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VALE INCO LIMITED

EXTERNAL AUDIT OF MINERAL RESERVES

VOLUME 2, SECTION 1

ONTARIO OPERATIONS

Submitted to:
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Mississauga, Ontario
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REPORT

Project Number: 10-1117-0032 Phase 1000

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Golder Associates

Executive Summary

Golder Associates Ltd.'s (Golder) Competent Persons, Greg Greenough, P.Geo., and Kevin Beauchamp, P.Eng., have visited the Vale Ontario Operations Project from July 5 to 9, 2010 and validated that part of the mineral resource that is the basis for the following Mineral Reserve estimate as at June 30, 2010 for the Ontario Operations.

During the site visit they inspected mining operations, interviewed personnel and gathered information required to evaluate the appropriateness of the data and methodology used to estimate the resources and reserves. A list of people contacted for this study includes:

- Steve Lowen – Principal MRMR Geological Engineer
- Lee Weitzel – Manager – Business Planning
- Chris Davis – Manager – Mines Geology
- Trevor Courchesne – Chief Engineer - Business Planning Coleman, Creighton and Totten Mines Tom Corkal – Chief Engineer - Business Planning North, Stobie and Garson Mines
- Richard Jundis – Senior Mine Engineer
- Scott Jeffrey – Chief Geologist – Design and Evaluation

This study includes a review of technical reports, memoranda and supporting technical information obtained from Vale. Reports on previous internal and external technical reviews and audits were also made available to Golder (e.g., an independent audit of Garson Deep by SRK Consulting carried out in August, 2009).

The mineral reserve estimates provided to Golder were expected to conform to the requirements of the Securities Exchange Commission's Industry Guide 7 and to Canadian National Instrument (NI) 43-101 using specific terminology from CIM (2004). No exceptions were found to these requirements.

The mineral reserve statement at June 30, 2010 for the Vale was audited by Golder. The mineral reserve audited by Golder was based on the mineral resource models and was prepared using costs, optimisation, mine design and scheduling practices that are appropriate. Golder accepts the procedure adopted to convert the mineral resource into a mineral reserve. The numbers are appropriate for the purpose of public reporting in that they provide an acceptable prediction of the available mineral reserves. The tonnes and grades are reported at an appropriate economic cut-off grade based on documented costs and prices.

The following table with the mineral reserve figures are provided at the appropriate level of precision for public reporting.

Ontario Operations Mineral Reserves June 30, 2010

Operating Mines	Class	Tonnes	%Cu	% Ni	%Co	Pt (g/tonne)	Pd (g/tonne)	Au (g/tonne)
C.C. North	Proven	10,940,921	1.07	1.03	0.04	0.7	0.7	0.3
	Probable	15,209,383	1.06	0.89	0.03	0.9	0.9	0.4
	Total	26,150,304	1.06	0.95	0.03	0.8	0.8	0.4
C.C. South	Proven	4,955,348	1.36	1.11	0.03	1.1	1.0	0.4
	Probable	8,199,547	1.50	1.34	0.04	1.2	1.6	0.5
	Total	13,154,895	1.45	1.25	0.04	1.2	1.4	0.5
Creighton #9	Proven	6,408,941	2.36	2.27	0.05	0.7	0.7	0.2
	Probable	4,402,491	1.66	1.91	0.04	0.6	0.7	0.2
	Total	10,811,432	2.06	2.10	0.04	0.7	0.7	0.2
Stobie/Frood	Proven	24,850,044	0.65	0.69	0.03	0.3	0.3	0.1
	Probable	8,201,578	0.70	0.72	0.03	0.3	0.3	0.1
	Total	33,051,622	0.66	0.70	0.03	0.3	0.3	0.1
Garson	Proven	6,156,020	1.26	1.71	0.06	0.6	0.7	0.3
	Probable	523,572	0.82	1.17	0.05	0.4	0.3	0.2
	Total	6,679,592	1.22	1.67	0.06	0.6	0.7	0.2
Coleman	Proven	15,805,749	2.87	1.62	0.04	1.0	1.7	0.5
	Probable	2,579,037	5.34	1.10	0.01	4.3	6.4	1.4
	Total	18,384,786	3.18	1.53	0.04	1.5	2.4	0.7
Totten	Proven							
	Probable	7,896,820	2.07	1.47	0.04	2.1	2.1	0.8
	Total	7,896820	2.07	1.47	0.04	2.1	2.1	0.8
Ellen	Proven	400,975	0.45	1.00	0.03	0.1	0.1	0.0
	Probable							
	Total	400,975	0.45	1.00	0.03	0.1	0.1	0.0
Ontario Operations	**Proven**	**69,517,998**	**1.48**	**1.22**	**0.04**	**0.7**	**0.8**	**0.3**
	Probable	**47,012,428**	**1.53**	**1.15**	**0.03**	**1.2**	**1.4**	**0.5**
	Total	**116,530,426**	**1.50**	**1.19**	**0.04**	**0.9**	**1.0**	**0.4**

Significant Opinions

- ***Potential post Labour Dispute Issues: Engagement and productivity of the Steelworkers Local 6500 employees may be affected as a result of the long and contentious labour dispute. Ongoing labour relations may result in lower than expected performance of baseline business.***
- ***The resource block modelling methods and factors for mining recovery and dilution employed at the Ontario Operations are completed to accepted industry standards and appropriate for mineral reserve reporting.***
- ***Geotechnical issues are likely to persist at the mines in the Ontario Operations. Furthermore, orebodies at greater depth have an increased likelihood of issues with regard to mining recovery, productivity and mining costs. However, it is the opinion of the QP that the ground control programs at the Ontario Operations have an established track record in addressing these geotechnical issues.***
- ***The Ontario Operations is required to meet proposed government regulations on sulphur dioxide emissions reduction. Economically and technically feasible solutions for reducing emissions will be required to prevent closure of the smelter and refinery, or a significant reduction in plant throughput.***

Table of Contents

TABLES

FIGURES

1.0 ONTARIO OPERATIONS

1.1 Location

The Vale Limited (Vale) Ontario Operations operating mines, non-operating mines and undeveloped properties are located in the Sudbury Basin of Ontario (Figure 1-1).

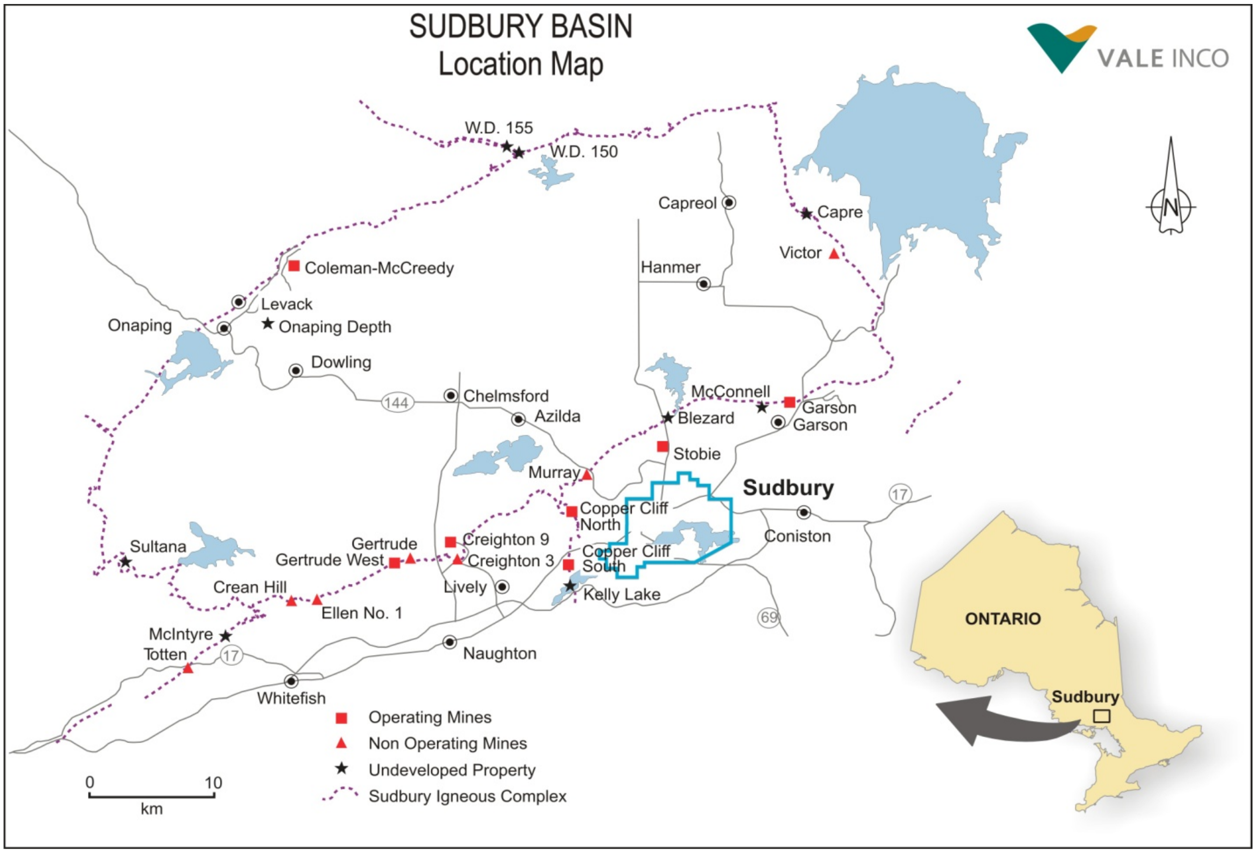

Figure 1-1: Location of Ontario Operations 2009 Properties.

1.2 Ownership

Vale owns 100% of the Ontario Operations.

1.3 Land Tenure and Mining Rights

In Sudbury, Ontario, Vale holds mining rights, surface rights, mining licenses of occupation and unpatented mining claims granted to it by the Province of Ontario. The following represents a description of each of these rights.

Patented Mining and Surface Rights

Vale owns approximately 82,085 hectares of patented mining rights and approximately 60,002 hectares of patented surface rights, which includes a combination of approximately 1,198 hectares of mining and surface rights co-owned with other parties. Mining rights are rights to exploit and extract minerals on, in or under the land, and surface rights are rights to use the surface of the land. These rights remain in effect so long as Vale owns the land to which these rights apply.

Mining and Surface Rights on Lands Leased to Vale

Vale holds approximately 14,116 hectares of land leased from the Province of Ontario. These leased lands, which include a combination of mining and surface rights, are leased for either 10 or 21 years. Annual rentals of CDN $3.00 per hectare (for a total annual rental of CDN $42,348) are paid to the Province to keep the leases in good standing. Based upon Golder's experience in renewing similar leases, problems are not expected in obtaining renewals of the leases covering any of the land noted above since the only requirement for renewal is payment of a nominal renewal fee. Four leases come up for renewal in 2010. These leases represent claim blocks comprised of 1 to 7 units situated in Norman Township west of the past producing Whistle Mine. These four leases do not contain mineral reserves or mineral resources at present.

Mining Licenses of Occupation

Vale holds licenses of occupation covering approximately 2,939 hectares in Ontario of which approximately 17 hectares are held jointly with other parties. These mining licenses of occupation allow Vale to use the land in the manner specified in each license, including the right to dig, excavate and remove ores and minerals from and under the land. These licenses are revocable by the Province of Ontario on 30 days prior notice. Annual rentals of CDN $5.00 per hectare (for a total annual rental of CDN $14,695) are paid to the province to keep these mining licenses of occupation in good standing.

Unpatented Mining Claims

Vale currently holds unpatented mining claims covering approximately 8,455 hectares in Ontario of which approximately 6,596 hectares are held jointly with other parties. Unpatented mining claims are issued by the province for the purpose of exploring the mineral potential and require the performance of assessment work to continue holding the claims.

The estimated mineral reserves and mineral resources reported in this document are contained on patented mining rights owned by Vale.

1.4 Infrastructure

The processing facilities in Sudbury include a concentrator, a combined nickel and copper smelter, matte processing facilities, a carbonyl nickel refinery, a copper anode casting plant, a sulphuric acid plant and a sulphur dioxide liquefaction plant. The copper refinery was closed in 2006.

Supporting Ontario Operations infrastructure includes a tailings impoundment area, a slag disposal area and an oxygen plant. A portion of the production is sent to a carbonyl nickel refinery in Clydach, Wales. An electro cobalt refinery and precious metals upgrading facility are located at Port Colborne, Ontario, and a platinum group metals refinery is located at Acton, UK.

1.5 Production Process and Products

In 2009, nickel, copper and precious metals ore was produced from five underground mines. These include Garson, Creighton, Copper Cliff, Coleman and Stobie underground mines. The Gertrude West and Ellen open pits were moved to a care and maintenance status in 2009. Pre-production development for Totten Mine continued in 2009 with shaft rehabilitation, lateral and vertical development and diamond drilling. Pre-production development ore is expected from Totten in 2010.

Underground mining methods include sub-level cave, blast hole, post-pillar, cut-and-fill, and narrow vein drift and fill.

Ore is transported from the Ontario Operations mines and third party ore suppliers by rail and/or truck to Clarabelle Mill where it is blended together. The ore is crushed and ground, with the majority of the pyrrhotite removed through magnetic separation and sent to a designated waste storage area in the Copper Cliff tailings impoundment area. The remaining ore undergoes selective flotation to produce a bulk nickel and copper concentrate grading 14% Ni equivalent and approximately 8.5% Cu and 11% Ni. The concentrate is dewatered, mixed with custom concentrate feed and high-grade silica flux and conveyed to the smelter. The rock tailings are used for mine backfill, building dams in the Tailings area, or disposed of in the Copper Cliff tailings impoundment area.

In October 2006, a copper separation process was put into operation at Clarabelle Mill. Concentrate produced from the flotation process is used to generate a high copper concentrate by depressing the pentlandite, thus allowing the copper to float. The concentrate is then filtered to produce a filter cake with approximate grades of 33% Cu and 0.4% Ni. This process currently generates ~500 tonnes per day of final marketable copper concentrate production and reduces the copper units sent to the smelter. This process also allows the Clarabelle Mill to accept higher copper to nickel ratio ores from the mines.

At the Copper Cliff Smelter, the nickel-copper bulk concentrate is dried and processed through two flash furnaces and five or six converters. The smelter produces a bulk matte, sulphur dioxide and slag. The sulphur dioxide from the flash furnaces is fixed in the Acid and Liquid SO_2 Plants, and sold as sulphuric acid and liquid sulphur dioxide, while the lower-strength stream from the converters is vented to the stack. The slag from the furnaces is a waste product.

The converter matte is slow-cooled to produce a coarse crystal structure. It is then crushed, ground, and separated into metallics, nickel sulphides and copper sulphides by magnetic separation and flotation in the Matte Separation Plant.

All of the precious metal-bearing metallic, and some of the nickel oxide, are sent to the Copper Cliff Nickel Refinery. The remaining nickel sulphide is roasted in fluid bed roasters. The resulting nickel oxide is processed in the Copper Cliff Nickel Refinery or the Clydach Nickel Refinery, and a portion is marketed directly as nickel oxide sinter 75. Starting in 2007, all of the sulphur emissions from the Fluid Bed Roaster (FBR) are captured as part of the Emissions Reduction Program (ERP).

Copper sulphide from Matte Separation is treated in the MK reactor, where sulphur dioxide, as well as molten metal, is produced. The sulphur dioxide is fixed as sulphuric acid. Additional impurities are removed from the molten metal in finishing converters, producing blister copper and a nickel oxide residue. The small amount of sulphur dioxide evolved in the finishing converters is vented to the stack. The molten blister copper is transferred to anode furnaces and cast into anodes, which are then sold to or processed by others.

The saleable products from Ontario Operations by source are summarized in Table 1-1.

Table 1-1: Saleable Products from the Ontario Operations

Source	Product
Mill (Copper Separation)	Copper concentrate
Smelter	Sulphuric Acid, Oleum, Liquid SO_2, Copper Anode, miscellaneous intermediates
Matte Processing	Nickel Oxide Sinter 75
Nickel Refineries	Nickel Powder, Nickel Pellets, Ferro Nickel Pellets, miscellaneous intermediates
Port Colborne Refinery	Platinum Group Metals Concentrate, Gold sand, Silver sand, Electrolytic Cobalt
Acton Refinery	Platinum Group Metals

Permission from the Ontario Provincial Government is required to export intermediate products derived from the Ontario Operations properties outside of Canada. Vale's practice is to meet with the government officials prior to the expiration of each of the required export licenses to discuss relevant aspects of the export procedure. In December 2005, the Ontario Government granted permission for Vale to export nickel oxide sinter, nickel sulphate residue, nickel sulphide matte, by-products, residues and similar process derivatives to Clydach for a term of 10 years ending in December 2015. At the same time, the Ontario Government also granted permission for Vale to export its semi-refined platinum group metals concentrate to its Acton refinery for the same term period. In June 2007, the Ontario Government granted permission for Vale to export Copper anodes, Copper concentrate, and MK chalcocite copper concentrate outside of Canada for further processing. The term of that permission also expires in December 2015.

1.6 Metal Recoveries

The anticipated metal recoveries at the mill are currently based on the “Malcolm Bell” mill process model which was developed internally at Vale. The model rejects the same percentage of pyrrhotite from all the ores going to the mill at the same metal grades (annually adjusted to plan). Similarly, the rock tailings are rejected at the same metal grades (annually adjusted to plan) for all ores. The model contains assumptions on the behaviour of typical ores based on grade and pyrrhotite content. Maximum allowable values for recoveries are set for ores that may exceed the known expected recoveries.

The milling recovery for nickel is estimated based on the nickel head grade and the amount of pyrrhotite. The milling recovery for cobalt is estimated as 1% less than the nickel recovery. The copper recovery is estimated based on the copper head grade. Milling recoveries have not changed after the implementation of the new copper separation process at Clarabelle Mill.

The milling recoveries for Pt, Pd, Au, and Ag are estimated based on historical recovery compared to feed grade. The values of rhodium, ruthenium and iridium are determined for the financial model based on historical production.

Smelting and Refining recovery factors are determined from the annual metals plan models, which incorporate current metallurgical factors, processing and unaccounted losses in smelting and refining operations.

The metal recoveries, based on the average grades of the estimated mineral reserves, are listed in Table 1-2. Future precious metal recovery assumptions are consistent with the assumptions in previous years.

Table 1-2: Average Metal Recoveries (%)[1]

Metal	Mill Recovery to Bulk Concentrate %	Smelter and Refinery Recovery of Ni Concentrate %
Ni	82.9	94.2
Cu	95.7	94.4
Co	81.8	28.0
Pt	81.6	92.7
Pd	81.8	92.5
Au	79.3	90.1
Rh	54.0	87.3
Ru	35.0	51.3
Ir	35.0	71.7
Ag	77.6	87.0

Note: [1] Source 2010 production plan mill model within the 2009 MRMR financial model (reserves only).

A reconciliation for the past 5 years of the actual Clarabelle Mill Cu and Ni recoveries versus the financial model mill predicted metal recoveries has been completed and summarized in Table 1-3. The financial model predicted Cu recoveries are typically higher than the actual recoveries by 0.5-0.8% annually, while the predicted Ni recoveries are higher than the actual recoveries by 0.1-0.8% annually. Based on this variance, the model is successful in accurately predicting what the actual Cu and Ni mill recoveries will be annually from Clarabelle Mill.

Table 1-3: Mill Recovery Reconciliation

Year	Status	Clarabelle Mill Actual Data					Model Predicted		Actual - Predicted	
		Feed Grade			%Cu Rec	%Ni Rec	%Cu Rec	%Ni Rec	%Cu Rec	%Ni Rec
		%Cu	%Ni	%S						
2004	Actual	1.38	1.34	10.1	94.8	81.5	95.3	81.6	-0.5	-0.1
2005	Actual	1.33	1.28	9.7	95.4	81.5	95.2	82.1	0.1	-0.6
2006	Actual	1.30	1.23	9.0	95.6	82.3	95.1	82.5	0.5	-0.2
2007	Actual	1.33	1.22	9.1	94.6	81.0	95.2	81.8	-0.6	-0.8
2008	Actual	1.40	1.21	9.1	94.6	80.9	95.4	81.6	-0.8	-0.7
2009	Estimated	1.45	1.23	9.0	95.0	82.0	95.5	82.5	-0.5	-0.5

1.7 Market

Nickel Products

The Ontario Operations produce a number of nickel products, including nickel plating products, nickel melting products and various specialty products (e.g. powders and oxides).

Nickel melting, plating and specialty products are all sold, typically at a premium against the LME cash price. Premiums will vary by product form, packaging, market conditions, and other factors. Nickel oxide (Sinter 75), which contains 75% Ni, is sold at a discount to the LME price for further processing into Utility nickel which is generally sold into the Asian stainless steel market.

The costs of producing all of these products are included in the evaluation of the estimated mineral reserves. The price premium is established based on the mix of products planned in future years.

Copper Products

The copper is sold in one of three forms: either as a concentrate produced from the mill's copper separation circuit, as a cast anode, or as an electrowon product (from the Copper Cliff Nickel Refinery). The concentrate and anodes are sold at commercial rates benchmarked against the LME copper price. Electrowon copper is sold against the LME copper price.

Cobalt Product

The cobalt is sold as high purity cobalt metal, mostly through annual contracts, and used in specialty industries.

Precious Metals Products

The precious metals, except for silver, are sent to the Port Colborne refinery for upgrading. Gold sand is produced at Port Colborne and sent to the Royal Canadian Mint for processing. Platinum group metals are further refined at the Acton refinery in the United Kingdom and sold as pure metal at the current listed prices. The platinum group metals include: platinum, palladium, rhodium, ruthenium and iridium. Silver is sold primarily in copper anode with the copper concentrate and as silver sand from the Port Colborne refinery.

1.8 Historic Production

Table 1-4 shows mine production and the average grade for Ontario Operations for the period Jan 1, 2007 to June 30, 2010 (year-end). Production from 1H 2010 is also included for comparison.

Table 1-4: Historic Mines Production, 2007 to June 30, 2010

Statistics	Units	2007	2008	2009	1H 2010
Production Copper Cliff North					
Tonnage	('000t dry)	1,078	1,165	524	
Nickel grade	(%)	0.84	1.01	1.06	
Copper grade	(%)	0.92	1.01	0.96	
Production Copper Cliff South (1)					
Tonnage	('000t dry)	883	771	78	
Nickel grade	(%)	1.46	1.48	1.40	
Copper grade	(%)	1.71	1.67	1.45	
Production Creighton					
Tonnage	('000t dry)	963	1,001	395	94
Nickel grade	(%)	2.08	2.14	1.82	3.84
Copper grade	(%)	1.62	1.56	1.57	3.41
Production Stobie					
Tonnage	('000t dry)	2,850	2,892	1,198	73
Nickel grade	(%)	0.72	0.72	0.72	0.69
Copper grade	(%)	0.68	0.65	0.64	0.60
Production Garson					
Tonnage	('000t dry)	692	840	328	22
Nickel grade	(%)	1.59	1.69	1.45	0.84
Copper grade	(%)	1.58	1.72	1.93	3.15
Production Coleman					
Tonnage	('000t dry)	1,408	1,425	624	200
Nickel grade	(%)	1.74	1.62	1.64	1.62
Copper grade	(%)	2.75	2.66	3.28	2.91
Production Gertrude (2)					
Tonnage	('000t dry)	12	124		
Nickel grade	(%)	0.66	0.72		
Copper grade	(%)	0.25	0.29		

Notes: (1) This mine has been closed indefinitely since January 2009

(2) Moved to care and maintenance in 2009

In July 2009, unionised employees at Sudbury operations went on strike after rejecting a settlement offer for a new three-year collective bargaining agreement, resulting in significant reduction in production for 2009 and 1H2010. During the 3Q 2009, Vale resumed partial production at Garson and Coleman mines, with a focus on copper (Vale operated two high-copper mining zones and the Clarabelle Mill to produce copper concentrates). During 1Q2010, the focus was shifted to nickel and operations were partially resumed at Creighton and Stobie mines and the Copper Cliff smelter.

1.9 Geology and Mineral Deposits

Geology

The magmatic copper-nickel sulphide deposits at Sudbury are part of the Paleoproterozoic Sudbury Structure which comprises the Sudbury Igneous Complex (SIC); breccias, mudstones siltstones and wackes of the Whitewater Group which occupy the centre of the Sudbury Basin; and a ring of brecciated and shock-metamorphosed Archean and Paleoproterozoic footwall rocks which surrounds the SIC. All rocks defined as footwall to the Sudbury Structure are cut by occurrences of Sudbury Breccia. This breccia occurs as small veins, irregularly shaped patches and large, laterally extensive, crudely tabular bodies, which may extend for many kilometres along strike. The rocks of the SIC, dated at 1.85 Ga, are exposed within an elliptical or bean-shaped ring with a NE-trending long axis of 60 km and a short axis of 27 km.

The rocks of the Sudbury Structure, and specifically rocks of the SIC and Whitewater Group, are affected by several fault sets and by ductile and brittle deformation associated with these faults. The Sudbury Structure is cut by a number of regional and local mafic dyke swarms. Archean footwall rocks on the North Range are crosscut by north-south trending dykes of the ~2.454 Ga Matachewan swarm.

Northwest-trending olivine tholeiitic dykes of the Sudbury swarm, dated at 1.238 Ga, crosscut the SIC and all rock units within and surrounding the Sudbury Structure.

Ni-Cu-PGE-Au deposits at Sudbury are spatially and genetically related to relatively small discontinuous bodies of inclusion-rich material localized either at the contact between the main mass of the SIC and footwall rocks or within radiating and concentric offset dykes cutting footwall rocks. These deposits occur in four major geological environments.

Mineral Deposits

North Range Contact Deposits

North Range contact-type Ni-Cu deposits occur at the base of the SIC in association with a noritic to gabbroic inclusion-bearing contact phase termed the sub-layer, and within the metamorphic textured footwall breccia/granite breccia below the sub-layer in embayment features. These deposits include the Coleman Mine (formerly McCreedy East), Main, West and East orebodies.

The sub-layer inclusions consist of footwall and mafic to ultramafic rocks with the volumetric distribution of the sub-layer controlled by the shape and morphology of the basal contact of the SIC. Sulphide mineralization within the sub-layer consists of disseminated to massive sulphide generally zoned from massive sulphide at the footwall to disseminated sulphide ore towards the hangingwall. The PGE-Au content of the contact deposits is variable but low.

The bulk of the economic North Range Ni-Cu occurs within the granite breccia. This footwall breccia consists of fragments of country rock, exotic ultramafic inclusions and rare sub-layer and mafic norite xenoliths in a metamorphic-textured quartzo-feldspathic matrix. Mineralization occurs as blebby disseminations and fragments of sulphide, veins and stringers, and as accumulations of massive sulphide within bodies of footwall breccia. A transition zone exists between the footwall breccia and non-brecciated footwall rock with the greatest amount of sulphide found at the base of the footwall breccia.

North Range Footwall Deposits

Two types of footwall deposits have been defined in the North Range. These are massive stockwork style sulphide Cu-PGE-Au deposits (Coleman Mine 153 and 170 orebodies) and disseminated low sulphide high PGE-Au zones and deposits (Coleman 148 Zone and lenses within the 153 Orebody). Footwall mineralization is highly fractionated compared to the contact mineralization and is emplaced within or near thermally metamorphosed Sudbury Breccia into dilatant fractures. A physical connection between the contact sulphide and footwall sulphide is not always preserved or recognized, the exceptions being at the Quadra FNX Mining Ltd. McCreedy West Mine and the Xstrata Nickel Strathcona Mine.

South Range Contact Deposits

South Range contact-type Ni-Cu deposits are similar to those of the North Range. They occur at the base of the SIC in the sub-layer and include the Creighton Mine and Stobie Mine orebodies, Murray Mine Main Orebody and the Blezard Main Orebody. The South Range Footwall Breccia underlies the sub-layer and is derived from melanocratic metasedimentary rocks and metavolcanic rocks. Ni-Cu mineralization occurs as disseminated to massive sulphide within the sub-layer. These deposits are generally zoned from massive ore at the footwall to disseminated sulphide ore toward the hangingwall. The PGE-Au content of the contact deposits is generally low. Similar to North Range contact deposits, Ni-Cu mineralization occurs within bodies of footwall breccia with minor amounts of quartz diorite. Massive sulphide Cu-PGE-Au footwall mineralization is also found in the South Range deposits but is not abundant (Creighton Mine).

Offset Dyke Deposits

Significant economic Ni-Cu-PGE-Au mineralization occurs within quartz diorite offset dykes at Copper Cliff Mine offset orebodies and the Totten Mine orebodies. They can extend for many kilometres into the Sudbury Structure wall rock, and may be radial or concentric to the contact of the SIC with distinct, sharp contacts. Quartz diorite is the main component of South Range offsets, and of distal (>3 km from sic contact) portions of North Range offsets. Footwall breccia also occurs here as sheets and discontinuous lenses concentrated along the lower contact of the SIC, and as a major component of some of the offset dykes.

Mineralization consists of zones of disseminated blebby and massive Ni-Cu-PGE-Au sulphide that is spatially associated with inclusion-rich phases of quartz diorite, as well as with local structural complexities of the dykes. Ni-Cu-PGE-Au deposits have longer dip lengths then strike length and contain at least 5% sulphide. Areas between orebodies consist of barren quartz diorite or weakly mineralized inclusion-rich quartz diorite.

Structurally Controlled Deposits

The structurally controlled Cu-Ni-PGE-Au deposits occur in the South Range of the Sudbury Structure and include Garson Mine #1, #4 and #5 Shears, 360 and 600 orebodies. Ni-Cu mineralization is typically remobilized into shear zones and related structural traps. These deposits occur within fault zones at the contact of the SIC and metasedimentary and metavolcanic rocks of the Huronian Supergroup. Mineralization occurs as a recrystallized sulphide matrix surrounding variably deformed clasts of local footwall metasediment, hanging wall norite and quartz vein material. This ore type is characterized by silicified footwall rocks, strong deformation of the mineralization, and late crosscutting quartz carbonate fractures with sphalerite, marcasite and galena, indicative of later hydrothermal activity.

Geology and Mineral Deposit Review

Although the work stoppage made it difficult, discussions were held with the some chief geologists and mine geologists from each of the operations with respect to the geology and mineral deposits of the Ontario Operations.

The main data collection method used in evaluating and increasing confidence in geological interpretation and mineral resource evaluations is diamond drilling directed by the Mines Geology staff. Drilling density varies at the mines and is a function of the style of mineralization and the level of resource classification.

Once reserves are mined, geology mapping is completed typically on a round-by-round basis at the mines and intergraded into the Datamine geology models. In addition, probe data from production drilling is used in bulk mining areas to define the mineralized contacts in the planned mined areas to minimize dilution and identify economic material not identified by diamond drilling. Surveyed volumes of completed bulk stopes are combined with the probe data to produce robust models for reconciliation, and support for reserve mineability and dilution estimates.

Consistency of data collection and storage is achieved through drill core logging at three common sites, by geologists mainly dedicated to the task of logging and sampling, using common custom logging software linked directly to the drill hole database.

It is the opinion of Golder that with over 100 years of well documented knowledge, Vale has excellent knowledge and understanding of the geology and mineral deposit styles for the Ontario Operations, and this knowledge is being transferred to staff. The level of geology data being collected is completed to accepted industry standards and appropriate for mineral reserve reporting. The level of review completed on geology and mineral deposit styles by Golder did not identify any fatal flaws.

1.10 Exploration and Development Drilling

The total diamond drill length drilled and logged in Sudbury in 2009, as of October 31, is 98,687 m (303,086 m were drilled in 2008). The summary of drilling to October 31, 2009 is outlined in Table 1-5. Underground exploration and definition drilling was severely impacted by Ontario Operations unionized work stoppage.

Table 1-5: Summary of Diamond Drilling (metres) to October 31, 2009

Location	Exploration	Definition	Total
Copper Cliff Mine	17,170	11,486	28,656
Coleman	3,069	6,842	9,911
Creighton	9,506	5,153	14,659
Garson	14,136	8,118	22,254
Stobie/Frood	0	2,590	2,590
Totten	0	3,944	3,944
Other	16,673	0	16,673
Total Ontario Operations	60,554	38,133	98,687

A comprehensive review of mineral inventories for all deposits including low grade, near surface deposits for ramp access or open pit mining potential continues to be assessed by Ontario Operations, ranked and prioritized for future exploration and advancement. In 2009, the geology at all mines was compiled, reviewed and the resulting exploration targets were prioritized to provide more clarity for future exploration decision making, and keep them in line with the Ontario Operations Life Of Mine Plan (LOMP).

In general, drilling at both Garson and Creighton mines focused on support of mine expansions, while at Copper Cliff Mine, it concentrated on untested areas above existing infrastructure. In addition to the Main orebody, Coleman Mine exploration and delineation drilling focused on the footwall deposits where, in the opinion of the QP, most of the Vale's exploration potential at Coleman exists since most contact deposit down-dip potential lies on Xstrata Nickel property (mostly mined out).

1.11 Deposit Sampling Methods and Data Management

Typical core diameter sizes are BQ with some AQTW and NQ. Core is logged at four facilities at the Ontario Operations: the Coleman Mine, Copper Cliff North Mine, Creighton Mine and the VITSL Brownfields Exploration core facility near Copper Cliff South Mine. Geologists and technicians (supervised by the geologists) log and sample all drill holes in the MEBS database system. Sampling procedures are the same for the exploration and development core except that the exploration core is sawed in half with the remaining half retained at Vale's Ontario Operations core storages sites. Development drill core samples are fully sampled.

Sample Data Validation and QA/QC

Vale has developed a comprehensive QA/QC protocol procedure that is currently being implemented by Chris Davis at the Ontario Operations with support from Sasa Krstic Corporate QA/QC person located at Sheridan Park. In addition, the LIMS Sample Tracking System (LIMS STS) was implemented in September 2008. This system was implemented to provide a tracking system from core logging, sampling, shipping and sample results. As part of the QA/QC protocol, a monthly data validation report is created by the Geologist QA/QC (Atulya Verma) that outlines internally the quality control that has been completed. Similarly, a yearly report is also created by the Geologist QA/QC. Included in these reports are indications of failures (weight, grade estimations, sulphide estimations, sampling and footage errors, QA/QC sample errors, comparisons against assay certificates) and Vale's resolution on these failures.

All assay samples from ALS Chemex are directly entered into the MEBS database using LIMS STS. This system allows for direct data transfer from ALS Chemex into the database and does not require additional data manipulation. The LIMS STS also generates duplicate assays requests on a bi-weekly basis that is submitted to ALS Chemex.

Logging and Assay Quality Indicators

All drill hole and sample data is entered into the MEBS database by the geologist with build-in checks for the following principal quality indicators:

- Sample weight check which is based on estimated sulphide percentage and calculated bulk density (SG) x core size x length;
- Sample sulphide percent check which is based on estimated sulphide percentage vs. calculated sulphide percent (from assayed sulfur);
- Assay sample check which is estimated grade (%Cu + %Ni) vs assay value (%Cu + %Ni); and
- Estimation check which is %Cu + %Ni vs. estimated sulphide percent.

QA/QC Samples

The Ontario Operations QA/QC program consists of monitoring ALS Chemex's internal quality control samples, monitoring the results of Vale in-house standards and randomly selecting samples for check analysis at third party laboratories (SGS Lakefield), including the Vale control lab.

The QP completed a review of Vale's QA/QC procedures which included reviews of internal monthly QA/QC report (JuneJuly_09_MontlyQC report.pdf), a review of the 2009 checks (Verma, 2010) and the 2009 MRMR Statement for the Ontario Operations. The QA/QC sample procedures and results are summarized below:

- Submission of in-house standards and blanks at a 2% and 1% insertion rate by the sampling geologist and technicians. This process was started in 2008 at all mines in the Ontario Operations. The Ontario Operations and VITSL Brownfields Exploration group has included a QA/QC program in their sample batch submission since 2005.
- Monitoring the results of the in-house standards and blanks and acting on the failures (on a month-to-month basis).
- Comparison of original ALS Chemex data to the data in the MEBS database (i.e. Logging and Assay Quality Indicators).
- Address outliers from the Logging and Assay Quality Indicators check.
- Review randomly selected coarse reject duplicates checks (3% of samples).

- Review randomly selected pulp duplicates (2% of samples).
- Complete audit reviews of the of the ALS Chemex sample preparation in Sudbury and analytical lab facility in Vancouver. Audit reviews are completed approximately once a year.
- Monitor ALS Chemex internal QA/QC samples included within Vale sample batches. ALS Chemex internal QA/QC system includes standards, blanks and duplicates.

A review of the 2009 checks for the Ontario Operations (Verma, 2010) indicated no significant bias in the ALS Chemex sample assays. Plots of pulp and coarse reject duplicates show excellent precision that exceeds the Vale contractual precision tolerances. The number of checks that indicate a swap or mix-up has decreased to 1.6% failures in 2009. Ongoing communication with ALS Chemex and implementation of LIMT STS has resulted in eliminating issues of missing pulp and coarse reject duplicates. In an attempt to reduce sample error around the preparation procedures, ALS Chemex installed a new sample preparation protocol using a Boyd Crusher and rotary sample divider in February 2010.

As part of the audit, Greg Greenough, P.Geo., visited the Ontario Operations Mines Geology Department central core logging facility located at Copper Cliff Mine. During the visit, core logging, database entry, QA/QC sample inserting, digital photography and sample chain-of-custody procedures were observed or discussed with Vale geological staff.

It is the opinion of the QP that the core logging and sampling collection methods employed at the Ontario Operations core logging facilities are under Vale control and completed to accepted industry standards and are appropriate for mineral reserve reporting. The level of review completed on diamond drilling sampling methods by the QP did not identify any fatal flaws.

1.12 Mineral Resource Estimation

The Ontario Operations Mines Geology Department includes an established central Design and Evaluation group consisting of qualified geologists that complete full audits and peer reviews of all Mines Geology interpretations, block models and resource estimates. The LOMPs are also reviewed to ensure inclusion of all resources and reserves. The Design and Evaluation group are in the process of replacing the existing MRI (Mineral Reserve Inventory) database application with a new MRM (Mineral Resource Management) program. Observation of the new system during this review indicates that it will improve the Ontario Operations compliance to Corporate Governance, increase the flexibility and robustness of data tabulation and reporting, and ensure the files supporting all MRMR estimates and mine planning are centrally located and saved.

The bulk of the Ontario Operations mineral resources are estimated using block modelling and geostatistical interpolation methods, using audited, approved and standardized processes. Currently, block modelling is used for approximately 90% of the mineral resource and mineral reserve estimates. The remaining estimates, mainly in older remnant areas, are based on polygonal estimates using plans and cross-sections.

Block Modelling Methods

Normally, the appropriate Vale Chief Mine Geologist takes responsibility for, and acts as the Responsible Person (RP) for the mineral resource estimate, relying on properly trained individuals to generate the resource model. A peer or senior review of the work, with documentation and sign-off, as well as recommendations is completed by a qualified geologist in the Design and Evaluation group.

Standard techniques, processes and validation procedures are used for mineral domain definition (wire framing), sample selection, analysis of spatial variability, grade interpolation, variance corrections, and reporting of recoverable tonnage and grade. All resource and reserve block modelling uses Datamine Studio version 2. Standardization and consistency of procedures is effectively controlled with the utilization of a system of custom scripts for the Datamine application.

Block model domain limits are based on the limits of potential economic mineralization and controlling geological features such as structures and lithologies. The potential economic mineralization limits rely on the natural break in grade distribution more so than a calculated economic cut-off. Since most deposits have multiple elements contributing to the economic importance, a Ni-equivalent/Value attribute based on a reserve value formula is added to the drill hole data. This ensures the examination of all potentially economic areas. Characteristics such as mineral deposit shape, type of mineralization, and drill hole density also influence the deposit model.

Samples, captured by the mineralization envelope are weighted by density and composited into equal lengths in order to properly represent the proportion of metal present in the sample relative to the entire sample population. Composite lengths are chosen based on the most common sample interval for each orebody.

Unless deposit geometry is very simple (i.e. consistent strike and dip), the Datamine process 'Unfold' is used to transform the composite sample dataset into a stratified geological unit (interpolation coordinate system) for grade continuity analysis and interpolation. In the opinion of the Golder QP, this function adds greatly to the robustness of the Ontario Operations resource block models.

Since there is a direct correlation between grade and density in the Ontario Operations deposits, all procedures (variogram analysis, interpolation) use density-weighted elements.

Grade (density-weighted) variography for each interpolated element is used to establish search ellipse dimensions and orientation within the coordinate system of interpolation. Variogram contours are used to help establish preferred orientations of continuity. In the case of Indicator Kriged estimates, variogram modelling for each indicator class (each element) is carried out. Variogram calculation parameters are well documented as part of the custom script system.

Ordinary kriging is primarily used to estimate grades, and the addition of indicator groups is used where the mineral deposits contain separate and distinct mineralization types or highly variable (highly skewed) mineralization. The use of indicators also provides a means of minimizing or eliminating the need for top-cutting high "nugget" elements such as Cu, Ni, Pt, Pd and Au in mineral deposits enriched in these metals. Checks for outliers are still carried out with the use of indicators, but controls to these are applied carefully and rarely.

Model block sizes are chosen based on a combination of diamond drill hole density and the Smallest Mining Unit (SMU) for the deposit. The SMU typically represents the smallest blast size, which is a function of the mining method and size of mining equipment used for any given orebody.

Nearest Neighbour interpolations are created for all block models to report declustered global statistics and identify areas of poor grade spreading prior to Kriging. Global estimates from 'one-sample' composite (the composite grade for each entire drill hole is applied to each original composite length) Nearest Neighbour models are also used as a basis to check for the presence of a conditional bias that could affect the resource estimate.

Almost all grade interpolations use density-weighted Kriging methods, either Ordinary or Indicators and, as indicated above, most are carried out in the unfolded coordinate system. The scripted system produces documentation on all estimation and search parameters used in the estimates, as well as the applicable statistics. A number of these documents were reviewed and indicate that reasonable parameters are being used to provide an appropriate amount of grade smoothing, following industry best practices.

The validation of the final resource model includes visual checks and systematic verification of the absence of global and local bias. In addition, smoothing and volume-variance assessment is done using standard industry practices, and smoothing corrections applied where necessary.

Personnel within Vale, trained in block modelling, validate the block models and external consultants audit the methods. Reconciliation studies of mined-out areas (e.g. McCreedy East 153 Orebody, Garson #1 Shear Orebody, Creighton 400 Orebody and Stobie Division A) have been carried out to check the results from the geostatistical methods used in mineral resource and mineral reserve estimates and ensure the processes are functional and correct.

It is the opinion of the QP that the mineral resource block modelling methods employed at the Ontario Operations are completed to accepted industry standards and appropriate for mineral reserve reporting. The level of review completed on resource modelling procedures by the QP did not identify any fatal flaws.

Polygonal Methods

Polygonal estimation techniques have historically been used to determine estimated reserves/resources in the Ontario Operations. The proportion of resources estimated using this technique is being reduced.

Currently, a polygonal method is being used for the Coleman Mine 153 Orebody, and 6166 and 7386 footwall zones (resources only), and in older mining areas where pillar recovery is the primary source of production.

The mineral intersections on the boreholes are plotted on cross-sections and plans using standardized grading and interpretation procedures. A mining method is determined and cut-off grades are established based on the current breakeven cut-off grade policy. Borehole intersections that meet the cut-off grade using a minimum mining width for the mining method are marked on the boreholes. The mineral resource is interpreted and correlated manually on plans and cross-sections.

A modified 'polygonal' calculation supporting the current 153 Orebody reserve above 4945 level uses a 'linear' interpolation based on historic production. Linear interpolation of tons and grade between mined cuts using associated tons and grade gives an accurate prediction of tons and grade per unmined cut. When interpolating to a sill cut, the first 3 cuts, including the sill cut, are averaged to give a more accurate representation of the sill cut tons and grade profile. This accounts for any "farming" on the level which may have included production from marginally economic veins. Typically, the sill cut would have higher tonnage due to this factor although additional veins can be found at any elevation due to the breccia-like structure of the rock mass.

It is the reviewer's opinion that given the 153 Orebody characteristics and the abundance of production data, this method provides a robust mineral reserve estimate that is most suitable to mine planning and the LOMP.

1.13 Mineral Reserve Estimation

The reserve tonnage in each workplace is scheduled in the mine and operations production plan with corresponding capital requirements, operating and corporate costs, and assessed for economic viability. All mineable units, or "workplaces", which are scheduled for mining, are included in the reserves to be tested in the Ontario Operations production plan.

Mining plans and FEL2 (Front End Loading 2) or FEL3 studies are available for all of reported Ontario Operations mineral reserves. The level of engineering detail varies slightly between mines, but at a minimum meets the accepted criteria for FEL2 (pre-feasibility) status.

Assessment of Mining Method

The mining methods used at the Ontario Operations include cut-and-fill mining (CAF), mechanized cut-and-fill mining (MCAF), underhand cut-and-fill mining (UCAF), Post Pillar CAF (PPCAF), Sublevel Cave (SLC), Blasthole Stoping (BS), Vertical Retreat Mining (VRM) and Uppers Retreat Mining (URM). Underground mining is composed of both remnant pillar extraction in older mining blocks and new mining zones.

The underground mining method selection is based primarily on deposit geometry but also on a number of other factors including available infrastructure, geotechnical constraints and experience at the mine. The primary mining methods used at Coleman Mine are PPCAF in the massive contact orebodies and MCAF in the narrow vein footwall orebodies. For mining sill pillars in the Coleman main orebody (MOB) and the 150 orebody, BS and/or UCAF methods are used. The Copper Cliff Mine uses VRM, BS (slot-slash variation) for the bulk of the production. Sill pillars are recovered using URM. The Copper Cliff Mine LOMP also makes provision for limited use of MCAF. Creighton Mine employs BS (slot-slash variation), URM and MCAF mining methods. The primary mining methods used at Frood and Stobie mines are SLC, VRM and URM. Garson Mine uses BS (slot-slash variation) and URM mining methods. The mining methods planned at Totten Mine include VRM, URM, BS and MCAF.

It is the opinion of the QP that the mining methods used in the Ontario Operations are suitable for the ore deposits and no fatal flaws were identified.

Geotechnical Investigations

The mines in the Ontario Operations have a history of ground control issues including seismicity and rockbursting. All of the mines have well developed ground control programs and have undertaken geotechnical investigations and studies to assess the ground control requirements at each operation. Examples of recent studies include the following:

Frood and Stobie mines:

- 'Report on Site Visit to Frood-Stobie' by Pakalnis (January 2009)
- 'Stobie Mine Pit Footwall Stability A Phase2 Analysis' by Harding (January 2009)

Coleman Mine:

- '170 OB – Geotechnical Study' by Golder (June 2007)
- '153 OB – Crown Pillar Stability' by Internal (May 2009)

Copper Cliff Mine:

- 'External Review of Seismic Events of September 11, 2008' by Various (Jan. 2009)
- '3500 Level to 3710 Level Diminishing Pillar Mining with 3550 Sub Level' by Harding (April 2009)

Creighton Mine:

- 'Map3D FW Option 461 Modelling' by Yao (May 2006)
- 'Preliminary Study of Current Option for 7840 Access to 461 Orebody' by Yao (October 2006)

Garson Mine:

- 'Garson Geomechanical Study' by Golder (2009)
- 'Geomechanics for Garson Deep FEL II Study' by Itasca (2009)

Geotechnical issues are likely to persist at the mines in the Ontario Operations. Furthermore, orebodies at greater depth have an increased likelihood of issues with regard to mining recovery, productivity and mining costs. However, it is the opinion of the QP that the ground control programs at the Ontario Operations have an established track record in addressing these geotechnical issues. The level of review completed by the QP has not identified any fatal flaws.

Mining Equipment

The Ontario Operations primarily uses mechanized diesel-powered mining equipment. Each mine has a complement of forklifts, mechanized bolters, shotcrete equipment, haulage trucks, jumbo face drills, personnel carriers, production drills, road maintenance equipment, scissor lifts, load-haul-dump units (LHD) and utility vehicles. Each mine maintains a spreadsheet that lists the equipment used at the site. This spreadsheet includes a description of the equipment, the date of acquisition, whether the equipment is leased or owned, and the date of replacement for the equipment. The mine maintains a four-year rolling schedule for equipment needs within the spreadsheet and uses this for budgeting and equipment acquisition planning.

The spreadsheet for Creighton Mine includes the following list of equipment:

- Forklifts: 10 Kubotas and 1 Manitou
- Mechanized Bolters: 2 Macleans, 1 Atlas Copcos, 2 Boltecs and 1 Boom Bolter
- Shotcrete Equipment: 3 Kubotas
- Haulage Trucks: 3 Tamrocks, 1 Catepillar and 1 Kiruna
- Jumbo Face Drills: 3 Atlas Copcos
- Personnel Carriers: 1 Minemaster, 2 John Deeres, 1 Kubota, 5 Minecats, 1 Jeep and 3 RTVs
- Production Drills: 1 Boart, 3 Cubex and 1 Orion
- Road Maintenance Equipment: 1 Grader, 1 Marcotte and 1 Sweeper
- Scissor Lifts: 2 Marcottes and 2 Teledynes
- LHD Units: 9 Caterpillars, 1 Elphinstone and 1 Wagner
- Utility Vehicles: 1 Rockbreaker, 2 Anfo Loaders, 1 Bobcat, 1 Boom Truck, 1 Spreader, 1 Compactor, 1 Manlift, 1 Flatbed Truck and 1 Fuel Truck

In general, the mine equipment used at the Ontario Operations is appropriate for the mining methods used and planned production. The Ontario Operations are similar to most modern mines and are dependent on diesel powered mobile equipment.

Mining Rates

Table 1-6 presents the budget and actual mining rates for 2010 (to June 30) for each mine in the Ontario Operations.

Table 1-6: Summary of Mining Rates for the Ontario Operations (2010 LOMPs, Actuals to June 30)

Mine	2009 Actual Mining Rate, Tons/day	2010 Budget Mining Rate, Tons/day*
Copper Cliff	3,037	2,806
Coleman	1,461	4,602
Creighton	833	3,252
Garson	520	2,766
Frood-Stobie	2,570	8,970
Totten	599	153

* *Wet Tons per day*

A work stoppage between Vale and the United Steelworkers Local 6500 has affected production since July 2009.

It is the opinion of the QP that the planned mining rates budgeted in the LOMPs for the mines in the Ontario Operation are appropriate. It is recognized that production in 2009 and 2010 has been negatively affected by the work stoppage between Vale and the United Steelworkers Local 6500. A potential challenge for Vale will be to re-establish production to pre-work stoppage levels. The level of review completed on the mining rates by the QP did not identify any fatal flaws.

Mine Services

Mine services for the Ontario Operations mining facilities include ore and rock handling (both track and trackless), ventilation, water handling (i.e. dewatering), compressed air and water, electrical, automation, construction infrastructure (i.e. dams and bulkheads) and shaft infrastructure. The standards and specifications for these services are well defined for the Ontario Operations through Mines Technical Services guidelines. These services are typical for modern mechanized mines and there does not appear to be any critical issues with mine services.

The mine services employed at the Ontario Operations are appropriate and adequately support current mining operations.

Grade Control

In large blast hole bulk mining areas, grade control is managed using borehole probing and visual estimation based on the quantity of sulphides present. Once a stoping block is drilled in preparation for production blasting, a borehole conductivity or magnetic susceptibility probe is inserted into each hole to estimate grade within the stope block. These results are plotted against the reserve block model and mine planners determine an extraction plan to maximize recovery. In some cases, it is possible to blast and remove waste zones separately. Where mixing of blasted ore and waste occurs, it is sometimes possible to visually separate waste material at the drawpoint. This is typically done by visually assessing the quantity of sulphide material and, if waste is determined, then this material is handled to a waste pass/stockpile or dumped as backfill.

In mechanized cut-and-fill mining areas (including narrow vein footwall deposits), each face advance is mapped by a geologist and assessed for economic viability. Any potential separation of waste, either through selective drilling and blasting or muck removal, is also managed by the geologist.

Grade control is well managed on a short-term basis through a combination of conductivity probing and manual visual techniques which appear to be adequate.

Mine Recovery and Dilution

Internal and planned dilution is included in the estimate of resources as defined by the engineer's stope design. External or unplanned dilution (waste overbreak and backfill) as well as mining recovery are included in the estimate of reserve grade and tonnage, and are based on historical mineability and dilution data. Although industry standards suggest that resources should not include dilution, there will be no affect on the Ontario Operations reserves by including planned dilution. Any changes to the mineral resource and reserve reporting system, however, should incorporate the ability to identify planned and unplanned dilution separately.

All mined blasthole stopes (where safely possible) are surveyed using a Cavity Monitoring System (laser scanner) and combined with the borehole probe grade data to calculate the tonnage and grade, mining recovery and dilution, as per Ontario Operations guidelines. The tonnage and grade is reconciled to the reported tram and recovery and dilution factors are compiled. These recoveries and the unplanned dilution factors are used to aid in the application of recovery and dilution to the reserves.

The definitions and factors for mining recovery and dilution at the Ontario Operations are reasonable and are backed by historical data and experience. As mining advanced deeper, however, notably Creighton and Garson mines, increasing geotechnical challenges have the potential to adversely affect recovery and dilution factors.

Conversion of Mineral Resource to Mineral Reserve

Reserves are quoted from block models based on an established mining plan and using workplace engineered layouts for the mining method. Appropriate factors for ore losses due to mining and dilution are established, guided by actual recovery and dilution data.

The mining (cash) cost, including direct costs, indirect costs and operation overheads, is compared to the NPR block value (after factoring for recoveries, dilution, etc.) to establish workplace limits based on a breakeven reserve cut-off value. The impact of grade smoothing and drill hole spacing is also taken into consideration when establishing the workplace limits. The cut-off value is the same for estimates of both proven and probable ore reserves. The operating cut-off value, on a short-term basis, may vary from the cut-off value used for mineral reserve estimates as a result of short-term variations in metal prices, short-term variations in the plant throughput, or mine throughput capability.

1.14 Reported Mineral Reserve

Prior to conversion to mineral reserves, mineral resources are classified based on the corporate guidelines of +/- 15% on tonnes, grade and contained metal on a quarterly production basis for measured resources, on an annual basis for indicated resources and globally for inferred resources. Measured resources are converted to proven reserves, and indicated resources are converted to probable reserves. The 2009 reported proven and probable mineral reserves for the Ontario Operations are listed in

Table 1-7. These estimates are based on in-place material after adjustments for mining dilution and mining recovery. No adjustments to these estimates have been made for metal losses due to processing (beneficiation, smelting and refining). All reserves are quoted for June 30, 2010. No new reserves have been included for 2010. Production during 2010 at the Ontario Operations was suspended during a labour work stoppage and only approximately 400,000 tonnes of material was mined and processed from the Coleman, Garson, Stobie and Creighton mines.

The total proven reserves are 69.5 M tonnes grading 1.48% Cu, 1.22% Ni and 1.8 g/tonne total precious metals (TPM). The total probable reserves are 47.0 M tonnes grading 1.53% Cu, 1.15% Ni and 3.1 g/tonne TPM. From 2006 to June 2010, there has been a decrease in reserves (from 160 M tonnes to 117 M tonnes) due primarily to mining depletions and to downgrading of mineral reserves to mineral resources as existing mining plans are outdated and no longer support the mineral reserve estimate. The reserves included in this report are based on the fact that the Acid Emissions Reduction (AER) project will be completed by 2015 and mining will continue beyond that date. It should be noted that the current AER project assumptions are based on a FEL1 Study.

Table 1-7: Ontario Operations Mineral Reserves June 30, 2010

Operating Mines	Class	Tonnes	%Cu	% Ni	%Co	Pt (g/tonne)	Pd (g/tonne)	Au (g/tonne)
C.C. North	Proven	10,940,921	1.07	1.03	0.04	0.7	0.7	0.3
	Probable	15,209,383	1.06	0.89	0.03	0.9	0.9	0.4
	Total	26,150,304	1.06	0.95	0.03	0.8	0.8	0.4
C.C. South	Proven	4,955,348	1.36	1.11	0.03	1.1	1.0	0.4
	Probable	8,199,547	1.50	1.34	0.04	1.2	1.6	0.5
	Total	13,154,895	1.45	1.25	0.04	1.2	1.4	0.5
Creighton #9	Proven	6,408,941	2.36	2.27	0.05	0.7	0.7	0.2
	Probable	4,402,491	1.66	1.91	0.04	0.6	0.7	0.2
	Total	10,811,432	2.06	2.10	0.04	0.7	0.7	0.2
Stobie/Frood	Proven	24,850,044	0.65	0.69	0.03	0.3	0.3	0.1
	Probable	8,201,578	0.70	0.72	0.03	0.3	0.3	0.1
	Total	33,051,622	0.66	0.70	0.03	0.3	0.3	0.1
Garson	Proven	6,156,020	1.26	1.71	0.06	0.6	0.7	0.3
	Probable	523,572	0.82	1.17	0.05	0.4	0.3	0.2
	Total	6,679,592	1.22	1.67	0.06	0.6	0.7	0.2
Coleman	Proven	15,805,749	2.87	1.62	0.04	1.0	1.7	0.5
	Probable	2,579,037	5.34	1.10	0.01	4.3	6.4	1.4
	Total	18,384,786	3.18	1.53	0.04	1.5	2.4	0.7
Totten	Proven							
	Probable	7,896,820	2.07	1.47	0.04	2.1	2.1	0.8
	Total	7,896820	2.07	1.47	0.04	2.1	2.1	0.8
Ellen	Proven	400,975	0.45	1.00	0.03	0.1	0.1	0.0
	Probable							
	Total	400,975	0.45	1.00	0.03	0.1	0.1	0.0
Ontario Operations	**Proven**	**69,517,998**	**1.48**	**1.22**	**0.04**	**0.7**	**0.8**	**0.3**
	Probable	**47,012,428**	**1.53**	**1.15**	**0.03**	**1.2**	**1.4**	**0.5**
	Total	**116,530,426**	**1.50**	**1.19**	**0.04**	**0.9**	**1.0**	**0.4**

Mineral Reserve Classification

The average diamond drill hole spacing varies from mine to mine due primarily to differences in deposit characteristics, style of mineralization, mining methods, mining selectivity and confidence in the location of the boreholes. The drill spacing required to support these criteria for resource classification can be unique to each orebody. The drill hole spacings listed in Table 1-8 are general overall spacings for each producing and non-producing for proven and probable mineral reserves.

Table 1-8: Average Drill Hole Spacing for Proven and Probable Reserve Classification

Operating Mines	Classification	Average Drill Spacing (m x m)
C.C. North	Proven	15 x 25
	Probable	45 x 60
C.C. South	Proven	15 x 25
	Probable	45 x 60
Creighton #9	Proven	15 x 25
	Probable	45 x 90
Stobie / Frood	Proven	15 x 45
	Probable	60 x 90
Garson	Proven	12 x 25
	Probable	35 x60
Coleman	Proven	20x 30
	Probable	60 x 90
Non - Operating Mines		
Totten	Proven	-
	Probable	45 x 75
Ellen	Proven	15 x 25
	Probable	25 x 90

Changes in Mineral Reserves: 2008-2009

The changes in mineral reserves from 2008-2009 are summarized in Table 1-9. Changes typically result from reductions due to mining, reductions due to mineral reserves being downgraded to mineral resources, changes due to evaluations and planning, additions due to mineral resources being converted to mineral reserves and additions due to drilling.

Table 1-9: Mineral Reserve Changes 2008-2009

	Tonnes (M)	% Cu	% Ni
2009 mineral reserve	116.9	1.5	1.2
Less Mined	0.4	2.58	1.90
Less reserves moved to resources	0	0	0
Less evaluation/planning changes	0	0	0
Add resources moved to reserves	0	0	0
Add reserves due to drilling	0.00	0	0
Evaluation/planning changes	0	0	0
Net Additions to Reserves	0	0	0
June 30th 2010 mineral reserve	116.5	1.50	1.19

The total Ontario Operations reserve tonnage has decreased from December 31st 2009 to June 30th 201 by 0.4 M tonnes due to mine depletions. There were no other changes to the mineral reserves as of the date of the audit due to the ongoing strike prevailing at the Ontario operation.

1.15 Reconciliation and Reserve Audits

Comparison of Mineral Reserve Model Estimate to Milled Production

Table 1-10 shows the overall reconciliation between the milled production with the estimated tonnage and grade of the material removed from the Ontario Operation's mines. The estimated tonnage and grades of the material removed is derived from estimates based on the detailed drilling and grade control mapping. For the three-year period 2007-2009, the variance for 2007 is the greatest. The major reason for this is the application of the 'Operating' cut-off grade policy for the Ontario Operations in 2007. The application of the short term, 5-year average Ni price of US $8.03 (vs. US $4.47 mineral resource/ mineral reserve) to short-term mine planning resulted in the mining of lower grade material that was not classified as mineral reserve.

Table 1-10: Mineral Reserves vs. Actual Assigned Production Comparison

Mine		Reserve			Mill Assigned			Mill vs. Reserve		
		Tonnes	%Cu	%Ni	Tonnes	%Cu	%Ni	Tonnes	%Cu	%Ni
Total Ontario Operations	**2009**	4,290,000	1.58	1.30	5,669,000	1.39	1.45	132%	88%	109%
	2008	6,898,000	1.56	1.46	7,267,000	1.52	1.44	105%	97%	99%
	2007	6,968,000	1.52	1.40	7,887,461	1.39	1.25	113%	91%	89%
	3 Year	18,156,000	1.55	1.41	19,964,461	1.46	1.32	110%	94%	94%

External Audits and Reconciliation Studies

In 2005, the Ontario Operations commissioned an external consultant (J. Spiteri) to audit the mines dilution rates and ore recoveries (mineability) and highlight opportunities for improvement. In general, the audit found that the mines employed strong grade control measures, and that the measured mineability and dilution rates were reasonable when compared to industry competitors. An internal mineability and dilution audit conducted by Mines Geology Department in 2006 and 2008 confirmed similar results.

AMEC E&C Services Inc. (AMEC) conducted an external audit of the 2004 Creighton Mine mineral resource and reserve estimates. Overall, the methods used for the 2004 MRMR estimates were found adequate and in compliance with the applicable regulatory requirements. In addition, the guidelines developed by Vale Inco Technical Services (VITSL) to define a FEL2 (pre-feasibility) level of engineering were validated by AMEC as being both compliant with minimum requirements and sufficient to support the mineral reserve estimates in areas where no active mining has been conducted (AMEC, Creighton Mine External Audit Report, January 24, 2005). AMEC conducted a comprehensive external audit in 2006 to review the McCreedy East 2005 mineral reserve and resource estimates, concentrating on the footwall Cu and precious metal deposits. The report was issued in July 2007 (AMEC, Technical Audit of 153 and 170 Deposits, McCreedy East Mine, Sudbury ON, July, 2007).

Quantitative Group (QGI) conducted an external audit of the 2007 Stobie Division A mineral resource and mineral reserve. The audit involved a ten-day site visit in September 2008 and a presentation of the initial findings to site personnel. The scope of the audit was to review the geology and resource estimation; mining and reserves; economic analysis; and opportunities. Overall, the methods used for the MRMR estimates were found adequate and in compliance with the applicable regulatory requirements (QGI, Stobie Complex, External Resource and Reserve Audit, Stobie Report_final .pdf, December, 2008).

A formal reconciliation study was undertaken at Garson Mine in 2004 (B. Thomas, 2004). The study involved comparing block models to actual mined tonnes and grade based on conductivity probing and cavity monitor surveys. These results were used to determine current mineability and dilution rates. A metal balance was conducted to ensure mineral reserves were not over-reported.

Less formal reconciliation studies were also conducted at Coleman Mine and Creighton #9 Mine in 2005. In general, the estimated tonnes and grade compared well with actual production.

A formal reconciliation study of the 800 and 810 orebodies by VITSL (Lloyd, T. and Zhang, L., 2007) was conducted in 2006 and the report issued in 2007. The study supported the current mineral resource and mineral reserve estimation techniques for offset deposits and supported historical mineability and dilution rates.

In September 2008, an independent audit was performed at Stobie Mine on the Division A sub-level cave mineral reserve and mineral resource by QGI. No fatal flaws were observed and the results of the audit and recommendations were issued to address shortfalls of the Division A Sub Level Cave mineral reserve and mineral resource estimates.

In June 2009, SRK Consulting (Canada) Inc. (SRK) completed an audit of the mineral resources and mineral reserves supporting the Garson Deep from 5100-5600 ft Levels. Following the scope of work outlined by Vale, SRK audited the Garson MRMR between 5100-45600 ft Level on the basis of the information contained in the FEL2 study and supporting documentation and files. The audit shows that although the FEL2 study generally complies with reporting requirements, certain aspects of the Project are improperly documented.

1.16 Environmental

A review of the environmental summaries in the 2009 MRMR Technical Reports for each of the seven Ontario operations, Coleman Mine, Copper Cliff North and South Mines, Creighton Mine, Frood/Stobie Mine, Garson Mine, Totten Mine and Ellen Pit, and the 2009 Ontario Operations Consolidated MRMR Technical Report was conducted through a fatal flaw review. Golder requested the following for each mine site to conduct the review:

- A list of environmental permits/licences/approvals including that date issued, process or operation permitted and expiry date (if any);
- A current site plan; and
- Confirmation that a Closure Plan was filed, the date issued and the updated closure costs.

Follow-up correspondence with Glen Watson and Carolyn Hunt, both of Vale, to provide additional information and further clarification was also completed.

Of the information that was provided to Golder, each of the seven Ontario Operations sites was found to have the necessary environmental permits for a typical mining operation. All of the sites have current Certificates of Approval for air and water discharges. Most of the sites had current permits to take water for mine dewatering with the exception of a few of the older sites which are considered to be “grandfathered”. Vale has stated that permits are being worked on for these sites over the next few years as the “grandfathering” ceases to apply.

A detailed review of each site’s sampling procedures, frequencies and/or sample analysis to determine whether they are meeting all the requirements under the above mentioned permits and approvals was not within the scope of this review.

The total closure costs listed in each site’s 2009 MRMR Technical Report is reflective of updated closure costing that was completed by Vale in 2007 / 2008 which are more reflective of actual closure costs, and are higher than those currently filed with the Ministry of Northern Development, Mines and Forestry.

It should be noted that The Climate Change/Greenhouse Gases and Toxics Reduction Act was passed at the end of 2009, and therefore the sections discussing this Act and Regulations in the MRMR will require updating to reflect this as well as Vale’s requirements pertaining to these Regulations (see O.Reg. 452/09 – Greenhouse Gas Emissions Reporting under the Environmental Protection Act and O.Reg. 455/09 – General under the Toxics Reduction Act, 2009).

1.17 Community and Government Affairs

There are no known community or government affairs issues that would materially impact the mineral reserve estimates at this time.

1.18 Operating Costs

The operating costs are a product of the compiled LOMP, which supports the economic justification of mining the mineral reserves only, for the purpose of this document. This differs from the strategic LOMP whereby local strategy is determined using mineral resources and potential mineral deposits and their associated estimated costs. These figures have been extracted from the 2009 Corporate MRMR and have not been verified independently by Golder. A summary of cash operating costs is provided in Table 1-11 and Table 1-12.

Table 1-11: Cast Operating Cost Summary

Cash Cost Summaries	US$ '000
Corporate SG&A	187,387
Primary metals SG&A	307,200
Legacy labour and pensions	1,280,099
EBC	1,038,949
Shutdown facilities	230,060
Land reclamation and decommissioning	195,030
Divisional R&D	172,166
Total	3,410,890

Table 1-12: Cash Costs, Fixed and Variable

Cash Costs, Fixed/Variable	US$ '000
Mines	5,252,899
Mills	663,798
Smelting	819,874
Refining	967,266
Delivery	412,542
Total Variable	8,116,380
Mine operating	3,212,161
Processing operating	3,186,300
Division overheads	2,356,787
Corporate overheads	3,410,890
Engineering strategic studies (SSS)	162,598
Exploration	199,485
Closure	1,335,959
Total Fixed	13,864,181

Mining Costs

The cash mining costs include the direct operating costs, mine operating expenses and transportation to the mill. These costs exclude the labour "legacy" costs (related to fixed pension liabilities, etc.), operations overhead costs and any surface processing costs. C.C. North and C.C. South mines have been combined into a single Copper Cliff Mine entry. The cash mining cost per ton for most operating mines decreased in 2009 as compared to previous years, as a result of a forced reduction in staff directly linked to the downturn in market conditions in late 2008.

Processing Costs

Most processing costs decreased in 2009 due mainly to the forced labour reductions in staff personnel early in 2009. The variable milling costs increased significantly in 2009 (68%) as compared to 2008 due to an accounting change in the fixed/variable cost split, but the total unit cost (fixed and variable costs) of milling actually decreased by 24% ($11.93/ton to $9.01/ton) during the same period as a result of the staff reductions.

Fixed Costs

Fixed cash costs are based on 2009 actual operating costs and budget. These include the fixed cash costs for milling, smelting and refining and all Ontario Operations overhead cash costs. In the MRMR economic evaluation, these costs are adjusted over time, based on the ratio of the refined Ni production from the mineral reserves only over the Ni production in the LOMP.

Corporate Costs

Corporate fixed cash costs are updated on an annual basis by the Corporate Office and are based on the 2009 Plan. In the MRMR economic evaluation, these costs are adjusted over time, based on the ratio of the refined Ni production from the Mineral Reserves only over the Ni production in the LOMP.

The total operating cash cost to mine the approximate 117 M tonnes of mineral reserves is estimated to be CDN $23.3 B for the Ontario Operations. This calculates to an average total operating cash cost of CDN $199.00 per tonne of mineral reserve mined, which is 7.6% higher than was reported at the end of 2008. This increase in the average cost of reserve is a result of most of the ore moved from the 2008 MRMR reserve to the 2009 MRMR resource classification (28.7 M tonnes) came from the Creighton #3 Shaft (18.7 M tonnes) which had both lower costs ($60.86/ton total operating cost) and lower grades (0.55%Cu, 0.87% Ni) assigned to it.

1.19 Capital Costs

The capital cost estimates used in the MRMR economic model are summarized in

Table 1-13. The principal reason for the decreased total capital costs in 2009 relative to 2008 is the change in operating strategy in 2009 from a growth to a sustaining strategy with limited capital expenditures in the early years. This change of strategy was a direct result of the downturn in the world economic markets in late 2008 and the subsequent softness in the forecasted demand for nickel in the short to medium term.

New, less capital extensive plans that sustain (not increase) current levels of production are now being developed. For example, the current mining plan that supports the Copper Cliff Deep mineral resources does not utilize the Copper Cliff Deep Project shaft, but rather "ramps" from existing C.C. North and C.C. South mines infrastructure.

The Capital expenditure profile is sufficient and appropriate to execute the LOMP as stated in this report.

Table 1-13: Summary of Total Capital Costs[1]

Area	2008 DCF M US$	2009 DCF M US$	Delta M US$
Mine Development & Construction	3,800.6	2,317.9	(1,482.7)
Mine Equipment	900.5	728.8	(171.7)
Mine Expense	133.9	7.9	(126.0)
Sub-total mines	**4,835.1**	**3,054.7**	**(1,780.4)**
Mill[2]	350.2	418.9	68.6
Processing[3]	1,515.0	1,969.3	454.3
Atmospheric Emissions Reduction (AER) Project	1,079.6	1,116.2	36.5
Other[4]	187.8	156.1	(31.7)
Total Ontario Operations Capital	**7,967.7**	**6,715.1**	**(1,252.6)**

Notes:

[1] *For mineral reserves only for the life of the Ontario Operations*

[2] *Does not include CORE Project*

[3] *Includes Acton and Clydach plants*

[4] *Includes misc. Ontario Operations departments such as Power, Transportation, Central Lab, Divisional Shops*

1.20 Taxation

Taxable income arising from carrying on the activities of the Ontario Operations is subject to comprehensive corporate income taxation under the Income Tax Act (Canada) (the “Income Tax Act”) and the Corporations Tax Act (Ontario) (the “Corporations Tax Act”) and mining tax under the Mining Tax Act (Ontario). The current applicable statutory rate under the Income Tax Act and the Taxation Act as applied to taxable income attributable to Ontario in 2010 is 18.0% (19.0% - 2009) and 12.0% (12.0% - 2009), respectively relating to mining income earned in Ontario. In 2009 Ontario harmonised its corporate income tax base with the federal income tax base with the exception of resource allowance whereby Ontario will retain the tax benefit of the resource allowance such that to the extent the company earns resource profits, the Ontario component of the statutory rate may be reduced.

The Mining Tax Act (Ontario) imposes a tax of 10.0% on mine profits derived from mining activities undertaken in the Province.

The MRMR Economic Model approximates cash taxes based on enacted combined statutory tax rates. These rates are currently scheduled to decline from 32.5% (2010) to 29.6% (2012 and thereafter) including estimated provincial mineral processing allowances. A capital cost allowance tax shield is also applied at an approximate 26.0% capital cost allowance rate. To the extent applicable, the MRMR Economic Model applies new mine tax incentives including accelerated depreciation on new mine development which may reduce the overall effective income tax rates.

1.21 Economic Evaluation of Mineral Reserves

Golder consultants were not provided with a copy of the Ontario Operations discounted cash flow (DCF) spreadsheet model; however, Golder was permitted to review and audit the DCF model on secure Vale computers to gain an understanding of the model, to assess its correctness and to test project sensitivities to key input variables.

Key Assumptions

A summary of the key parameters used in the economic analysis for the Ontario Operation is presented in External Audit of Mineral Reserves, Volume 1, Consolidated Report, Key Assumptions.

Ontario Operations Cash Flow Evaluation

The cash flow forecast is based upon the updated depleted mineral reserve estimate for the Ontario Operations' deposits. The total Ontario Operations cash flow for both the Vale and three-year pricing assumptions, remained positive demonstrating project economics supporting the declaration of mineral reserves.

The cash flow forecast is based on the June 2010 update of the 2009 MRMR Economic Models, including Reserve depletion year-to-date, which reflects the following assumptions:

- The financial calculations are based on an after tax discount rate.
- Taxes are approximated with a 30% tax rate (declines from 32.5% in 2010 to 29.6% in 2012 and beyond) on taxable income after a capital cost allowance of 26%, on a declining balance basis.
- All costs and prices are in un-escalated “real” dollar terms.
- The operating costs include both fixed and variable cash mining costs, based on the mine plans, and the milling, smelting, refining and delivery variable cash costs based on the 2009 actual costs to the end of May 2009.
- Fixed cash costs for the Ontario Operations overheads, the mill, smelter and refineries and the corporate cost distributions are based on the 2009 budget and are included as line items, adjusted over time based on the annual ratio of the processed Ni from mineral reserves only to the total Ni production in the LOMP.
- Closure cash costs are included as lump sums at the end of the life of a site, following the completion of the LOMP.
- Unit cost assumptions are based on a defined metal throughput for the 2009 Plan (not reviewed by Golder).
- Future unit cost assumptions assume similar metal production.
- Capital costs include forecast expenditures for the mines, mill, smelter, refineries and other departments.
- Production is based on the Ontario Operations mine’s mineral reserves only; no external feeds or concentrates have been included in this economic analysis.

- Mill recoveries for copper and nickel are based on a mill model, with factors updated to match the 2009 production plan. Recoveries for cobalt and precious metals are based on factors developed for the 2009 production plan. If calculated mill recoveries exceed normal operating parameters they are adjusted for top cut to respect probable recoveries. Smelting and refining recoveries are also based on factors from the 2009 production plan. Copper concentrate separation at the mill is included in the model at 45% of the copper content in the ore.
- Revenue is calculated from the recoverable metal and the long term forecast of metal prices and exchange rate, based on SEC reporting requirements (three-year moving average prices). Revenue from the sale of a copper concentrate is included, based on the contained metal, accountability factors and the long term forecast for metals prices and exchange rates. The sale of copper anodes is addressed in the model.

Sensitivity Analysis

Golder was permitted to review and audit the DCF model on secure Vale computers to gain an understanding of the model and to assess its correctness and to test project sensitivities to key input variables.

It was observed that the model contained construction costs, reclamation and closure costs, detailed federal and provincial tax sheets, sustaining capital allowances, and the correct schedule from the (updated) 2009 MRMR reports. The base case cost and price assumptions have been updated since the release of the 2009 MRMR, and these changes are reflected within the model.

Base case cash flows were observed for individual years using the three-year moving average price assumption scenario. Using the DCF spreadsheet, significant changes were made to price and cost assumptions to test the robustness of project economics. Detailed sensitivity analysis was not possible; however, the cases tested involved making +/-20% changes, in five percentage point increments, to nickel price, capital expenditure, operating costs and foreign exchange. Furthermore, Golder tested the effect of changes in discount rate between 6% and 10%, in increments of half a percentage point.

The results are presented in Figure 1-2.

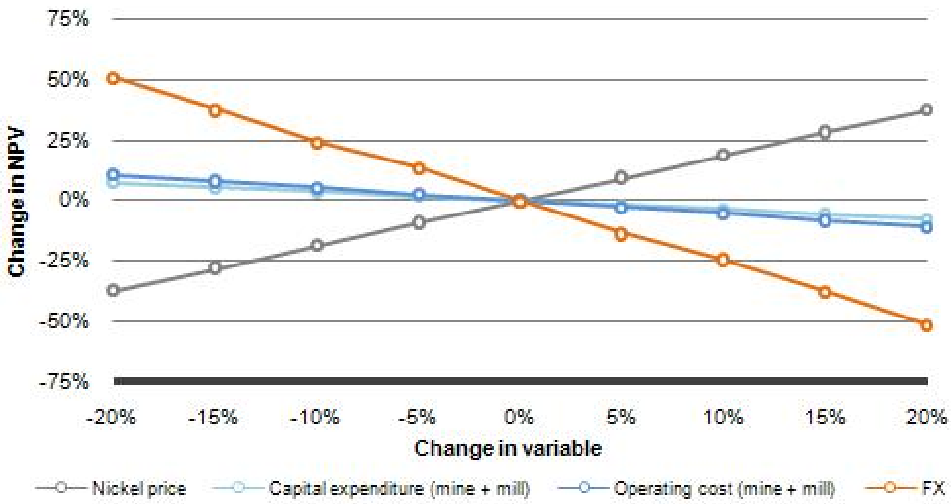

Figure 1-2: Ontario Operations Sensitivity Analysis

The NPV was most highly sensitive to the US$/C$ exchange rate with the Ni price having a lesser but still significant effect on the NPV. Both factors are considered highly significant value drivers. The NPV was least sensitive to mine capital costs.

Conclusions and Recommendations

In both cost and pricing assumptions scenarios used (Vale and three-year moving average), positive project economics support conversion of mineral resources to mineral reserves. Under sensitivity analysis, the NPV remained positive in all cases tested, suggesting robust project economics.

The financial model used for MRMR reporting adopts an end-of-year discounting convention. This is a commonly used method of discounting future cash flows.

The financial model is large and cumbersome, due to a long mine life and multiple previous stakeholders in the data. This has lead to complexity and multiple formulae referencing cells on multiple input sheets, in addition to formula trails that are difficult to follow. Legacy models are difficult to audit and frequently contain much information that is not used.

It was noted that the financial model reflects the strike activity at Sudbury, with only 5% of the budgeted production in the 1st half of 2010. The production for the remainder of the LOMP has not been changed however, to reflect this, with 95% of 2010 budgeted production occurring in the 2nd half of 2010.

1.22 Mine Life

The Ontario Operations develops an annual LOMP that includes all reserves, resources and potential resources. The most current LOMP was developed in late 2009 and the period 2010 to at least 2025 for each mine. The 5-year plan (2010 to 2014) for each mine is composed entirely of mineral reserves only.

Table 1-14 presents the five-year mine production rates for the mines in the Ontario Operations.

Table 1-14: Five-Year Mine Production for Ontario Operations (Wet Tons Mined from LOMP 2009)

Mine	2010	2011	2012	2013	2014
Copper Cliff	996,010	1,188,780	926,590	1,888,760	2,365,037
Coleman	1,633,844	1,656,875	1,706,735	1,642,699	1,748,078
Creighton	1,154,508	1,378,727	1,333,664	1,288,046	1,049,466
Garson	981,910	840,857	852,393	872,436	833,000
Frood-Stobie	3,184,396	3,148,584	3,251,565	3,238,368	3,234,336
Totten	54,288	308,676	654,936	765,600	765,600

Table 1-15 presents the five-year plan for total Ni production in ore from the Ontario Operations.

Table 1-15: Five-year Ni production for Ontario Operations (Lbs Ni in Ore from LOMP 2009)

Mine	2010	2011	2012	2013	2014
Copper Cliff	23,499,361	28,019,134	19,761,312	37,868,108	47,547,116
Coleman	51,710,874	52,214,174	54,154,388	52,319,501	54,163,967
Creighton	44,241,033	52,340,407	48,356,001	46,376,945	39,459,260
Garson	26,860,689	27,566,594	29,190,569	29,493,053	29,821,400
Frood-Stobie	45,808,183	41,167,761	42,788,102	44,332,381	46,474,084
Totten	2,258,381	9,630,691	20,826,965	25,111,680	25,264,800

A detailed LOMP is developed for the Ontario Operations based on the individual mines and production areas at each mine. This plan is supported by historical data and factors, actual mine plans and FEL2 studies, depending on the area. The level of review completed by the QP on the mine life plan did not identify any fatal flaws.

REFERENCES

Reports

Drilling Procedures and Parameters.doc, Coleman Mine

Mineral Resource Estimation.doc, Coleman Mine

Production Reconciliation.doc, Coleman Mine

Resource Classification.doc, Coleman Mine

Upper Coleman Final report.doc

Spreadsheets

2009 MRMR Dec 9 CC Mine v1 (Nov 30)b.xls

2009 MRMR Dec 9 Coleman v1 (Nov 11)b.xls

2009 MRMR Dec 9 Creighton v1 (Nov 18)b.xls

2009 MRMR Dec 9 Ellen v1 (Nov 11)b.xls

2009 MRMR Dec 9 Garson v1 (Nov 30)b.xls

2009 MRMR Dec 9 Stobie v1 (Nov 30)b.xls

2009 MRMR Dec 9 Totten v1 (Dec 14)b.xls

2009 EQUIP REQUIREMENT 2009-2013 SHEET Pivot table.xls

17-Creighton 2010 LOMP v7_Nov 12 09 (2009 MRMR).xls

Creighton Asset Integrity Projects Feb 19 2010 v3.xls

Garson Working Mine Plans.xls

MRMR 2008A-2009A Groupings OPEX Costs.xls

Planning Assumptions 2010-2014 – April 30 2010 v2.0.xls

Price Deck (Sept 16th 2009) v2.xls

R1Q1 Forecast Feb 11_08_LOM_2007 Creighton Aug_22_07NEW.xls

LOM3b (MRMR Dec 9 2009)(3yearrunning avg metal price).xls

LOM3b (MRMR Dec 9 2009)(3yearrunning avg metal price)b.xls

LOM3b (MRMR July 1 2010)(3yearrunning avg metal price).xls

LOM3b (MRMR July 1 2010)(April 30 metal prices).xls

LOM3b (MRMR July 1 2010)(April 30 metal prices).xls

Appendix F – 2009 Assumptions – 2009 Mineral Res Calc-3-yr avg Metal-Prices – May 2010(2).xls

Presentations

2009 Planning – Jan MC pres.ppt

Planning Assumptions 2010-2014-April 30 2010v2.0.xls

2009 LOBP 3.ppt

MRMR Presentation East Mines.ppt

MRMR Presentation West Mines.ppt

Stope design.ppt

Figures

Diagram of Annual Planning Cycle (LOMP MRMR).pdf

Report Signature Page

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