.198 | 0.029 | 19.81 | 0.014 | 93.92 |
| Scavenger 1 | 3.83 | 26.91 | 2.316 | 10.88 | 1.647 | 0.116 | 0.085 | 0.069 | 0.033 | 0.189 | 0.099 | 1.935 | 19.38 | 11.37 | 0.01 | 17.48 | 0.03 | 92.55 |
| Scavenger 2 | 2.70 | 33.72 | 3.692 | 12.89 | 2.78 | 0.186 | 0.126 | 0.104 | 0.034 | 0.122 | 0.144 | 0.358 | 17.77 | 8.19 | 0.01 | 12.38 | 0.043 | 92.55 |
| Scavenger 3 | 3.61 | 35.44 | 4.513 | 13.29 | 3.556 | 0.232 | 0.158 | 0.121 | 0.015 | 0.056 | 0.166 | 0.138 | 19.43 | 3.587 | 0.01 | 10.73 | 0.045 | 91.49 |
| Pyrite-pyrrhotite 1 | 3.52 | 19.42 | 2.48 | 7.414 | 2.043 | 0.14 | 0.086 | 0.069 | 0.022 | 0.014 | 0.1 | 0.051 | 37.26 | 1.052 | 0.01 | 22.91 | 0.343 | 93.41 |
| Pyrite-pyrrhotite 2 | 3.24 | 24.68 | 3.346 | 9.443 | 2.75 | 0.188 | 0.116 | 0.088 | 0.028 | 0.017 | 0.121 | 0.034 | 32.15 | 1.002 | 0.01 | 18.63 | 0.021 | 92.62 |
| Final tails | 71.06 | 49.25 | 7.85 | 16.35 | 7.27 | 0.37 | 0.01 | 0.17 | 0.07 | 0.01 | 0.25 | 0.02 | 8.09 | 0.21 | 0.01 | 0.20 | 0.01 | 90.14 |
| **Feed calculated** | **100.00** | **43.41** | **6.35** | **14.97** | **5.76** | **0.30** | **0.04** | **0.14** | **0.06** | **0.04** | **0.21** | **0.45** | **12.51** | **1.39** | **0.01** | **5.33** | **0.03** | **91.0** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Rougher | 12.05 | 8.6 | 3.5 | 10.3 | 3.0 | 3.4 | 25.1 | 4.5 | 4.7 | 52.5 | 4.9 | 76.1 | 19.9 | 27.7 | 28.4 | 44.8 | 6.6 |
| Scavenger 1 | 3.83 | 2.4 | 1.4 | 2.8 | 1.1 | 1.5 | 9.3 | 1.8 | 2.3 | 16.6 | 1.8 | 16.5 | 5.9 | 31.3 | 3.1 | 12.6 | 4.5 |
| Scavenger 2 | 2.70 | 2.1 | 1.6 | 2.3 | 1.3 | 1.7 | 9.7 | 1.9 | 1.6 | 7.6 | 1.8 | 2.2 | 3.8 | 15.9 | 2.2 | 6.3 | 4.6 |
| Scavenger 3 | 3.61 | 2.9 | 2.6 | 3.2 | 2.2 | 2.8 | 16.3 | 3.0 | 1.0 | 4.6 | 2.8 | 1.1 | 5.6 | 9.3 | 2.9 | 7.3 | 6.4 |
| Pyrite-pyrrhotite 1 | 3.52 | 1.6 | 1.4 | 1.7 | 1.2 | 1.7 | 8.6 | 1.7 | 1.4 | 1.1 | 1.7 | 0.4 | 10.5 | 2.7 | 2.9 | 15.2 | 47.4 |
| Pyrite-pyrrhotite 2 | 3.24 | 1.8 | 1.7 | 2.0 | 1.5 | 2.0 | 10.7 | 2.0 | 1.6 | 1.3 | 1.9 | 0.2 | 8.3 | 2.3 | 2.6 | 11.3 | 2.7 |
| Final tails | 71.06 | 80.6 | 87.9 | 77.6 | 89.6 | 86.9 | 20.3 | 85.1 | 87.4 | 16.3 | 85.1 | 3.5 | 46.0 | 10.8 | 57.8 | 2.6 | 27.9 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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**Test pameters**

| | |
|---|---|
| PROJECT NUMBER | T881- Développement d'un procédé de flottation du Ni du Lac Rocher |
| TEST NUMBER | 5 |
| TEST DESCRIPTION | Studying the effect of the kinetic at the roughing stage |
| SAMPLE | Nickel and Copper |
| TECHNICIAN | C.L. |
| DATE | 9 August 2007 |

| Stage | Preflot | Rougher | Scavenger | Sulfide Rghr | Sulfide Scav | | |
|---|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | 5 | 5 | | |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | 1400 | 1400 | | |
| Weight of ore (kg) | 2 | | | | | | |
| Solid density (g/cm³) | 3.8 | | | | | | |
| Pulp Density, (% solids) | 30.0 | | | | | | |
| Air flowrate (l/min) | 3 | 3 | 3 | 3 | 3 | | |

| Reagents concentration (% mass) | | | | |
|---|---|---|---|---|
| KAX 51 | MIBC | Cu2SO4 | Lime | H2SO4 |
| **2** | **0.5** | **0.5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | KAX 51 | MIBC | Cu2SO4 | Lime | H2SO4 | pH | T(°C) | ORP(mV) | dO(%sat) | t total | Cond.(min) | Flot. (min) | pH setpoint |
| **pH Adjustment** | | | | | | | | | | | | | 10.0 |
| cond. 1 | **1.5** | | | | | **9.97** | | | | 0.00 | **3** | | 10.0 |
| Cond. 2 | | **6** | | | | **9.99** | 23.1 | -338.3 | 0.5 | 3.00 | **1** | | 10.0 |
| **Preflottation** | | | | | | **9.85** | 23.9 | 154.3 | 65.2 | 4.00 | | **4.0** | 10.0 |
| cond. 3 | **6** | | | | | | | | | 8.00 | | | 10.0 |
| cond. 4 | | **4** | | | | | | | | 8.00 | | | 10.0 |
| **Rougher (30 sec)** | | | | | | | | | | 8.00 | | **0.5** | 10.0 |
| **Rghr (1,5 min cumul.)** | | | | | | | | | | 8.50 | | **1.0** | 10.0 |
| **Rghr (2,5 min cumul.)** | | | | | | | | | | 9.50 | | **1.0** | 10.0 |
| **Rghr (4,0 min cumul.)** | | | | | | **9.98** | 24.4 | -101.1 | 100.1 | 10.50 | | **1.5** | 10.0 |
| cond. 5 | **4** | | | | | | | | | 12.00 | | | ** |
| cond. 6 | | **4** | | | | | | | | 12.00 | | | |
| **Scavenger (30 sec)** | | | | | | **10.06** | 24.7 | -105.0 | 97.8 | 12.00 | | **0.5** | |
| **Scav (1,0 min cumul.)** | | | | | | | | | | 12.50 | | **0.5** | |
| **Scav (2,0 min cumul.)** | | | | | | **9.98** | 24.9 | -111.3 | 72.5 | 13.00 | | **1.0** | |
| **Ajust. pH** | | | | | | **9.94** | 25.1 | -179.8 | 18.5 | 14.00 | | | 8.3 |
| cond. 7 | | | **10** | | | **8.25** | | | | 14.00 | **1.5** | | 8.3 |
| cond. 8 | **5** | | | | | | | | | 15.50 | | | 8.3 |
| cond. 9 | | **6** | | | | **8.32** | 25.7 | -338.9 | 0.5 | 15.50 | **1.5** | | 8.3 |
| **Sulfide Rghr (2,5 min)** | | | | | | | | | | 17.00 | | **2.5** | 8.3 |
| **Sulfide Rghr (5 min cumul.)** | | | | | | **8.48** | 26.4 | -13.7 | 88.1 | 19.50 | | **2.5** | 8.3 |
| cond. 10 | **3** | | | | | | | | | 22.00 | | | 8.3 |
| cond. 11 | | **4** | | | | | | | | 22.00 | | | 8.3 |
| **Sulfide Scav (5 min)** | | | | | | **8.39** | 26.7 | -59.8 | 36.2 | 22.00 | | **5.0** | 8.3 |
| **Sulfide Scav (10 min cumul.)** | | | | | | **8.31** | 27.2 | 20.0 | 103.8 | 27.00 | | **5.0** | 8.3 |
| Lecture finale | | | | | | **8.26** | 27.5 | 27.9 | 103.1 | 32.00 | | | 8.3 |
| **Used (mL)** | | | | **95.7** | **38.4** | | | | | | | | |

comments

Jean-Claude Caron (Protec), Normand Grégoire (Roche Ltée), Guylaine Laforest, Mohamed Ourriban, Marilène Renaud were present during the test

pH, PRP, dO and T were taken at the beginning of the conditionning or flotation time

* The pH was not stabilised before the addition of the reagents.

* *pH control's pump was stop at the scavenger step and restart with H2SO4 for the sulfie flotation.

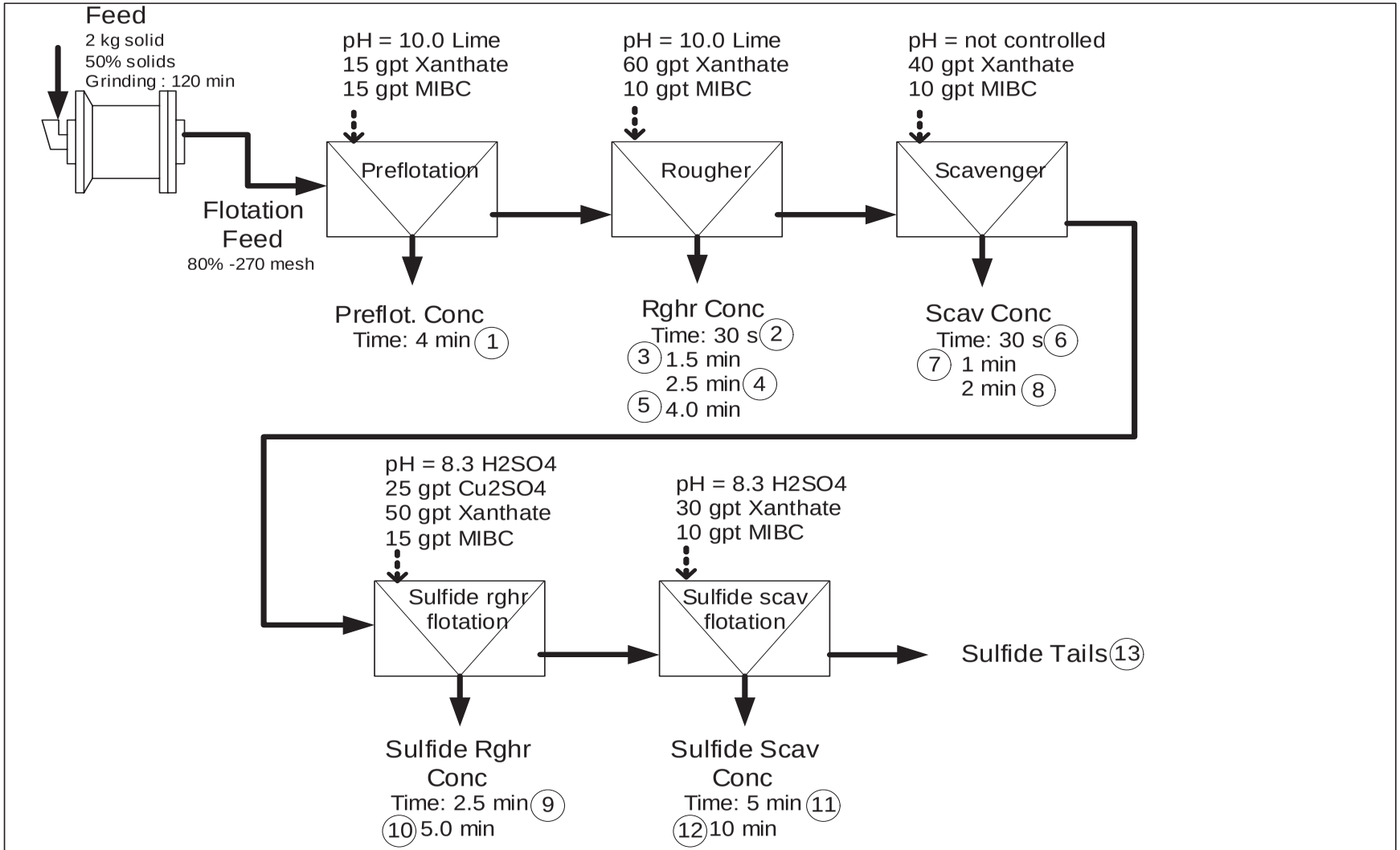
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| Flotation test 5 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Preflotation | 11.07 | 38.17 | 3.05 | 14.96 | 2.54 | 0.15 | 0.11 | 0.08 | 0.03 | 0.14 | 0.12 | 1.32 | 17.29 | 0.91 | 0.03 | 14.18 | 0.01 | 93.09 |
| Rougher conc. 30sec. | 0.56 | 25.41 | 2.09 | 10.31 | 1.49 | 0.09 | 0.08 | 0.05 | 0.02 | 0.13 | 0.09 | 8.95 | 21.35 | 3.76 | 0.01 | 20.58 | 0.03 | 94.43 |
| Rougher conc. 1m30s | 1.98 | 28.40 | 2.14 | 11.49 | 1.74 | 0.11 | 0.09 | 0.06 | 0.04 | 0.11 | 0.14 | 8.55 | 20.02 | 3.37 | 0.01 | 18.64 | 0.03 | 94.93 |
| Rougher conc. 2m30s | 1.52 | 32.41 | 3.08 | 12.83 | 2.50 | 0.15 | 0.11 | 0.09 | 0.03 | 0.15 | 0.13 | 2.34 | 17.43 | 7.11 | 0.01 | 14.51 | 0.02 | 92.89 |
| Rougher conc. 4min | 1.76 | 30.45 | 3.12 | 11.68 | 2.64 | 0.16 | 0.11 | 0.09 | 0.04 | 0.18 | 0.13 | 0.88 | 17.40 | 9.89 | 0.01 | 14.75 | 0.03 | 91.54 |
| Scavenger conc. 30sec | 0.22 | 32.49 | 3.84 | 12.31 | 3.09 | 0.19 | 0.13 | 0.10 | 0.01 | 0.14 | 0.14 | 0.89 | 17.68 | 7.39 | 0.01 | 13.58 | 0.03 | 92.03 |
| Scavenger conc. 1min | 0.38 | 35.32 | 4.03 | 13.39 | 3.21 | 0.20 | 0.14 | 0.11 | 0.03 | 0.13 | 0.15 | 0.73 | 16.75 | 6.01 | 0.01 | 12.36 | 0.04 | 92.60 |
| Scavenger conc. 2min | 0.96 | 33.22 | 3.81 | 12.49 | 3.10 | 0.19 | 0.13 | 0.10 | 0.03 | 0.14 | 0.15 | 0.41 | 17.35 | 7.63 | 0.01 | 13.24 | 0.04 | 92.06 |
| Sulfide rougher 2m30s | 2.42 | 31.17 | 3.81 | 11.99 | 2.89 | 0.18 | 0.13 | 0.10 | 0.01 | 0.15 | 0.16 | 0.23 | 18.18 | 8.81 | 0.01 | 14.52 | 0.07 | 92.41 |
| Sulfide rougher 5min | 1.64 | 30.01 | 3.61 | 11.64 | 2.77 | 0.20 | 0.12 | 0.10 | 0.03 | 0.16 | 0.14 | 0.17 | 18.19 | 9.77 | 0.01 | 13.89 | 0.05 | 90.85 |
| Sulfide scavenegr 5min | 2.31 | 29.48 | 3.37 | 11.38 | 2.79 | 0.19 | 0.13 | 0.10 | 0.03 | 0.07 | 0.14 | 0.16 | 24.37 | 4.73 | 0.01 | 15.18 | 0.09 | 92.22 |
| Sulfide scavenger 10 min. | 1.64 | 24.62 | 2.76 | 9.37 | 2.47 | 0.16 | 0.11 | 0.09 | 0.03 | 0.03 | 0.26 | 0.16 | 31.96 | 2.10 | 0.01 | 19.41 | 0.08 | 93.62 |
| Sulfide tails | 73.55 | 47.90 | 7.53 | 15.89 | 6.91 | 0.39 | 0.23 | 0.16 | 0.06 | 0.01 | 0.23 | 0.01 | 9.80 | 0.26 | 0.01 | 1.44 | 0.02 | 90.84 |
| **Feed calculated** | **100.00** | **44.04** | **6.36** | **15.12** | **5.76** | **0.33** | **0.20** | **0.14** | **0.05** | **0.04** | **0.21** | **0.45** | **12.30** | **1.29** | **0.01** | **5.04** | **0.02** | **91.4** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Preflotation | 11.07 | 9.6 | 5.3 | 10.9 | 4.9 | 5.0 | 6.2 | 6.3 | 6.2 | 37.7 | 6.4 | 32.6 | 15.6 | 7.8 | 26.4 | 31.1 | 6.2 |
| Rougher conc. 30sec. | 0.56 | 0.3 | 0.2 | 0.4 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 1.7 | 0.2 | 11.2 | 1.0 | 1.6 | 0.5 | 2.3 | 0.6 |
| Rougher conc. 1m30s | 1.98 | 1.3 | 0.7 | 1.5 | 0.6 | 0.7 | 0.9 | 0.9 | 1.4 | 5.2 | 1.3 | 37.9 | 3.2 | 5.2 | 2.1 | 7.3 | 2.2 |
| Rougher conc. 2m30s | 1.52 | 1.1 | 0.7 | 1.3 | 0.7 | 0.7 | 0.8 | 0.9 | 0.9 | 5.3 | 0.9 | 7.9 | 2.1 | 8.4 | 1.2 | 4.4 | 1.5 |
| Rougher conc. 4min | 1.76 | 1.2 | 0.9 | 1.4 | 0.8 | 0.9 | 1.0 | 1.1 | 1.3 | 7.3 | 1.1 | 3.5 | 2.5 | 13.5 | 1.4 | 5.1 | 1.9 |
| Scavenger conc. 30sec | 0.22 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.8 | 0.1 | 0.4 | 0.3 | 1.3 | 0.2 | 0.6 | 0.3 |
| Scavenger conc. 1min | 0.38 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 1.2 | 0.3 | 0.6 | 0.5 | 1.8 | 0.3 | 0.9 | 0.6 |
| Scavenger conc. 2min | 0.96 | 0.7 | 0.6 | 0.8 | 0.5 | 0.5 | 0.6 | 0.7 | 0.6 | 3.2 | 0.7 | 0.9 | 1.4 | 5.7 | 0.8 | 2.5 | 1.5 |
| Sulfide rougher 2m30s | 2.42 | 1.7 | 1.5 | 1.9 | 1.2 | 1.3 | 1.6 | 1.7 | 0.6 | 8.8 | 1.9 | 1.2 | 3.6 | 16.6 | 2.0 | 7.0 | 6.3 |
| Sulfide rougher 5min | 1.64 | 1.1 | 0.9 | 1.3 | 0.8 | 1.0 | 1.0 | 1.2 | 1.1 | 6.1 | 1.1 | 0.6 | 2.4 | 12.4 | 1.3 | 4.5 | 3.4 |
| Sulfide scavenegr 5min | 2.31 | 1.5 | 1.2 | 1.7 | 1.1 | 1.3 | 1.5 | 1.6 | 1.5 | 3.9 | 1.6 | 0.8 | 4.6 | 8.5 | 1.9 | 6.9 | 8.3 |
| Sulfide scavenger 10 min. | 1.64 | 0.9 | 0.7 | 1.0 | 0.7 | 0.8 | 0.9 | 1.1 | 1.0 | 1.2 | 2.1 | 0.6 | 4.3 | 2.7 | 1.3 | 6.3 | 5.1 |
| Sulfide tails | 73.55 | 80.0 | 87.0 | 77.3 | 88.2 | 87.3 | 84.8 | 83.9 | 84.8 | 17.4 | 82.3 | 1.6 | 58.6 | 14.6 | 60.4 | 21.0 | 62.0 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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| | | | |
|---|---|---|---|
| COREM | T881 Nickel Flotation Process Development for Lac Rocher Ore | Flotation test conditions: Test 5 | révision 04-02-08 |

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**Test pameters**

| | |
|---|---|
| PROJECT NUMBER | T881 |
| TEST NUMBER | 6 |
| TEST DESCRIPTION | Confirming the necessity of preflotation and start to study the cleaning |
| SAMPLE | Nickel and Copper |
| TECHNICIAN | C.L. |
| DATE | 16 August 2007 |
| | |

| Stage | Preflot | Rougher | Scav 1 | Scav 2 | Cleaner 1 | Cleaner 2 |
|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | 5 | 2.5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 30.0 | | | | | |
| Air flowrate (l/min) | 3 | 3 | 3 | 3 | 2.5 | 2.5 |

| Reagents concentration (% mass) | | | | |
|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 |
| **2** | **0.5** | **0.5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | KAX 51 | MIBC | Cu2SO4 | Lime | H2SO4 | pH | T(°C) | ORP(mV) | dO(%sat) | T to tal | Cond.(min) | Flot. (min.) | pH setpoint |
| **pH adjustment** | | | | | | **10.06** | | | | | | | 10.0 |
| cond. 1 | | **6** | | | | **10.02** | 24.4 | -156.6 | 4.3 | 0.00 | 3 | | 10.0 |
| **Preflottation** | | | | | | | | | | 3.00 | | **4.0** | 10.0 |
| **pH adjustment** | | | | | | **9.16** | | | | 7.00 | | | 9.25 |
| cond. 2 | **8** | | | | | **9.19** | 26.2 | -475.1 | 3.5 | 7.00 | | | 9.25 |
| cond. 3 | | **6** | | | | | | | | 7.00 | 5 | | 9.25 |
| **Rougher** | | | | | | | | | | 12.00 | | **5,0** | 9.25 |
| cond. 4 | **3.5** | | | | | | | | | 12.00 | | | 9.25 |
| cond. 5 | | **6** | | | | **9.22** | 27.6 | -355.8 | 4.7 | 12.00 | 0.5 | | 9.25 |
| **Scavenger 1** | | | | | | | | | | 12.50 | | **4.0** | 9.25 |
| **Adjust. pH** | | | | | | | | | | 16.50 | | | 8.3 |
| cond. 6 | | | **10** | | | **8.21** | 28.5 | -278.4 | 3.3 | 16.50 | 1.5 | | 8.3 |
| cond. 7 | **3.5** | | | | | | | | | 18.00 | | | 8.3 |
| cond. 8 | | **6** | | | | | | | | 18.00 | 1.5 | | 8.3 |
| **Scavenger 2** | | | | | | | | | | 19.50 | | **5.0** | 8.3 |
| | | | | | | | | | | 24.50 | | | |
| **2,5 L cell** | | | | | | | | | | 24.50 | | | |
| **pH adjustment** | | | | | | | | | | 24.50 | | | 8.3 |
| **Cleaner 1** | | | | | | | | | | 24.50 | | **7.0** | 8.3 |
| Cond. 9 | **1** | **2.5** | | | | | | | | 31.50 | | | 8.3 |
| **Cleaner 2** | | | | | | | | | | 31.50 | | **5.5** | 8.3 |
| | | | | | | | | | | | | | |
| Final readings | | | | | | **8.1** | 28.6 | 34.4 | 139.4 | | | | |
| **Used (mL)** | | | | **43.3** | **51** | | | | | | | | |

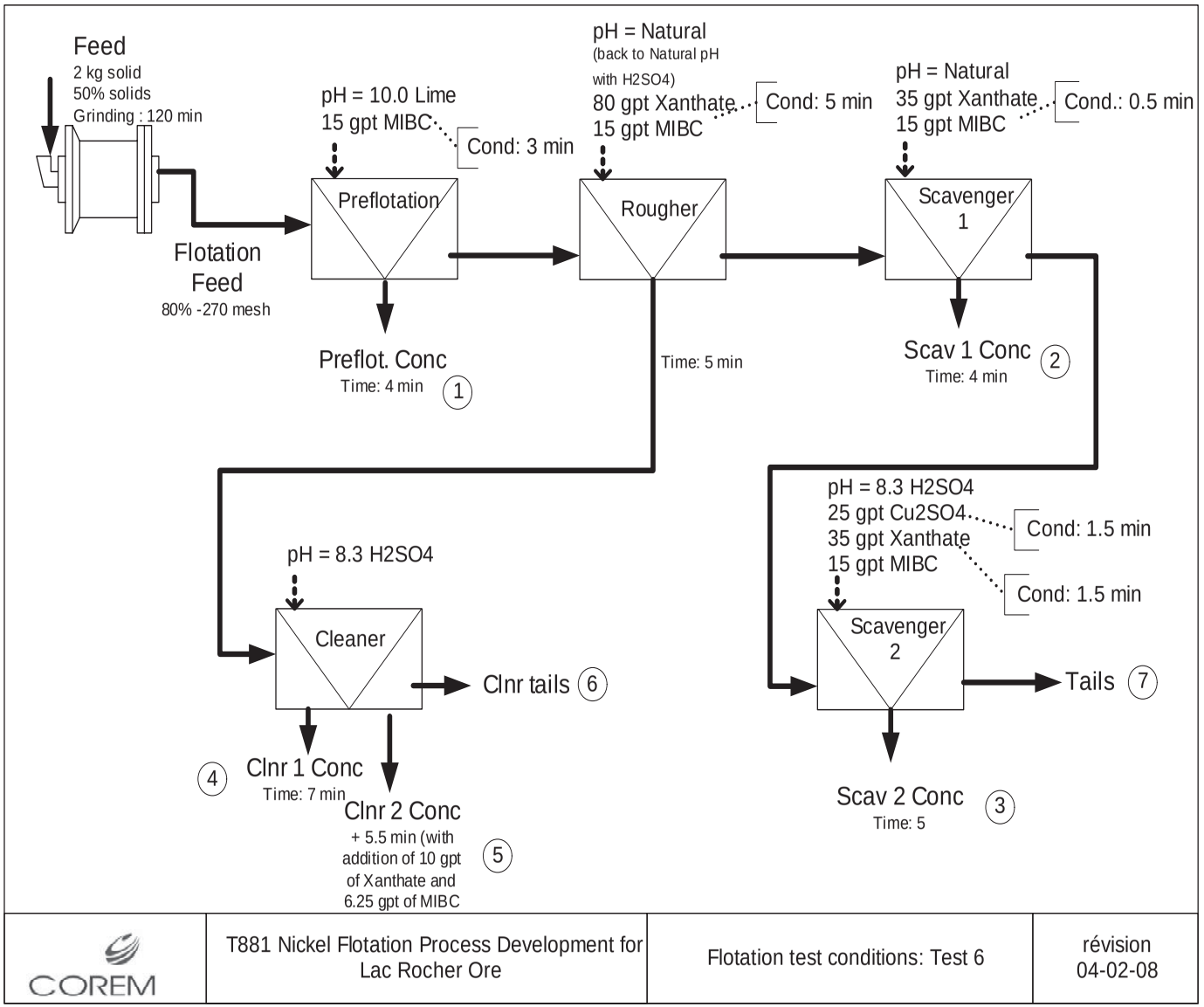
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| **Flotation test 6** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Preflotation | 6.15 | 52.29 | 3.58 | 21.39 | 2.83 | 0.11 | 0.13 | 0.10 | 0.03 | 0.02 | 0.15 | 0.18 | 7.72 | 0.57 | 0.01 | 1.35 | 0.02 | 90.46 |
| Scavenger 1 conc | 3.50 | 30.91 | 3.43 | 11.97 | 2.58 | 0.12 | 0.13 | 0.10 | 0.02 | 0.15 | 0.14 | 0.32 | 19.49 | 8.00 | 0.01 | 15.06 | 0.03 | 92.45 |
| Scavenger 2 conc. | 6.60 | 18.47 | 2.20 | 7.15 | 1.68 | 0.08 | 0.08 | 0.06 | 0.02 | 0.05 | 0.20 | 0.09 | 36.58 | 3.35 | 0.01 | 23.72 | 0.12 | 93.87 |
| Cleaner 1 conc | 2.77 | 12.02 | 0.79 | 5.18 | 0.35 | 0.01 | 0.03 | 0.02 | 0.05 | 0.23 | 0.03 | 13.66 | 28.29 | 4.12 | 0.09 | 31.01 | 0.04 | 95.91 |
| Cleaner 2 conc | 4.77 | 17.75 | 1.11 | 7.35 | 0.67 | 0.01 | 0.05 | 0.04 | 0.02 | 0.34 | 0.06 | 0.48 | 27.81 | 8.01 | 0.01 | 30.22 | 0.01 | 93.94 |
| Cleaner tails | 2.96 | 39.15 | 4.65 | 14.71 | 3.72 | 0.17 | 0.17 | 0.13 | 0.03 | 0.08 | 0.17 | 0.24 | 15.70 | 3.25 | 0.01 | 9.30 | 0.01 | 91.47 |
| Final tails | 73.24 | 48.96 | 8.04 | 16.21 | 7.09 | 0.35 | 0.23 | 0.17 | 0.06 | 0.01 | 0.24 | 0.02 | 8.45 | 0.22 | 0.01 | 0.34 | 0.01 | 90.42 |
| **Feed calculated** | **100.00** | **43.72** | **6.59** | **15.01** | **5.72** | **0.28** | **0.19** | **0.14** | **0.05** | **0.04** | **0.21** | **0.45** | **12.34** | **1.29** | **0.01** | **5.00** | **0.02** | **91.1** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Preflotation | 6.15 | 7.4 | 3.3 | 8.8 | 3.0 | 2.3 | 4.0 | 4.4 | 3.3 | 2.2 | 4.4 | 2.4 | 3.9 | 2.7 | 6.4 | 1.7 | 4.6 |
| Scavenger 1 conc | 3.50 | 2.5 | 1.8 | 2.8 | 1.6 | 1.5 | 2.3 | 2.3 | 1.2 | 12.7 | 2.4 | 2.5 | 5.5 | 21.7 | 2.8 | 10.5 | 4.6 |
| Scavenger 2 conc. | 6.60 | 2.8 | 2.2 | 3.1 | 1.9 | 1.9 | 2.8 | 2.9 | 2.9 | 7.8 | 6.4 | 1.3 | 19.6 | 17.1 | 5.3 | 31.3 | 39.2 |
| Cleaner 1 conc | 2.77 | 0.8 | 0.3 | 1.0 | 0.2 | 0.1 | 0.5 | 0.3 | 2.7 | 15.3 | 0.4 | 83.8 | 6.4 | 8.8 | 20.6 | 17.2 | 5.6 |
| Cleaner 2 conc | 4.77 | 1.9 | 0.8 | 2.3 | 0.6 | 0.2 | 1.1 | 1.2 | 1.9 | 38.8 | 1.3 | 5.1 | 10.8 | 29.6 | 3.8 | 28.8 | 3.4 |
| Cleaner tails | 2.96 | 2.6 | 2.1 | 2.9 | 1.9 | 1.8 | 2.6 | 2.6 | 1.4 | 5.4 | 2.4 | 1.6 | 3.8 | 7.4 | 2.4 | 5.5 | 2.1 |
| Final tails | 73.24 | 82.0 | 89.4 | 79.1 | 90.8 | 92.1 | 86.7 | 86.3 | 86.6 | 17.7 | 82.7 | 3.4 | 50.2 | 12.5 | 58.7 | 5.0 | 40.5 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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**Test pameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 7 |
| TEST DESCRIPTION | Confirming the necessity of preflotation and start to study the cleaning stage |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 2007-08-17 |
| | |

| Stage | Preflot | Preflot. Clner | Rougher | Scavenger 1 | Scavenger 2 | Scavenger 3 | Cleaner 1 | Cleaner 2 |
|---|---|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 1.25 | 5 | 5 | 5 | 5 | 1.25 | 1.25 |
| Agitation speed (rpm) | 1400 | 1000 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 30.0 | | | | | | | |
| Air flowrate (l/min) | 3 | 3 | 3 | 3 | 3 | 3 | 2.5 | 2.5 |

| Reagents concentration (% mass) | | | | |
|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 |
| **2** | **0.5** | **0.5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagent addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 | pH | T(°C) | ORP(mV) | dO(%sat) | T to tal | Cond.(min) | Flot. (min.) | pH setpoint |
| cond. 1 | | **6** | | | | **9.24** | 23.2 | -229.0 | 5.1 | 0.00 | **3** | | 9.2 |
| **Preflotation** | | | | | | | | | | 3.00 | | **4.0** | 9.2 |
| **pH adjustment** | | | | | | **10.04** | | | | 7.00 | | | 10.0 |
| **Preflot. Cleaner** | | | | | | **9.00** | | | | 7.00 | | **7.0** | 10.0 |
| **Ajust. pH** | | | | | | | | | | 14.00 | | | 8.3 |
| cond. 3 | | | **40** | | | **8.00** | 24.7 | -248.0 | | 14.00 | **2** | | 8.3 |
| cond. 4 | **8** | | | | | | | | | 16.00 | | | 8.3 |
| cond. 5 | | **6** | | | | **8.35** | 25.2 | -268.5 | | 16.00 | **5** | | 8.3 |
| **Rougher** | | | | | | | | | | 21.00 | | **5.0** | 6,4* |
| cond. 6 | **5** | | | | | | | | | 26.00 | | | 8.3 |
| cond. 7 | | **6** | | | | **8.39** | 26.8 | -191.3 | | 26.00 | **1** | | 8.3 |
| **Scavenger 1** | | | | | | | | | | 27.00 | | **4.0** | 8.3 |
| cond. 8 | **3.5** | | | | | | | | | 31.00 | | | 8.3 |
| cond. 9 | | **6** | | | | **8.19** | | | | 31.00 | **1** | | 8.3 |
| **Scavenger 2** | | | | | | | | | | 32.00 | | **5.0** | 8.3 |
| cond. 10 | **1** | | | | | | | | | 37.00 | | | 8.3 |
| cond. 11 | | **2.5** | | | | | | | | 37.00 | **1** | | 8.3 |
| **Scavenger 3** | | | | | | | | | | 38.00 | | **2.5** | 8.3 |
| cond. 12 | **1** | | | | | | | | | 40.50 | | | 8.3 |
| cond. 13 | | **2.5** | | | | **8.39** | 25.5 | -38.8 | | 40.50 | **1** | | 8.3 |
| **Cleaner 1** | | | | | | | | | | 41.50 | | **7.0** | 8.3 |
| **Cleaner 2** | | | | | | | | | | 48.50 | | **5.5** | 8.3 |
| Final Reading | | | | | | **9** | | | | 54.00 | | | 8.3 |
| **Used (mL)** | | | | **102.2** | **95.7** | | | | | | | | |

comments
*pH at end of preflotation was 8,4. It decreased to 6,4 during rougher stage
During cleaner stage, froth was collected every 20 s. instead of 10 s. in order to allow the formation of a sufficient amount of froth.
A third scavenger was added in order to improve recovery.
Rougher concentrate was slow to float. Froth was silver colored.
Scavenger 1 was less loaded than rougher and bubbles were brittle. Froth is grayish-green.
Scavenger 2 flotation was slow and froth load is low.
Cleaner 1 concentrate is heavy. Froth coller is grayish-gold.
Cleaner 2 concentrate is gray.

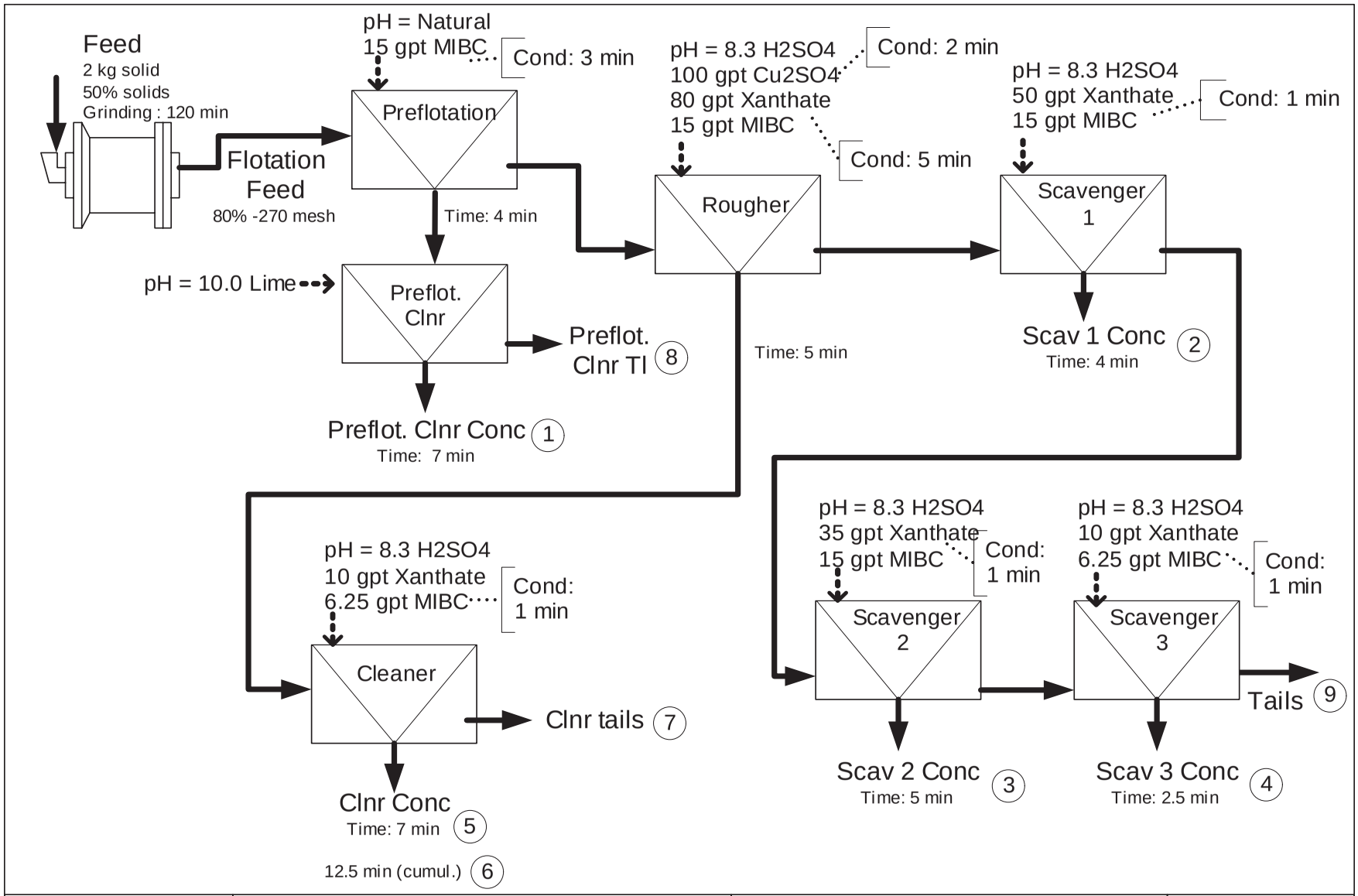
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| **Flotation test 7** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Preflot. Cleaner conc. | 4.17 | 56.49 | 2.08 | 24.54 | 1.59 | 0.03 | 0.08 | 0.08 | 0.01 | 0.01 | 0.12 | 0.04 | 5.93 | 0.24 | 0.01 | 0.12 | 0.01 | 91.38 |
| Scavenger 1 conc. | 5.70 | 19.03 | 1.74 | 7.53 | 1.35 | 0.05 | 0.07 | 0.06 | 0.02 | 0.10 | 0.08 | 0.41 | 33.31 | 5.88 | 0.01 | 23.64 | 0.07 | 93.37 |
| Scavenger 2 conc. | 2.59 | 23.44 | 2.48 | 9.39 | 1.89 | 0.10 | 0.10 | 0.08 | 0.02 | 0.06 | 0.12 | 0.21 | 30.78 | 4.12 | 0.01 | 19.94 | 0.06 | 92.79 |
| Scavenger 3 conc. | 0.65 | 21.31 | 2.57 | 8.06 | 2.15 | 0.10 | 0.10 | 0.08 | 0.01 | 0.04 | 0.10 | 0.12 | 34.96 | 2.43 | 0.01 | 22.12 | 0.13 | 94.30 |
| Cleaner 1 conc. | 6.09 | 7.98 | 0.45 | 3.25 | 0.26 | 0.01 | 0.03 | 0.02 | 0.03 | 0.33 | 0.03 | 6.13 | 34.29 | 5.12 | 0.05 | 37.59 | 0.14 | 95.69 |
| Cleaner 2 conc. | 2.09 | 23.20 | 1.53 | 9.69 | 1.00 | 0.04 | 0.06 | 0.05 | 0.01 | 0.16 | 0.08 | 0.73 | 25.47 | 10.18 | 0.01 | 20.96 | 0.09 | 93.24 |
| Cleaning tails | 1.90 | 44.06 | 4.95 | 16.21 | 4.29 | 0.18 | 0.18 | 0.14 | 0.03 | 0.04 | 0.20 | 0.27 | 14.08 | 2.42 | 0.01 | 5.90 | 0.03 | 92.97 |
| Preflot. Cleaning tails | 1.47 | 47.64 | 5.82 | 17.37 | 5.03 | 0.20 | 0.19 | 0.15 | 0.05 | 0.03 | 0.20 | 0.35 | 10.34 | 1.00 | 0.01 | 2.80 | 0.02 | 91.18 |
| Final tails | 75.34 | 49.59 | 7.88 | 16.34 | 7.13 | 0.35 | 0.22 | 0.17 | 0.04 | 0.01 | 0.24 | 0.02 | 8.29 | 0.31 | 0.01 | 0.32 | 0.01 | 90.94 |
| **Feed calculated** | **100.00** | **44.06** | **6.44** | **15.02** | **5.77** | **0.28** | **0.18** | **0.14** | **0.04** | **0.04** | **0.20** | **0.45** | **12.46** | **1.29** | **0.01** | **5.14** | **0.03** | **91.5** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Preflot. Cleaner conc. | 4.17 | 5.3 | 1.3 | 6.8 | 1.1 | 0.5 | 1.9 | 2.3 | 1.2 | 1.0 | 2.4 | 0.3 | 2.0 | 0.8 | 3.4 | 0.1 | 1.6 |
| Scavenger 1 conc. | 5.70 | 2.5 | 1.5 | 2.9 | 1.3 | 1.1 | 2.2 | 2.4 | 2.9 | 14.5 | 2.3 | 5.3 | 15.2 | 26.0 | 4.7 | 26.2 | 15.2 |
| Scavenger 2 conc. | 2.59 | 1.4 | 1.0 | 1.6 | 0.8 | 0.9 | 1.3 | 1.5 | 1.1 | 4.0 | 1.5 | 1.2 | 6.4 | 8.3 | 2.1 | 10.1 | 6.5 |
| Scavenger 3 conc. | 0.65 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.4 | 0.3 | 0.2 | 0.6 | 0.3 | 0.2 | 1.8 | 1.2 | 0.5 | 2.8 | 3.4 |
| Cleaner 1 conc. | 6.09 | 1.1 | 0.4 | 1.3 | 0.3 | 0.2 | 1.0 | 0.8 | 4.9 | 50.2 | 0.7 | 83.5 | 16.8 | 24.2 | 23.0 | 44.6 | 33.2 |
| Cleaner 2 conc. | 2.09 | 1.1 | 0.5 | 1.3 | 0.4 | 0.3 | 0.6 | 0.7 | 0.6 | 8.3 | 0.8 | 3.4 | 4.3 | 16.5 | 1.7 | 8.5 | 7.0 |
| Cleaning tails | 1.90 | 1.9 | 1.5 | 2.1 | 1.4 | 1.2 | 1.8 | 1.9 | 1.3 | 1.8 | 1.9 | 1.1 | 2.2 | 3.6 | 1.6 | 2.2 | 2.5 |
| Preflot. Cleaning tails | 1.47 | 1.6 | 1.3 | 1.7 | 1.3 | 1.1 | 1.5 | 1.6 | 2.0 | 1.0 | 1.4 | 1.1 | 1.2 | 1.1 | 1.2 | 0.8 | 1.2 |
| Final tails | 75.34 | 84.8 | 92.2 | 81.9 | 93.1 | 94.6 | 89.3 | 88.6 | 85.9 | 18.6 | 88.6 | 3.9 | 50.1 | 18.3 | 61.8 | 4.7 | 29.5 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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| | | | |
|---|---|---|---|
| COREM | T881 Nickel Flotation Process Development for Lac Rocher Ore | Flotation test conditions: Test 7 | révision 04-02-08 |

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**Test parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 8 |
| TEST DESCRIPTION | Confirming the necessity of preflotation and start to study the cleaning stage |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 2007-08-23 |
| | |

| Stage | Preflot | Preflot. Clner | Rougher 1 | Rougher 2 | Scavenger | Cleaner 1 | Cleaner 2 |
|---|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 1.25 | 5 | 5 | 5 | 2.5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1000 | 1400 | 1400 | 1400 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 30.0 | | | | | | |
| Air flowrate (l/min) | 3 | 2.5 | 3 | 3 | 3 | 2.5 | 2.5 |

| Reagents concentration (% mass) | | | | | |
|---|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 | Soda ash |
| **2** | **0.5** | **0.5** | **5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagent addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ÉTAPE** | Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 | pH | T(℃) | ORP(mV) | dO(%sat) | T to tal | Cond.(mi | Flot. (min.) | pH setpoint |
| cond. 1 | | **6** | | | | | | | | 0.00 | **3** | | 9.2 |
| **Preflottation** | | | | | | | | | | 3.00 | | **4.0** | 9.2 |
| cond. 2 | **8** | | | | | | | | | 7.00 | | | 9.2 |
| cond. 3 | | **6** | | | | **9.41** | 25 | -427.4 | 0.6 | 7.00 | **5** | | 9.2 |
| **Rougher 1** | | | | | | | | | | 12.00 | | **5.0** | 9.2 |
| cond. 4 | **5** | | | | | | | | | 17.00 | | | 9.2 |
| cond. 5 | | **6** | | | | **9.27** | 26.2 | -281.9 | 25.9 | 17.00 | **1** | | 9.2 |
| **Rougher 2** | | | | | | | | | | 18.00 | | **4.0** | 9.2 |
| **pH adjustment** | | | | | | | | | | 22.00 | **2** | | 8.3 |
| cond. 6 | | | **10** | | | **8.27** | 27.4 | -311.8 | 0.8 | 24.00 | **2** | | 8.3 |
| cond. 7 | **3.5** | | | | | | | | | 26.00 | | | 8.3 |
| cond. 8 | | **6** | | | | **8.35** | 27.6 | -342.8 | 0.5 | 26.00 | **1** | | 8.3 |
| **Scavenger** | | | | | | | | | | 27.00 | | **11.5** | 8.3 |
| **2,5 L Cell** | | | | | | | | | | | | | |
| **pH adjustment** | | | | | | | | | | 38.50 | | | 9.2 |
| cond. 9 | **1** | | | | | | | | | 38.50 | | | 9.2 |
| cond. 10 | | **2.5** | | | | **9.24** | 27.2 | -65.3 | 49.4 | 38.50 | **1** | | 9.2 |
| **Cleaner 1** | | | | | | | | | | 39.50 | | **7.0** | 9.2 |
| **Cleaner 2** | | | | | | | | | | 46.50 | | **6.0** | 9.2 |
| **pH adjustment** | | | | | | **8.55** | | | | 52.50 | | | 9.2 |

**Test parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 8 |
| TEST DESCRIPTION | Confirming the necessity of preflotation and start to study the cleaning stage |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 2007-08-23 |
| | |

| Stage | Preflot | Preflot. Clner | Rougher 1 | Rougher 2 | Scavenger | Cleaner 1 | Cleaner 2 |
|---|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 1.25 | 5 | 5 | 5 | 2.5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1000 | 1400 | 1400 | 1400 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 30.0 | | | | | | |
| Air flowrate (l/min) | 3 | 2.5 | 3 | 3 | 3 | 2.5 | 2.5 |

| Reagents concentration (% mass) | | | | | |
|---|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 | Soda ash |
| **2** | **0.5** | **0.5** | **5** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 120 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagent addition (ml) | | | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ÉTAPE** | Kax 51 | MIBC | Cu2SO4 | Lime | H2SO4 | pH | T(°C) | ORP(mV) | dO(%sat) | T to tal | Cond.(mi | Flot. (min.) | pH setpoint |
| **1,25 L cell** | | | | | | | | | | | | | |
| **Preflot. Clnr** | | | | | | | | | | 52.50 | | **7.0** | 9.2 |
| Final Reading | | | | | | **9.17** | 29.6 | 42.9 | 69.8 | 59.50 | | | |
| **Used (mL)** | | | | **30.4** | **27.5** | | | | | | | | |

Comments
No Soda Ash addition was necessary to cleaner 1
Approximately 1 ml of Kax 51 and 2,5 ml of MIBC were added after 9min. into scavenging stage in order to verify completion of Ni and Cu scavenging.
Rougher 1 froth is metallic-gray-green.
Scavenger flotation is slow
Cleaner concentrate is heavy and gold colored.
pH climbed to 10 during cleaner 1. 1 drop of H2SO4 decreased it to 9,3.
pH was 8.55 before preflotation cleaner. A drop of lime decreased it to 9.6.

COREM

| Flotation test 8 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Preflot. Cleaner conc. | 3.37 | 56.67 | 1.91 | 25.15 | 1.25 | 0.01 | 0.08 | 0.07 | 0.01 | 0.01 | 0.11 | 0.02 | 5.63 | 0.24 | 0.01 | 0.07 | 0.01 | 91.25 |
| Preflot. Cleaner tail | 1.94 | 51.23 | 4.35 | 20.35 | 3.79 | 0.15 | 0.15 | 0.13 | 0.02 | 0.02 | 0.18 | 0.20 | 8.60 | 0.62 | 0.01 | 1.44 | 0.01 | 91.25 |
| Cleaner conc. 1 | 8.24 | 15.65 | 1.19 | 6.66 | 0.62 | 0.01 | 0.04 | 0.03 | 0.02 | 0.30 | 0.08 | 4.59 | 27.69 | 7.22 | 0.03 | 30.07 | 0.03 | 94.22 |
| Cleaner conc. 2 | 0.89 | 32.84 | 2.44 | 13.65 | 1.87 | 0.08 | 0.09 | 0.08 | 0.02 | 0.16 | 0.13 | 0.93 | 17.44 | 7.55 | 0.01 | 15.15 | 0.02 | 92.46 |
| Cleaner tails | 3.11 | 43.28 | 4.43 | 17.29 | 3.87 | 0.18 | 0.17 | 0.14 | 0.02 | 0.06 | 0.19 | 0.29 | 12.29 | 2.45 | 0.01 | 5.51 | 0.02 | 90.20 |
| Scavenger conc. | 6.16 | 16.43 | 1.70 | 6.51 | 1.35 | 0.07 | 0.07 | 0.05 | 0.01 | 0.09 | 0.08 | 0.22 | 35.71 | 5.53 | 0.01 | 24.69 | 0.16 | 92.67 |
| Final tails | 76.30 | 48.34 | 7.83 | 15.89 | 7.01 | 0.34 | 0.21 | 0.17 | 0.06 | 0.01 | 0.24 | 0.02 | 9.19 | 0.27 | 0.01 | 0.94 | 0.01 | 90.54 |
| **Feed calculated** | **100.00** | **43.72** | **6.49** | **14.97** | **5.73** | **0.28** | **0.18** | **0.14** | **0.05** | **0.04** | **0.21** | **0.43** | **12.38** | **1.30** | **0.01** | **5.05** | **0.02** | **91.0** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Preflot. Cleaner conc. | 3.37 | 4.4 | 1.0 | 5.7 | 0.7 | 0.2 | 1.5 | 1.5 | 0.7 | 0.8 | 1.8 | 0.2 | 1.5 | 0.6 | 2.9 | 0.0 | 1.6 |
| Preflot. Cleaner tail | 1.94 | 2.3 | 1.3 | 2.6 | 1.3 | 1.1 | 1.6 | 1.8 | 0.7 | 0.8 | 1.7 | 0.9 | 1.3 | 0.9 | 1.6 | 0.6 | 1.1 |
| Cleaner conc. 1 | 8.24 | 2.9 | 1.5 | 3.7 | 0.9 | 0.3 | 1.7 | 1.9 | 3.7 | 59.2 | 3.2 | 87.9 | 18.4 | 45.6 | 22.3 | 49.0 | 9.9 |
| Cleaner conc. 2 | 0.89 | 0.7 | 0.3 | 0.8 | 0.3 | 0.2 | 0.5 | 0.5 | 0.4 | 3.5 | 0.6 | 1.9 | 1.2 | 5.1 | 0.7 | 2.7 | 0.9 |
| Cleaner tails | 3.11 | 3.1 | 2.1 | 3.6 | 2.1 | 2.1 | 2.9 | 3.1 | 1.1 | 4.4 | 2.9 | 2.1 | 3.1 | 5.8 | 2.6 | 3.4 | 3.0 |
| Scavenger conc. | 6.16 | 2.3 | 1.6 | 2.7 | 1.4 | 1.5 | 2.3 | 2.2 | 1.6 | 13.0 | 2.5 | 3.1 | 17.8 | 26.1 | 5.2 | 30.1 | 46.8 |
| Final tails | 76.30 | 84.4 | 92.1 | 81.0 | 93.3 | 94.7 | 89.5 | 88.9 | 91.9 | 18.4 | 87.4 | 3.9 | 56.6 | 15.8 | 64.6 | 14.2 | 36.7 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

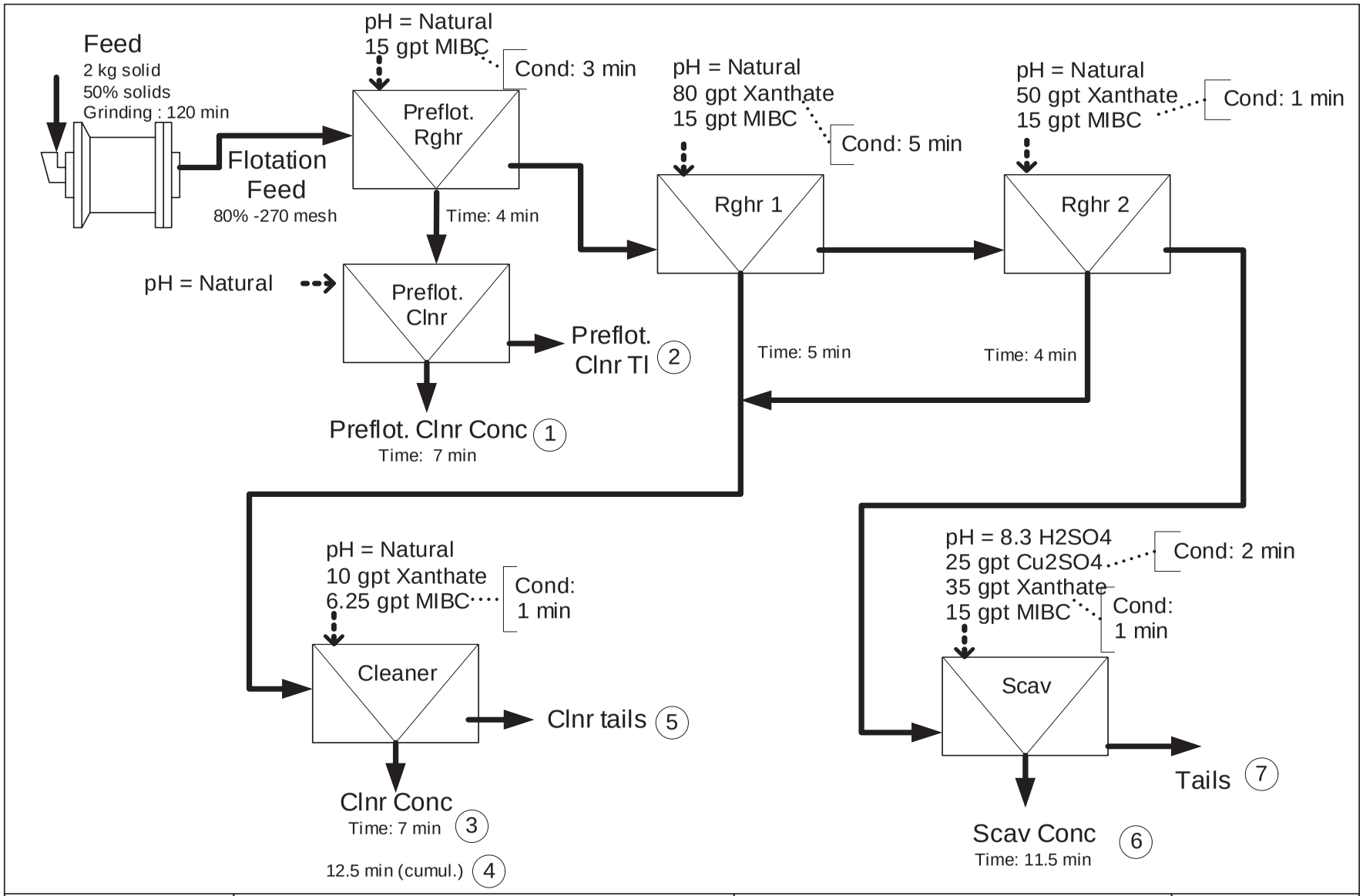
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**FLOTATION TEST 8**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.30 | 100.00 | 0.43 | 100.00 | 12.38 | 100.00 | 43.72 | 100.00 | 14.97 | 100.00 |
| **1** | Preflot. Cleaner conc. | 3.37 | 0.24 | 0.61 | 0.02 | 0.17 | 5.63 | 1.53 | 56.67 | 4.37 | 25.15 | 5.66 |
| **2** | Preflot. Clnr tails | 1.94 | 0.62 | 0.91 | 0.20 | 0.89 | 8.60 | 1.35 | 51.23 | 2.27 | 20.35 | 2.63 |
| **3** | Cleaner conc. 1 | 8.24 | 7.22 | 45.61 | 4.59 | 87.90 | 27.69 | 18.42 | 15.65 | 2.95 | 6.66 | 3.66 |
| **4** | Cleaner conc. 2 | 0.89 | 7.55 | 5.12 | 0.93 | 1.92 | 17.44 | 1.25 | 32.84 | 0.66 | 13.65 | 0.81 |
| **5** | Cleaner tails | 3.11 | 2.45 | 5.84 | 0.29 | 2.13 | 12.29 | 3.09 | 43.28 | 3.08 | 17.29 | 3.59 |
| **6** | Scavenger conc. | 6.16 | 5.53 | 26.11 | 0.22 | 3.09 | 35.71 | 17.76 | 16.43 | 2.31 | 6.51 | 2.68 |
| **7** | Final tails | 76.30 | 0.27 | 15.80 | 0.02 | 3.90 | 9.19 | 56.61 | 48.34 | 84.35 | 15.89 | 80.96 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rougher Conc (calc) | 12.24 | 6.03 | 56.57 | 3.23 | 91.94 | 23.03 | 22.76 | 23.92 | 6.69 | 9.87 | 8.06 |
| Clnr Stage (cumul) | | | | | | | | | | | |
| Cleaner 1 conc | 8.24 | 7.22 | 45.61 | 4.59 | 87.90 | 27.69 | 18.42 | 15.65 | 2.95 | 6.66 | 3.66 |
| Cleaner 2 conc | 9.12 | 7.25 | 50.73 | 4.23 | 89.82 | 26.70 | 19.67 | 17.32 | 3.61 | 7.33 | 4.47 |




| | | | |
|---|---|---|---|
| COREM | T881 Nickel Flotation Process Development for Lac Rocher Ore | Flotation test conditions: Test 8 | révision 04-02-08 |

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COREM

**Test parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 9 |
| TEST DESCRIPTION | Confirming the necessity of preflotation and start to study the cleaning stage |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 19-11-2007 |
| | |

| Stage | Preflot | Rougher 1 | Rougher 2 | Scavenger | Cleaner 1 | Cleaner 2 | Cleaner 3 |
|---|---|---|---|---|---|---|---|
| Cell volume (L) | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 |
| Agitation speed (rpm) | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | |
| Solid density (g/cm³) | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp Density, (% solids) | 30.0 | | | | | | |
| Air flowrate (l/min) | 3 | 3 | 3 | 3 | 2.5 | 2.5 | 2.5 |

| Reagents concentration (% mass) | | | | | |
|---|---|---|---|---|---|
| Kax 51 | MIBC | Cu2SO4 | CMC | H2SO4 | Soda ash |
| **2** | **0.5** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 90 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ÉTAPE** | Kax 51 | MIBC | Cu2SO4 | CMC | H2SO4 | Soda ash | pH | T total | Cond.(min) | Flot. (min.) | pH setpoint |
| cond. 1 | | **6** | | | | | **9.26** | 0.00 | **3** | | 9.2 |
| **Preflotation** | | | | | | | | 3.00 | | **4.0** | 9.2 |
| cond. 2 | **8** | **6** | | | | | **9.3** | 7.00 | **5** | | 9.2 |
| **Rougher 1** | | | | | | | | 12.00 | | **5.0** | 9.2 |
| cond. 3 | **5** | **6** | | | | | | 17.00 | **1** | | 9.2 |
| **Rougher 2** | | | | | | | | 18.00 | | **4.0** | 9.2 |
| cond. 4 | **3.5** | **6** | | | | | **9.39** | 22.00 | **1** | | 9.2 |
| **Scavenger** | | | | | | | | 23.00 | | **15.0** | 9.2 |
| cond. 5 | **3.5** | **3.5** | | | | | **9.36** | 38.00 | **1** | | 9.2 |
| **Scavenger 2** | | | | | | | | 39.00 | | **5.0** | |
| **2,5 L cell** | | | | | | | | 44.00 | | | |
| **pH adjustment** | | | | | | | **9.52** | 44.00 | | | 9.5 |
| cond. 6 | | | | **10** | | | | 44.00 | **2** | | 9.5 |
| cond. 7 | **1** | | | | | | | 46.00 | **1** | | 9.5 |
| cond. 8 | | **2.5** | | | | | **9.48** | 47.00 | **1** | | 9.5 |
| **Cleaner 1** | **1** | **1** | | | | | | 48.00 | | **7.0** | 9.5 |
| **Cleaner 2** | **1** | | | | | | | 55.00 | | **6.0** | 9.5 |
| **Cleaner 3** | **1** | | | | | | | 61.00 | | **5.0** | 9.5 |
| **pH final** | | | | | | | **9.43** | 66.00 | | | 9.5 |
| Total (mL) | | | | | | 57.3 | | | | | |

Comments

Preflotation froth is pale gray

Froth in rougher 1 is gold colored in first two minutes and turn to dull gray.

Froth load is low after 9 minutes. After 12 minutes, concentrate recovery become almost non-existant.

Froth in cleaner was slow to form. Little concentrate was recovered.

COREM

| **Flotation test 9** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Preflot. Conc. | 6.29 | 54.30 | 3.55 | 21.70 | 2.94 | 0.11 | 0.13 | 0.11 | 0.10 | 0.02 | 0.15 | 0.18 | 7.99 | 0.61 | 0.02 | 1.54 | 0.02 | 93.47 |
| Scav. conc. 1 | 4.27 | 33.00 | 4.18 | 12.60 | 3.54 | 0.20 | 0.15 | 0.13 | 0.10 | 0.02 | 0.17 | 0.15 | 24.70 | 1.07 | 0.02 | 12.90 | 0.04 | 92.97 |
| Scav. conc. 2 | 1.19 | 25.90 | 3.20 | 9.74 | 3.00 | 0.15 | 0.14 | 0.11 | 0.10 | 0.02 | 0.14 | 0.07 | 31.90 | 0.95 | 0.02 | 18.30 | 0.06 | 93.80 |
| Scav. tail | 68.09 | 49.50 | 8.42 | 16.00 | 7.25 | 0.36 | 0.23 | 0.17 | 0.10 | 0.02 | 0.24 | 0.01 | 8.66 | 0.15 | 0.02 | 0.50 | 0.02 | 91.65 |
| Cleaner conc. 1 | 4.03 | 4.54 | 1.00 | 1.63 | 0.23 | 0.05 | 0.07 | 0.02 | 0.10 | 0.36 | 0.02 | 9.26 | 35.20 | 4.79 | 0.06 | 40.10 | 0.03 | 97.46 |
| Cleaner conc. 2 | 2.58 | 6.16 | 1.00 | 2.19 | 0.11 | 0.05 | 0.05 | 0.02 | 0.10 | 0.42 | 0.03 | 1.11 | 32.40 | 16.60 | 0.02 | 36.90 | 0.04 | 97.20 |
| Cleaner conc. 3 | 1.28 | 12.00 | 1.02 | 4.18 | 0.38 | 0.05 | 0.05 | 0.03 | 0.10 | 0.33 | 0.04 | 0.51 | 29.70 | 16.90 | 0.02 | 32.10 | 0.04 | 97.45 |
| Final Tail | 12.26 | 40.30 | 3.96 | 16.10 | 3.50 | 0.15 | 0.14 | 0.12 | 0.10 | 0.04 | 0.18 | 0.13 | 16.60 | 2.45 | 0.02 | 8.26 | 0.03 | 92.08 |
| **Feed calculated** | **100.00** | **44.28** | **6.74** | **15.06** | **5.75** | **0.28** | **0.19** | **0.15** | **0.10** | **0.05** | **0.21** | **0.45** | **12.51** | **1.34** | **0.02** | **5.20** | **0.02** | **92.35** |

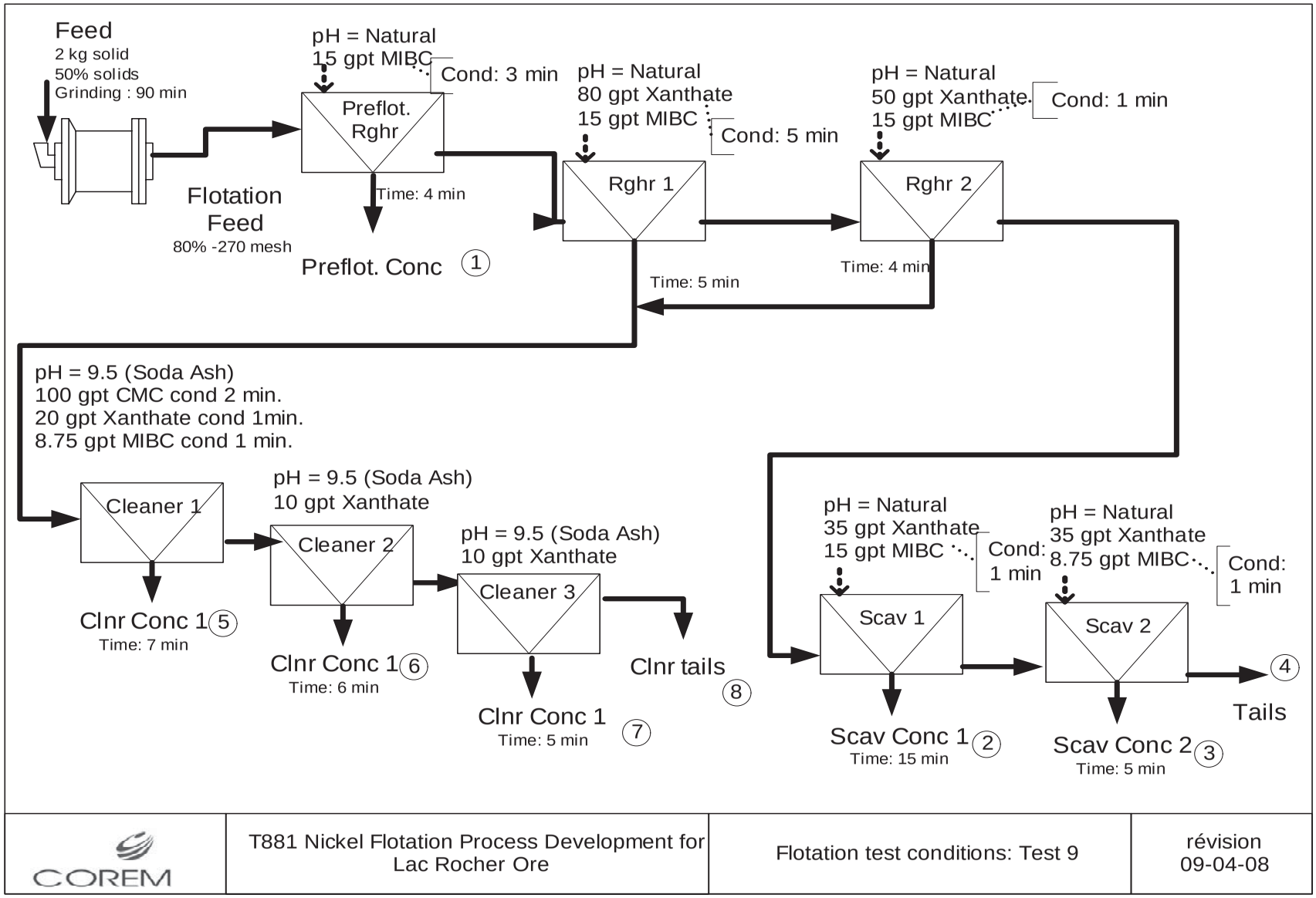
| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Preflot. Conc. | 6.29 | 7.7 | 3.3 | 9.1 | 3.2 | 2.4 | 4.2 | 4.7 | 6.3 | 2.5 | 4.6 | 2.5 | 4.0 | 2.9 | 5.8 | 1.9 | 5.3 |
| Scav. conc. 1 | 4.27 | 3.2 | 2.7 | 3.6 | 2.6 | 3.0 | 3.3 | 3.8 | 4.3 | 1.7 | 3.5 | 1.4 | 8.4 | 3.4 | 4.0 | 10.6 | 7.2 |
| Scav. conc. 2 | 1.19 | 0.7 | 0.6 | 0.8 | 0.6 | 0.6 | 0.9 | 0.9 | 1.2 | 0.5 | 0.8 | 0.2 | 3.0 | 0.8 | 1.1 | 4.2 | 3.0 |
| Scav. tail | 68.09 | 76.1 | 85.1 | 72.3 | 85.8 | 86.1 | 80.4 | 79.3 | 68.1 | 27.0 | 79.3 | 1.5 | 47.2 | 7.6 | 63.0 | 6.5 | 57.4 |
| Cleaner conc. 1 | 4.03 | 0.4 | 0.6 | 0.4 | 0.2 | 0.7 | 1.4 | 0.6 | 4.0 | 28.7 | 0.4 | 83.0 | 11.3 | 14.4 | 11.2 | 31.1 | 5.1 |
| Cleaner conc. 2 | 2.58 | 0.4 | 0.4 | 0.4 | 0.0 | 0.5 | 0.7 | 0.4 | 2.6 | 21.5 | 0.4 | 6.4 | 6.7 | 32.1 | 2.4 | 18.3 | 4.4 |
| Cleaner conc. 3 | 1.28 | 0.3 | 0.2 | 0.4 | 0.1 | 0.2 | 0.3 | 0.3 | 1.3 | 8.4 | 0.2 | 1.5 | 3.0 | 16.2 | 1.2 | 7.9 | 2.2 |
| Final Tail | 12.26 | 11.2 | 7.2 | 13.1 | 7.5 | 6.5 | 8.8 | 10.1 | 12.3 | 9.7 | 10.7 | 3.5 | 16.3 | 22.5 | 11.3 | 19.5 | 15.5 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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**FLOTATION TEST 9**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.34 | 100.00 | 0.45 | 100.00 | 12.51 | 100.00 | 44.28 | 100.00 | 15.06 | 100.00 |
| **1** | Preflot. conc. | 6.29 | 0.61 | 2.87 | 0.18 | 2.52 | 7.99 | 4.02 | 54.30 | 7.71 | 21.70 | 9.06 |
| **2** | Scav. conc. 1 | 4.27 | 1.07 | 3.42 | 0.15 | 1.43 | 24.70 | 8.44 | 33.00 | 3.19 | 12.60 | 3.57 |
| **3** | Scav. conc. 2 | 1.19 | 0.95 | 0.85 | 0.07 | 0.19 | 31.90 | 3.05 | 25.90 | 0.70 | 9.74 | 0.77 |
| **4** | Scav. tail | 68.09 | 0.15 | 7.65 | 0.01 | 1.51 | 8.66 | 47.15 | 49.50 | 76.12 | 16.00 | 72.32 |
| **5** | Cleaner conc. 1 | 4.03 | 4.79 | 14.45 | 9.26 | 82.98 | 35.20 | 11.34 | 4.54 | 0.41 | 1.63 | 0.44 |
| **6** | Cleaner conc. 2 | 2.58 | 16.60 | 32.09 | 1.11 | 6.38 | 32.40 | 6.69 | 6.16 | 0.36 | 2.19 | 0.38 |
| **7** | Cleaner conc. 3 | 1.28 | 16.90 | 16.17 | 0.51 | 1.45 | 29.70 | 3.04 | 12.00 | 0.35 | 4.18 | 0.35 |
| **8** | Cleaner tail | 12.26 | 2.45 | 22.50 | 0.13 | 3.55 | 16.60 | 16.28 | 40.30 | 11.16 | 16.10 | 13.11 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc (calc) | 20.15 | 5.65 | 85.21 | 2.10 | 94.35 | 23.17 | 37.34 | 26.98 | 12.28 | 10.67 | 14.27 |
| Scavenger 1 (cumul) | 24.43 | 4.85 | 88.63 | 0.49 | 95.78 | 5.98 | 45.78 | 14.96 | 15.47 | 17.38 | 17.85 |
| Scavenger 2 (cumul) | 25.62 | 4.66 | 89.48 | 0.13 | 95.97 | 1.92 | 48.83 | 8.12 | 16.16 | 26.99 | 18.62 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger 1 | 4.274 | 1.07 | 3.42 | 0.15 | 1.43 | 24.70 | 8.44 | 33.00 | 3.19 | 12.60 | 3.57 |
| Scavenger 2 | 5.468 | 1.04 | 4.27 | 0.13 | 1.61 | 26.27 | 11.49 | 31.45 | 3.88 | 11.98 | 4.35 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 conc | 4.03 | 4.79 | 14.45 | 9.26 | 82.98 | 35.20 | 11.34 | 4.54 | 0.41 | 1.63 | 0.44 |
| Cleaner 2 conc | 6.61 | 9.40 | 46.54 | 6.08 | 89.36 | 34.11 | 18.03 | 5.17 | 0.77 | 1.85 | 0.81 |
| Cleaner 3 conc | 7.89 | 10.62 | 62.71 | 5.17 | 90.81 | 33.39 | 21.06 | 6.28 | 1.12 | 2.23 | 1.17 |




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**Test parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 10 |
| OBJECTIVE OF TEST | Confirming the necessity of preflotation and start to study the cleaning stage |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 06-12-07 |
| | |

| Flotation | Rougher 1 | Rougher 2 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner 2 | Cleaner 3 | Scav.Cleaner 1 | Scav.Cleaner 2 | Scav.Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 1 | 1 | 1 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | H2SO4 | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 90 minutes | |
| Grind : d80 % -270 mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | H2SO4 | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| cond. 1 | **8** | **6** | | | | **9.2** | 0.00 | **5** | | 9.2 |
| **Rougher 1** | | | | | | | 5.00 | | **5.0** | 9.2 |
| cond. 2 | **5** | **6** | | | | **8.94** | 10.00 | **1** | | 9.2 |
| **Rougher 2** | | | | | | | 11.00 | | **4.0** | 9.2 |
| cond. 3 | **3.5** | **6** | | | | **9.03** | 15.00 | **1** | | 9.2 |
| **Scavenger** | | | | | | | 16.00 | | **15.0** | 9.2 |
| cond. 4 | **3.5** | **3.5** | | | | | 31.00 | **1** | | 9.2 |
| **Scavenger 2** | | | | | | | 32.00 | | **5.0** | 9.2 |
| **2.5 l cell** | | | | | | | | | | |
| **Ajust. pH** | | | | | | **9.56** | 37.00 | | | 9.5 |
| cond. 6 | | | **20** | | | | 37.00 | **2** | | 9.5 |
| cond. 7 | **1** | | | | | **9.67** | 39.00 | **1** | | 9.5 |
| cond. 8 | | **2.5** | | | | | 40.00 | **1** | | 9.5 |
| **Cleaner 1** | **1** | **1** | | | | | 41.00 | | **7.0** | 9.5 |
| **Cleaner 2** | **1** | **1.2** | | | | **9.5** | 48.00 | | **6.0** | 9.5 |
| **Cleaner 3** | **0.5** | | | | | **9.36** | 54.00 | | **5.0** | 9.5 |
| **Cleaner 4** | | | | | | | 59.00 | | **5.0** | |
| **1 l cell** | | | | | | | | | | |
| **SCAVENGER CLEANER** | | | | | | **8.68** | 64.00 | | | 9.5 |
| cond. 9 | | | **6.7** | | | **9.57** | 64.00 | **2** | | 9.5 |
| **Scav cleaner 1** | | | | | | | 66.00 | | **5.0** | 9.5 |
| cond. 10 | **0.3** | **0.8** | | | | **9.55** | 71.00 | **1** | | 9.5 |
| **Scav cleaner 2** | | | | | | | 72.00 | | **5.0** | 9.5 |
| cond. 11 | **0.3** | **0.8** | | | | **9.3** | 77.00 | **1** | | 9.5 |
| **Scav cleaner 3** | | | | | | | 78.00 | | **5+** | 9.5 |
| total pH controller (soda ash) addition (mL) | | | | | | | | | | |

Notes : Cleaner scavenger flotation time was adjusted according to operator observations

Technician comments

Roygher froth was loaded. Concentrate weight recovery should be higher than in previous tests.
Loading of scavenger froth was slow.

COREM

| **Flotation test 10** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Scav. 2 tail | 82.66 | 47.20 | 7.68 | 15.60 | 6.79 | 0.32 | 0.22 | 0.16 | <0.10 | <0.02 | 0.22 | 0.02 | 10.90 | 0.27 | <0.02 | 2.25 | 0.02 | 0.00 |
| Cleaner conc. 1 | 6.03 | 10.00 | <1.00 | 4.15 | 0.16 | <0.05 | <0.05 | <0.02 | <0.10 | 0.34 | 0.03 | 4.89 | 31.30 | 9.26 | 0.03 | 35.60 | <0.02 | 0.00 |
| Cleaner conc. 2 | 1.58 | 40.60 | 2.10 | 17.00 | 1.62 | <0.05 | 0.09 | 0.07 | <0.10 | 0.12 | 0.11 | 0.63 | 14.30 | 5.25 | <0.02 | 11.50 | <0.02 | 0.00 |
| Cleaner conc. 3 | 0.42 | 51.10 | 2.82 | 21.00 | 2.57 | 0.08 | 0.12 | 0.10 | <0.10 | 0.04 | 0.15 | 0.15 | 8.96 | 1.80 | <0.02 | 3.15 | <0.02 | 0.00 |
| Cleaner conc. 4 | 0.33 | 53.10 | 3.13 | 22.10 | 2.84 | 0.11 | 0.14 | 0.12 | <0.10 | 0.02 | 0.18 | 0.17 | 8.04 | 0.92 | <0.02 | 1.72 | <0.02 | 0.00 |
| Cleaner tail | 6.11 | 53.20 | 4.11 | 21.30 | 3.58 | 0.14 | 0.15 | 0.13 | <0.10 | <0.02 | 0.20 | 0.05 | 7.88 | 0.41 | <0.02 | 0.61 | <0.02 | 0.00 |
| Scav. Cleaner Conc. 1 | 0.48 | 9.92 | 1.18 | 3.55 | 0.31 | <0.05 | <0.05 | 0.03 | <0.10 | 0.31 | 0.04 | 1.38 | 27.00 | 20.20 | <0.02 | 28.60 | 0.06 | 0.00 |
| Scav. Cleaner Conc. 2 | 0.28 | 16.70 | 1.80 | 5.92 | 0.90 | <0.05 | 0.06 | 0.04 | <0.10 | 0.24 | 0.07 | 1.53 | 25.90 | 16.50 | <0.02 | 24.20 | 0.10 | 0.00 |
| Scav. Cleaner Conc. 3 | 0.15 | 25.70 | 2.49 | 9.26 | 1.74 | 0.08 | 0.10 | 0.08 | <0.10 | 0.16 | 0.11 | 1.68 | 23.30 | 10.70 | <0.02 | 19.00 | 0.13 | 0.00 |
| Scav. Cleaner Tail | 1.96 | 48.50 | 4.68 | 19.40 | 3.99 | 0.23 | 0.19 | 0.16 | <0.10 | 0.03 | 0.25 | 0.47 | 10.60 | 1.43 | <0.02 | 2.91 | 0.03 | 0.00 |
| **Feed calculated** | **100.00** | **0.00** | **44.98** | **6.82** | **15.30** | **5.97** | **0.28** | **0.20** | **0.15** | **0.10** | **0.04** | **0.20** | **0.35** | **12.11** | **1.09** | **0.02** | **4.54** | **0.02** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Scav. 2 tail | 82.66 | 86.7 | 93.1 | 84.3 | 94.0 | 93.6 | 90.6 | 90.1 | 82.7 | 38.1 | 89.0 | 4.7 | 74.4 | 20.5 | 80.2 | 41.0 | 79.5 |
| Cleaner conc. 1 | 6.03 | 1.3 | 0.9 | 1.6 | 0.2 | 1.1 | 1.5 | 0.8 | 6.0 | 47.3 | 0.9 | 84.7 | 15.6 | 51.3 | 8.8 | 47.3 | 5.8 |
| Cleaner conc. 2 | 1.58 | 1.4 | 0.5 | 1.8 | 0.4 | 0.3 | 0.7 | 0.8 | 1.6 | 4.4 | 0.8 | 2.9 | 1.9 | 7.6 | 1.5 | 4.0 | 1.5 |
| Cleaner conc. 3 | 0.42 | 0.5 | 0.2 | 0.6 | 0.2 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.3 | 0.2 | 0.3 | 0.7 | 0.4 | 0.3 | 0.4 |
| Cleaner conc. 4 | 0.33 | 0.4 | 0.2 | 0.5 | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.1 | 0.3 |
| Cleaner tail | 6.11 | 7.2 | 3.7 | 8.5 | 3.7 | 3.0 | 4.6 | 5.4 | 6.1 | 2.8 | 6.0 | 0.9 | 4.0 | 2.3 | 5.9 | 0.8 | 5.9 |
| Scav. Cleaner Conc. 1 | 0.48 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.5 | 3.4 | 0.1 | 1.9 | 1.1 | 8.8 | 0.5 | 3.0 | 1.4 |
| Scav. Cleaner Conc. 2 | 0.28 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.3 | 1.6 | 0.1 | 1.2 | 0.6 | 4.3 | 0.3 | 1.5 | 1.4 |
| Scav. Cleaner Conc. 3 | 0.15 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.6 | 0.1 | 0.7 | 0.3 | 1.5 | 0.1 | 0.6 | 1.0 |
| Scav. Cleaner Tail | 1.96 | 2.1 | 1.3 | 2.5 | 1.3 | 1.6 | 1.9 | 2.1 | 2.0 | 1.4 | 2.4 | 2.6 | 1.7 | 2.6 | 1.9 | 1.3 | 2.8 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **96.6** | **94.8** |

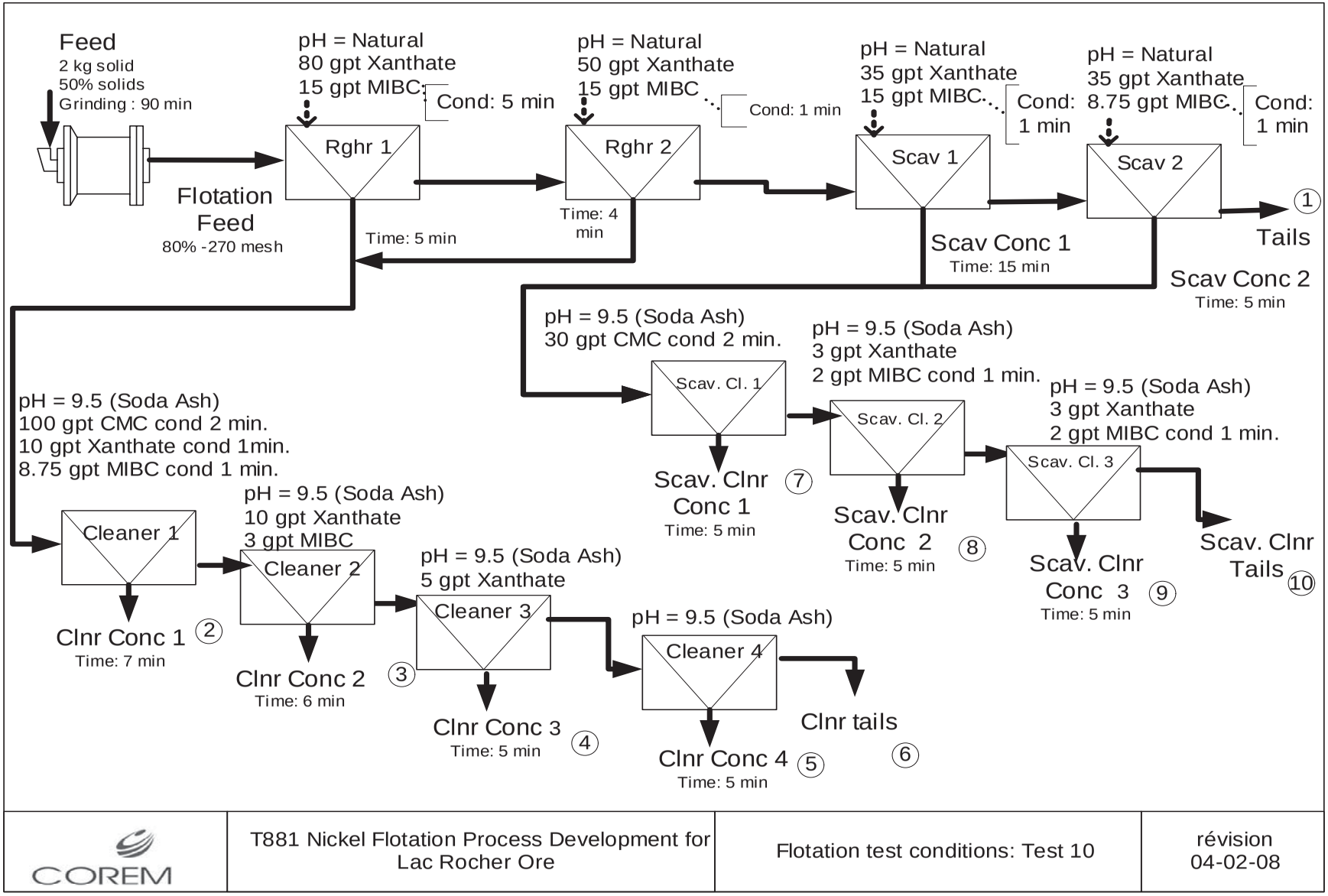
COREM

**FLOTATION TEST 10**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.09 | 100.00 | 0.35 | 100.00 | 12.11 | 100.00 | 44.98 | 100.00 | 15.30 | 100.00 |
| **1** | Scav. 2 tail | 82.66 | 0.27 | 20.52 | 0.02 | 4.75 | 10.90 | 74.37 | 47.20 | 86.74 | 15.60 | 84.26 |
| **2** | Cleaner conc. 1 | 6.03 | 9.26 | 51.35 | 4.89 | 84.66 | 31.30 | 15.58 | 10.00 | 1.34 | 4.15 | 1.64 |
| **3** | Cleaner conc. 2 | 1.58 | 5.25 | 7.61 | 0.63 | 2.85 | 14.30 | 1.86 | 40.60 | 1.42 | 17.00 | 1.75 |
| **4** | Cleaner conc. 3 | 0.42 | 1.80 | 0.69 | 0.15 | 0.18 | 8.96 | 0.31 | 51.10 | 0.47 | 21.00 | 0.57 |
| **5** | Cleaner conc. 4 | 0.33 | 0.92 | 0.28 | 0.17 | 0.16 | 8.04 | 0.22 | 53.10 | 0.39 | 22.10 | 0.48 |
| **6** | Cleaner tail | 6.11 | 0.41 | 2.30 | 0.05 | 0.88 | 7.88 | 3.97 | 53.20 | 7.22 | 21.30 | 8.50 |
| **7** | Scav. Cleaner Conc. 1 | 0.48 | 20.20 | 8.84 | 1.38 | 1.89 | 27.00 | 1.06 | 9.92 | 0.11 | 3.55 | 0.11 |
| **8** | Scav. Cleaner Conc. 2 | 0.28 | 16.50 | 4.31 | 1.53 | 1.25 | 25.90 | 0.61 | 16.70 | 0.11 | 5.92 | 0.11 |
| **9** | Scav. Cleaner Conc. 3 | 0.15 | 10.70 | 1.51 | 1.68 | 0.74 | 23.30 | 0.29 | 25.70 | 0.09 | 9.26 | 0.09 |
| **10** | Scav. Cleaner Tail | 1.96 | 1.43 | 2.58 | 0.47 | 2.65 | 10.60 | 1.72 | 48.50 | 2.12 | 19.40 | 2.49 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc (calc) | 14.46 | 4.68 | 62.23 | 2.14 | 88.73 | 18.38 | 21.94 | 33.75 | 10.85 | 13.69 | 12.94 |
| Scavenger +rougher (cumul) | 17.34 | 4.99 | 79.48 | 1.91 | 95.25 | 17.90 | 25.63 | 34.41 | 13.26 | 13.89 | 15.74 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger (calculated) | 2.88 | 6.52 | 17.25 | 0.79 | 6.52 | 15.50 | 3.68 | 37.76 | 2.41 | 14.90 | 2.80 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 | 6.03 | 9.26 | 51.35 | 4.89 | 84.66 | 31.30 | 15.58 | 10.00 | 1.34 | 4.15 | 1.64 |
| Cleaner 2 cumul | 7.61 | 8.43 | 58.96 | 4.01 | 87.51 | 27.78 | 17.45 | 16.34 | 2.76 | 6.81 | 3.39 |
| Cleaner 3 cumul | 8.02 | 8.09 | 59.65 | 3.81 | 87.69 | 26.80 | 17.75 | 18.14 | 3.24 | 7.55 | 3.96 |
| Cleaner 4 cumul | 8.36 | 7.80 | 59.93 | 3.66 | 87.86 | 26.06 | 17.97 | 19.53 | 3.63 | 8.13 | 4.44 |
| **Cleaner scavenger stage** | | | | | | | | | | | |
| Scav cleaner 1 | 0.48 | 20.20 | 8.84 | 1.38 | 1.89 | 27.00 | 1.06 | 9.92 | 0.11 | 3.55 | 0.11 |
| Scav cleaner 2 (cumul) | 0.76 | 18.82 | 13.16 | 1.44 | 3.13 | 26.59 | 1.67 | 12.46 | 0.21 | 4.44 | 0.22 |
| Scav cleaner 3 (cumul) | 0.91 | 17.45 | 14.67 | 1.48 | 3.87 | 26.04 | 1.96 | 14.68 | 0.30 | 5.25 | 0.31 |
| **Final concentrate** | | | | | | | | | | | |
| Cleaner 4 cumul | 8.36 | 7.80 | 59.93 | 3.66 | 87.86 | 26.06 | 17.97 | 19.53 | 3.63 | 8.13 | 4.44 |
| Scav cleaner 1 | 8.83 | 8.47 | 68.78 | 3.54 | 89.74 | 26.11 | 19.03 | 19.01 | 3.73 | 7.88 | 4.55 |
| Scav cleaner 2 (cumul) | 9.12 | 8.72 | 73.09 | 3.48 | 90.99 | 26.10 | 19.64 | 18.94 | 3.84 | 7.82 | 4.66 |
| Scav cleaner 3 (cumul) | **9.27** | **8.75** | **74.60** | **3.45** | **91.73** | **26.05** | **19.94** | **19.05** | **3.93** | **7.84** | **4.75** |
| **Final concentrate with cleaner 1-3 only** | | | | | | | | | | | |
| Cleaner 3 cumul | 8.02 | 8.09 | 59.65 | 3.81 | 87.69 | 26.80 | 17.75 | 18.14 | 3.24 | 7.55 | 3.96 |
| Scav cleaner 1 | 8.50 | 8.76 | 68.49 | 3.67 | 89.58 | 26.81 | 18.81 | 17.68 | 3.34 | 7.33 | 4.07 |
| Scav cleaner 2 (cumul) | 8.79 | 9.01 | 72.81 | 3.60 | 90.83 | 26.78 | 19.42 | 17.65 | 3.45 | 7.28 | 4.18 |
| Scav cleaner 3 (cumul) | **8.94** | **9.04** | **74.32** | **3.57** | **91.57** | **26.72** | **19.72** | **17.79** | **3.54** | **7.31** | **4.27** |
| **Final concentrate with cleaner 1-2 only** | | | | | | | | | | | |
| Cleaner 2 cumul | 7.61 | 8.43 | 58.96 | 4.01 | 87.51 | 27.78 | 17.45 | 16.34 | 2.76 | 6.81 | 3.39 |
| Scav cleaner 1 | 8.08 | 9.12 | 67.81 | 3.85 | 89.40 | 27.73 | 18.51 | 15.97 | 2.87 | 6.62 | 3.50 |
| Scav cleaner 2 (cumul) | 8.37 | 9.37 | 72.12 | 3.77 | 90.65 | 27.67 | 19.11 | 15.99 | 2.98 | 6.60 | 3.61 |
| Scav cleaner 3 (cumul) | **8.52** | **9.40** | **73.63** | **3.74** | **91.39** | **27.59** | **19.41** | **16.17** | **3.06** | **6.65** | **3.70** |
| **Final concentrate with cleaner 1 only** | | | | | | | | | | | |
| Cleaner 1 | 6.03 | 9.26 | 51.35 | 4.89 | 84.66 | 31.30 | 15.58 | 10.00 | 1.34 | 4.15 | 1.64 |
| Scav cleaner 1 | 6.51 | 10.06 | 60.19 | 4.63 | 86.55 | 30.99 | 16.64 | 9.99 | 1.45 | 4.11 | 1.75 |
| Scav cleaner 2 (cumul) | 6.79 | 10.33 | 64.51 | 4.50 | 87.80 | 30.77 | 17.25 | 10.27 | 1.55 | 4.18 | 1.86 |
| Scav cleaner 3 (cumul) | **6.95** | **10.34** | **66.01** | **4.44** | **88.54** | **30.61** | **17.55** | **10.62** | **1.64** | **4.29** | **1.95** |

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| COREM | T881 Nickel Flotation Process Development for Lac Rocher Ore | Flotation test conditions: Test 10 | révision 04-02-08 |
|---|---|---|---|

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**Test Parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 11 |
| OBJECTIVE OF TEST | Improve recovery in rougher scavenger and depress more MgO than test 10 |
| | - Coarser grind addition of CMC to rougher and higher air flowrate |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 14-12-07 |

| Flotation | Rougher 1 | Rougher 2 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner 2 | Cleaner 3 | Cleaner 4 | Scav.Cleaner 1 | Scav.Cleaner 2 | Scav.Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 2.5 | 1 | 1 | 1 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | 2.5 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | H2SO4 | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | H2SO4 | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| Cond. 1 | | | **100** | | | **8.64** | 0 | **2** | | Natural |
| cond. 2 | **10** | **6** | | | | | 2.00 | **5** | | Natural |
| **Rougher 1** | | | | | | | 7.00 | | **5.0** | Natural |
| cond. 3 | **6** | **6** | | | | **8.52** | 12.00 | **1** | | Natural |
| **Rougher 2** | | | | | | | 13.00 | | **6.0** | Natural |
| cond. 4 | **4** | **6** | | | | **8.52** | 19.00 | **1** | | Natural |
| **Scavenger** | | | | | | | 20.00 | | **14.3** | Natural |
| cond. 5 | **4** | **3.5** | | | | **8.36** | 34.25 | **1** | | Natural |
| **Scavenger 2** | | | | | | | 35.25 | | **5.0** | Natural |
| **2.5 l cell** | | | | | | | | | | |
| **Ajust. pH** | | | | | | **9.59** | 40.25 | | | 9.5 |
| cond. 7 | | | **20** | | | | 40.25 | **2** | | 9.5 |
| cond. 8 | **1** | | | | | **9.59** | 42.25 | **1** | | 9.5 |
| cond. 9 | | **2.5** | | | | **9.59** | 43.25 | **1** | | 9.5 |
| **Cleaner 1** | **1** | **1** | | | | **9.5** | 44.25 | | **6.5** | 9.5 |
| **Cleaner 2** | **1** | **1.2** | | | | | 50.75 | | **6.0** | 9.5 |
| **Cleaner 3** | **0.5** | | | | | **9.41** | 56.75 | | **5.0** | 9.5 |
| **Cleaner 4** | **5** | | | | | **9.52** | 61.75 | | **5.0** | |
| **1 l cell** | | | | | | | | | | |
| **SCAVENGER CLEANER** | | | | | | **9.55** | 66.75 | | | 9.5 |
| cond. 10 | | | **6.7** | | | **9.56** | 66.75 | **2** | | 9.5 |
| **Scav cleaner 1** | | | | | | | 68.75 | | **5.0** | 9.5 |
| cond. 11 | **0.3** | **0.8** | | | | **9.53** | 73.75 | **1** | | 9.5 |
| **Scav cleaner 2** | | | | | | | 74.75 | | **5.0** | 9.5 |
| cond. 12 | **0.3** | **0.8** | | | | **9.5** | 79.75 | **1** | | 9.5 |
| **Scav cleaner 3** | | | | | | | 80.75 | | **5+** | 9.5 |
| total pH controller (soda ash) addition (mL) | 33.1 | 27.8 | 126.7 | | 25.3 | | | | | |

Comments

Cleaner 2 and 3 were combined. Mass recovery was low.
Most of rougher 1 conc. was refloated in cleaner 1.

COREM

**Test Parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 11 |
| OBJECTIVE OF TEST | Improve recovery in rougher scavenger and depress more MgO than test 10 |
| | - Coarser grind addition of CMC to rougher and higher air flowrate |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 14-12-07 |

| Flotation | Rougher 1 | Rougher 2 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner 2 | Cleaner 3 | Cleaner 4 | Scav.Cleaner 1 | Scav.Cleaner 2 | Scav.Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 2.5 | 1 | 1 | 1 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | 3.5 | 2.5 | 2.5 | 2.5 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | H2SO4 | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | H2SO4 | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |

Scavenging time was reduced to 14,25 min.

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| Flotation test 11 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Scavenger Tail | 73.02 | 48.9 | 7.98 | 16.2 | 7.07 | 0.37 | 0.25 | 0.17 | < 0.10 | < 0.02 | 0.23 | < 0.01 | 9.32 | 0.18 | < 0.02 | 1.11 | < 0.02 | 91.781 |
| Cleaner conc. 1 | 7.63 | 4.35 | < 1.00 | 1.41 | < 0.05 | < 0.05 | < 0.05 | < 0.02 | < 0.10 | 0.4 | 0.02 | 4.79 | 34.7 | 11.2 | 0.03 | 39.8 | 0.03 | 96.73 |
| Cleaner conc. 2-3 | 0.81 | 11.8 | 1.16 | 4.07 | 0.31 | < 0.05 | < 0.05 | 0.02 | < 0.10 | 0.3 | 0.03 | 1.57 | 28 | 16.5 | 0.03 | 29.3 | 0.09 | 93.18 |
| Cleaner conc. 4 | 0.36 | 28.7 | 1.37 | 11.3 | 0.71 | < 0.05 | 0.05 | 0.04 | < 0.10 | 0.18 | 0.07 | 1.1 | 22 | 10.1 | 0.04 | 20 | 0.14 | 95.8 |
| Cleaner tail | 9.87 | 52 | 3.64 | 21.6 | 3.26 | 0.14 | 0.14 | 0.12 | < 0.10 | < 0.02 | 0.18 | 0.06 | 8.32 | 0.61 | < 0.02 | 1.42 | < 0.02 | 91.49 |
| Scav. Cleaner 1 conc. | 1.66 | 12.4 | 1.36 | 4.43 | 0.91 | < 0.05 | < 0.05 | 0.04 | < 0.10 | 0.04 | 0.05 | 0.54 | 43.6 | 2.6 | < 0.02 | 29.5 | 0.06 | 95.53 |
| Scav. Cleaner 2 conc. | 0.87 | 16 | 1.5 | 5.98 | 1.21 | < 0.05 | 0.06 | 0.05 | < 0.10 | 0.03 | 0.07 | 0.36 | 41.3 | 1.78 | < 0.02 | 26.9 | 0.08 | 95.32 |
| Scav. Cleaner 3 conc. | 0.42 | 21.9 | 2.01 | 8.28 | 1.64 | 0.06 | 0.08 | 0.07 | < 0.10 | 0.03 | 0.1 | 0.28 | 36.4 | 1.58 | 0.02 | 22.8 | 0.06 | 95.31 |
| Scav. Cleaner Tail | 5.37 | 49.9 | 5.06 | 19.2 | 4.74 | 0.25 | 0.21 | 0.17 | < 0.10 | < 0.02 | 0.25 | 0.08 | 11 | 0.47 | < 0.02 | 2.34 | < 0.02 | 93.67 |
| **Feed calculated** | **100.00** | **44.48** | **6.59** | **15.33** | **5.78** | **0.30** | **0.21** | **0.15** | **0.10** | **0.05** | **0.20** | **0.41** | **12.40** | **1.31** | **0.02** | **5.24** | **0.02** | **92.61** |

| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Scavenger Tail | 73.02 | 80.3 | 88.4 | 77.1 | 89.3 | 89.1 | 85.4 | 83.7 | 73.0 | 27.9 | 82.7 | 0.2 | 54.9 | 10.1 | 69.8 | 15.5 | 63.2 |
| Cleaner conc. 1 | 7.63 | 0.7 | 1.2 | 0.7 | 0.1 | 1.3 | 1.8 | 1.0 | 7.6 | 58.3 | 0.8 | 90.0 | 21.3 | 65.4 | 10.9 | 57.9 | 9.9 |
| Cleaner conc. 2-3 | 0.81 | 0.2 | 0.1 | 0.2 | 0.0 | 0.1 | 0.2 | 0.1 | 0.8 | 4.7 | 0.1 | 3.1 | 1.8 | 10.3 | 1.2 | 4.6 | 3.2 |
| Cleaner conc. 4 | 0.36 | 0.2 | 0.1 | 0.3 | 0.0 | 0.1 | 0.1 | 0.1 | 0.4 | 1.2 | 0.1 | 1.0 | 0.6 | 2.7 | 0.7 | 1.4 | 2.2 |
| Cleaner tail | 9.87 | 11.5 | 5.4 | 13.9 | 5.6 | 4.6 | 6.5 | 8.0 | 9.9 | 3.8 | 8.8 | 1.5 | 6.6 | 4.6 | 9.4 | 2.7 | 8.5 |
| Scav. Cleaner 1 conc. | 1.66 | 0.5 | 0.3 | 0.5 | 0.3 | 0.3 | 0.4 | 0.4 | 1.7 | 1.3 | 0.4 | 2.2 | 5.8 | 3.3 | 1.6 | 9.3 | 4.3 |
| Scav. Cleaner 2 conc. | 0.87 | 0.3 | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 | 0.3 | 0.9 | 0.5 | 0.3 | 0.8 | 2.9 | 1.2 | 0.8 | 4.5 | 3.0 |
| Scav. Cleaner 3 conc. | 0.42 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 | 1.2 | 0.5 | 0.4 | 1.8 | 1.1 |
| Scav. Cleaner Tail | 5.37 | 6.0 | 4.1 | 6.7 | 4.4 | 4.4 | 5.3 | 6.2 | 5.4 | 2.1 | 6.6 | 1.1 | 4.8 | 1.9 | 5.1 | 2.4 | 4.7 |
| **Feed calculated** | **100.00** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** | **100.0** |

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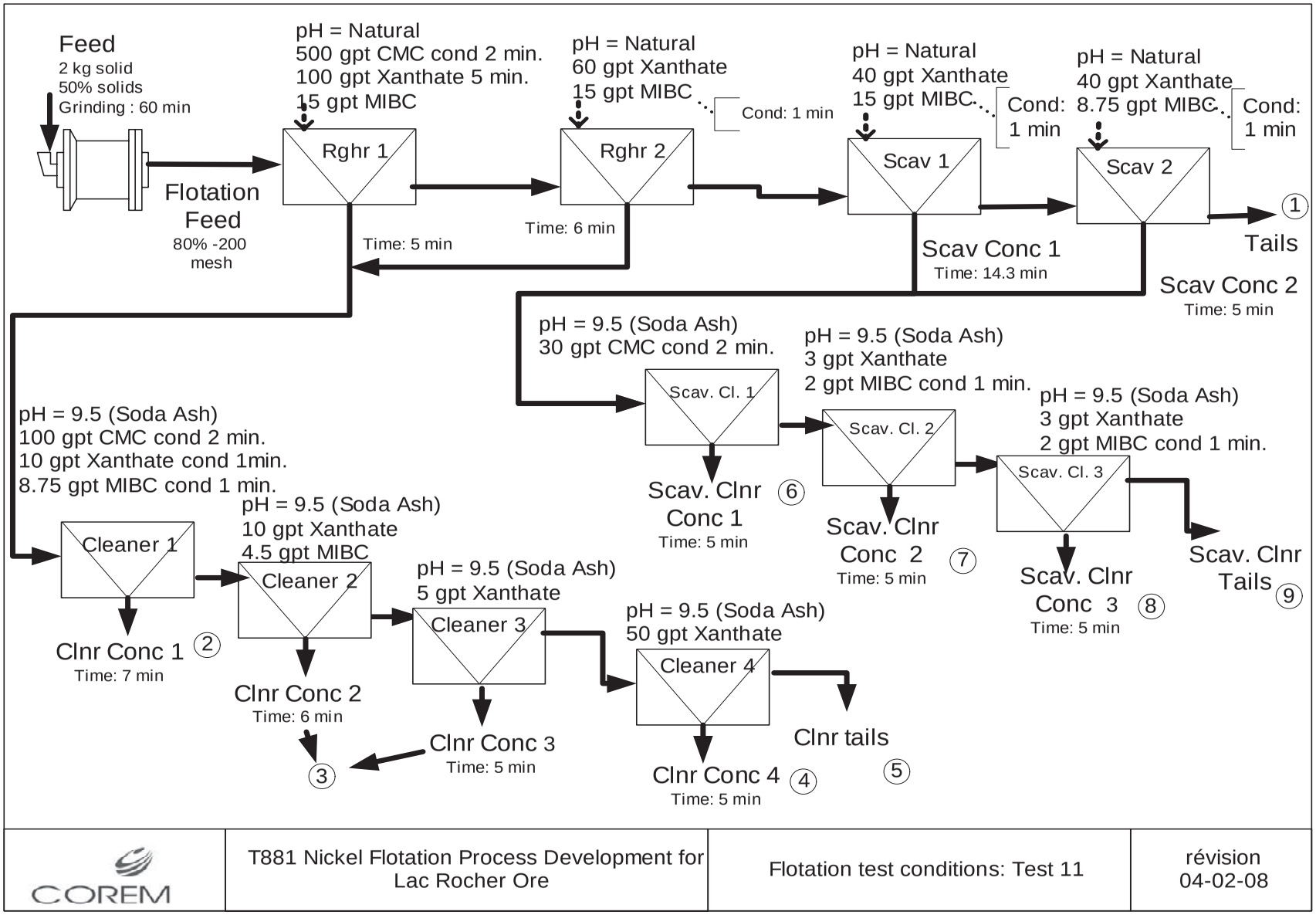
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**FLOTATION TEST 11**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.31 | 100.00 | 0.41 | 100.00 | 12.40 | 100.00 | 44.48 | 100.00 | 15.33 | 100.00 |
| **1** | Scavenger Tail | 73.02 | 0.18 | 10.06 | 0.00 | 0.16 | 9.32 | 54.87 | 48.90 | 80.26 | 16.20 | 77.14 |
| **2** | Cleaner conc. 1 | 7.63 | 11.20 | 65.38 | 4.79 | 89.95 | 34.70 | 21.34 | 4.35 | 0.75 | 1.41 | 0.70 |
| **3** | Cleaner conc. 2-3 | 0.81 | 16.50 | 10.28 | 1.57 | 3.15 | 28.00 | 1.84 | 11.80 | 0.22 | 4.07 | 0.22 |
| **4** | Cleaner conc. 4 | 0.36 | 10.10 | 2.75 | 1.10 | 0.96 | 22.00 | 0.63 | 28.70 | 0.23 | 11.30 | 0.26 |
| **5** | Cleaner tail | 9.87 | 0.61 | 4.61 | 0.06 | 1.46 | 8.32 | 6.62 | 52.00 | 11.54 | 21.60 | 13.90 |
| **6** | Scav. Cleaner 1 conc. | 1.66 | 2.60 | 3.30 | 0.54 | 2.20 | 43.60 | 5.82 | 12.40 | 0.46 | 4.43 | 0.48 |
| **7** | Scav. Cleaner 2 conc. | 0.87 | 1.78 | 1.18 | 0.36 | 0.77 | 41.30 | 2.89 | 16.00 | 0.31 | 5.98 | 0.34 |
| **8** | Scav. Cleaner 3 conc. | 0.42 | 1.58 | 0.51 | 0.28 | 0.29 | 36.40 | 1.23 | 21.90 | 0.21 | 8.28 | 0.23 |
| **9** | Scav. Cleaner Tail | 5.37 | 0.47 | 1.93 | 0.08 | 1.06 | 11.00 | 4.77 | 49.90 | 6.03 | 19.20 | 6.73 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc (calc) | 18.67 | 5.81 | 83.02 | 2.08 | 95.52 | 20.22 | 30.43 | 30.33 | 12.73 | 12.39 | 15.08 |
| Scavenger +rougher (cumul) | 26.98 | 4.35 | 89.94 | 1.50 | 99.84 | 20.75 | 45.13 | 32.54 | 19.74 | 12.99 | 22.86 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger (calculated) | 8.32 | 1.09 | 6.92 | 0.21 | 4.32 | 21.93 | 14.71 | 37.48 | 7.01 | 14.33 | 7.77 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 | 7.63 | 11.20 | 65.38 | 4.79 | 89.95 | 34.70 | 21.34 | 4.35 | 0.75 | 1.41 | 0.70 |
| Cleaner 2-3 cumul | 8.44 | 11.71 | 75.66 | 4.48 | 93.10 | 34.05 | 23.18 | 5.07 | 0.96 | 1.67 | 0.92 |
| Cleaner 4 cumul | 8.80 | 11.65 | 78.41 | 4.34 | 94.06 | 33.57 | 23.81 | 6.02 | 1.19 | 2.06 | 1.18 |
| **Cleaner scavenger stage** | | | | | | | | | | | |
| Scav cleaner 1 | 1.66 | 2.60 | 3.30 | 0.54 | 2.20 | 43.60 | 5.82 | 12.40 | 0.46 | 4.43 | 0.48 |
| Scav cleaner 2 (cumul) | 2.53 | 2.32 | 4.48 | 0.48 | 2.97 | 42.81 | 8.72 | 13.64 | 0.77 | 4.96 | 0.82 |
| Scav cleaner 3 (cumul) | 2.94 | 2.21 | 4.99 | 0.45 | 3.26 | 41.90 | 9.94 | 14.81 | 0.98 | 5.43 | 1.04 |
| **Final concentrate** | | | | | | | | | | | |
| Cleaner 4 cumul | 8.80 | 11.65 | 78.41 | 4.34 | 94.06 | 33.57 | 23.81 | 6.02 | 1.19 | 2.06 | 1.18 |
| Scav cleaner 1 | 10.45 | 10.21 | 81.71 | 3.74 | 96.26 | 35.16 | 29.63 | 7.03 | 1.65 | 2.43 | 1.66 |
| Scav cleaner 2 (cumul) | 11.32 | 9.57 | 82.89 | 3.48 | 97.03 | 35.63 | 32.52 | 7.72 | 1.97 | 2.70 | 2.00 |
| Scav cleaner 3 (cumul) | **11.74** | **9.28** | **83.40** | **3.37** | **97.32** | **35.66** | **33.75** | **8.23** | **2.17** | **2.90** | **2.22** |
| **Final concentrate with cleaner 1-2 only** | | | | | | | | | | | |
| Cleaner 2-3 cumul | 8.44 | 11.71 | 75.66 | 4.48 | 93.10 | 34.05 | 23.18 | 5.07 | 0.96 | 1.67 | 0.92 |
| Scav cleaner 1 | 10.10 | 10.22 | 78.96 | 3.83 | 95.30 | 35.62 | 29.00 | 6.27 | 1.42 | 2.12 | 1.40 |
| Scav cleaner 2 (cumul) | 10.97 | 9.55 | 80.14 | 3.56 | 96.07 | 36.07 | 31.89 | 7.04 | 1.74 | 2.43 | 1.73 |
| Scav cleaner 3 (cumul) | **11.38** | **9.26** | **80.65** | **3.44** | **96.36** | **36.08** | **33.12** | **7.59** | **1.94** | **2.64** | **1.96** |
| **Final concentrate with cleaner 1 only** | | | | | | | | | | | |
| Cleaner 1 | 7.63 | 11.20 | 65.38 | 4.79 | 89.95 | 34.70 | 21.34 | 4.35 | 0.75 | 1.41 | 0.70 |
| Scav cleaner 1 | 9.28 | 9.67 | 68.68 | 4.03 | 92.15 | 36.29 | 27.16 | 5.79 | 1.21 | 1.95 | 1.18 |
| Scav cleaner 2 (cumul) | 10.15 | 8.99 | 69.87 | 3.72 | 92.92 | 36.72 | 30.05 | 6.66 | 1.52 | 2.29 | 1.52 |
| Scav cleaner 3 (cumul) | **10.57** | **8.70** | **70.37** | **3.58** | **93.21** | **36.70** | **31.28** | **7.26** | **1.73** | **2.53** | **1.74** |

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| | | | |
|---|---|---|---|
| COREM | T881 Nickel Flotation Process Development for Lac Rocher Ore | Flotation test conditions: Test 11 | révision 04-02-08 |

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**Test Parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 12 |
| OBJECTIVE OF TEST | Kinetic test on rougher stage and separation of Ni and Cu |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 14-12-07 |

| Flotation | Rougher 1 | Rougher 2 | Rougher x | Rougher 8 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 0.5 | 0.5 | 0.5 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | n/d | n/d | n/d |
| Weight of ore (kg) | 2 | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 30.0 | | | | | | | | | | | |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | | | |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| Cond. 1 | | | **100** | | | **8.92** | 0 | **2** | | Natural |
| cond. 2 | **10** | **6** | | | | **8.88** | 2.00 | **5** | | Natural |
| **Rougher 1** | | | | | | | 7.00 | | **5.0** | Natural |
| cond. 3 | **6** | **6** | | | | | 12.00 | **1** | | Natural |
| **Rougher 2** | | | | | | | 13.00 | | **6.0** | Natural |
| cond. 4 | **2** | **3** | | | | **8.69** | 19.00 | **1** | | Natural |
| **Rougher 3** | | | | | | | 20.00 | | **2.0** | Natural |
| **Rougher 4** | | | | | | | 22.00 | | **1.0** | Natural |
| **Rougher 5** | | | | | | | 23.00 | | **3.0** | Natural |
| cond. 5 | **2** | **3** | | | | **8.64** | 26.00 | | | Natural |
| **Rougher 6** | | | | | | | 26.00 | | **2.0** | Natural |
| **Rougher 7** | | | | | | | 28.00 | | **1.0** | Natural |
| **Rougher 8** | | | | | | | 29.00 | | **3.0** | Natural |
| cond. 5 | **3** | **3.5** | | | **x** | **9.97** | 32.00 | **1** | | 10.0 |
| **Scavenger 1** | | | | | **x** | | 33.00 | | **5.0** | 10.0 |
| cond. 6 | **3** | **3.5** | | | **x** | **9.96** | 38.00 | **1** | | 10.0 |
| **Scavenger 2** | | | | | **x** | | 39.00 | | **5.0** | 10.0 |
| **2.5 l cell** | | | | | | | | | | |
| **pH adjustment** | | | | | **x** | **9.57** | 44.00 | | | 9.5 |
| cond. 7 | | | **20** | | **x** | | 44.00 | **2** | | 9.5 |
| cond. 8 | **1** | | | | **x** | | 46.00 | **1** | | 9.5 |
| cond. 9 | | **2.5** | | | **x** | | 47.00 | **1** | | 9.5 |
| **Cleaner 1** | **1** | **1** | | | **x** | | 48.00 | | **6.5** | 9.5 |
| **Cleaner 2** | **1** | **1.2** | | | **x** | | 54.50 | | **6.0** | 9.5 |
| **Cleaner 3** | **0.5** | **3 drops** | | | **x** | | 60.50 | | **5.0** | 9.5 |
| **Cleaner 4** | **5** | **3 drops** | | | **x** | | 65.50 | | **5.0** | 9.5 |
| **Cleaner 5** | **2.5** | **3 drops** | | | **x** | | 70.50 | | **5.0** | 9.5 |

COREM

**Test Parameters**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 12 |
| OBJECTIVE OF TEST | Kinetic test on rougher stage and separation of Ni and Cu |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 14-12-07 |

| Flotation | Rougher 1 | Rougher 2 | Rougher x | Rougher 8 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 0.5 | 0.5 | 0.5 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | n/d | n/d | n/d |
| Weight of ore (kg) | 2 | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 30.0 | | | | | | | | | | | |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | | | |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| **0.5 l cell** | | | | | | | | | | |
| **Cu Cleaner** | | | | | | | | | | |
| **Ajust. pH** | | | | **x** | | **12.1** | 75.50 | | | 12.0 |
| cond. 10 | **1** | | | **x** | | | 75.50 | **2** | | 12.0 |
| **Cu Cleaner 1** | | | | **x** | | | 77.50 | | **0.5** | 12.0 |
| **Cu Cleaner 2** | | | | **x** | | | 78.00 | | **0.5** | 12.0 |
| **Cu Cleaner 3** | | | | **x** | | | 78.50 | | **1.0** | 12.0 |
| **Cu Cleaner 4** | | | | **x** | | | 79.50 | | **2.0** | 12.0 |
| total pH controller (soda ash) addition (mL) | 38 | 29.7 | 120 | 22.6 | 108.3 | | | | | |

COREM

| **Flotation test 12** | **T-881** |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Rougher 3 conc. | 2.43 | 46.30 | 3.50 | 18.90 | 3.40 | 0.13 | 0.16 | 0.13 | 0.10 | 0.02 | 0.19 | 0.00 | 13.10 | 1.18 | 0.02 | 5.18 | 0.02 | 92.33 |
| Rougher 4 conc. | 0.83 | 46.70 | 4.00 | 19.30 | 3.73 | 0.16 | 0.17 | 0.14 | 0.10 | 0.02 | 0.21 | 0.21 | 12.30 | 0.82 | 0.02 | 4.17 | 0.03 | 92.08 |
| Rougher 5 conc. | 1.64 | 47.00 | 3.86 | 19.10 | 3.80 | 0.17 | 0.18 | 0.15 | 0.10 | 0.02 | 0.22 | 0.23 | 12.20 | 0.79 | 0.02 | 4.02 | 0.03 | 91.89 |
| Rougher 6 conc. | 0.89 | 39.50 | 3.45 | 15.20 | 3.38 | 0.14 | 0.16 | 0.13 | 0.10 | 0.02 | 0.19 | 0.22 | 20.80 | 1.00 | 0.02 | 10.50 | 0.03 | 94.84 |
| Rougher 7 conc. | 0.36 | 38.80 | 3.43 | 15.40 | 3.47 | 0.17 | 0.15 | 0.13 | 0.10 | 0.02 | 0.19 | 0.15 | 20.40 | 0.82 | 0.02 | 10.00 | 0.03 | 93.28 |
| Rougher 8 conc. | 0.98 | 40.30 | 3.63 | 16.30 | 3.53 | 0.18 | 0.16 | 0.14 | 0.10 | 0.02 | 0.20 | 0.20 | 18.40 | 0.83 | 0.02 | 8.56 | 0.03 | 92.60 |
| Scav. 1 conc. | 3.96 | 21.20 | 1.96 | 7.61 | 2.12 | 0.07 | 0.10 | 0.07 | 0.10 | 0.02 | 0.11 | 0.16 | 38.10 | 1.06 | 0.02 | 23.80 | 0.02 | 96.52 |
| Scav.2 conc. | 1.45 | 31.20 | 2.87 | 12.20 | 3.09 | 0.14 | 0.14 | 0.11 | 0.10 | 0.02 | 0.16 | 0.13 | 26.50 | 1.00 | 0.02 | 15.00 | 0.08 | 92.76 |
| Scav. 2 tail | 72.49 | 49.90 | 7.61 | 16.30 | 7.25 | 0.31 | 0.23 | 0.18 | 0.10 | 0.02 | 0.24 | 0.02 | 8.36 | 0.15 | 0.02 | 0.33 | 0.02 | 91.04 |
| Cleaner 2 conc. | 1.87 | 10.20 | 1.00 | 3.40 | 0.09 | 0.05 | 0.05 | 0.02 | 0.10 | 0.33 | 0.03 | 2.37 | 28.30 | 20.90 | 0.02 | 31.20 | 0.06 | 98.12 |
| Cleaner 3 conc. | 0.28 | 28.80 | 1.38 | 11.10 | 0.97 | 0.05 | 0.06 | 0.05 | 0.10 | 0.16 | 0.07 | 1.02 | 21.50 | 10.00 | 0.04 | 18.80 | 0.11 | 94.21 |
| Cleaner 4 conc. | 0.28 | 35.30 | 1.31 | 14.30 | 1.14 | 0.05 | 0.07 | 0.06 | 0.10 | 0.11 | 0.09 | 0.80 | 19.20 | 6.01 | 0.04 | 14.80 | 0.11 | 93.49 |
| Cleaner 5 conc. | 0.32 | 45.60 | 1.69 | 19.10 | 1.40 | 0.05 | 0.08 | 0.07 | 0.10 | 0.05 | 0.10 | 0.45 | 13.50 | 2.91 | 0.04 | 7.94 | 0.06 | 93.14 |
| Cleaner 5 tail | 5.87 | 54.90 | 2.96 | 22.50 | 2.91 | 0.07 | 0.14 | 0.11 | 0.10 | 0.02 | 0.16 | 0.07 | 7.34 | 0.36 | 0.02 | 0.74 | 0.02 | 92.42 |
| Cu conc. 1 | 1.21 | 1.51 | 1.00 | 0.47 | 0.05 | 0.05 | 0.05 | 0.02 | 0.10 | 0.42 | 0.03 | 7.30 | 37.20 | 6.70 | 0.02 | 44.20 | 0.02 | 99.14 |
| Cu conc. 2 | 1.08 | 1.93 | 1.00 | 0.56 | 0.05 | 0.05 | 0.05 | 0.02 | 0.10 | 0.41 | 0.02 | 6.09 | 36.20 | 8.69 | 0.02 | 42.60 | 0.03 | 97.82 |
| Cu conc. 3 | 1.68 | 2.29 | 1.00 | 0.67 | 0.05 | 0.05 | 0.05 | 0.02 | 0.10 | 0.41 | 0.02 | 5.41 | 35.50 | 10.40 | 0.02 | 42.10 | 0.02 | 98.11 |
| Cu conc. 4 | 1.06 | 2.94 | 1.00 | 0.90 | 0.05 | 0.05 | 0.05 | 0.02 | 0.10 | 0.40 | 0.02 | 4.73 | 35.10 | 11.40 | 0.02 | 41.00 | 0.02 | 97.80 |
| Cu tail | 1.35 | 7.17 | 1.00 | 2.43 | 0.52 | 0.05 | 0.05 | 0.02 | 0.10 | 0.36 | 0.03 | 3.53 | 33.90 | 9.92 | 0.03 | 39.00 | 0.03 | 98.14 |
| **Feed calculated** | **100.00** | **44.57** | **6.16** | **15.16** | **5.83** | **0.25** | **0.20** | **0.15** | **0.10** | **0.05** | **0.21** | **0.43** | **12.39** | **1.30** | **0.02** | **5.24** | **0.02** | **92.09** |

| **Flotation test 12** | | | | | | | | | | | | | | | | | | **T-881** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | | |
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn | |
| Rougher 3 conc. | 2.43 | 2.5 | 1.4 | 3.0 | 1.4 | 1.3 | 2.0 | 2.1 | 2.4 | 1.0 | 2.2 | 0.0 | 2.6 | 2.2 | 2.4 | 2.4 | 2.1 | |
| Rougher 4 conc. | 0.83 | 0.9 | 0.5 | 1.1 | 0.5 | 0.5 | 0.7 | 0.8 | 0.8 | 0.3 | 0.8 | 0.4 | 0.8 | 0.5 | 0.8 | 0.7 | 1.1 | |
| Rougher 5 conc. | 1.64 | 1.7 | 1.0 | 2.1 | 1.1 | 1.1 | 1.5 | 1.6 | 1.6 | 0.6 | 1.7 | 0.9 | 1.6 | 1.0 | 1.6 | 1.3 | 2.1 | |
| Rougher 6 conc. | 0.89 | 0.8 | 0.5 | 0.9 | 0.5 | 0.5 | 0.7 | 0.8 | 0.9 | 0.3 | 0.8 | 0.5 | 1.5 | 0.7 | 0.9 | 1.8 | 1.2 | |
| Rougher 7 conc. | 0.36 | 0.3 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.1 | 0.3 | 0.1 | 0.6 | 0.2 | 0.4 | 0.7 | 0.5 | |
| Rougher 8 conc. | 0.98 | 0.9 | 0.6 | 1.1 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 0.4 | 0.9 | 0.5 | 1.5 | 0.6 | 1.0 | 1.6 | 1.3 | |
| Scav. 1 conc. | 3.96 | 1.9 | 1.3 | 2.0 | 1.4 | 1.1 | 2.0 | 1.8 | 4.0 | 1.6 | 2.1 | 1.5 | 12.2 | 3.2 | 3.9 | 18.0 | 3.4 | |
| Scav.2 conc. | 1.45 | 1.0 | 0.7 | 1.2 | 0.8 | 0.8 | 1.0 | 1.0 | 1.4 | 0.6 | 1.1 | 0.4 | 3.1 | 1.1 | 1.4 | 4.1 | 5.0 | |
| Scav. 2 tail | 72.49 | 81.2 | 89.5 | 78.0 | 90.2 | 90.2 | 84.4 | 85.1 | 72.5 | 28.6 | 84.0 | 3.4 | 48.9 | 8.3 | 71.4 | 4.6 | 63.2 | |
| Cleaner 2 conc. | 1.87 | 0.4 | 0.3 | 0.4 | 0.0 | 0.4 | 0.5 | 0.2 | 1.9 | 12.2 | 0.3 | 10.3 | 4.3 | 30.0 | 1.8 | 11.1 | 4.9 | |
| Cleaner 3 conc. | 0.28 | 0.2 | 0.1 | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.3 | 0.9 | 0.1 | 0.7 | 0.5 | 2.2 | 0.6 | 1.0 | 1.3 | |
| Cleaner 4 conc. | 0.28 | 0.2 | 0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.6 | 0.1 | 0.5 | 0.4 | 1.3 | 0.5 | 0.8 | 1.3 | |
| Cleaner 5 conc. | 0.32 | 0.3 | 0.1 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 | 0.7 | 0.6 | 0.5 | 0.8 | |
| Cleaner 5 tail | 5.87 | 7.2 | 2.8 | 8.7 | 2.9 | 1.6 | 4.2 | 4.2 | 5.9 | 2.3 | 4.5 | 1.0 | 3.5 | 1.6 | 5.8 | 0.8 | 5.1 | |
| Cu conc. 1 | 1.21 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.3 | 0.2 | 1.2 | 10.0 | 0.2 | 20.5 | 3.6 | 6.2 | 1.2 | 10.2 | 1.1 | |
| Cu conc. 2 | 1.08 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.3 | 0.1 | 1.1 | 8.7 | 0.1 | 15.3 | 3.2 | 7.2 | 1.1 | 8.8 | 1.4 | |
| Cu conc. 3 | 1.68 | 0.1 | 0.3 | 0.1 | 0.0 | 0.3 | 0.4 | 0.2 | 1.7 | 13.6 | 0.2 | 21.1 | 4.8 | 13.4 | 1.7 | 13.5 | 1.5 | |
| Cu conc. 4 | 1.06 | 0.1 | 0.2 | 0.1 | 0.0 | 0.2 | 0.3 | 0.1 | 1.1 | 8.4 | 0.1 | 11.7 | 3.0 | 9.3 | 1.0 | 8.3 | 0.9 | |
| Cu tail | 1.35 | 0.2 | 0.2 | 0.2 | 0.1 | 0.3 | 0.3 | 0.2 | 1.3 | 9.6 | 0.2 | 11.0 | 3.7 | 10.2 | 2.0 | 10.0 | 1.8 | |
| **Feed calculated** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | |

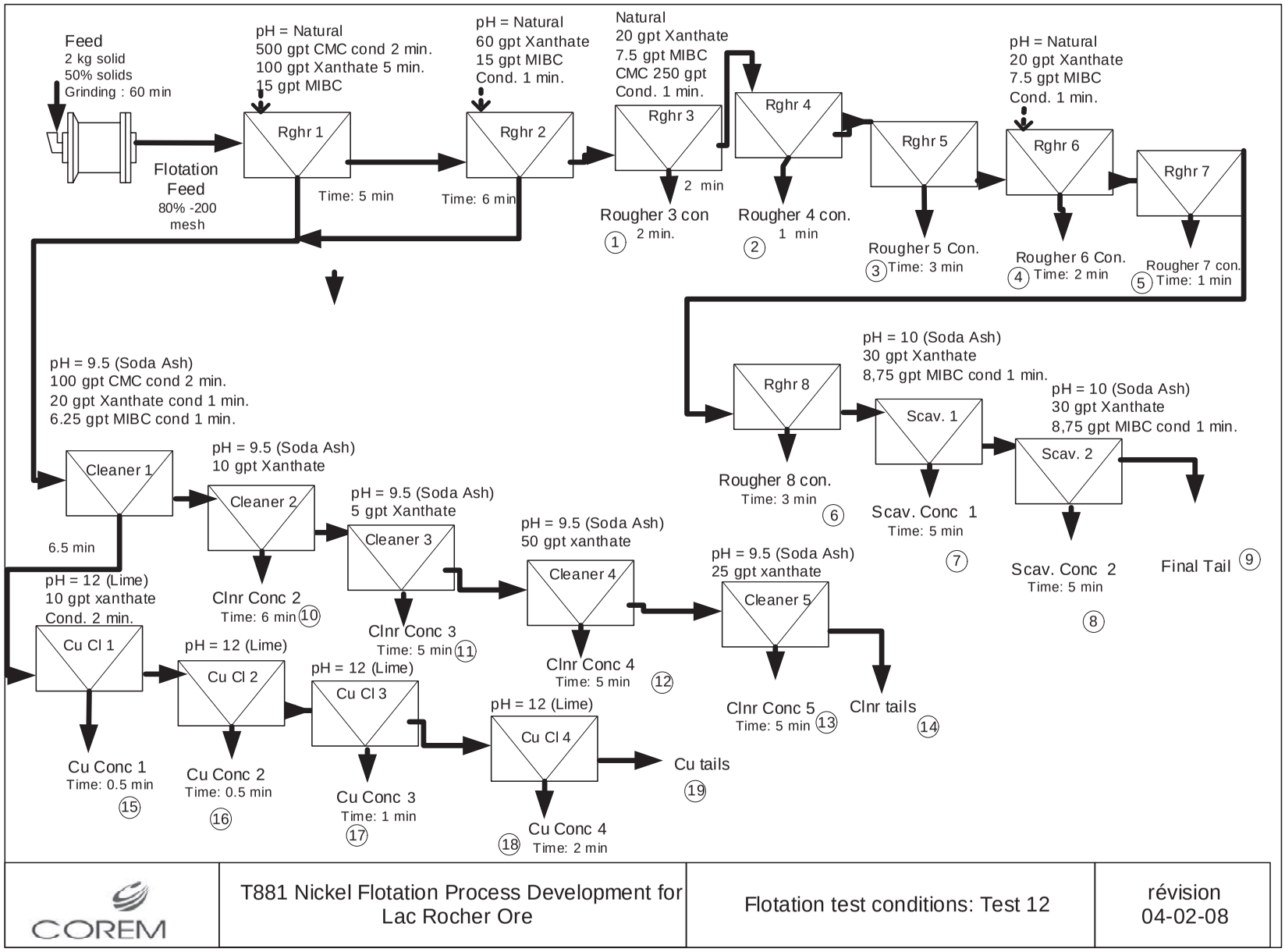
COREM

**FLOTATION TEST 12**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.30 | 100.00 | 0.43 | 100.00 | 12.39 | 100.00 | 44.57 | 100.00 | 15.16 | 100.00 |
| **1** | Rougher 3 conc. | 2.43 | 1.18 | 2.20 | 0.00 | 0.01 | 13.10 | 2.56 | 46.30 | 2.52 | 18.90 | 3.02 |
| **2** | Rougher 4 conc. | 0.83 | 0.82 | 0.52 | 0.21 | 0.41 | 12.30 | 0.82 | 46.70 | 0.87 | 19.30 | 1.06 |
| **3** | Rougher 5 conc. | 1.64 | 0.79 | 1.00 | 0.23 | 0.88 | 12.20 | 1.62 | 47.00 | 1.73 | 19.10 | 2.07 |
| **4** | Rougher 6 conc. | 0.89 | 1.00 | 0.68 | 0.22 | 0.45 | 20.80 | 1.49 | 39.50 | 0.78 | 15.20 | 0.89 |
| **5** | Rougher 7 conc. | 0.36 | 0.82 | 0.23 | 0.15 | 0.12 | 20.40 | 0.59 | 38.80 | 0.31 | 15.40 | 0.36 |
| **6** | Rougher 8 conc. | 0.98 | 0.83 | 0.62 | 0.20 | 0.46 | 18.40 | 1.46 | 40.30 | 0.89 | 16.30 | 1.05 |
| **7** | Scav. 1 conc. | 3.96 | 1.06 | 3.22 | 0.16 | 1.47 | 38.10 | 12.17 | 21.20 | 1.88 | 7.61 | 1.99 |
| **8** | Scav.2 conc. | 1.45 | 1.00 | 1.11 | 0.13 | 0.44 | 26.50 | 3.10 | 31.20 | 1.01 | 12.20 | 1.17 |
| **9** | Scav. 2 tail | 72.49 | 0.15 | 8.35 | 0.02 | 3.37 | 8.36 | 48.91 | 49.90 | 81.16 | 16.30 | 77.96 |
| **10** | Cleaner 2 conc. | 1.87 | 20.90 | 29.98 | 2.37 | 10.30 | 28.30 | 4.27 | 10.20 | 0.43 | 3.40 | 0.42 |
| **11** | Cleaner 3 conc. | 0.28 | 10.00 | 2.16 | 1.02 | 0.67 | 21.50 | 0.49 | 28.80 | 0.18 | 11.10 | 0.21 |
| **12** | Cleaner 4 conc. | 0.28 | 6.01 | 1.27 | 0.80 | 0.51 | 19.20 | 0.43 | 35.30 | 0.22 | 14.30 | 0.26 |
| **13** | Cleaner 5 conc. | 0.32 | 2.91 | 0.72 | 0.45 | 0.34 | 13.50 | 0.35 | 45.60 | 0.33 | 19.10 | 0.41 |
| **14** | Cleaner 5 tail | 5.87 | 0.36 | 1.62 | 0.07 | 0.95 | 7.34 | 3.47 | 54.90 | 7.22 | 22.50 | 8.71 |
| **15** | Cu conc. 1 | 1.21 | 6.70 | 6.23 | 7.30 | 20.55 | 37.20 | 3.63 | 1.51 | 0.04 | 0.47 | 0.04 |
| **16** | Cu conc. 2 | 1.08 | 8.69 | 7.19 | 6.09 | 15.27 | 36.20 | 3.15 | 1.93 | 0.05 | 0.56 | 0.04 |
| **17** | Cu conc. 3 | 1.68 | 10.40 | 13.39 | 5.41 | 21.10 | 35.50 | 4.80 | 2.29 | 0.09 | 0.67 | 0.07 |
| **18** | Cu conc. 4 | 1.06 | 11.40 | 9.27 | 4.73 | 11.66 | 35.10 | 3.00 | 2.94 | 0.07 | 0.90 | 0.06 |
| **19** | Cu tail | 1.35 | 9.92 | 10.25 | 3.53 | 11.05 | 33.90 | 3.68 | 7.17 | 0.22 | 2.43 | 0.22 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc 1-2 | 14.98 | 7.14 | 82.07 | 2.65 | 92.39 | 22.56 | 27.28 | 26.30 | 8.84 | 10.55 | 10.43 |
| Rougher 3 Cumul | 17.41 | 6.31 | 84.27 | 2.28 | 92.40 | 21.24 | 29.84 | 29.09 | 11.36 | 11.71 | 13.45 |
| Rougher 4 Cumul | 18.24 | 6.06 | 84.79 | 2.19 | 92.80 | 20.83 | 30.67 | 29.89 | 12.23 | 12.06 | 14.51 |
| Rougher 5 cumul | 19.88 | 5.62 | 85.79 | 2.03 | 93.68 | 20.12 | 32.28 | 31.30 | 13.96 | 12.64 | 16.58 |
| Rougher 6 Cumul | 20.77 | 5.42 | 86.47 | 1.95 | 94.14 | 20.15 | 33.77 | 31.65 | 14.75 | 12.75 | 17.47 |
| Rougher 7 Cumul | 21.12 | 5.35 | 86.69 | 1.92 | 94.26 | 20.15 | 34.36 | 31.77 | 15.06 | 12.79 | 17.83 |
| Rougher 8 Cumul | 22.10 | 5.15 | 87.32 | 1.84 | 94.72 | 20.08 | 35.82 | 32.15 | 15.94 | 12.95 | 18.88 |
| Scav 1 Cumul | 26.06 | 4.53 | 90.54 | 1.59 | 96.19 | 22.81 | 47.99 | 30.49 | 17.83 | 12.14 | 20.87 |
| Scav 2 Cumul | 27.51 | 4.34 | 91.65 | 1.51 | 96.63 | 23.01 | 51.09 | 30.53 | 18.84 | 12.14 | 22.04 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger (calculated) | 5.41 | 1.04 | 4.33 | 0.15 | 1.91 | 34.99 | 15.27 | 23.88 | 2.90 | 8.84 | 3.15 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 | 6.37 | 9.47 | 46.33 | 5.37 | 79.62 | 35.54 | 18.27 | 3.22 | 0.46 | 1.02 | 0.43 |
| Cleaner 2 cumul | 8.24 | 12.06 | 76.31 | 4.69 | 89.92 | 33.90 | 22.54 | 4.80 | 0.89 | 1.56 | 0.85 |
| Cleaner 3 cumul | 8.52 | 12.00 | 78.46 | 4.57 | 90.59 | 33.49 | 23.03 | 5.59 | 1.07 | 1.88 | 1.05 |
| Cleaner 4 cumul | 8.79 | 11.81 | 79.73 | 4.45 | 91.10 | 33.04 | 23.45 | 6.52 | 1.29 | 2.27 | 1.31 |
| **Cleaner 5 cumul** | **9.12** | **11.49** | **80.45** | **4.31** | **91.44** | **32.35** | **23.80** | **7.90** | **1.62** | **2.86** | **1.72** |
| **Copper Concentrate** | | | | | | | | | | | |
| Cu conc. 1 | 1.21 | 6.70 | 6.23 | 7.30 | 20.55 | 37.20 | 3.63 | 1.51 | 0.04 | 0.47 | 0.04 |
| Conc. Cu 2 cumul | 2.29 | 7.64 | 13.42 | 6.73 | 35.82 | 36.73 | 6.78 | 1.71 | 0.09 | 0.51 | 0.08 |
| Conc. Cu 3 cumul | 3.96 | 8.81 | 26.80 | 6.17 | 56.92 | 36.21 | 11.59 | 1.95 | 0.17 | 0.58 | 0.15 |
| Conc. Cu 4 cumul | 5.02 | 9.35 | 36.08 | 5.87 | 68.57 | 35.98 | 14.59 | 2.16 | 0.24 | 0.65 | 0.21 |
| **Nickel Concentrate** | | | | | | | | | | | |
| Cleaner 5 tail | 1.35 | 9.92 | 10.25 | 3.53 | 11.05 | 33.90 | 3.68 | 7.17 | 0.22 | 2.43 | 0.22 |
| Cleaner 2 cumul | 3.21 | 16.30 | 40.23 | 2.86 | 21.35 | 30.64 | 7.95 | 8.93 | 0.64 | 2.99 | 0.63 |
| Cleaner 3 cumul | 3.50 | 15.80 | 42.39 | 2.71 | 22.02 | 29.91 | 8.44 | 10.53 | 0.83 | 3.65 | 0.84 |
| Cleaner 4 cumul | 3.77 | 15.08 | 43.66 | 2.57 | 22.53 | 29.13 | 8.86 | 12.34 | 1.04 | 4.42 | 1.10 |
| Cleaner 5 cumul | 4.09 | 14.13 | 44.37 | 2.40 | 22.86 | 27.90 | 9.21 | 14.95 | 1.37 | 5.58 | 1.51 |

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**Test Parameter**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 13 |
| OBJECTIVE OF TEST | Separate copper and nickel and adjust rougher duration |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 16-12-07 |

| Flotation | Rougher 1 | Rougher 2 | Rougher x | Rougher 8 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 0.5 | 0.5 | 0.5 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | n/d | n/d | n/d |
| Weight of ore (kg) | 2 | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | | | |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| | | | | | | | | | | |
| Cond. 1 | | | **100** | | | | 0 | **2** | | |
| cond. 2 | **10** | **6** | | | | **8.87** | 2.00 | **5** | | Natural |
| **Rougher 1** | | | | | | | 7.00 | | **5.0** | Natural |
| cond. 3 | **6** | **6** | | | | **8.7** | 12.00 | **1** | | Natural |
| **Rougher 2** | | | | | | | 13.00 | | **6.0** | Natural |
| cond. 4 | | | **50** | | | | | | | |
| cond. 5 | **2** | **3** | | | | **9.95** | 19.00 | **1** | | 10.0 |
| **Rougher 3** | | | | | | | 20.00 | | **2.0** | 10.0 |
| **Rougher 4** | | | | | | | 22.00 | | **1.0** | 10.0 |
| cond. 5 | **2** | **3** | | | | | 23.00 | **1** | | 10.0 |
| **Scavenger 1** | | | | | | | 24.00 | | **8.0** | 10.0 |
| cond. 5 | **3** | **3.5** | | | **x** | **9.92** | 32.00 | **1** | | 10.0 |
| **Scavenger 2** | | | | | **x** | | 33.00 | | **5.0** | 10.0 |
| cond. 6 | **3** | **3.5** | | | **x** | **9.89** | 38.00 | **1** | | 10.0 |
| **Scavenger 3** | | | | | **x** | | 39.00 | | **5.0** | 10.0 |
| **2.5 l cell** | | | | | | | | | | |
| **pH adjustment** | | | | | **x** | **9.6** | 44.00 | | | 9.5 |
| cond. 7 | | | **20** | | **x** | | 44.00 | **2** | | 9.5 |
| cond. 8 | | **2.5** | | | **x** | | 46.00 | **1** | | 9.5 |
| **Cleaner 1** | | | | | **x** | | 47.00 | | **6.5** | 9.5 |
| **Cleaner 2** | **2** | **1.2** | | | **x** | | 53.50 | | **6.0** | 9.5 |
| **Cleaner 3** | **0.5** | **2-3 drops** | | | **x** | | 59.50 | | **5.0** | 9.5 |
| **Cleaner 4** | **5** | **2-3 drops** | | | **x** | | 64.50 | | **5.0** | 9.5 |
| **Cleaner 5** | **2.5** | | | | **x** | | 69.50 | | **5.0** | 9.5 |

COREM

**Test Parameter**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 13 |
| OBJECTIVE OF TEST | Separate copper and nickel and adjust rougher duration |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 16-12-07 |

| Flotation | Rougher 1 | Rougher 2 | Rougher x | Rougher 8 | Scav.1 | Scav.2 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 0.5 | 0.5 | 0.5 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | n/d | n/d | n/d |
| Weight of ore (kg) | 2 | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 4 | 4 | 2.5 | 2.5 | 2.5 | | | |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash |
|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| | | | | | | | | | | |
| **0.5 l cell** | | | | | | | | | | |
| **Cu Cleaner** | | | | | | | | | | |
| **pH adjustment** | | | | **x** | | **12.1** | 74.50 | | | 12.0 |
| cond. 9 | | | | **x** | | | 74.50 | **2** | | 12.0 |
| **Cu Cleaner 1** | | | | **x** | | | 76.50 | | **0.5** | 12.0 |
| **Cu Cleaner 2** | | | | **x** | | | 77.00 | | **0.5** | 12.0 |
| **Cu Cleaner 3** | | | | **x** | | | 77.50 | | **1.0** | 12.0 |
| **Cu Cleaner 4** | | | | **x** | | | 78.50 | | **2.0** | 12.0 |
| **1 l cell** | | | | | | | | | | |
| **SCAVENGER CLEANER** | | | | | | | | | | |
| cond. 10 | | | **6.7** | | **x** | **9.59** | 80.50 | **2** | | 9.5 |
| **Scav cleaner 1** | | | | | **x** | | 82.50 | | **5.0** | 9.5 |
| cond. 11 | **0.3** | **0.8** | | | **x** | **9.43** | 87.50 | **1** | | 9.5 |
| **Scav cleaner 2** | | | | | **x** | | 88.50 | | **5.0** | 9.5 |
| cond. 12 | **0.3** | **0.8** | | | **x** | **9.57** | 93.50 | **1** | | 9.5 |
| **Scav cleaner 3** | | | | | **x** | | 94.50 | | **5+** | 9.5 |
| total pH controller (soda ash) addition (mL) | 36 | 28.7 | 170 | 22.6 | 108.3 | | | | | |

COREM

| Flotation test 13 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Rougher 3 conc. | 1.22 | 10.90 | 1.34 | 3.41 | 0.96 | 0.05 | 0.05 | 0.03 | 0.10 | 0.05 | 0.04 | 0.37 | 44.40 | 3.64 | 0.02 | 30.90 | 0.03 | 0.00 |
| Rougher 4 conc. | 0.40 | 11.60 | 1.28 | 3.84 | 0.95 | 0.06 | 0.05 | 0.03 | 0.10 | 0.04 | 0.04 | 0.41 | 44.40 | 2.69 | 0.02 | 30.40 | 0.04 | 0.00 |
| Scav. 3 tail | 77.95 | 49.60 | 7.81 | 16.60 | 6.98 | 0.32 | 0.22 | 0.17 | 0.10 | 0.02 | 0.24 | 0.01 | 8.65 | 0.20 | 0.02 | 0.60 | 0.02 | 0.00 |
| Cleaner 2 conc. | 1.84 | 6.60 | 1.00 | 2.15 | 0.05 | 0.05 | 0.05 | 0.02 | 0.10 | 0.35 | 0.02 | 2.82 | 29.80 | 18.00 | 0.05 | 33.90 | 0.06 | 0.00 |
| Cleaner 3 conc. | 0.17 | 22.80 | 1.43 | 8.88 | 0.77 | 0.06 | 0.05 | 0.04 | 0.10 | 0.22 | 0.06 | 1.40 | 22.20 | 13.70 | 0.11 | 21.10 | 0.17 | 0.00 |
| Cleaner 4 conc. | 0.18 | 36.20 | 1.55 | 14.80 | 0.94 | 0.07 | 0.07 | 0.06 | 0.10 | 0.14 | 0.08 | 0.85 | 17.00 | 7.79 | 0.11 | 14.30 | 0.15 | 0.00 |
| Cleaner 5 conc. | 0.28 | 48.50 | 1.63 | 20.60 | 1.14 | 0.08 | 0.07 | 0.07 | 0.10 | 0.06 | 0.10 | 0.37 | 10.70 | 3.15 | 0.06 | 5.97 | 0.07 | 0.00 |
| Cleaner 5 tail | 7.21 | 53.90 | 3.24 | 22.80 | 2.89 | 0.08 | 0.13 | 0.12 | 0.10 | 0.02 | 0.17 | 0.03 | 7.04 | 0.34 | 0.02 | 0.47 | 0.02 | 0.00 |
| Scav. Cleaner 1 conc. | 0.22 | **11.30** | **1.14** | **3.69** | **0.95** | **0.05** | **0.05** | **0.03** | **0.10** | **0.03** | **0.04** | **0.44** | **45.50** | **2.20** | **0.02** | **31.00** | **0.21** | 0.00 |
| Scav. Cleaner 2 conc. | 0.00 | | | | | | | | | | | | | | | | | 0.00 |
| Scav. Cleaner 3 conc. | 0.00 | | | | | | | | | | | | | | | | | 0.00 |
| Scav. Cleaner 3 tail | 4.28 | 27.40 | 2.40 | 10.80 | 2.05 | 0.05 | 0.10 | 0.08 | 0.10 | 0.03 | 0.11 | 0.28 | 30.80 | 1.37 | 0.02 | 18.50 | 0.07 | 0.00 |
| Cu conc. 1 | 0.86 | 1.83 | 1.00 | 0.69 | 0.18 | 0.05 | 0.05 | 0.02 | 0.10 | 0.38 | 0.02 | 11.60 | 36.30 | 3.55 | 0.02 | 43.00 | 0.03 | 0.00 |
| Cu conc. 2 | 0.72 | 2.17 | 1.01 | 0.72 | 0.23 | 0.05 | 0.05 | 0.02 | 0.10 | 0.35 | 0.02 | 12.20 | 36.00 | 3.58 | 0.02 | 42.00 | 0.04 | 0.00 |
| Cu conc. 3 | 0.42 | 3.10 | 1.02 | 1.08 | 0.36 | 0.05 | 0.05 | 0.02 | 0.10 | 0.30 | 0.05 | 14.50 | 35.80 | 2.88 | 0.11 | 39.80 | 0.05 | 0.00 |
| Cu conc. 4 | 0.16 | 3.71 | 1.03 | 1.28 | 0.56 | 0.05 | 0.05 | 0.02 | 0.10 | 0.24 | 0.02 | 17.60 | 33.00 | 2.32 | 0.02 | 37.30 | 0.06 | 0.00 |
| Cu tail | 4.08 | 3.54 | 1.04 | 1.07 | 0.27 | 0.05 | 0.05 | 0.02 | 0.10 | 0.43 | 0.02 | 0.95 | 35.00 | 13.60 | 0.02 | 41.50 | 0.02 | 0.00 |
| **Feed calculated** | **100.00** | **44.49** | **6.54** | **15.31** | **5.78** | **0.26** | **0.19** | **0.15** | **0.10** | **0.05** | **0.21** | **0.40** | **12.24** | **1.30** | **0.02** | **5.16** | **0.02** | **0.00** |

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| Flotation test 13 | T-881 |
|---|---|

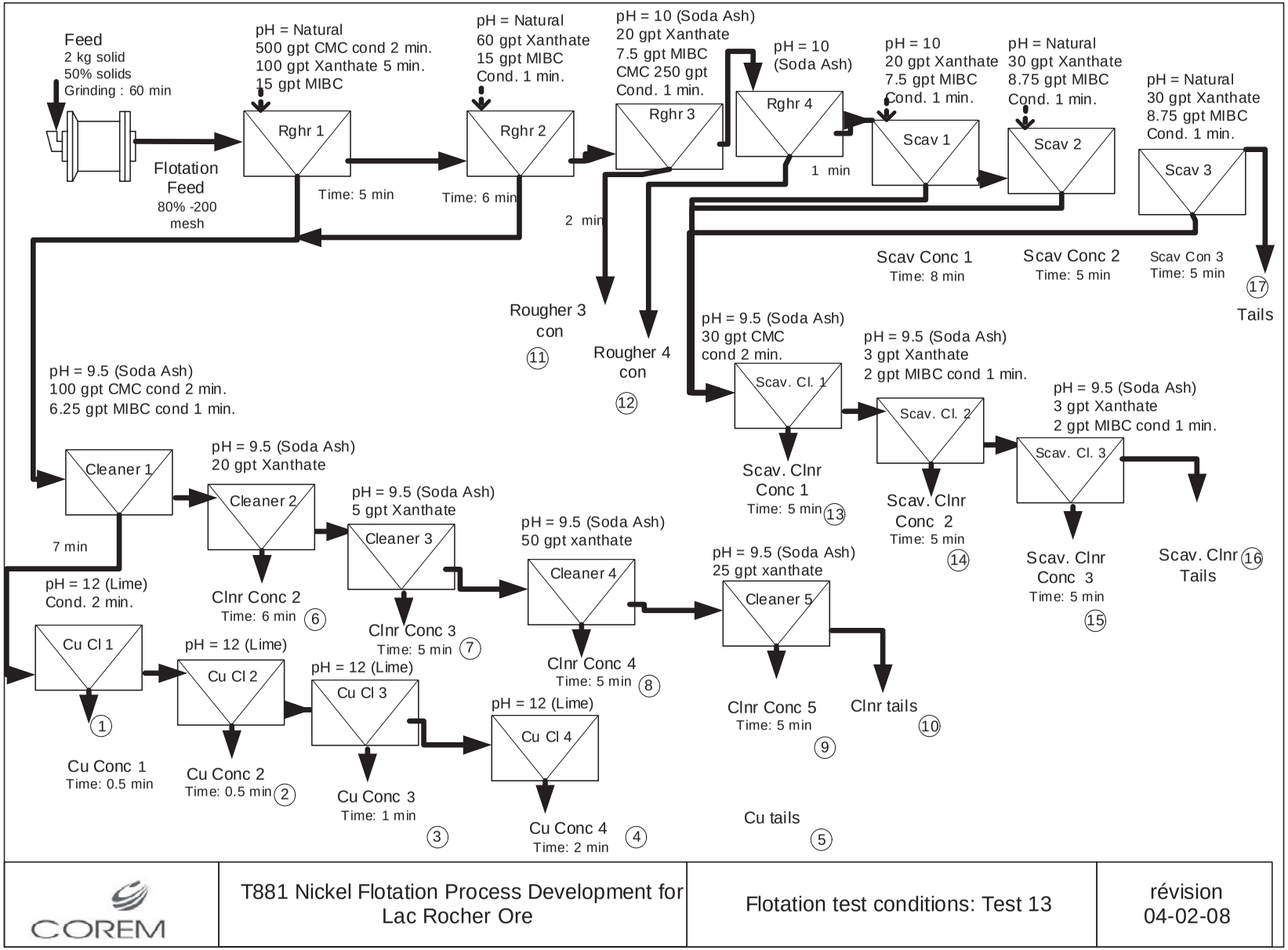
| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Rougher 3 conc. | 1.22 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 1.2 | 1.2 | 0.2 | 1.1 | 4.4 | 3.4 | 1.1 | 7.3 | 1.5 |
| Rougher 4 conc. | 0.40 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 | 0.3 | 0.1 | 0.4 | 1.5 | 0.8 | 0.4 | 2.4 | 0.7 |
| Scav. 3 tail | 77.95 | 86.9 | 93.1 | 84.5 | 94.2 | 94.9 | 90.0 | 90.1 | 78.0 | 30.3 | 90.4 | 1.9 | 55.1 | 12.0 | 73.0 | 9.1 | 63.5 |
| Cleaner 2 conc. | 1.84 | 0.3 | 0.3 | 0.3 | 0.0 | 0.4 | 0.5 | 0.3 | 1.8 | 12.5 | 0.2 | 12.9 | 4.5 | 25.4 | 4.3 | 12.1 | 4.5 |
| Cleaner 3 conc. | 0.17 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.7 | 0.0 | 0.6 | 0.3 | 1.8 | 0.9 | 0.7 | 1.2 |
| Cleaner 4 conc. | 0.18 | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.5 | 0.1 | 0.4 | 0.3 | 1.1 | 0.9 | 0.5 | 1.1 |
| Cleaner 5 conc. | 0.28 | 0.3 | 0.1 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.3 | 0.1 | 0.3 | 0.2 | 0.7 | 0.8 | 0.3 | 0.8 |
| Cleaner 5 tail | 7.21 | 8.7 | 3.6 | 10.7 | 3.6 | 2.2 | 4.9 | 5.9 | 7.2 | 2.8 | 5.9 | 0.5 | 4.1 | 1.9 | 6.8 | 0.7 | 5.9 |
| Scav. Cleaner 1 conc. | 0.22 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.2 | 0.8 | 0.4 | 0.2 | 1.3 | 1.9 |
| Scav. Cleaner 2 conc. | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Scav. Cleaner 3 conc. | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Scav. Cleaner 3 tail | 4.28 | 2.6 | 1.6 | 3.0 | 1.5 | 0.8 | 2.2 | 2.3 | 4.3 | 2.5 | 2.3 | 3.0 | 10.8 | 4.5 | 4.0 | 15.4 | 12.2 |
| Cu conc. 1 | 0.86 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 0.1 | 0.9 | 6.4 | 0.1 | 24.8 | 2.5 | 2.3 | 0.8 | 7.2 | 1.0 |
| Cu conc. 2 | 0.72 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.7 | 4.9 | 0.1 | 21.9 | 2.1 | 2.0 | 0.7 | 5.9 | 1.2 |
| Cu conc. 3 | 0.42 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.4 | 2.5 | 0.1 | 15.2 | 1.2 | 0.9 | 2.2 | 3.3 | 0.9 |
| Cu conc. 4 | 0.16 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.7 | 0.0 | 7.0 | 0.4 | 0.3 | 0.1 | 1.2 | 0.4 |
| Cu tail | 4.08 | 0.3 | 0.6 | 0.3 | 0.2 | 0.8 | 1.1 | 0.6 | 4.1 | 34.1 | 0.4 | 9.6 | 11.7 | 42.5 | 3.8 | 32.8 | 3.3 |
| **Feed calculated** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |

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**FLOTATION TEST 13**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.30 | 100.00 | 0.40 | 100.00 | 12.24 | 100.00 | 44.49 | 100.00 | 15.31 | 100.00 |
| **1** | Cu conc. 1 | 0.86 | 3.55 | 2.34 | 11.60 | 24.80 | 36.30 | 2.55 | 1.83 | 0.04 | 0.69 | 0.04 |
| **2** | Cu conc. 2 | 0.72 | 3.58 | 1.98 | 12.20 | 21.92 | 36.00 | 2.12 | 2.17 | 0.04 | 0.72 | 0.03 |
| **3** | Cu conc. 3 | 0.42 | 2.88 | 0.93 | 14.50 | 15.24 | 35.80 | 1.23 | 3.10 | 0.03 | 1.08 | 0.03 |
| **4** | Cu conc. 4 | 0.16 | 2.32 | 0.28 | 17.60 | 6.99 | 33.00 | 0.43 | 3.71 | 0.01 | 1.28 | 0.01 |
| **5** | Cu tail | 4.08 | 13.60 | 42.55 | 0.95 | 9.65 | 35.00 | 11.67 | 3.54 | 0.32 | 1.07 | 0.29 |
| **6** | Cleaner 2 conc. | 1.84 | 18.00 | 25.41 | 2.82 | 12.92 | 29.80 | 4.48 | 6.60 | 0.27 | 2.15 | 0.26 |
| **7** | Cleaner 3 conc. | 0.17 | 13.70 | 1.81 | 1.40 | 0.60 | 22.20 | 0.31 | 22.80 | 0.09 | 8.88 | 0.10 |
| **8** | Cleaner 4 conc. | 0.18 | 7.79 | 1.10 | 0.85 | 0.39 | 17.00 | 0.26 | 36.20 | 0.15 | 14.80 | 0.18 |
| **9** | Cleaner 5 conc. | 0.28 | 3.15 | 0.66 | 0.37 | 0.25 | 10.70 | 0.24 | 48.50 | 0.30 | 20.60 | 0.37 |
| **10** | Cleaner 5 tail | 7.21 | 0.34 | 1.88 | 0.03 | 0.54 | 7.04 | 4.15 | 53.90 | 8.74 | 22.80 | 10.74 |
| **11** | Rougher 3 conc. | 1.22 | 3.64 | 3.40 | 0.37 | 1.12 | 44.40 | 4.41 | 10.90 | 0.30 | 3.41 | 0.27 |
| **12** | Rougher 4 conc. | 0.40 | 2.69 | 0.83 | 0.41 | 0.41 | 44.40 | 1.46 | 11.60 | 0.10 | 3.84 | 0.10 |
| **13** | Scav. 3 tail | 77.95 | 0.20 | 11.96 | 0.01 | 1.94 | 8.65 | 55.10 | 49.60 | 86.92 | 16.60 | 84.51 |
| **14** | Scav. Cleaner 1 conc. | 0.22 | 2.20 | 0.37 | 0.44 | 0.24 | 45.50 | 0.81 | 11.30 | 0.06 | 3.69 | 0.05 |
| **15** | Scav. Cleaner 2 conc. | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **16** | Scav. Cleaner 3 conc. | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **17** | Scav. Cleaner 3 tail | 4.28 | 1.37 | 4.50 | 0.28 | 2.99 | 30.80 | 10.78 | 27.40 | 2.64 | 10.80 | 3.02 |
| **18** | Feed calculated | 100.00 | 1.30 | 100.00 | 0.40 | 100.00 | 12.24 | 100.00 | 44.49 | 100.00 | 15.31 | 100.00 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc 1-2 | 15.93 | 6.46 | 78.95 | 2.35 | 93.30 | 21.09 | 27.44 | 27.90 | 9.99 | 11.58 | 12.05 |
| Rougher 3 Cumul | 17.14 | 6.26 | 82.35 | 2.21 | 94.42 | 22.74 | 31.86 | 26.69 | 10.29 | 11.00 | 12.32 |
| Rougher 4 Cumul | 17.54 | 6.18 | 83.18 | 2.17 | 94.84 | 23.24 | 33.31 | 26.34 | 10.39 | 10.84 | 12.42 |
| Scav 1 Cumul | 22.05 | 5.21 | 88.04 | 1.79 | 98.06 | 24.93 | 44.90 | 26.40 | 13.08 | 10.76 | 15.49 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger (calculated) | 4.50 | 1.41 | 4.87 | 0.29 | 3.22 | 31.51 | 11.59 | 26.62 | 2.69 | 10.46 | 3.07 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 | 6.24 | 10.05 | 48.08 | 5.06 | 78.60 | 35.30 | 18.00 | 3.12 | 0.44 | 0.98 | 0.40 |
| Cleaner 2 cumul | 8.08 | 11.86 | 73.49 | 4.55 | 91.52 | 34.05 | 22.48 | 3.91 | 0.71 | 1.25 | 0.66 |
| Cleaner 3 cumul | 8.25 | 11.90 | 75.30 | 4.48 | 92.12 | 33.80 | 22.80 | 4.31 | 0.80 | 1.41 | 0.76 |
| Cleaner 4 cumul | 8.44 | 11.81 | 76.41 | 4.40 | 92.51 | 33.43 | 23.05 | 5.00 | 0.95 | 1.70 | 0.94 |
| **Cleaner 5 cumul** | 8.71 | 11.53 | 77.07 | 4.28 | 92.77 | 32.71 | 23.29 | 6.38 | 1.25 | 2.30 | 1.31 |
| **Copper Concentrate** | | | | | | | | | | | |
| Cu conc. 1 | 0.86 | 3.55 | 2.34 | 11.60 | 24.80 | 36.30 | 2.55 | 1.83 | 0.04 | 0.69 | 0.04 |
| Conc. Cu 2 cumul | 1.58 | 3.56 | 4.32 | 11.87 | 46.72 | 36.16 | 4.67 | 1.99 | 0.07 | 0.70 | 0.07 |
| Conc. Cu 3 cumul | 2.00 | 3.42 | 5.25 | 12.43 | 61.96 | 36.09 | 5.90 | 2.22 | 0.10 | 0.78 | 0.10 |
| Conc. Cu 4 cumul | 2.16 | 3.34 | 5.54 | 12.81 | 68.95 | 35.86 | 6.34 | 2.33 | 0.11 | 0.82 | 0.12 |
| **Nickel Concentrate** | | | | | | | | | | | |
| Cu conc. 2 | 4.08 | 13.60 | 42.55 | 0.95 | 9.65 | 35.00 | 11.67 | 3.54 | 0.32 | 1.07 | 0.29 |
| Cleaner 2 cumul | 5.92 | 14.97 | 67.96 | 1.53 | 22.57 | 33.38 | 16.15 | 4.49 | 0.60 | 1.41 | 0.54 |
| Cleaner 3 cumul | 6.09 | 14.93 | 69.77 | 1.53 | 23.17 | 33.07 | 16.46 | 5.01 | 0.69 | 1.62 | 0.64 |
| Cleaner 4 cumul | 6.28 | 14.72 | 70.87 | 1.51 | 23.56 | 32.59 | 16.72 | 5.93 | 0.84 | 2.00 | 0.82 |
| Cleaner 5 cumul | 6.55 | 14.24 | 71.53 | 1.46 | 23.82 | 31.68 | 16.96 | 7.71 | 1.14 | 2.79 | 1.19 |




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COREM

**Test Parameter**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 14 |
| OBJECTIVE OF TEST | Use dextrine to depress Ni in Cu flotation and confirm test 13 results |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 18-01-08 |

| Flotation | Rougher 1 | Rougher x | Rougher 4 | Scav.1 | Scav.2 | Scav.3 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 | Scav. Cleaner 1 | Scav. Cleaner 2 | Scav. Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 1.25 | 1.25 | 1.25 | 2.5 | 2.5 | 2.5 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | n/d | n/d | n/d | 1000 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 3 | 4 | 2.5 | 2.5 | 2.5 | | | | 2.5 | 3.5 | 4.5 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash | Dextrine |
|---|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** | **1** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | | | Time | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | Dex | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| Cond. 1 | | | **100** | | | | | 0 | **2** | | Natural |
| cond. 2 | **10** | **6** | | | | | **8.83** | 2.00 | **5** | | Natural |
| **Rougher 1** | | | | | | | | 7.00 | | **5.0** | Natural |
| cond. 3 | **6** | **6** | | | | | **8.72** | 12.00 | **1** | | Natural |
| **Rougher 2** | | | | | | | | 13.00 | | **6.0** | Natural |
| cond. 4 | | | **50** | | | | | | | | |
| cond. 5 | **2** | **3** | | | | | **9.99** | 19.00 | **1** | | 10.0 |
| **Rougher 3** | | | | | | | | 20.00 | | **2.0** | 10.0 |
| **Rougher 4** | | | | | | | | 22.00 | | **1.0** | 10.0 |
| cond. 5 | **2** | **3** | | | | | **9.91** | 23.00 | **1** | | 10.0 |
| **Scavenger 1** | | | | | | | | 24.00 | | **8.0** | 10.0 |
| cond. 5 | **3** | **3.5** | | | **x** | | **9.98** | 32.00 | **1** | | 10.0 |
| **Scavenger 2** | | | | | **x** | | | 33.00 | | **5.0** | 10.0 |
| cond. 6 | **3** | **3.5** | | | **x** | | **9.93** | 38.00 | **1** | | 10.0 |
| **Scavenger 3** | | | | | **x** | | | 39.00 | | **5.0** | 10.0 |
| **2.5 l cell** | | | | | | | | | | | |
| **pH adjustment** | | | | | **x** | | **9.55** | 44.00 | | | 9.5 |
| cond. 7 | | | **20** | | **x** | | | 44.00 | **2** | | 9.5 |
| cond. 9 | | **2.5** | | | **x** | | | 46.00 | **1** | | 9.5 |
| **Cleaner 1** | | | | | **x** | | **9.46** | 47.00 | | **6.5** | 9.5 |
| **Cleaner 2** | **2** | **1.2** | | | **x** | | | 53.50 | | **6.0** | 9.5 |
| **Cleaner 3** | **0.5** | **2-3 drops** | | | **x** | | | 59.50 | | **5.0** | 9.5 |
| **Cleaner 4** | **5** | **2-3 drops** | | | **x** | | **9.46** | 64.50 | | **5.0** | 9.5 |
| **Cleaner 5** | **2.5** | | | | **x** | | | 69.50 | | **5.0** | 9.5 |

COREM

**Test Parameter**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 14 |
| OBJECTIVE OF TEST | Use dextrine to depress Ni in Cu flotation and confirm test 13 results |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 18-01-08 |

| Flotation | Rougher 1 | Rougher x | Rougher 4 | Scav.1 | Scav.2 | Scav.3 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 | Scav. Cleaner 1 | Scav. Cleaner 2 | Scav. Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 1.25 | 1.25 | 1.25 | 2.5 | 2.5 | 2.5 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | n/d | n/d | n/d | 1000 | 1000 | 1000 |
| Weight of ore (kg) | 2 | | | | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 3 | 4 | 2.5 | 2.5 | 2.5 | | | | 2.5 | 3.5 | 4.5 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash | Dextrine |
|---|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** | **1** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O : 2L |

| | Reagents addition (ml) | | | | | | | | Time | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | Dex | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| **1.25 l cell** | | | | | | | | 74.50 | | | |
| **Cu Cleaner** | | | | | | | | | | | |
| **pH adjustment** | | | | **x** | | | **12.05** | | | | 12.0 |
| cond. 9 | | | | **x** | | **50** | | 74.50 | **5** | | 12.0 |
| **Cu Cleaner 1** | | | | **x** | | | | 79.50 | | **0.5** | 12.0 |
| **Cu Cleaner 2** | | | | **x** | | | | 80.00 | | **0.5** | 12.0 |
| **Cu Cleaner 3** | | | | **x** | | | | 80.50 | | **1.0** | 12.0 |
| **Cu Cleaner 4** | | | | **x** | | | | 81.50 | | **2.0** | 12.0 |
| **2.5 l cell** | | | | | | | | 83.50 | | | |
| **SCAVENGER CLEANER** | | | | | | | | | | | |
| cond 10 | | | **6.7** | | **x** | | **9.57** | | **2** | | 9.5 |
| **Scav cleaner 1** | | | | | **x** | | | 83.50 | | **5.0** | 9.5 |
| cond 11 | **0.3** | **0.8** | | | **x** | | **9.51** | 88.50 | **1** | | 9.5 |
| **Scav cleaner 2** | | | | | **x** | | | 89.50 | | **5.0** | 9.5 |
| cond 12 | **0.3** | **0.8** | | | **x** | | **9.4** | 94.50 | **1** | | 9.5 |
| **Scav cleaner 3** | | | | | **x** | | | 95.50 | | **5+** | 9.5 |
| total pH controller (soda ash) addition (mL) | 36 | 28.7 | 170 | 58.8 | 69.5 | | | | | | |

Comments

Froth was scarce in Cu cleaner. A 0,5 L cell should be used.

Cu cleaner were combined because of low mass recovery, as were scavenger cleaner concentrates.

COREM

| Flotation test 14 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Cu conc. 1-4 | 0.30 | 1.47 | 1.00 | 0.56 | 0.12 | 0.05 | 0.05 | 0.02 | 0.10 | 0.10 | 0.02 | 26.40 | 31.10 | 2.03 | 0.02 | 36.20 | 0.04 | 0.00 |
| Cu tail | 5.84 | 3.28 | 1.00 | 1.06 | 0.12 | 0.05 | 0.05 | 0.02 | 0.10 | 0.41 | 0.02 | 4.52 | 36.20 | 8.84 | 0.03 | 42.20 | 0.03 | 0.00 |
| Cleaner 2 conc. | 2.54 | 8.05 | 1.00 | 2.80 | 0.15 | 0.05 | 0.05 | 0.02 | 0.10 | 0.29 | 0.02 | 1.99 | 30.90 | 16.90 | 0.02 | 32.10 | 0.07 | 0.00 |
| Cleaner 3 conc. | 0.39 | 20.80 | 1.43 | 7.75 | 0.95 | 0.05 | 0.05 | 0.04 | 0.10 | 0.14 | 0.06 | 0.77 | 29.40 | 9.08 | 0.04 | 23.50 | 0.08 | 0.00 |
| Cleaner 4 conc. | 0.65 | 27.70 | 1.35 | 11.20 | 0.89 | 0.05 | 0.05 | 0.04 | 0.10 | 0.08 | 0.07 | 0.44 | 28.30 | 4.75 | 0.04 | 20.10 | 0.06 | 0.00 |
| Cleaner 5 conc. | 0.56 | 41.10 | 1.69 | 17.30 | 1.14 | 0.05 | 0.06 | 0.06 | 0.10 | 0.03 | 0.09 | 0.34 | 18.60 | 2.12 | 0.02 | 10.90 | 0.04 | 0.00 |
| Cleaner 5 tail | 8.33 | 50.30 | 3.30 | 20.80 | 3.02 | 0.09 | 0.14 | 0.11 | 0.10 | 0.02 | 0.17 | 0.06 | 10.50 | 0.45 | 0.02 | 3.01 | 0.02 | 0.00 |
| Scav. Cleaner 1 conc.-3 | 0.12 | 14.70 | 1.47 | 5.03 | 1.23 | 0.05 | 0.06 | 0.05 | 0.10 | 0.03 | 0.06 | 0.62 | 42.30 | 2.00 | 0.02 | 28.50 | 0.19 | 0.00 |
| Scav. Cleaner 3 tail | 4.77 | 27.00 | 2.51 | 10.50 | 2.16 | 0.08 | 0.09 | 0.08 | 0.10 | 0.02 | 0.11 | 0.26 | 30.80 | 1.25 | 0.02 | 18.60 | 0.08 | 0.00 |
| Scav. 3 tail | 76.50 | 49.50 | 7.96 | 16.40 | 7.07 | 0.32 | 0.23 | 0.17 | 0.10 | 0.02 | 0.23 | 0.03 | 8.45 | 0.14 | 0.02 | 0.43 | 0.02 | 0.00 |
| **Feed calculated** | **100.00** | **44.26** | **6.60** | **15.12** | **5.79** | **0.26** | **0.20** | **0.15** | **0.10** | **0.05** | **0.20** | **0.44** | **12.25** | **1.24** | **0.02** | **5.17** | **0.03** | **0.00** |

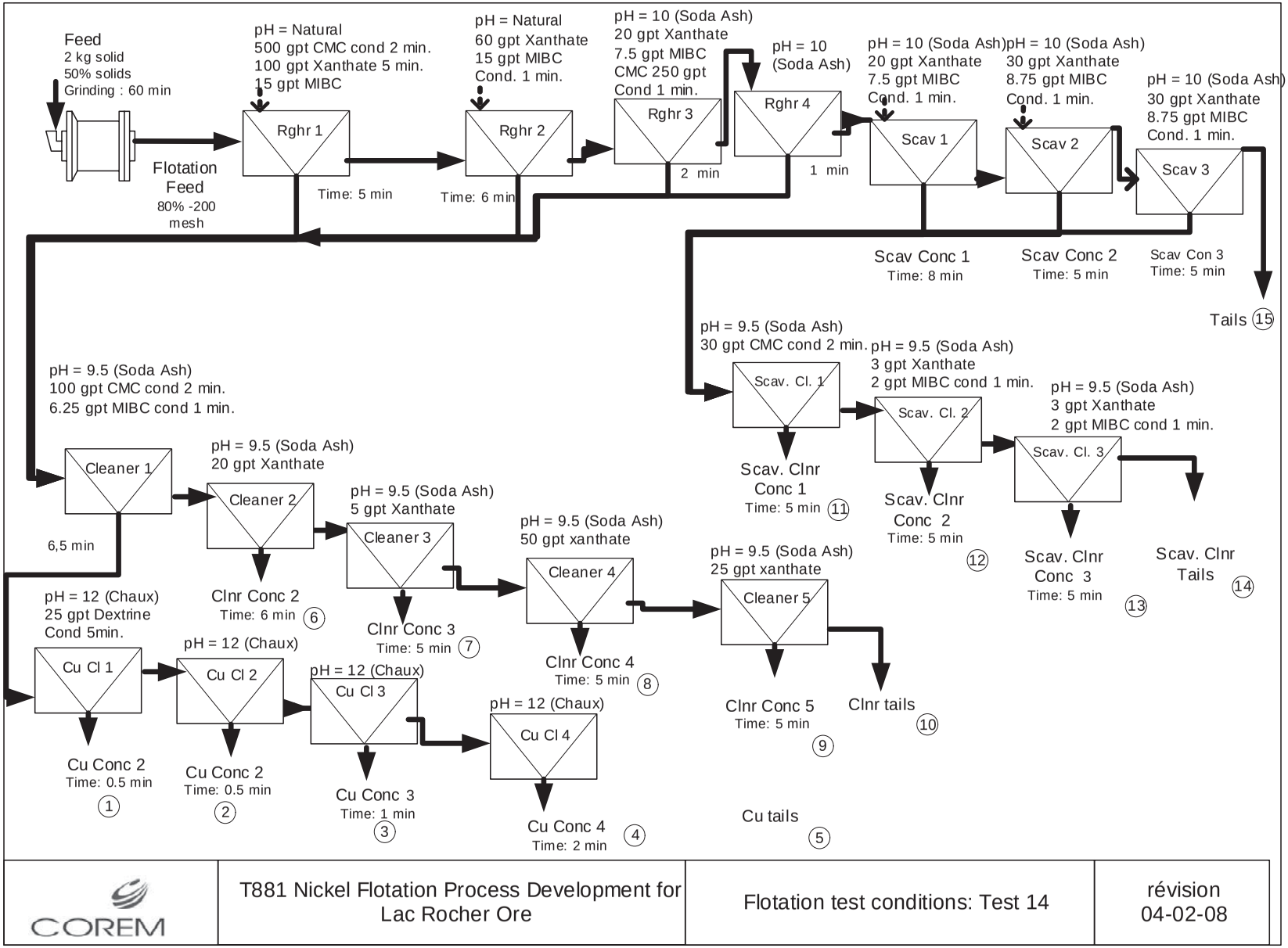
| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Cu conc. 1-4 | 0.30 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.3 | 0.6 | 0.0 | 17.7 | 0.8 | 0.5 | 0.3 | 2.1 | 0.5 |
| Cu tail | 5.84 | 0.4 | 0.9 | 0.4 | 0.1 | 1.1 | 1.5 | 0.8 | 5.8 | 47.1 | 0.6 | 59.8 | 17.2 | 41.8 | 8.4 | 47.6 | 6.8 |
| Cleaner 2 conc. | 2.54 | 0.5 | 0.4 | 0.5 | 0.1 | 0.5 | 0.6 | 0.3 | 2.5 | 14.5 | 0.3 | 11.4 | 6.4 | 34.7 | 2.4 | 15.8 | 6.9 |
| Cleaner 3 conc. | 0.39 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 | 1.1 | 0.1 | 0.7 | 0.9 | 2.8 | 0.7 | 1.8 | 1.2 |
| Cleaner 4 conc. | 0.65 | 0.4 | 0.1 | 0.5 | 0.1 | 0.1 | 0.2 | 0.2 | 0.6 | 1.0 | 0.2 | 0.6 | 1.5 | 2.5 | 1.2 | 2.5 | 1.5 |
| Cleaner 5 conc. | 0.56 | 0.5 | 0.1 | 0.6 | 0.1 | 0.1 | 0.2 | 0.2 | 0.6 | 0.3 | 0.3 | 0.4 | 0.9 | 1.0 | 0.5 | 1.2 | 0.9 |
| Cleaner 5 tail | 8.33 | 9.5 | 4.2 | 11.5 | 4.3 | 2.9 | 5.9 | 6.3 | 8.3 | 3.3 | 7.1 | 1.1 | 7.1 | 3.0 | 8.0 | 4.9 | 6.5 |
| Scav. Cleaner 1 conc.-3 | 0.12 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.2 | 0.4 | 0.2 | 0.1 | 0.7 | 0.9 |
| Scav. Cleaner 3 tail | 4.77 | 2.9 | 1.8 | 3.3 | 1.8 | 1.5 | 2.2 | 2.6 | 4.8 | 1.9 | 2.6 | 2.8 | 12.0 | 4.8 | 4.6 | 17.2 | 14.9 |
| Scav. 3 tail | 76.50 | 85.6 | 92.3 | 83.0 | 93.4 | 93.7 | 89.2 | 89.3 | 76.5 | 30.1 | 88.7 | 5.2 | 52.8 | 8.7 | 73.6 | 6.4 | 59.8 |
| **Feed calculated** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |

COREM

**FLOTATION TEST 14**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.24 | 100.00 | 0.44 | 100.00 | 12.25 | 100.00 | 44.26 | 100.00 | 15.12 | 100.00 |
| **1** | Cu conc. 1-4 | 0.30 | 2.03 | 0.49 | 26.40 | 17.69 | 31.10 | 0.75 | 1.47 | 0.01 | 0.56 | 0.01 |
| **2** | Conc. Cu 2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **3** | Conc. Cu 3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **4** | Conc. Cu 4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **5** | Cu tail | 5.84 | 8.84 | 41.77 | 4.52 | 59.79 | 36.20 | 17.24 | 3.28 | 0.43 | 1.06 | 0.41 |
| **6** | Cleaner 2 conc. | 2.54 | 16.90 | 34.71 | 1.99 | 11.44 | 30.90 | 6.40 | 8.05 | 0.46 | 2.80 | 0.47 |
| **7** | Cleaner 3 conc. | 0.39 | 9.08 | 2.83 | 0.77 | 0.67 | 29.40 | 0.92 | 20.80 | 0.18 | 7.75 | 0.20 |
| **8** | Cleaner 4 conc. | 0.65 | 4.75 | 2.50 | 0.44 | 0.65 | 28.30 | 1.50 | 27.70 | 0.41 | 11.20 | 0.48 |
| **9** | Cleaner 5 conc. | 0.56 | 2.12 | 0.97 | 0.34 | 0.43 | 18.60 | 0.86 | 41.10 | 0.52 | 17.30 | 0.65 |
| **10** | Cleaner 5 tail | 8.33 | 0.45 | 3.04 | 0.06 | 1.13 | 10.50 | 7.14 | 50.30 | 9.47 | 20.80 | 11.46 |
| **11** | Scav. Cleaner 1 conc.-3 | 0.12 | 2.00 | 0.20 | 0.62 | 0.17 | 42.30 | 0.43 | 14.70 | 0.04 | 5.03 | 0.04 |
| **12** | Scav. Cleaner 2 conc. | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **13** | Scav. Cleaner 3 conc. | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **14** | Scav. Cleaner 3 tail | 4.77 | 1.25 | 4.83 | 0.26 | 2.81 | 30.80 | 12.00 | 27.00 | 2.91 | 10.50 | 3.32 |
| **15** | Scav. 3 tail | 76.50 | 0.14 | 8.67 | 0.03 | 5.20 | 8.45 | 52.76 | 49.50 | 85.56 | 16.40 | 82.97 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc 1-2 | 18.60 | 5.73 | 86.29 | 2.18 | 91.81 | 22.93 | 34.81 | 27.33 | 11.48 | 11.12 | 13.67 |
| Scav 1-3 Cumul | 23.50 | 4.80 | 91.33 | 1.78 | 94.80 | 24.63 | 47.24 | 27.19 | 14.44 | 10.96 | 17.03 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger 1-3 (calculated) | 4.90 | 1.27 | 5.03 | 0.27 | 2.99 | 31.09 | 12.43 | 26.69 | 2.95 | 10.36 | 3.36 |
| **Cleaner Scavenger Stage** | | | | | | | | | | | |
| Scav. Cleaner 1 conc. | 0.12 | 2.00 | 0.20 | 0.62 | 0.17 | 42.30 | 0.43 | 14.70 | 0.04 | 5.03 | 0.04 |
| Scav. Cleaner 2 conc. Cumul | 0.12 | 2.00 | 0.20 | 0.62 | 0.17 | 42.30 | 0.43 | 14.70 | 0.04 | 5.03 | 0.04 |
| Scav. Cleaner 3 conc. Cumul | 0.12 | 2.00 | 0.20 | 0.62 | 0.17 | 42.30 | 0.43 | 14.70 | 0.04 | 5.03 | 0.04 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 | 6.13 | 8.51 | 42.25 | 5.58 | 77.48 | 35.95 | 17.99 | 3.19 | 0.44 | 1.04 | 0.42 |
| Cleaner 2 cumul | 8.67 | 10.97 | 76.96 | 4.53 | 88.92 | 34.48 | 24.39 | 4.61 | 0.90 | 1.55 | 0.89 |
| Cleaner 3 cumul | 9.05 | 10.89 | 79.79 | 4.37 | 89.59 | 34.26 | 25.31 | 5.30 | 1.08 | 1.82 | 1.09 |
| Cleaner 4 cumul | 9.70 | 10.48 | 82.29 | 4.10 | 90.24 | 33.86 | 26.81 | 6.80 | 1.49 | 2.44 | 1.57 |
| **Cleaner 5 cumul** | **10.27** | **10.02** | **83.26** | **3.90** | **90.68** | **33.02** | **27.67** | **8.69** | **2.01** | **3.26** | **2.21** |
| Cleaner 5 cumul + Scav Cl. 3 cumul | 10.39 | 9.92 | 83.46 | 3.86 | 90.85 | 33.13 | 28.10 | 8.76 | 2.06 | 3.28 | 2.25 |
| **Copper Concentrate** | | | | | | | | | | | |
| Cu conc. 1-4 | 0.30 | 2.03 | 0.49 | 26.40 | 17.69 | 31.10 | 0.75 | 1.47 | 0.01 | 0.56 | 0.01 |
| Conc. Cu 2 cumul | 0.30 | 2.03 | 0.49 | 26.40 | 17.69 | 31.10 | 0.75 | 1.47 | 0.01 | 0.56 | 0.01 |
| Conc. Cu 3 cumul | 0.30 | 2.03 | 0.49 | 26.40 | 17.69 | 31.10 | 0.75 | 1.47 | 0.01 | 0.56 | 0.01 |
| Conc. Cu 4 cumul | 0.30 | 2.03 | 0.49 | 26.40 | 17.69 | 31.10 | 0.75 | 1.47 | 0.01 | 0.56 | 0.01 |
| **Nickel Concentrate** | | | | | | | | | | | |
| Cu cl. tail | 5.84 | 8.84 | 41.77 | 4.52 | 59.79 | 36.20 | 17.24 | 3.28 | 0.43 | 1.06 | 0.41 |
| Cu cl. tail + Cl. 2 | 8.37 | 11.28 | 76.48 | 3.75 | 71.23 | 34.59 | 23.64 | 4.73 | 0.89 | 1.59 | 0.88 |
| Cu cl. tail + Cl. 3 cumul | 8.76 | 11.19 | 79.31 | 3.62 | 71.90 | 34.37 | 24.56 | 5.43 | 1.07 | 1.86 | 1.08 |
| Cu cl. tail + Cl. 4 cumul | 9.41 | 10.74 | 81.80 | 3.40 | 72.55 | 33.95 | 26.06 | 6.97 | 1.48 | 2.50 | 1.56 |
| **Cu cl. tail + Cl. 5 cumul** | **9.97** | **10.25** | **82.77** | **3.23** | **72.98** | **33.08** | **26.92** | **8.90** | **2.01** | **3.34** | **2.20** |
| Cu cl. tail + Cl. 5 cumul + Scav. Cl. 1 cumul | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| Cu cl. tail + Cl. 5 cumul + Scav. Cl. 2 cumul | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A | #N/A |
| Cu cl. tail + Cl. 5 cumul + Scav. Cl. 3 cumul | 10.09 | 10.15 | 82.97 | 3.20 | 73.16 | 33.19 | 27.35 | 8.97 | 2.05 | 3.36 | 2.24 |




COREM
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COREM

**Test Parameter**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 15 |
| OBJECTIVE OF TEST | Adjust dextrine addition and confirm test 13 and 14 grades and recoveries |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 23-01-08 |

| Flotation | Rougher 1 | Rougher 2 | Rougher 3 | Scav.1 | Scav.2 | Scav.3 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 | Scav. Cleaner 1 | Scav. Cleaner 2 | Scav. Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | 900 | 900 | 900 | 900 | 900 | 900 |
| Weight of ore (kg) | 2 | | | | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 3 | 4 | 2.5 | 2.5 | 2.5 | | | | 2.5 | 3.5 | 4.5 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash | Dextrine |
|---|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** | **1** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O: 2L |

| | Reagents addition (ml) | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | Dextrine | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| Cond. 1 | | | **100** | | | | **8.87** | 0 | **2** | | |
| cond. 2 | **10** | **6** | | | | | | 2.00 | **5** | | Natural |
| **Rougher 1** | | | | | | | **8.84** | 7.00 | | **5.0** | Natural |
| cond. 3 | **6** | **6** | | | | | **8.75** | 12.00 | **1** | | Natural |
| **Rougher 2** | | | | | | | | 13.00 | | **6.0** | Natural |
| **pH adjustment** | | | | | **x** | | | 19.00 | | | 10.0 |
| cond. 4 | | | **50** | | **x** | | | 19.00 | | | 10.0 |
| cond. 5 | **2** | **3** | | | **x** | | **9.98** | 19.00 | **1** | | 10.0 |
| **Rougher 3** | | | | | **x** | | | 20.00 | | **2.0** | 10.0 |
| **Scavenger 1** | | | | | **x** | | | 22.00 | | **1.0** | 10.0 |
| cond. 7 | **2** | **3** | | | **x** | | **9.87** | 23.00 | **1** | | 10.0 |
| **Scavenger 2** | | | | | **x** | | | 24.00 | | **8.0** | 10.0 |
| cond. 8 | **3** | **3.5** | | | **x** | | | 32.00 | **1** | | 10.0 |
| **Scavenger 3** | | | | | **x** | | **9.92** | 33.00 | | **5.0** | 10.0 |
| **2.5 l cell** | | | | | | | | | | | |
| **pH adjustment** | | | | | **x** | | **9.78** | 38.00 | | | 9.5 |
| cond. 7 | | | **20** | | **x** | | | 38.00 | **1** | | 9.5 |
| cond. 8 | | **2.5** | | | **x** | | **9.75** | 38.00 | **1** | | 9.5 |
| **Cleaner 1** | **1** | | | | **x** | | | 39.00 | | **6.5** | 9.5 |
| **Cleaner 2** | **1** | **1.2** | | | **x** | | | 39.00 | | **6.0** | 9.5 |
| **Cleaner 3** | **0.5** | **2-3 drops** | | | **x** | | **9.4** | 45.00 | | **5.0** | 9.5 |
| **Cleaner 4** | **5** | **2-3 drops** | | | **x** | | **9.58** | 50.00 | | **5.0** | 9.5 |
| **Cleaner 5** | **2.5** | | | | **x** | | | 55.00 | | **5.0** | 9.5 |

COREM

**Test Parameter**

| | |
|---|---|
| PROJECT NUMBER | T-881 |
| TEST NUMBER | 15 |
| OBJECTIVE OF TEST | Adjust dextrine addition and confirm test 13 and 14 grades and recoveries |
| | |
| SAMPLE | nickel and copper |
| TECHNICIAN | C.L |
| DATE | 23-01-08 |

| Flotation | Rougher 1 | Rougher 2 | Rougher 3 | Scav.1 | Scav.2 | Scav.3 | Cleaner 1 | Cleaner x | Cleaner 5 | Cleaner Cu 1 | Cleaner Cu x | Cleaner Cu 4 | Scav. Cleaner 1 | Scav. Cleaner 2 | Scav. Cleaner 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cell (L) | 5 | 5 | 5 | 5 | 5 | 5 | 2.5 | 2.5 | 2.5 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| Impeller speed (rmp) | 1400 | 1400 | 1400 | 1400 | 1400 | 1400 | 1000 | 1000 | 1000 | 900 | 900 | 900 | 900 | 900 | 900 |
| Weight of ore (kg) | 2 | | | | | | | | | | | | | | |
| Density | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Pulp density (% solids) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Air flow (l/min.) | 4 | 4 | 4 | 4 | 3 | 4 | 2.5 | 2.5 | 2.5 | | | | 2.5 | 3.5 | 4.5 |

Reagents concentration (% mass)

| Kax 51 | MIBC | CMC | Chaux | Soda ash | Dextrine |
|---|---|---|---|---|---|
| **2** | **0.5** | **1** | **5** | **5** | **1** |

| **GRINDING CONDITIONS** | |
|---|---|
| Grinding Mill : Rod Mill | |
| Charge : 16,5 kg | |
| Lenght: 60 minutes | |
| Grind : d80 % -200 Mesh | |
| Ore : 2 Kg | H2O: 2L |

| | Reagents addition (ml) | | | | | | | Time | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STAGE** | Kax 51 | MIBC | CMC | Chaux | Soda ash | Dextrine | pH | Total | Cond.(min) | Flot. (min.) | pH setpoint |
| **1.25 l cell** | | | | | | | | | | | |
| **Cu Cleaner** | | | | | | | | | | | |
| **pH adjustment** | | | | **x** | | | **11.94** | 60.00 | | | 12.0 |
| cond. 9 | | | | **x** | | **25** | | 60.00 | **5** | | 12.0 |
| **Cu Cleaner 1** | | | | **x** | | | | 65.00 | | **0.5** | 12.0 |
| **Cu Cleaner 2** | | | | **x** | | | | 65.50 | | **0.5** | 12.0 |
| **Cu Cleaner 3** | | | | **x** | | | | 66.00 | | **1.0** | 12.0 |
| **Cu Cleaner 4** | | | | **x** | | | | 67.00 | | **2.0** | 12.0 |
| **1.25 l cell** | | | | | | | | | | | |
| **Scavenger cleaner** | | | | | | | | | | | |
| **pH adjustment** | | | | | | | **9.78** | 69.00 | | | 9.5 |
| cond. 10 | | | **6.7** | | **x** | | | 69.00 | **2** | | 9.5 |
| **Scav cleaner 1** | | | | | **x** | | | 71.00 | | **5.0** | 9.5 |
| cond. 11 | **0.3** | **0.8** | | | **x** | | **9.62** | 76.00 | **1** | | 9.5 |
| **Scav cleaner 2** | | | | | **x** | | | 77.00 | | **5.0** | 9.5 |
| cond. 12 | **0.3** | **0.8** | | | **x** | | **9.5** | 82.00 | **1** | | 9.5 |
| **Scav cleaner 3** | | | | | **x** | | | 83.00 | | **5+** | 9.5 |
| total pH controller (soda ash) addition (mL) | 33 | 25.2 | 170 | 18.4 | 57.9 | 25 | | | | | |

Comments
Scavenger 1 was 2 minutes instead of 1
pH was adjusted after collector addition in cleaner 1
More mass reported to scavenger cleaner than previous test
High agitation speed rendered froth recovery difficult in Cu flotation. Agitation speed was reduced from 1000 to 900 rpm.

COREM

| Flotation test 15 | T-881 |
|---|---|

| Product | Weight (%) | Analysis | | | | | | | | | | | | | | | | Sum (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) | |
| Cu conc. 1 | 0.16 | 1.14 | <1.00 | 0.40 | 0.10 | <0.05 | <0.05 | <0.02 | <0.10 | 0.05 | <0.02 | 30.00 | 30.50 | 1.19 | <0.02 | 35.30 | 0.04 | 99.98 |
| Cu conc. 2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu conc. 3 | 0.15 | 1.82 | <1.00 | 0.71 | 0.13 | <0.05 | <0.05 | <0.02 | <0.10 | 0.10 | 0.03 | 25.40 | 31.00 | 2.96 | <0.02 | 35.70 | 0.04 | 99.13 |
| Cu conc. 4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cu Tail | 7.22 | 4.30 | <1.00 | 1.54 | 0.09 | <0.05 | <0.05 | <0.02 | <0.10 | 0.40 | <0.02 | 3.94 | 34.70 | 11.20 | 0.02 | 40.30 | 0.03 | 97.76 |
| Cleaner 2 conc. | 1.05 | 13.50 | 1.21 | 4.72 | 0.50 | <0.05 | <0.05 | 0.03 | <0.10 | 0.25 | 0.04 | 1.43 | 28.80 | 15.70 | <0.02 | 28.20 | 0.07 | 94.67 |
| Cleaner 3 conc. | 0.34 | 24.60 | 1.87 | 9.25 | 1.15 | <0.05 | 0.06 | 0.05 | <0.10 | 0.16 | 0.08 | 0.95 | 25.20 | 9.88 | 0.03 | 21.10 | 0.09 | 94.62 |
| Cleaner 4 conc. | 0.57 | 31.70 | 1.52 | 12.70 | 1.10 | <0.05 | 0.06 | 0.05 | <0.10 | 0.10 | 0.08 | 0.54 | 22.90 | 6.15 | 0.03 | 16.90 | 0.08 | 94.06 |
| Cleaner 5 conc. | 0.55 | 46.00 | 1.87 | 18.90 | 1.41 | <0.05 | 0.07 | 0.07 | <0.10 | 0.04 | 0.11 | 0.26 | 14.70 | 2.38 | 0.02 | 8.04 | 0.04 | 94.06 |
| Cleaner 5 tail | 7.62 | 53.10 | 3.63 | 22.00 | 3.19 | 0.09 | 0.15 | 0.12 | <0.10 | <0.02 | 0.18 | 0.03 | 8.40 | 0.38 | <0.02 | 1.26 | <0.02 | 92.69 |
| Scav. Cleaner 1 conc | 0.77 | 13.30 | 1.31 | 4.54 | 1.06 | <0.05 | <0.05 | 0.04 | <0.10 | 0.03 | 0.05 | 0.48 | 43.60 | 2.08 | <0.02 | 29.40 | 0.13 | 96.24 |
| Scav. Cleaner 2 conc. | 0.83 | 12.30 | 1.11 | 4.30 | 0.98 | <0.05 | <0.05 | 0.04 | <0.10 | 0.03 | 0.05 | 0.39 | 44.90 | 1.85 | <0.02 | 30.10 | 0.10 | 96.37 |
| Scav. Cleaner 3 conc. | 0.65 | 14.00 | 1.36 | 5.14 | 1.05 | <0.05 | 0.05 | 0.04 | <0.10 | 0.03 | 0.06 | 0.34 | 42.80 | 1.78 | <0.02 | 28.70 | 0.09 | 95.61 |
| Scav. Cleaner 3 tail | 2.05 | 42.10 | 4.31 | 16.20 | 3.68 | 0.13 | 0.16 | 0.14 | <0.10 | 0.02 | 0.17 | 0.19 | 16.90 | 1.11 | <0.02 | 7.26 | 0.04 | 92.53 |
| Scav. 3 tail | 78.04 | 49.10 | 7.88 | 16.40 | 6.90 | 0.33 | 0.24 | 0.17 | <0.10 | <0.02 | 0.25 | 0.01 | 9.12 | 0.20 | <0.02 | 0.93 | <0.02 | 91.69 |
| **Feed calculated** | **100.00** | **44.49** | **6.66** | **15.28** | **5.76** | **0.27** | **0.21** | **0.15** | **0.10** | **0.05** | **0.22** | **0.42** | **12.29** | **1.31** | **0.02** | **5.16** | **0.02** | **92.41** |

COREM

| Flotation test 15 | T-881 |
|---|---|

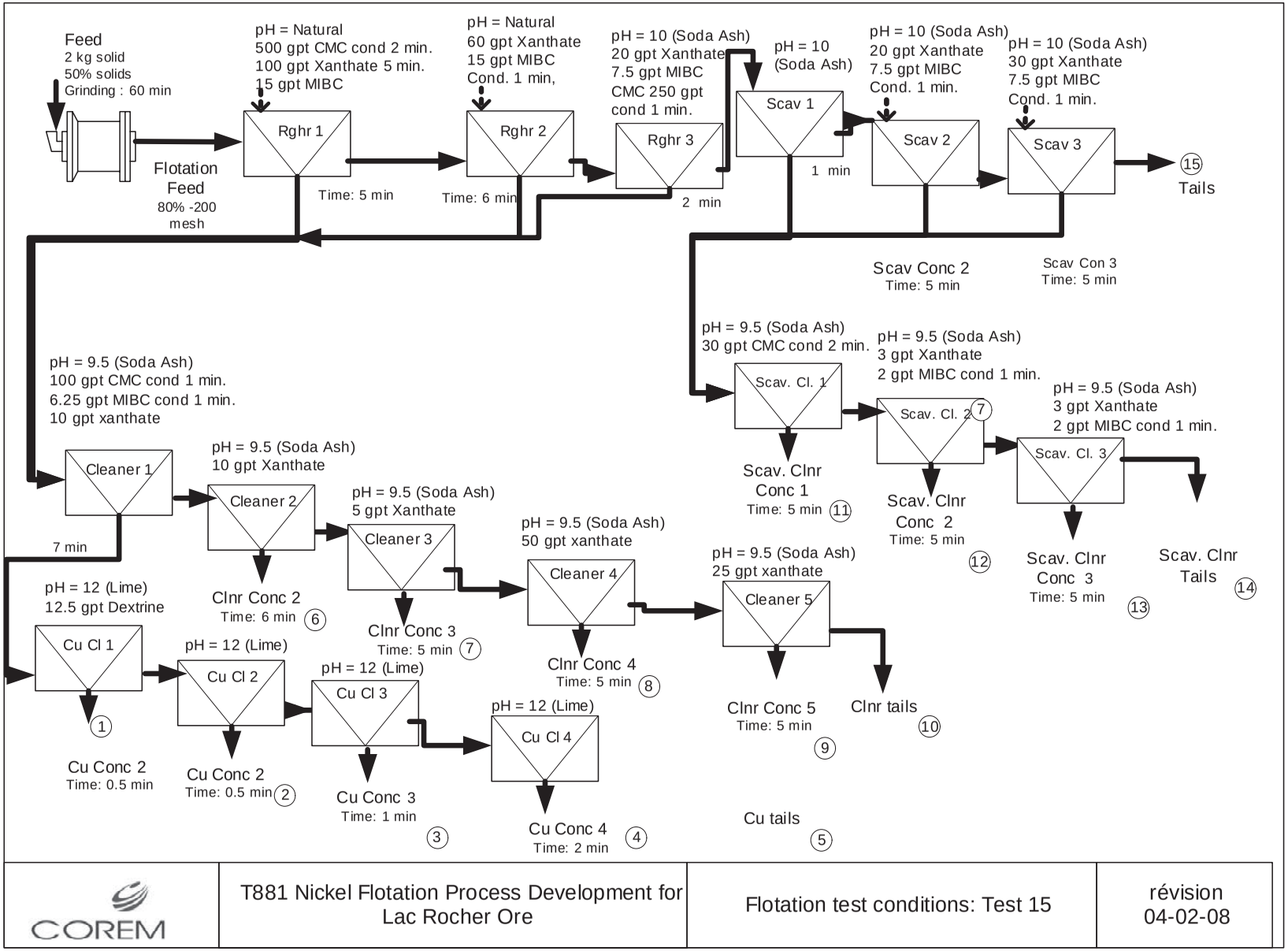
| Product | Weight (%) | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| Cu conc. 1 | 0.16 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.0 | 11.7 | 0.4 | 0.1 | 0.2 | 1.1 | 0.3 |
| Cu conc. 2 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cu conc. 3 | 0.15 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.0 | 9.2 | 0.4 | 0.3 | 0.2 | 1.0 | 0.2 |
| Cu conc. 4 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Cu Tail | 7.22 | 0.7 | 1.1 | 0.7 | 0.1 | 1.3 | 1.7 | 1.0 | 7.2 | 56.3 | 0.7 | 68.1 | 20.4 | 61.6 | 7.2 | 56.4 | 8.9 |
| Cleaner 2 conc. | 1.05 | 0.3 | 0.2 | 0.3 | 0.1 | 0.2 | 0.3 | 0.2 | 1.0 | 5.1 | 0.2 | 3.6 | 2.5 | 12.6 | 1.0 | 5.7 | 3.0 |
| Cleaner 3 conc. | 0.34 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 1.0 | 0.1 | 0.8 | 0.7 | 2.5 | 0.5 | 1.4 | 1.2 |
| Cleaner 4 conc. | 0.57 | 0.4 | 0.1 | 0.5 | 0.1 | 0.1 | 0.2 | 0.2 | 0.6 | 1.1 | 0.2 | 0.7 | 1.1 | 2.7 | 0.9 | 1.9 | 1.9 |
| Cleaner 5 conc. | 0.55 | 0.6 | 0.2 | 0.7 | 0.1 | 0.1 | 0.2 | 0.3 | 0.5 | 0.4 | 0.3 | 0.3 | 0.7 | 1.0 | 0.5 | 0.9 | 0.9 |
| Cleaner 5 tail | 7.62 | 9.1 | 4.2 | 11.0 | 4.2 | 2.5 | 5.5 | 6.2 | 7.6 | 3.0 | 6.3 | 0.5 | 5.2 | 2.2 | 7.6 | 1.9 | 6.3 |
| Scav. Cleaner 1 conc | 0.77 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.8 | 0.4 | 0.2 | 0.9 | 2.7 | 1.2 | 0.8 | 4.4 | 4.1 |
| Scav. Cleaner 2 conc. | 0.83 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.8 | 0.5 | 0.2 | 0.8 | 3.0 | 1.2 | 0.8 | 4.9 | 3.4 |
| Scav. Cleaner 3 conc. | 0.65 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.7 | 0.4 | 0.2 | 0.5 | 2.3 | 0.9 | 0.6 | 3.6 | 2.4 |
| Scav. Cleaner 3 tail | 2.05 | 1.9 | 1.3 | 2.2 | 1.3 | 1.0 | 1.6 | 1.9 | 2.0 | 0.8 | 1.6 | 0.9 | 2.8 | 1.7 | 2.0 | 2.9 | 3.4 |
| Scav. 3 tail | 78.04 | 86.1 | 92.4 | 83.8 | 93.5 | 94.3 | 89.9 | 89.5 | 78.0 | 30.4 | 90.0 | 1.9 | 57.9 | 11.9 | 77.7 | 14.1 | 64.0 |
| **Feed calculated** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** | **100.00** |

COREM

**FLOTATION TEST 15**

| | | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flot feed | 100.00 | 1.31 | 100.00 | 0.42 | 100.00 | 12.29 | 100.00 | 44.49 | 100.00 | 15.28 | 100.00 |
| **1** | Cu conc. 1 | 0.16 | 1.19 | 0.15 | 30.00 | 11.66 | 30.50 | 0.40 | 1.14 | 0.00 | 0.40 | 0.00 |
| **2** | Cu conc. 2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **3** | Cu conc. 3 | 0.15 | 2.96 | 0.34 | 25.40 | 9.23 | 31.00 | 0.38 | 1.82 | 0.01 | 0.71 | 0.01 |
| **4** | Cu conc. 4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **5** | Cu Tail | 7.22 | 11.20 | 61.63 | 3.94 | 68.12 | 34.70 | 20.38 | 4.30 | 0.70 | 1.54 | 0.73 |
| **6** | Cleaner 2 conc. | 1.05 | 15.70 | 12.56 | 1.43 | 3.59 | 28.80 | 2.46 | 13.50 | 0.32 | 4.72 | 0.32 |
| **7** | Cleaner 3 conc. | 0.34 | 9.88 | 2.53 | 0.95 | 0.76 | 25.20 | 0.69 | 24.60 | 0.19 | 9.25 | 0.20 |
| **8** | Cleaner 4 conc. | 0.57 | 6.15 | 2.69 | 0.54 | 0.74 | 22.90 | 1.07 | 31.70 | 0.41 | 12.70 | 0.48 |
| **9** | Cleaner 5 conc. | 0.55 | 2.38 | 0.99 | 0.26 | 0.34 | 14.70 | 0.66 | 46.00 | 0.57 | 18.90 | 0.68 |
| **10** | Cleaner 5 tail | 7.62 | 0.38 | 2.21 | 0.03 | 0.55 | 8.40 | 5.21 | 53.10 | 9.09 | 22.00 | 10.97 |
| **11** | Scav. Cleaner 1 conc | 0.77 | 2.08 | 1.21 | 0.48 | 0.88 | 43.60 | 2.72 | 13.30 | 0.23 | 4.54 | 0.23 |
| **12** | Scav. Cleaner 2 conc. | 0.83 | 1.85 | 1.17 | 0.39 | 0.78 | 44.90 | 3.04 | 12.30 | 0.23 | 4.30 | 0.23 |
| **13** | Scav. Cleaner 3 conc. | 0.65 | 1.78 | 0.88 | 0.34 | 0.53 | 42.80 | 2.27 | 14.00 | 0.21 | 5.14 | 0.22 |
| **14** | Scav. Cleaner 3 tail | 2.05 | 1.11 | 1.73 | 0.19 | 0.93 | 16.90 | 2.82 | 42.10 | 1.94 | 16.20 | 2.17 |
| **15** | Scav. 3 tail | 78.04 | 0.20 | 11.90 | 0.01 | 1.87 | 9.12 | 57.90 | 49.10 | 86.11 | 16.40 | 83.75 |

| | %W | %Ni grade | %Ni rec. | %Cu grade | %Cu rec. | %Fe grade | %Fe rec. | %SiO2 grade | %SiO2 rec. | %MgO grade | %MgO rec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rougher scavenger stage** | | | | | | | | | | | |
| Rougher Conc 1-3 | 17.66 | 6.17 | 83.10 | 2.25 | 95.01 | 21.75 | 31.25 | 28.42 | 11.28 | 11.59 | 13.39 |
| Scav 1-3 Cumul | 21.96 | 5.26 | 88.10 | 1.87 | 98.13 | 23.56 | 42.10 | 28.13 | 13.89 | 11.30 | 16.25 |
| **Scavenger stage** | | | | | | | | | | | |
| Scavenger 1-3 (calculated) | 4.30 | 1.53 | 5.01 | 0.30 | 3.12 | 31.01 | 10.85 | 26.94 | 2.60 | 10.14 | 2.85 |
| **Cleaner Scavenger Stage** | | | | | | | | | | | |
| Scav. Cleaner 1 conc. | 0.77 | 2.08 | 1.21 | 0.48 | 0.88 | 43.60 | 2.72 | 13.30 | 0.23 | 4.54 | 0.23 |
| Scav. Cleaner 2 conc. | 1.60 | 1.96 | 2.39 | 0.43 | 1.66 | 44.28 | 5.76 | 12.78 | 0.46 | 4.41 | 0.46 |
| Scav. Cleaner 3 conc. | 2.25 | 1.91 | 3.27 | 0.41 | 2.19 | 43.85 | 8.03 | 13.13 | 0.66 | 4.62 | 0.68 |
| **Cleaner stage** | | | | | | | | | | | |
| Cleaner 1 | 7.53 | 10.82 | 62.12 | 4.93 | 89.02 | 34.53 | 21.17 | 4.18 | 0.71 | 1.50 | 0.74 |
| Cleaner 2 cumul | 8.58 | 11.42 | 74.68 | 4.51 | 92.61 | 33.83 | 23.63 | 5.32 | 1.03 | 1.89 | 1.06 |
| Cleaner 3 cumul | 8.92 | 11.36 | 77.21 | 4.37 | 93.38 | 33.51 | 24.32 | 6.05 | 1.21 | 2.17 | 1.27 |
| Cleaner 4 cumul | 9.49 | 11.04 | 79.90 | 4.14 | 94.12 | 32.87 | 25.38 | 7.60 | 1.62 | 2.81 | 1.74 |
| **Cleaner 5 cumul** | **10.04** | **10.57** | **80.89** | **3.93** | **94.46** | **31.88** | **26.04** | **9.69** | **2.19** | **3.68** | **2.42** |
| Cleaner 5 cumul + Scav Cl. 1 cumul | 10.81 | 9.97 | 82.10 | 3.68 | 95.34 | 32.71 | 28.76 | 9.95 | 2.42 | 3.75 | 2.65 |
| Cleaner 5 cumul + Scav Cl. 2 cumul | 11.64 | 9.39 | 83.28 | 3.45 | 96.12 | 33.58 | 31.80 | 10.12 | 2.65 | 3.78 | 2.88 |
| Cleaner 5 cumul + Scav Cl. 3 cumul | 12.29 | 8.98 | 84.16 | 3.28 | 96.65 | 34.07 | 34.07 | 10.32 | 2.85 | 3.86 | 3.10 |
| **Copper Concentrate** | | | | | | | | | | | |
| Cu conc. 1 | 0.16 | 1.19 | 0.15 | 30.00 | 11.66 | 30.50 | 0.40 | 1.14 | 0.00 | 0.40 | 0.00 |
| Conc. Cu 2 cumul | 0.16 | 1.19 | 0.15 | 30.00 | 11.66 | 30.50 | 0.40 | 1.14 | 0.00 | 0.40 | 0.00 |
| Conc. Cu 3 cumul | 0.31 | 2.05 | 0.49 | 27.78 | 20.90 | 30.74 | 0.79 | 1.47 | 0.01 | 0.55 | 0.01 |
| Conc. Cu 4 cumul | 0.31 | 2.05 | 0.49 | 27.78 | 20.90 | 30.74 | 0.79 | 1.47 | 0.01 | 0.55 | 0.01 |
| **Nickel Concentrate** | | | | | | | | | | | |
| Cu cl. tail | 7.22 | 11.20 | 61.63 | 3.94 | 68.12 | 34.70 | 20.38 | 4.30 | 0.70 | 1.54 | 0.73 |
| Cu cl. tail + Cl. 2 | 8.27 | 11.77 | 74.19 | 3.62 | 71.72 | 33.95 | 22.84 | 5.47 | 1.02 | 1.94 | 1.05 |
| Cu cl. tail + Cl. 3 cumul | 8.61 | 11.70 | 76.72 | 3.52 | 72.48 | 33.61 | 23.53 | 6.21 | 1.20 | 2.23 | 1.26 |
| Cu cl. tail + Cl. 4 cumul | 9.18 | 11.35 | 79.41 | 3.33 | 73.22 | 32.94 | 24.60 | 7.81 | 1.61 | 2.88 | 1.73 |
| **Cu cl. tail + Cl. 5 cumul** | **9.73** | **10.85** | **80.40** | **3.16** | **73.56** | **31.91** | **25.25** | **9.96** | **2.18** | **3.79** | **2.41** |
| Cu cl. tail + Cl. 5 cumul + Scav. Cl. 1 cumul | 10.49 | 10.21 | 81.61 | 2.96 | 74.44 | 32.77 | 27.97 | 10.20 | 2.41 | 3.84 | 2.64 |
| Cu cl. tail + Cl. 5 cumul + Scav. Cl. 2 cumul | 11.33 | 9.59 | 82.79 | 2.77 | 75.22 | 33.66 | 31.02 | 10.36 | 2.64 | 3.87 | 2.87 |
| Cu cl. tail + Cl. 5 cumul + Scav. Cl. 3 cumul | 11.98 | 9.17 | 83.67 | 2.64 | 75.75 | 34.16 | 33.29 | 10.56 | 2.84 | 3.94 | 3.09 |




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# Appendix B:

# Mineralogical Study

**COREM**
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# Mineralogical study – Preliminary results

## 1. Objectives

The objectives of this mineralogical study are the **identification of the principal nickel bearing minerals and the gangue minerals** and the evaluation of the **liberation particle size for nickel bearing phases**.

## 2. Sample preparation

- Select randomly one –10 mesh sample.
- Crush the ore to pass it through a 35 Mesh screen.
- Mix the sample well and then divide it into two 500-g samples.
- Chose one of the sub-samples and weight it precisely.
- Perform dry screening for 20 minutes in Rotap. Use the following Tyler screens: 28 Mesh, 35 Mesh, 65 Mesh, 100 Mesh, 200 Mesh and 325 Mesh.
- At the end of the test, and while samples are on the screen, remove the screen from the stack and wash the sample with water to remove the fine particles from that fraction.
- Wash all the samples on the other screens as it was explained in previous section.
- Collect the fine particles in the pail and filter it. Measure its dry weight.
- Collect all the washed samples: +28 Mesh,-28+35 Mesh, -35+65 Mesh, -65+100 Mesh, -100+200 Mesh, -200+325 Mesh and –325 Mesh fraction, dry them and measure their dry weight.
- Reports the dry weight of the fractions (Table 1), and fines washed off from the screens.

The samples were mounted in polished sections for optical microscopic observations.

Table 1. Sample weight by fraction

| Fraction | Size fraction (um) | Weight (g) |
|---|---|---|
| +28 Mesh | >589 | 69.1 |
| -28+35 Mesh | 417-589 | 71.9 |
| -35+65 Mesh | 208-417 | 93.7 |
| -65+100 Mesh | 147-208 | 45.6 |
| -100+200 Mesh | 74-147 | 83.8 |
| -200+325 Mesh | 44-74 | 45.5 |
| -325 Mesh | <44 | 83.5 |

The Ni contents are required to interpret this table according to the representation of Ni in each class but not necessary to evaluate the liberation size.

### 3. General mineralogy

The determination of the major phases was made by x-ray diffraction analyses, scanning electron microscope (SEM) with x-ray energy dispersive analysis (EDAX) and optical microscope.

The major Ni-bearing phase is pentlandite ($(Ni, Fe)_9S_8$; Ni content: 34.22%). Violarite ($Ni_2FeS_4$; Ni content: 38.94%) is present as minor nickel bearing phases in association with pentlandite (Figure 1). The pentlandite is also associated with pyrrhotite ($Fe_{1-x}S$) as ex-solution flames (Figure 2) and as grain contact (Figure 3). The possible content of Ni in pyrrhotite was investigated by EDAX on SEM with a limit detection of 2%. The particles of pyrrhotite analyzed did not contain Ni. The Cu-bearing is chalcopyrite ($CuFeS_2$). Pyrite ($FeS_2$) and sphalerite ((Zn,Fe)S) are also present.

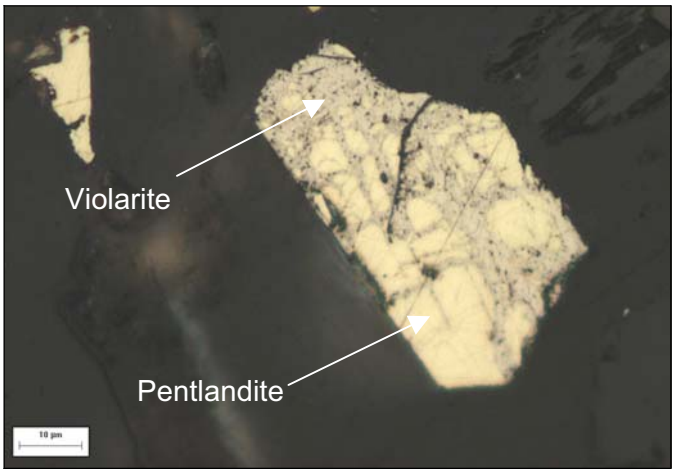



Figure 1. Particle of pentlandite (in light yellow) with violarite (in light brownish pink).

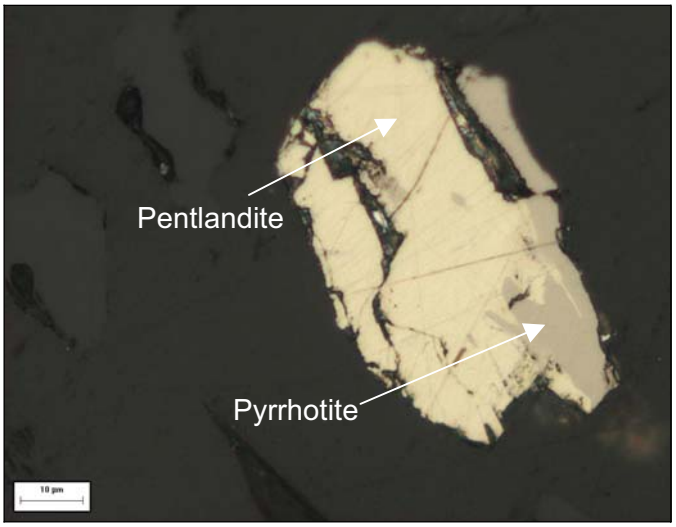



Figure 2. Particle of pentlandite (in light yellow) with pyrrhotite ex-solution (in brown).

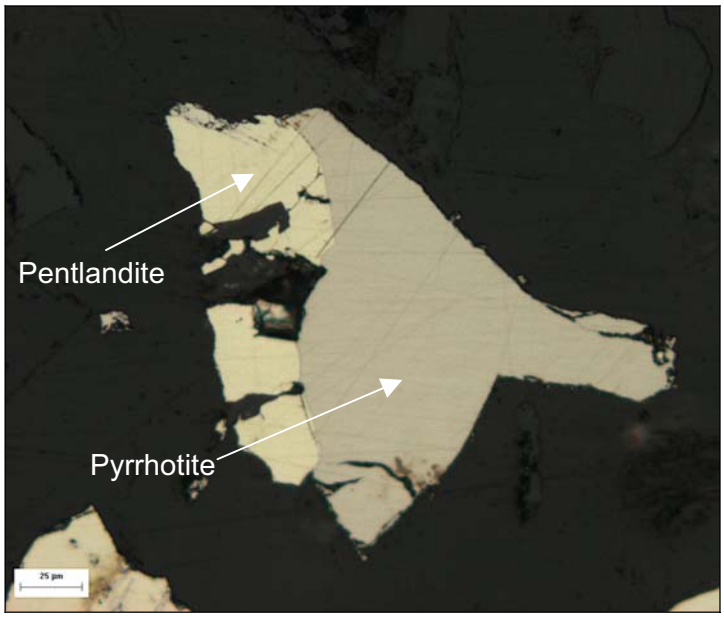



Figure 3. Particle of pentlandite (in light yellow) with pyrrhotite (in brown).

The gangue minerals are mainly composed of calcic ferro-magnesian amphibole as actinolite ($Ca_2(Mg,Fe)_5[Si_8O_{22}](OH)_2$), micas as phlogopite ($KMg_3(Si_3Al)O_{10}(OH)_2$) and chlorite ($(Mg,Fe)_6(Si,Al)_4O_{10}(OH)_8$). The minor phases are albite ($NaAlSi_3O_8$), forsterite ($(Mg,Fe)_2SiO_4$), and orthoclase ($KAlSi_3O_8$). Quartz ($SiO_2$) and talc ($Mg_3Si_4O_{10}(OH)_2$ are present in trace. Brucite is also possible according to XRD analysis but was not observed by MEB nor by binocular lenses. Pyroxene (enstatite ($MgSiO_3$) or hypersthene ($(Mg,Fe)SiO_3$) are in trace.

## 4. Liberation particle size for nickel bearing phases

The liberation particle size for pentlandite is between 325 and 200M; around 50-60 µm. The majority of pentlandite is liberated with some association with pyrrhotite (Figure 2). The chalcopyrite (the copper bearing phase) is completely liberated at this size.

# Appendix C:

## Complete Size Distribution of Grinding Test

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# *TECHNICAL NOTE*

**Date :** **07/03/2007** **Ref. Number :** **13648**

**Duration of grinding :** **10 min**

**Grinding mill :** **40 % of critical speed**

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 34.800 | 3.889 | 4.680 | 0.289 | 0.030 |
| 645.600 | 98.450 | 47.980 | 32.960 | 3.566 | 4.290 | 0.265 | 0.020 |
| 592.000 | 95.950 | 44.000 | 31.160 | 3.270 | 3.930 | 0.243 | 0.020 |
| 542.900 | 93.080 | 40.350 | 29.420 | 2.999 | 3.590 | 0.223 | 0.020 |
| 497.800 | 89.920 | 37.000 | 27.740 | 2.750 | 3.270 | 0.204 | 0.010 |
| 456.500 | 86.640 | 33.930 | 26.120 | 2.522 | 2.970 | 0.187 | 0.000 |
| 418.600 | 83.460 | 31.110 | 24.570 | 2.312 | 2.690 | 0.172 | 0.000 |
| 383.900 | 80.570 | 28.530 | 23.090 | 2.121 | 2.430 | 0.158 | 0.000 |
| 352.000 | 77.990 | 26.160 | 21.670 | 1.945 | 2.180 | 0.145 | 0.000 |
| 322.800 | 75.740 | 23.990 | 20.320 | 1.783 | 1.950 | 0.133 | 0.000 |
| 296.000 | 73.730 | 22.000 | 19.030 | 1.635 | 1.740 | 0.122 | 0.000 |
| 271.400 | 71.890 | 20.170 | 17.820 | 1.499 | 1.540 | 0.111 | 0.000 |
| 248.900 | 70.160 | 18.500 | 16.680 | 1.375 | 1.350 | 0.102 | 0.000 |
| 228.200 | 68.460 | 16.960 | 15.620 | 1.261 | 1.170 | 0.094 | 0.000 |
| 209.300 | 66.730 | 15.560 | 14.630 | 1.156 | 1.000 | 0.086 | 0.000 |
| 191.900 | 64.910 | 14.270 | 13.710 | 1.060 | 0.840 | 0.079 | 0.000 |
| 176.000 | 62.990 | 13.080 | 12.860 | 0.972 | 0.690 | 0.072 | 0.000 |
| 161.400 | 60.950 | 12.000 | 12.070 | 0.892 | 0.550 | 0.066 | 0.000 |
| 148.000 | 58.820 | 11.000 | 11.320 | 0.818 | 0.410 | 0.061 | 0.000 |
| 135.700 | 56.630 | 10.090 | 10.610 | 0.750 | 0.280 | 0.056 | 0.000 |
| 124.500 | 54.420 | 9.250 | 9.940 | 0.688 | 0.170 | 0.051 | 0.000 |
| 114.100 | 52.260 | 8.482 | 9.290 | 0.630 | 0.090 | 0.047 | 0.000 |
| 104.700 | 50.150 | 7.778 | 8.670 | 0.578 | 0.040 | 0.043 | 0.000 |
| 95.960 | 48.110 | 7.133 | 8.080 | 0.530 | 0.040 | 0.039 | 0.000 |
| 88.000 | 46.130 | 6.541 | 7.510 | 0.486 | 0.040 | 0.036 | 0.000 |
| 80.700 | 44.200 | 5.998 | 6.970 | 0.446 | 0.040 | 0.033 | 0.000 |
| 74.000 | 42.300 | 5.500 | 6.460 | 0.409 | 0.040 | 0.030 | 0.000 |
| 67.860 | 40.410 | 5.044 | 5.980 | 0.375 | 0.040 | 0.028 | 0.000 |
| 62.230 | 38.530 | 4.625 | 5.520 | 0.344 | 0.040 | 0.026 | 0.000 |
| 57.060 | 36.660 | 4.241 | 5.090 | 0.315 | 0.040 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 9.3 | 40% = | 66.6 | 70% = | 246.9 | 95% = | 574.8 |
| 20% = | 23.5 | 50% = | 104.0 | 80% = | 376.9 | | |
| 30% = | 41.5 | 60% = | 155.3 | 90% = | 498.9 | | |

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# *TECHNICAL NOTE*

**Date :** **07/03/2007** **Ref. Number :** **13649**

**Duration of grinding :** **20 min**

**Grinding mill :** **40 % of critical speed**

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 34.580 | 3.889 | 4.400 | 0.289 | 0.050 |
| 645.600 | 99.710 | 47.980 | 32.570 | 3.566 | 4.030 | 0.265 | 0.040 |
| 592.000 | 99.240 | 44.000 | 30.630 | 3.270 | 3.690 | 0.243 | 0.030 |
| 542.900 | 98.690 | 40.350 | 28.790 | 2.999 | 3.360 | 0.223 | 0.020 |
| 497.800 | 97.950 | 37.000 | 27.050 | 2.750 | 3.060 | 0.204 | 0.020 |
| 456.500 | 96.920 | 33.930 | 25.400 | 2.522 | 2.780 | 0.187 | 0.020 |
| 418.600 | 95.490 | 31.110 | 23.830 | 2.312 | 2.510 | 0.172 | 0.010 |
| 383.900 | 93.510 | 28.530 | 22.340 | 2.121 | 2.260 | 0.158 | 0.000 |
| 352.000 | 91.030 | 26.160 | 20.930 | 1.945 | 2.030 | 0.145 | 0.000 |
| 322.800 | 88.070 | 23.990 | 19.590 | 1.783 | 1.810 | 0.133 | 0.000 |
| 296.000 | 84.860 | 22.000 | 18.310 | 1.635 | 1.600 | 0.122 | 0.000 |
| 271.400 | 81.660 | 20.170 | 17.110 | 1.499 | 1.410 | 0.111 | 0.000 |
| 248.900 | 78.570 | 18.500 | 15.980 | 1.375 | 1.220 | 0.102 | 0.000 |
| 228.200 | 75.690 | 16.960 | 14.940 | 1.261 | 1.040 | 0.094 | 0.000 |
| 209.300 | 72.960 | 15.560 | 13.970 | 1.156 | 0.870 | 0.086 | 0.000 |
| 191.900 | 70.310 | 14.270 | 13.080 | 1.060 | 0.710 | 0.079 | 0.000 |
| 176.000 | 67.690 | 13.080 | 12.260 | 0.972 | 0.560 | 0.072 | 0.000 |
| 161.400 | 65.050 | 12.000 | 11.500 | 0.892 | 0.420 | 0.066 | 0.000 |
| 148.000 | 62.400 | 11.000 | 10.790 | 0.818 | 0.280 | 0.061 | 0.000 |
| 135.700 | 59.730 | 10.090 | 10.120 | 0.750 | 0.150 | 0.056 | 0.000 |
| 124.500 | 57.100 | 9.250 | 9.470 | 0.688 | 0.060 | 0.051 | 0.000 |
| 114.100 | 54.540 | 8.482 | 8.850 | 0.630 | 0.060 | 0.047 | 0.000 |
| 104.700 | 52.080 | 7.778 | 8.250 | 0.578 | 0.060 | 0.043 | 0.000 |
| 95.960 | 49.720 | 7.133 | 7.670 | 0.530 | 0.060 | 0.039 | 0.000 |
| 88.000 | 47.440 | 6.541 | 7.120 | 0.486 | 0.060 | 0.036 | 0.000 |
| 80.700 | 45.230 | 5.998 | 6.600 | 0.446 | 0.060 | 0.033 | 0.000 |
| 74.000 | 43.060 | 5.500 | 6.100 | 0.409 | 0.060 | 0.030 | 0.000 |
| 67.860 | 40.910 | 5.044 | 5.640 | 0.375 | 0.060 | 0.028 | 0.000 |
| 62.230 | 38.770 | 4.625 | 5.200 | 0.344 | 0.060 | 0.026 | 0.000 |
| 57.060 | 36.650 | 4.241 | 4.790 | 0.315 | 0.060 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 9.9 | 40% = | 65.4 | 70% = | 190.0 | 95% = | 409.2 |
| 20% = | 24.7 | 50% = | 97.0 | 80% = | 259.2 | | |
| 30% = | 42.7 | 60% = | 136.9 | 90% = | 341.3 | | |

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# TECHNICAL NOTE

**Date :** 07/03/2007 **Ref. Number :** 13650

**Duration of grinding :** 40 min

**Grinding mill :** 40 % of critical speed

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 40.990 | 3.889 | 4.860 | 0.289 | 0.050 |
| 645.600 | 100.000 | 47.980 | 38.420 | 3.566 | 4.450 | 0.265 | 0.040 |
| 592.000 | 100.000 | 44.000 | 35.920 | 3.270 | 4.070 | 0.243 | 0.030 |
| 542.900 | 100.000 | 40.350 | 33.530 | 2.999 | 3.710 | 0.223 | 0.020 |
| 497.800 | 99.990 | 37.000 | 31.260 | 2.750 | 3.370 | 0.204 | 0.020 |
| 456.500 | 99.860 | 33.930 | 29.120 | 2.522 | 3.050 | 0.187 | 0.020 |
| 418.600 | 99.640 | 31.110 | 27.120 | 2.312 | 2.750 | 0.172 | 0.010 |
| 383.900 | 99.340 | 28.530 | 25.260 | 2.121 | 2.470 | 0.158 | 0.000 |
| 352.000 | 98.920 | 26.160 | 23.520 | 1.945 | 2.210 | 0.145 | 0.000 |
| 322.800 | 98.330 | 23.990 | 21.900 | 1.783 | 1.970 | 0.133 | 0.000 |
| 296.000 | 97.570 | 22.000 | 20.390 | 1.635 | 1.740 | 0.122 | 0.000 |
| 271.400 | 96.620 | 20.170 | 19.000 | 1.499 | 1.520 | 0.111 | 0.000 |
| 248.900 | 95.460 | 18.500 | 17.720 | 1.375 | 1.320 | 0.102 | 0.000 |
| 228.200 | 94.080 | 16.960 | 16.550 | 1.261 | 1.130 | 0.094 | 0.000 |
| 209.300 | 92.390 | 15.560 | 15.480 | 1.156 | 0.940 | 0.086 | 0.000 |
| 191.900 | 90.310 | 14.270 | 14.500 | 1.060 | 0.770 | 0.079 | 0.000 |
| 176.000 | 87.760 | 13.080 | 13.600 | 0.972 | 0.600 | 0.072 | 0.000 |
| 161.400 | 84.640 | 12.000 | 12.770 | 0.892 | 0.440 | 0.066 | 0.000 |
| 148.000 | 81.010 | 11.000 | 11.990 | 0.818 | 0.300 | 0.061 | 0.000 |
| 135.700 | 76.960 | 10.090 | 11.250 | 0.750 | 0.160 | 0.056 | 0.000 |
| 124.500 | 72.720 | 9.250 | 10.530 | 0.688 | 0.070 | 0.051 | 0.000 |
| 114.100 | 68.550 | 8.482 | 9.840 | 0.630 | 0.070 | 0.047 | 0.000 |
| 104.700 | 64.580 | 7.778 | 9.170 | 0.578 | 0.070 | 0.043 | 0.000 |
| 95.960 | 60.950 | 7.133 | 8.520 | 0.530 | 0.070 | 0.039 | 0.000 |
| 88.000 | 57.630 | 6.541 | 7.900 | 0.486 | 0.070 | 0.036 | 0.000 |
| 80.700 | 54.580 | 5.998 | 7.310 | 0.446 | 0.070 | 0.033 | 0.000 |
| 74.000 | 51.710 | 5.500 | 6.760 | 0.409 | 0.070 | 0.030 | 0.000 |
| 67.860 | 48.950 | 5.044 | 6.240 | 0.375 | 0.070 | 0.028 | 0.000 |
| 62.230 | 46.260 | 4.625 | 5.750 | 0.344 | 0.070 | 0.026 | 0.000 |
| 57.060 | 43.610 | 4.241 | 5.290 | 0.315 | 0.060 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 8.7 | 40% = | 50.6 | 70% = | 117.7 | 95% = | 241.5 |
| 20% = | 21.5 | 50% = | 70.2 | 80% = | 144.8 | | |
| 30% = | 35.2 | 60% = | 93.7 | 90% = | 189.8 | | |

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# TECHNICAL NOTE

**Date :** 07/03/2007 **Ref. Number :** 13651

**Duration of grinding :** 60 min

**Grinding mill :** 40 % of critical speed

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 46.980 | 3.889 | 5.670 | 0.289 | 0.060 |
| 645.600 | 100.000 | 47.980 | 43.970 | 3.566 | 5.220 | 0.265 | 0.050 |
| 592.000 | 100.000 | 44.000 | 41.110 | 3.270 | 4.790 | 0.243 | 0.040 |
| 542.900 | 100.000 | 40.350 | 38.410 | 2.999 | 4.390 | 0.223 | 0.030 |
| 497.800 | 99.990 | 37.000 | 35.870 | 2.750 | 4.010 | 0.204 | 0.020 |
| 456.500 | 99.890 | 33.930 | 33.480 | 2.522 | 3.650 | 0.187 | 0.010 |
| 418.600 | 99.740 | 31.110 | 31.220 | 2.312 | 3.320 | 0.172 | 0.010 |
| 383.900 | 99.560 | 28.530 | 29.090 | 2.121 | 3.010 | 0.158 | 0.000 |
| 352.000 | 99.350 | 26.160 | 27.090 | 1.945 | 2.720 | 0.145 | 0.000 |
| 322.800 | 99.080 | 23.990 | 25.200 | 1.783 | 2.450 | 0.133 | 0.000 |
| 296.000 | 98.750 | 22.000 | 23.430 | 1.635 | 2.190 | 0.122 | 0.000 |
| 271.400 | 98.340 | 20.170 | 21.790 | 1.499 | 1.940 | 0.111 | 0.000 |
| 248.900 | 97.840 | 18.500 | 20.280 | 1.375 | 1.710 | 0.102 | 0.000 |
| 228.200 | 97.200 | 16.960 | 18.900 | 1.261 | 1.480 | 0.094 | 0.000 |
| 209.300 | 96.370 | 15.560 | 17.650 | 1.156 | 1.270 | 0.086 | 0.000 |
| 191.900 | 95.270 | 14.270 | 16.520 | 1.060 | 1.070 | 0.079 | 0.000 |
| 176.000 | 93.800 | 13.080 | 15.500 | 0.972 | 0.880 | 0.072 | 0.000 |
| 161.400 | 91.840 | 12.000 | 14.560 | 0.892 | 0.710 | 0.066 | 0.000 |
| 148.000 | 89.360 | 11.000 | 13.680 | 0.818 | 0.550 | 0.061 | 0.000 |
| 135.700 | 86.310 | 10.090 | 12.840 | 0.750 | 0.410 | 0.056 | 0.000 |
| 124.500 | 82.810 | 9.250 | 12.040 | 0.688 | 0.280 | 0.051 | 0.000 |
| 114.100 | 79.010 | 8.482 | 11.260 | 0.630 | 0.160 | 0.047 | 0.000 |
| 104.700 | 75.080 | 7.778 | 10.510 | 0.578 | 0.080 | 0.043 | 0.000 |
| 95.960 | 71.180 | 7.133 | 9.780 | 0.530 | 0.080 | 0.039 | 0.000 |
| 88.000 | 67.360 | 6.541 | 9.080 | 0.486 | 0.080 | 0.036 | 0.000 |
| 80.700 | 63.690 | 5.998 | 8.420 | 0.446 | 0.080 | 0.033 | 0.000 |
| 74.000 | 60.140 | 5.500 | 7.790 | 0.409 | 0.080 | 0.030 | 0.000 |
| 67.860 | 56.690 | 5.044 | 7.210 | 0.375 | 0.080 | 0.028 | 0.000 |
| 62.230 | 53.350 | 4.625 | 6.660 | 0.344 | 0.080 | 0.026 | 0.000 |
| 57.060 | 50.110 | 4.241 | 6.150 | 0.315 | 0.070 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 7.3 | 40% = | 42.5 | 70% = | 93.5 | 95% = | 188.7 |
| 20% = | 18.2 | 50% = | 56.9 | 80% = | 116.7 | | |
| 30% = | 29.6 | 60% = | 73.7 | 90% = | 151.2 | | |

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# *TECHNICAL NOTE*

**Date :** **07/04/2007** **Ref. Number :** **13659**

**Duration of grinding :** **120 min**

**Grinding mill :** **40 % of critical speed**

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 64.420 | 3.889 | 8.680 | 0.289 | 0.050 |
| 645.600 | 100.000 | 47.980 | 60.710 | 3.566 | 8.030 | 0.265 | 0.040 |
| 592.000 | 100.000 | 44.000 | 57.090 | 3.270 | 7.410 | 0.243 | 0.030 |
| 542.900 | 100.000 | 40.350 | 53.630 | 2.999 | 6.820 | 0.223 | 0.020 |
| 497.800 | 100.000 | 37.000 | 50.330 | 2.750 | 6.270 | 0.204 | 0.020 |
| 456.500 | 100.000 | 33.930 | 47.190 | 2.522 | 5.750 | 0.187 | 0.020 |
| 418.600 | 99.990 | 31.110 | 44.220 | 2.312 | 5.260 | 0.172 | 0.010 |
| 383.900 | 99.920 | 28.530 | 41.400 | 2.121 | 4.800 | 0.158 | 0.000 |
| 352.000 | 99.810 | 26.160 | 38.720 | 1.945 | 4.370 | 0.145 | 0.000 |
| 322.800 | 99.680 | 23.990 | 36.160 | 1.783 | 3.970 | 0.133 | 0.000 |
| 296.000 | 99.530 | 22.000 | 33.750 | 1.635 | 3.580 | 0.122 | 0.000 |
| 271.400 | 99.370 | 20.170 | 31.490 | 1.499 | 3.210 | 0.111 | 0.000 |
| 248.900 | 99.190 | 18.500 | 29.400 | 1.375 | 2.850 | 0.102 | 0.000 |
| 228.200 | 98.980 | 16.960 | 27.480 | 1.261 | 2.500 | 0.094 | 0.000 |
| 209.300 | 98.720 | 15.560 | 25.740 | 1.156 | 2.170 | 0.086 | 0.000 |
| 191.900 | 98.380 | 14.270 | 24.160 | 1.060 | 1.850 | 0.079 | 0.000 |
| 176.000 | 97.930 | 13.080 | 22.720 | 0.972 | 1.560 | 0.072 | 0.000 |
| 161.400 | 97.320 | 12.000 | 21.390 | 0.892 | 1.290 | 0.066 | 0.000 |
| 148.000 | 96.490 | 11.000 | 20.140 | 0.818 | 1.040 | 0.061 | 0.000 |
| 135.700 | 95.390 | 10.090 | 18.950 | 0.750 | 0.820 | 0.056 | 0.000 |
| 124.500 | 94.000 | 9.250 | 17.810 | 0.688 | 0.630 | 0.051 | 0.000 |
| 114.100 | 92.270 | 8.482 | 16.690 | 0.630 | 0.460 | 0.047 | 0.000 |
| 104.700 | 90.210 | 7.778 | 15.610 | 0.578 | 0.310 | 0.043 | 0.000 |
| 95.960 | 87.820 | 7.133 | 14.560 | 0.530 | 0.170 | 0.039 | 0.000 |
| 88.000 | 85.120 | 6.541 | 13.560 | 0.486 | 0.070 | 0.036 | 0.000 |
| 80.700 | 82.150 | 5.998 | 12.610 | 0.446 | 0.070 | 0.033 | 0.000 |
| 74.000 | 78.930 | 5.500 | 11.710 | 0.409 | 0.070 | 0.030 | 0.000 |
| 67.860 | 75.480 | 5.044 | 10.880 | 0.375 | 0.070 | 0.028 | 0.000 |
| 62.230 | 71.870 | 4.625 | 10.100 | 0.344 | 0.070 | 0.026 | 0.000 |
| 57.060 | 68.160 | 4.241 | 9.370 | 0.315 | 0.060 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 4.6 | 40% = | 27.3 | 70% = | 59.6 | 95% = | 132.3 |
| 20% = | 10.9 | 50% = | 36.7 | 80% = | 76.1 | | |
| 30% = | 19.0 | 60% = | 47.2 | 90% = | 103.9 | | |

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# TECHNICAL NOTE

**Date :** 07/24/2007 **Ref. Number :** 13732

**Duration of grinding :** 180 min

**Grinding mill :** 40 % of critical speed

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 74.270 | 3.889 | 10.730 | 0.289 | 0.060 |
| 645.600 | 100.000 | 47.980 | 70.530 | 3.566 | 9.940 | 0.265 | 0.050 |
| 592.000 | 100.000 | 44.000 | 66.780 | 3.270 | 9.190 | 0.243 | 0.040 |
| 542.900 | 100.000 | 40.350 | 63.100 | 2.999 | 8.480 | 0.223 | 0.030 |
| 497.800 | 100.000 | 37.000 | 59.500 | 2.750 | 7.800 | 0.204 | 0.020 |
| 456.500 | 100.000 | 33.930 | 56.020 | 2.522 | 7.170 | 0.187 | 0.010 |
| 418.600 | 100.000 | 31.110 | 52.650 | 2.312 | 6.570 | 0.172 | 0.010 |
| 383.900 | 100.000 | 28.530 | 49.410 | 2.121 | 6.010 | 0.158 | 0.000 |
| 352.000 | 100.000 | 26.160 | 46.300 | 1.945 | 5.490 | 0.145 | 0.000 |
| 322.800 | 100.000 | 23.990 | 43.310 | 1.783 | 5.000 | 0.133 | 0.000 |
| 296.000 | 100.000 | 22.000 | 40.470 | 1.635 | 4.530 | 0.122 | 0.000 |
| 271.400 | 100.000 | 20.170 | 37.820 | 1.499 | 4.080 | 0.111 | 0.000 |
| 248.900 | 99.990 | 18.500 | 35.370 | 1.375 | 3.650 | 0.102 | 0.000 |
| 228.200 | 99.930 | 16.960 | 33.130 | 1.261 | 3.220 | 0.094 | 0.000 |
| 209.300 | 99.830 | 15.560 | 31.100 | 1.156 | 2.810 | 0.086 | 0.000 |
| 191.900 | 99.690 | 14.270 | 29.270 | 1.060 | 2.410 | 0.079 | 0.000 |
| 176.000 | 99.490 | 13.080 | 27.590 | 0.972 | 2.040 | 0.072 | 0.000 |
| 161.400 | 99.220 | 12.000 | 26.040 | 0.892 | 1.690 | 0.066 | 0.000 |
| 148.000 | 98.850 | 11.000 | 24.570 | 0.818 | 1.380 | 0.061 | 0.000 |
| 135.700 | 98.340 | 10.090 | 23.160 | 0.750 | 1.100 | 0.056 | 0.000 |
| 124.500 | 97.640 | 9.250 | 21.790 | 0.688 | 0.860 | 0.051 | 0.000 |
| 114.100 | 96.720 | 8.482 | 20.440 | 0.630 | 0.650 | 0.047 | 0.000 |
| 104.700 | 95.530 | 7.778 | 19.130 | 0.578 | 0.460 | 0.043 | 0.000 |
| 95.960 | 94.030 | 7.133 | 17.850 | 0.530 | 0.290 | 0.039 | 0.000 |
| 88.000 | 92.200 | 6.541 | 16.630 | 0.486 | 0.160 | 0.036 | 0.000 |
| 80.700 | 90.020 | 5.998 | 15.470 | 0.446 | 0.100 | 0.033 | 0.000 |
| 74.000 | 87.480 | 5.500 | 14.390 | 0.409 | 0.080 | 0.030 | 0.000 |
| 67.860 | 84.580 | 5.044 | 13.380 | 0.375 | 0.080 | 0.028 | 0.000 |
| 62.230 | 81.370 | 4.625 | 12.440 | 0.344 | 0.080 | 0.026 | 0.000 |
| 57.060 | 77.910 | 4.241 | 11.560 | 0.315 | 0.070 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 3.6 | 40% = | 21.7 | 70% = | 47.4 | 95% = | 101.3 |
| 20% = | 8.2 | 50% = | 29.0 | 80% = | 60.1 | | |
| 30% = | 14.8 | 60% = | 37.5 | 90% = | 80.6 | | |

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# TECHNICAL NOTE

**Date :** 08/07/2007 **Ref. Number :** 13751

**Duration of grinding :** 40 min

**Grinding mill :** 70 % of critical speed

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 35.740 | 3.889 | 4.170 | 0.289 | 0.050 |
| 645.600 | 99.940 | 47.980 | 32.890 | 3.566 | 3.840 | 0.265 | 0.040 |
| 592.000 | 99.840 | 44.000 | 30.250 | 3.270 | 3.530 | 0.243 | 0.040 |
| 542.900 | 99.720 | 40.350 | 27.850 | 2.999 | 3.230 | 0.223 | 0.030 |
| 497.800 | 99.570 | 37.000 | 25.680 | 2.750 | 2.950 | 0.204 | 0.020 |
| 456.500 | 99.390 | 33.930 | 23.720 | 2.522 | 2.680 | 0.187 | 0.020 |
| 418.600 | 99.160 | 31.110 | 21.950 | 2.312 | 2.430 | 0.172 | 0.010 |
| 383.900 | 98.860 | 28.530 | 20.350 | 2.121 | 2.190 | 0.158 | 0.000 |
| 352.000 | 98.480 | 26.160 | 18.890 | 1.945 | 1.970 | 0.145 | 0.000 |
| 322.800 | 98.000 | 23.990 | 17.550 | 1.783 | 1.760 | 0.133 | 0.000 |
| 296.000 | 97.400 | 22.000 | 16.330 | 1.635 | 1.560 | 0.122 | 0.000 |
| 271.400 | 96.670 | 20.170 | 15.210 | 1.499 | 1.370 | 0.111 | 0.000 |
| 248.900 | 95.780 | 18.500 | 14.190 | 1.375 | 1.190 | 0.102 | 0.000 |
| 228.200 | 94.690 | 16.960 | 13.260 | 1.261 | 1.020 | 0.094 | 0.000 |
| 209.300 | 93.300 | 15.560 | 12.420 | 1.156 | 0.850 | 0.086 | 0.000 |
| 191.900 | 91.510 | 14.270 | 11.650 | 1.060 | 0.690 | 0.079 | 0.000 |
| 176.000 | 89.210 | 13.080 | 10.950 | 0.972 | 0.540 | 0.072 | 0.000 |
| 161.400 | 86.270 | 12.000 | 10.300 | 0.892 | 0.400 | 0.066 | 0.000 |
| 148.000 | 82.710 | 11.000 | 9.700 | 0.818 | 0.270 | 0.061 | 0.000 |
| 135.700 | 78.540 | 10.090 | 9.130 | 0.750 | 0.140 | 0.056 | 0.000 |
| 124.500 | 74.000 | 9.250 | 8.580 | 0.688 | 0.060 | 0.051 | 0.000 |
| 114.100 | 69.350 | 8.482 | 8.050 | 0.630 | 0.060 | 0.047 | 0.000 |
| 104.700 | 64.740 | 7.778 | 7.540 | 0.578 | 0.060 | 0.043 | 0.000 |
| 95.960 | 60.380 | 7.133 | 7.050 | 0.530 | 0.060 | 0.039 | 0.000 |
| 88.000 | 56.270 | 6.541 | 6.570 | 0.486 | 0.060 | 0.036 | 0.000 |
| 80.700 | 52.420 | 5.998 | 6.110 | 0.446 | 0.060 | 0.033 | 0.000 |
| 74.000 | 48.790 | 5.500 | 5.680 | 0.409 | 0.060 | 0.030 | 0.000 |
| 67.860 | 45.310 | 5.044 | 5.270 | 0.375 | 0.060 | 0.028 | 0.000 |
| 62.230 | 41.970 | 4.625 | 4.880 | 0.344 | 0.060 | 0.026 | 0.000 |
| 57.060 | 38.770 | 4.241 | 4.510 | 0.315 | 0.060 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 11.5 | 40% = | 59.0 | 70% = | 115.5 | 95% = | 233.7 |
| 20% = | 28.0 | 50% = | 76.2 | 80% = | 139.8 | | |
| 30% = | 43.6 | 60% = | 95.2 | 90% = | 181.0 | | |

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# TECHNICAL NOTE

**Date :** 11/05/2007 **Ref. Number :** 13988

**Duration of grinding :** 62 min

**Grinding mill :** 70 % of critical speed

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 57.620 | 3.889 | 6.960 | 0.289 | 0.050 |
| 645.600 | 100.000 | 47.980 | 54.100 | 3.566 | 6.380 | 0.265 | 0.040 |
| 592.000 | 100.000 | 44.000 | 50.760 | 3.270 | 5.840 | 0.243 | 0.030 |
| 542.900 | 100.000 | 40.350 | 47.630 | 2.999 | 5.330 | 0.223 | 0.020 |
| 497.800 | 100.000 | 37.000 | 44.670 | 2.750 | 4.850 | 0.204 | 0.020 |
| 456.500 | 100.000 | 33.930 | 41.860 | 2.522 | 4.400 | 0.187 | 0.020 |
| 418.600 | 100.000 | 31.110 | 39.190 | 2.312 | 3.990 | 0.172 | 0.010 |
| 383.900 | 100.000 | 28.530 | 36.630 | 2.121 | 3.610 | 0.158 | 0.000 |
| 352.000 | 100.000 | 26.160 | 34.180 | 1.945 | 3.260 | 0.145 | 0.000 |
| 322.800 | 100.000 | 23.990 | 31.820 | 1.783 | 2.930 | 0.133 | 0.000 |
| 296.000 | 100.000 | 22.000 | 29.580 | 1.635 | 2.620 | 0.122 | 0.000 |
| 271.400 | 100.000 | 20.170 | 27.480 | 1.499 | 2.330 | 0.111 | 0.000 |
| 248.900 | 100.000 | 18.500 | 25.540 | 1.375 | 2.050 | 0.102 | 0.000 |
| 228.200 | 99.980 | 16.960 | 23.770 | 1.261 | 1.780 | 0.094 | 0.000 |
| 209.300 | 99.890 | 15.560 | 22.160 | 1.156 | 1.520 | 0.086 | 0.000 |
| 191.900 | 99.640 | 14.270 | 20.720 | 1.060 | 1.270 | 0.079 | 0.000 |
| 176.000 | 99.170 | 13.080 | 19.420 | 0.972 | 1.040 | 0.072 | 0.000 |
| 161.400 | 98.400 | 12.000 | 18.230 | 0.892 | 0.830 | 0.066 | 0.000 |
| 148.000 | 97.250 | 11.000 | 17.130 | 0.818 | 0.630 | 0.061 | 0.000 |
| 135.700 | 95.600 | 10.090 | 16.090 | 0.750 | 0.460 | 0.056 | 0.000 |
| 124.500 | 93.470 | 9.250 | 15.080 | 0.688 | 0.300 | 0.051 | 0.000 |
| 114.100 | 90.860 | 8.482 | 14.100 | 0.630 | 0.160 | 0.047 | 0.000 |
| 104.700 | 87.820 | 7.778 | 13.140 | 0.578 | 0.060 | 0.043 | 0.000 |
| 95.960 | 84.430 | 7.133 | 12.210 | 0.530 | 0.060 | 0.039 | 0.000 |
| 88.000 | 80.780 | 6.541 | 11.320 | 0.486 | 0.060 | 0.036 | 0.000 |
| 80.700 | 76.950 | 5.998 | 10.470 | 0.446 | 0.060 | 0.033 | 0.000 |
| 74.000 | 73.020 | 5.500 | 9.670 | 0.409 | 0.060 | 0.030 | 0.000 |
| 67.860 | 69.060 | 5.044 | 8.920 | 0.375 | 0.060 | 0.028 | 0.000 |
| 62.230 | 65.140 | 4.625 | 8.220 | 0.344 | 0.060 | 0.026 | 0.000 |
| 57.060 | 61.310 | 4.241 | 7.570 | 0.315 | 0.060 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 5.7 | 40% = | 32.0 | 70% = | 69.3 | 95% = | 132.3 |
| 20% = | 13.6 | 50% = | 43.1 | 80% = | 86.5 | | |
| 30% = | 22.4 | 60% = | 55.4 | 90% = | 111.3 | | |

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**Date :** 11/05/2007 **Ref. Number :** 13989

**Duration of grinding :** 90 min

**Grinding mill :** 70 % of critical speed

| Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing | Fraction (µm) | % passing |
|---|---|---|---|---|---|---|---|
| 704.000 | 100.000 | 52.330 | 64.840 | 3.889 | 8.540 | 0.289 | 0.030 |
| 645.600 | 100.000 | 47.980 | 61.120 | 3.566 | 7.880 | 0.265 | 0.020 |
| 592.000 | 100.000 | 44.000 | 57.520 | 3.270 | 7.250 | 0.243 | 0.020 |
| 542.900 | 100.000 | 40.350 | 54.080 | 2.999 | 6.650 | 0.223 | 0.020 |
| 497.800 | 100.000 | 37.000 | 50.790 | 2.750 | 6.090 | 0.204 | 0.010 |
| 456.500 | 100.000 | 33.930 | 47.640 | 2.522 | 5.560 | 0.187 | 0.000 |
| 418.600 | 100.000 | 31.110 | 44.620 | 2.312 | 5.070 | 0.172 | 0.000 |
| 383.900 | 100.000 | 28.530 | 41.730 | 2.121 | 4.610 | 0.158 | 0.000 |
| 352.000 | 100.000 | 26.160 | 38.970 | 1.945 | 4.190 | 0.145 | 0.000 |
| 322.800 | 100.000 | 23.990 | 36.330 | 1.783 | 3.790 | 0.133 | 0.000 |
| 296.000 | 100.000 | 22.000 | 33.830 | 1.635 | 3.420 | 0.122 | 0.000 |
| 271.400 | 100.000 | 20.170 | 31.510 | 1.499 | 3.060 | 0.111 | 0.000 |
| 248.900 | 99.990 | 18.500 | 29.370 | 1.375 | 2.720 | 0.102 | 0.000 |
| 228.200 | 99.930 | 16.960 | 27.420 | 1.261 | 2.390 | 0.094 | 0.000 |
| 209.300 | 99.810 | 15.560 | 25.660 | 1.156 | 2.070 | 0.086 | 0.000 |
| 191.900 | 99.630 | 14.270 | 24.080 | 1.060 | 1.770 | 0.079 | 0.000 |
| 176.000 | 99.350 | 13.080 | 22.640 | 0.972 | 1.480 | 0.072 | 0.000 |
| 161.400 | 98.940 | 12.000 | 21.320 | 0.892 | 1.220 | 0.066 | 0.000 |
| 148.000 | 98.330 | 11.000 | 20.080 | 0.818 | 0.980 | 0.061 | 0.000 |
| 135.700 | 97.430 | 10.090 | 18.900 | 0.750 | 0.770 | 0.056 | 0.000 |
| 124.500 | 96.180 | 9.250 | 17.760 | 0.688 | 0.580 | 0.051 | 0.000 |
| 114.100 | 94.500 | 8.482 | 16.650 | 0.630 | 0.420 | 0.047 | 0.000 |
| 104.700 | 92.390 | 7.778 | 15.560 | 0.578 | 0.270 | 0.043 | 0.000 |
| 95.960 | 89.830 | 7.133 | 14.500 | 0.530 | 0.130 | 0.039 | 0.000 |
| 88.000 | 86.870 | 6.541 | 13.490 | 0.486 | 0.040 | 0.036 | 0.000 |
| 80.700 | 83.590 | 5.998 | 12.530 | 0.446 | 0.040 | 0.033 | 0.000 |
| 74.000 | 80.050 | 5.500 | 11.620 | 0.409 | 0.040 | 0.030 | 0.000 |
| 67.860 | 76.320 | 5.044 | 10.770 | 0.375 | 0.040 | 0.028 | 0.000 |
| 62.230 | 72.490 | 4.625 | 9.980 | 0.344 | 0.040 | 0.026 | 0.000 |
| 57.060 | 68.650 | 4.241 | 9.240 | 0.315 | 0.040 | 0.023 | 0.000 |

## Percentiles

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 10% = | 4.6 | 40% = | 27.0 | 70% = | 58.8 | 95% = | 116.9 |
| 20% = | 10.9 | 50% = | 36.2 | 80% = | 73.9 | | |
| 30% = | 19.0 | 60% = | 46.7 | 90% = | 96.5 | | |

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COREM

| SIEVE ANALYSIS | |
|---|---|
| PROJECT | T-881 |
| TITLE | Size distribution for grinding curve |
| TEST OBJECTIVES | |
| SAMPLE | 40 minutes in Rod Mill at 69 rpm |
| TECHNICIAN | Carolyne Lavoie |
| DATE | 2007-13-11 |

| Fraction | | Weight (%) | Cumulative retained (%) | Cumulative passing (%) |
|---|---|---|---|---|
| µm | mesh or inch | | | |
| +300 | 48 | 0.08 | 0.08 | 99.92 |
| +212 | 65 | 0.67 | 0.75 | 99.25 |
| +150 | 100 | 3.57 | 4.32 | 95.68 |
| +106 | 150 | 9.06 | 13.38 | 86.62 |
| +75 | 200 | 17.41 | 30.80 | 69.20 |
| +53 | 270 | 16.87 | 47.67 | 52.33 |
| +45 | 325 | 8.81 | 56.48 | 43.52 |
| +38 | 400 | 6.28 | 62.76 | 37.24 |
| -38 | | 37.24 | 100.00 | (0.00) |
| Total | | 100.00 | | |

$p_{80}$ (µm) = 93.6

COREM

## DISTRIBUTION GRANULOMÉTRIQUE

| | |
|---|---|
| PROJET | T-881 |
| TITRE | Size distribution for grinding curve |
| BUT DE L'ESSAI | |
| ÉCHANTILLON | 62 minutes in Rod Mill at 69 rpm |
| TECHNICIEN(NE) | Patrick Boucher |
| DATE | 2008-04-09 |

| Fraction | | Poids (%) | Cumulatif retenu (%) | Cumulatif passant (%) |
|---|---|---|---|---|
| µm | mailles ou po. | | | |
| +425 | 35 | | | |
| +300 | 48 | 0.10 | 0.10 | 99.90 |
| +212 | 65 | 0.20 | 0.30 | 99.70 |
| +150 | 100 | 1.20 | 1.50 | 98.50 |
| +106 | 150 | 3.30 | 4.80 | 95.20 |
| +75 | 200 | 11.69 | 16.48 | 83.52 |
| +53 | 270 | 17.88 | 34.37 | 65.63 |
| +45 | 325 | 11.09 | 45.45 | 54.55 |
| +38 | 400 | 6.59 | 52.05 | 47.95 |
| -38 | | 47.95 | 100.00 | 0.00 |
| Total | | 100.00 | | |

$p_{80}$ (µm) = 71.1

COREM

| SIEVE ANALYSIS | |
|---|---|
| PROJECT | T-881 |
| TITLE | Size distribution for grinding curve |
| TEST OBJECTIVES | |
| SAMPLE | 90 minutes in Rod Mill at 69 rpm |
| TECHNICIAN | Patrick Boucher |
| DATE | 2008-04-09 |

| Fraction | | Poids (%) | Cumulatif retenu (%) | Cumulatif passant (%) |
|---|---|---|---|---|
| µm | mailles ou po. | | | |
| +300 | 48 | 0.16 | 0.16 | 99.84 |
| +212 | 65 | 0.08 | 0.25 | 99.75 |
| +150 | 100 | 0.82 | 1.07 | 98.93 |
| +106 | 150 | 1.97 | 3.04 | 96.96 |
| +75 | 200 | 5.82 | 8.86 | 91.14 |
| +53 | 270 | 13.95 | 22.81 | 77.19 |
| +45 | 325 | 10.58 | 33.39 | 66.61 |
| +38 | 400 | 8.61 | 42.00 | 58.00 |
| -38 | | 58.00 | 100.00 | 0.00 |
| Total | | 100.00 | | |

$p_{80}$ (µm) = 56.5

COREM

## DISTRIBUTION GRANULOMÉTRIQUE

| | |
|---|---|
| PROJET | T-881 |
| TITRE | Size distribution for grinding curve |
| BUT DE L'ESSAI | |
| ÉCHANTILLON | 110 minutes in Rod Mill at 69 rpm |
| TECHNICIEN(NE) | Patrick Boucher |
| DATE | 2008-04-09 |

| Fraction | | Poids (%) | Cumulatif retenu (%) | Cumulatif passant (%) |
|---|---|---|---|---|
| µm | mailles ou po. | | | |
| +300 | 48 | | | |
| +212 | 65 | 0.08 | 0.08 | 99.92 |
| +150 | 100 | 0.24 | 0.32 | 99.68 |
| +106 | 150 | 1.11 | 1.42 | 98.58 |
| +75 | 200 | 3.64 | 5.06 | 94.94 |
| +53 | 270 | 11.54 | 16.60 | 83.40 |
| +45 | 325 | 10.59 | 27.19 | 72.81 |
| +38 | 400 | 8.54 | 35.73 | 64.27 |
| -38 | | 64.27 | 100.00 | 0.00 |
| Total | | 100.00 | | |

$p_{80}$ (µm) = 47.1

# Appendix D:

# Bond Work Index Results

**COREM**
1180, rue de la Minéralogie, Québec (Québec)  G1N 1X7 Canada
☎ **(418) 527-8211** ● **(418) 527-9188**

| BALL MILL - WORK INDEX | |
|---|---|
| PROJECT | **T-881** |
| TITLE | |
| TEST OBJECTIVES | Work Index |
| SAMPLE | Sample crushed to 10 mesh |
| TECHNICIAN | C.L |
| DATE | 2008-04-08 |

| Cycle | New feed (g) | Revolutions | Undersize (g) 100 Mesh | | | | |
|---|---|---|---|---|---|---|---|
| | | | In product | In feed | In new product | Per mill revolutions | To be ground |
| 1 | 1267.3 | 100 | 465.0 | 290.0 | 175.0 | 1.75 | 72.1 |
| 2 | 465.0 | 146 | 414.8 | 106.4 | 308.4 | 2.11 | 255.7 |
| 3 | 414.8 | 126 | 360.0 | 94.9 | 265.1 | 2.10 | 267.2 |
| 4 | 360.0 | 132 | 365.4 | 82.4 | 283.0 | 2.14 | 279.7 |
| 5 | 365.4 | 129 | 365.7 | 83.6 | 282.1 | 2.19 | 278.5 |
| 6 | 365.7 | 127 | 364.0 | 83.7 | 280.3 | 2.21 | 278.4 |

Cycle 4 to 6 g/Rev 2.18

Circulating load (%) : 247.18

p80 (µm) : 125.3

f80 (µm) : 1265

22.88% minus 100 mesh (Feed)

2.18 per mill revolutions

1267.3 g for 700 mL

Ideal weight (g): 362.1

WI (kWh/metric tonne) : 13.4

# Appendix E:

## Complete Results of Size-by-size Analysis of Flotation Test 6 Products

**COREM**
1180, rue de la Minéralogie, Québec (Québec) G1N 1X7 Canada
☎ **(418) 527-8211** ● **(418) 527-9188**

COREM

**Mass balance over size fraction of flottation cleaner 2 concentrate**

| Product | % Weight | Analysis | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) |
| + 75 µm | 1.81 | 37.90 | 2.63 | 16.5 | 1.77 | 0.1 | 0.10 | 0.1 | < 0.10 | 0.15 | 0.11 | 0.14 | 17.30 | 1.15 | 0.03 | 14.10 | < 0.02 |
| + 53 µm | 9.02 | 20.20 | 1.50 | 8.0 | 1.33 | < 0.05 | 0.07 | 0.0 | < 0.10 | 0.33 | 0.07 | 0.18 | 28.80 | 3.86 | 0.02 | 30.90 | < 0.02 |
| + 45 µm | 20.96 | 13.30 | 1.01 | 5.2 | 0.78 | < 0.05 | < 0.05 | 0.0 | < 0.10 | 0.38 | 0.05 | 0.17 | 31.80 | 6.48 | < 0.02 | 35.90 | < 0.02 |
| -45 µm | 68.21 | 15.10 | 1.03 | 6.3 | 0.46 | < 0.05 | 0.05 | 0.0 | < 0.10 | 0.35 | 0.05 | 0.55 | 29.30 | 8.95 | < 0.02 | 32.40 | < 0.02 |
| **Calculated combined fractions** | 100.00 | 15.6 | 1.1 | 6.4 | 0.63 | 0.0 | 0.04 | 0.0 | 0.00 | 0.35 | 0.05 | 0.43 | 29.56 | 7.83 | 0.00 | 32.67 | 0.00 |
| **Assayed combined fractions** | | 17.8 | 1.1 | 7.4 | 0.67 | 0.0 | 0.05 | 0.0 | 0.02 | 0.34 | 0.06 | 0.48 | 27.81 | 8.01 | 0.01 | 30.22 | 0.01 |

| Product | % Weight | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| + 75 µm | 1.81 | 4.4 | 4.3 | 4.7 | 5.1 | - | - | 4.0 | - | 0.8 | 3.8 | 0.6 | 1.1 | 0.3 | - | 0.8 | - |
| + 53 µm | 9.02 | 11.7 | 12.3 | 11.4 | 19.1 | - | - | 11.4 | - | 8.5 | 11.9 | 3.8 | 8.8 | 4.4 | - | 8.5 | - |
| + 45 µm | 20.96 | 17.9 | 19.3 | 17.0 | 26.0 | - | - | 19.9 | - | 22.7 | 19.8 | 8.3 | 22.5 | 17.3 | - | 23.0 | - |
| -45 µm | 68.21 | 66.0 | 64.0 | 67.0 | 49.9 | - | - | 64.7 | - | 68.0 | 64.5 | 87.3 | 67.6 | 77.9 | - | 67.7 | - |
| Calculated combined fractions | 100.00 | 100.0 | 100.0 | 100.0 | 100.0 | - | - | 100.0 | - | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | - | 100.0 | - |

COREM

**Mass balance over size fraction of flottation test 6 tail**

| Product | % Weight | Analysis | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 (%) | Al2O3 (%) | MgO (%) | CaO (%) | K2O (%) | TiO2 (%) | MnO (%) | P2O5 (%) | Co (%) | Cr (%) | Cu (%) | Fe (%) | Ni (%) | Pb (%) | S (%) | Zn (%) |
| + 150 µm | 0.34 | 31.68 | 15.83 | 19.6 | 1.04 | 1.6 | 0.49 | 0.2 | 0.02 | <0.01 | 0.34 | 0.04 | 13.24 | 0.17 | 0.01 | 0.60 | 0.06 |
| + 106 µm | 1.71 | 33.62 | 15.65 | 20.1 | 1.27 | 1.5 | 0.47 | 0.2 | <0.01 | <0.01 | 0.37 | <0.01 | 12.12 | 0.17 | <0.01 | 0.12 | <0.01 |
| + 75 µm | 3.97 | 43.53 | 10.96 | 18.5 | 4.53 | 0.8 | 0.31 | 0.2 | <0.01 | <0.01 | 0.31 | 0.02 | 9.65 | 0.15 | <0.01 | 0.09 | <0.01 |
| + 53 µm | 12.91 | 49.48 | 8.10 | 17.1 | 6.79 | 0.4 | 0.22 | 0.2 | 0.04 | <0.01 | 0.26 | <0.01 | 8.12 | 0.13 | <0.01 | 0.29 | 0.02 |
| + 45 µm | 10.55 | 51.40 | 7.34 | 16.3 | 7.61 | 0.3 | 0.20 | 0.2 | 0.04 | <0.01 | 0.24 | <0.01 | 7.70 | 0.12 | <0.01 | 0.37 | 0.02 |
| + 38 µm | 10.81 | 51.44 | 7.56 | 16.3 | 7.68 | 0.3 | 0.21 | 0.2 | 0.04 | <0.01 | 0.24 | <0.01 | 7.73 | 0.13 | <0.01 | 0.31 | 0.01 |
| + 32 µm | 5.71 | 52.04 | 7.17 | 16.1 | 8.24 | 0.3 | 0.20 | 0.2 | 0.06 | <0.01 | 0.23 | <0.01 | 7.56 | 0.12 | <0.01 | 0.32 | 0.01 |
| -32 µm | 53.99 | 50.17 | 7.68 | 15.8 | 7.38 | 0.3 | 0.23 | 0.2 | 0.07 | <0.01 | 0.23 | <0.01 | 8.79 | 0.31 | 0.02 | 0.31 | 0.04 |
| **Calculated combined fractions** | 100.00 | 49.8 | 8.0 | 16.3 | 7.17 | 0.3 | 0.23 | 0.2 | 0.05 | 0.00 | 0.24 | 0.00 | 8.51 | 0.23 | 0.01 | 0.30 | 0.03 |
| **Assayed combined fractions** | | 49.5 | 8.0 | 16.1 | 7.19 | 0.4 | 0.23 | 0.2 | 0.06 | <0.01 | 0.23 | <0.01 | 8.48 | 0.22 | <0.01 | 0.35 | 0.01 |

| Product | % Weight | Distribution (%) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SiO2 | Al2O3 | MgO | CaO | K2O | TiO2 | MnO | P2O5 | Co | Cr | Cu | Fe | Ni | Pb | S | Zn |
| + 150 µm | 0.34 | 0.2 | 0.7 | 0.4 | 0.1 | 1.7 | 0.7 | 0.4 | - | - | 0.5 | - | 0.5 | 0.3 | - | 0.7 | - |
| + 106 µm | 1.71 | 1.2 | 3.4 | 2.1 | 0.3 | 7.4 | 3.5 | 1.5 | - | - | 2.6 | - | 2.4 | 1.3 | - | 0.6 | - |
| + 75 µm | 3.97 | 3.5 | 5.5 | 4.5 | 2.5 | 9.0 | 5.4 | 3.7 | - | - | 5.2 | - | 4.5 | 2.6 | - | 1.2 | - |
| + 53 µm | 12.91 | 12.8 | 13.1 | 13.6 | 12.2 | 15.8 | 12.7 | 12.5 | - | - | 14.2 | - | 12.3 | 7.5 | - | 12.2 | - |
| + 45 µm | 10.55 | 10.9 | 9.7 | 10.6 | 11.2 | 9.7 | 9.4 | 10.0 | - | - | 10.4 | - | 9.6 | 5.7 | - | 12.8 | - |
| + 38 µm | 10.81 | 11.2 | 10.3 | 10.8 | 11.6 | 9.7 | 9.8 | 10.5 | - | - | 11.0 | - | 9.8 | 6.0 | - | 11.1 | - |
| + 32 µm | 5.71 | 6.0 | 5.2 | 5.6 | 6.6 | 4.5 | 5.0 | 5.6 | - | - | 5.5 | - | 5.1 | 3.1 | - | 5.9 | - |
| -32 µm | 53.99 | 54.3 | 52.2 | 52.4 | 55.6 | 42.3 | 53.5 | 55.9 | - | - | 50.7 | - | 55.8 | 73.6 | - | 55.5 | - |
| Calculated combined fractions | 100.00 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 | 100.0 | 0.0 | 100.0 | 100.0 | 0.0 | 100.0 | 0.0 |

# Appendix F:

## Memorandum on Size-by-size Mineralogical Study of Test 6 Products

**COREM**
1180, rue de la Minéralogie, Québec (Québec) G1N 1X7 Canada
☎ **(418) 527-8211** ● **(418) 527-9188**

# Preliminary Results of Mineralogy Observations on Cleaner and Scavenger Concentrate from Lac Rocher Ore

## Introduction

The following results are a summary of the SEM and optical microscope observations performed on two concentrates from flotation of Lac Rocher ore:

- Cleaner concentrate #2 from flotation test #6
- Scavenger concentrate #2 from flotation test #6

Both samples were sieved on 200, 270 and 325 mesh. Each size fraction was studied separately.

## Results

- Figures 1 and 2 show pentlandite associations with gangue, chalcopyrite and pyrrhotite in the cleaner and scavenger concentrate. More than 90% of pentlandite is either liberated or in exsolution in pyrrhotite.

- Figures 3 and 4 show the distribution of associated pentlandite between different degrees of liberation classes. A vast majority of the associated pentlandite is liberated at 50% or more for both concentrates.

- Table 1 shows the increasing pentlandite liberation with decreasing size class for cleaner 2 and scavenger 2 concentrates. The increase in pentlandite liberation from the whole sample to the –325 mesh fraction only is low, going from 74 to 79% for the cleaner concentrate and from 61 to 64% for the scavenger concentrate.

- The optical observation has shown that some pyrite (in the order of 10%) is present in the cleaner concentrate. However, it is almost absent from the scavenger concentrate (< 0.1%).

**Conclusions**

Considering these results, we can conclude that:

- The pentlandite is well liberated and no further grinding should be done on the ore. This is also confirmed by the mass balance over the main elements assayed in different size classes of the scavenger tail presented in Table 2. It shows that most of the pentlandite in the reject is in the fine fraction (-32 microns). Use of a slightly coarser grind could even be beneficial.
- Fine particles of pentlandite have slower flotation kinetics. This could explain the higher grade of pentlandite in the –32 um fraction of the reject than in the coarser fractions. Thus increasing flotation time could be beneficial for the overall Ni recovery.
- Liberated pyrite is present in cleaner concentrate and not in the scavenger concentrate, showing that it is probably present because of true flotation (as opposed to entrainment). Increasing the pH (for instance above 11) could help depress the pyrite found in cleaner concentrate.
- Liberated gangue with high MgO content is present in both scavenger and cleaner concentrates. Addition of CMC in the rougher should help depress it and increase overall Ni and Cu grade.

**Recommandations**

For the upcomming flotation test, the following modifications are suggested to improve flowsheet of flotation test 6.

1. Flotation time should be increased by extending rougher and scavenger phases or adding of scavenger stages.

2. Carboxy methyl cellulose (CMC) should be added before the rougher stage, after preflotation, in order to depress magnesium containing gangue.
3. Test should be performed with a pH over 11 during cleaning in order to prevent dixanthogen formation and thus pyrite flotation.

In the next test, it is suggested to use modifications 1 and 2 only to assess the effect of CMC on the flotation. Increase of pH of cleaning stage could be tested in later tests.

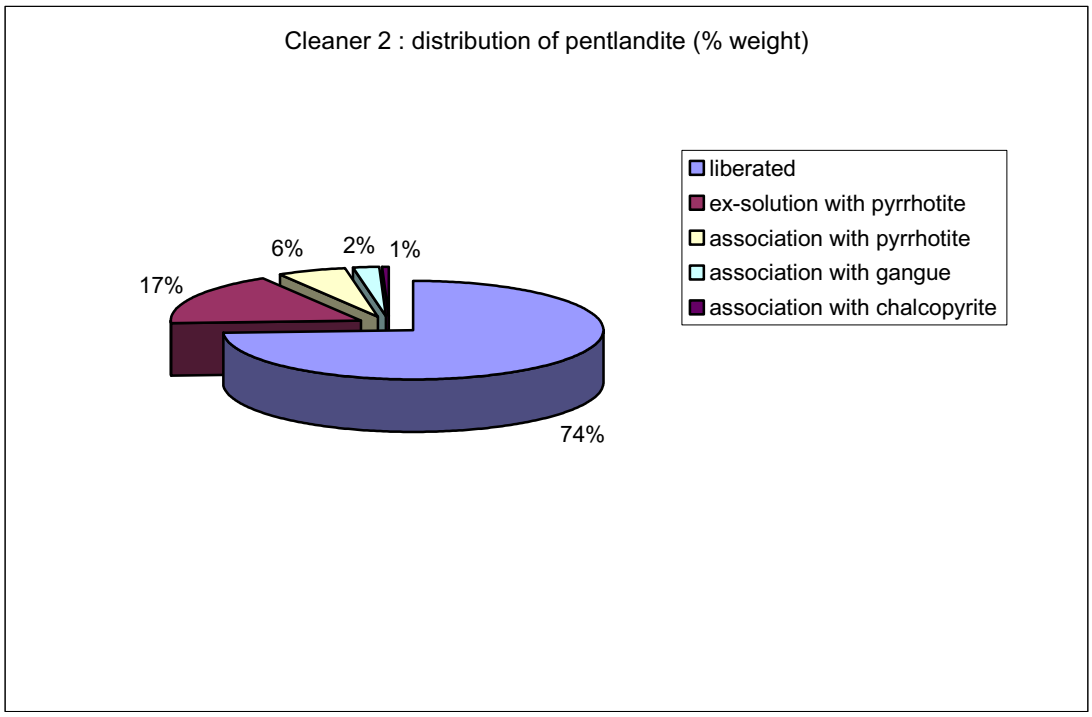



**Figure 1: Pentlandite associations in test #6 cleaner 2 concentrate sample**

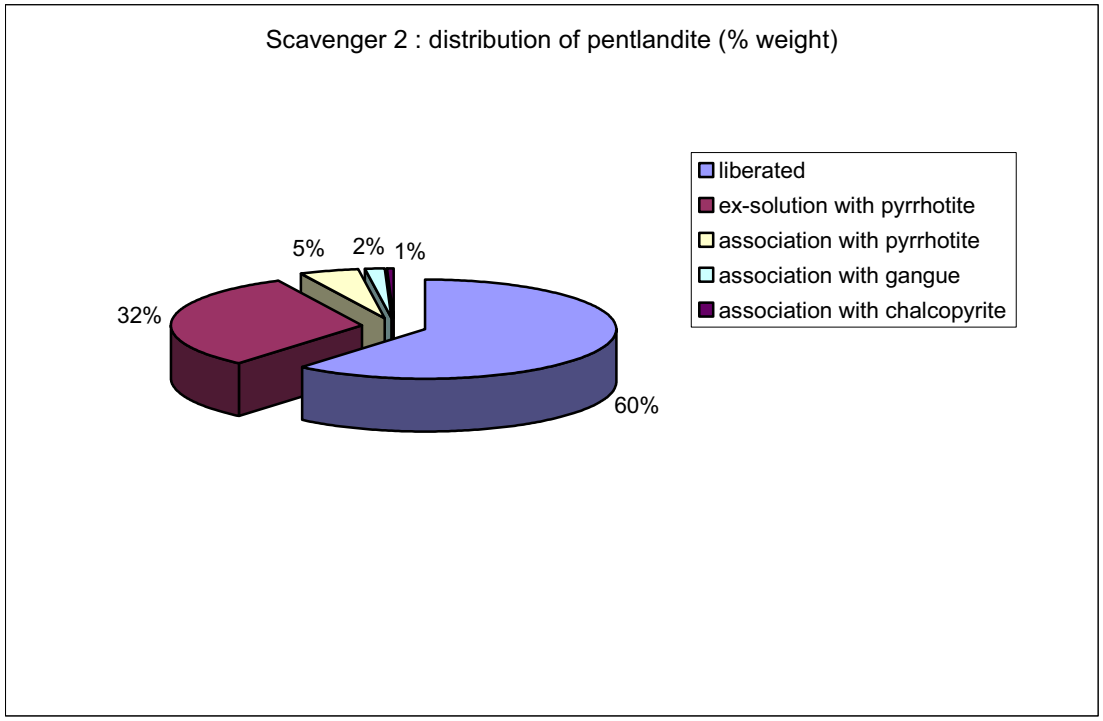



**Figure 2: Pentlandite associations in test #6 scavenger 2 concentrate sample**

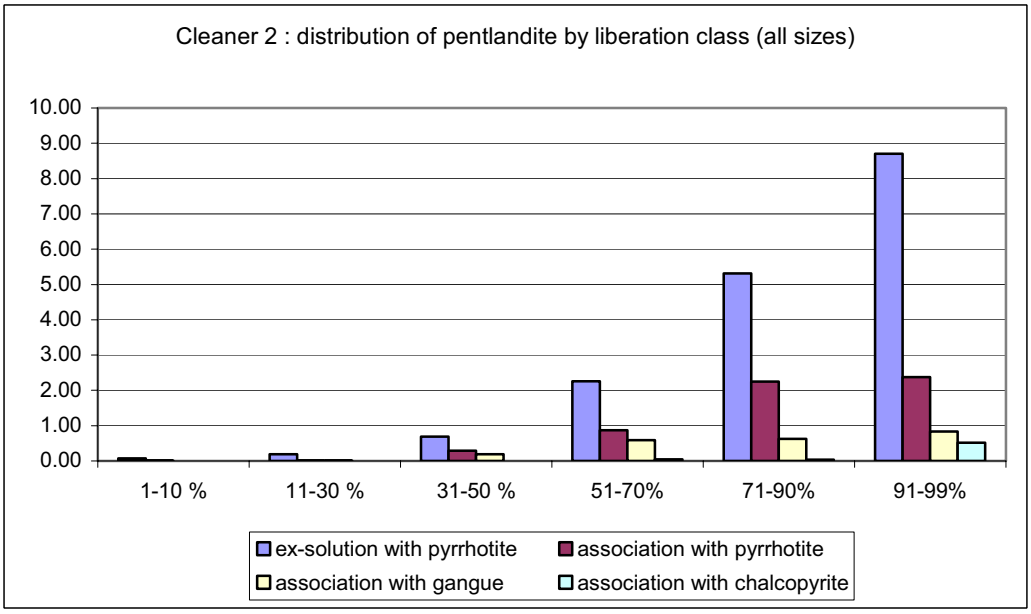



**Figure 3: Distribution of pentlandite according to its degree of liberation class in cleaner 2 concentrate**

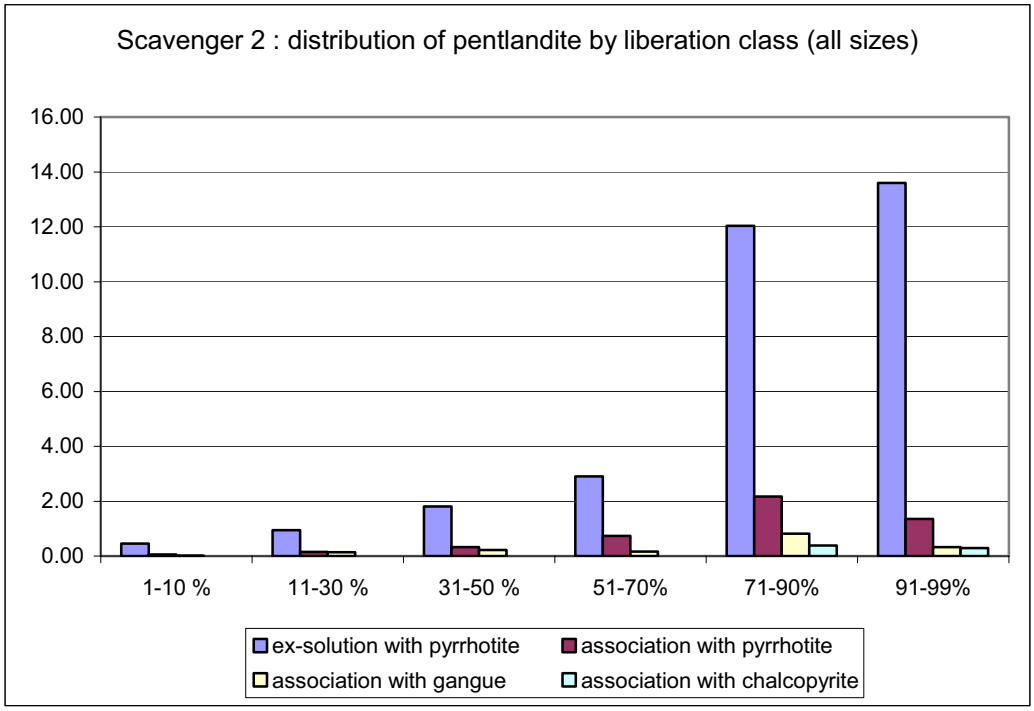



**Figure 4: Distribution of pentlandite according to its degree of liberation class in scavenger 2 concentrate**

**Table 1: Degree of liberation for decreasing class size for cleaner 2 and scavenger 2 concentrate**

| | Cleaner 2 | Scavenger 2 |
|---|---|---|
| Total sample | 74.1 | 61.1 |
| -200M | 74.3 | 61.6 |
| -270M | 76.1 | 62.9 |
| -325M | 79.0 | 64.1 |

**Table 2: Mass balance of elements in the different size classes of test 6 flotation tail**

| Product | % Weight | Analysis | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | $SiO_2$ | $Al_2O_3$ | MgO | CaO | $K_2O$ | Fe | Ni | S |
| | | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| + 150 µm | 0.34 | 31.68 | 15.83 | 19.6 | 1.04 | 1.6 | 13.24 | 0.17 | 0.60 |
| + 106 µm | 1.71 | 33.62 | 15.65 | 20.1 | 1.27 | 1.5 | 12.12 | 0.17 | 0.12 |
| + 75 µm | 3.97 | 43.53 | 10.96 | 18.5 | 4.53 | 0.8 | 9.65 | 0.15 | 0.09 |
| + 53 µm | 12.91 | 49.48 | 8.10 | 17.1 | 6.79 | 0.4 | 8.12 | 0.13 | 0.29 |
| + 45 µm | 10.55 | 51.40 | 7.34 | 16.3 | 7.61 | 0.3 | 7.70 | 0.12 | 0.37 |
| + 38 µm | 10.81 | 51.44 | 7.56 | 16.3 | 7.68 | 0.3 | 7.73 | 0.13 | 0.31 |
| + 32 µm | 5.71 | 52.04 | 7.17 | 16.1 | 8.24 | 0.3 | 7.56 | 0.12 | 0.32 |
| -32 µm | 53.99 | 50.17 | 7.68 | 15.8 | 7.38 | 0.3 | 8.79 | 0.31 | 0.31 |
| Calculated combined fractions | 100.00 | 49.8 | 8.0 | 16.3 | 7.17 | 0.3 | 8.51 | 0.23 | 0.30 |
| Assayed combined fractions | | 49.5 | 8.0 | 16.1 | 7.19 | 0.4 | 8.48 | 0.22 | 0.35 |

| Product | % Weight | Distribution | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | $SiO_2$ | $Al_2O_3$ | MgO | CaO | $K_2O$ | Fe | Ni | S |
| | | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| + 150 µm | 0.34 | 0.2 | 0.7 | 0.4 | 0.1 | 1.7 | 0.5 | 0.3 | 0.7 |
| + 106 µm | 1.71 | 1.2 | 3.4 | 2.1 | 0.3 | 7.4 | 2.4 | 1.3 | 0.6 |
| + 75 µm | 3.97 | 3.5 | 5.5 | 4.5 | 2.5 | 9.0 | 4.5 | 2.6 | 1.2 |
| + 53 µm | 12.91 | 12.8 | 13.1 | 13.6 | 12.2 | 15.8 | 12.3 | 7.5 | 12.2 |
| + 45 µm | 10.55 | 10.9 | 9.7 | 10.6 | 11.2 | 9.7 | 9.6 | 5.7 | 12.8 |
| + 38 µm | 10.81 | 11.2 | 10.3 | 10.8 | 11.6 | 9.7 | 9.8 | 6.0 | 11.1 |
| + 32 µm | 5.71 | 6.0 | 5.2 | 5.6 | 6.6 | 4.5 | 5.1 | 3.1 | 5.9 |
| -32 µm | 53.99 | 54.3 | 52.2 | 52.4 | 55.6 | 42.3 | 55.8 | 73.6 | 55.5 |

# Appendix B

Mr. Chris Wagg's Memorandum

Composite Sample Preparation, Representativeness and Shipment to Corem

## *Appendix B Mr. Cris Wagg's Memorandum: Composite Sample Preparation, Representativeness and Shipment to Corem*

***Note to the reader: the following memo was sent by its author to Normand Grégoire, Eng. (Roche Ltd) by Email, Friday February 22, 2008 (12:08 hr).***

**Normand Grégoire, ing. / Eng.**
Chargé de projet / Project Manager
**Roche Itée, Groupe-conseil / Roche Ltd, Consulting Group**
585, boulevard Charest Est, 5e étage
Québec, Québec, Canada G1K 3J2
tél.: 418.654.9696 poste / ext.: 6107
téléc. / fax: 418.654.9699

February 22, 2008

Re: Chain of custody for the Lac Rocher composite metallurgical sample submitted to Corem.

Monsieur Gregoire,

The 2006 diamond drilling program at the Victory Nickel Inc. Lac Rocher project was conducted under the direct supervision of Mr. Ted Goettel, P.Geo of Sherbrooke Quebec and myself during July. We were assisted during this period by Mr. Serge Bellehumeur, an employee of Services Exploration enr. of Rouyn-Noranda.

Either Mr. Goettel or I personally examined, logged, and selected the intervals to be cut for analytical testing following delivery to our camp by the Orbit Diamond Drilling Ltee drillcrew at the end of each shift. Mr. Bellehumeur saw-cut the sampled intervals of NQ diameter drillcore under direct supervision, and then personally delivered the bagged and sealed samples periodically to Lab Expert in Rouyn.

Following the completion of the program, the cross-piled drillcore was transported using a 5-ton rental truck to the security-gated site of the Copper Rand Mine near Chibougamau Quebec for permanent storage, where it was again cross-piled on forklift pallets and remained undisturbed until my arrival to remove portions of selected holes which comprise the metallurgical sample which Corem received.

Upon my arrival at the minesite and following unstacking of the piled core, I found the samples/intervals required for the composite to be in an acceptable state- little shuffled due to transport over rough roads, sample tags and footage blocks in their proper places; and had no difficulty in determing the start and endpoints of the samples/intervals which I sought.

Individual saw-cut samples were plastic bagged, indelible-marker numbered, and sealed so as to represent the same intervals which had previously been submitted to Lab Expert (such that individual sample intervals might have been reanalyzed for comparison to the numbers generated previously for the same core interval by Lab Expert). From my invoicing records:

Footage-labeled individual samples were numbered to correspond to the analytical "missing half" of previously analysed core which each represents, and packaged into two temporary shipping containers which were left in the care of Normand Lecuyer P.Eng, awaiting a choice of facility where the material will be sent for testing.

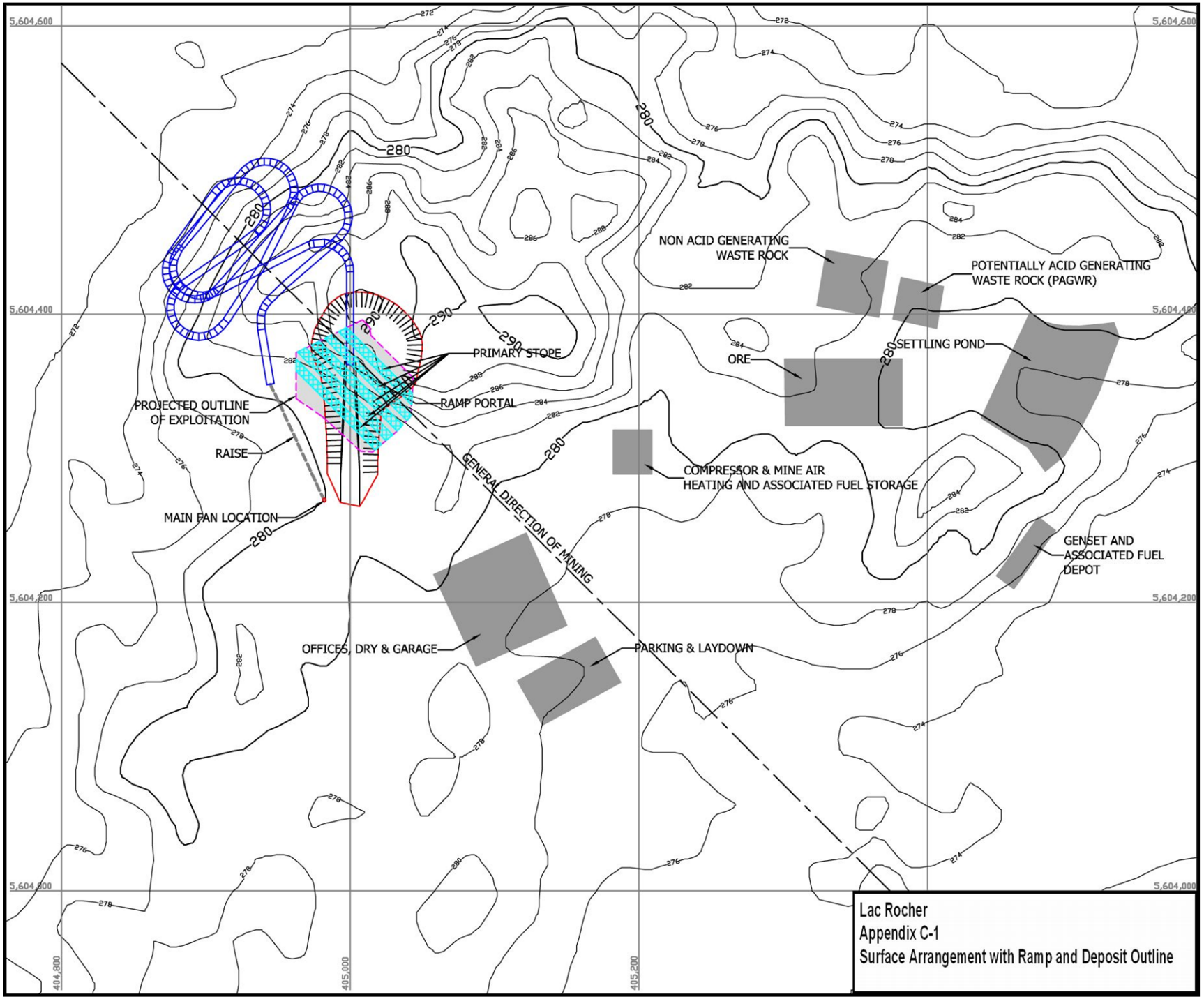
Each consecutive series from within a single drillhole were grouped together into sturdy rice bags and again sealed so that four half-filled rice bags resulted-each numbered with the drillhole and depth interval(s) contained therein. Four large rice bags were then used to double bag the selected material into two parcels for shipping purposes, each containing two drillhole intersections. Although no “tamper-proof” seals were employed during the process, I do not believe there was either opportunity or incentive for anyone to augment either the material or the grade of the materials selected and shipped to the Corem offices.

The selected materials were left at the Campbell Resources minesite May 10th 2007, within a locked up unused core shack building, under the care of Mr. Normand Lecuyer, P.Eng., who subsequently arranged for shipping to the Corem offices by commercial carrier. I am unaware of which specific carrier was utilized.

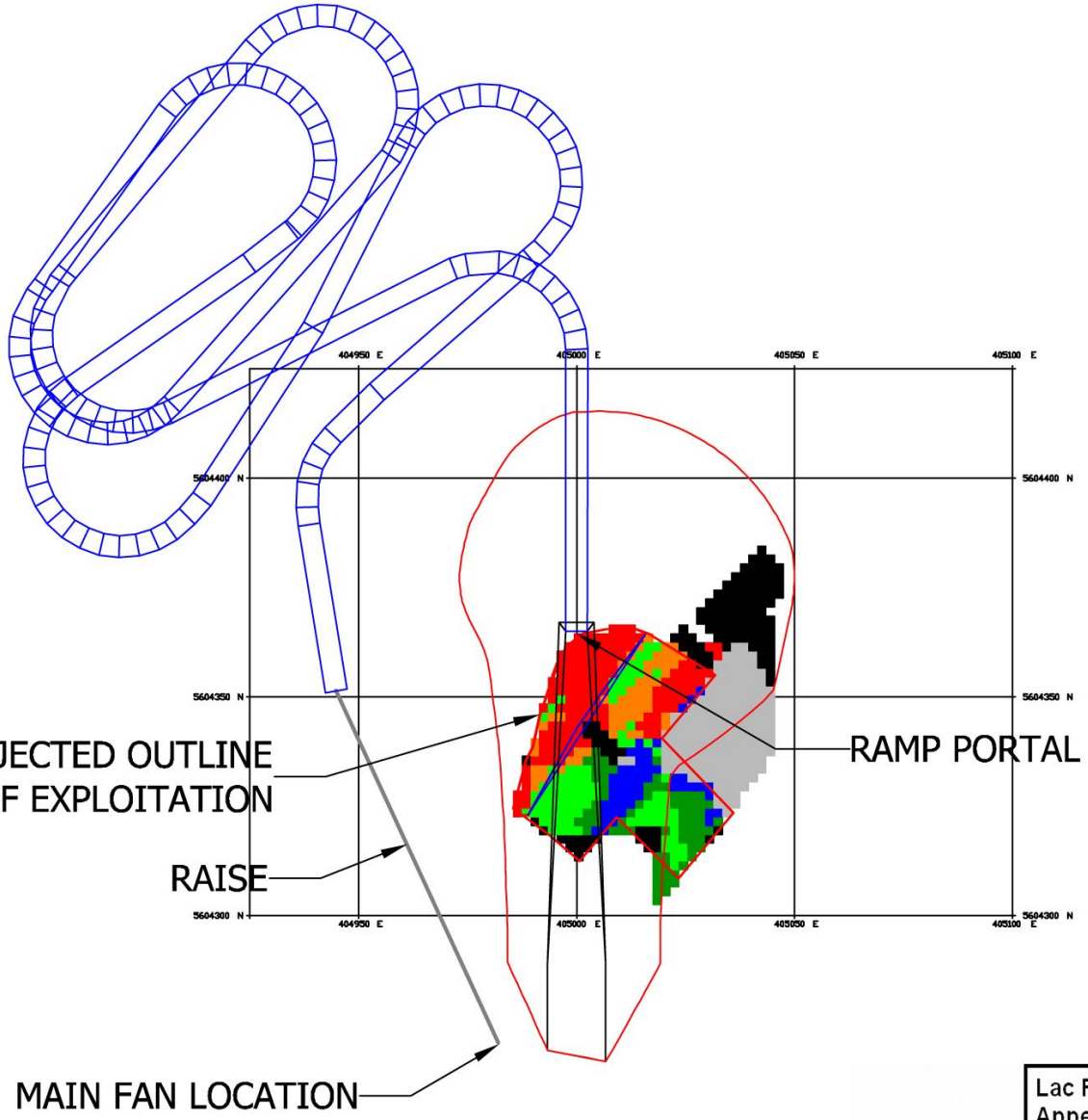
On behalf of Victory Nickel Inc., Christopher A. Wagg, P.Geo. APGO #-0947
February 22, 2008

# Appendix C

Typical Mine Plan and Sections


5,604,600
5,604,400
5,604,200
5,604,000
404,800
405,000
405,200
NON ACID GENERATING WASTE ROCK
POTENTIALLY ACID GENERATING WASTE ROCK (PAGWR)
SETTLING POND
ORE
PRIMARY STOPE
RAMP PORTAL
PROJECTED OUTLINE OF EXPLOITATION
RAISE
MAIN FAN LOCATION
GENERAL DIRECTION OF MINING
COMPRESSOR & MINE AIR HEATING AND ASSOCIATED FUEL STORAGE
GENSET AND ASSOCIATED FUEL DEPOT
OFFICES, DRY & GARAGE
PARKING & LAYDOWN
Lac Rocher
Appendix C-1
Surface Arrangement with Ramp and Deposit Outline

# LAC ROCHER PROJECT

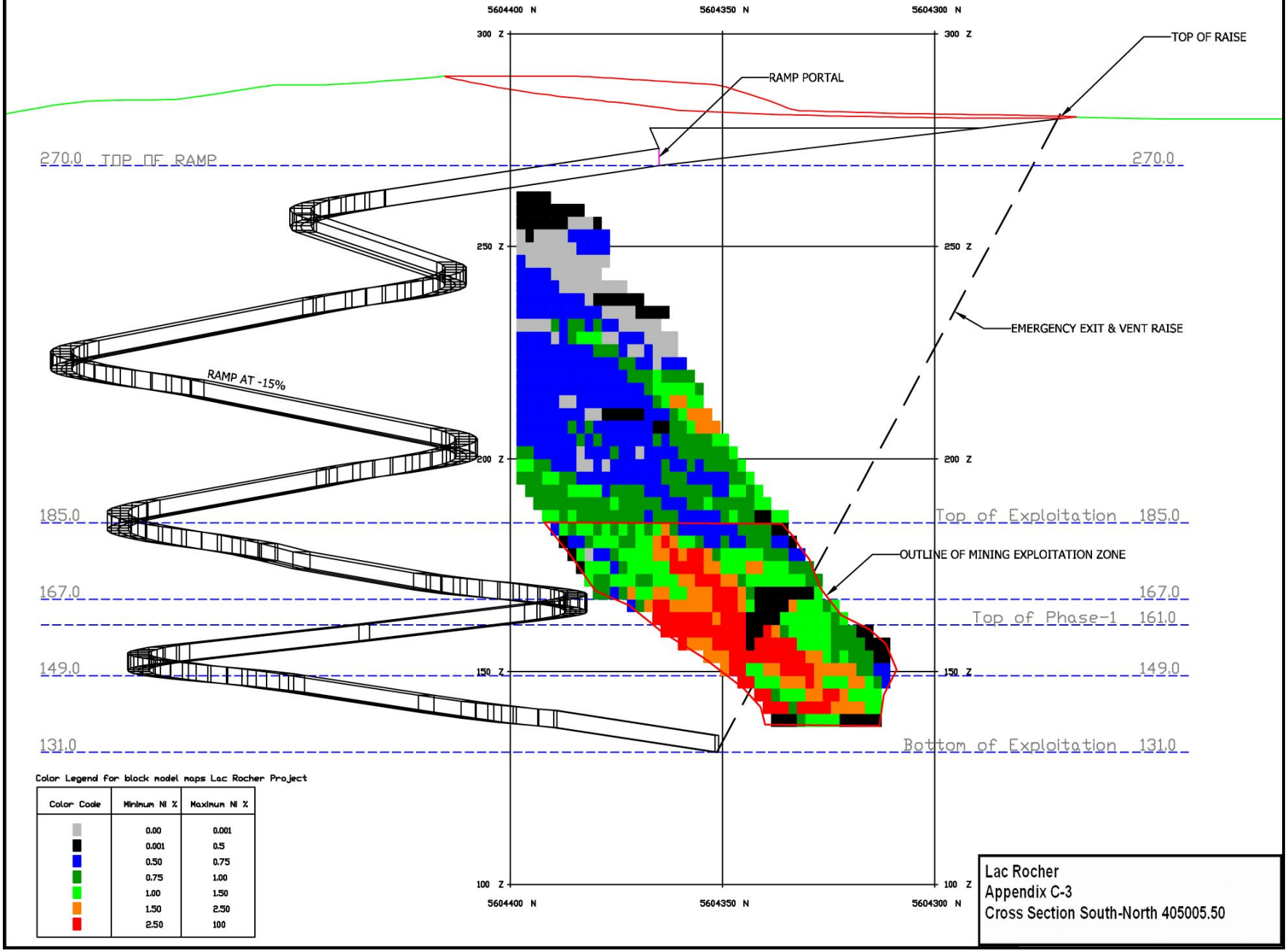



Color Legend for block model maps Lac Rocher Project

| Color Code | Minimum Ni % | Maximum Ni % |
|---|---|---|
| | 0.00 | 0.001 |
| | 0.001 | 0.5 |
| | 0.50 | 0.75 |
| | 0.75 | 1.00 |
| | 1.00 | 1.50 |
| | 1.50 | 2.50 |
| | 2.50 | 100 |

Lac Rocher
Appendix C-2
Block Model Plan at Elevation 159.5 m

# LAC ROCHER PROJECT

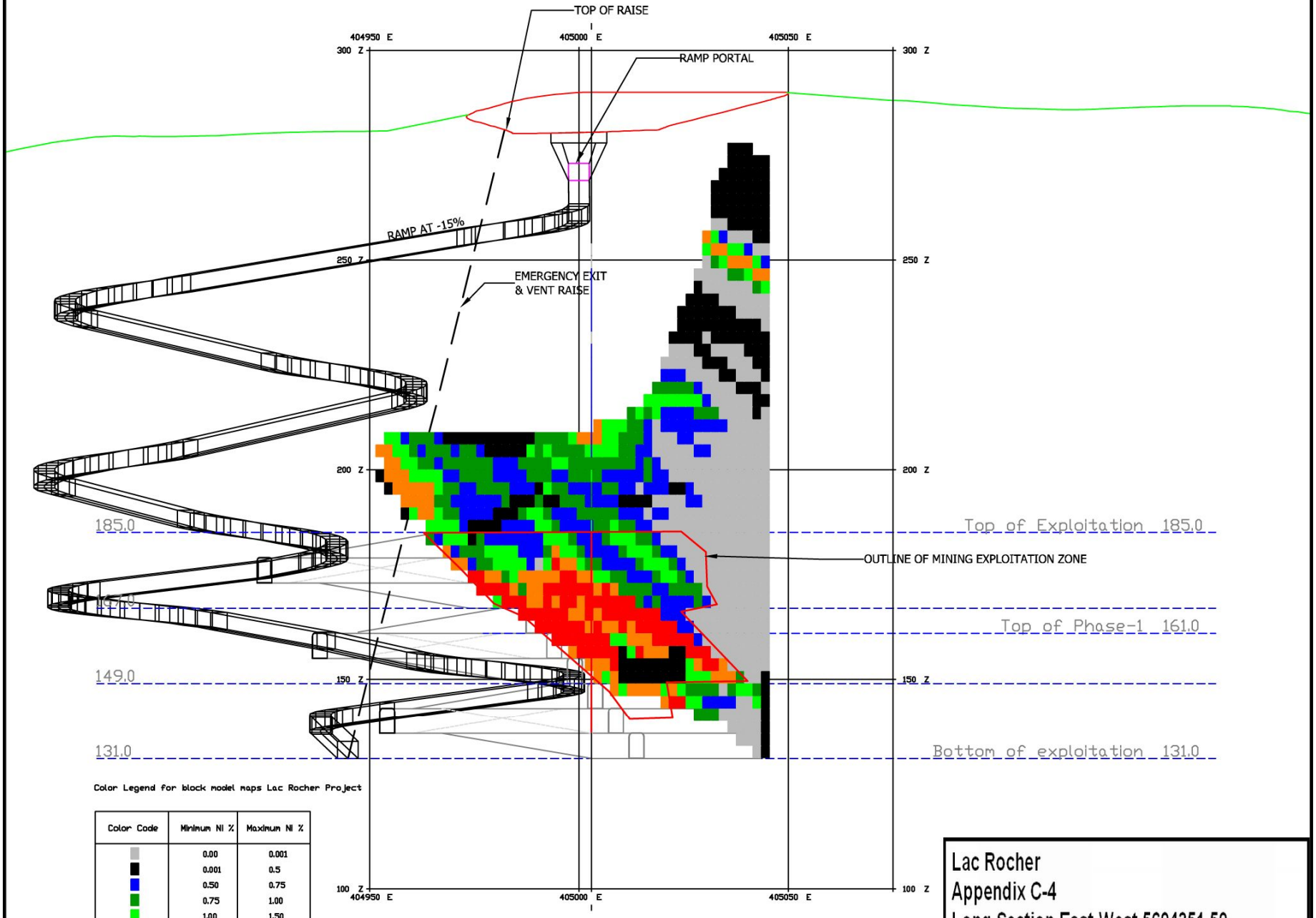



Color Legend for block model maps Lac Rocher Project

| Color Code | Minimum Ni % | Maximum Ni % |
|---|---|---|
| | 0.00 | 0.001 |
| | 0.001 | 0.5 |
| | 0.50 | 0.75 |
| | 0.75 | 1.00 |
| | 1.00 | 1.50 |
| | 1.50 | 2.50 |
| | 2.50 | 100 |

Lac Rocher
Appendix C-3
Cross Section South-North 405005.50

# LAC ROCHER PROJECT




Color Legend for block model maps Lac Rocher Project

| Color Code | Minimum Ni % | Maximum Ni % |
|---|---|---|
| | 0.00 | 0.001 |
| | 0.001 | 0.5 |
| | 0.50 | 0.75 |
| | 0.75 | 1.00 |
| | 1.00 | 1.50 |
| | 1.50 | 2.50 |
| | 2.50 | 100 |

Lac Rocher
Appendix C-4
Long Section East-West 5604351.50