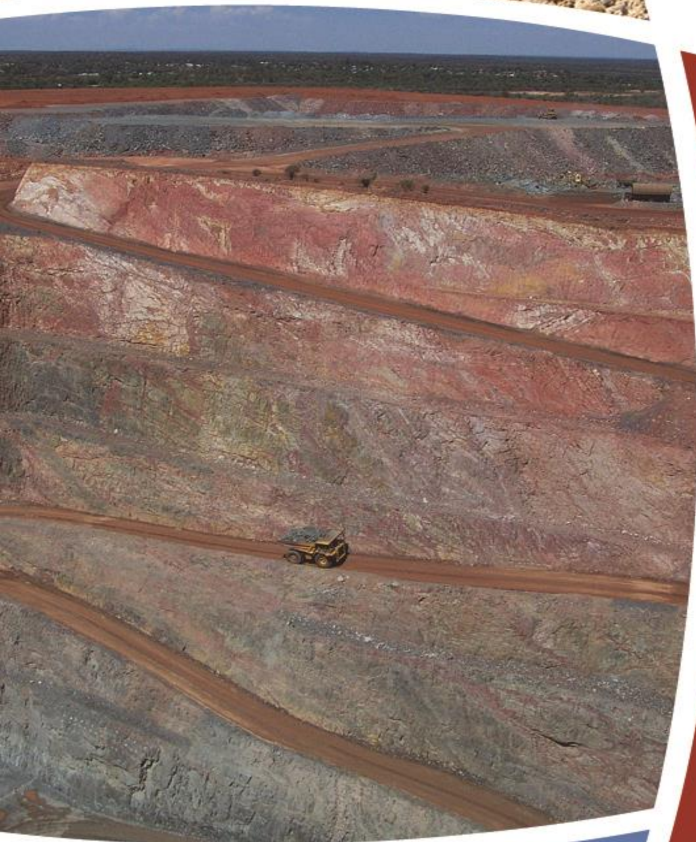

CSA Global
Mining Industry Consultants

NI 43-101 TECHNICAL REPORT

Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Province of Québec, Canada

CSA Global Report Nº R176.2020
Report Date: 9 April 2020
Effective Date: 27 February 2020

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Report information

Report Title	NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Province of Québec, Canada
Filename	R176.2020 VONEPEA01 Mont Sorcier NI 43-101 PEA Report - FINAL.docx
Last Edited	9/04/2020 3:41 PM
Report Date	9 April 2020
Report Effective Date	27 February 2020
Report Status	Final

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I, Luke Longridge, Ph.D., P.Geo, do hereby certify that:

- I am employed as a Senior Structural Geologist with the firm of CSA Global Consultants Canada Limited, an ERM Group company, located at 1111 West Hastings Street, 15th Floor, Vancouver, BC, V6E 2J3, Canada.
- I was admitted to the Degree of Bachelor of Science with Honours (Geology), from the University of the Witwatersrand, Johannesburg, South Africa in 2007. I was admitted to the Degree of PhD (Geology) from the University of the Witwatersrand in 2012.
- I am registered as a Professional Geoscientist (P.Geo) with the Engineers and Geoscientists British Columbia (EGBC), licence number 49259 and am registered on the Roll of members of the Ordre des Géologues du Québec (OGQ) to practice in Quebéc (licence number 02199).
- I have worked as a geologist since my graduation 12 years ago, and I have over eight years' experience with vanadiferous titanomagnetite mineral projects in South Africa and Canada.
- I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that because 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 purposes of NI 43-101.
- I have visited the Mont Sorcier Project on 30–31 October 2018.
- I am a co-author of the technical report titled: "NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Quebec, Canada" for Vanadium One Iron Corp., Effective Date 27 February 2020 (the "Technical Report"). I am responsible for Sections 2 to 12 inclusive, Sections 23, 24 and 27 and parts of Sections 1, 25 and 26.
- I have prior involvement with the Property and Issuer; I previously co-authored the technical report titled: "NI 43-101 Technical Report on the Mont Sorcier Project, Quebec, Canada" for Vanadium One Energy Corp., Effective Date 23 April 2019.
- As of the Effective Date of the Technical Report (27 February 2020), 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.
- I am independent of the Issuer applying all the tests in section 1.5 of NI 43-101.
- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

DATED this 9th day of April 2020 in Vancouver, Canada

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- I am registered as a Member of the AusIMM – Australian Institute of Mining and Metallurgy (since 1987), member No. 107390.
- I have been accredited as an AusIMM Chartered Professional under the discipline of Mining in Oct. 2016.
- I have experience in reporting ore reserves as a “Lead Competent Person” under JORC and SEC rules and mine planning risk assessment under SOX.
- I have worked as a mining engineer in various roles at iron ore mines in Australia for the RioTinto, BHP and Hammersley Iron, with 12 years of cumulative experience. Further, I have worked at many gold mining operations in Australia, West Africa and South America and cumulative of 7 years as a consultant mining engineer with BHP Engineering, Hatch and CSA Global.
- I have read the definition of “Qualified Person” set out in National Instrument 43-101 (“NI 43-101”) and certify that through my education, affiliation with a professional association (as defined in NI 43-101) and past work experience, I fulfill the requirements to be a “Qualified Person” for the purposes of NI 43-101.
- I am a co-author of the technical report titled: “NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Quebec, Canada” for Vanadium One Iron Corp., Effective Date 27 February 2020 (the “Technical Report”). I am responsible for Sections 1.8 and 16 and parts of 1.14, 18, 21 and 25.
- I have no prior involvement with the Property or Issuer.
- As of the Effective Date of the Technical Report (27 February 2020), 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.
- I am independent of the Issuer applying all the tests in section 1.5 of NI 43-101.
- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

DATED this 9th day of April 2020 in Perth, Australia

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Karol Bartsch, B.Sc. (Hons.), MAusIMM (CP, Mining)

Certificate of Qualification of Co-Author – Bruce Pilcher, B.E. (Mining), FAusIMM (CP Min)

I, Bruce Pilcher, B.E. (Mining), FAusIMM (CP Min) do herby certify that:

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- I have achieved the degree of Bachelor of Engineering (Mining), at the University of Sydney, Faculty of Engineering, 1984.
- I am a Fellow of the Institute of Material, Minerals and Mining (FMMM) (#50141) and Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM) (#101906).
- I am a registered Chartered Engineer (C Eng) with the Engineering Council UK (#526806), Chartered Professional Mining (CP Min) (#101906) and European Engineer (Eur Ing) with the European Federation of National Engineering Association (FEANI) (#30087).
- I have worked in the minerals industry for 30 years in the mining industry in Australia, South Africa, United Kingdom, Europe and North America.
- I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that through my education, affiliation with a professional association (as defined in NI 43-101) and past work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.
- I am a co-author of the technical report titled: "NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Quebec, Canada" for Vanadium One Iron Corp., Effective Date 27 February 2020 (the "Technical Report"). I am responsible for Section 22 and parts of Sections 1, 25 and 26.
- I have no prior involvement with the Property or Issuer.
- As of the Effective Date of the Technical Report (27 February 2020), 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.
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- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

DATED this 9th day of April 2020 in Horsham, UK

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{Bruce Pilcher}

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Bruce Pilcher, B.E. (Mining), FAusIMM (CP Min)

Certificate of Qualification of Co-Author – Dr Adrian Martinez Vargas, Ph.D., P.Geo.

I, Adrian Martinez Vargas, PhD., P.Geo. (ON, BC), do hereby certify that:

- I am employed as a Senior Resource Geologist with the firm of CSA Global Consultants Canada Ltd, an ERM Group company, located at Suite 401, 15 Toronto Street, Toronto, Ontario, M5H 2V1, Canada.
- I graduated with a degree in Bachelor of Science, Geology, from the Instituto Superior Minero Metalurgico de Moa (ISMM), 2000. I have a Postgraduate Specialization in Geostatistics (CFSG) MINES ParisTech, 2005, and a PhD on Geological Sciences, Geology, from the ISMM in 2006.
- I am a Professional Geoscientist (P.Geo.) registered with the Association of Professional Geoscientists of Ontario (APGO, No. 2934). I completed and reported the Mt. Sorcier mineral resource estimate in 2019 under Special Authorization from the Ordre des Géologues du Québec to practice in Quebéc (OGQ No. 446).
- I have worked as a geologist since my graduation 19 years ago, I have experience with precious and base metals mineral projects in Cuba and Canada, including Mineral Resource estimation.
- I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that because 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 purposes of NI 43-101.
- I have not visited the Mont Sorcier Project.
- I am a co-author of the technical report titled: "NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Quebec, Canada" for Vanadium One Iron Corp., Effective Date 27 February 2020 (the "Technical Report"). I am responsible for Section 14 and parts of Sections 1, 25 and 26.
- I have prior involvement with the Property and Issuer; I previously co-authored the technical report titled: "NI 43-101 Technical Report on the Mont Sorcier Project, Quebec, Canada" for Vanadium One Energy Corp., Effective Date 23 April 2019.
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- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

DATED this 9th day of April 2020 in Toronto, Canada

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{Adrian Martinez Vargas}

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Adrian Martinez Vargas, PhD., P. Geo

Certificate of Qualification of Co-Author – Georgi Doundarov, M.Sc., P.Eng., PMP, CCP

I, Georgi Doundarov, M.Sc., P.Eng., PMP, CCP, do hereby certify that:

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- I am a graduate from the University of Mining and Geology, Sofia, Bulgaria, 1996 with a M.Sc. in Mineral Processing and Metallurgy, and I have practised my profession continuously since that time.
- I am a graduate from the Yokohama National University, Yokohama, Japan, 2005 with a M.Sc. in Infrastructure Management – Mineral Processing and Metallurgy, and I have practised my profession continuously since that time.
- I have worked as a metallurgical engineer, project manager, cost professional, as well as taking various executive positions at consulting and mining operating companies since my graduation, and I have over 25 years of experience with mineral projects in Canada and internationally.
- I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that because 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 purposes of NI 43-101.
- I have not visited the Mont Sorcier Project.
- I am a co-author of the technical report titled: "NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Quebec, Canada" for Vanadium One Iron Corp., Effective Date 27 February 2020 (the "Technical Report"). I am responsible for sections 13, 17, 20, and parts of 1, 18, 21, 22, 25, and 26.
- I have no prior involvement with the Property or Issuer.
- As of the Effective Date of the Technical Report (27 February 2020), 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.
- I am independent of the Issuer applying all the tests in section 1.5 of NI 43-101.
- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

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- I hold a MSc degree in Mining Engineering from the University of Petrosani, Petrosani, Romania and am a registered Member in good standing of the Professional Engineers Ontario (Membership Number 100078587).
- My experience includes 26 continuous years in the engineering and mining industry.
- I have read the definition of “Qualified Person” set out in National Instrument 43-101 (“NI 43-101”) and certify that because 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 purposes of NI 43-101.
- I have not visited the Mont Sorcier Project.
- I am a co-author of the technical report titled: “NI 43-101 Technical Report - Preliminary Economic Assessment (PEA) of the Mont Sorcier Project, Quebec, Canada” for Vanadium One Iron Corp., Effective Date 27 February 2020 (the “Technical Report”). I am responsible for Sections 15 and 19 and parts of Sections 1, 22, 25, and 26.
- I have no prior involvement with the Property or Issuer.
- As of the Effective Date of the Technical Report (27 February 2020), 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.
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Appendices

Appendix A Summary Discounted Cash Flow Model
Appendix B Glossary of Technical Terms and Abbreviations

1 Summary

1.1 Introduction

In December 2019, Vanadium One Iron Corp. (VONE or "the Issuer") engaged CSA Global Consultants Canada Limited (CSA Global), an ERM Group company, to complete a Preliminary Economic Assessment (PEA) and Technical Report ("the Report") for the Mont Sorcier Iron, Vanadium and Titanium Project ("Mont Sorcier Project" or "the Project" or "the Property") in Roy Township, Québec.

The Report, with an Effective Date of 27 February 2020, is reported in accordance with National Instrument 43-101 (NI 43-101) (30 June 2011), companion policy NI 43-101CP, and Form 43-101F1 (Standards of Disclosure for Mineral Projects). The Mineral Resource estimate (MRE) used in this PEA was previously reported in a NI 43-101 Technical Report with an effective date of 23 April 2019 (Longridge and Martinez Vargas, 2019) and has been prepared in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves (10 May 2014). Only Mineral Resources are estimated – no Mineral Reserves are defined.

The Report is intended to assess the economic potential of the Mont Sorcier Project at a PEA level of study and to enable the Issuer and potential partners to reach informed decisions with respect to the Project.

1.2 Location

The Mont Sorcier Property is located approximately 20 km east of the town of Chibougamau within Roy Township, Québec, Canada. It covers an area of approximately 1,919 hectares (4,797.5 acres) and comprises 37 map-designated cells (see Section 4). The centre of the Property lies at approximately Latitude 49° 54.5'N, Longitude 74° 07'W (NTS Map Sheet: 32G-16).

1.3 Geology

The Project area is located at the northeast end of the Archaean Abitibi Sub-Province (Superior Province), comprising east-west trending volcanic and sedimentary "greenstone belts". The volcanic-sedimentary belts are folded and faulted and typically have a steep dip, younging away from major intervening domes of intrusive rocks. Major, crustal-scale, east-trending fault zones are prominent in the Abitibi greenstone belt. In the Chibougamau area, a large layered mafic complex (the Lac Dore Complex or LDC) has been emplaced into the volcaniclastic stratigraphy.

The LDC is a stratiform intrusive complex composed primarily of (meta-) anorthosite with lesser amounts of gabbro, anorthositic gabbro, pyroxenite, dunite and harzburgite, and is comparable to other better known complexes such as the Bushveld Complex in South Africa, the Skaergaard Intrusion in Greenland or the nearby Bell River Complex in Matagami, Québec. The anorthosite represents 70–90% by volume of the lithologies present within the LDC. A younger granite emplaced in the centre of the LDC obscures the mafic lithologies in this area. The LDC stratigraphy comprises four zones (Allard, 1976):

- The lowermost anorthositic zone composed of anorthosite and gabbro
- The layered zone composed of bands of ferro-pyroxenite, magnetite-bearing gabbro, magnetitite (rock consisting of at least 90% magnetite) (containing titanium and vanadium) and anorthosite
- The granophyre zone (at the top) composed of soda-rich leuco-tonalite
- The border zone in contact with the surrounding sedimentary and volcanic rocks.

The Project area itself straddles the contact between the mafic magmatic rocks of the LDC to the south and sediments and mafic volcanics of the Roy Group to the north, into which the LDC is emplaced. Within the property, the volcanic stratigraphy of the Roy Group comprises predominantly basaltic to andesitic rocks of the

Obatogamau Formation and Basalt, andesitic basalt, mafic to felsic volcaniclastic rock, dacite, rhyolite, banded iron formation, chert, and argillite of the Waconichi Formation. Both the LDC and Roy Group are crosscut by mafic to ultramafic sills and younger plutonic intrusions ranging from tonalites to carbonatites.

The Project area is largely underlain by anorthosites of the LDC, which grade into the iron-rich ultramafic units through a crude stratigraphy comprising (from base to top): anorthosite, gabbro, magnetite-gabbro, magnetite-pyroxenite, magnetite-peridotite, magnetite-dunite and centimetre-scale magnetitite layers. The presence of magnetite is strongly associated with ultramafic units – although magnetite is locally observed within anorthosites, it occurs only as minor disseminations or veinlets within the anorthosites. The banded iron formation (BIF) of the Waconichi Formation is also notable in the project area, the LDC can be seen in contact with these BIFs, and in places, possibly assimilating them. This may have implications for the formation of the low-Ti magnetitites within the Project.

The upright regional folding has also affected the layered mafic-ultramafic rocks of LDC in the Mont Sorcier area, and the Project area represents the northern limb of the large east-west trending anticlinal LDC. The North Zone and South Zone represent the same stratigraphic unit that has been folded into kilometre-scale parasitic folds, with the North Zone representing the north-dipping limb of a smaller-scale anticlinal fold structure, and the South Zone representing the hinge zone of a syncline (see Section 7).

1.4 Mineralization

Magnetite mineralization at the Mont Sorcier Project shows several similarities to other magmatic vanadiferous titanomagnetite (VTM) or ilmenite deposits associated with layered mafic intrusive complexes, where repeated crystallisation and settling of magnetite leads to the formation of magnetite layers. Vanadium is compatible in the magnetite crystal structure and fractionates into magnetite. However, VTM mineralization at Mont Sorcier is unusual in several respects:

- It is associated with olivine-bearing ultramafic units, with remarkably primitive compositions; and
- The VTM is anomalously low in titanium, with TiO_2 grades generally below 2%.

In the North Zone, mineralization is interpreted to occur as a roughly tabular body, with a subvertical to steep northerly dip, and striking east-west. The North Zone is identifiable in the field and through airborne magnetics over a strike length of approximately 4 km and has been drilled over approximately 2.5 km of its strike length. In the South Zone, tabular mineralization has been folded around a synclinal axis with a shallow west-southwest plunging orientation. The South Zone is identifiable over approximately 3 km strikes east-northeast to west-southwest and has been mapped in detail as well as being drilled over its entire strike length. Both the North Zone and South Zone mineralized bodies trend roughly east-west and are steeply dipping; however, the North Zone is interpreted to extend to significant depths (the actual vertical extent has not yet been confirmed and the base of mineralization is unknown). The South Zone mineralization is expected to terminate at depth owing to its position in the hinge of a shallow-dipping syncline. Mineralization is interpreted to vary between approximately 100 m and 200 m in true thickness in the North Zone and South Zone.

1.5 Historical Exploration

The bulk of historical work exploration pertinent to the Property was conducted by Campbell Chibougamau Mines in 1961, 1965 to 1969 and 1974 to 1975, who carried out detailed investigations into the potential of the magnetite layers on the Property, primarily as an iron resource. Work included a ground magnetic survey, geological mapping, electromagnetic surveys, geochemistry, trenching, surface diamond drilling, sampling and assaying, and metallurgical testwork. Details of the results of this testwork are available and include drillhole logs, assay results, metallurgical testwork reports, and historical grade and tonnage estimates. The drillholes were primarily drilled between 1963 and 1966 and were selectively resampled as composites and re-assayed in the 1970s. Two drillholes were also drilled by Chibougamau Independent Mines in 2013, and these drill cores are retained by VONE.

1.6 Exploration

Between 2017 and 2019, VONE has carried out stripping, mapping and reprocessing of an earlier airborne geophysical survey of the property. Stripping was used to expose the glaciated bedrock, which was used for mapping focused on identifying major structures within the deposit and mapping the distribution of mafic and ultramafic units.

The data from an airborne magnetic survey carried out by AeroQuest in 2010 using a helicopter-borne tri-axial gradiometer at 100 m line spacing and 30 m height was reprocessed in 2018 and the results were used to aid the geological modelling and interpretation. Products included total magnetic intensity (TMI) and measured vertical gradient.

The combination of mapping and airborne magnetics has shown that areas underlain by magnetite-bearing ultramafic rocks correspond to magnetic highs.

A total of 32 NQ diameter drillholes (7,388.18 m) were drilled on the Mont Sorcier North and South zones between 2017 and 2018 (see Section 10). Core was logged, split, sampled and analysed for head grades (using fused disc x-ray fluorescence [XRF]), percentage of magnetic minerals (determined using Davis Tube Testing) and the grades of the concentrates (via fused disc XRF).

1.7 Mineral Resource Estimates

The MRE was prepared by Dr Adrian Martínez-Vargas, P.Geo., a senior consultant of CSA Global. Mineral Resources were estimated in two zones of the property, the North Zone and the South Zone, using all drillhole data available by April 2019.

VONE provided Dr Luke Longridge, one of the authors of this report, with a digital elevation model (DEM) covering the property, and with the drillhole databases described in Sections 10, 11 and 12 of this report. Dr Longridge prepared the geological interpretation of the mineralized domains that were used to constrain the extend of the mineralization in the resource model. Dr Martínez-Vargas reviewed the informing data, the compiled database, and the geological interpretation completed by Dr Longridge and considers that the quality and quantity are appropriate for Mineral Resource estimation.

The MRE workflow was as follows:

1.7.1 Input Database Validation

The database consists of two drilling datasets:

- An older dataset based on drilling between 1963 and 1966, with average ~7 m intervals sampled and assayed for Fe_2O_3 and TiO_2, but also included larger (10–60 m) composite intervals from which Davis Tube magnetic concentrates were prepared and assayed for several oxides, including V_2O_5, in the 1970s. These composites were also assayed for Fe_2O_3 and TiO_2 head grades.
- Data from drilling between 2013 and 2018, and sampled over ~2 m (in the South Zone) or ~3 m (in the North Zone) intervals, and assayed for Al_2O_3, Fe_2O_3, MgO, TiO_2, SiO_2, CaO, Cr_2O_3, K_2O, MnO, Na_2O, P_2O_5, Na_2O, and P_2O_5, in both the head grade and in the magnetic fraction produced using Davis Tube magnetic separation. Cu and S head grades were collected for some intervals.

These data were separated into two sets of collar, survey, and assay tables in CSV format, one set for the North Zone and one for the South Zone of the property. These tables were imported in the python package PyGSLIB, and validated for presence of gaps, overlap and relation issues between tables.

1.7.2 Compositing

The average sampling interval in the 2013–2018 drilling campaigns is ~3 m in the North Zone and ~2 m in the South Zone. The average sampling interval in the 1963–1966 drilling campaigns is ~7 m in both zones. Composite samples collected in the 1970s from the 1963–1966 drilling campaigns are between 10 m and 60 m in length. Drillhole intervals for head grade interpolation were composited at 3 m in the North Zone and 2 m in the South Zone. Composites of 20 m were created to interpolate average grades in concentrate and to interpolate a head grade trend (a smooth reference grade). Composited samples collected in the 1970s were used to populate intervals without assay, but only to generate 20 m composites. The 20 m composited samples were not used to interpolate head grade and percent of magnetite.

1.7.3 Statistical Analyses

The statistical analyses were completed using composited intervals for both head grade and grade in concentrates. The analysis was done separately for each of the mineralized domains of the South Zone and the North Zone, using Supervisor software, and consisted of de-clustering analysis when necessary, exploratory data analysis, construction of histograms and cumulative histograms, basic statistical calculations, and a basic multivariate statistics review. De-clustering was used only in the South Zone, and an appropriated de-clustering cell was deduced by comparing many cell sizes. The univariate statistics analysis consisted of calculating basic statistics such as mean values and coefficient of variations (CVs). All CVs are lower than one, which is a good empirical criterion to use linear interpolators such as the inverse of the distance, ordinary kriging, and simple kriging.

1.7.4 Geostatistical Analysis

Experimental variograms were calculated only for head grade variables and percent of magnetite, using 2 m and 3 m composites, and fitted to a variogram model. In the North Zone, the down dip variogram model was used as a reference to fit an omnidirectional variogram model. In the South Zone, where the quantity of drillholes with close spacing is higher, the variogram model was fit from directional variograms. It was found that the same variogram model fits properly the experimental variograms of the head grade variables and the percent of magnetite.

1.7.5 Density

Density measurements were taken using gas pycnometry at both SGS and Activation Laboratories. Of the 2,273 samples submitted during 2017 and 2018, 278 samples (12.13%) were measured for density. Density values show a positive correlation with total iron of the samples, and the Fe_2O_3 of the sample was used to estimate the density for samples with no pycnometry using a polynomial formula based on regression analysis which corresponds well to a theoretical mixing model between magnetite, olivine and feldspar.

1.7.6 Block Modelling and Interpolation

Block models with 10 m cube blocks were created for the North Zone and South Zone and filled with blocks inside the mineralized domains. An approximate percentage of the block inside the solid was used to reproduce the solid volume. The models were then visually validated, section by section and no missing blocks or artifacts were identified. This estimate consists of two main components:

- **Components characterizing the in-situ properties of the rock.** These include head grade assays and percent of magnetite. Only Fe_2O_3 and TiO_2 head grades were used, as well as the percent of magnetite. These three in-situ components of the rock were interpolated using simple kriging with local mean (SKLM). The local means were estimated in block models with inverse of the squared distance using 20 m composites informed by sample intervals assays. In some instances where there was no data in the regular sample interval, larger length composites assays were used. The local means are smooth and are intended to represent grade trends at large distances, therefore using sample composites are appropriated for this purpose. Up to 50 composites were used for interpolation, with a maximum of 20 samples per drillhole. In addition, simple kriging, with local trend or mean, was used to interpolate using only regular sample intervals composited at 2 m and 3 m intervals, where this data was available. This approach was used to re-produce the smaller-scale local distribution of grade where such small-scale distributions are available through more detailed sampling. A minimum and maximum of eight and 30 samples were used to interpolate, with a maximum of five samples per drillhole. This combined approach using both larger length and smaller length composites allows integration of all the data available, while maintaining a resolution appropriate to the level of detail in the sampling.

- **Components characterizing the magnetite concentrate produced after crushing the rock and magnetic separation of the magnetite.** These are the assayed grades of the chemical elements in the concentrate. The Al_2O_3, Fe_2O_3, MgO, SiO_2, TiO_2, Fe_2O_3, and V_2O_5 grades in magnetite concentrates were interpolated using the same approach and interpolation parameters used to estimate local means or trends.

The average grade of the concentrates was modelled using grade in concentrate available in sample intervals of the 2010 drillholes and in the 1970s composite samples collected from the 1963–1966 drillholes, using a smooth interpolator and long compositing intervals. The concentrate grade is affected by granulometry of the sample, and samples drilled in 1963–1966 were milled to smaller sizes than those drilled in 2013–2018, resulting in a small difference in the iron grade of the concentrate; however, this is not considered material at this stage of the Project.

1.7.7 Model Validation

Model validation consisted of visual comparison of drillholes and blocks in sections, comparison of average grades and statistical distributions, validation with swath plots, and global change of support. The author is of the opinion that all the model validations were satisfactory, and the estimates are appropriated for Mineral Resource reporting and for mining studies.

1.7.8 Mineral Resource Classification and Reporting

The aim of this Project is to produce a saleable magnetite concentrate, with potential value added from the vanadium (V_2O_5) content of the concentrate. In order to assess reasonable prospects of eventual economic extraction in the 2019 MRE, a 65% Fe magnetite concentrate was assumed would be saleable at US$90 per dry metric tonne. A V_2O_5 price of 30,864.68/tonne (US$14/lb) was assumed, and it is assumed that VONE would be able to realize 50% of the value of the V_2O_5 value contained in the concentrate (i.e. US$15,432.34/tonne). An analysis of assumed costs and revenue was used to evaluate Fe_2O_3 cut-off grades at varying V_2O_5 concentrate grades. A head grade of 20% Fe_2O_3 (or 14% Fe) was selected as the reference cut-off for resource reporting. All unconstrained resources fell within theoretical pit shells derived for both zones.

The resource classification definitions used for this estimate are in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves (CIM Council, 10 May 2014). Only Mineral Resources are estimated – no Mineral Reserves are defined.

Mineral Resources in areas with drillhole spacing between 400 m and 200 m were classified as Inferred Resources. Areas with drillhole spacing between 200 m and 100 m, and mostly drilled in recent campaigns, were classified as Indicated Resources. Blocks located more than 50–70 m below drilling were not classified. Blocks without interpolated values of percent of magnetite, Fe_2O_3 head grade, or V_2O_5 in the concentrate were not classified. The classification was completed by selecting blocks within classification polygons manually digitized along drillhole sections.

With an effective date of 23 April 2019 and based on the above criteria, a summary of Mineral Resources reported over a cut-off of 20% Fe_2O_3 head grade (or 14% Fe) is shown in Table 1-1.

Table 1-1: MRE for the Mont Sorcier Project effective 23 April 2019; cut-off grade is 20% Fe_2O_3 (14% Fe)

Zone	Category[1]	Tonnage[2]		Head grade[2]		Grade in concentrate[2]					
		Rock (Mt)	Concentrate (Mt)	Fe (%)	Magnetite (%)	Fe (%)	V_2O_5 (%)	Al_2O_3 (%)	TiO_2 (%)	MgO (%)	SiO_2 (%)
South	Indicated	113.5	35.0	22.7	30.9	65.3	0.6	0.3	1.2	3.8	2.8
	Inferred	144.6	36.1	20.2	24.9	66.9	0.5	0.4	1.0	3.4	2.5
North	Inferred	376.0	142.2	27.4	37.8	63.7	0.6	1.0	1.8	3.5	4.2
TOTAL	**Indicated**	**113.5**	**35.0**	**22.7**	**30.9**	**65.3**	**0.6**	**0.3**	**1.2**	**3.8**	**2.8**
	Inferred	**520.6**	**178.3**	**25.4**	**34.2**	**64.4**	**0.6**	**0.8**	**1.7**	**3.5**	**3.9**

Notes:

1. *Numbers have been rounded to reflect the precision of Inferred and Indicated MREs.*
2. *The reporting cut-off was calculated for a saleable magnetite concentrate containing 65% Fe with price of US$90/t of dry concentrate, 50% of the price of V_2O_5 contained in the concentrate, a V_2O_5 price of US$14/lb, a minimum of 0.2% of V_2O_5 contained in the concentrate, an open pit mining operation, a cost of mining and milling feed mineralization of US$13.80/t, a cost of transporting concentrate of US$40/t; and a cost of tailing disposal of US$1.5/t.*
3. *The Qualified Person and VONE are not aware of any current environmental, permitting, legal, title, taxation, socio-economic, marketing or political factors that might materially affect these MREs.*
4. *Resource classification, as defined by the Canadian Institute of Mining, Metallurgy and Petroleum in their document "CIM Definition Standards for Mineral Resources and Mineral Reserves" of 10 May 2014.*
5. *Mineral Resources are not Mineral Reserves and by definition do not demonstrate economic viability. This MRE includes inferred Mineral Resources that are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*
6. *Due to rounding, some columns may not total exactly as shown.*

1.8 Mining Methods

Mont Sorcier is planned as a traditional truck and loader open pit mining operation, focusing on extraction of magnetite mineralized material and waste materials. During its life, two mining areas will be developed – a large open pit on the north side of the mine and a smaller pit to the south. The south mining area may operate up to four distinct open pits:

- South Main (the largest of the south area pits)
- South 1, 2 and 3 (relatively small pits to the east of the South Main pit).

The mine will need to support a processing plant with nominal output of 5 Mtpa of dry concentrate. The plant recovery will depend on quality of mineralized material and concentration of the primary mineral – magnetite. Based on an average magnetite concentrate in the mineralized material, it is expected the pit to deliver up to 15 Mtpa of mineralized material on average. The waste mining will be on average at about 13 Mtpa, with the maximum currently predicted not to exceed 45 Mtpa. This combined with relatively low waste to mineralized material ratio, would allow for bulk mining of both waste and mineralized material.

Mine production fleet would consist of two large excavators and a wheel loader, waste and mineralized material hauling would require up to 14 large haul trucks. Purchase of equipment is spread over the first few years of mine life, in line with the mine production ramp up schedule and procurement lead time for each fleet. A list of primary mine production equipment is in the Table 16-1 and the list of support equipment is in the Table 16-2.

The mine designs are based on optimized pit shells derived using Geovia Whittle software. The optimization used the Mineral Resources in this report and a series of input economic parameters (see Section 16.1).

Pit optimization results are captured graphically in Figure 16-1 and Figure 16-2.

Given the high proportion of Inferred Resources (especially in the North Zone), and the early stage of study, a Revenue Factor (RF) 1.0 (the largest undiscounted cash flow), pit shells were selected for the scheduling and design stage. For the North Zone, the RF 1.0 pit-shell was shell 46, while for the South Zone the selected pit shell was 44.

The following pit shells were used to define pushbacks:

- North pushbacks to pit shells: 1, 4, 7, 12, 46
- South pushbacks to pit shells: 4, 8, 44.

Whittle's "Milawa Balanced" mode was selected to produce a preliminary schedule that would be constrained to a maximum of 35 Mtpa of total movement in the North Zone and 25 Mtpa in the South Zone to produce the required 5 Mtpa of concentrate.

The schedule for the South Zone was produced first and the gaps (concentrate shortfalls) in the South schedule were used in the set-up of period targets for magnetite metal production limits for the North Zone.

The scheduling has produced a 15-year schedule for the South Zone and 33-year life of mine (LOM) plan for the North Zone. The combined schedule being a 37-year plan. The visual description of individual and combined schedules can be seen in Figure 16-3 to Figure 16-5.

The Mont Sorcier mining area would require opening and operating five pits (two relatively large):

- North
- South
- Three much smaller pits to the east of the main South pit.

The North Zone pit (see Figure 16-7) reaches the lowest level of 40 m (above sea level) using the full haul ramp width of 33 m. The main reason for allowing the full ramp width all the way to the bottom, is the width of the deposit at the pit bottom. The pit is almost 160 m wide. The pit crest is almost 5 km in length and the total area of the crest covers 126 hectares (ha). The pit crest elevation varies from just below 410 m to almost 550 m above sea level. The elevation of Lake Chibougamau is about 378 m above sea level for comparison.

The South Zone pit (see Figure 16-8) is subdivided into two sections, one reaching the lowest level at 110 m and the second at 130 m. Due to presence of the lake, the ramps were placed on the north side of the pit, flattening the overall slope to between 39° and 42.7° due to a number of ramp switchbacks. The western sub-pit is utilizing 15 m-wide ramps for the lowest 50 m vertical, then changing to full 33-m wide ramp. The eastern sub-pit has 15 m-wide ramp for the lowest 30 m vertical, changing to full 33 m thereafter. The pit crest is also almost 5 km long and enclosing an area of 90 ha.

1.9 Metallurgical Testing, Recovery Methods and Process Plant Design

1.9.1 Mineral Processing and Metallurgical Testing

Various historical and recent metallurgical test programs have been conducted for the Mont Sorcier Project. In addition, VONE conducted a test program at the COREM laboratory in Québec specifically for the purposes of the current PEA (Goudreau, 2020).

The standard grindability tests average results indicated:

- Abrasion index (Ai): The material was classified as non-abrasive
- Bond Rod Mill Work index (RWi) and Bond Ball Mill Work index (BWi): The material was classified as hard.
- SAG variability test (SVT) results: The material was classified at the 82.9 percentile, which means that this material was harder than 82.9% of the materials tested by Starkey & Associate Inc.

The head analyses of the composite samples showed that:

- The average total iron grade was 30.8% Fe_T.
- The average magnetite grade, determined by Satmagan, was 37% magnetic material.
- The average V_2O_5 grade was 0.33% V_2O_5.
- The main impurities were SiO_2 (average of 22.1%) and MgO (average of 21.7%).
- Based on the Satmagan and the Fe_T values, it can be assumed that iron-bearing minerals were mostly, but not entirely, magnetite. COREM has recommended detailed mineralogical analysis to identify and quantify the other iron-bearing minerals.

Preconcentration, using dry Low Intensity Magnetic Separators (LIMS) at a crushing size of 3.35 mm, led to the following metallurgical performances (average) of the magnetic products:

- Weight yield of 84.1%
- Magnetite: A 40% grade with a 98.3% recovery
- Total iron: A 32.5% grade with a 95.1% recovery
- V_2O_5: A 0.36% grade with a 95% recovery.

Based on these results, it can be concluded that pre-concentration would allow removal of low-grade material, in an early stage of the beneficiation process, improving the economics by lowering energy usage (lower amount of grinding)) and capital expenditure (CAPEX) for downstream equipment.

During the concentration tests, the Davis Tube tests results showed that, at a grinding P_{95} of ~38 µm for the four composite samples, the average weight recovery of the magnetite product was 47.3% grading 65.8% Fe_T, 89% magnetite and 0.67% V_2O_5, with corresponding recoveries of 92.0% Fe_T, 98.3% magnetite and 85.3% V_2O_5.

From the wet LIMS tests of the concentration work results, it can be observed that:

- For the North High Grade (NHG) composite sample:
  - At P_{95} 106 µm, a mag product with 61.1% Fe_T, 84% mag and 0.75% V_2O_5 was obtained
  - At P_{95} 38 µm, a mag product with 61.8% Fe_T, 84% mag and 0.75% V_2O_5 was obtained.
- For the South High Grade (SHG) composite sample:
  - At a P_{95} 106 µm, a mag product with 63.8% Fe_T, 85% mag and 0.85% V_2O_5 was obtained
  - At a P_{95} 38 µm, a mag product with 65.7% Fe_T, 89% mag and 0.87% V_2O_5 was obtained.
- For both composite samples:
  - The quality upgrade of the concentrate when ground to 38 µm instead of 106 µm was negligible
  - SiO_2 and MgO grades in the mag concentrate remained similar despite the grinding size
  - It is recommended to perform a more detailed mineralogical work (MLA) to explain this behavior.

From both LIMS and Davis Tube test results, it can be observed:

- Globally, the wet LIMS results were consistent with the Davis Tube results. The quality of the wet LIMS magnetic products was slightly lower than the Davis Tube magnetic products. This behavior was expected because the separation of the wet LIMS is less efficient than the Davis Tube separation due to a less efficient washing of the magnetic product of the wet LIMS compared to the Davis Tube.
- For both composite samples:
  - The quality improvement of the concentrate was small when grinding to 38 µm vs 106 µm.
  - Grinding finer also led to lower weight and valuable elements recoveries. More detailed mineralogical work would be required to explain this behavior.

- For the NHG composite sample:
  - Total iron grade: 61.1% Fe_T at P_{95} 106 µm vs 61.8% Fe_T at P_{95} 38 µm
  - Magnetite grade: No upgrade (84%) when grinding to a finer size
  - V_2O_5 grade: No upgrade (0.75% V_2O_5) with a finer grinding size
  - The main impurities of the magnetite products were SiO_2 and MgO, and a slight reduction was observed with finer grinding (4.9% SiO_2 at P_{95} 106 µm vs 4.5% SiO_2 at P_{95} 38 µm and 5.0% MgO at P_{95} 106 µm vs 4.5% MgO at P_{95} 38 µm).
- For the SHG composite sample:
  - Total iron grade: 63.8% Fe_T at P_{95} 106 µm vs 65.7% Fe_T at P_{95} 38 µm
  - Magnetite grade: 85% at P_{95} 106 µm vs 89% at P_{95} 38 µm
  - V_2O_5 grade: 0.85% V_2O_5 at P_{95} 106 µm versus 0.87% V_2O_5 at P_{95} 38 µm
  - The main impurities of the magnetite products were SiO_2 and MgO, and a slight reduction was observed with finer grinding (2.9% SiO_2 at P_{95} 106 µm vs 1.8% SiO_2 at P_{95} 38 µm and 4.4% MgO at P_{95} 106 µm vs 3.1% MgO at P_{95} 38 µm).

1.9.2 Process Design

The processing facilities include a beneficiation plant (Concentrator), designed to produce 5.0 Mtpa of magnetite concentrate over a 37-year mine life. The run of mine (ROM) material is based on a magnetite plant weight recovery of 45%.

A design factor of 20% is applied on nominal requirements to ensure that the process equipment has enough capacity to take care of the expected feed variation.

The process plant design is based on testwork performed to date by VONE and the previous owners, knowledge acquired in the processing of magnetite-rich ores in the Iron Range in Northern USA and project developments in nearby properties.

The proposed beneficiation plant circuit, based on the testwork and above presented design criteria and mass balance, is shown in Figure 1-1. The process description is divided into the following areas:

- Crushing area
- Grinding and magnetic separation area
- Concentrate dewatering and handling area
- Reagents area
- Tailings thickening area
- Utilities and services area.

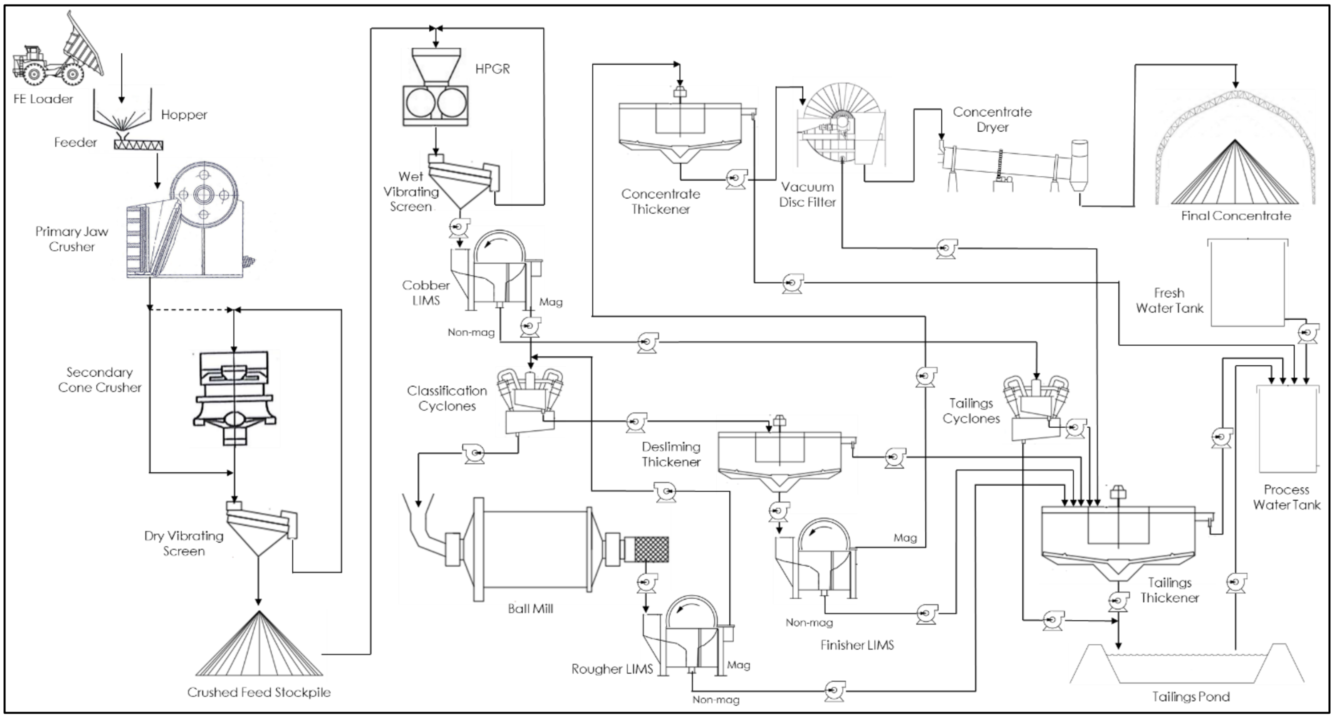

Figure 1-1: Simplified process flowsheet

1.10 Mine and Plant Infrastructure

The Mont Sorcier Property is located approximately 20 km east of the town of Chibougamau, Québec, Canada. The is easily accessible by an all-weather gravel road heading east from Highway QC-167 some 10 km east-northeast of Chibougamau. This gravel road passes through the northern claims and numerous forestry roads give access to lakes and different sectors in the southern and central portions of the Property.

The overall mine and plant infrastructure consist of open pit, waste and overburden dumps, crushing plant as well as various buildings, such as concentrator, offices and workshops, service areas, concentrator storage and loading facility, and administration buildings. Drainage ditches will be constructed around the open pit and dumps to direct water runoff to settling ponds to avoid contamination. The mineralized material will be hauled using 180t standard open pit haul trucks to the primary crusher area adjacent to the concentrator. A haulage road will be constructed between the mine and the crushers. All crushed material will be sent via conveyor system to the cone crusher and screening plants, stockpiled, and subsequently transported to the concentrator via a short conveying system.

The annual production of 5 Mt of iron and vanadium concentrate will be conveyed to a covered storage stockpile area. The stored iron and vanadium concentrate will be loaded into rail cars on a newly constructed railway loop at the stockpile area. The concentrate will be transported via the new, 18 km long railway spur line to connect with the existing CN rail infrastructure, from where it will be transported for approximately 360 km to the Saguenay port. The rail transportation system involves six trains each with 120 gondola-type railcars operating throughout the year. At port, the iron concentrate will be loaded directly into ocean freight vessels.

No permanent accommodation camp will be constructed with the accommodation strategy involving mining and milling personnel commuting on a per shift basis from the Project's nearest town of Chibougamau. A new 25 km, 315 kV powerline will be built along with a substation to connect to the main powerline.

1.11 Environmental Studies, Permitting and Social or Community Impact

1.11.1 Environmental Studies

VONE commissioned Norda Stelo (a technical services firm based in Québec) to carry out an Environmental and Social Scoping Study (ESSS) on the Project, which has summarised available information sources and knowledge gaps physical environment components (Climate and weather, Air quality, Topography, Geology and surface deposits, Hydrography and hydrology, Sediment and freshwater quality, Hydrogeology and groundwater quality), biological environment components (Protected areas and wildlife habitats, Plant communities, Freshwater fish and fish habitat, Avifauna, Herpetofauna, Mammals, Special status species) and human environment components (Population and demographic trends, Socio-economic profile, Land tenure and zoning, Main land uses in the study area, Transport infrastructure, Cree traditional land use (historical and current), Historical and cultural resources).

Key environmental issues identified as part of the ESSS (Boulé *et al.,* 2019) include:

Biophysical issues:

- Greenhouse gas emissions
- Dust emissions
- Water management and effluent quality
- Project of biological refuge
- Impact on hydrology
- Terrestrial habitat losses
- Impacts on fish populations and fish habitats
- Destruction of wetlands
- Contamination of soil, water, plants, fish and animals
- Destruction of bird nests
- Disturbance of wildlife
- Special status plant and wildlife species
- Risk management.

The main socio-economic issues generally raised by the Cree of Eeyou Istchee in the context of mining projects are as follows:

- Potential for conflicts between mining activities and the traditional uses of the land
- Environmentally and culturally sustainable development
- Cultural and heritage protection and development
- Human health risks
- Economic benefits and revenue sharing
- Provision of sustainable economic development within the region in order to provide employment and business opportunities for its members
- Training and education programs so that members of the community might fully participate in available opportunities.

Additional socio-economic issues raised for similar projects in the area include:

- Contamination of traditional food

- Access to the area
- Hunting pressure on big game, small game and fur-bearing animals
- Site safety
- Social acceptability
- Impact of mineralized material/concentrate transport
- Lodging/housing availability
- Signature of a framework agreement with the local communities
- Training and employment
- Creation of local and regional economic benefits.

Upcoming environmental studies and project development activities that will need to be undertaken in order to advance the Project include:

- Environmental baseline studies
- Public consultations and engagement
- Project notice and description of a designated project
- Environmental and Social Impact Assessment (ESIA)
- Permitting.

1.11.2 Environmental Assessment Process and Permitting

The Mont Sorcier Project is located in the Nord-du-Québec Region on lands subject to the James Bay and Northern Québec Agreement (JBNQA). The JBNQA was put in place in 1975 by the government of Québec, the government of Canada, the Grand Council of the Crees (Eeyou Itschee) (GCC(EI)), and the Northern Québec Inuit Association. It enacts the environmental and social protection regimes for the James Bay and Nunavik regions. The JBNQA establishes three categories of lands, numbered I, II, and III and defines specific rights for each category. The Mont Sorcier Project area lies over Category III lands, which are public lands in the domain of the State.

The Crees have exclusive trapping rights on these lands, as well as certain non-exclusive hunting and fishing rights. The Crees also benefit from an environmental and social protection regime that includes, among other things, the obligation for proponents to carry out an ESIA for mining projects such as the Mont Sorcier Project and the obligation to consult with First Nations communities. At first, the provincial and federal environmental assessment processes are described. Then, the permitting process that may be required in order to realize the Project is presented. In summary the following steps may be required:

Provincial Environmental Assessment Process

1) Notice of Intent and Preliminary Information Statement
2) Assessment and ESIA Guidelines (Directive)
3) Impact Assessment
4) Review
5) Decision.

Federal Environmental Assessment Process

1) Project Description
2) Notice of Consideration and Public Consultation Period

3) Determination of the Requirement of an Environmental Assessment
4) Notice of Commencement, Comment Period and Environmental Impact Statement Guidelines
5) Preparation of Environmental Studies and Environmental Impact Statement by the Proponent
6) Analysis of the Environmental Impact Statement by the Agency
7) Preparation of the Environmental Assessment Report by the Agency
8) Environmental Assessment Decision Statement.

Permitting Process

Once the Project has received the global approval from government agencies, VONE will need to obtain numerous specific provincial and federal authorizations and licences from federal and provincial authorities before initiating construction activities. The provincial permitting process can only begin once the environmental assessment procedure has been completed and the Project has received the certificate of authorization from the "Ministère de l'Environnement et de la Lutte contre les changements climatiques" (MELCC).

1.12 Market Studies

The base case selling price was derived from the analyst consensus (Vermeulen, 2019) 65% Fe benchmark price of US$92/dmtu and applying a US$15/dmtu premium for vanadium credits. This method establishes a selling price of US$107/dmt (C$140.79/dmt), CFR (Cost and Freight) port in China.

1.13 Economic Analysis

The reader is cautioned that the PEA reported in this Report is preliminary in nature and uses Inferred and Indicated Mineral Resources; Mineral Resources are not Mineral Reserves and by definition do not demonstrate economic viability. Inferred Mineral Resources are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that the PEA outcomes will be realized.

The overall project shows potentially robust economic results with an after-tax net present value (NPV) at 8%, discount rate of C$1,699 million and internal rate of return (IRR) of 33.8% (Table 1-2). Project economics are based on a potential 37-year mine life with a three-year payback period, with positive after-tax cash flow commencing in Year 1. Total cumulative, after tax free cash flow over the LOM is estimated at C$6,214 million as shown in Figure 1-2 below.

Table 1-2: PEA results summary

	Units	Value
Assumptions		
Iron and vanadium concentrate	C$/dmt	140.79
Exchange rate	US$:C$ C$:US$	1:1.32 1:0.76
Production profile		
Total tonnes of mineralized material mined and processed	Mt	554.9
Total tonnes waste mined	Mt	492.9
Total Material Mined	Mt	1,047.8
Strip ratio	Waste:feed (tw:tf)	0.89
Peak tonnes per day mineralized material mined	Tonnes	55,950
Average iron grade in ROM	Fe_2O_3%	23.02
Total concentrate produced	Mt	177.1
Concentrate iron grade	Fe%	65.25
Vanadium grade in concentrate	V_2O_5%	0.56
Peak annual concentrate production	Mt	5.0
Mine life	years	37
Unit operating costs		
LOM average cash cost	C$/dmt	80.2
All-in sustaining cost (1)	C$/dmt	87.8
Project economics		
Royalties	%	3.0
Average annual EBITDA	C$ M	271.2
Pre-tax NPV 8.0% / After-tax NPV 8.0%	C$ M	2,505 / 1,699
Pre-tax IRR / After-tax IRR	%	41.5 / 33.8
Undiscounted operating pre-tax cash flow / after-tax cash flow	C$ M	8,968 / 6,214
After-tax payback period	years	3.0

(1) All-in sustaining cost per tonnes of dry concentrate represents mining, processing and site G&A costs, royalty, offsite costs and sustaining capital expenditures, divided by dry metric tonnes of concentrate produced.

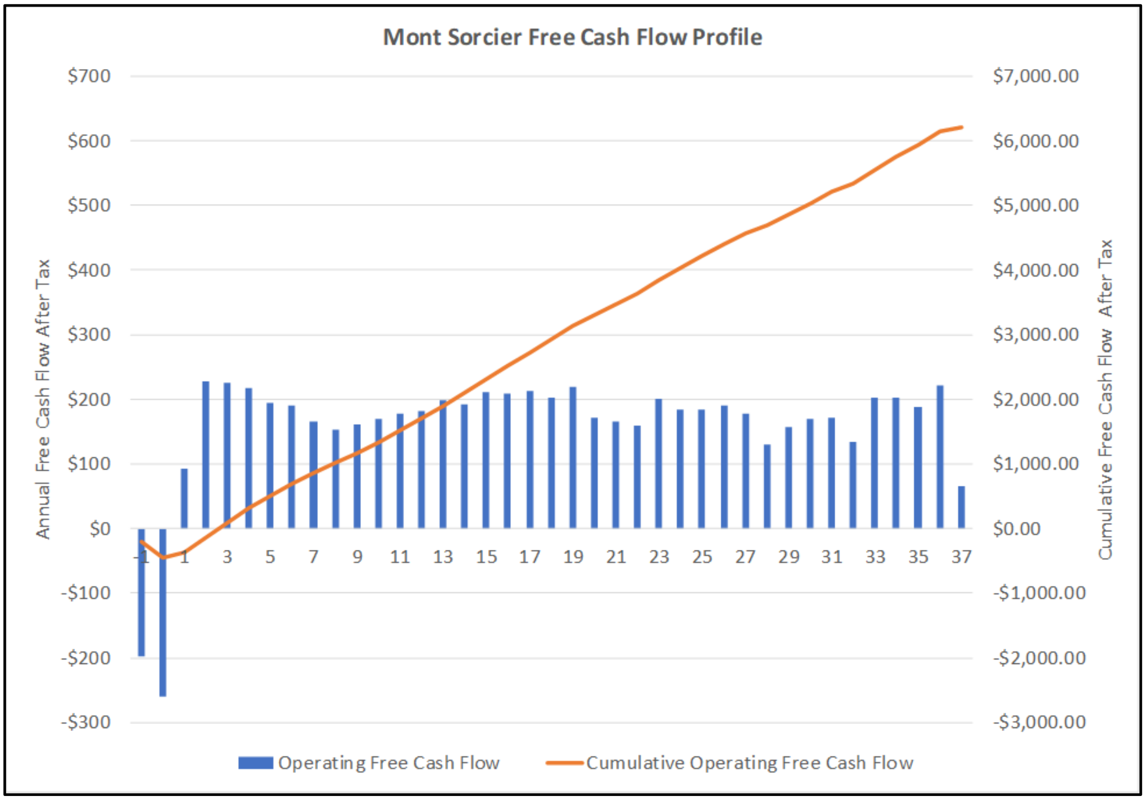

Figure 1-2: Mont Sorcier cash profile (C$ M)

Source: CSA Global, 2020

The chart below highlights the Project after-tax NPV sensitivity analysis.

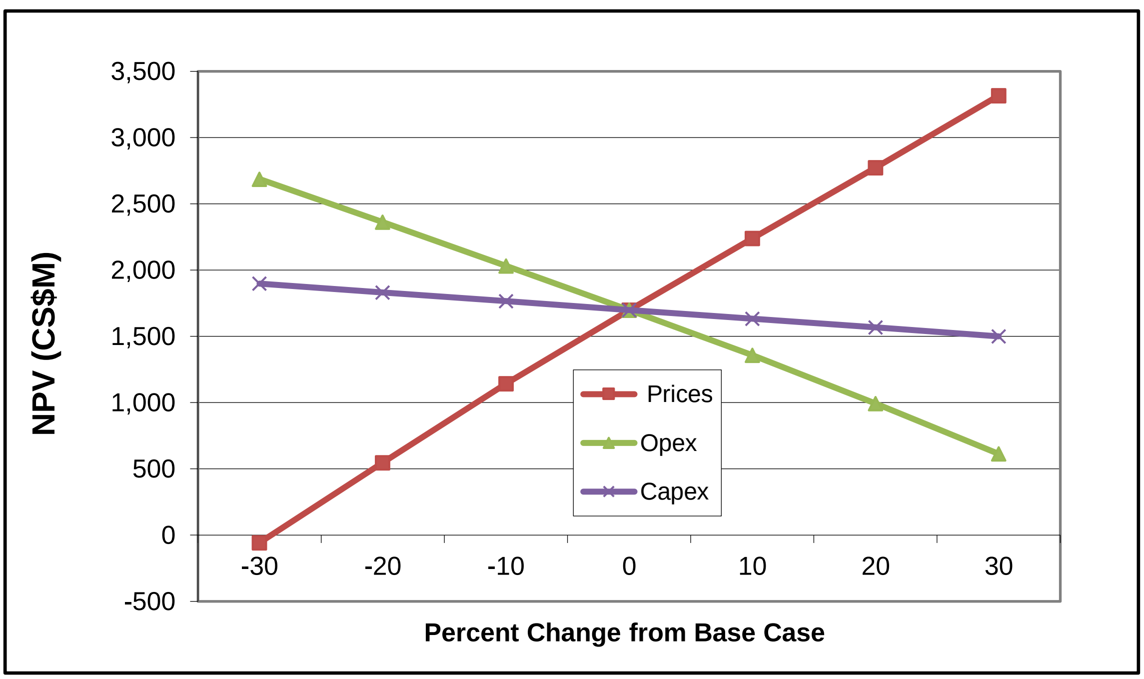

Figure 1-3: Post-tax NPV sensitivity at a 8% discount factor with changes to the concentrate price and capital and operating costs (C$ M)

Source: CSA Global, 2020

As would be expected, the Project is most sensitive to metal prices, followed by operating costs and finally capital costs. The Mont Sorcier Project is robust at a CFR concentrate price of C$140.79/dmt. Even a 20% reduction in metal prices produces a positive post tax cash flow of C$546 million.

1.14 Conclusions

Based on the economic assumptions used for this PEA, the Mont Sorcier is a potentially economic iron and vanadium project. Given the positive outcome of this study further work is warranted at the Project to improve confidence and refine the assumptions used to define the Project.

1.14.1 Geology and Mineral Resource Conclusions

VTM mineralization at the Mont Sorcier Project shows several similarities to other magmatic VTM deposits associated with layered mafic intrusive complexes; however, VTM mineralization at Mont Sorcier was likely triggered by assimilation of a carbonate-facies iron formation, resulting in a broad zone of VTM mineralization without the characteristic stratification found in other magnetite deposits, and without differentiation of highly vanadium or titanium enriched zones within the deposit. Two zones of mineralization are defined – the North Zone and the South Zone.

Based on recent drilling by VONE, as well as historical drilling and assay results, Mineral Resources have been reported (effective 23 April 2019) at a cut-off of 20% Fe_2O_3 head grade (or 14% Fe) for the Mont Sorcier Project. Total Indicated Mineral Resources of 113.5 Mt at 22.7% Fe and 30.9% magnetite and total Inferred Mineral Resources of 520.6 Mt at 25.4% Fe and 34.2% magnetite have been estimated, as detailed in Table 1-1.

1.14.2 Metallurgy and Mineral Processing Conclusions

The various test programs conducted for the Mont Sorcier Project show:

- The material is non-abrasive and hard.
- Preconcentration would allow removal of low-grade material at an early stage of the beneficiation process, and thus foreseen savings in energy (to avoid grinding waste) and CAPEX for downstream equipment.
- Davis Tube tests results showed that, at a grind of P_{95} ~38 µm for the four composite samples, the average weight recovery of the mag product was 47.3% grading 65.8% Fe_T, 89% magnetite and 0.67% V_2O_5, with corresponding recoveries of 92.0% Fe_T, 98.3% magnetite and 85.3% V_2O_5. Based upon the mine plan, Mont Sorcier is expected to produce a life of mine average concentrate grading 65% iron with 0.6% V_2O_5.

The processing facilities include a beneficiation plant (Concentrator) with three stages of magnetic separation, designed to produce 5.0 Mtpa of magnetite concentrate over a 37-year mine life.

1.14.3 Mining Conclusions

The work completed as part of this PEA indicates that a viable mining operation is possible under the assumptions outlined in this report. The mine would be a conventional drill, blast, load and haul operation from open pits, using standard, fully optioned equipment.

The mine design is based on the sequential mining of the South Zone followed by the North Zone using standard, fully optioned, large open pit mining equipment. This will allow for the South pit to be used for waste disposition in future years. CSA Global has developed a mine plan which processes 555 million tonnes of the current resource base over a 37-year mine life at an average strip ratio of 0.89 to 1. Mining will reach a peak material movement of approximately 44 Mtpa in Year 9. Mining costs are estimated at C$2.29/t of material moved. SiO_2 content will be kept under 2.5% through pit grade-control practice to maintain above 65% iron in concentrate.

1.14.4 Environmental Conclusions

VONE commissioned Norda Stelo (a technical services firm based in Québec) to carry out an Environmental and Social Scoping Study (ESSS) on the Project (Boulé *et al.*, 2019). As part of the ESSS, Norda Stelo identified key biophysical environmental and socio-economic issues raised by the Cree of Eeyou Istchee and other local stakeholders in the context of mining which will need to be addressed in an Environmental and Social Impact Assessment (ESIA).

Upcoming environmental studies and project development activities that will need to be undertaken in order to advance the Project include:

- Environmental baseline studies.
- Public consultations and engagement.
- Project notice and description of a designated project.
- Environmental and Social Impact Assessment (ESIA).
- Permitting.

1.14.5 Economic Assessment Conclusions

Readers are cautioned that the PEA is preliminary in nature. It includes Inferred Mineral Resources considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty the PEA will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, socio-political, marketing or other relevant issues.

For the PEA, a simple after-tax model was developed for the Mont Sorcier Project pending a more detailed review in the future. All costs are in 2020 Canadian dollars (C$) with no allowance for inflation or escalation. The Mont Sorcier Project is subject to three levels of taxation, including federal income tax, provincial income tax and provincial mining taxes:

- Québec mining tax rate of 16%
- Income tax rate of 26.5% (federal and provincial combined).

The federal and provincial corporate tax rates currently applicable over the Project's operating life are 15.0% and 11.5% of taxable income, respectively. The marginal tax rates applicable under the recently adopted mining tax regulations in Québec are 16%, 22% and 28% of taxable income and depend on the profit margin. As the Project concerns the processing of iron concentrate at the mine site, a processing allowance rate of 10% was assumed. Actual taxes payable will be affected by corporate activities, profitability and current and future tax benefits that have not been considered.

The combined effect of the three levels of taxation on the Project, including the elements described above, is an appropriate cumulative effective tax rate of 30.3%, based on Project earnings. It is anticipated, based on the current Project assumptions, that the Company will pay approximately C$2,715 million in direct tax payments to the provincial and federal governments over the life of mine based on the operating and commodity price assumptions used in the PEA.

The overall project shows potentially robust economic results with a an after tax NPV at 8% discount rate of C$1,699 million and IRR of 33.8%. Project economics are based on a potential 37-year mine life with a three-year payback period, with positive after-tax cash flow commencing in year 1. Total cumulative, after tax free cash flow over the LOM is estimated at C$6,253 million.

As expected, the Mont Sorcier Project pre-tax and post-tax IRR and NPV is less sensitive to operating and capital cost and is highly sensitive to concentrate price.

1.14.6 Risks

General

Environmental, permitting, legal, title, taxation, socio-economic, marketing, and political or other relevant issues could potentially materially affect access, title, or the right or ability to perform the work recommended in this report on the Project. However, at the time of this report, the Qualified Persons are unaware of any such potential issues affecting the Project and work programs recommended in this report.

Mineral Resource Estimate

In addition to the general risks noted above, the following risks and uncertainties may affect the reliability or confidence in the exploration information and MRE:

- Not all historical drillhole collars have been surveyed by an independent surveyor, and no downhole deviation data is available for historical drillholes; however, those that have been located compare favourably with recorded locations.
- QAQC procedures associated with historical assay data have not been documented; however, comparison of the results of historical assays with recent assay values shows that they compare favourably.

Metallurgy/Mineral Processing

- Selective mining of the different mineralization types separately may not be fully achievable.
- Cold climate effect on tailings and concentrate transportation.
- Degree of deleterious elements content that may affect the metal payable and penalties.

Mining

- Nearby lakes and water inflows into the open pits.
- Additional recovery loss and dilution (due to slow results from sampling or analyses).
- Faults and intrusive alteration that could induce water inflows and/or influencing pit walls stability.
- Elevated water tables requiring highwall dewatering.

Environment, Permitting, Social and Community

- Additional environmental or social risks identified during the next study phase, as a result of further design development or baseline studies.
- Delays and costs associated with acquiring land, particularly if compulsory purchase is needed or compensation/lease of First Nation land that requires extensive negotiations and could delay the permitting and project construction phase.

1.14.7 Opportunities

Geology/Mineral Resource Estimate

The following opportunities have been identified with respect to further exploration:

- There is potential to extend both the North Zone and South Zone resources along strike towards the east and west by drilling the magnetic anomalies along strike from the current drilling

- Infill drilling and more detailed sampling with 2–3 m smaller sample lengths in areas of historical drilling will allow more granularity in the resource and may enable the delineation of higher-grade domains within the current resource.

Metallurgy/Mineral Processing

The Project has potential to:

- Optimize and simplify the process flowsheet based on detailed test program conducted as part of the next stage of the Project development. This may result in removing parts of the circuit, and/or introduce a fully dry process which will further reduce the overall capital requirements and operating costs to operate the concentrator.

Mining

The Project has potential to:

- Be a long-term investment into a profitable business
- Provide employment opportunities within local communities
- Provide tangible benefits to the local community and economy of the area.

Environment, Permitting, Social and Community

- Engagement with local community to maximise impact of employment and economic development.
- Planning closure to provide positive ongoing legacy.

1.15 Recommendations

The following recommendations are made with respect to future work on the Property. This work will be required for upgrading resources on the North Zone to the Indicated category, and to progress to higher confidence engineering study. These are listed as separate phases, as increasing the confidence of the resources to the Indicated or Measured category will be required prior to more detailed study and economic analysis. A budget for this future work is outlined in Table 26-1.

Phase 1 – In order to increase the confidence in the resources:

- Survey all remaining historical collar locations
- More gas pycnometry specific gravity (SG) measurements are required from the laboratory (30–50% of all samples). Additional density measurements should also be taken on 5–10% of samples using the Archimedes method (weight in air/weight in water)
- Duplicate and umpire measurements of SG required
- Infill drilling of the North Zone, with a three-hole fence every 200 m along strike
- Increase the number of round-robin assays involving more laboratories and more samples per laboratory to enable the calculation of a statically valid mean and standard deviation for the reference standards sample material
- 5% of samples from the 2017 campaign should be sent for duplicate analyses, and 5% for umpire analyses. It is also recommended that the standards used should also be subject to magnetic separation, and the magnetic portion assayed
- Completed updated Mineral Resources to convert Inferred Resources to Indicated Resource or higher classification.

Phase 2 – Work required to complete advanced engineering and economic studies:

- Detailed environmental studies and assessments of permitting requirements
- Undertake geotechnical study of the Project to establish reliable data for mine design this would include oriented core diamond drilling, sampling, laboratory testing, and reporting
- Complete a hydrogeology and hydrology study for the Project to establish water sources for processing and other uses, and for disposing on any excess water
- A tailings study to develop a detailed plan and designs for the safe disposal and storage of tailings from the Project
- Detailed metallurgical testwork including grind optimization, comminution testwork and assessment of pellet options
- Geometallurgical study and modelling to better define mineralized domains within each deposit to improve iron recoveries and economics over the LOM
- Mineralogical testwork on samples taken from through out both deposits to reflect the geometallurgical domains
- Mining equipment study to prove up equipment size, fleet size, productivity, capital and operating expenses
- Infrastructure studies, to determine concentrate transport and shipping options for the Project. Detailed discussion with rail and port authorities with detailed pricing models
- Detailed marketing studies to establish pricing metrics for the likely concentrate from the Project
- Seek an agreement with an offtake partner to take the mineralized material which demonstrates the value of the vanadium credits in the magnetite.

2 Introduction

2.1 Issuer

Vanadium One Iron Corp. (VONE or the "Issuer") is a mineral exploration company located in Toronto, Canada, with 100% ownership in the Mont Sorcier Iron, Vanadium and Titanium Project in Roy Township, Québec, 18 km east of the Town of Chibougamau. VONE also has 100% ownership in three mineral leases near Clinton, British Columbia, Canada, where it is targeting manganese mineralization. VONE is listed on the TSXV Exchange and on the Frankfurt Stock Exchange.

2.2 Terms of Reference

In December 2019, VONE engaged CSA Global to prepare this 2020 PEA and NI 43-101 Technical Report to support the continued development of the Mont Sorcier Project. The primary purpose of this document is to assess the economic potential of the Mont Sorcier Project at a PEA level of study.

This Report is based on information known to the authors and CSA Global including: outcomes of the exploration and evaluation programs completed by VONE at the Project, the 2019 MRE (Longridge and Martinez Vargas, 2019), and the PEA study completed by CSA Global up to and including 27 February 2020 (the "Effective Date").

The Report is specific to the standards dictated by NI 43-101 (30 June 2011), companion policy NI 43-101CP, and Form 43-101F1 (Standards of Disclosure for Mineral Projects). The MRE used in this PEA was previously reported in a NI 43-101 Technical Report with an effective date of 1 June 2019 (Longridge and Martinez Vargas, 2019) and has been prepared in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves (10 May 2014). Only Mineral Resources are estimated – no Mineral Reserves are defined in this PEA. The Report is intended to enable the Issuer and potential partners to reach informed decisions with respect to the Project.

The Issuer reviewed draft copies of this report for factual errors. Any changes made because of these reviews did not include alterations to the interpretations and conclusions made. Therefore, the statements and opinions expressed in this document are given in good faith and in the belief that such statements and opinions are not false and misleading at the date of this Report.

2.3 Sources of Information

This Technical Report is based on internal company technical reports, testwork results, maps, published government reports and public information, in addition to items listed in Section 27 (References) of this Report. The various studies and reports have been collated and integrated into this Report by the authors. The authors have taken reasonable steps to verify the information provided, where possible. The MRE was completed by Dr Adrian Martinez of CSA Global and previously reported with an effective date of 23 April 2019 (Longridge and Martinez Vargas, 2019).

The authors also had discussions with the management and consultants of the Issuer, including:

- Mr Pierre-Jean Lafleur, P.Eng. (OIQ), Vice President Exploration for VONE, regarding the geology and tenure of the property
- Mr Ashley Martin, COO for VONE, regarding internal corporate and external consultant technical studies with respect to the project; and
- Mr Alonso Sotomayor, CFO for VONE, regarding Quebec and Federal taxes applicable to the project.

This Report includes technical information that requires calculations to derive subtotals, totals and weighted averages, which inherently involve a degree of rounding and, consequently, introduce a margin of error. Where this occurs, the authors do not consider it to be material.

2.4 Qualified Persons

This Report was prepared by the Qualified Persons listed in Table 2-1.

Table 2-1: Qualified Persons – report responsibilities

Section	Qualified Person
Section 1: Summary	All authors
Section 2: Introduction	Luke Longridge, Ph.D., P.Geo.
Section 3: Reliance on Other Experts	Luke Longridge
Section 4: Property Description and Location	Luke Longridge
Section 5: Accessibility, Climate, Local Resources, Infrastructure and Physiography	Luke Longridge
Section 6: History	Luke Longridge
Section 7: Geological Setting and Mineralization	Luke Longridge
Section 8: Deposit Types	Luke Longridge
Section 9: Exploration	Luke Longridge
Section 10: Drilling	Luke Longridge
Section 11: Sample Preparation, Analyses and Security	Luke Longridge
Section 12: Data Verification	Luke Longridge
Section 13: Mineral Processing and Metallurgical Testing	Georgi Doundarov, M.Sc., P. Eng., PMP, CCP
Section 14: Mineral Resource Estimates	Adrian Martinez Vargas, Ph.D., P.Geo.
Section 15: Mineral Reserve Estimates	Alex Veresezan, M.Sc., P.Eng.
Section 16: Mining Methods	Karol Bartsch, BSc Mining (Hons), MAusIMM
Section 17: Recovery Methods	Georgi Doundarov, M.Sc., P. Eng., PMP, CCP
Section 18: Project Infrastructure	Georgi Doundarov and Karol Bartsch
Section 19: Market Studies and Contracts	Alex Veresezan
Section 20: Environmental Studies, Permitting and Social or Community Impact	Georgi Doundarov
Section 21: Capital and Operating Costs	Karol Bartsch and Georgi Doundarov
Section 22: Economic Analysis	Bruce Pilcher, B.E. (Mining), Eur Ing, CEng, FIMMM, FAusIMM CP and Alex Veresezan
Section 23: Adjacent Properties	Luke Longridge
Section 24: Other Relevant Data and Information	Luke Longridge
Section 25: Interpretation and Conclusions	All authors
Section 26: Recommendations	All authors
Section 27: References	Luke Longridge

The authors are Qualified Persons with the relevant experience, education and professional standing for the portions of the Report for which they are responsible.

CSA Global conducted an internal check to confirm that there is no conflict of interest in relation to its engagement in this project or with VONE and that there is no circumstance that could interfere with the Qualified Persons' judgement regarding the preparation of the Technical Report.

2.5 Qualified Person Property Inspection

A two-day visit to the Mont Sorcier Project was conducted by Dr Luke Longridge on 30–31 October 2018 as detailed in Section 12.1. The authors consider Dr Longridge's 2018 site visit current under Section 6.2 of NI 43-101 as no further work has been physically completed on the Property since the site visit.

3 Reliance on Other Experts

The authors and CSA Global have relied on claim tenure information including online web-based land records from the Government of Québec's online Mining Title Management System: GESTIM Plus as of the effective date (https://mern.gouv.qc.ca/english/mines/rights/rights-gestim.jsp).

The authors and CSA Global have relied upon VONE and its management for information related to underlying contracts and agreements pertaining to the acquisition of the mining claims and their status and technical information not in the public domain (Section 4). The Property description presented in this Report is not intended to represent a legal, or any other opinion as to title.

For the base case concentrate selling price presented in Section 19 and utilized in the PEA, the authors and CSA Global have relied upon an Independent Market Pricing Study commissioned by VONE to determine the potential value of the vanadium-rich iron product produced by Mont Sorcier given the lack of available quoted market index prices. The study reviewed main iron index price forecasts as well as estimates of the applicable vanadium credits. The study was completed by Paul Vermeulen of Vulcan Technologies in late October 2019 (Vermeulen, 2019). The extent to which the study outcomes can be realized is not certain and requires more investigation. Ideally, the Issuer should engage with end-use buyers to establish a price for the magnetite and vanadium products likely to be produced from Mont Sorcier.

4 Property Description and Location

4.1 Location and Area of Property

The Mont Sorcier Property is located in Roy Township, approximately 20 km east of the town of Chibougamau, in the eastern part of the Abitibi Region, Province of Québec, Canada (Figure 4-1). It covers an area of approximately 1,919 ha (4,797.5 acres). The centre of the Property lies at approximately Latitude 49°54.5'N, Longitude 74°07'W (NTS Map Sheet: 32G-16).

Figure 4-1: Location of the Mont Sorcier Project, approximately 20 km east of Chibougamau, Québec
Source: Google Earth, earth.google.com/web/

4.2 Mineral Tenure

The Mont Sorcier Property (Figure 4-2) comprises 37 map-designated cell claims and locally partial cell claims covering an area of approximately 1,919 ha (4,797.5 acres). There are no surface rights associated with the claims; however, because the Property is located on public lands, the claims grant a right of first refusal to obtain such surface rights within the Property area, when required. A list of claims, including expiry dates, areas, current work requirements and fees, current surplus credits and lapse dates is presented Table 4-1.

Table 4-1: List of claims for the Mont Sorcier Project

Claim title	Area (ha)	Expiry/Renewal date	Required work	Required fees	Expiry/Renewal date with excess work credits applied	Excess work
CDC 2394478	55.44	2022-11-10	$1,800	$66.25	2032-11-10	$290.54
CDC 2394491	55.46	2021-03-27	$1,800	$66.25	2031-03-27	$290.54
CDC 2394492	55.46	2021-03-27	$1,800	$66.25	2031-03-27	$290.54
CDC 2397349	55.47	2022-01-12	$1,800	$66.25	2032-01-12	$290.54
CDC 2397350	55.47	2022-01-12	$1,800	$66.25	2032-01-12	$290.54
CDC 2397351	55.46	2022-01-12	$1,800	$66.25	2032-01-12	$290.54
CDC 2397352	55.45	2022-01-12	$1,800	$66.25	2032-01-12	$290.54
CDC 2436339	55.45	2021-05-09	$1,800	$66.25	2031-05-09	$344.90
CDC 2436341	55.44	2021-05-09	$1,800	$66.25	2031-05-09	$344.25
CDC 2436342	55.43	2021-05-09	$1,800	$66.25	2031-05-09	$343.62
CDC 2436343	55.43	2021-05-09	$1,800	$66.25	2031-05-09	$293.22
CDC 2436344	55.43	2021-05-09	$1,800	$66.25	2031-05-09	$290.54
CDC 2436345	55.43	2021-05-09	$1,800	$66.25	2031-05-09	$290.54
CDC 2436346	55.45	2021-05-09	$1,800	$66.25	2031-05-09	$344.90
CDC 2436347	55.44	2021-05-09	$1,800	$66.25	2031-05-09	$344.25
CDC 2436532	11.06	2021-10-24	$750	$33.75	2031-10-24	$290.54
CDC 2436662	31.63	2021-10-24	$1,800	$66.25	2031-10-24	$290.54
CDC 2436663	8.10	2021-10-24	$750	$33.75	2031-10-24	$290.54
CDC 2436664	41.05	2021-10-24	$1,800	$66.25	2031-10-24	$290.54
CDC 2436665	55.46	2021-10-24	$1,800	$66.25	2031-10-24	$410.33
CDC 2436666	55.46	2021-10-24	$1,800	$66.25	2031-10-24	$374.77
CDC 2436667	55.46	2021-10-24	$1,800	$66.25	2031-10-24	$347.80
CDC 2436668	55.46	2021-10-24	$1,800	$66.25	2031-10-24	$290.54
CDC 2436669	55.45	2021-10-24	$1,800	$66.25	2031-10-24	$290.54
CDC 2436670	55.45	2021-10-24	$1,800	$66.25	2031-10-24	$363.48
CDC 2436671	55.45	2021-10-24	$1,800	$66.25	2031-10-24	$290.54
CDC 2477242	55.43	2022-01-08	$1,800	$66.25	2032-01-08	$290.54
CDC 2477243	55.43	2022-01-25	$1,800	$66.25	2032-01-25	$290.54
CDC 2477244	55.43	2022-01-25	$1,800	$66.25	2032-01-25	$290.54
CDC 2477245	55.43	2021-11-06	$1,800	$66.25	2031-11-06	$290.54
CDC 2477246	53.69	2022-01-05	$1,800	$66.25	2032-01-05	$290.54
CDC 2477247	55.44	2022-01-08	$1,800	$66.25	2032-01-08	$290.54
CDC 2477248	55.44	2022-01-08	$1,800	$66.25	2032-01-08	$290.54
CDC 2477249	55.07	2021-12-14	$1,800	$66.25	2031-12-14	$290.54
CDC 2477250	55.44	2022-04-02	$1,800	$66.25	2032-04-02	$290.54
CDC 2477251	55.44	2022-02-08	$1,800	$66.25	2032-02-08	$290.55
CDC 2477252	55.45	2021-10-24	$1,800	$66.25	2031-10-24	$290.55

Note that claims can be renewed for periods of two years beyond the expiration date, if work in excess of the amount required is carried out before the 60th day preceding the claim expiry date. Excess work from previous renewals can be credited and carried over to subsequent periods. The claims cannot be renewed beyond the lapse date, and an application to convert the claims to mining rights needs to have been made by the lapse date. Additional details can be found at https://mern.gouv.qc.ca/english/publications/online/mines/claim/index.asp.

As of the Effective Date of the Report, GESTIM Plus reports all claims with 100% ownership interest under:

Mines Indépendantes Chibougamau Inc. (Client # 87029)
86, 14e Rue
Rouyn-Noranda, Québec, Canada, J9X 2J1

VONE had an earn-in agreement with Mines Indépendantes Chibougamau Inc., as announced on SEDAR on 8 November 2016. Under the agreement, VONE paid Mines Indépendantes Chibougamau Inc. C$150,000 in cash and issued it 2,750,000 VONE common shares. A minimum of C$1 million of exploration was to be undertaken in the first 24 months following signature of the agreement. Mines Indépendantes Chibougamau retain a 2% Gross Metal Royalty (GMR) on all mineral production from the Property. Globex Mining Enterprises Inc. (GMX-TSX), which held a 3% GMR on some claims, reduced its royalty to 1% GMR (on all claims), and was issued a finder's fee of 300,000 common shares in VONE. As of January 2019, VONE fulfilled its C$1 million financial commitment for exploration expenditures and completed the earn-in. The transfer of 100% ownership of all 37 claims to VONE and filing and registration with the Ministère de l'Énergie et des Ressources naturelles (MERN) is in progress as of the effective date of the Report.

In order to maintain claims in good standing, VONE is required to pay a fee every second year after the recording date and to file a certain amount of exploration expenditure at each renewal. Excess work will be banked and can later be used to renew claim itself or contiguous claims which lie completely within a 4 km radius from the centre of the claim carrying the surplus credit. All the claims (Figure 4-2, Table 4-1) are in good standing with assessment work requirements being kept up to date.

Figure 4-2: Map of claims over the Mont Sorcier Property
Source: CSA Global, 2019

4.3 Permitting and Consultation

In order to conduct surface exploration work (principally stripping, trenching and diamond drilling) on claims covering crown land, an intervention permit (permis d'intervention) needs to be obtained. The application process is straight forward, and permits are generally rapidly obtained. No permits are currently held, and permits will be required for additional drilling work as recommended in Section 26.

Permitting for underground exploration, which is not required at the Project, is more complex, involving numerous regulations from various governmental levels.

The Mont Sorcier Project is located in the Nord-du-Québec Region on lands subjected to the JBNQA. The JBNQA was put in place in 1975 by the government of Québec, the Government of Canada, the GCC(EI), and the Northern Québec Inuit Association. It enacts the environmental and social protection regimes for the James Bay and Nunavik regions. The JBNQA establishes three categories of lands, numbered I, II and III and defines specific rights for each category.

The Mont Sorcier Project area lies over Category III lands, which are public lands in the domain of the State. The Cree Nation has exclusive trapping rights on these lands, as well as certain non-exclusive hunting and fishing rights. The Cree Nation also benefits from an environmental and social protection regime that includes, among other things, the obligation for proponents to carry out an ESIA for mining projects and the obligation to consult with First Nations communities. Category III lands include all the lands within the territory covered by the JBNQA that are located south of the 55th parallel and are not included in other land categories. Category III lands are managed by the Eeyou Istchee James Bay Regional Government (EIJBRG) as established by the Act establishing the EIJBRG (chapter G-1.04). VONE is required to inform and consult with the First Nation communities as well trap line permit holders concerning any planned exploration work, in order to minimize interference with traditional trapping, hunting and fishing activities. In the event of the construction of a mine, the Project will be submitted for review by First Nation communities.

4.4 Risks and Liabilities

There are no known environmental liabilities resulting from exploration works completed by previous owners on claims within the current Property area.

To the best of the authors' knowledge, there are no other environmental, permitting, legal, title, taxation, socio-economic, marketing, and political or other relevant issues, liabilities and risks associated with the Project at this time that may affect access, title or the right or ability to perform the work recommended in this Report within the Project area.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Access to Property

Chibougamau is an active mining and forestry centre which straddles Highway QC-167 and has a population of over 7,000 people. Chibougamau is serviced by an airport with daily regular scheduled direct flights to Montreal, Québec (Air Creebec).

The Mont Sorcier Property is easily accessible by an all-weather gravel road heading east from Highway QC-167 some 10 km east-northeast of Chibougamau. This gravel road passes through the northern claims and numerous forestry roads give access to lakes and different sectors in the southern and central portions of the Property.

5.2 Topography, Elevation and Vegetation

The physiography of the general area is one of rolling hills and abundant lakes and rivers. Forests cover about 84% of the area with an additional 16% representing lakes and rivers.

The overburden cover generally consists of sand and clay varying in thickness from 1 m to locally more than 30 m. Widespread swampy areas are found within this moderately to locally densely forested (generally black spruce, minor birch, pine, aspen with alder undergrowth) area of the province. Bedrock exposures are sparse.

The Property has local relief of up to approximately 130 m. Mont Sorcier rises roughly 510 m above sea level with local steep topographic features characterized by vertical cliffs of up to 30 m in height. The level of Lac Chibougamau, just south of the mining claims, is about 380 m above sea level.

5.3 Climate

Chibougamau has a humid sub-arctic continental climate with cool summers and no dry season. Climate conditions are fairly typical of the Canadian Shield; the temperature varies from an average minimum of -26°C in winter (January and February) to an average maximum of 22°C in the summer (July and August). Nevertheless, temperature extremes below -36°C or above +27°C can be expected within the respective seasons. Rainfall is usually frequent in the summer along with snowfall in the winter. The “warm” season usually lasts from mid-May to mid-September and the “cold” season from early December to early March.

Seasonally appropriate mineral exploration activities may be conducted year-round at the Property. Depending on local ground conditions, drilling may be best conducted during the winter months when the ground and water surfaces are frozen. Mine operations in the region can operate year-round with supporting infrastructure.

5.4 Infrastructure

5.4.1 Sources of Power

Hydro-electric power is readily available in the region, and the 735-kV line linking generation facilities in the James Bay region (north of Chibougamau) to Montreal and Québec (to the south) runs through Chibougamau, where a 735-kV substation is located.

5.4.2 Water

The province of Québec and the Chibougamau region contain abundant water sources sufficient for mining operations.

5.4.3 Local Infrastructure and Mining Personnel

Chibougamau and nearby Chapais (approximately 45 km drive west of Chibougamau) are former copper and gold mining centres and have a combined municipal population of about 10,000 residents. The local Cree communities of Mistissini and Ouje-Bougoumo have a population of approximately 3,000 and 1,000 residents, respectively. In addition to regional mining, the local economy is based on forestry, tourism, energy and an integrated service industry. Social, educational, commercial, medical and industrial services, as well as a helicopter base, airport and seaplane base are available at Chibougamau-Chapais.

A large and competitive skilled labour force, including mining personnel, is available in the Chibougamau area which is also well served by heavy equipment service and maintenance providers. Several companies specialise in mining services.

Chibougamau is also the railhead of Canadian National's Chemin de fer d'intérêt local interne du Nord du Québec (CFILNQ). A seaport is available at La Baie (Port-Alfred), approximately 300 km southeast, along the railroad.

5.4.4 Property Infrastructure

The Property has no infrastructure except for the east-west all-weather gravel road (Lac Chibougamau North Road) maintained by the local logging company (Chantiers Chibougamau Ltd) in the north and several poorly maintained logging roads.

5.4.5 Adequacy of Property Size

At this time, it appears that VONE holds sufficient claims necessary for proposed exploration activities and potential future mining operations (including potential tailings storage areas, potential waste disposal areas, and potential processing plant sites) should a mineable mineral deposit be delineated at the Property. The adequacy of the Property area for required mining and processing infrastructure will be further assessed as more detailed engineering studies advance.

6 History

6.1 Property Ownership

The current claims have had numerous owners over the past several decades and have only recently been amalgamated into the current property boundary. Owing to this, the current property claims have been fragmented, with a complex ownership history. Historical and current ownership of the Property pertaining to the magnetite deposits is summarised in Table 6-1 below.

Table 6-1: Summary of historical ownership and work undertaken on the magnetite occurrences at the Mont Sorcier Property

Dates	Ownership	Comments
1929 to 1930	Dome Mines Ltd	Trenching and surface diamond drilling on the North Zone and South Zone.
1955	ROYCAM Copper Mines Ltd	Geological and geophysical surveys on the property along with 913.0 m of drilling.
1961 to 1975	Campbell Chibougamau Mines	Significant exploration of magnetite layers (Fe +Ti + V) within the LDC, including a magnetic survey, geological mapping, electromagnetic surveys, geochemistry, trenching, surface diamond drilling and sampling.
2010	Apella Resources	No formal record exists available of Apella ownership. However, based on available geophysical surveys carried out by Apella, they had an option over the Property in 2010.
Unknown to 2012	Globex Mining	Property transferred to Chibougamau Independent Mines Inc., effective 29 December 2012.
2012 to 2016	Chibougamau Independent Mines Inc.	Drilling of two drillholes, MS-13-17, MS-13-19 (VONE retains the drill core).
2016 to present	Vanadium One (Vendome Resources Corp.)	As of January 2019, VONE earned a 100% interest in the Property through an option agreement with Mines Indépendantes Chibougamau Inc., who retains a 2% GMR on the Property, Globex Mining also retains a 1% GMR on the Property. Vendome changed name to Vanadium One in early 2017.

Note: Owing to the complex ownership of the claims, this list is not comprehensive.

6.2 Project Results – Previous Owners

Within the Property (i.e. claims currently held by VONE), exploration has been carried out since the 1920s on several targets, including the Baie Magnetite Nord and Baie Magnetite Sud occurrences containing iron, titanium and vanadium mineralization (the target of VONE's current exploration for magnetite mineralization, and referred to herein as the "North Zone" and the "South Zone", respectively), the Sulphur Converting/Baie de l'Ours occurrence (gold, silver, copper, zinc, iron), and the Baie Magnetite Ouest occurrence (gold).

Only work undertaken on the North Zone and South Zone occurrences is documented in this Report; work carried out on the other occurrences is not considered relevant to the magnetite mineralization targeted by VONE and described here. More complete detail of historical work undertaken on all occurrences within the Property can be found in the VONE's (then Vendome) previous technical report entitled "Technical Review and Exploration Potential on the Mont Sorcier mining claims controlled by Chibougamau Independent Mines Inc. in Roy Township, Chibougamau Area; NTS 32G-16, Province of Québec" (Larouche, 2016), available on SEDAR at:

https://www.sedar.com/GetFile.do?lang=EN&docClass=24&issuerNo=00025074&issuerType=03&projectNo=02549636&docId=4008373

6.2.1 Historical Exploration by Campbell Chibougamau Mines Ltd

The bulk of historical work pertinent to the Property was carried out by Campbell Chibougamau Mines in 1961, 1965 to 1969 and 1974 to 1975, who carried out a significant exploration program investigating the potential of the magnetite layers on the Property, primarily as an iron resource. Work included a ground magnetic survey, geological mapping, electromagnetic surveys, geochemistry, trenching, surface diamond drilling, sampling and assaying, and metallurgical testwork. Details of the results of this testwork are available, and include drillhole logs, assay results, metallurgical testwork reports, and historical grade and tonnage estimates.

The list of drillholes completed by Campbell Chibougamau Mines Ltd in the 1960s on the North Zone and South Zone deposits is presented in Table 6-2 below, and displayed in Figure 6-1. Holes were generally vertical and were drilled on several north-south sections.

Table 6-2: Drillholes completed by Campbell Chibougamau Mines Ltd (1963 to 1966)

Hole name	Zone	Easting	Northing	Azimuth	Dip	Year	Collar resurveyed by VONE
FE-01	South	564382.13	5528071.59	0	-90	1963	Yes
FE-02	South	564375.75	5528162.81	0	-90	1965	Yes
FE-03	South	564378.94	5528117.20	0	-90	1965	Yes
FE-04	South	564388.50	5527980.38	0	-90	1965	Yes
FE-05	South	564397.01	5527858.75	0	-40	1965	Yes
FE-06	South	563887.00	5528068.76	0	-90	1965	Yes
FE-07	South	563887.00	5528023.04	0	-90	1965	Yes
FE-08	South	563861.50	5527965.30	0	-90	1965	Yes
FE-09	South	563887.00	5527901.12	0	-90	1965	Yes
FE-10	South	563427.00	5527991.86	0	-70.5	1965	Yes
FE-11	South	563408.00	5527991.86	0	-41	1965	Yes
FE-12	South	563414.00	5527962.00	0	-90	1965	Yes
FE-13	South	563887.00	5528114.48	0	-90	1965	Yes
FE-14	South	564909.90	5528192.30	0	-90	1965	Yes
FE-15	South	564913.88	5528146.75	0	-90	1965	Yes
FE-16	South	564917.82	5528101.81	0	-90	1965	Yes
FE-17	South	565353.02	5528250.86	0	-90	1965	Yes
FE-18	South	565356.26	5528204.64	0	-90	1965	Yes
FE-31	South	564904.37	5528255.46	180	-81	1966	Yes
FE-32	South	565155.82	5528304.97	180	-45	1966	Yes
FE-33	South	565359.45	5528159.03	0	-90	1966	Yes
FE-34	South	565350.83	5528282.18	0	-90	1966	Yes
FE-35	South	565768.33	5528208.82	0	-90	1966	Yes
FE-36	South	565765.67	5528239.18	0	-90	1966	Yes
FE-37	South	565763.02	5528269.55	0	-90	1966	Yes
FE-38	South	565760.15	5528302.34	0	-90	1966	Yes
FE-39	South	565757.49	5528332.70	0	-90	1966	Yes
FS-41	South	563655.64	5528021.18	0	-90	1966	Yes
FS-42	South	563654.04	5527990.74	0	-90	1966	Yes
FS-43	South	563652.45	5527960.30	0	-90	1966	Yes
FS-44	South	563650.85	5527929.86	0	-90	1966	Yes
FS-45	South	564132.00	5528062.52	0	-90	1966	Yes

Hole name	Zone	Easting	Northing	Azimuth	Dip	Year	Collar resurveyed by VONE
FS-47	South	564132.00	5528093.00	0	-90	1966	Yes
FS-49	South	564132.00	5528121.96	0	-90	1966	Yes
FS-51	South	564132.00	5528032.04	0	-90	1966	Yes
FS-52	South	564132.00	5528001.56	0	-90	1966	Yes
FS-53	South	565988.77	5528337.38	0	-90	1966	Yes
FS-56	South	564132.00	5527971.08	0	-90	1966	Yes
FS-57	South	564384.68	5528035.11	0	-90	1966	Yes
FS-58	South	565986.64	5528367.79	0	-90	1966	Yes
FS-59	South	564663.00	5528075.42	0	-90	1966	Yes
FS-61	South	565990.90	5528306.97	0	-90	1966	Yes
FS-63	South	565984.52	5528398.19	0	-90	1966	Yes
FS-64	South	565578.69	5528278.73	0	-90	1966	Yes
FS-66	South	565576.03	5528309.09	0	-90	1966	Yes
FS-69	South	565259.28	5528161.76	0	-90	1966	Yes
FE-19	North	563565	5529436	0	-90	1965	No
FE-20	North	563569	5529396	0	-90	1965	No
FE-21	North	563373	5529353	0	-90	1965	No
FE-22	North	564103	5529431	0	-90	1965	No
FE-23	North	564107	5529354	0	-90	1965	No
FE-28	North	563084	5529238	0	-90	1966	No
FE-29	North	563090	5529349	0	-90	1966	No
FE-30	North	563085	5529301	0	-90	1966	No
FE-40	North	563083	5529388	0	-90	1966	No
FN-46	North	562577	5529369	0	-90	1966	No
FN-48	North	562580	5529337	0	-90	1966	No
FN-50	North	562577	5529402	0	-90	1966	No
FN-54	North	562576	5529432	0	-90	1966	No
FN-55	North	562097	5529365	0	-90	1966	No
FN-60	North	562578	5529469	0	-90	1966	No
FN-62	North	562097	5529390	0	-90	1966	No
FN-65	North	562096	5529425	0	-90	1966	No
FN-67	North	562119	5529484	0	-89	1966	No

Note: Coordinates are UTM, NAD83.

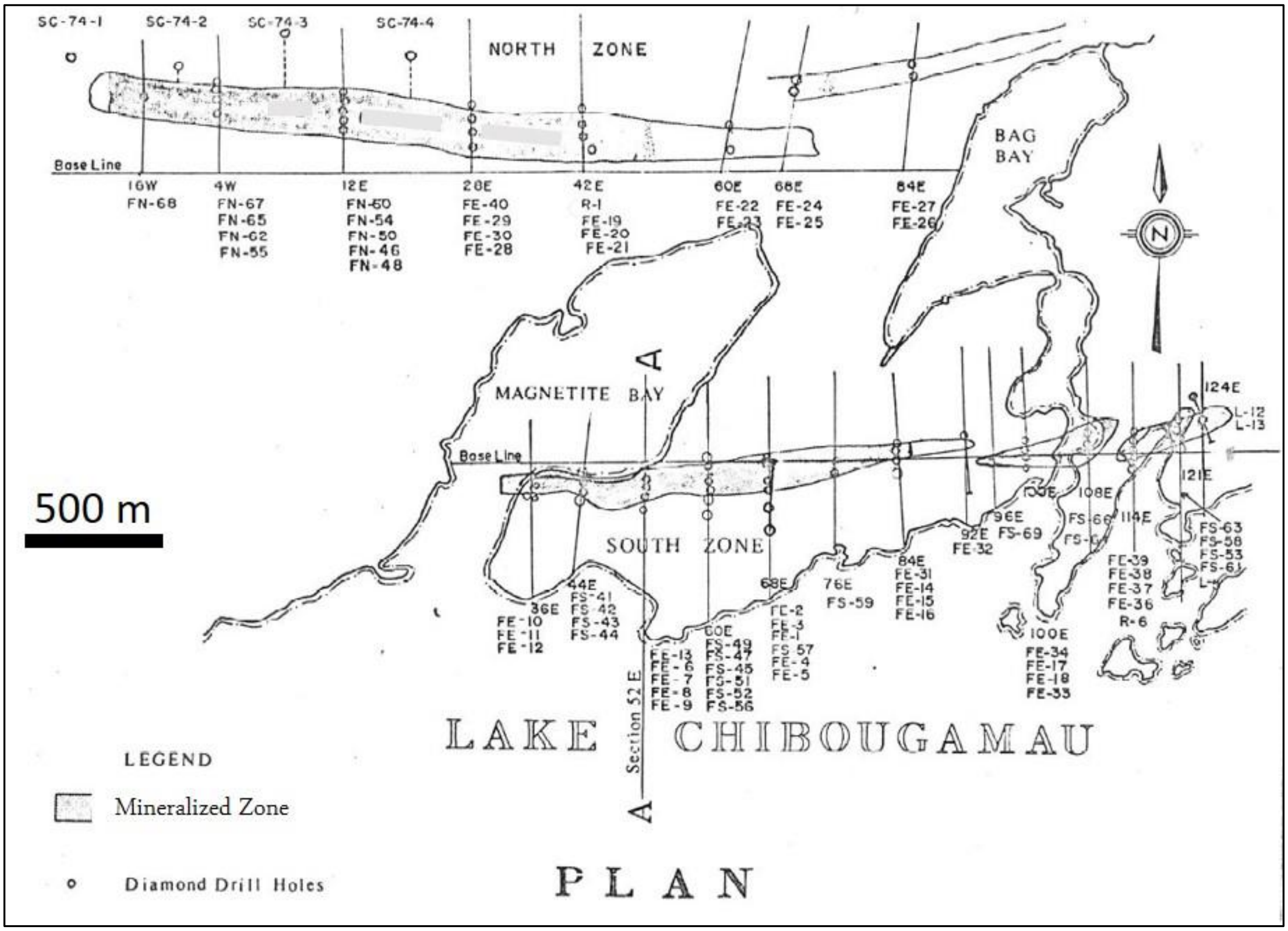

Figure 6-1: Map of historical drillhole locations
Source: Campbell Chibougamau Mines Ltd, 1974

Historical data is available as PDF documents, showing detailed drill logs and assay data for each drillhole (Figure 6-2).

CAMPBELL CHIBOUGAMAU MINES LTD.

Hole #	FE-25				ACID TEST ~~TRO PARI TESTS~~				SURVEY RESULTS
Location	10+70 N	Size of core	AXT	PROPERTY	Depth	Mag. Bng.	Corr. Bng.	Dip	Latitude
Section	68E	Started	January 18, 1966	Magnetite Bay Corval Group	800.0'			88°	Departure
Strike	-	Completed	January 27,66						Elevation
Dip	-90°	Cement	none						Strike
Length	811.0	Logged by	P.C. Masterman, G. Benussi						Dip

FOOTAGE		ROCK TYPE	DESCRIPTION			CORE - SAMPLES				ASSAYS			
			Alteration – Colour	Structure - Texture	Sulphides - Minor features - Remarks	Number	From	To	Length	Au	Cu	Fe	TiO_2
0.0		Overburden											
	10.0					25501	10.0	25.0	15.0			28.8	1.95
10.0		Iron Formation	L-M Serp, M gy	M.gr. equigranular	25-30% Mag, 1% Po	25502	25.0	50.0	25.0			31.4	2.11
				L. contact sharp 45-50°CN	diss.	25503	50.0	75.0	25.0			32.0	1.85
	99.3	Gab. I.F.	Patchy M Serp. M gy	Vague co.gab.text.	Mag. occurs in fract.fillings	25504	75.0	100.0	25.0			32.3	1.79
				in lesser patches	+ repl. patchy 25% mag.	25505	100.0	125.0	25.0			28.0	1.78
					Tr po	25506	125.0	150.0	25.0			30.2	1.76
	225.0	Iron Formation	L.M. Serp M gy	Gab. text. declines	Increased carbonate veining	25507	150.0	175.0	25.0			29.9	1.49
					25% Mag	25508	175.0	200.0	25.0			31.6	1.25
						25509	200.0	225.0	25.0			28.7	1.00
						25510	225.0	250.0	25.0			29.2	1.15
						25511	250.0	275.0	25.0			28.4	1.66
	276.0	Serp. I.F.	M-H Serp. Dk gy blck	Vitreous app. vague	Fine veinlets mag. common	25512	275.0	300.0	25.0			19.2	0.89
				dunite text.	20-25% mag. carb.								
					veining irreg. up to 2". Tr Po								
	308.5	Iron Formation	L-M Carb. Dk gy	Patchy L-M Sh. +	Carb. concentrated in short	25513	300.0	325.0	25.0			27.6	1.38
				brecc. 60-80° CN	sheared sections + veinlets								
	327.0	Brecc. I.F.	M Carb. Dk gy	M. Brecc.	H Carb. in H Sheared sects.	25514	325.0	350.0	25.0			22.2	1.06
					minor graphite								
	332.5												
332.5		Lost Core	Fragts. broken brecc. + sheared										
	336.5												
336.5		Brecc. I.F.	L-M Carb. Dk gy										
	339.6	Sheared I.F.	H Carb. Pale gy	M-H Sh. 65-70° CN	Dis. mag. 20%, Po, 1%, Cpy Tr								
	347.0	Brecc. I.F.	M-H Carb. Dk gy	Vague gab. texture		25515	350.0	375.0	25.0			27.3	1.40
	374.0	Sheared I.F.	Dk.gy. part. alternating	M. shearing	35% mag. Tr po	25531	375.0	400.0	25.0			13.1	1.24
			of bands of light and dark	foliation 70-90° CN									
			mineral. H Carb, L Ser	Co.gr. vague phenos									

Figure 6-2: Example of a historical drillhole log from Campbell Chibougamau Mines Ltd, showing assays for Fe and TiO_2

In the 1970s, Campbell Chibougamau Mines Ltd re-evaluated the Project and created composite samples from the 1963–1966 drill core. These composite samples were milled to 95% passing -325 mesh (44 µm), and magnetic separates were created using Davis Tube testing, and the concentrates were assayed for Fe, TiO_2 and V_2O_5 (Figure 6-3).

SECTION 42E																PIT "A"	QDNR (1972) ASSAYS		
		Footage		Length	Mine Analysis		Head Analysis			Davis Tube Concentrate Test (Ore Only)					Area	Area			
Hole #	Test #	From	To	Feet	% Fe	% TiO_2	% Fe	% TiO_2	% Wt	% Fe	% TiO_2	Fe Dist.	TiO_2 Dist.	Grind	Sq. Ft.	Sq. Ft.	% Sol Fe	% TiO_2	% V_2O_5
FE-21	F-21-1	6.8	227.6	220.8	25.4	1.71	27.8	1.49	39.0	63.7	2.01	89.3	53.0	97.0	38,424	10,800	26.54	1.75	0.23
	F-21-2	227.6	458.0	230.4	18.3	1.55	19.3	1.46	20.2	64.7	2.19	67.0	30.1	94.0	29,098	--	19.24	1.62	0.12
FE-20	F-20-1	2.5	250.0	247.5	25.9	1.11	26.2	0.91	36.5	62.9	1.53	87.5	70.4	94.0	61,070	61,070	27.09	1.09	0.21
	F-20-2	250.0	504.0	254.0	26.7	1.50	25.8	1.24	34.7	64.5	1.87	86.5	52.4	94.2	66,167	44,130	25.52	1.40	0.29
	F-20-3	As Section Average			28.4	1.13	28.3	1.00	33.8	64.9	1.51	77.2	52.9	96.3	40,575	5,270	28.68	1.12	0.21
	F-20-4	As Section Average			28.4	1.13	28.3	1.00	33.8	64.9	1.51	77.2	52.9	96.3	60,390	--	28.68	1.12	0.21
FE-19	F-19-1	3.5	115.7	112.2	32.8	0.48	32.6	0.51	36.2	68.1	0.83	75.5	58.8	99.0	12,851	12,851	34.46	0.52	0.21
	F-19-2	115.7	270.0	154.3	28.3	0.93	28.0	0.94	24.1	66.3	1.31	57.0	33.0	99.0	25,768	25,768	27.76	0.96	0.13
	F-19-3	270.0	425.0	155.0	42.4	0.68	41.3	0.74	52.0	67.2	0.90	84.5	63.5	98.8	29,016	29,016	42.22	0.76	0.27
	F-19-4	425.0	546.7	121.7	31.6	0.51	30.8	0.49	21.6	64.9	1.02	45.4	45.0	98.6	25,009	25,009	31.18	0.45	0.13
	F-19-5	546.7	747.0	200.3	31.5	0.75	30.7	0.66	32.9	66.2	1.04	70.8	51.5	98.0	42,724	42,724	32.32	0.73	0.20
	Weighted Average (Overall)				28.4	1.13	28.3	1.00	33.8	64.9	1.51	77.2	52.9	96.3	431,092		28.68	1.12	0.21
	Weighted Average (Pit "A")				30.0	0.99	29.6	0.87	34.7	65.1	1.35	76.3	55.5	96.6		256,638	30.25	0.97	0.21

(Grind %-325 m)

Figure 6-3: Example of composite sample data from Campbell Chibougamau Mines Ltd

6.2.2 Campbell Chibougamau Mines Ltd Historical Metallurgical Testwork (1963–1966 and 1970s)

Several phases of historical metallurgical testwork were carried out on the Project by Campbell Chibougamau Mines Ltd, including mineralogy, magnetite concentration tests, autogenous grinding tests, pelletizing tests and blast furnace smelting tests. Of these tests, magnetite concentration tests (using a Davis Tube) were carried out at a fine grind of 95% passing 325 mesh (44 µm), and at 98% passing 325 mesh. These results showed that an acceptable concentrate grade of 66% Fe was produced at 95% passing 325 mesh, but this could be improved to 68.5% to 69% Fe by regrinding to 98% passing 325 mesh.

This Davis Tube work was followed by magnetic separation of two bulk samples (35 tons each) to emulate Davis Tube testwork on a larger scale. Separation included magnetic cobbing (rejection of waste) of samples ground to minus 10 mesh (2 mm), followed by regrinding of the cobbed concentrate to 95% passing 325 mesh and upgraded using two-stage magnetic separation. One concentrate sample was further reground to 98% passing 325 mesh and subject to an additional stage of magnetic separation. The results are summarised in Table 6-3 and plotted in Figure 6-4 below.

Table 6-3: Historical grind vs concentrate grade data from Campbell Chibougamau Mines Ltd

Grind (% -325 mesh)	Concentrate grade (% Fe)	Iron recovery to concentrate (%)
94.1	66.5	83.0
95.5	66.7	84.3
98.0	68.5	82.4
98.8	68.5	81.3
94.8	66.7	89.5

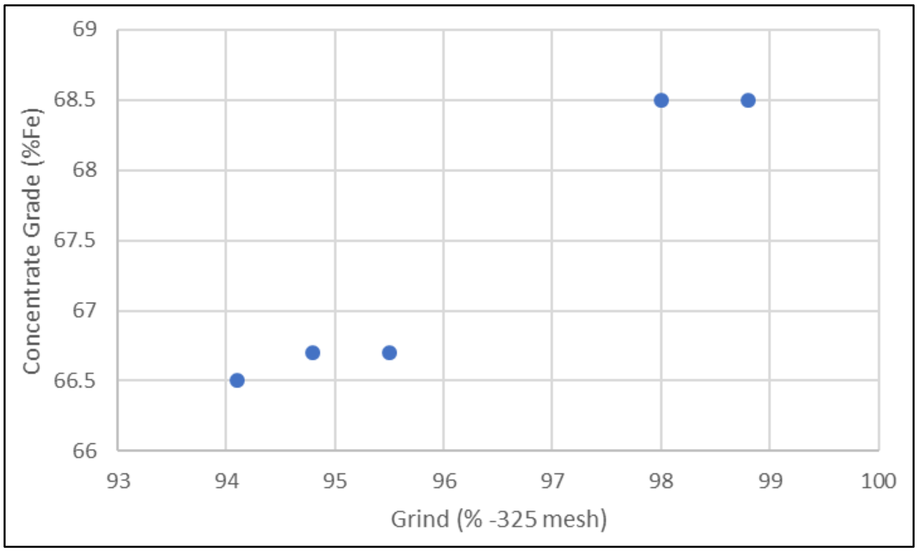

Figure 6-4: Historical grind vs concentrate grade data from Campbell Chibougamau Mines

6.2.3 Historical Geophysics by Apella Resources (2010)

In 2010, Apella Resources (a Vancouver headquartered company who had an option on the property) contracted AeroQuest to conduct an airborne geophysical (magnetic) survey using a helicopter-borne tri-axial gradiometer. The survey was flown at a nominal instrument terrain clearance of 30 m and at a line spacing of 100 m, with 50 m infill lines over the core of the deposit (Figure 6-5). Products included total magnetic intensity and measured vertical gradient.

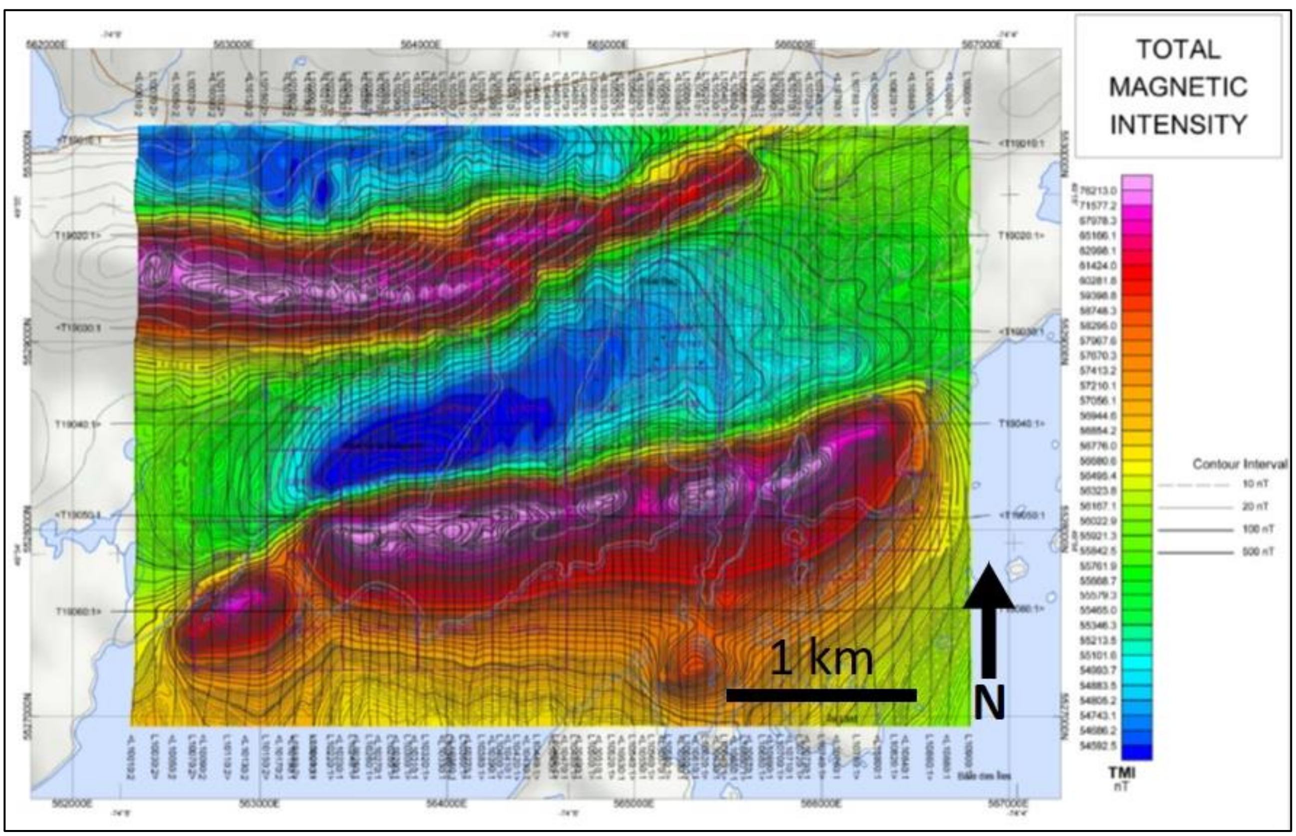

Figure 6-5: Map of flight lines and TMI from the 2010 AeroQuest survey

6.2.4 Drilling by Chibougamau Independent Mines (2013)

In 2013, Chibougamau Independent Mines drilled two diamond drillholes, MS-13-17 (on the North Zone) and MS-13-19 (on the South Zone). Drill core is in the possession of VONE, and collar locations have been verified and surveyed by VONE (Table 6-4).

Table 6-4: Drillhole drilled by Chibougamau Independent Mines in 2013 on the Mont Sorcier Property

Hole name	Easting	Northing	Azimuth	Dip	Length (m)
MS-13-17	562539.0	5529314.6	360	-42	603
MS-13-19	564118.2	5528099.5	180	-45	102

Note: Coordinates are UTM, NAD83.

6.3 Historical Mineral Resource Estimates

Based on its work from 1961 to 1974, Campbell Chibougamau Mines Ltd in 1974 generated a grade and tonnage estimate on the magnetite layers within the Project area totalling 274.4 Mt grading 29% Fe (172 Mt at 30% Fe for the North Zone, 103 Mt at 27.4% Fe for the South Zone). The estimate was completed with a cut-off of 17.0% Fe (or 24.3% $Fe2O3$), using polygonal methods and excluding polygons (or blocks) with 1.75% $TiO2$ in the concentrate. The informing data used to produce this estimate were composites created from core assays with Fe head grade over 15%.

This estimate is "historical" in nature and not in compliance with NI 43-101. A Qualified Person has not done the work necessary to verify the historical estimates as current estimates under NI 43-101 and as such they should not be relied upon. The authors, CSA Global and VONE are not treating the historical estimate as a current Mineral Resource or Mineral Reserve and it is presented for informational purposes only. The historical resource estimate is superseded by the 2019 MRE presented in Section 14 of this Report.

7 Geological Setting and Mineralization

7.1 Regional Geology

The Project area is located at the northeast end of the well-documented Abitibi Sub-Province, also known as the Abitibi greenstone belt, the world's largest contiguous area of Archean volcanic and sedimentary rocks, and host to a significant number of mineral deposits. It covers an approximately 500 km x 350 km large area in the south-eastern portion of the Archean Superior craton (Monecke *et al.,* 2017). The Precambrian rocks in the area are commonly covered by an overburden of Quaternary glacial deposits of variable thickness.

The Abitibi greenstone belt is primarily composed of east-trending submarine volcanic packages, which largely formed between 2795 Ma and 2695 Ma (Ayer *et al.,* 2002; Leclerc *et al.,* 2012). The volcanic packages of the belt are folded and faulted and typically have a steep dip, younging away from major intervening domes of intrusive rocks (Monecke *et al.,* 2017). Major, crustal-scale, east-trending fault zones are prominent in the Abitibi greenstone belt (Figure 7-1).

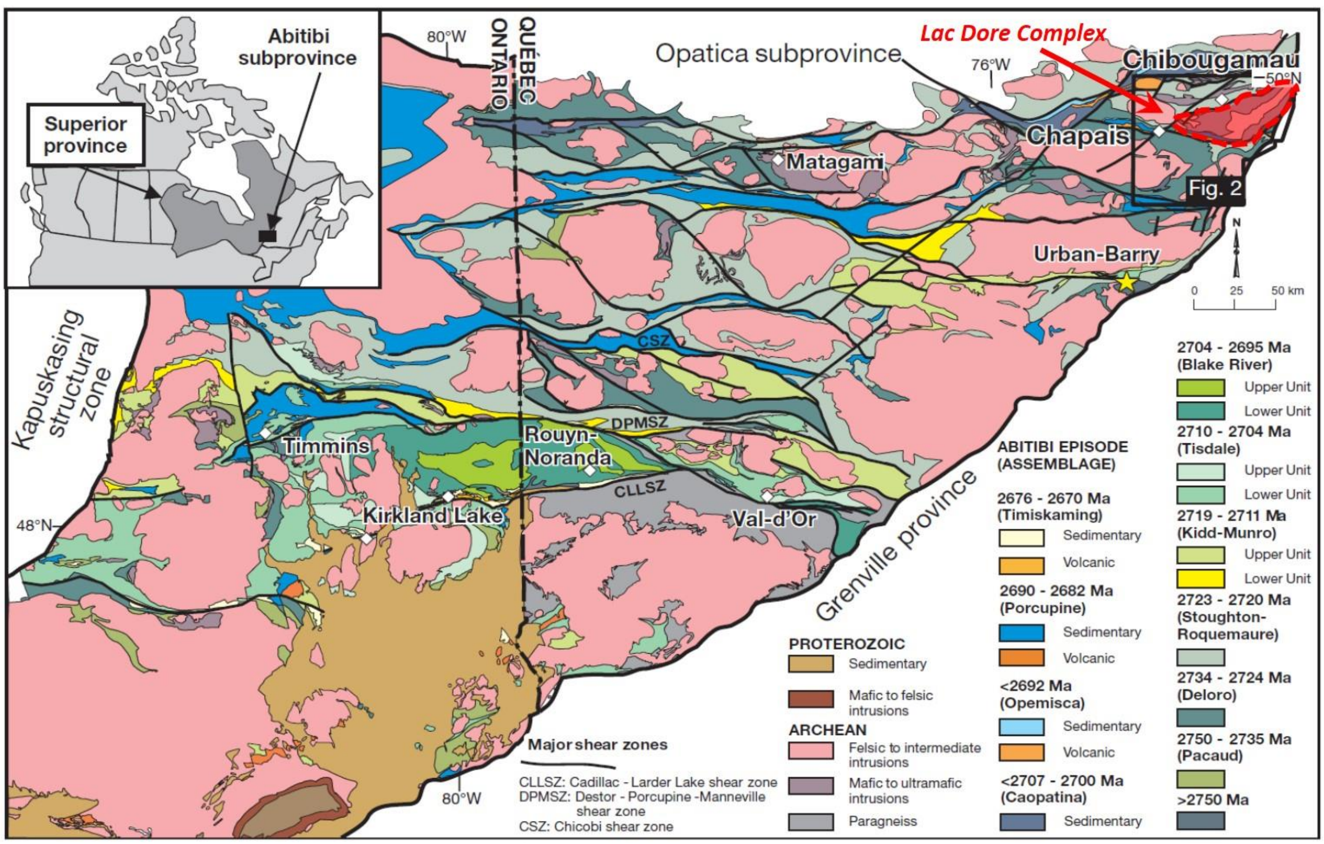

Figure 7-1: Geology of the Abitibi greenstone belt showing the location of the LDC

Note: Upper-left inset shows location of the Abitibi greenstone belt in the Superior Province.
Source: Leclerc et al. (2012)

In the Chibougamau area, a large layered mafic complex (the LDC) has been emplaced into the volcaniclastic stratigraphy (Figure 7-2). The LDC is comparable to other better-known complexes such as the Bushveld Complex in South Africa, the Skaergaard Intrusion in Greenland or the nearby Bell River Complex in Matagami, Québec.

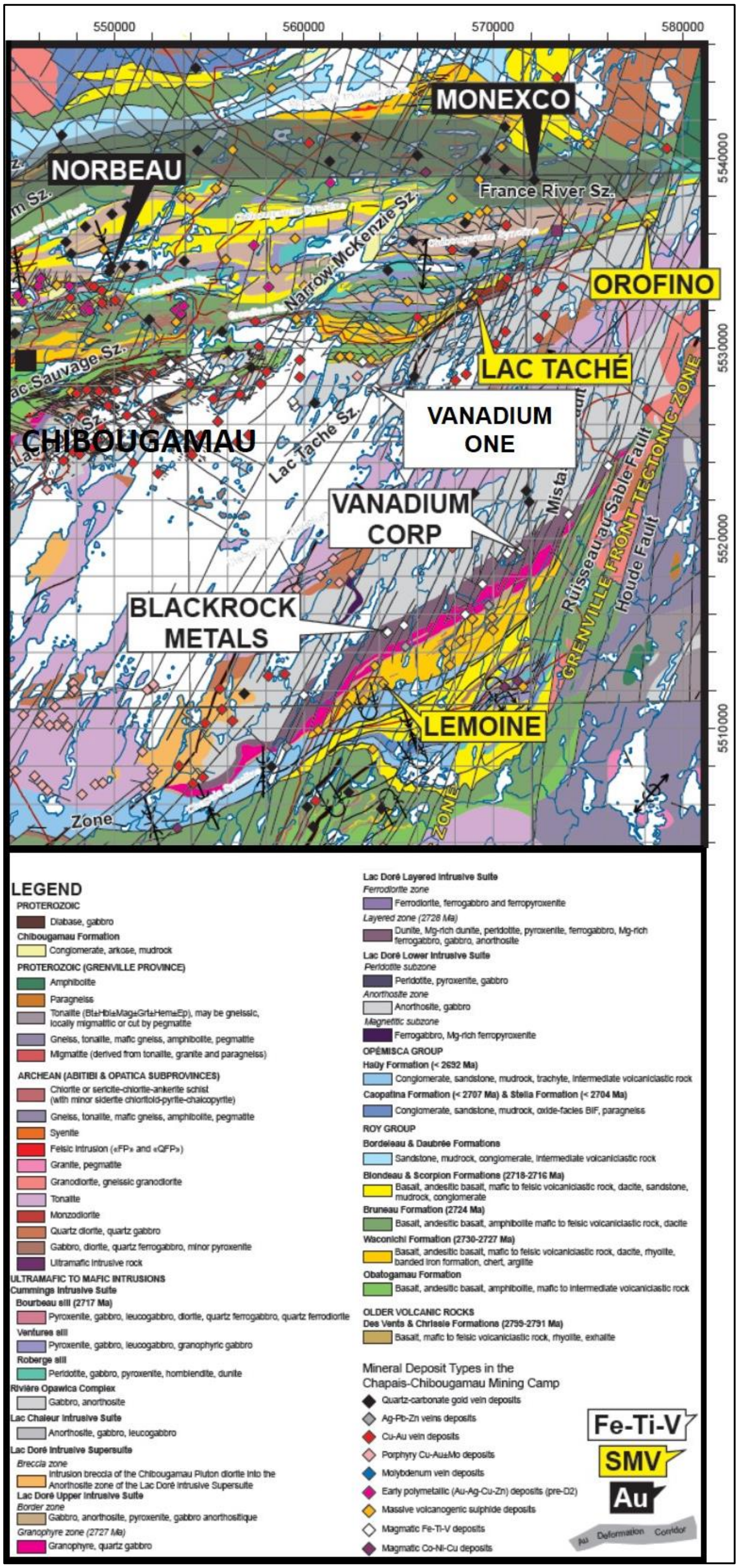

Figure 7-2: Regional geology of the Chibougamau area and the LDC (modified from MERN, 2019)

The LDC is a stratiform intrusive complex composed primarily of (meta-) anorthosite with lesser amounts of gabbro, anorthositic gabbro, pyroxenite, dunite and harzburgite. The anorthosite represents 70–90% by volume of the lithologies present within the LDC. A younger granitic phase of the LDC is emplaced in the centre of the LDC and obscures the mafic lithologies in this area.

The LDC stratigraphy comprises four zones (Allard, 1976):

- The lowermost anorthositic zone composed of anorthosite and gabbro, in variable proportions (including gabbroic anorthosite and anorthositic gabbro). A maximum thickness of 3,000 m has been estimated by Allard (1976).
- The layered zone composed of bands of ferro-pyroxenite, magnetite-bearing gabbro, magnetitite (rock consisting of at least 90% magnetite) (containing titanium and vanadium) and anorthosite. The maximum thickness has been estimated at 900 m (Allard, 1976). The layered zone rocks pass gradually into the underlying anorthosites and gabbros of the anorthositic zone.
- The granophyre zone (at the top) composed of soda-rich leuco-tonalite.
- The border zone, found in contact with the volcanic rocks of the Roy Group (Waconichi Formation), which forms the margin of the complex. This border zone is discontinuous and is composed of gabbro and anorthosite locally containing a considerable percentage of quartz.

7.1.1 Regional Tectonics and Structure

All rock units in the area were affected by multiple deformation events and are folded into a succession of east-west trending anticlines and synclines. Lithological units tend to have steep to subvertical dips. The LDC was folded into a broad east-west trending anticline (Figure 7-3) during the compressive accretion of the Abitibi-Wawa Terrane between 2.698 Ga and 2.690 Ga (Daigneault and Allard, 1990). The LDC has also been affected by deformation (and low-grade metamorphism) owing to the much younger Grenville Orogeny (c. 1.1 Ga), along the eastern edge of the Superior Province. The late Chibougamau pluton that occupies the core of the Chibougamau anticline has intruded and truncated the LDC.

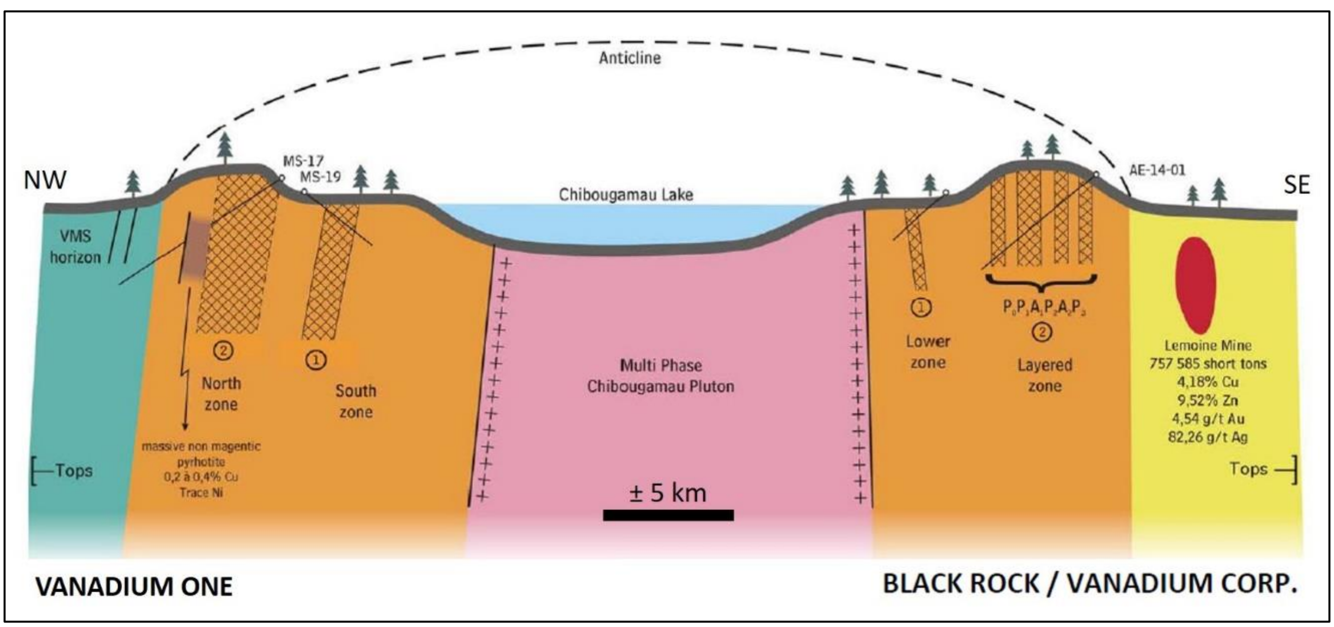

Figure 7-3: Schematic northwest-southeast cross-section through the LDC
Note: All features are not to scale, and the scale bar is an approximation. Source: VONE, 2018

Faults and shear zones in the region strike between northeast and east, although northwest-striking faults are also reported. Large scale synclines and anticlines are generally bound by regional synvolcanic/sedimentary and syntectonic east-west faults. Late northeast to north-northeast faults dissect the region and are either associated with or reactivated by the Grenvillian event.

7.2 Prospect and Local Geology

The Project area straddles the contact between the mafic magmatic rocks of the LDC to the south and sediments and mafic volcanics of the Roy Group to the north (Figure 7-2, Figure 7-5). Within the Property, the volcanic stratigraphy of the Roy Group comprises predominantly basaltic to andesitic rocks of the Obatogamau Formation and basalt, andesitic basalt, mafic to felsic volcaniclastic rock, dacite, rhyolite, BIF, chert, and argillite of the Waconichi Formation (dated at 2726–2729 Ma). The LDC is emplaced into this volcano-sedimentary package, and both are crosscut by mafic to ultramafic sills and younger plutonic intrusions ranging from tonalites to carbonatites. The BIF of the Waconichi Formation are particularly notable in the Project area, as the LDC can be seen in contact with these BIFs, and in places, can be seen assimilating them (Figure 7-4). This may have implications for the formation of the low-titanium magnetites within the Project. A small felsic plug, probably related to the younger Lac Chibougamau batholith, is present at the western boundary of the property.

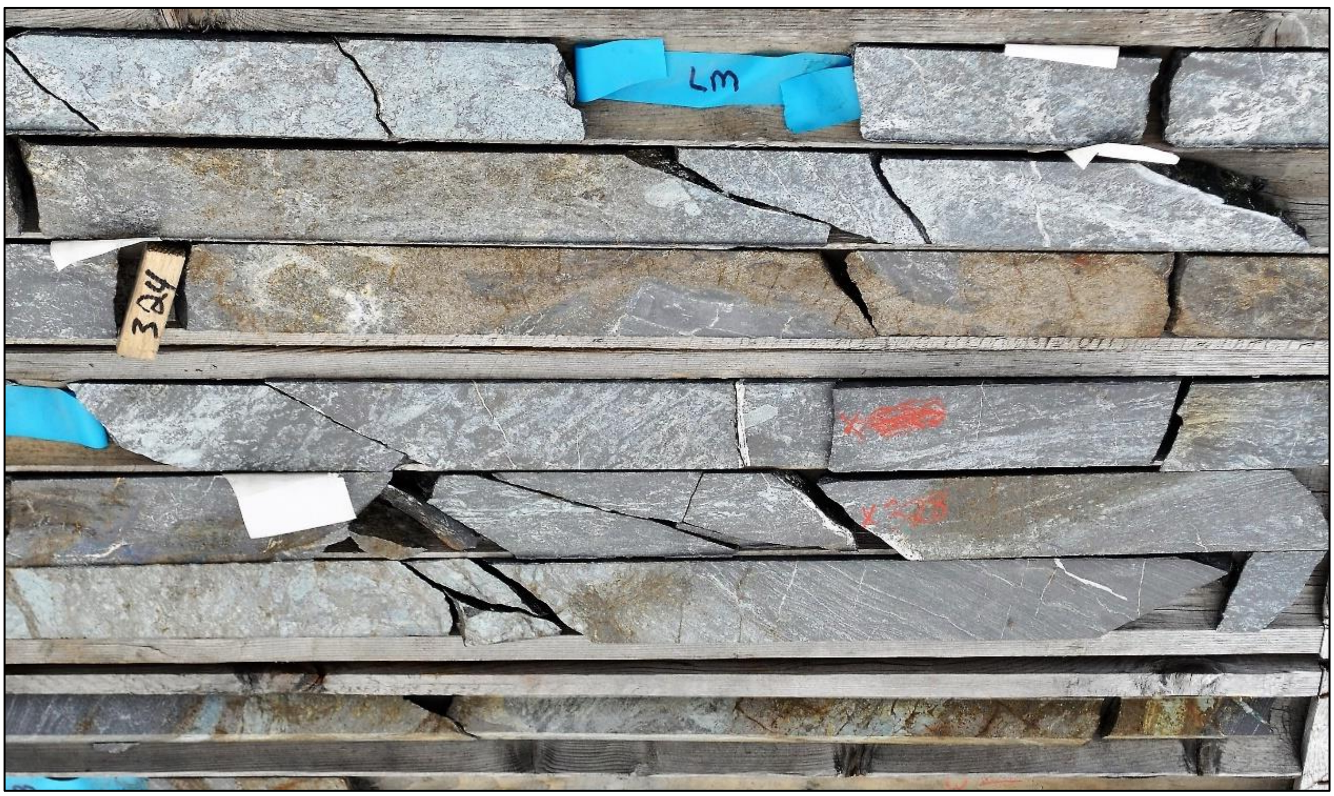

Figure 7-4: BIF being assimilated into mafic magmas in drillhole MS-13-17

The Project area is largely underlain by anorthosites of the LDC, which grade into the iron-rich ultramafic units through a crude stratigraphy comprising (from base to top): anorthosite, gabbro, magnetite-gabbro, magnetite-pyroxenite, magnetite-peridotite, magnetite-dunite and centimetre-scale magnetitite layers. The presence of magnetite is strongly associated with ultramafic units. Magnetite is locally observed within anorthosites; however, it occurs only as minor disseminations or veinlets.

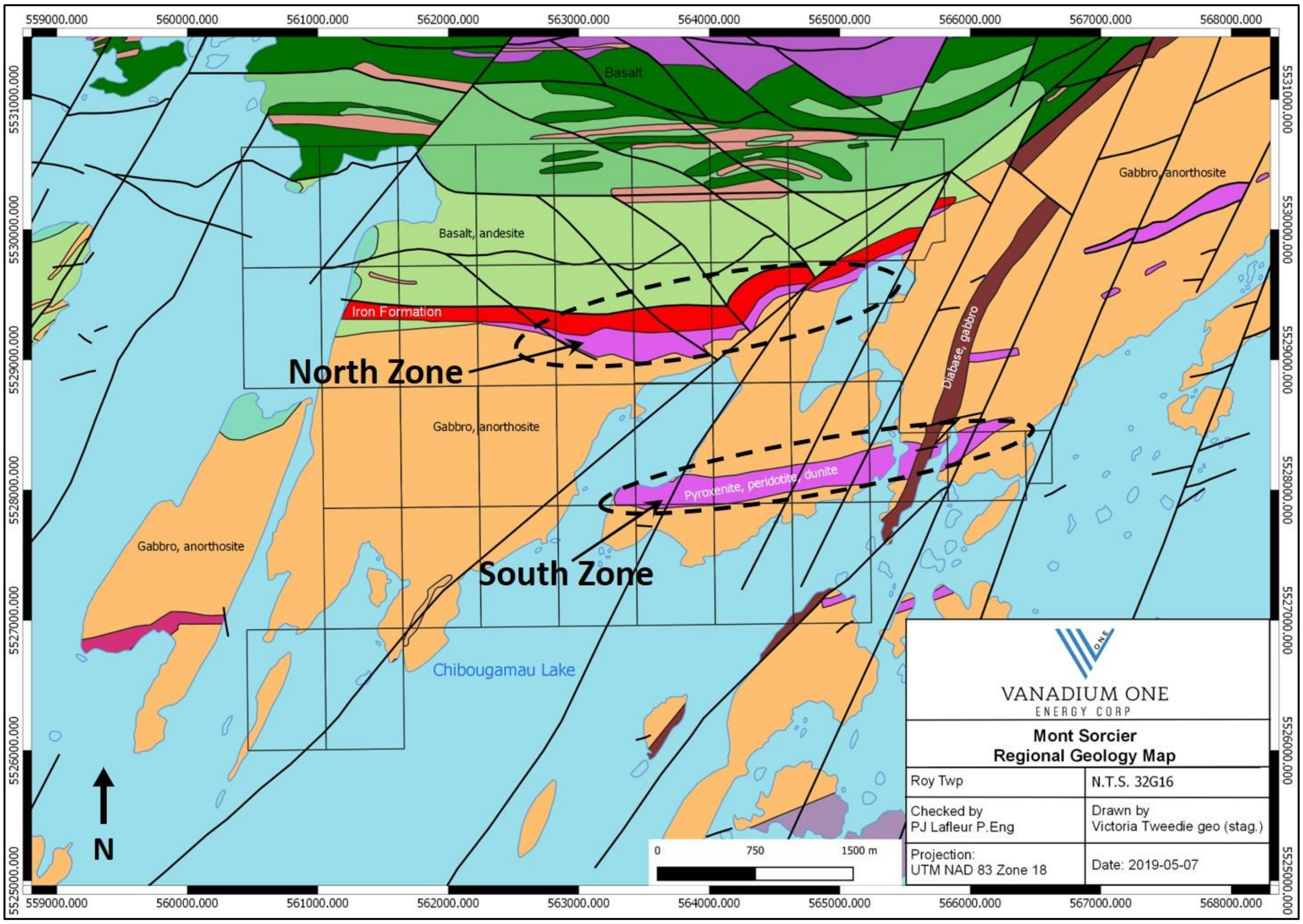

Figure 7-5: Geological map of the Mont Sorcier Property
Source: VONE, 2019

The layered mafic-ultramafic rocks of the Mont Sorcier area have also been affected by the upright folding that affects the region, and that has created the anticlinal nature of the LDC. The North Zone and South Zone thus represent the same stratigraphic unit that has been folded into kilometre-scale parasitic folds, with the North Zone representing the north-dipping limb of an anticlinal fold structure, and the South Zone representing the hinge zone of a syncline (Figure 7-6).

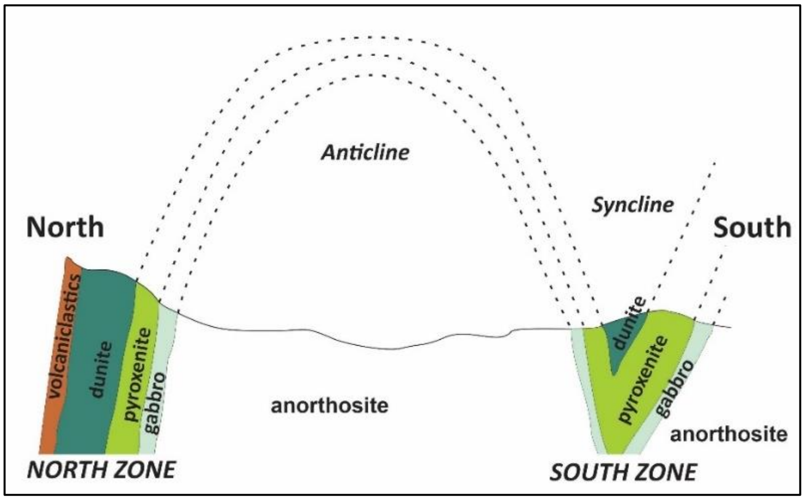

Figure 7-6: Structural relationship between the North Zone and South Zone (after Dorr, 1966)

7.2.1 North Zone and South Zone

Two significant mineralized zones are found on the Property – the North Zone and the South Zone.

The North Zone is identifiable in the field and through airborne magnetics over a strike length of approximately 4 km. It appears to be between 100 m and 300 m in thickness, forming a roughly tabular body that strikes east-west, is subvertical and extends to depths of at least 500 m based on drilling. The North Zone has been drilled over approximately 2.5 km of its strike length. Possible extensions to the North Zone could be found to the east, as well as down-dip.

The South Zone is identifiable over approximately 3 km strikes east-northeast to west-southwest and has been mapped in detail as well as being drilled over its entire strike length. It is thought to form a tight synclinal structure, with a shallow plunge to the west-southwest. It is 100–200 m thick and extends to at least ~300 m in depth in the western part of the deposit, shallowing towards the east. Although the total depth of mineralization has not been fully tested, it is not expected to continue to depths significantly deeper than currently defined. The South Zone has been cut by several small northeast-trending faults, one larger northeast-trending fault with a ~150 m dextral displacement and is also cut by a north-northeast trending dyke that is ~150 m thick.

Both the North Zone and South Zone appear to have formed from the crystallization of VTM triggered by assimilation of a carbonate-facies iron formation (the Lac Sauvage iron formation) by mafic magmas of the LDC (see Section 8). In both the North Zone and South Zone, magnetite is disseminated within ultramafic rocks (dunite, peridotite pyroxenite), and the ultramafic VTM-bearing lithologies are surrounded by mafic units (gabbro and anorthosite).

Mineralogy

In early 2018, VONE commissioned ActLabs to undertake mineralogical studies for selected samples using QEMSCAN, in order to determine the liberation characteristics of the magnetite and associated minerals. In late 2018, VONE commissioned SGS Laboratories to carry out additional QEMSCAN mineralogical characterization of selected magnetite-bearing samples to investigate any alteration, characterize the mode of occurrence of magnetite, and gain insight into the formation of the magnetite-rich ultramafic rocks (Glossop and Prout, 2019).

Several of the samples analysed by SGS show fresh, igneous textures with limited alteration of pyroxene and olivine (Figure 7-7). In pristine samples, magnetite often displays an interstitial texture, filling spaces between subhedral to euhedral pyroxene (Figure 7-7A) and olivine (Figure 7-7B) crystals. Elsewhere, magnetite occurs as minute grains within pyroxene (Figure 7-7C) and olivine (D) grains. Large subhedral pyroxene crystals contain few magnetite inclusions (Figure 7-7C), and some samples display younger magnetite veins in addition to the disseminated igneous magnetite (Figure 7-7D).

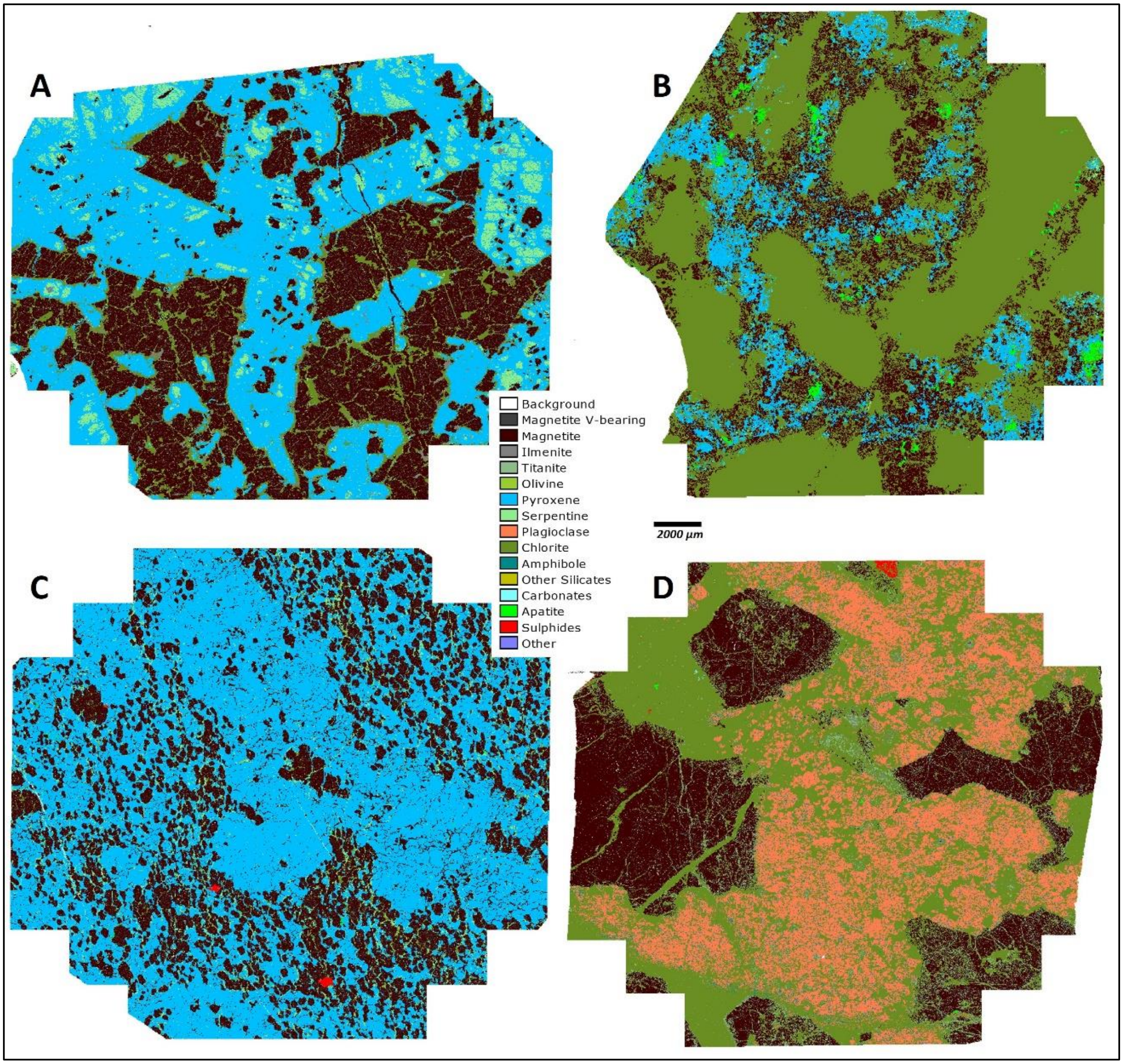

Figure 7-7: SGS QEMSCAN images of magnetite-bearing samples (Glossop & Prout, 2019) – note the presence of apatite and sulphides in some samples

A: Interstitial magnetite associated with subhedral to euhedral pyroxene.

B: Large, magnetite-free chlorite pseudomorphs (after pyroxene) surrounded by an interstitial mix of extremely fine-grained magnetite and pyroxene.

C: Fine-grained magnetite grains within pyroxene.

D: Interstitial magnetite between subhedral grains of plagioclase feldspar that has been partially altered to chlorite.

More deformed or altered samples (Figure 7-8) show complete serpentinization of olivine (Figure 7-8A), as well as evidence for deformation in the form of small, intrafolial folds of magnetite (Figure 7-8B). In rare cases where olivine is still preserved, it is found as minute relict grains within an alteration matrix of carbonate and chlorite

(Figure 7-8C). In some cases, secondary remobilised veins of magnetite crosscut altered samples and primary magnetite (Figure 7-8D).

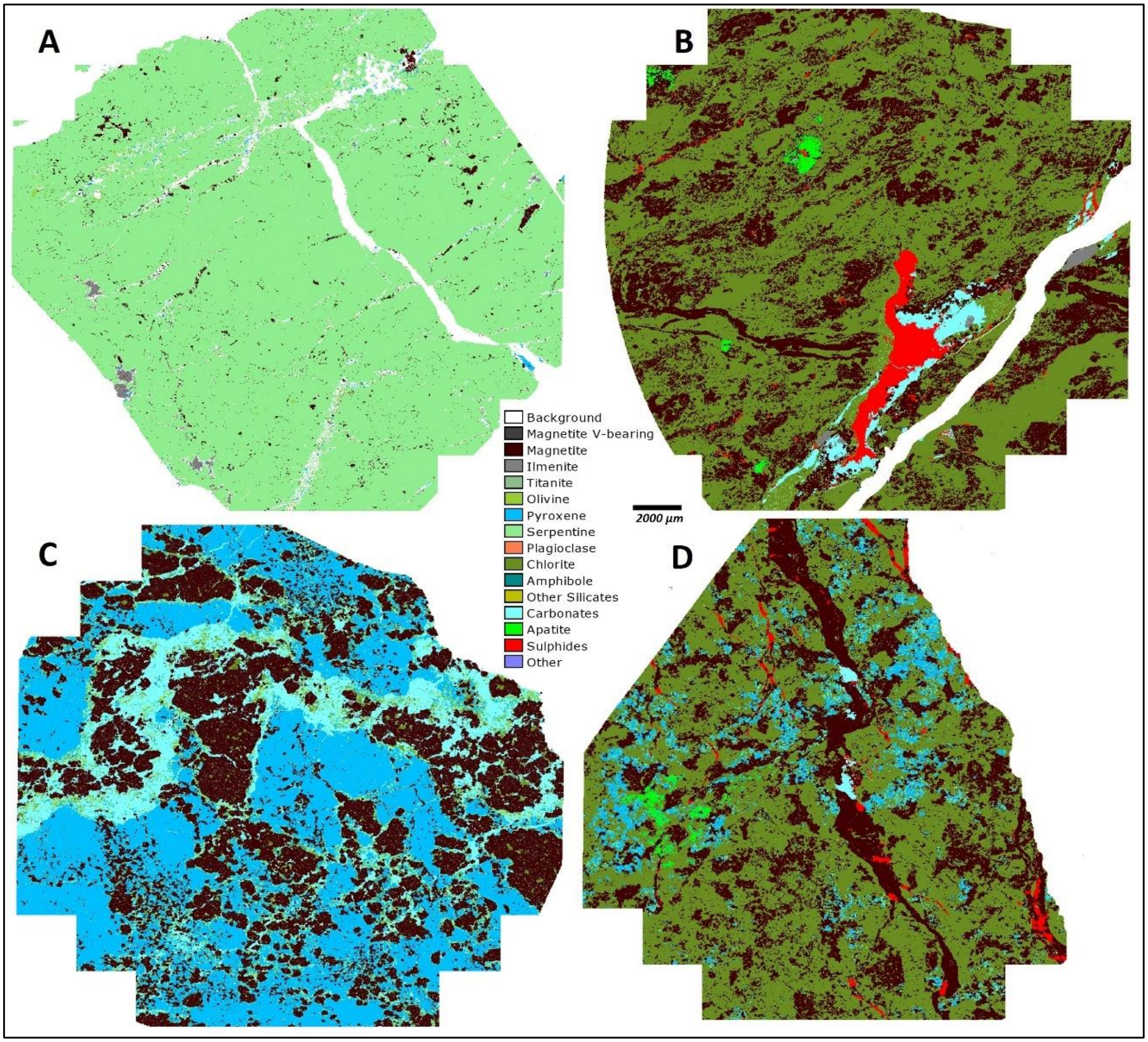

Figure 7-8: SGS QEMSCAN images of more altered and deformed samples (Glossop & Prout, 2019) – note the presence of apatite and sulphides in some samples

A: Serpentine (after olivine) with fine-grained secondary magnetite.

B: Deformed magnetite bands within a chlorite sample. Note the small-scale folded magnetite bands.

C: Magnetite-bearing pyroxenite with a zone of carbonate (with chlorite), and other similar zones of carbonate surrounding magnetite crystals. Note that some fine-grained relict olivine is present within the carbonate-chlorite matrix.

D: Sample of chlorite (with minor unaltered pyroxene), as well as a vein a magnetite.

8 Deposit Types

8.1 Mineralization Styles

Magnetite mineralization at the Mont Sorcier Project shows several similarities to other magmatic VTM or ilmenite deposits associated with layered mafic intrusive complexes such as the Bushveld Complex (South Africa) or the Skaergard Intrusion (Greenland). In these and other layered complexes, as well as on the south-eastern margin of the LDC (the Blackrock Minerals Armitage deposit and the Vanadium Corp. Lac Dore deposit), VTM and ilmenite deposits typically form in the upper portions of the layered complexes and have been subdivided into ilmenite-dominant deposits (generally in massif-type anorthosites host rocks) and magnetite-dominant deposits (generally in layered intrusions within gabbroic host rocks – Gross, 1996).

Crystallization of magnetite is initiated when the evolving magma becomes sufficiently iron-enriched to form oxide minerals, and thereafter settling of magnetite crystals results in localized lowering of the magma density from ~2.7 to ~2.5. This creates an inverted density stratification, resulting in overturn of the magma and resulting magma mixing, thereby precipitating additional magnetite. The repetition of this process leads to the formation of several stratified layers of magnetite, often with sharp bases and gradational upper contacts. Because vanadium is compatible in the magnetite crystal structure, it fractionates into magnetite, thereby depleting the remaining magma of vanadium. This results in the lowermost magnetite-bearing units in layered complexes typically having the highest V_2O_5 values, with the vanadium content of the magnetite gradually decreasing upwards through the stratigraphy (Figure 8-1) – lower layers can have V_2O_5 contents of up to 3%, while this drops to below 0.3% in the upper layers. Conversely, titanium is incompatible, and becomes more concentrated in the residual magma – hence the lower VTM layers have lower titanium contents (typically 7–12% TiO_2) than upper layers (up to 20% TiO_2), where ilmenite and even rutile may be observed.

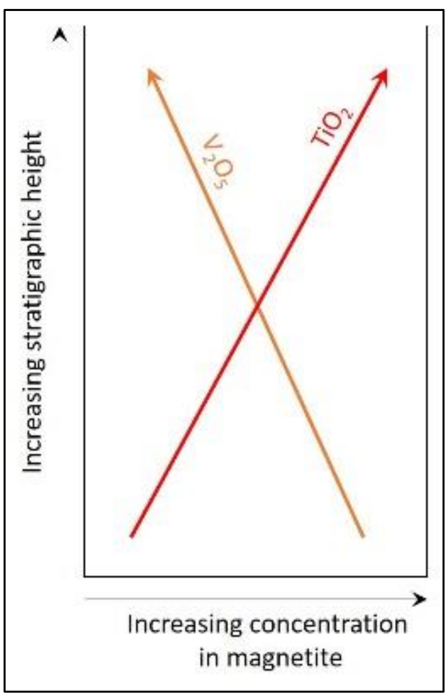

Figure 8-1: Schematic diagram showing the general increase in TiO_2 and decrease in V_2O_5 in magnetite with increased stratigraphic height in the upper portions of layered mafic complexes

8.2 Conceptual Models

VTM deposits are typically found in the upper, more fractionated portions of layered complexes. In the Upper Zone of the Bushveld Complex, the formation of VTM-enriched layers has been attributed to magma mixing events, resulting either from a breakdown of densely stratified liquid layers (i.e. overturn) or the influx of new magma (Harne and Von Gruenewaldt, 1995). Separation of a dense, iron-rich magma owing to large-scale silicate liquid immiscibility has also been suggested and may explain the occurrence of apatite-oxide layers in the upper portions of some layered mafic complexes (Van Tongeren and Mathez, 2012).

Although this conceptual model appears to explain the formation of the VTM-enriched units elsewhere on the LDC, the VTM mineralization at Mont Sorcier is unusual in several respects:

- It is associated with olivine-bearing ultramafic units, with remarkably primitive compositions ($Fo_{82–90}$ – Mathieu, 2019)
- The VTM is anomalously low in titanium, with TiO_2 grades generally below 2%.

These unusual features, in combination with detailed studies of the chemistry of the VTM and host rocks at the Mont Sorcier deposit, has led Mathieu (2019) to propose that the formation of VTM mineralization at Mont Sorcier was triggered by assimilation of a carbonate-facies iron formation (the Lac Sauvage iron formation, within the Waconichi Formation of the Roy Group). The assimilation of these iron-enriched, magnesium-bearing, and silicon-poor rocks would have desilicified and added iron-magnesium to an already iron-enriched, evolved basaltic magma and favoured the formation of magnesium-olivine (Mathieu, 2019). In addition, the assimilation of carbonate by magma is known to favour the crystallization of clinopyroxene over plagioclase and to induce CO_2 degassing, and oxidizing CO_2-bearing fluids may have favoured the crystallization of magnetite. Furthermore, the volatiles may also have promoted fast cooling rates, prevented prolonged magma differentiation, local vanadium-enrichment and magnetite settling (Mathieu, 2019).

The overall result is the formation of a broad layered zone of magnetite mineralization in which vanadium has a relatively homogeneous spatial distribution (Figure 8-2), in contrast to the rhythmic succession of centimetre- to metre-thick magnetitite and silicate-rich rocks that characterize the VTM deposits elsewhere within the LDC and within other layered complexes, but which are not observed at Mont Sorcier (Mathieu, 2019).

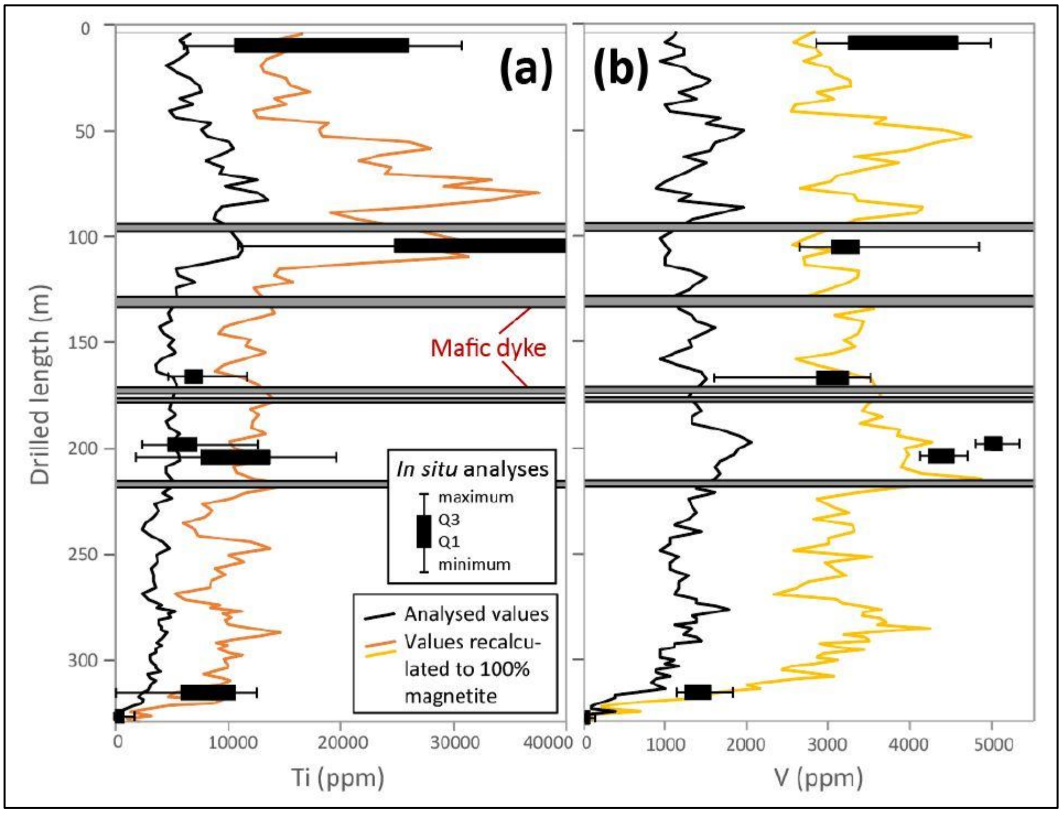

Figure 8-2: Titanium (a) and vanadium (b) contents (from drill core MS-13-17) represented as a function of downhole length

Note: The vanadium and titanium contents are analyzed bulk rock values (black lines) and values recalculated to 100% magnetite (orange lines). The magnetite proportions used to perform these calculations were measured by SATMAGAN (from Mathieu, 2019).

9 Exploration

9.1 Exploration Program

Between 2017 and 2019, VONE has carried out stripping and mapping of the Property, in addition to drilling (see Section 10).

9.2 Stripping

In June 2018, a selected area was cleared of vegetation and washed clean of any remaining overburden, to expose the pristine glaciated bedrock (Figure 9-1). The 2018 stripping area runs parallel to and just east of historical section 52E, the site of historical trenching and drilling (historical drillholes FE-6, FE-7, FE-8 and FE-9, FE-13). No trenching/sampling of the exposed areas by VONE has taken place, but the exposed bedrock has been used for mapping.

Figure 9-1: Washing of a stripped area of the South Zone deposit to expose the glaciated bedrock below

9.3 Mapping

In August 2018, VONE commissioned Mr Ali Ben Ayad to carry out detailed lithological and structural mapping of the South Zone. This mapping focused on identifying major structures within the deposit and mapping the distribution of mafic and ultramafic units – an example of the mapping is shown in Figure 9-2.

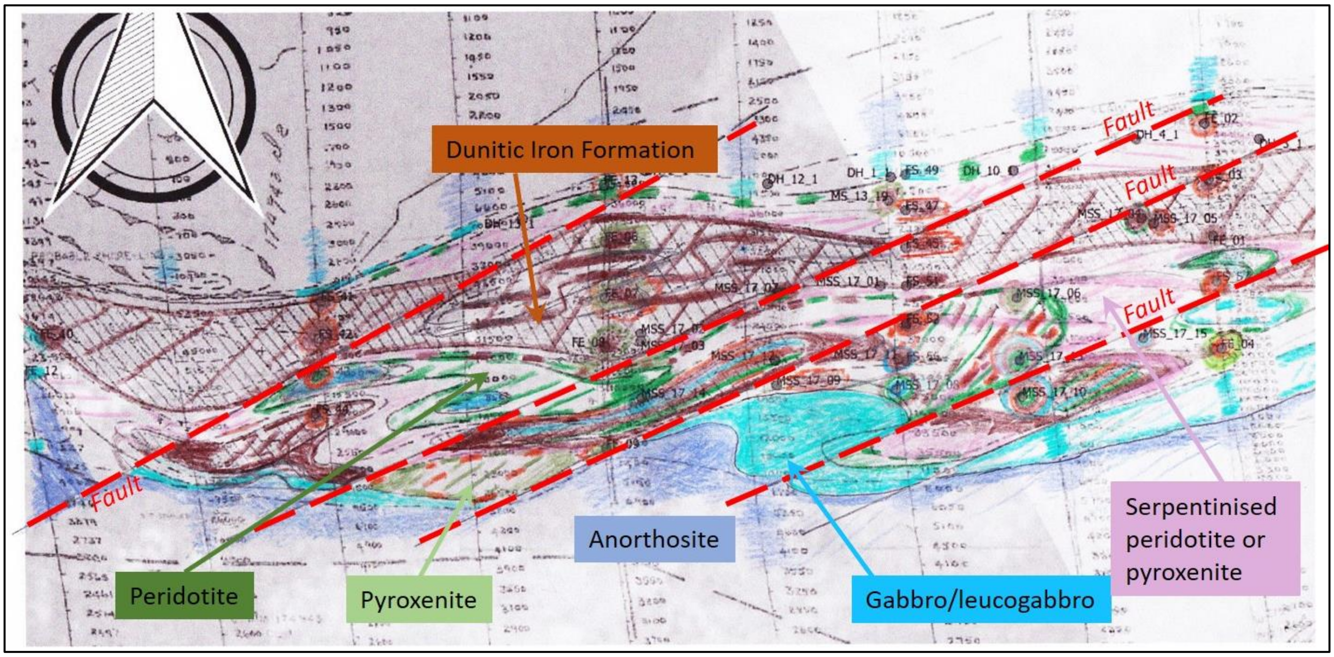

Figure 9-2: *Hand-drawn geological map (created by Mr Ali Ben Ayad) of a portion of the South Zone deposit*

Note: The map has been drawn over historical ground magnetic data (carried out by Campbell Chibougamau Mines Ltd). Several northeast-trending sinsitral faults are evident, which displace and offset mafic-ultramafic units and accociated magnetite mineralization. Modified from original by L. Longridge (2019)

9.4 Airborne Geophysics Reprocessing

In 2018, VONE commissioned Laurentia Exploration (a geological consultancy based in Québec) to reprocess the previous historical (2010) aeromagnetic data to produce derivative products, including First Vertical Derivative (1VD) (Figure 9-3) and Tilt. These products were used together with the results of field mapping to aid in the interpretation of wireframes for Mineral Resource estimation.

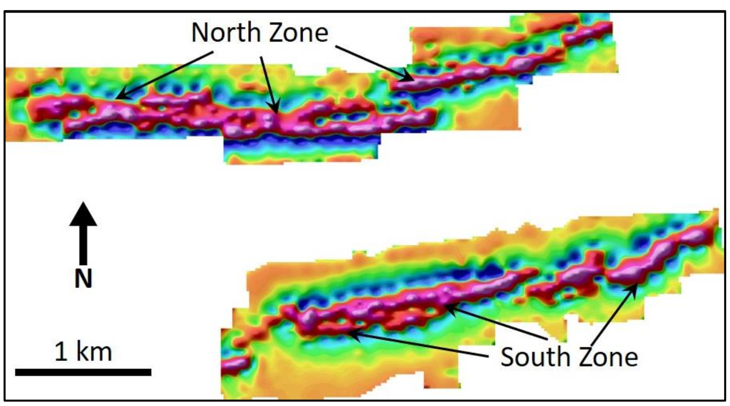

Figure 9-3: *1VD created in 2018 by Laurentia Exploration using 2010 AeroQuest airborne magnetic data*

9.5 Interpretation

The combination of mapping and airborne magnetics has shown that areas underlain by magnetite-bearing ultramafic rocks correspond to magnetic highs. This is expected since magnetite-bearing units will naturally give a strong magnetic response. The use of magnetic surveys is a useful tool in the exploration and delineation of magnetite deposits, and magnetic data has been used in the interpretation of the geology and creation of the geological model for the deposit.

10 Drilling

10.1 Historical Drilling

Historical drilling conducted by previous operators on the Mont Sorcier Project is discussed in Section 6 (History).

10.2 Summary of VONE 2017–2018 Drilling

Local drill company, Forage Chibougamau was contracted to drill NQ diameter diamond drill core on the Mont Sorcier North and South deposits. Drill core was delivered to the VONE core facility in Chibougamau at the end of each shift. VONE's Project Geologist managed the contractors.

A list of all drillholes drilled by VONE during 2017 and 2018, their coordinates (easting and northing), length, and the dip and azimuth of the hole, are shown in Table 10-1. A total of 32 drillholes (7,388.18 m) were drilled.

Table 10-1: Drillhole drilled by VONE in 2017 and 2018 on the Mont Sorcier Property

Hole name	Easting	Northing	Azimuth	Dip	Length (m)
MSN-18-01	562889.2	5529129.4	360	-45	552
MSN-18-02	563298.9	5529083	360	-45	578
MSN-18-03	562227.2	5529596.1	180	-45	363
MSN-18-04	562770.5	5529643.5	180	-45	439.54
MSS-17-01	564112.6	5528033.1	180	-45	141
MSS-17-02	563918.6	5527992.9	180	-45	141
MSS-17-03	563918.6	5527987.4	180	-45	141
MSS-17-04	564328.2	5528091.3	360	-45	141
MSS-17-05	564332.7	5528087.2	180	-45	141
MSS-17-06	564223.0	5528023.5	360	-45	195
MSS-17-07	564028.4	5528026.9	180	-45	102
MSS-17-08	564123.8	5527946.1	360	-59	276
MSS-17-09	564026.0	5527948.5	360	-59	276
MSS-17-10	564226.6	5527938.7	360	-55	273
MSS-17-11	564125.1	5527969.5	360	-45	174
MSS-17-12	564025.9	5527973.2	360	-45	174
MSS-17-13	564225.6	5527967.7	360	-45	234
MSS-17-14	563915.1	5527942.4	360	-45	225
MSS-17-15	564325.6	5527988.5	360	-45	225
MSS-18-16	564219.6	5528118.2	180	-45	153
MSS-18-17	564321.4	5528145.6	180	-45	189
MSS-18-18	564219.6	5528143.0	180	-45	270
MSS-18-19	564019.6	5528113.7	180	-60	222
MSS-18-20	564019.6	5528114.2	180	-45	192
MSS-18-21	563936.7	5528121.9	180	-60	201
MSS-18-22	563936.7	5528122.4	180	-60	210
MSS-18-23	563826.1	5528061.2	180	-45	186
MSS-18-24	564456.1	5527995.0	360	-45	237
MSS-18-25	564521.5	5527958.6	350	-45	207
MSS-18-26	564762.7	5528074.9	360	-45	175.4
MSS-18-27	564991.2	5528163.0	360	-45	138.24
MSS-18-28	564923.3	5528111.2	340	-45	216

Note: Coordinates are UTM, NAD83.

A map showing the locations of all holes drilled by VONE between 2017 and 2018, in addition to the locations of historical drillholes, is shown in Figure 10-1.

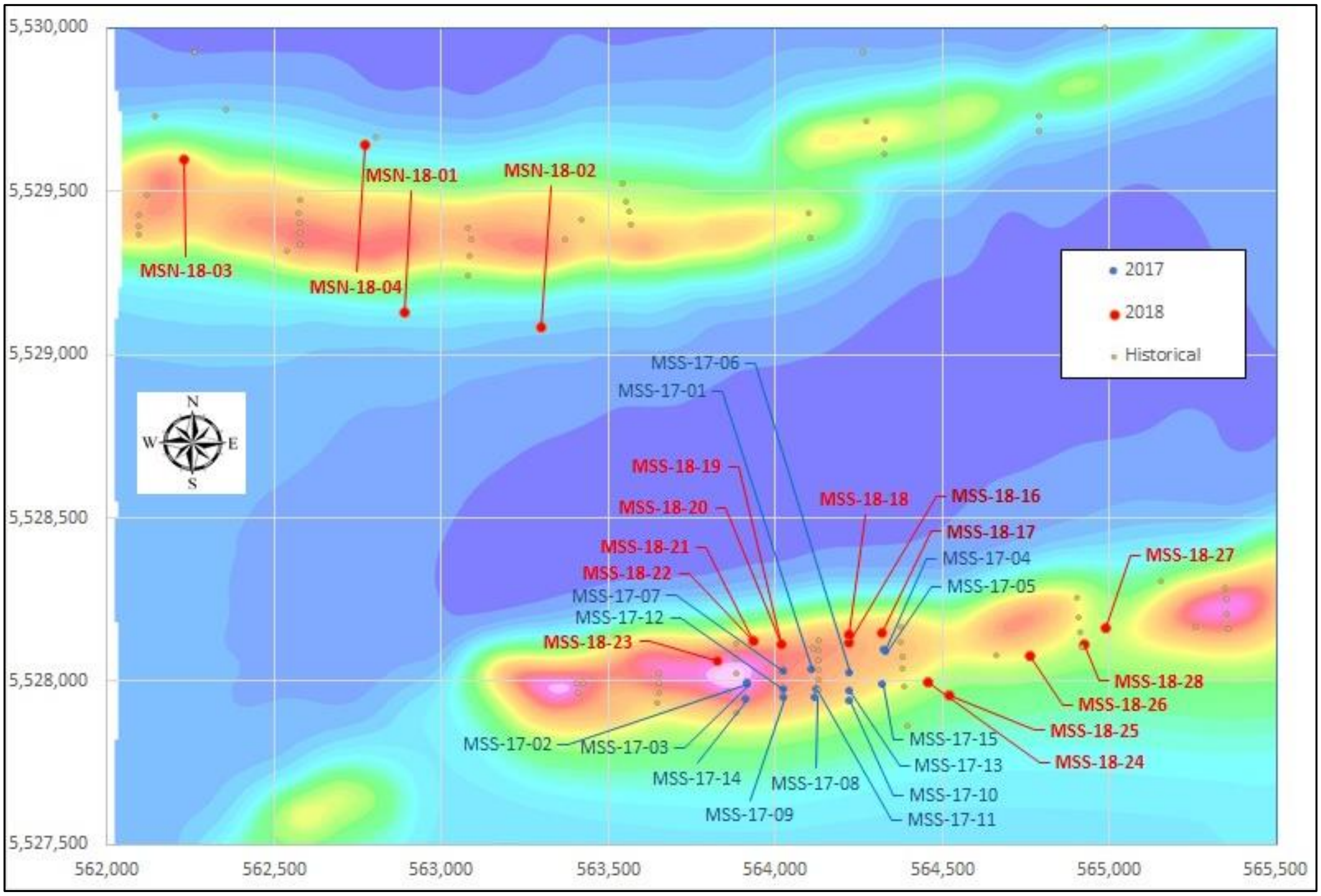

Figure 10-1: Location of drillholes on the Mont Sorcier Project, overlain on the TMI (airborne magnetics data) for the Property
Source: VONE, 2019

10.3 Sampling

10.3.1 Core Logging

Subsequent to unpackaging at the core facility, the drill core was checked for measurement errors and placement errors by Technicians and then metered appropriately. The VONE Project Geologist prepared a quick log summary each morning to summarize the drill progress, geology encountered, and sampling performed to that point.

The VONE Project Geologist or technicians use a magnetic probe to measure the magnetic susceptibility and conductivity every 50 cm down the drillhole. A scale was also used to measure whole core sample weight, both dry and in water, in order to calculate the density, although the results of these density measurements are highly variable and have not been used for the purposes of resource estimation.

The Drill Geologist is responsible for recording geological aspects of the drill core including lithology, alteration, and mineralization with special focus on structures (bedding, foliation, shearing, faults) and geologic relationships (contacts) and their relation to the stratigraphy, lithology, and magnetite mineralization.

10.3.2 Core Sampling

Following the completion of logging the Drill Geologist samples the drill core at 2–4 m intervals respecting lithological boundaries, major structures, and magnetite mineralization.

Sampled core is cut into halves at the VONE core facility using a diamond saw. The bottom half is returned to the core box and top half is placed in a sample bag with the corresponding sample tag and sealed with a zip tie. All bags are labelled. Beginning in 2018, quality assurance/quality control (QAQC) samples (5% standards, blanks, and duplicates) are included with each shipment sent to the lab.

The archived core is stored in core racks at the VONE core storage facility in Chibougamau.

10.4 Surveying

10.4.1 Collar Surveying

Collars were surveyed by an independent surveyor (Paul Roy, Q.L.S., C.L.S). A list of preliminary drillhole coordinates was provided to the surveyor by the VONE Project Geologist. A Leica GS15 GNSS RTK receiver was set up as a base station at control point MS-1 (5,527,937.63mN, 564,210.33mE) whose coordinates were determined in June 2018 using Precise Point Positioning from Natural Resource Canada (30 June 2018 report, Document 7662). A measurement check was performed on existing permanent control point MS-2 (5,527,922.09mN, 564,091.77mE). Drillhole collars for all 2013, 2017 and 2018 drillholes, as well as most historical drillholes (see Table 6-2) were measured by a Leica GS18 multi-frequency GNSS providing centimetre-level accuracy.

10.4.2 Downhole Surveying

A north seeking Champ Gyro was deployed to measure downhole azimuth and dip of drillholes. The Champ Gyro is first run down and then up the borehole length with the up run being a repeat for quality assurance. Azimuth and dip accuracies are 0.75° and 0.15°, respectively. The use of a gyro-based instrument is appropriate for rocks with significant proportions of magnetite. No historical holes were surveyed for downhole deviation; however, as these holes were all vertical, minimal deviation is anticipated.

10.5 Significant Intervals

A list of significant intervals for holes drilled by VONE in 2017 and 2018 is presented in Table 10-2.

Table 10-2: List of significant intervals drilled by VONE in 2017 and 2018

Zone	Hole name	From	To	Length	Azimuth	Dip	True thickness	Fe2O3_T	V_2O_5	V_2O_5c
North	MSN-18-01	258.0	552.0	294.0	360.0	-45.0	207.9	32.1	0.16	0.45
	MSN-18-02	275.0	578.0	303.0	360.0	-45.0	214.3	36.2	0.29	0.60
	MSN-18-03	147.0	290.0	143.0	180.0	-45.0	101.1	37.5	0.22	0.52
	MSN-18-04	194.0	408.0	214.0	180.0	-45.0	151.3	37.5	0.18	0.43
South	MSS-17-01	14.8	136.5	121.7	180.0	-45.0	86.1	33.8	0.26	0.60
	MSS-17-02	11.7	141.0	129.3	360.0	-45.0	91.4	33.6	0.23	0.50
	MSS-17-03	12.5	27.5	15.0	180.0	-45.0	10.6	20.4	0.06	0.18
		117.0	132.0	15.0	180.0	-45.0	10.6	17.7	0.02	0.08
	MSS-17-04	8.6	107.6	99.0	360.0	-45.0	70.0	32.0	0.20	0.45
	MSS-17-05	16.2	31.2	15.0	180.0	-45.0	10.6	41.7	0.29	0.53
		31.2	46.2	15.0	180.0	-45.0	10.6	36.6	0.18	0.37
		46.2	126.0	79.8	180.0	-45.0	56.4	30.1	0.13	0.35

Zone	Hole name	From	To	Length	Azimuth	Dip	True thickness	Fe2O3_T	V_2O_5	V_2O_5c
	MSS-17-06	32.1	135.2	103.1	360.0	-45.0	72.9	40.8	0.33	0.57
	MSS-17-08	5.7	21.7	16.0	360.0	-59.0	8.2	16.1	0.01	0.04
		39.0	258.0	219.0	360.0	-59.0	112.8	38.3	0.30	0.59
	MSS-17-09	3.8	244.0	240.2	360.0	-59.0	123.7	39.4	0.29	0.55
	MSS-17-10	76.2	254.5	178.3	360.0	-55.0	102.3	33.3	0.27	0.61
	MSS-17-11	23.1	170.4	147.3	360.0	-45.0	104.2	39.2	0.33	0.65
	MSS-17-12	13.8	147.5	133.7	360.0	-45.0	94.5	43.2	0.34	0.65
	MSS-17-13	11.5	71.6	60.1	360.0	-45.0	42.5	32.6	0.24	0.56
		71.6	86.6	15.0	360.0	-45.0	10.6	34.3	0.29	0.66
		86.6	101.6	15.0	360.0	-45.0	10.6	38.5	0.30	0.63
		101.6	202.0	100.4	360.0	-45.0	71.0	40.7	0.32	0.64
	MSS-17-14	60.9	75.9	15.0	360.0	-45.0	10.6	17.9	0.09	0.37
		94.2	225.0	130.8	360.0	-45.0	92.5	32.7	0.24	0.62
	MSS-17-15	58.2	187.0	128.8	360.0	-45.0	91.1	34.6	0.25	0.55
	MSS-18-16	21.0	148.4	127.4	180.0	-45.0	90.1	39.6	0.30	0.60
	MSS-18-17	12.0	187.6	175.6	180.0	-45.0	124.2	36.1	0.26	0.53
	MSS-18-18	27.0	270.0	243.0	180.0	-45.0	171.8	34.8	0.23	0.50
	MSS-18-19	35.0	221.2	186.2	180.0	-60.0	93.1	38.9	0.28	0.55
	MSS-18-20	54.0	192.0	138.0	180.0	-45.0	97.6	45.1	0.39	0.70
	MSS-18-21	47.0	201.0	154.0	180.0	-60.0	77.0	33.6	0.23	0.53
	MSS-18-22	85.0	210.0	125.0	180.0	-60.0	62.5	38.1	0.30	0.65
	MSS-18-23	3.0	119.0	116.0	180.0	-45.0	82.0	35.1	0.23	0.51
	MSS-18-24	84.5	223.0	138.5	360.0	-45.0	97.9	32.4	0.19	0.41
	MSS-18-25	98.0	150.6	52.6	350.0	-45.0	36.6	33.3	0.18	0.40
	MSS-18-26	33.3	132.0	98.8	360.0	-45.0	69.8	22.0	0.10	0.35
	MSS-18-27	66.5	104.5	38.0	360.0	-45.0	26.8	26.7	0.15	0.28
	MSS-18-28	63.0	83.0	20.0	360.0	-45.0	14.1	15.5	0.02	0.04
		106.0	183.0	77.0	340.0	-45.0	51.2	22.0	0.11	0.28

10.6 Interpretation

10.6.1 Mineralization Orientation and Thickness

In the North Zone, mineralization is interpreted to occur as a roughly tabular body, with a subvertical to steeply north-dipping dip, and striking east-west. In the South Zone, tabular mineralization has been folded around a synclinal axis with a shallow west-southwest plunging orientation. Both the North Zone and South Zone mineralized bodies trend roughly east-west and are steeply dipping, however the North Zone is interpreted to extend to significant depths (the actual vertical extent has not yet been confirmed and the base of mineralization is unknown). The South Zone mineralization is expected to terminate at depth owing to its position in the hinge of a shallow-dipping syncline. Representative cross-sections through the North Zone and South Zone are shown in Figure 10-2A and Figure 10-2B, respectively.

Mineralization is interpreted to vary between approximately 100 m and 200 m in true thickness in the North Zone and South Zone.

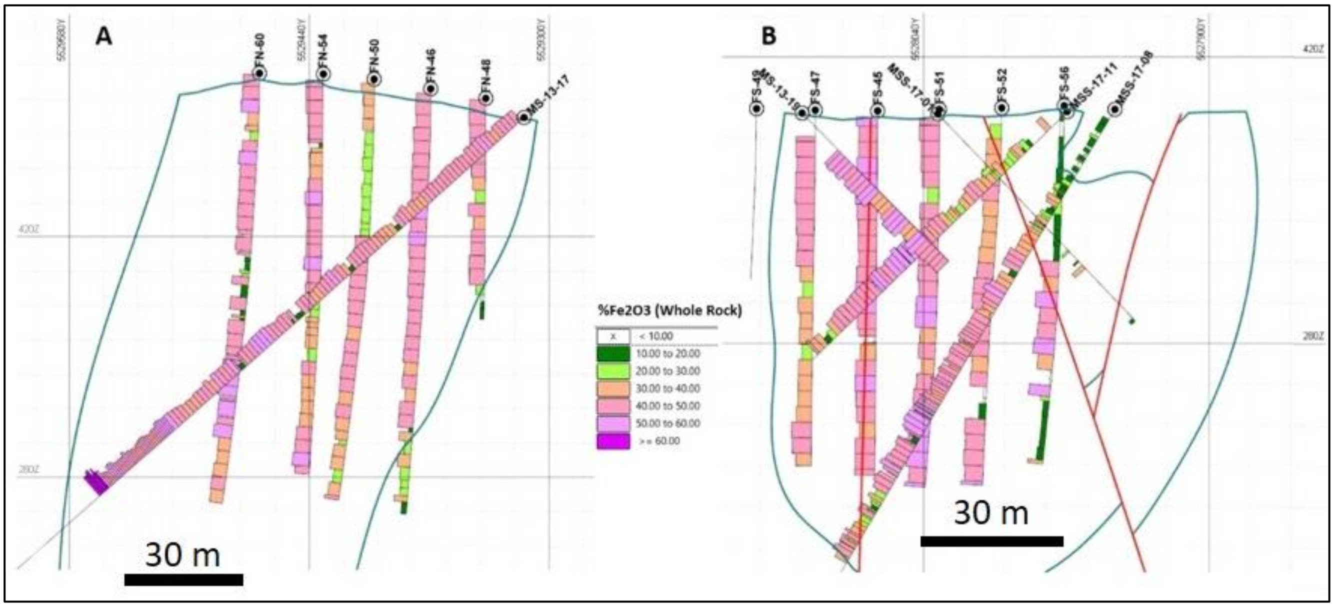

Figure 10-2: Representative cross-sections looking east through the mineralization, showing historical and recent drilling, and assay values for Fe_2O_3

A: North Zone. B: South Zone. Note that some holes have been projected onto the section.

10.7 Additional Discussion

Historical drillholes have not been subject to downhole gyro surveys – these historical holes are all vertical and were subject to acid dip tests, which showed minimal downhole deviations (<1°). The rocks are magnetic and therefore no azimuths could be determined using magnetic-based survey methods at that time. Because the historical holes are vertical, downhole deviations are expected to be negligible. Additionally, some historical drillhole collars have not been subject to accurate surveys using a differential global positioning system (GPS).

Due to the fact boreholes are widely spaced, mineralization is continuous and broadly disseminated, and because only Inferred Mineral Resources have been estimated in areas with predominantly historical drillholes; this is not considered material at this stage of the Project.

11 Sample Preparation, Analyses and Security

11.1 Project Based Sample Preparation and Security

The following procedure applies to samples collected by VONE, as well as samples collected from 2013 drilling by Chibougamau Independent Mines Ltd. Following the completion of logging, the VONE Project Geologist lays out drill core samples at 2–4 m intervals respecting lithological boundaries, major structures, and magnetite mineralization. Sampled core is cut into halves at the VONE core facility. The bottom half is returned to the core box for archive and top half is placed in a sample bag with the corresponding sample tag and sealed with a zip tie. All bags are labelled. Beginning in 2018, QAQC samples (5% standards, blanks, and duplicates) are included with each shipment sent to the lab.

Security of samples prior to dispatch to the analytical laboratory was maintained by limiting access to the samples by unauthorized persons. Samples are sealed and stored within wooden boxes at the VONE core facility prior to shipment. Samples remained under the supervision of VONE personnel at the core facility until transferred to a commercial trucking for ground delivery of the boxed samples to the analytical lab. The VONE Project Geologist is responsible for overseeing the transfer of samples from VONE to the shipping company. The VONE geologist is alerted of the arrival of the samples at the Laboratory.

Sample preparation and security procedures utilized by historical operators are undocumented.

11.2 Laboratory Based Sample Preparation

For drillholes from 2013 onwards, sample preparation and assays were carried out at three laboratories: Activation Laboratories (Actlabs – Val d'Or, Québec) Laboritoire Expert (Expert – Rouyn-Noranda, Québec), and SGS Laboratories (SGS – Lakefield, Ontario). Samples analysed at SGS were crushed and milled at the SGS laboratory in Val d'Or. For all laboratories, samples were weighed, dried at 105°C, and crushed to 75% passing 2 mm. A 250 g split was taken using a riffle splitter and milled in a non-magnetic chromium-steel ring and bowl mill to 80% passing 75 µm.

11.3 Analytical Method

Actlabs, Expert and SGS, and their employees, are independent from VONE. Other than initial sample collection and bagging, VONE personnel and its consultants and contractors are not involved in the core sample preparation and analysis. Actlabs and Expert are both certified to ISO 9001:2008. Actlabs is ISO 17025 accredited. SGS is ISO 17025 accredited and certified to ISO 9001:2015.

The laboratories used for the various VONE drillhole samples are summarised in Table 11-1.

Table 11-1: Laboratories used by VONE for assay of samples

Laboratory	Boreholes
Activation Laboratories	MS-13-17, MS-13-19, MSS-17-01 to MSS-17-05, MSS-17-08 to MSS-17-15
Laboritoire Expert	MS-13-17
SGS Laboratories	MSN-18-01 to MSN-18-04, MSS-18-16 to MSS-18-28

Samples were assayed using similar methodologies at all laboratories. Head samples were fused into disks using a borate flux (borate fusion) and analysed using XRF spectrometry. A 30–50 g subsample of the head sample was used to create magnetic separates using a Davis Tube magnetic separator, at a magnetic intensity of 1000 Gauss. The head sample was weighed, and the magnetic fraction produced was dried and weighed, to determine the percentage of magnetics within the sample. The magnetic fraction was also analysed using XRF on a borate fusion disk.

Sample analytical procedures utilized by Campbell Chibougamau Mines Ltd are largely undocumented, although historical reports indicate that magnetic separation was also carried out using Davis Tube tests on samples milled to >95% or >98% passing 44 µm.

11.3.1 Davis Tube Testing

Drill core samples from the 2017 and 2018 VONE drilling programs have all been subject to Davis Tube testing. Davis Tube testing has been used as part of the assaying procedure for each sample (and has been used to estimate the iron, vanadium and titanium grades of the magnetite concentrates as part of the MRE). Davis Tube testing also gives useful insights into the metallurgical parameters of the Mont Sorcier deposit. Davis Tube magnetic separators (Figure 11-1) create a magnetic field which is able to extract magnetic particles from pulverized samples, and the percentage of magnetic and non-magnetic material in a sample may be determined. A 30–50 g aliquot of pulp sample is gradually added to the cylindrical glass tube which oscillates at 60 strokes per minute. As the sample progresses down the inclined tube the magnetic particles are captured by the magnetic field. Wash water flushes the non-magnetic fraction out of the tube until only the magnetic fraction remains. Both the magnetic and non-magnetic fractions are dried and weighed to determine the percentage of magnetics in each sample.

Figure 11-1: A Davis Tube magnetic separator
Source: https://geneq.com/materials-testing/en/product/sepor/davis-tube-tester-11534

For Davis Tube testwork, it was assumed that all magnetic iron is present within magnetite, and that all vanadium is present as a solid solution within magnetite. Mineralogical testwork has shown no evidence for other magnetic iron-bearing minerals (e.g. pyrrhotite) and has also demonstrated that the vanadium is found within magnetite. A grind size of -75 microns has been used for the Davis Tube testing. This is coarser than the grind used for historical testwork. Each drill core sample submitted for assay was subject to Davis Tube testing. Since a large number of samples from across the entire deposit have been tested, the samples tested reflect the various mineralization styles across the deposit.

The primary objective of the Davis Tube testing has been to determine if there is a relationship between magnetite concentration in the sample and recovery of iron, vanadium and titanium. The results show that recovery increases with increasing magnetite content, and that there is a substantial increase in the recovery curve for Fe_2O_3 up to ~15% Fe_2O_3 (Figure 11-2). A slightly higher cut-off grade of 20% Fe_2O_3 has been chosen for Mineral Resources.

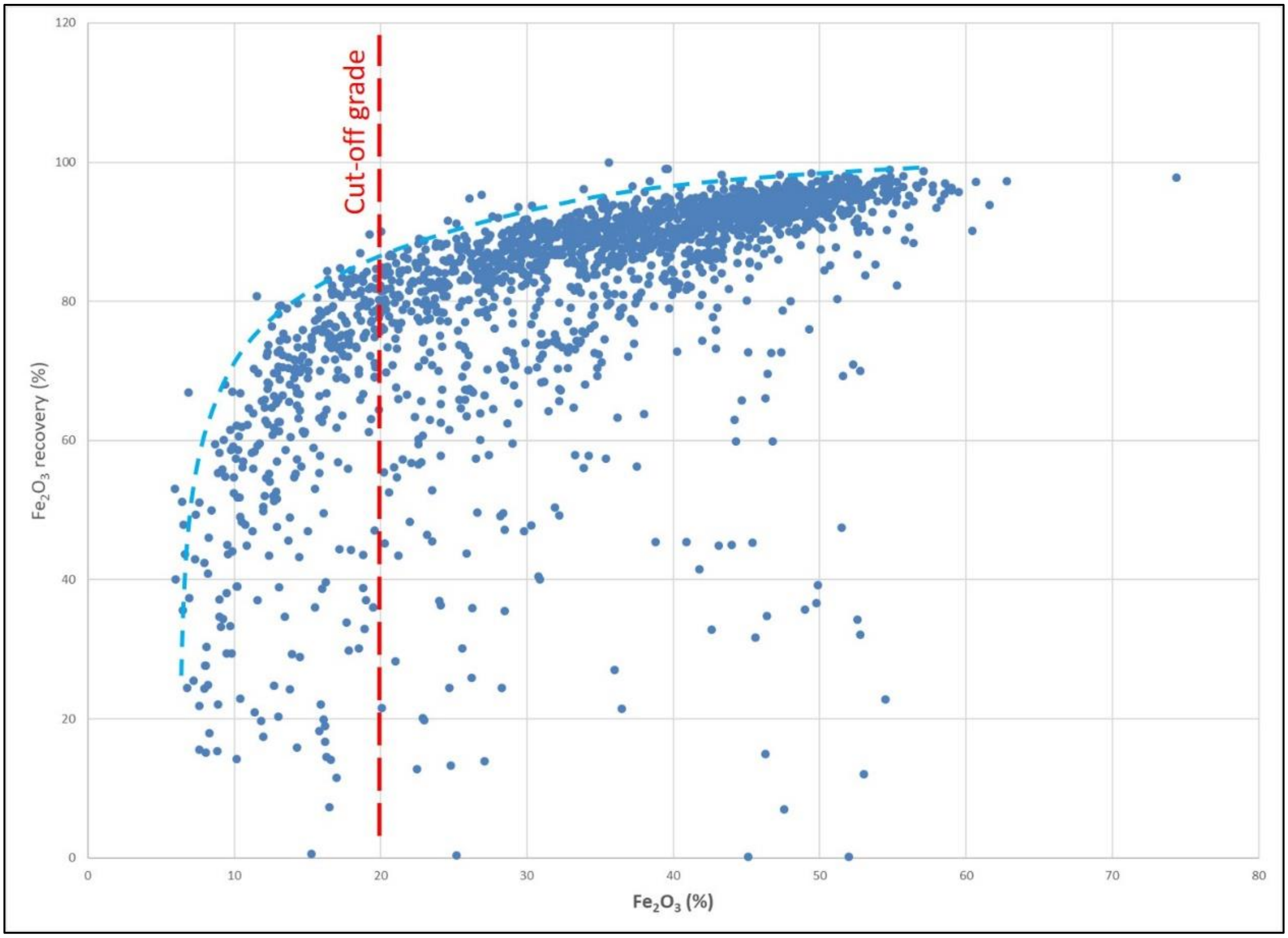

Figure 11-2: Graph of Fe_2O_3 recovery vs Fe_2O_3 grade of the head sample from Davis Tube testing

11.4 Quality Assurance and Quality Control

11.4.1 Overview

The following QAQC procedures have been followed by VONE since 2018. No standards or blanks were used during 2013 and 2017. Two standards (a high-grade and a low-grade) were made up by VONE using archived 2017 reject material. The standard materials were prepared by Actlabs, and samples were referee assayed at three different laboratories (ALS, COREM, AGAT). Two samples of each standard were analysed at each laboratory. Blanks used were quartz rocks collected near Chapais, Québec. In 2018, 4% blanks, 3.5% duplicates, and 4.6% standards were submitted.

Total numbers of samples, standards, blanks and duplicates are summarised in Table 11-2 below.

Table 11-2: Summary of samples submitted between 2013 and 2018

Sample type	2013	2017	2018	Total
Sample	274	1,002	1,171	2,447
Standard	-	-	54	54
Blank	-	-	47	47
Duplicate	-	-	41	41
Repeat	-	-	3	3
All samples	**274**	**1,002**	**1,316**	**2,592**

QAQC protocols and procedures that may have been utilized by historical operators are undocumented.

11.4.2 Analysis of QAQC Data

Referee Analysis of Standards

In 2018, two standards (a high-grade and a low-grade) were made up by VONE using reject material collected from the 2017 drillhole samples. The Standard materials were prepared by Actlabs, and two samples of each standard were referee assayed at three different commercial laboratories (ALS, COREM and, AGAT).

Although the small number (six samples) of standard assayed by these three independent referee laboratories may not have captured the inherent variability of the samples, results from the standard analyses show no obvious evidence for bias.

Ideally creation of a standard material should involve more labs and more samples per lab to enable the calculation of a statistically valid mean and standard deviation for the sample material. This is recommended for future programmes (see recommendations).

High-grade standard samples inserted into core sample batches submitted to both SGS and Actlabs have values for Fe_2O_3_T (Figure 11-3), V_2O_5 (Figure 11-4) and TiO_2 (Figure 11-5) that are aligned with results from the samples submitted to referee labs: ALS, COREM and AGAT. Results from the standard analyses at SGS and Actlabs show no evidence for bias, although it is apparent that analyses from Actlabs show more variability with respect to Fe_2O_3_T results than those from SGS. Note that there are two outliers, which could be the result of mislabelling of samples.

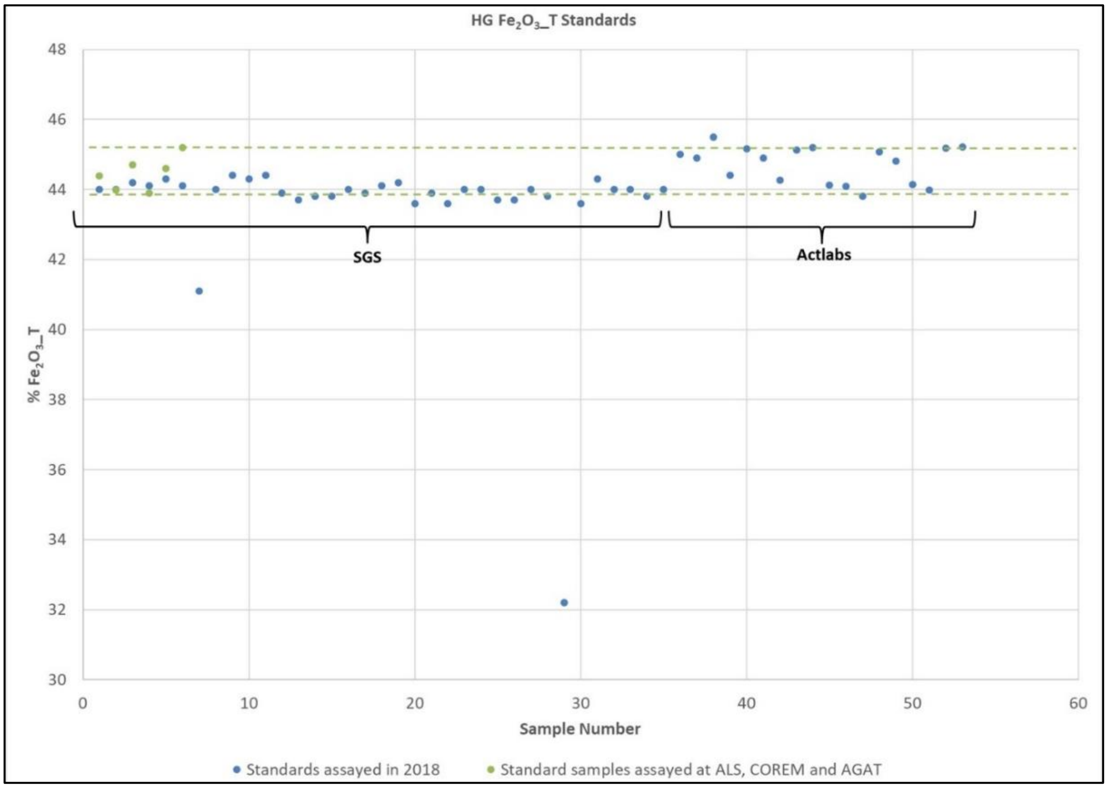

Figure 11-3: High-grade standard analyses for Fe_2O_3_T

Note: Green dashed lines show the range of analyses from referee labs: ALS, COREM and AGAT.

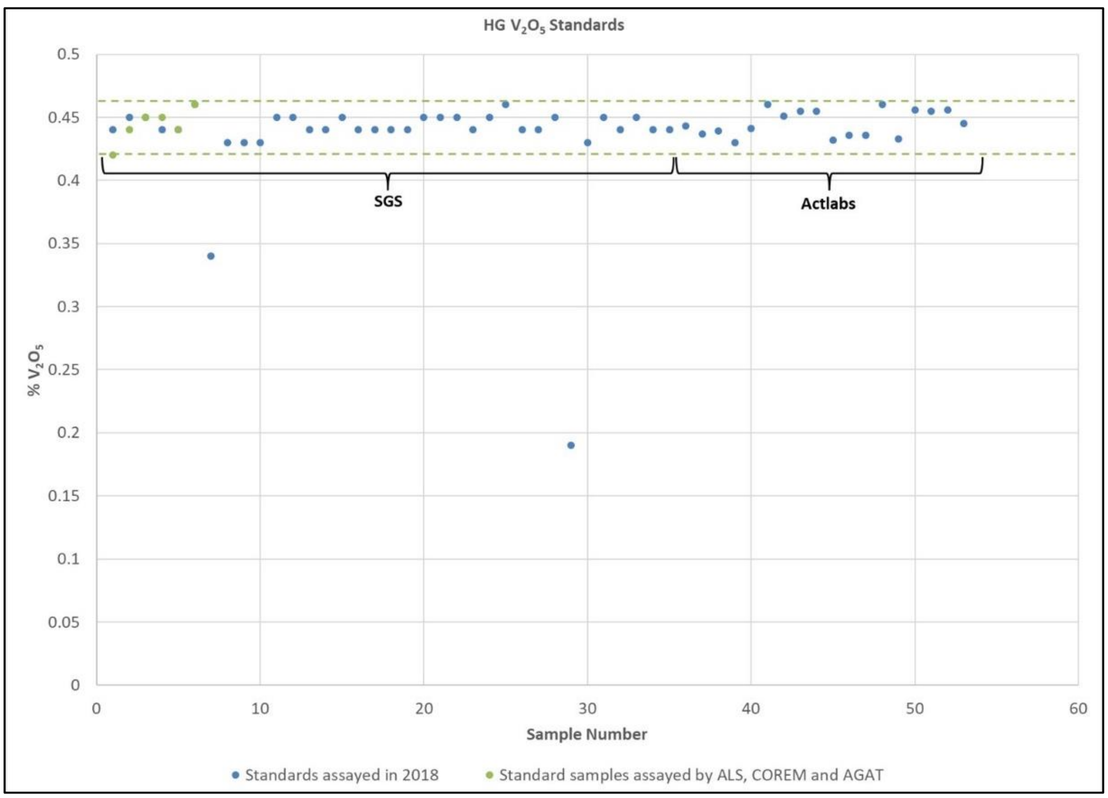

Figure 11-4: High-grade standard analyses for V_2O_5

Note: Green dashed lines show the range of analyses from referee labs: ALS, COREM and AGAT.

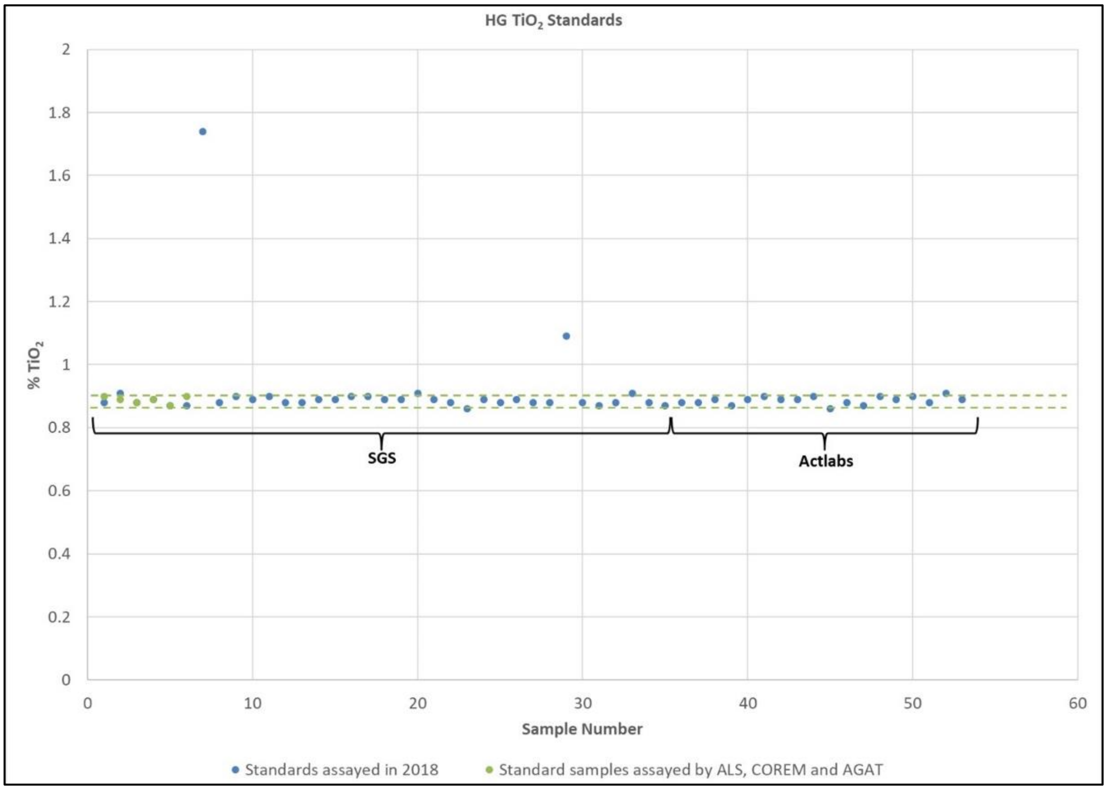

Figure 11-5: High-grade standard analyses for TiO_2

Note: Green dashed lines show the range of analyses from referee labs: ALS, COREM and AGAT.

Low-grade standard samples submitted to both SGS and Actlabs have values for Fe_2O_3_T (Figure 11-6), and TiO_2 (Figure 11-7) that are aligned with results from the samples submitted to ALS, COREM and AGAT. However, low-grade standards assayed for V_2O_5 (at SGS and Actlabs) show higher values than those assayed at ALS, COREM and AGAT (Figure 11-8). It is possible that the referee assays for V_2O_5 at these three external laboratories are too low, since values between SGS and Actlabs correlate well.

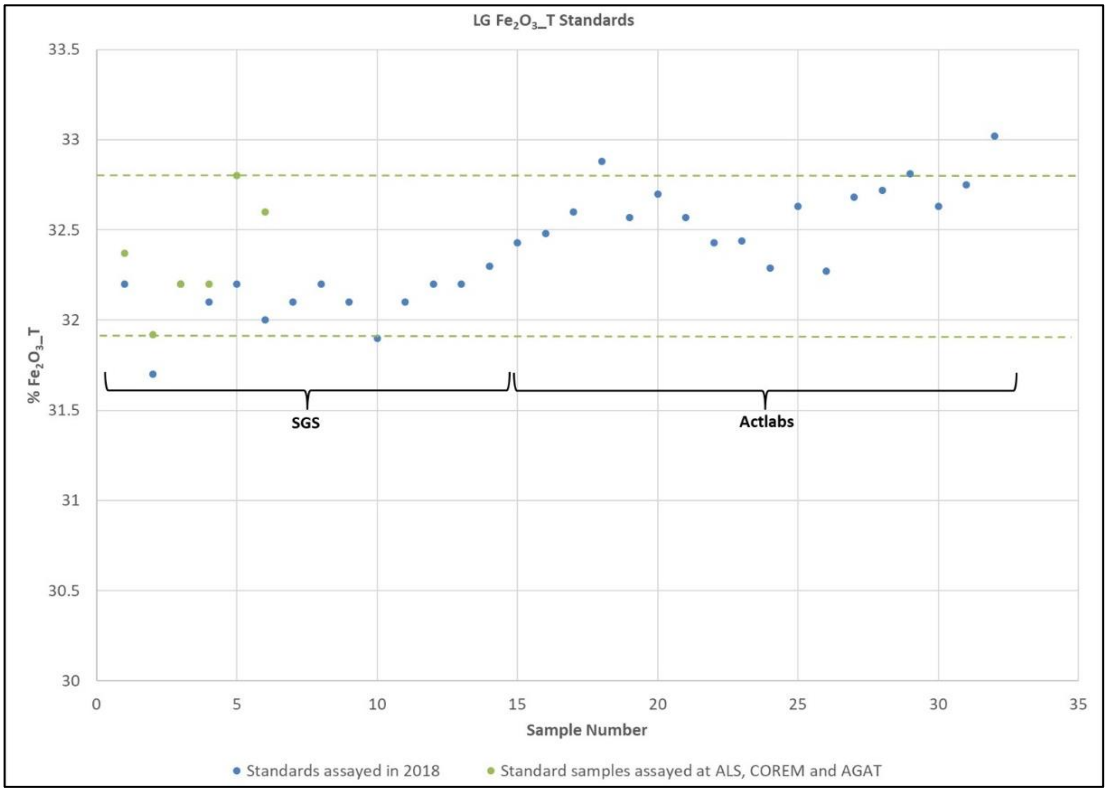

Figure 11-6: Low-grade standard analyses for Fe_2O_3_T

Note: Green dashed lines show the range of analyses from referee labs: ALS, COREM and AGAT.

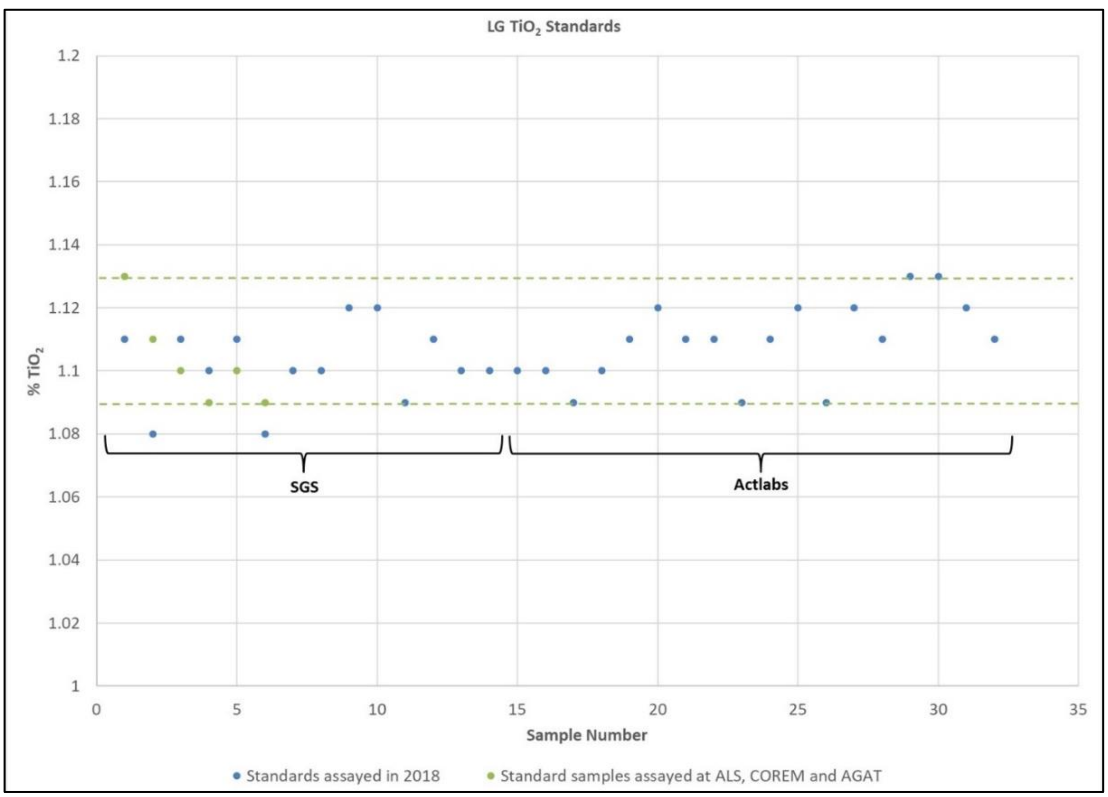

Figure 11-7: Low-grade standard analyses for TiO_2

Note: Green dashed lines show the range of analyses from referee labs: ALS, COREM and AGAT.

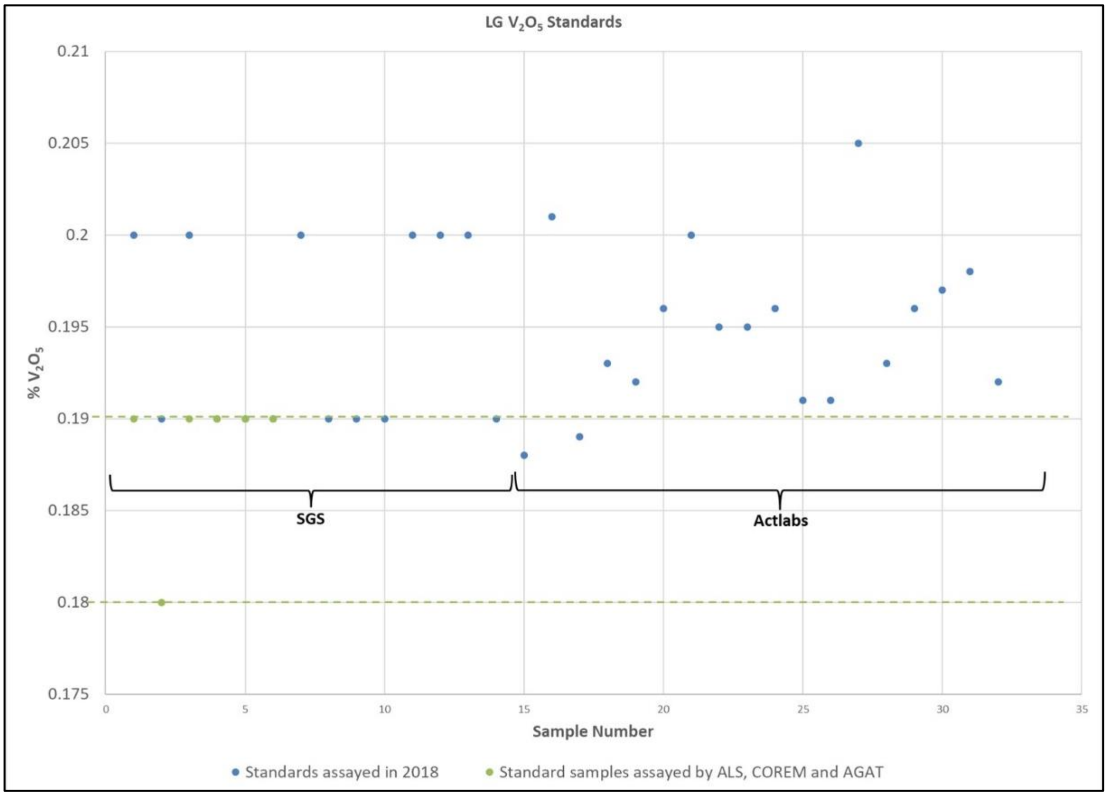

Figure 11-8: Low-grade standard analyses for V_2O_5

Note: Green dashed lines show the range of analyses from referee labs: ALS, COREM and AGAT.

Blanks

Blank samples assayed at SGS and Actlabs largely show no significant contamination for Fe_2O_3 (Figure 11-9), V_2O_5 (Figure 11-11) or TiO_2 (Figure 11-10); however, a single outlier is evident (chart sample #29) which is clearly a mislabelled mineralized core sample.

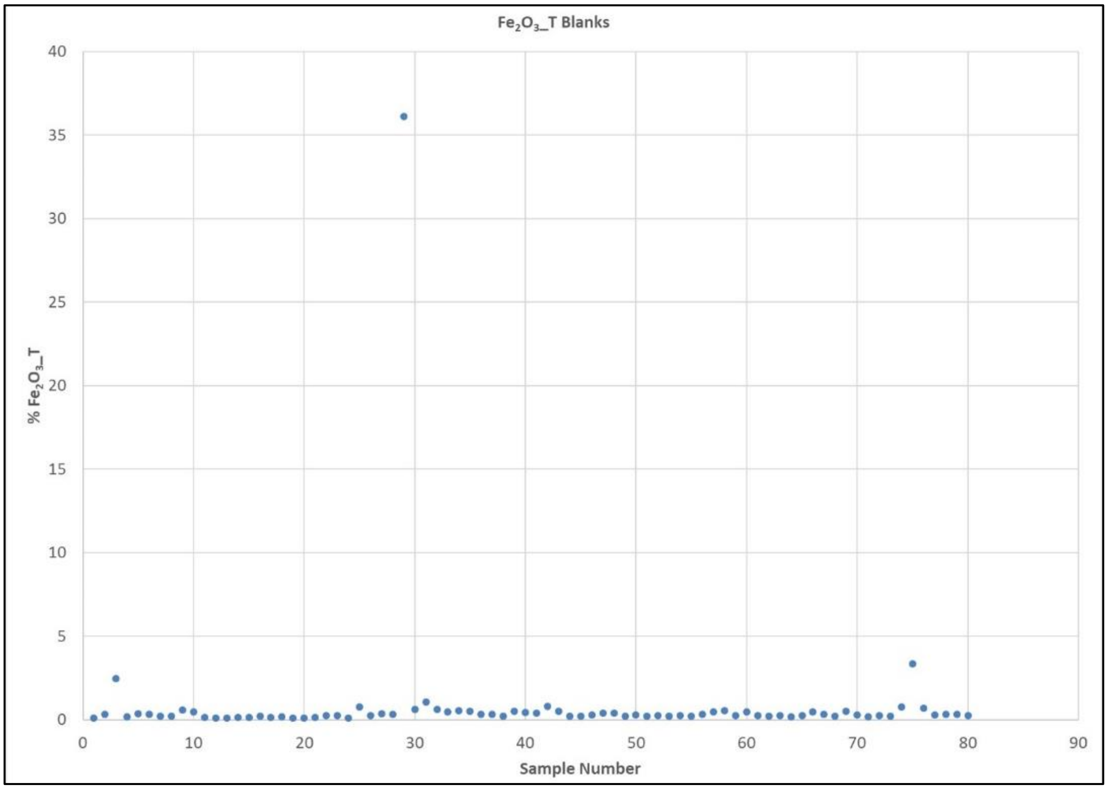

Figure 11-9: Fe_2O_3_T values of blanks

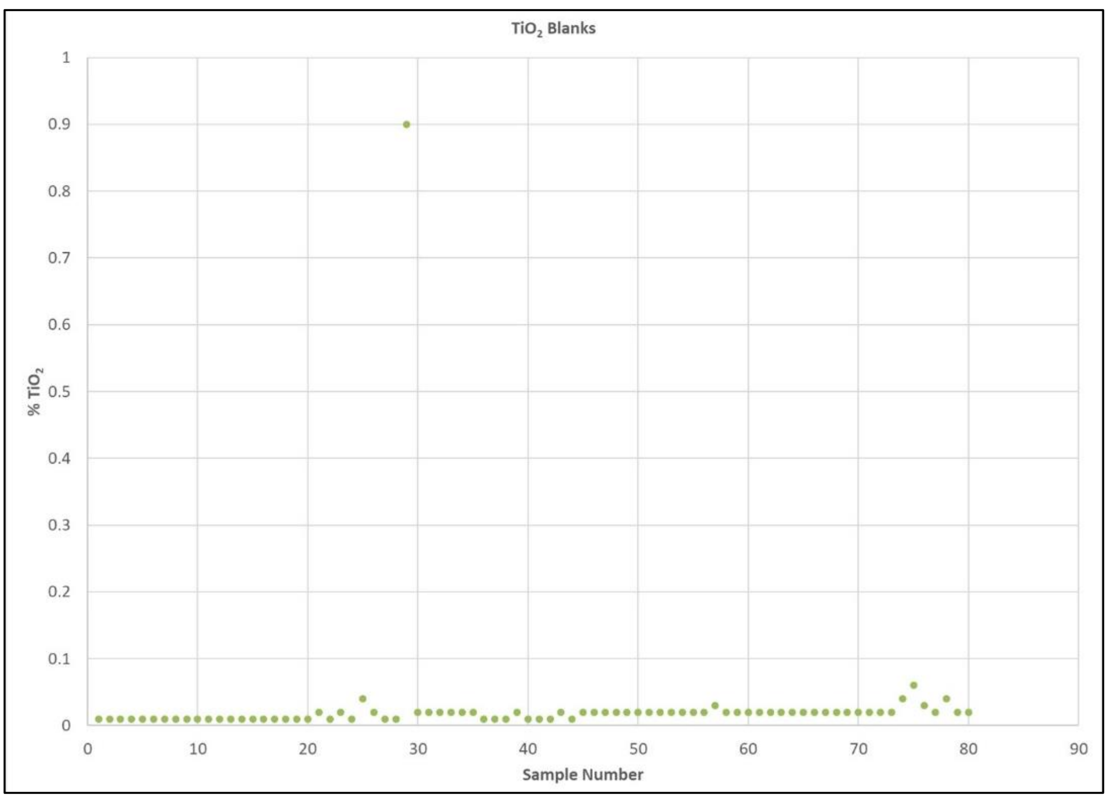

Figure 11-10: TiO_2 values of blanks

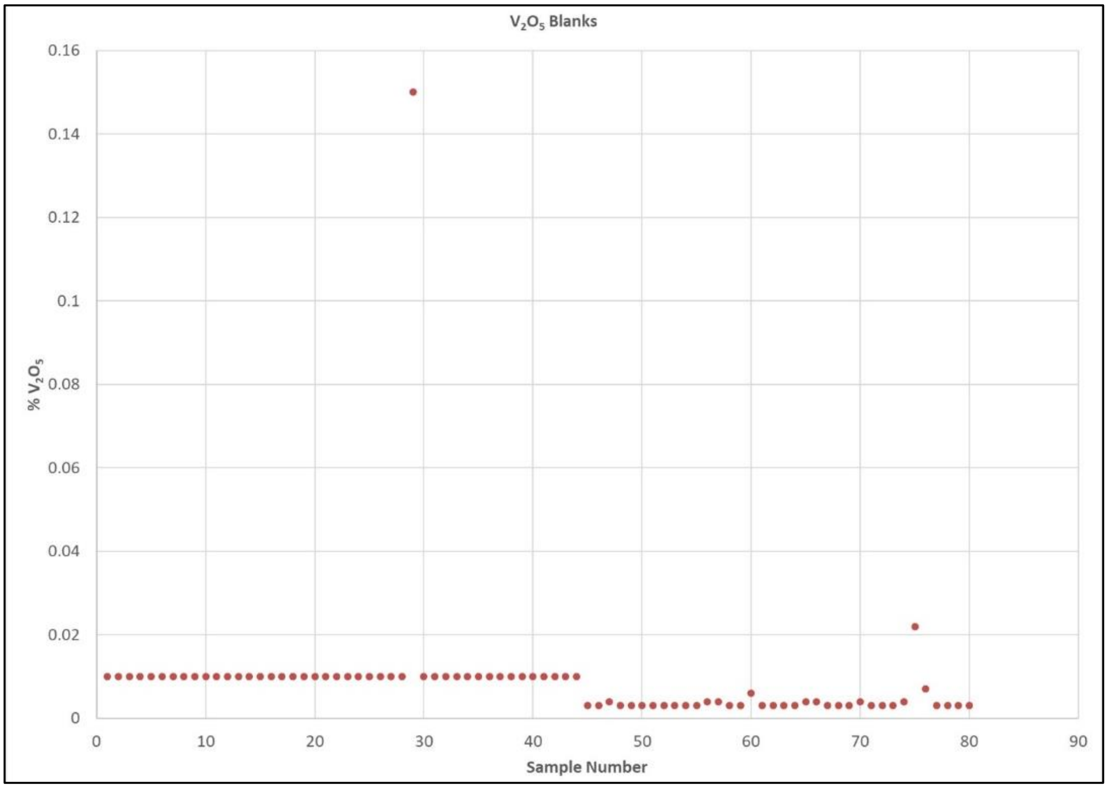

Figure 11-11: V_2O_5 values of blanks

11.4.3 Duplicates

Duplicate samples produced from quarter core (apart from the half core submitted from assay) were submitted simultaneously with different sample numbers. Comparison of original assays with duplicate assays are shown in Figure 11-12 (Fe_2O_3) and Figure 11-13 (V_2O_5) below, and show a good correlation between original and duplicate results. Re-submitting returned rejects to a different laboratory (or the same lab) as duplicate check assays remains to be done.

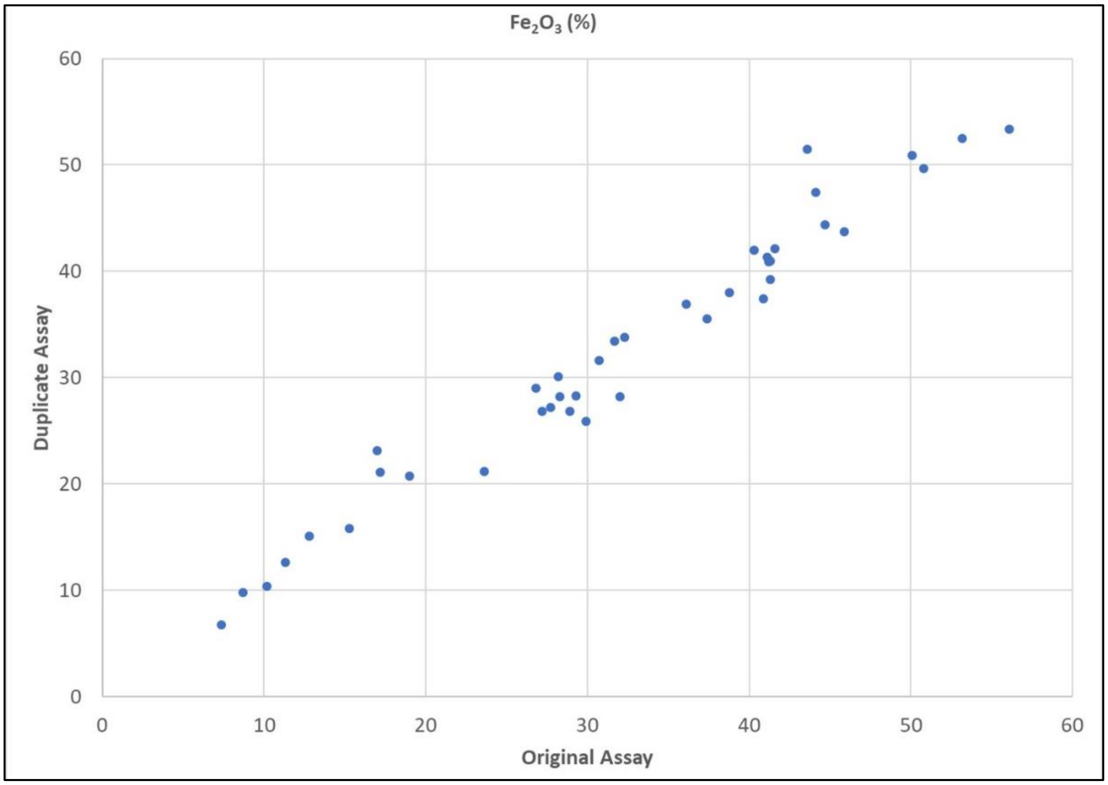

Figure 11-12: Duplicate and original assay results for Fe_2O_3

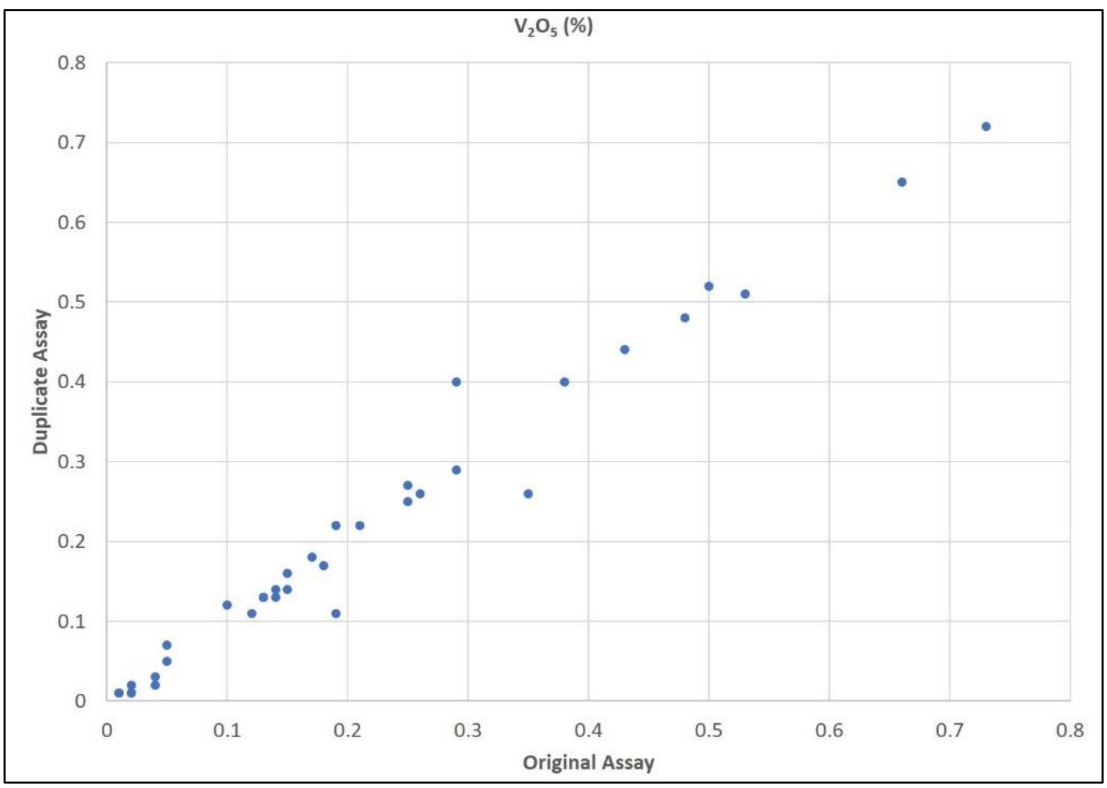

Figure 11-13: Duplicate and original assay results for V_2O_5

11.4.4 QAQC Conclusions

It is the author's opinion that VONE's independent QAQC program undertaken during the 2018 drill programs is appropriate for the type of project and stage of development and it conforms to industry standards.

It is the author's opinion that the 2018 standard, blank, and duplicate sample results provide sufficient confidence in the 2018 drill core assay values for their use in the estimation of Inferred and Indicated resources. Given the 2013 and 2017 drill samples were collected and analysed by similar methods, the author is confident in their use in the estimation of Inferred and Indicated Resources.

No QAQC data is available for the remaining historical assays. However, the data is considered adequate for the estimation of an Inferred Resource where they are not supported by 2013 to 2018 drill results.

It is recommended that 5% of samples from the 2017 campaign be sent for duplicate analyses, and 5% for umpire analyses. It is also recommended that the standards used should also be subject to magnetic separation, and the magnetic portion assayed.

11.5 Qualified Person's Opinion on Sample Preparation, Security and Analytical Procedures

The Qualified Person and CSA Global believe the security and integrity of the core samples submitted for analyses during the 2013–2018 diamond drill programs is un-compromised, given the adequate record keeping, storage locations, sample transport methods, and the analytical laboratories' chain of custody procedures.

Furthermore, it is Qualified Person's and CSA Global's opinion that the sample collection, preparation and analytical procedures undertaken on the Project during the 2013–2018 diamond drill programs are appropriate for the sample media and mineralization type, the type and stage of project and, conform to industry standards.

Based on an assessment of the drilling sample analytical results and the available quality control information, the Qualified Person is of the opinion that the Mont Sorcier Project dataset (with particular reference to 2013–2018 drilling) is acceptable for resource estimation. Analytical results are considered to pose minimal risk to the overall confidence level of the MRE. Although analytical methods and QAQC procedures for historical data are not available, the nature of the mineralization (disseminated to massive magnetite that is visible on surface and can be clearly identified using airborne magnetic surveys) as well as the validation of the data (see Section 12.2) means that the Qualified Person is of the opinion that it is considered suitable for use in resource estimation. A minor amount of risk related to the historical data does exist, and hence in areas where it is not supported by recent drilling it has only been used to estimate Inferred Mineral Resources (see Section 14.13).

12 Data Verification

12.1 Site Visit

The Qualified Person and author, Dr Luke Longridge carried out a two-day site visit to the Mont Sorcier Project on 30–31 October 2018. During this time, the author visited the property site, noted exposed outcrops of magnetite mineralization (Figure 12-1A), validated the collar positions of both recent and historical drilling using a handheld GPS (Figure 12-1B,C), and reviewed drill core at the VONE facility in Chibougamau (Figure 12-1D).

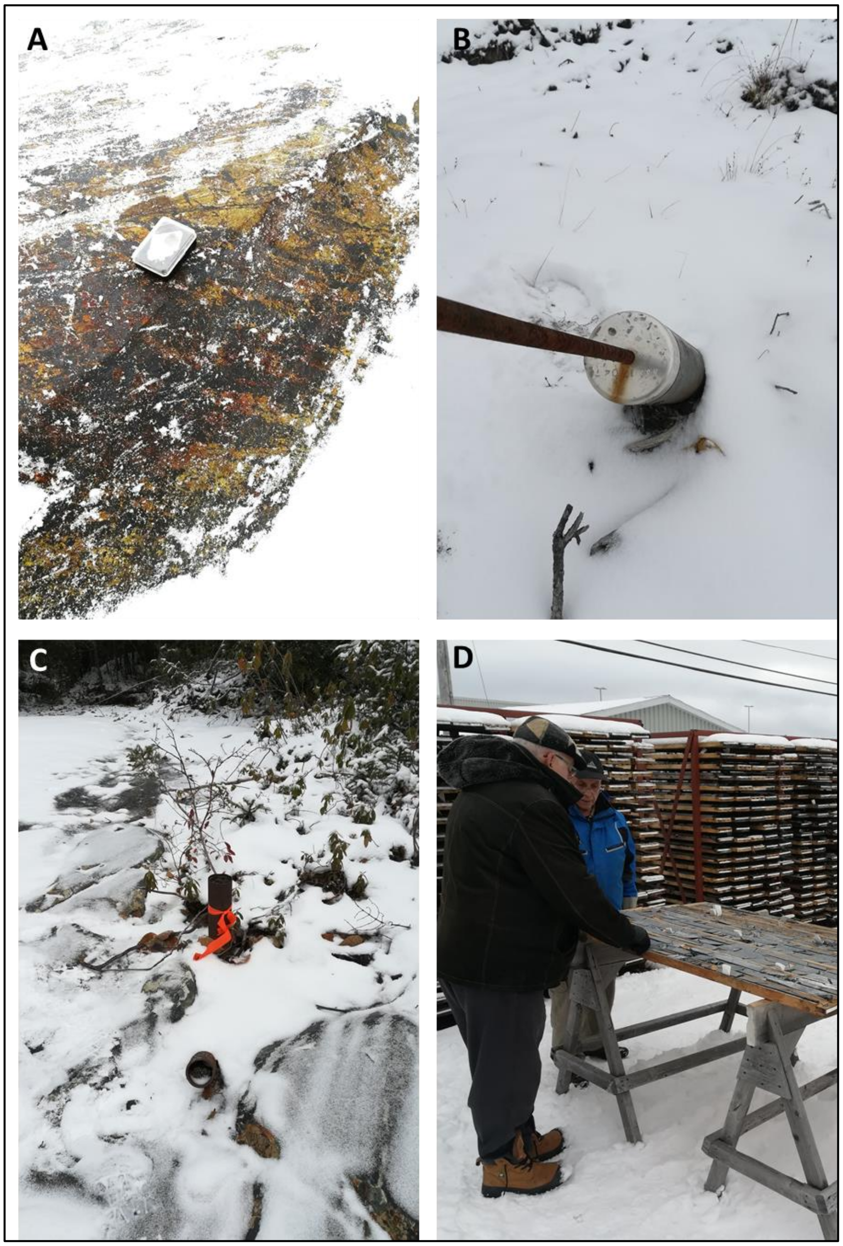

Figure 12-1: Photographs from the author's site visit to the Mont Sorcier Project

A: An outcrop of banded magnetite mineralization within altered ultramafic rocks.
B: Collar of drillhole MSS-17-02.
C: Historical collars.
D: Examining drill core with VONE geologists and management.

Drill core was visually compared to assay results and geological logs for several drill cores from 2013, 2017 and 2018 drilling. Magnetite mineralization was evident and visually consistent with the recorded geological logging and reported assay results. Significant intercepts appear to correlate with the intervals of highest magnetite concentration recorded in the drill logs.

There were no negative outcomes from the above site inspection.

12.2 Data Validation

Assay certificates from recent and historical drilling were compared with the digital database for several drillholes in order to confirm that data is accurately captured in the digital database.

12.2.1 Validation of Historical Data

In order to verify and validate the quality of the historical assay and Davis Tube magnetic separation data, a comparison was made between historical data and recent data. A cumulative probability plot of Fe_2O_3 values (head grade) shows an excellent correlation between recent and historical data (Figure 12-2).

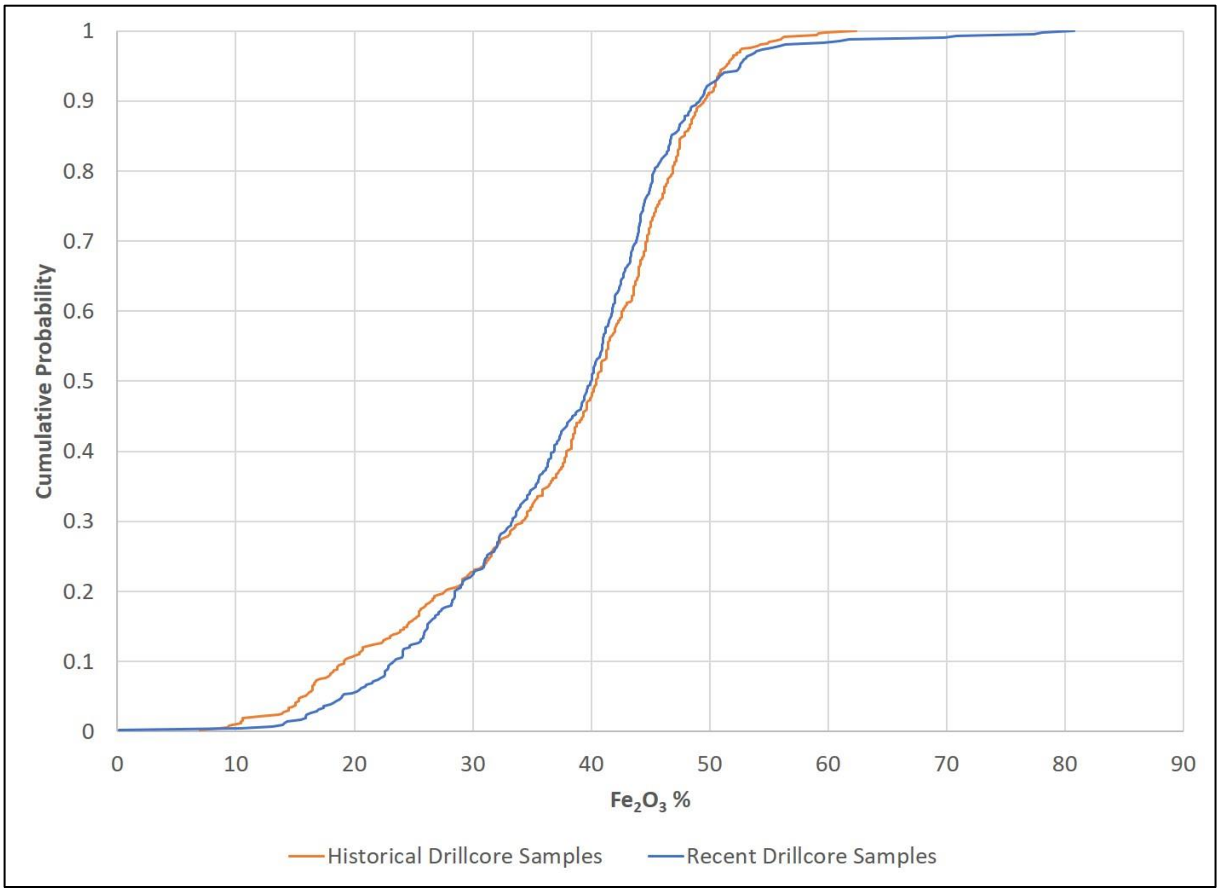

Figure 12-2: Cumulative probability plot for Fe_2O_3, comparing recent and historical assays

Comparing recent drill core assay data with historical composites for magnetite content (Figure 12-3) and V_2O_5 (Figure 12-4) shows that at low magnetite percentages, historical composites are slightly higher than recent drill core assays. At lower vanadium grades, recent drill core assays show slightly higher values than historical composites. These discrepancies are due to the fact magnetite content and vanadium grade in historical samples were measured on composite samples results rather than on smaller individual sample intervals. The differences are not considered material.

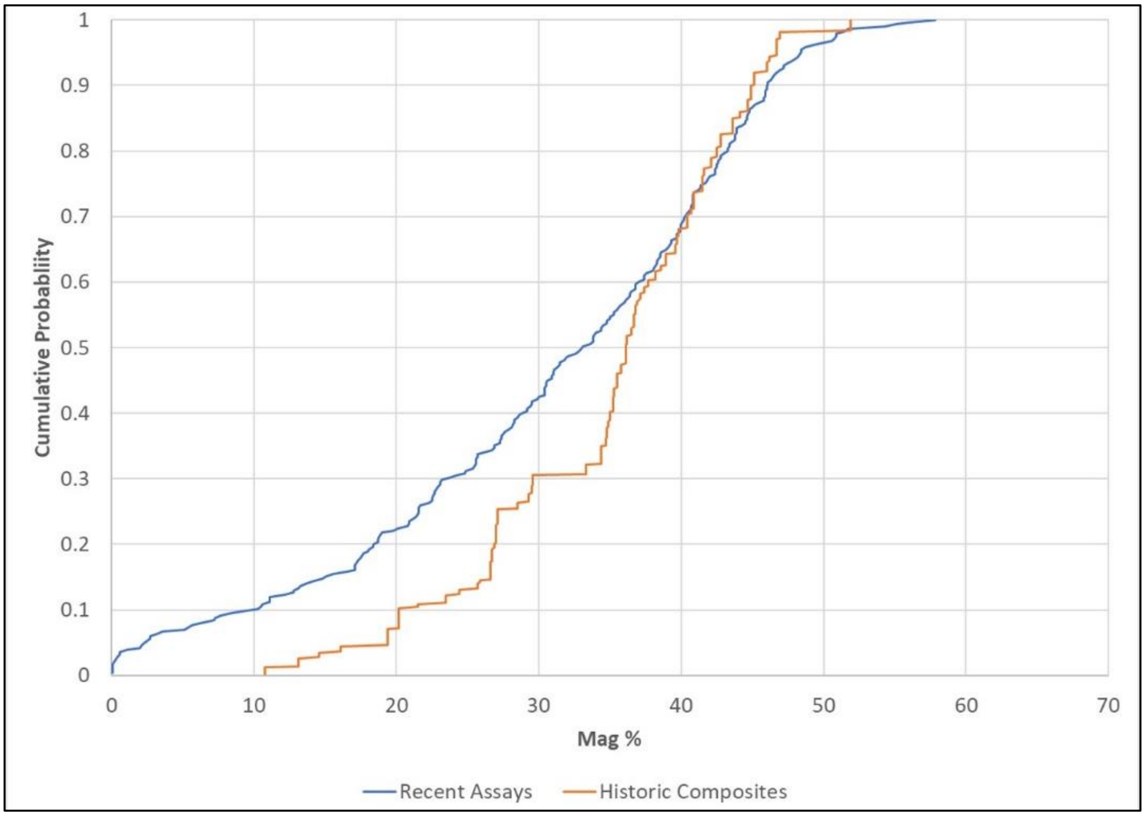

Figure 12-3: Cumulative probability plot for magnetite content

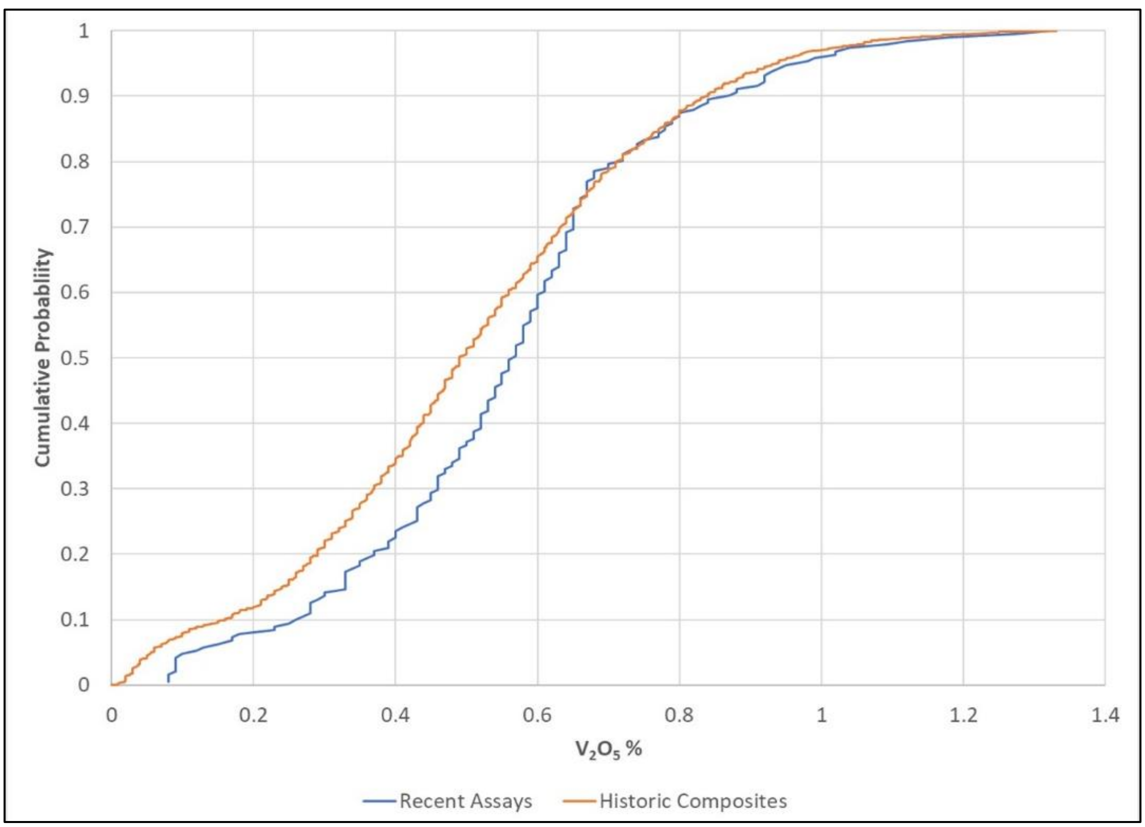

Figure 12-4: Cumulative probability plot for V_2O_5

Comparing iron and titanium values (Figure 12-5), it appears that both historical drill core samples and recent drill core samples show a small proportion of elevated TiO_2 values, and a cumulative probability plot of historical and recent data for both drill core and concentrate samples (Figure 12-6) shows largely excellent agreement between recent and historical data. Recent concentrate assays show a small proportion with higher TiO_2 values than historical composites. This is likely the result of the coarser grind size used for the recent concentrate separates and is not considered material.

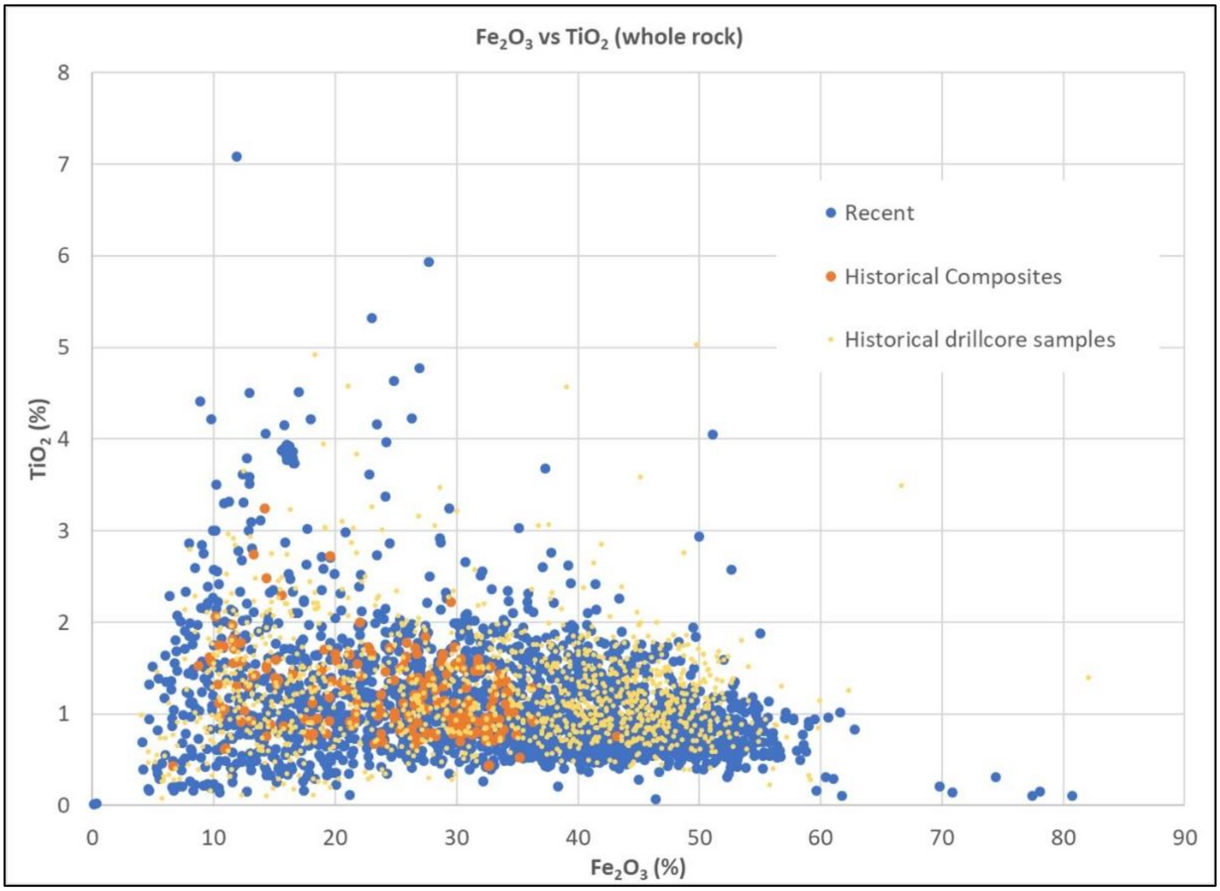

Figure 12-5: Fe_2O_3 vs TiO_2 for recent drill core samples, historical drill core samples and historical composites

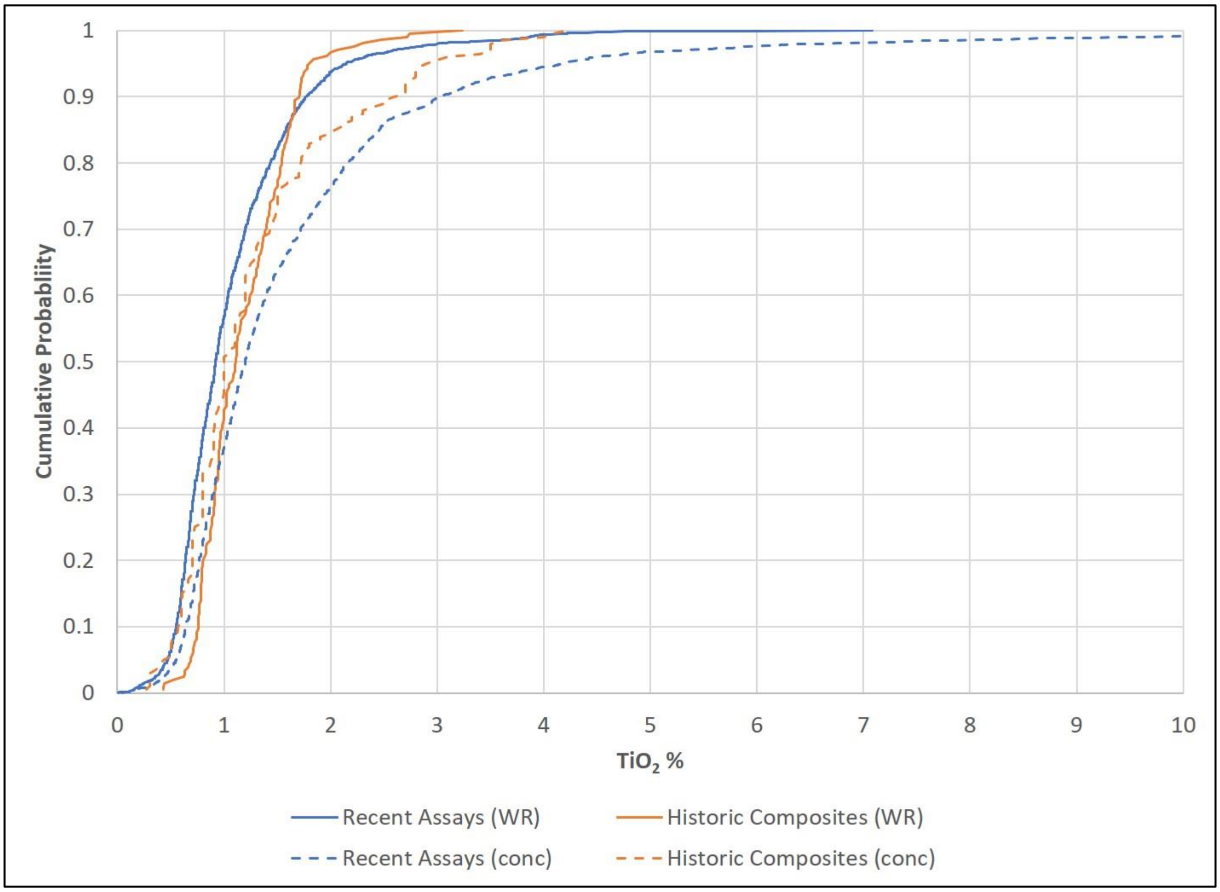

Figure 12-6: Cumulative probability plot for recent and historical data from both drill core samples and composites, as well as for whole rock (WR) and concentrate (conc)

12.2.2 Database Validation

Validation of the final drillhole database provided to CSA Global for the MRE included checks for overlapping intervals, missing assay data, missing lithological data, missing collars and missing or erroneous survey data. No errors were identified.

12.3 Qualified Person's Opinion

It is the opinion of the authors of this Report that the inspection of historical drillhole collars and comparison of historical data with current data verifies and validates the use of the historical data. Both the historical and current data is considered adequate for the purposes of Mineral Resource estimation as described in Section 14.

13 Mineral Processing and Metallurgical Testing

13.1 Lakefield Research of Canada Ltd Test Program 1966 (for Campbell Chibougamau Mines Ltd)

In 1966, Lakefield Research of Canada Ltd executed an autogenous grinding and magnetic separation and pilot plant test program on a 35 ton magnetite-bearing sample. As part of the program, tests were carried out to determine liberation with particle size distribution relationships, as well as dry magnetic separation using a Sala-Mortsell drum separator to give additional information on the concentration characteristics of the mineralized material.

13.1.1 Head Grade Analysis

Crude mineralized material analyses were obtained by direct sampling of the screen undersize in tests 4 to 10. Magnetic iron assays were obtained from the balance of tests 9 and 11.

Results showed on average:

- 28.9% soluble (sol.) Fe
- 25.3% magnetic (mag.) Fe.

13.1.2 Single Stage Autogenous Grinding Tests

The purpose of the closed-circuit grinding was to reduce the magnetite-bearing sample in a single stage to a degree of fineness that subsequent magnetic separation could produce a finished concentrate of the desired grade. The required grind was thought to be 90% passing 325 mesh (44 µm). It became apparent however that this could not be achieved. The finest grind obtained was only 76.2% passing 325 mesh (44 µm) at approximately 40% weight recovery.

13.1.3 Two-Stage Grinding and Regrind Tests

After executing further testing, involving an additional stage of grinding and addition of a regrind stage, the desired concentrate grades and recoveries were achieved. Table 13-1 summarizes these results.

Table 13-1: Two-stage grinding and regrind test results

Test no.	Source of feed	Feed rate (lb/hr)	Grind %, -325 mesh (44 µm)	Concentrate grade (% sol. Fe)
11	Test 9	250	98.0	68.5
12	Test 10	300	98.8	68.5
13	Test 2-6	520	97.3	67.6
14	Test 2, 6	460	97.6	68.0
15	Test 4, 5	500	98.8	67.6

13.1.4 Magnetic Separation Tests

Based on the confirmed grinding process, magnetic separation tests showed results as those noted in Table 13-2.

Table 13-2: Magnetic separation tests results

Product	Test no.	Weight (%)	Assay (% mag. Fe)	% Distribution Mag. Fe
S-3 Con	11	32.7	67.7	87.4
S-3 Tail	11	1.9	5.7	0.4
S S O/F	9	0.8	31.0	1.0
S-2 Tail	9	0.7	5.5	0.2
S-3 Tail	9	12.7	1.4	0.7
S-1 Tail	9	51.2	5.1	10.3
Head		100	25.3	100

13.2 COREM Test Program 2017

13.2.1 Liberation Mineralogical Study

A study of the liberation of magnetite and deportment of vanadium in magnetite was performed by COREM in 2017 (Laflamme *et al.,* 2017) using sample material from drillhole MSS-17-06 only. The testing was done on a composite of 24 separate 4 kg samples that were combined to produce a 96 kg composite with a grade of 0.39% V_2O_5 and 46.1%. Fe_2O_3. Six size fractions were analyzed with the Mineral Liberation Analyzer (MLA) in order to identify the liberation of the magnetite: -300 +212 µm, -212 +150 µm, -150 +106 µm, -106 +75 µm, -75 +38 µm, and -38 µm.

For size fractions coarser than 150 µm, two polished sections were made, while one polished section per fraction was made for size fractions finer than 150 µm. MLA is an automated scanning electron microscope (SEM) that combines back-scattered electron image analysis and x-ray mineral identification to provide quantitative mineral characterization. In addition, the sample was observed under an SEM. The mineralogical characterization carried out in this study was completed with microprobe analyses to characterize vanadium deportment in magnetite. Furthermore, x-ray diffraction (XRD) analyses were carried out to verify the main minerals present in the sample.

None of the size fractions contained 90 Wt.% or more of liberated magnetite (i.e. containing more than 90 Wt.% magnetite in free particles); Davis Tube test results from all other drillholes show excellent recovery of liberated magnetite, and more liberation tests should be carried out across other areas of the deposit. Table 13-3 presents the proportion of free magnetite in Wt.% by size fraction and for the combined head sample obtained from the MLA analyses. In the head sample, only 59 Wt.% magnetite was liberated. The finest size fraction (-38 µm) contained 78 Wt.% free magnetite.

Table 13-3: MLA liberation results

Size fraction	Magnetite as free particles (Wt%)
Head sample	59
-300 +212 µm	36
-212 +150 µm	47
-150 +106 µm	57
-106 +75 µm	66
-75 +38 µm	74
-38 µm	78

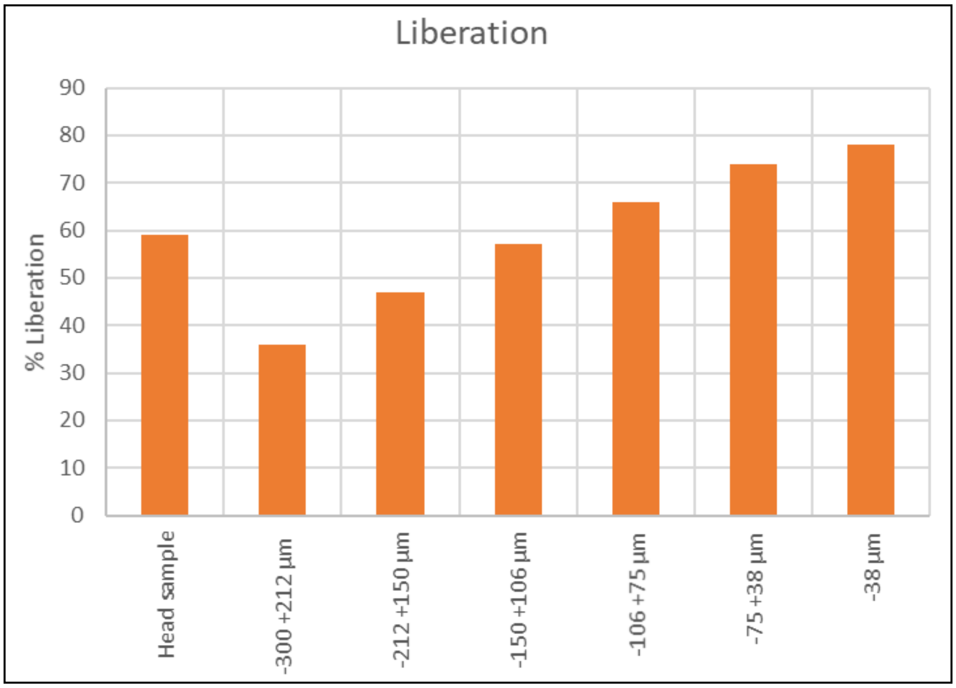

Figure 13-1: MLA liberation results, showing increased liberation with finer particle size

13.2.2 Grind Size vs Recovery Tests

As part of their testwork program for VONE, COREM carried out Davis Tube tests at several grind sizes (80% passing 75 µm, 53 µm and 38 µm – Table 13-4), which showed that recovery of iron and vanadium does not vary significantly with grind size (Laflamme *et al.,* 2017).

Table 13-4: Grind size vs iron and vanadium recovery and iron grade for COREM Davis Tube concentrates

Grind size	Fe recovery (%)	V_2O_5 recovery (%)	Fe grade (%)
75 µm	93.6	81.4	63.3
53 µm	93.8	81.4	64.4
38 µm	93.9	81.2	65.1

13.2.3 Vanadium Deportment Study

The polished section from the -150 +106 µm size fraction was analysed using the microprobe (a total of 50 microprobe measurements) to investigate the vanadium deportment in magnetite (i.e. the variability of the vanadium content in the magnetite). The results indicate that there is a large range in the V_2O_5 content of the magnetite, with three distinct populations:

- Vanadium-enriched magnetite, with ~ 1.3% V_2O_5 in magnetite
- Magnetite with between 0.3% V_2O_5 and 1.1% V_2O_5 (average of ~0.7% V_2O_5)
- Low-vanadium magnetite (<0.2% V_2O_5).

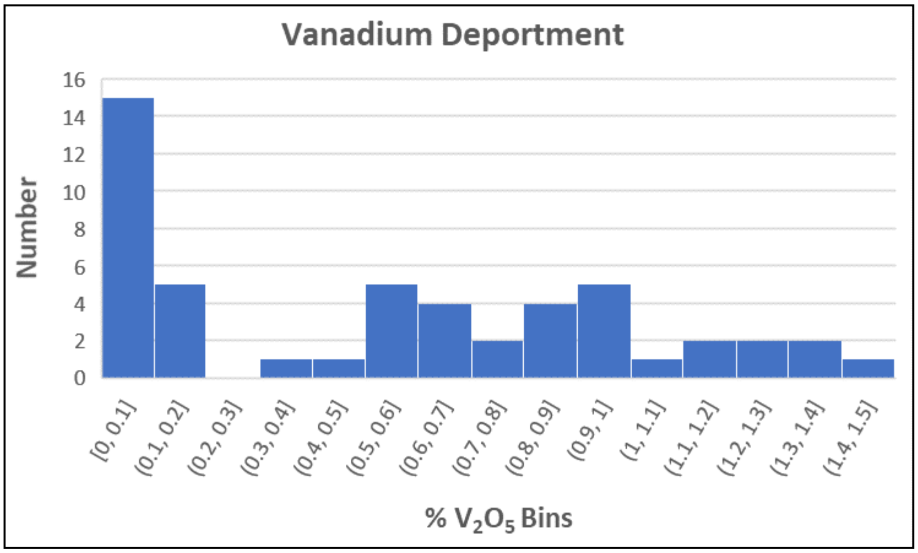

Figure 13-2: Vanadium deportment in magnetite (sum of 50 microprobe analyses)

13.2.4 Bond Ball Mill Work Index Tests

COREM conducted BWi tests on a sample from the Mont Sorcier Project (Laflamme *et al.,* 2017). A Bond Ball Mill grindability test is a standard test for determining the BWi of mineralized feed sample. The BWi is a measure of the resistance to crushing and grinding and can be used to determine the net grinding power required for a given throughput of mineralized material under ball mill grinding conditions. The test is a closed circuit dry grindability test performed in a standard ball mill. It can be performed at mesh sizes ranging from 28 mesh (700 µm) to 400 mesh (38 µm). The finishing size used in this project was 300 mesh (53 µm).

The BWi for the sample is 18.6 kWh/t, which corresponds to a Hard classification as defined by the Julius Kruttschnitt Mineral Research Centre (JKMRC) classification.

13.2.5 Alkali Roasting and Leaching Tests

In order to determine the potential recovery of vanadium from the concentrate using the salt roast process, several roasting and leaching tests were carried out by COREM (Laflamme *et al.,* 2017). Following several preliminary roasting optimization tests (using 50 g concentrate samples) at varying temperatures, a 4 kg sample was roasted with NaOH salt at 400°C, and then leached in water and a final concentrate precipitated. Preliminary tests showed little change in vanadium recovery to the leach solution with increasing roasting temperature, and the final roasting/leaching test showed 69.2% recovery of vanadium to the leach solution.

13.3 COREM Test Program 2019

In 2019, COREM processed VONE drill core composite samples from four zones of their deposits: North High Grade (NHG), North Low Grade (NLG), South High Grade (SHG) and South Low Grade (SLG). The objective of the 2019 project was to carry out grindability and concentratability testwork on these composites. The grindability tests included the standard Bond abrasion test, the rod and ball mill work indexes and the SAG variability test (SVT). The concentratability testwork included preconcentration using dry LIMS and concentration using a Davis Tube test and laboratory wet LIMS. The 2019 testwork was divided into three tasks, as presented in Figure 13-3.

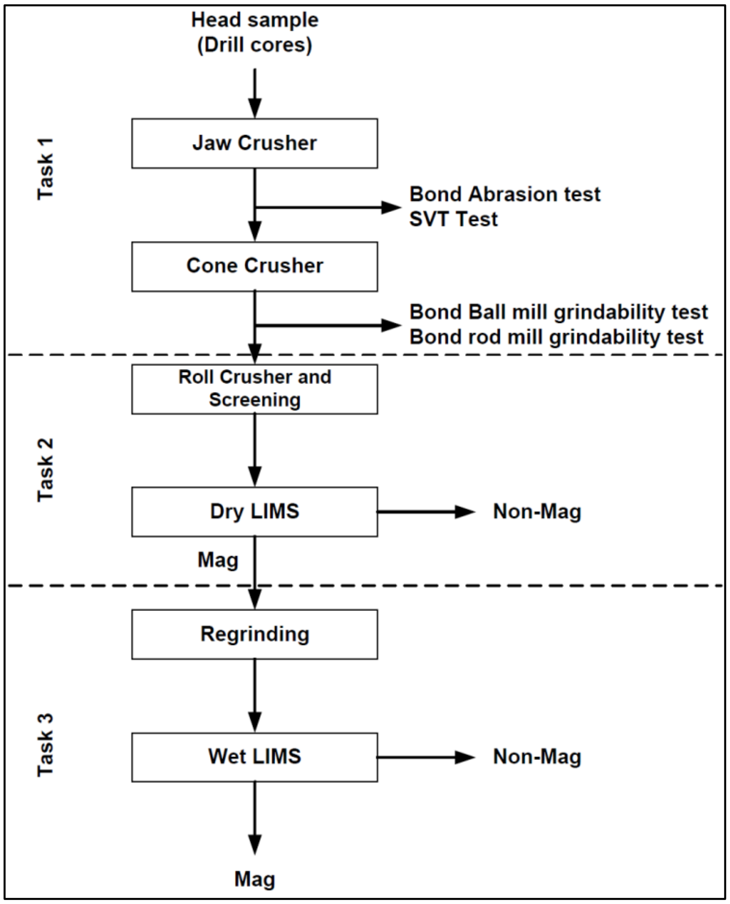

Figure 13-3: COREM's 2019 testwork methodology

Bagged drill core samples were received and composited into the four composite samples, based on VONE's instructions. Table 13-5 lists the drill core intervals included in each composite sample.

Table 13-5: Diamond drillhole core intervals used to create 2019 composite test samples

Composite sample	Source DDH interval		
	DDH ID	From (m)	To (m)
North High Grade (NHG)	MSN-18-02	339.0	440.0
	MSN-18-03	223.0	271.0
	MSN-18-04	332.0	372.0
North Low Grade (NLG)	MSN-18-01	312.0	363.0
	MSN-18-03	171.0	223.0
	MSN-18-04	304.0	332.0
South High Grade (SHG)	MSS-18-16	27.0	54.0
	MSS-18-18	47.0	97.0
	MSS-18-20	83.0	135.0
South Low Grade (SLG)	MSS-18-16	54.0	125.5
	MSS-18-17	111.9	162.0
	MSS-18-24	145.0	196.0

13.3.1 Summary of the Work

The standard grindability tests average results indicated:

- Abrasion index (Ai): The material was classified as non-abrasive.
- RWi and BWi: The material was classified as hard.
- SVT test results: The material was classified at the 82.9 percentile, which means that this material was harder than 82.9% of the materials tested by Starkey & Associate Inc.

The head analyses of the composite samples showed that:

- The average total iron grade was 30.8% Fe_T.
- The average magnetite grade, determined by Satmagan, was 37% magnetite.
- The average V_2O_5 grade was 0.33% V_2O_5.
- The main impurities were SiO_2 (average of 22.1%) and MgO (average of 21.7%).
- Based on the Satmagan and the Fe_T values, it can be assumed that iron-bearing minerals were not only magnetite. COREM recommends a detailed mineralogical analysis to identify and quantify the other iron-bearing minerals.

Pre-concentration, using dry LIMS at a crushing size of 3.35 mm, led to the following metallurgical performances (average) of the magnetic products:

- Weight yield of 84.1%
- Magnetite: A 40% grade with a 98.3% recovery
- Total iron: A 32.5% grade with a 95.1% recovery
- V_2O_5: A 0.36% grade with a 95% recovery.

Based on these results, it can be concluded that preconcentration will remove low-grade material in an early stage of the beneficiation process, and thus result in potential savings in energy (to avoid grinding waste) and CAPEX for downstream equipment.

During the concentration tests, the Davis Tube tests results showed that, at a grind of P_{95} ~38 µm for the four composite samples, the average weight recovery of the mag product was 47.3% grading 65.8% Fe_T, 89% magnetite and 0.67% V_2O_5, with corresponding recoveries of 92.0% Fe_T, 98.3% magnetite and 85.3% V_2O_5.

From the wet LIMS tests of the concentration work results (Table 13-6), it can be observed that:

- For the NHG composite sample:
  - At P_{95} 106 µm, a mag product with 61.1% Fe_T, 84% mag and 0.75% V_2O_5 was obtained
  - At P_{95} 38 µm, a mag product with 61.8% Fe_T, 84% mag and 0.75% V_2O_5 was obtained.
- For the SHG composite sample:
  - At P_{95} 106 µm, a mag product with 63.8% Fe_T, 85% mag and 0.85% V_2O_5 was obtained
  - At P_{95} 38 µm, a mag product with 65.7% Fe_T, 89% mag and 0.87% V_2O_5 was obtained.
- For both composite samples:
  - SiO_2 and MgO grades in the mag concentrate remained similar despite the grinding size
  - More detailed mineralogical work (MLA) is recommended to explain this behaviour.

Table 13-6: Final concentrate analysis

Composite sample	Size (P_{95}, µm)	Fe_T grade (%)	Mag grade (%)	V_2O_5 grade (%)	SiO_2 grade (%)	MgO grade (%)
North High Grade (NHG)	106	61.1	84	0.75	4.9	5.0
	38	61.8	84	0.75	4.5	4.5
South High Grade (SHG)	106	63.8	85	0.85	2.9	4.4
	38	65.7	89	0.87	1.8	3.1

13.3.2 Grindability Tests

Table 13-7 summarizes the results of the grindability tests. Based on Metso's abrasiveness classification and the average of the composite samples, this material could be classified as "non- abrasive" with an average Ai of 0.0263. Based on the RWi and BWi results and on JKMRC evaluation, this material could be classified as "hard" with average results of 15.2 kWh/t for RWi and 19.6 kWh/t for BWi. An average SVT of 13.5 kWh/t put this material at the 82.9 percentile of the Starkey & Associates Inc. database, which means that this material is harder than 82.9% of the materials included in Starkey & Associates Inc. database.

Table 13-7: Summary of grindability test results

Composite Sample	Ai (g)	RWi (kW/t)	BWi (kW/t)	SVT (kW/t)
North High Grade (NHG)	0.0458	16.4	20.0	10.8
North Low Grade (NLG)	0.0255	18.0	19.2	19.0
South High Grade (SHG)	0.0184	13.8	19.6	13.8
South Low Grade (SLG)	0.0153	12.7	19.6	10.3

13.3.3 Low Intensity Magnetic Separation – Preconcentration Stage: Dry LIMS

Table 13-8 and Table 13-9 summarize the preliminary dry LIMS test results performed at a P_{95} 6.3 mm and 1.0 mm respectively. Table 13-10 presents the preliminary dry LIMS test results performed at a P_{95} of 3.35 mm.

Table 13-8: Summary of the results of the dry LIMS test products at P_{95} of ~6.3 mm

Composite sample	% Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade %	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)
North High Grade (NHG)	92.5	33.7	98.0	41	99.0	0.41	98.1
North Low Grade (NLG)	85.5	26.2	93.7	28	98.5	0.20	94.4
South High Grade (SHG)	91.0	34.3	98.2	44	99.2	0.50	98.1
South Low Grade (SLG)	84.6	32.2	96.5	40	98.4	0.29	95.2

Table 13-9: Summary of the results of the dry LIMS test products at P_{95} of ~1.0 mm

Composite sample	% weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)
North High Grade (NHG)	80.7	37.4	96.0	47	98.5	0.49	95.4
North Low Grade (NLG)	66.3	31.1	86.3	36	96.1	0.24	88.7
South High Grade (SHG)	81.5	39.0	96.5	49	97.8	0.56	95.0
South Low Grade (SLG)	73.5	37.3	95.4	48	96.3	0.33	90.2

Table 13-10: Summary of the results of the dry LIMS test products at P_{95} of ~3.35 mm

Composite sample	% weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)
North High Grade (NHG)	87.9	34.1	97.2	42	98.8	0.44	97.0
North Low Grade (NLG)	75.7	27.2	88.7	30	96.6	0.20	91.2
South High Grade (SHG)	90.3	35.5	98.3	45	99.2	0.51	97.7
South Low Grade (SLG)	82.5	33.2	96.3	42	98.6	0.30	94.0

The dry LIMS test, after crushing at 6.3 mm, resulted in:

- An average magnetic product weight yield of 88.4%, with the SLG composite being the lowest at 84.6% whereas the NHG composite was the highest at 92.5%
- An average V_2O_5 grade of 0.35% in the magnetic product, with the NLG composite being the lowest at 0.20% V_2O_5, whereas the SHG composite was the highest at 0.50% V_2O_5
- An average V_2O_5 recovery of 96.5% in the magnetic product, with the NLG composite being the lowest at 94.4%, whereas the SHG and NHG composites were the highest at 98.1%
- An average Fe_T grade of 31.6% in the magnetic product, with the NLG composite being the lowest at 26.2% Fe_T, whereas the SHG composite was the highest at 34.3% Fe_T
- An average Fe_T recovery of 96.6% in the magnetic product, with the NLG composite being the lowest at 93.7%, whereas the SHG composite was the highest at 98.2%
- An average magnetite grade of 38% in the magnetic product, with the NLG composite being the lowest at 28%, whereas the SHG composite was the highest at 44%
- An average magnetite recovery of 98.8% in the magnetic product, with all the composite samples having a magnetite recovery between 98.4% and 99.2%.

The dry LIMS test, at 1 mm crushing, resulted in:

- An average magnetic product weight yield of 75.5% wt, with the NLG composite being the lowest at 66.3% wt, whereas the SHG composite SHG was the highest at 81.5% wt
- An average V_2O_5 grade of 0.41% in the magnetic product, with the NLG composite being the lowest at 0.24% V_2O_5, whereas the SHG composite was the highest at 0.56% V_2O_5
- An average V_2O_5 recovery of 92.3% in the magnetic product, with the NLG composite being the lowest at 88.7%, whereas the NHG composite was the highest at 95.4%
- An average Fe_T grade of 36.2% Fe_T in the magnetic product, with the NLG composite being the lowest at 31.1% Fe_T, whereas the NHG composite was the highest at 37.4% Fe_T
- An average Fe_T recovery of 93.6% in the magnetic product, with the NLG composite being the lowest at 86.3%, whereas the SHG composite was the highest at 96.5%
- An average magnetite grade of 45% in the magnetic product, with the NLG composite being the lowest at 36%, whereas the SHG composite was the highest at 49%
- An average magnetite recovery of 97.7% in the magnetic product, with all the composite samples having a magnetite recovery between 96.1% and 98.5%.

13.3.4 Low Intensity Magnetic Separation – Concentration Stage: Wet LIMS

Davis Tube Tests

From the Davis Tube test results (Table 13-11 to Table 13-16), it can be observed that:

- The NLG composite sample had the lowest weight yield in the mag product.
- Composite samples NHG and SHG had the highest V_2O_5 grade in the mag product.
- For the total iron grade in the mag product:
  - The SHG and SLG composite samples reached a total iron grade of 65% Fe_T or higher at P_{95} 106 µm
  - The NHG composite sample reached a total iron grade of 65.7% Fe_T at P_{95} 45 µm
  - The maximum total iron grade reached by the NLG composite sample was 62.2% Fe_T at P_{95} 45 µm.
- For the magnetite grade in the mag product:
  - The NLG composite sample obtained the lowest value
  - The NHG composite sample returned a magnetite grade similar to the SHG and SLG composite samples at P_{95} 75 µm.
- For the % SiO_2 in the mag product:
  - The NHG, SHG and SLG composite samples were less than 2% SiO_2 at P_{95} 38 µm
  - The NLG composite sample was less than 4.5% SiO_2 at P_{95} 38 µm.
- For the % Al_2O_3 in the mag product:
  - The NHG, SHG and SLG composite samples had 0.3% Al_2O_3 at P_{95} 38 µm
  - The NLG composite sample was less than 0.7–1.0% Al_2O_3 at P_{95} 45-38 µm.
- For the % MgO in the mag product:
  - The NHG, SHG and SLG composite samples contained 2.3–2.6% MgO at P_{95} 38 µm
  - The NLG composite sample was 3.8% MgO at P_{95} 38 µm.

Table 13-11: Laboratory-scale wet LIMS test results – NHG Concentrate Product

Davis Tube grind size, (P95, µm)	(%) Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)	SiO_2 grade (%)	SiO_2 distribution (%)	Al_2O_3 grade (%)	Al_2O_3 distribution (%)	MgO grade (%)	MgO distribution (%)
212	59.8	57.3	94.5	76	98.9	0.69	89.5	7.3	22.4	0.7	19.9	7.2	22.7
150	56.9	59.7	94.2	82	99.0	0.73	89.8	5.9	16.9	0.5	14.2	5.8	17.3
106	53.4	62.6	93.8	86	98.8	0.76	88.8	4.2	11.6	0.4	10.3	4.2	12.0
75	51.7	64.5	93.6	92	98.9	0.78	88.4	3.0	7.9	0.4	9.3	3.1	8.4
45	48.8	65.7	92.6	88	98.9	0.79	87.2	2.2	5.3	0.3	6.2	2.3	5.8
38	47.9	66.4	92.4	90	98.6	0.80	87.0	1.9	4.5	0.3	5.9	2.0	4.9

Table 13-12: Summary of Davis Tube test results – NLG Concentrate Product

Davis Tube grind size, (P_{95}, µm)	(%) Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)	SiO_2 grade (%)	SiO_2 distribution (%)	Al_2O_3 grade (%)	Al_2O_3 distribution (%)	MgO grade (%)	MgO distribution (%)
212	49.9	50.8	87.0	66	97.8	0.39	88.6	11.8	24.1	1.5	15.7	9.9	24.2
150	43.3	56.4	85.4	75	97.8	0.44	87.1	7.9	14.0	1.0	8.7	6.8	14.3
106	42.8	56.2	84.9	76	97.4	0.43	86.5	7.9	13.7	1.0	8.8	6.8	14.0
75	41.1	59.7	85.0	81	97.9	0.46	86.5	6.1	10.1	0.9	7.4	5.3	10.5
45	40.6	62.2	85.0	85	97.2	0.47	86.5	4.5	7.7	0.7	5.8	3.9	7.9
38	40.5	62.1	85.0	83	96.8	0.48	86.7	4.5	7.6	1.0	8.2	3.8	7.8

Table 13-13: Summary of Davis Tube test results – SHG Concentrate Product

Davis Tube grind size, (P_{95}, µm)	(%) Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)	SiO_2 grade (%)	SiO_2 distribution (%)	Al_2O_3 grade (%)	Al_2O_3 distribution (%)	MgO grade (%)	MgO distribution (%)
212	57.0	61.3	95.8	81	98.7	0.83	88.7	4.5	13.7	0.4	22.8	6.1	16.8
150	53.8	64.3	96.0	89	98.9	0.85	88.4	2.7	7.6	0.2	11.5	4.2	10.8
106	53.1	65.0	95.4	89	98.7	0.86	87.4	2.1	6.9	0.4	17.1	3.7	9.5
75	54.8	66.2	96.2	92	98.9	0.86	88.9	1.5	4.5	0.2	11.9	2.8	7.9
45	52.2	66.5	96.0	95	99.0	0.88	87.3	1.4	3.8	0.4	17.2	2.8	7.0
38	51.1	67.0	95.4	92	98.7	0.89	86.9	1.3	3.4	0.3	12.5	2.6	6.3

Table 13-14: Summary of Davis Tube test results – SLG Concentrate Product

Davis Tube grind size, (P_{95}, µm)	(%) Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)	SiO_2 grade (%)	SiO_2 distribution (%)	Al_2O_3 grade (%)	Al_2O_3 distribution (%)	MgO grade (%)	MgO distribution (%)
212	52.7	62.4	94.9	84	98.6	0.47	81.4	3.8	10.3	0.4	19.0	5.3	12.8
150	52.2	64.7	95.1	90	98.7	0.49	81.7	2.7	7.4	0.2	10.8	4.2	10.1
106	50.1	66.2	94.9	94	98.8	0.49	80.4	1.8	4.7	0.2	10.1	3.2	7.3
75	50.2	66.0	90.5	93	95.9	0.49	83.2	2.1	5.6	0.5	10.3	2.7	7.3
45	49.9	67.4	95.0	94	99.0	0.51	80.9	1.6	4.1	0.3	12.5	2.7	6.4
38	49.5	67.5	95.1	92	99.0	0.51	80.6	1.2	3.2	0.3	12.3	2.4	5.5

Table 13-15: Summary of Davis Tube test results – average of NHG, NLG, SHG and SLG Concentrate Products

Davis Tube grind size, (P_{95}, µm)	(%) Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)	SiO_2 grade (%)	SiO_2 distribution (%)	Al_2O_3 grade (%)	Al_2O_3 distribution (%)	MgO grade (%)	MgO distribution (%)
212	54.9	58.0	93.1	77	98.5	0.60	87.1	6.9	17.6	0.8	19.4	7.1	19.1
150	51.6	61.3	92.7	84	98.6	0.63	86.9	4.8	11.5	0.5	11.3	5.3	13.1
106	49.9	62.5	92.3	86	98.4	0.64	85.8	4.1	9.2	0.5	11.6	4.5	10.7
75	49.5	64.1	91.3	90	98.1	0.65	86.8	3.2	7.0	0.5	9.7	3.5	8.5
45	47.8	65.5	92.2	91	98.5	0.66	85.5	2.4	5.2	0.4	10.4	2.9	6.8
38	47.3	65.8	92.0	89	98.3	0.67	85.3	2.2	4.7	0.5	9.7	2.7	6.1

Laboratory-Scale Wet LIMS

After the completion of the Davis Tube tests, laboratory-scale wet LIMS was completed on two composite samples (NHG and SHG) at two different grinding sizes (P_{95} ~106 and 38 µm). Table 13-15 summarizes the results of the wet LIMS tests.

Table 13-16: Summary of the laboratory-scale wet LIMS test results

Composite Sample	Size (P_{95}, µm)	(%) Weight	Fe_T grade (%)	Fe_T distribution (%)	Mag grade (%)	Mag distribution (%)	V_2O_5 grade (%)	V_2O_5 distribution (%)	SiO_2 grade (%)	SiO_2 distribution (%)	MgO grade (%)	MgO distribution (%)
North High Grade (NHG)	106 38	50.4 47.5	61.1 61.8	90.3 86.0	84 84	95.7 91.8	0.75 0.75	84.4 82.9	4.9 4.5	12.0 10.4	5.0 4.5	12.4 10.7
South High Grade (SHG)	106 38	52.7 49.8	63.8 65.7	94.6 92.2	85 89	97.3 95.1	0.85 0.87	87.1 84.4	2.9 1.8	4.4 3.1	4.4 3.1	10.8 7.5

From the results, it can be observed:

- Globally, the wet LIMS results were consistent with the Davis Tube results. The quality of the wet LIMS magnetic products was slightly lower than the Davis Tube magnetic products. This behavior was expected because the separation of the wet LIMS is less efficient than the Davis Tube separation due to a less efficient washing of the wet LIMS magnetic product compared to that of the Davis Tube.
- For both composite samples:
  - The quality improvement of the concentrate was small when grinding to 38 µm vs 106 µm.
  - Finer grinding also led to lower weight and valuable elements recoveries. More detailed mineralogical work would be required to explain this behaviour.
- For the NHG composite sample:
  - Total iron grade: 61.1% Fe_T at P_{95} 106 µm vs 61.8% Fe_T at P_{95} 38 µm.
  - Magnetite grade: No upgrade (84%) with a finer grind size.
  - V_2O_5 grade: No upgrade (0.75% V_2O_5) with a finer grind size.
  - The main impurities of the mag products were SiO_2 and MgO, and a slight reduction was observed with finer grinding (4.9% SiO_2 at P_{95} 106 µm vs 4.5% SiO_2 at P_{95} 38 µm and 5.0% MgO at P_{95} 106 µm vs 4.5% MgO at P_{95} 38 µm).
- For the SHG composite sample:
  - Total iron grade: 63.8% Fe_T at P_{95} 106 µm vs 65.7% Fe_T at P_{95} 38 µm.
  - Magnetite grade: 85% at P_{95} 106 µm vs 89% at P_{95} 38 µm.
  - V_2O_5 grade: 0.85% V_2O_5 at P_{95} 106 µm vs 0.87% V_2O_5 at P_{95} 38 µm.
  - The main impurities of the mag products were SiO_2 and MgO, and a slight reduction was observed with finer grinding (2.9% SiO_2 at P_{95} 106 µm vs 1.8% SiO_2 at P_{95} 38 µm and 4.4% MgO at P_{95} 106 µm vs 3.1% MgO at P_{95} 38 µm).

14 Mineral Resource Estimates

Section 14 was previously reported in a NI 43-101 Technical Report with an effective date of 23 April 2019 (Longridge and Martínez-Vargas, 2019) and is repeated below in accordance with the Canadian Securities Administrators' NI 43-101 and Form NI 43-101F1. The MRE has been prepared in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves (10 May 2014) and CIM "Estimation of Mineral Resource and Mineral Reserves Best Practice Guidelines" effective at the time of the Mineral Resource estimation. Only Mineral Resources are estimated – no Mineral Reserves are defined.

No new exploration work has been completed at the Project since the MRE's effective date of 23 April 2019.

14.1 Introduction

This MRE was prepared by Dr Adrian Martínez-Vargas, P.Geo., a Senior Consultant of CSA Global. Mineral Resources were estimated in two zones on the Property, the North Zone and the South Zone, using all drillhole data available by the 23 April 2019 Effective Date.

VONE provided Dr Luke Longridge, one of the authors of this report, with a digital elevation model (DEM) covering the property, and with the drillhole databases described in Section 10, 11 and 12 of this Report. Dr Longridge prepared the geological interpretation of the mineralized domains that were used to constrain the extent of the mineralization in the resource model. Dr Martínez-Vargas reviewed the informing data, the compiled database, and the geological interpretation completed by Dr Longridge and considers that the quality and quantity are appropriate for Mineral Resource estimation.

The MRE workflow was as follows:

- Input database validation
- Review of the interpretation of the geology and mineralization domains
- Coding, compositing (capping was not necessary)
- Block modelling
- Exploratory data analysis and statistical analysis
- Variogram analysis
- Derivation of kriging plan, interpolation and validation
- Classification and resource reporting.

14.2 Drillhole Database Loading and Validation

The database provided by VONE consists of two drilling campaigns. The older campaign was drilled between 1963 and 1966 and contains data sampled and assayed for head grade Fe_2O_3 and TiO_2 over approximately 7 m intervals. This drilling campaign also contains larger composite sample intervals (taken from the 1963 to 1966 drilling in the 1970s) that vary from 10 m to 60 m. These composites were assayed for Fe_2O_3 and TiO_2 head grades, and a Davis Tube magnetic concentrate fraction was prepared from the composites and assayed for several other oxides, including V_2O_5.

The latest drilling campaign was completed in 2013 and between 2017 and 2018. Diamond drill core was sampled in 2 m (in the South Zone) or 3 m (in the North Zone) intervals, and assayed for Al_2O_3, Fe_2O_3, MgO, TiO_2, SiO_2, CaO, Cr_2O_3, K_2O, MnO, Na_2O, P_2O_5, Na_2O, and P_2O_5, in both the head grade and in the magnetic fraction produced using Davis Tube magnetic separation. Copper and sulphur head grades were collected for some intervals.

Dr Longridge compiled this data to obtain a working database described in Table 14-1. The working database was provided as two separated sets of collar, survey, and assay tables in CSV format, one set for the North Zone and one for the South Zone. These tables were imported in the python package PyGSLIB, and validated for presence of gaps, overlap and relation issues between tables. The assay values were also reviewed to identify anomalous values. The drillhole intervals coordinates were calculated, plotted in 3D, and visually validated. Head and concentrate grades from 1963–1974 and 2013–2018 were compared, and no significant differences were observed (see Section 12.2). Differences in the granulometry of the sample preparation for magnetic separation, as explained in Sections 6.2.2 and 13.2.2 has resulted in a better liberation and lower contamination of the magnetite concentrate from historical samples, therefore Fe_2O_3 grades in concentrate tend to be higher in the 1963–1974 samples. The author of this section (Dr Adrian Martinez) considers that this difference is not material at this stage of work.

Table 14-1: Drillhole data used for Mineral Resource estimation

Parameter	Values	
	North Zone	South Zone
Number of drillholes (total)	23 (with assay data)	75
Number of drillholes (1960s campaign)	18	46
Number of drillholes (2013 to 2018 campaigns)	5	29
Metres (total)	5,220	11,370
Drillhole spacing in best areas (m)	50 x 500	30 x 100
Variables assayed for in regular sample intervals		
Head grade	Percent of magnetite, Al_2O_3, Fe_2O_3, MgO, TiO_2, SiO_2	
Concentrate	Al_2O_3, Fe_2O_3, MgO, TiO_2, V_2O_5, SiO_2	
Note: Only Fe_2O_3 and TiO_2 head grades are available in 1963–1974, and 2013 drilling campaigns. CaO, Cr_2O_3, K2O, MnO, Na_2O, P_2O_5, Na_2O, P_2O_5 were available in the head and concentrate grade but not modelled. V_2O_5 head grade is available but not modelled.		
Variables assayed for in larger composite sample intervals		
Head grade	Percent of magnetite, Fe_2O_3, TiO_2	
Concentrate	Al_2O_3, Fe_2O_3, MgO, SiO_2, TiO_2, V_2O_5	
Note: Available only in 1963–1974 drilling campaign.		

Since only Fe_2O_3 was assayed systematically in sample intervals of the two main drilling campaigns, and these drilling campaigns inform different parts of the deposit, the strategy to interpolate was as follows:

1) Fe_2O_3 head grades were used to deduce the percent of magnetite in 1963–1974 and 2013 drillhole sampling intervals, using the regression formulas shown in Figure 14-1. The percent of magnetite was then modelled in the block model using the 1963–1974 and 2013–2018 drillhole data.
2) The average grade in the concentrate was modelled using grade in concentrate available for the sample intervals from the 2013–2018 drillholes and in composite samples of the 1963–1974 drillholes (Table 14-1), using a smooth interpolator and long compositing intervals, as explained in more detail in Section 14.10.

Some of the 1960s drilling intervals were not sampled at regular 7 m sampling intervals. In order to populate these intervals with data, head grades for Fe_2O_3 and TiO_2 assayed in composited samples were used. However, this dataset was used only to obtain a smooth trend estimate (as in (2) above) but not for direct interpolation of head grades.

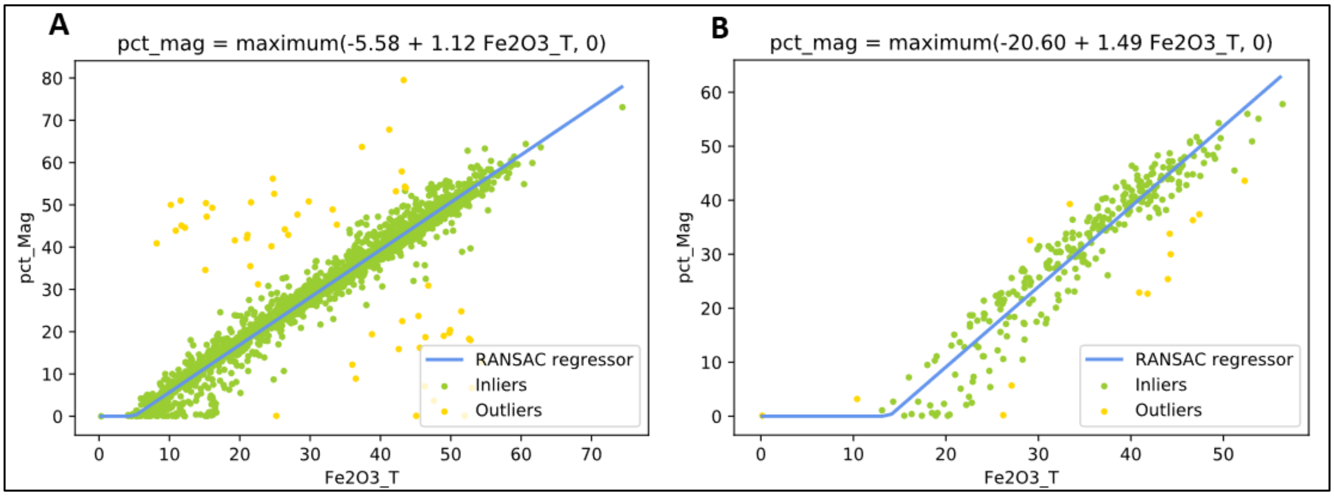

Figure 14-1: Linear regression formula between Fe_2O_3 and percent of magnetite fitted with 2010s drillhole data
A = South Zone; B = North Zone.

14.3 Geological Interpretation

The modelling of geological domains was completed by Dr Longridge and reviewed by the author of this section. Only one estimation domain was used for each one of the two mineralized zones of this deposit (Figure 14-2). The mineralization occurs predominantly in the ultramafic lithologies on the property. The interpretation was based on drillhole log data and as airborne magnetic anomalies, as well as and surface mapping available for the South Zone. The South Zone is dissected by 10 faults that slightly displaced the mineralized blocks. This displacement was considered small and the boundaries defined by faults were considered soft, in other words, ignored for interpolation purposes.

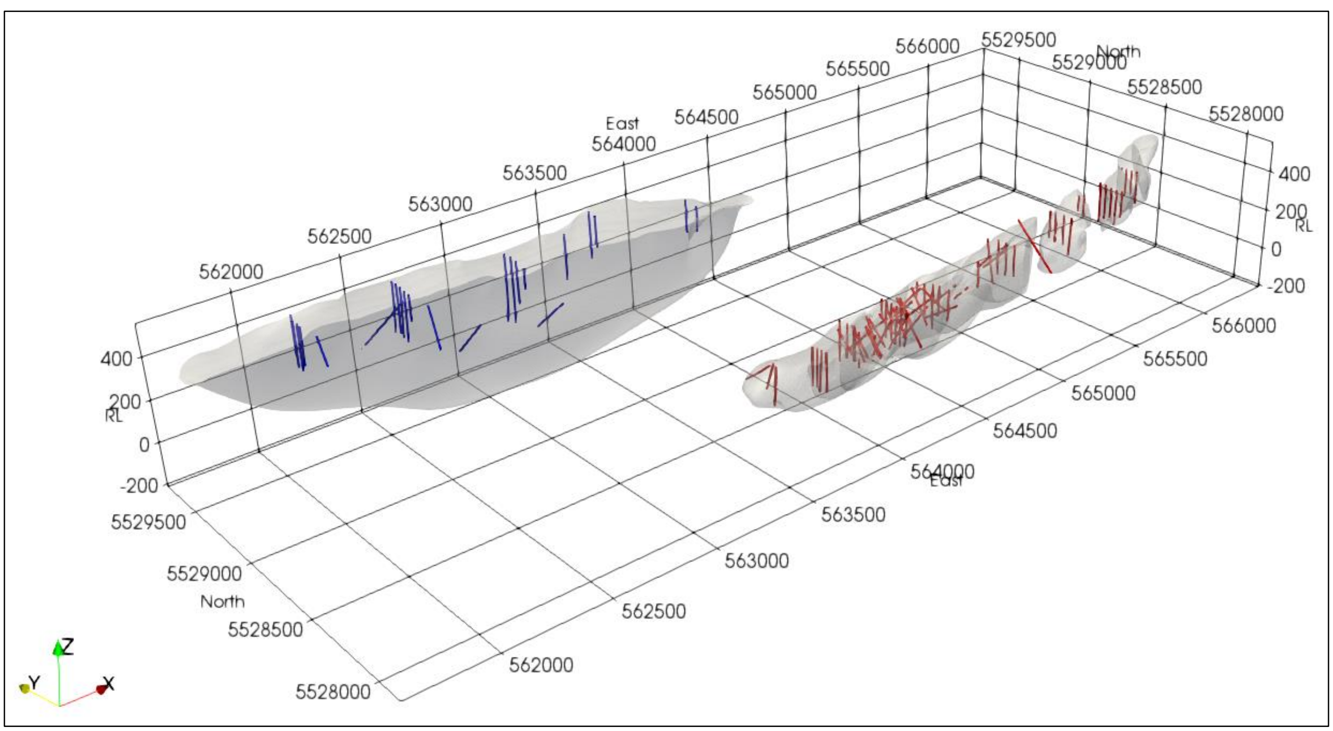

Figure 14-2: Geological interpretation of the mineralization (grey transparent wireframe), and drillhole data of the North Zone (blue) and the South Zone (red)

14.3.1 Lithology

During logging of drill core from the Mont Sorcier Project, as well as when capturing historical drill core logs, several lithological codes were used to describe the lithologies encountered on the Project. These codes are largely based on the SIGEOM Symbols and Abbreviations (Giguère *et al.,* 2014). For the purposes of geological interpretation, lithological codes were grouped together to form groups of similar lithologies, including overburden, tonalite/pegmatite, quartz veins, dolerite, faults/shears, anorthosite, mafic rocks (gabbro, norite), ultramafic rocks (pyroxenite, dunite, peridotite, magnetite), volcanics and sediments.

14.3.2 Weathering

Owing to relatively recent glaciation of the Project area, very little surface weathering has taken place, and outcrops in the project region show no evidence for weathering.

14.3.3 Mineralization

Previous work, inspection of the drill core by Dr Longridge and logging show that magnetite mineralization is strongly associated with ultramafic lithologies, and almost exclusively occurs within ultramafic rocks.

14.3.4 Topography

No detailed airborne elevation models are yet available for the Project, so Shuttle Radar Topography Mission elevation data was used and was adjusted to fit with surveyed collar elevations over mineralized areas.

14.4 Wireframes

The geological interpretation was carried out in Leapfrog 3D modelling software using logging codes grouped according to ultramafic lithologies, in combination with surface mapping data of lithologies and structures produced by VONE geologists, and airborne magnetic data which clearly highlights ultramafic units hosting magnetite mineralization.

14.5 Sample Compositing

Sampling interval in the 2013–2018 drilling campaigns is typically 3 m in the North Zone and 2 m in the South Zone (Figure 14-3). The sampling interval in the 1960s campaigns is around 7 m. Composite samples collected in the 1960s campaigns are between 10 m and 60 m in length. Drillhole intervals for head grade interpolation were composited at 3 m in the North Zone and 2 m in the South Zone. Composites of 20 m were created to interpolate average grades in concentrate and to interpolate a head grade trend (a smooth reference grade). Composited samples collected in the 1960s were used to populate intervals without assay, but only to generate 20 m composites. Composited samples were not used to generate the 2 m and 3 m composites used to interpolate head grade and percent of magnetite.

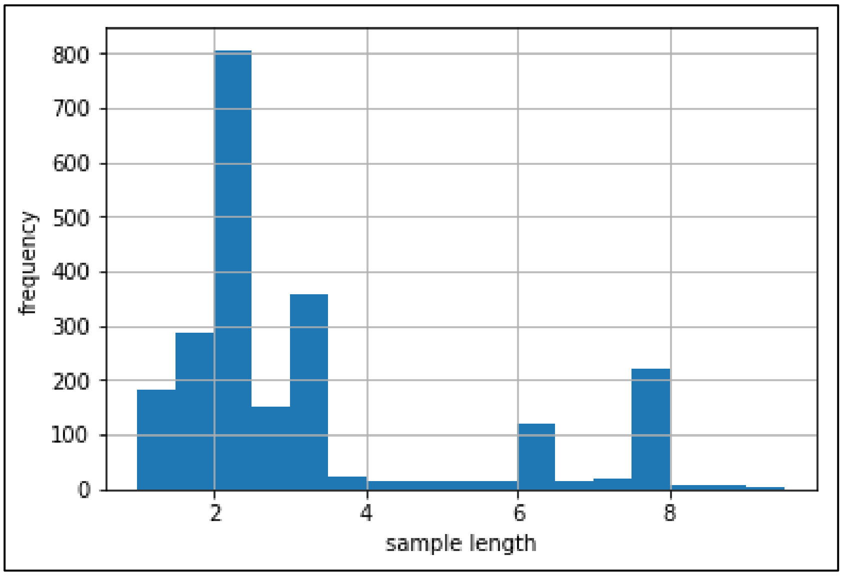

Figure 14-3: Histogram of sample lengths – South Zone

14.6 Statistical Analyses

The statistical analyses were completed using composited intervals for both head grade and grade in concentrates. The South Zone and North Zone mineralized domains were analysed separately using "Supervisor" software, and this consisted of de-clustering analysis when necessary, exploratory data analysis, construction of histograms and cumulative histograms, basic statistic calculation, and basic multivariate statistics review.

De-clustering was used only in the South Zone, and an appropriate de-clustering cell was deduced by comparing many cell sizes, as shown in Figure 14-4. The univariate statistics analysis consisted of calculating basic statistics such as mean values and coefficient of variations. All CVs are lower than one, which is a good empirical criterion to use linear interpolators such as the inverse of the distance, ordinary kriging, and simple kriging.

The statistical analysis for head grades was completed using 2 m (South Zone) and 3 m (North Zone) composite data. Histograms of head grades show tendency of normal distribution and bimodality attributed to the presence of low-grade intervals within the mineralized domain, especially in the South Zone (Figure 14-5 and Figure 14-6). The statistical analysis for concentrates was completed using 20 m composites; histograms are show in Figure 14-7 and Figure 14-8. Note that Fe_2O_3 grade in concentrate is generally higher than 85%. Fe_2O_3 grade in concentrate under 85% in the North Zone occurs mostly in the deepest part of the deposit and is associated with the 2013–2018 drillhole data.

Correlation between variables were also reviewed for both head grade variables and concentrate grade variables. There is a strong correlation between Fe_2O_3 head grade and percent of magnetite, as shown in Figure 14-1. There are also strong correlations between Fe_2O_3 and MgO, and between Fe_2O_3 and SiO_2 in the concentrate. There is a moderate correlation between V_2O_5 in concentrate and Fe_2O_3 head grade.

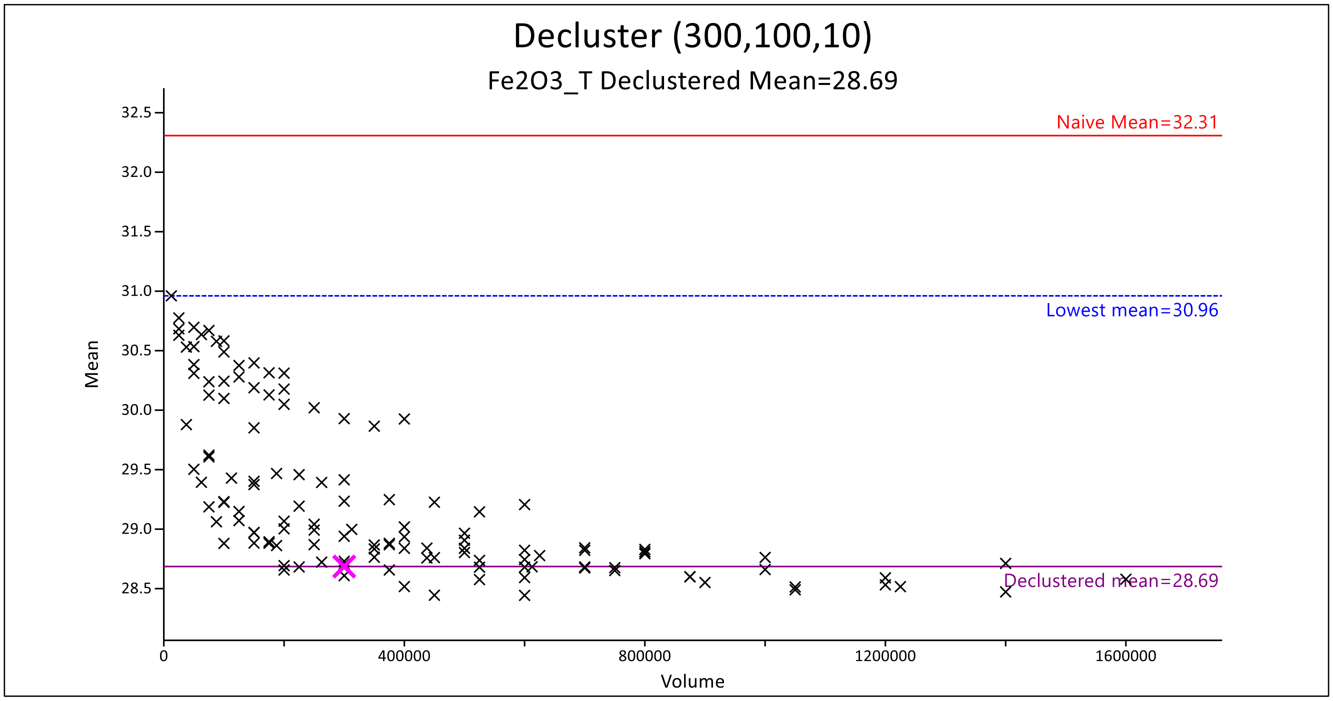

Figure 14-4: De-clustering weight optimization on South Zone, using Fe_2O_3 grades

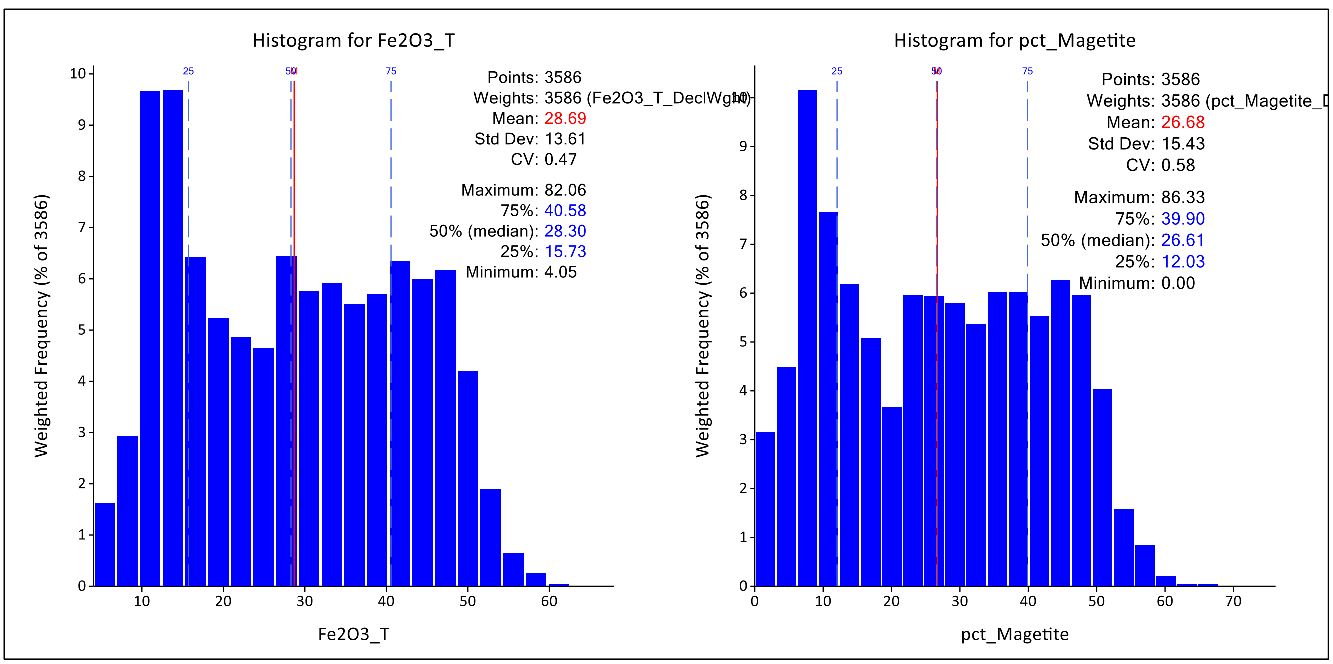

Figure 14-5: Histogram of iron oxide head grade and percent of magnetite – South Zone

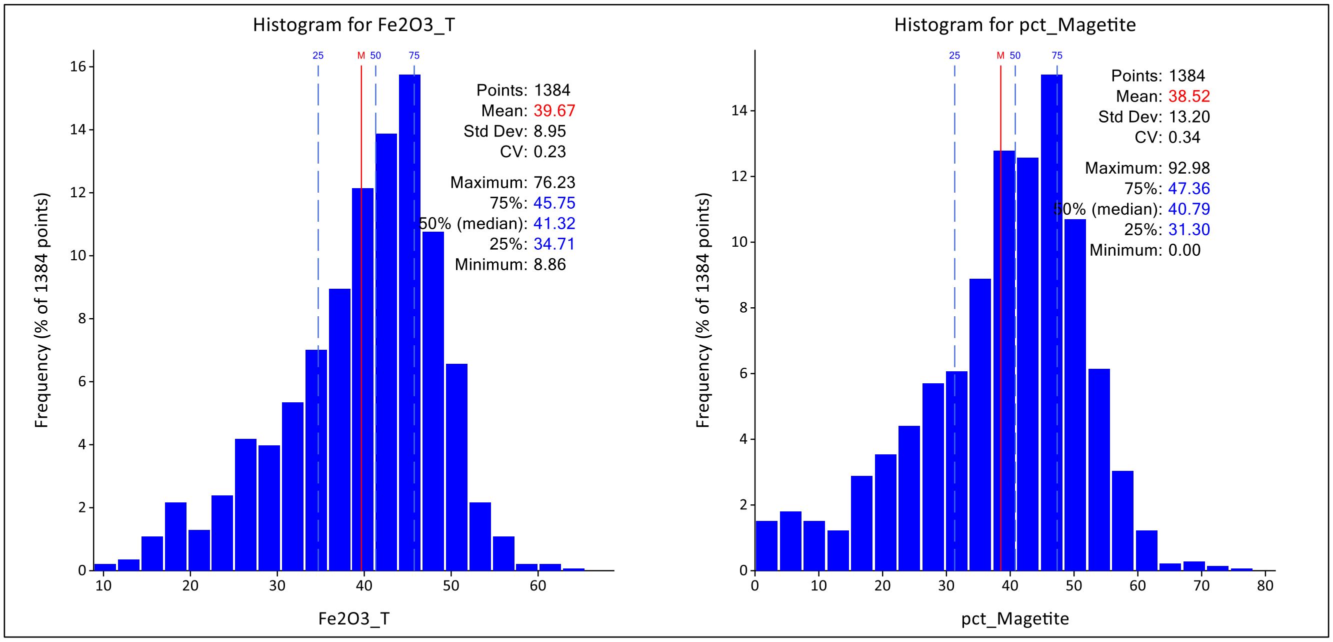

Figure 14-6: Histogram of iron oxide head grade and percent of magnetite – North Zone

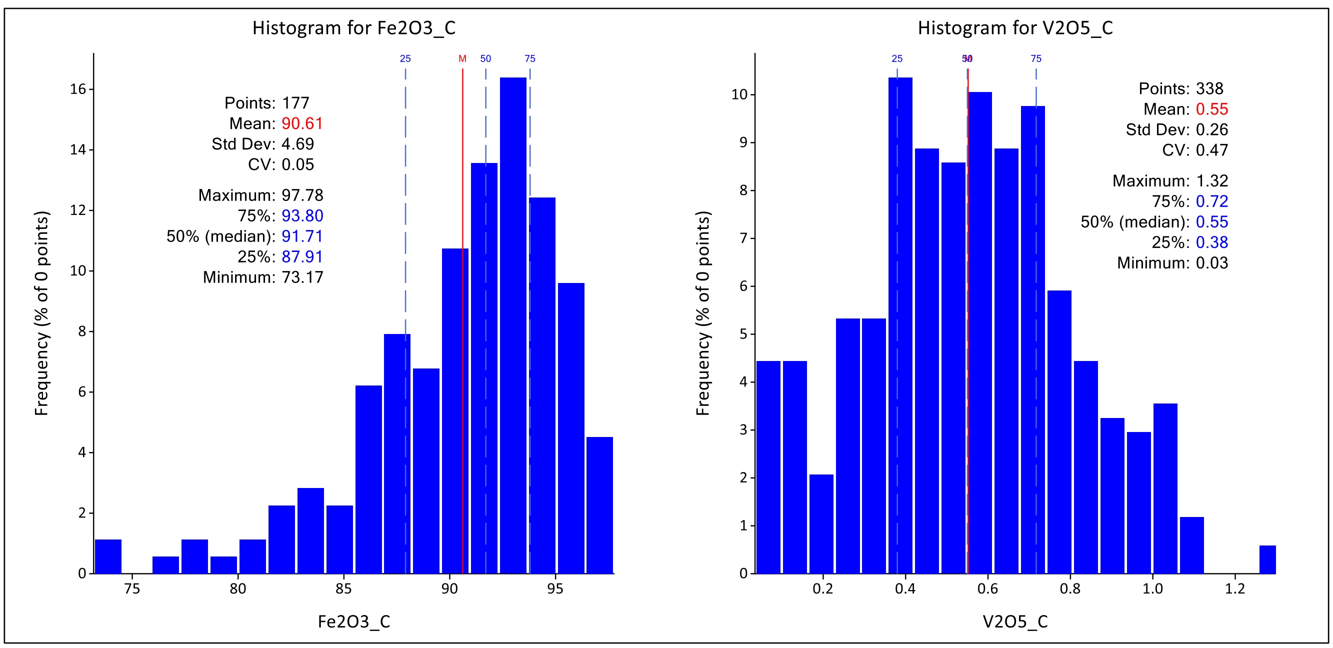

Figure 14-7: Histogram of Fe_2O_3 and V_2O_5 concentrate grade in the South Zone

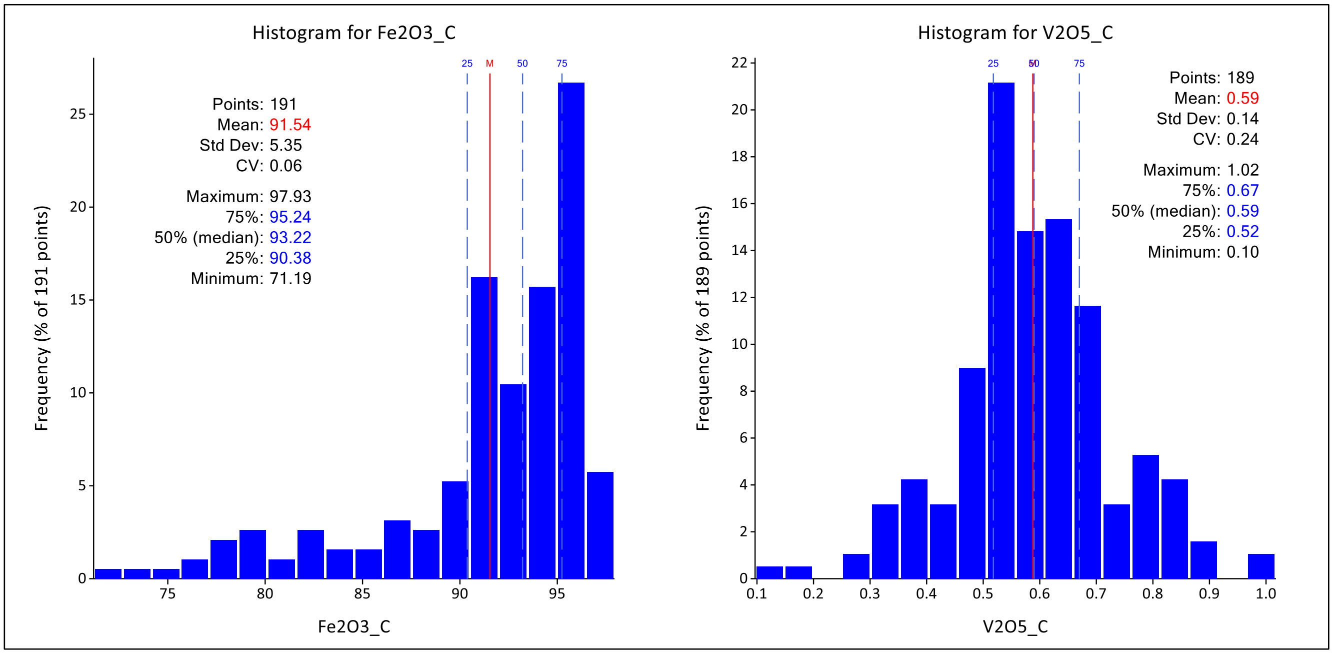

Figure 14-8: Histogram of Fe_2O_3 and V_2O_5 concentrate grade in the North Zone

14.7 Geostatistical Analysis

Experimental variograms were calculated only for head grade variables and percent of magnetite, using 2 m and 3 m composites, and fitted to a variogram model. In the North Zone, the down dip variogram model was used as a reference to fit an omnidirectional variogram model. In the South Zone, where the quantity of drillholes with close spacing is higher, the variogram model was fit from directional variograms. It was found that the same variogram model fits properly the experimental variograms of the head grade variables and the percent of magnetite (Figure 14-9). The variograms models are shown in Table 14-2.

Table 14-2: Variogram models used to interpolate Fe_2O_3 and TiO_2 head grades, and percent of magnetite

Zone	Orientation (dip-->dip direction)	Exponential		
		Nugget	Sill	Range
South	00-->085	0.165	0.835	307
	00-->355	0.165	0.835	101
	90-->000	0.165	0.835	187
North	Omnidirectional	0.11	0.89	60

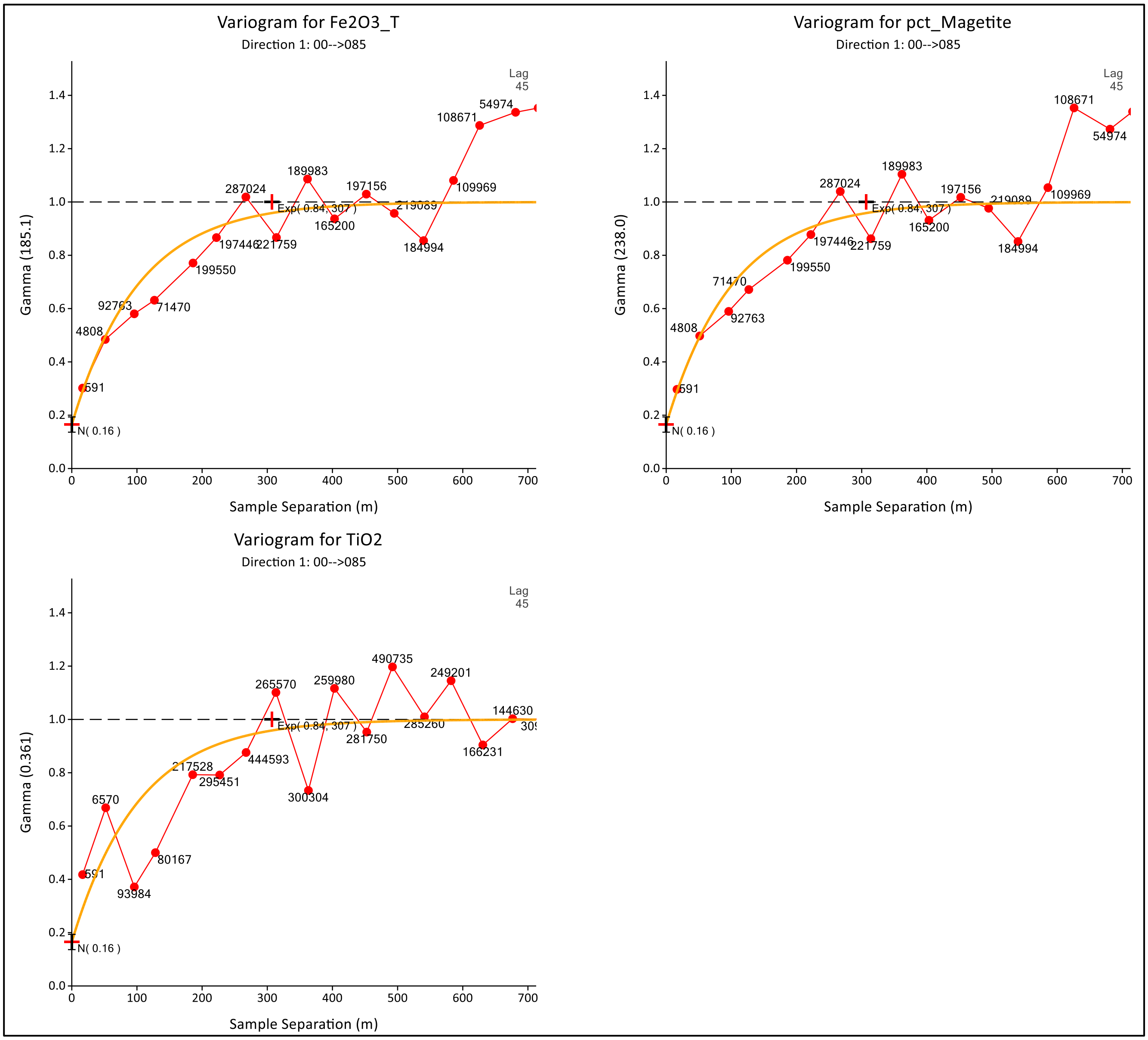

Figure 14-9: Same variogram model (in yellow) and experimental variograms of Fe_2O_3 and TiO_2 head grades, and percent of magnetite, in the horizontal direction with azimuth 85°

14.8 Density

Density measurements were taken using gas pycnometry at both SGS and Activation Laboratories. Of the 2,273 samples submitted during 2017 and 2018, 278 samples (12.13%) were measured for density. Density is expected to show a positive correlation with total iron of the sample and will depend on the relative proportions of magnetite (SG = 5.15), plagioclase feldspar (SG = 2.6 to 2.7), pyroxene (SG = 3.2 to 3.95) and olivine (SG = 3.3). A regression through the data gives a polynomial curve that corresponds well to a theoretical mixing model between magnetite, olivine and feldspar (Figure 14-10).

The polynomial formula:

$$SG = 0.0003(Fe2O3)2 + 0.0036(Fe2O3) + 2.7517$$

was used to calculate the density of samples without density measurements, based on the Fe_2O_3_T of the sample.

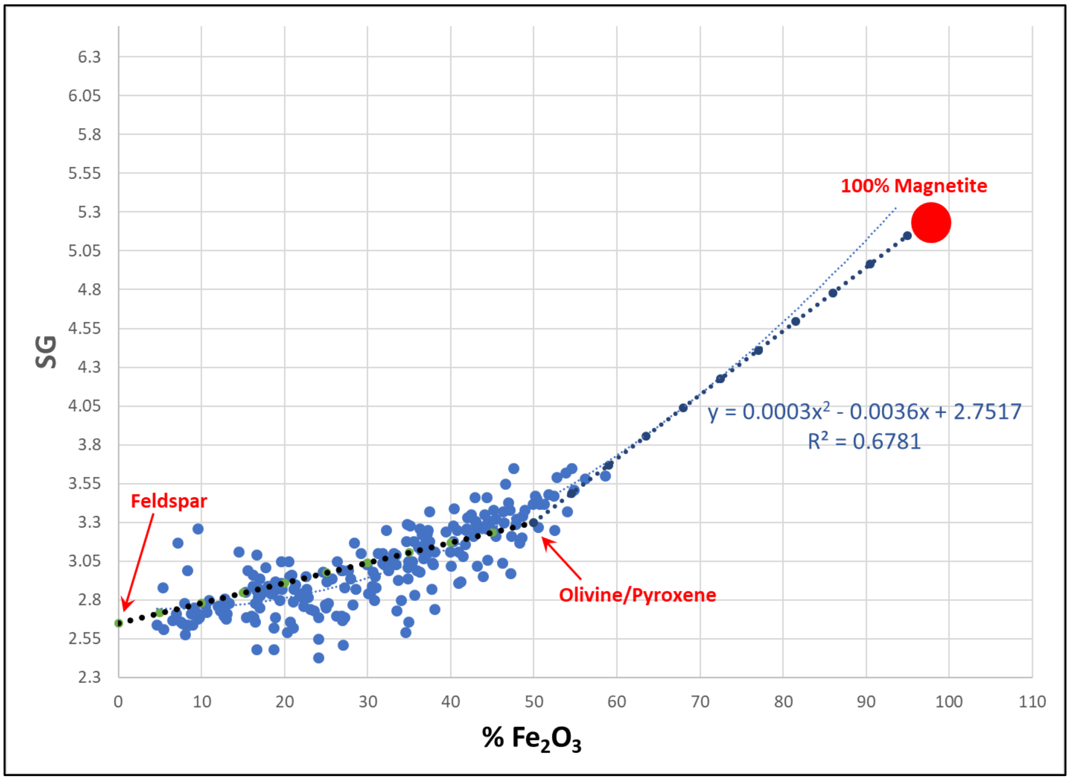

Figure 14-10: Plot of Fe_2O_3 (total) vs density (SG) for all samples measured for density using gas pycnometry in 2017 and 2018

Note: The regression line (blue) and formula are shown. The black dotted line shows theoretical linear density variation between feldspar and olivine/pyroxene, and between magnetite and olivine/pyroxene.

14.9 Block Model

Block models with 10 m cube blocks were created for the North Zone and South Zone and filled with blocks inside the mineralized domains. An approximate percentage of the block inside the solid was used to reproduce the solid volume. The models were then visually validated, section-by-section and no missing blocks or artifacts were identified.

14.10 Grade Estimation

This estimate consists of two main components:

- Components characterizing the in-situ properties of the rock. These include head grade assays and percent of magnetite.
- Components characterizing the magnetite concentrate produced after crushing the rock and completing magnetic separation of the magnetite. These are the assayed grades of the chemical elements in the concentrate.

14.10.1 Head Grade (Fe_2O_3 and TiO_2) and Percent of Magnetite Estimation

Only Fe_2O_3 and TiO_2 head grades (historical data did not include head assays for other chemical components), as well as the percent of magnetite were used to inform the block models. These three in-situ components of the rock were interpolated using simple kriging with local mean (SKLM).

The local means were estimated in block models with inverse of the squared distance using 20 m composites informed by sample intervals assays. In some instances where there was no data in the regular sample interval

(Figure 14-11), larger length composites assays were used. The local means are smooth and are intended to represent grade trends at large distances, therefore using sample composites are appropriated for this purpose. Up to 50 composites were used for interpolation, with a maximum of 20 samples per drillhole. The estimation parameters were tested in random individual blocks, as shown in Figure 14-12A. Local means were also interpolated into 2 m (South Zone) and 3 m (North Zone) intervals composites intervals, as this is a requirement for SKLM.

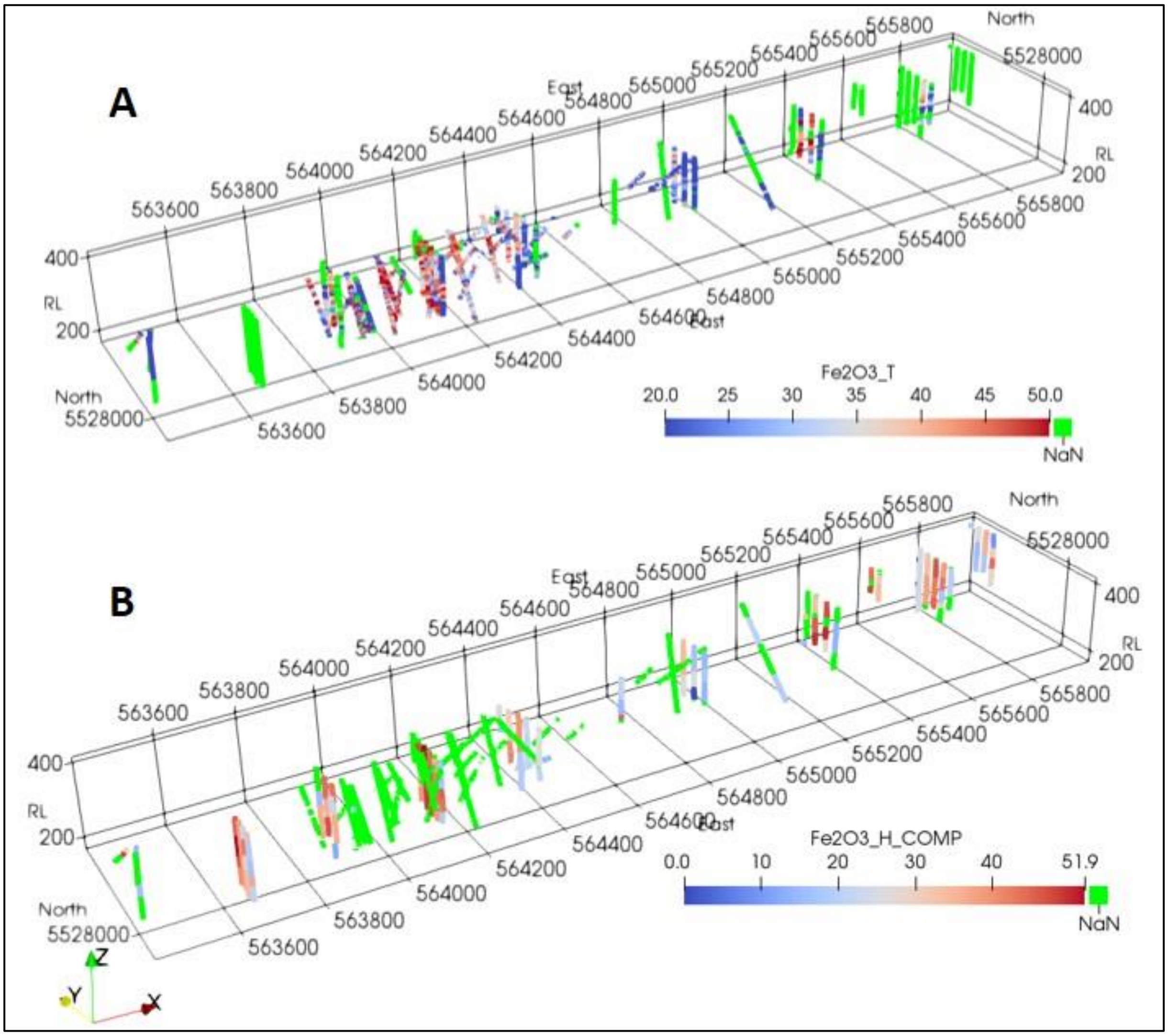

Figure 14-11: Sample intervals for the South Zone

A: Fe_2O_3 head grade in regular sample intervals.

B: Fe_2O_3 head grade in composite samples. Note that where non-informed regular sample intervals occur, these are informed by composite samples.

SKLM was used to interpolate the percent of magnetite, Fe_2O_3 and TiO_2 using only regular sample intervals composited at 2 m and 3 m intervals as primary data. This approach is used to represent the smaller-scale local distribution of grade where such small-scale distributions are available through more detailed sampling. A minimum and maximum of eight and 30 samples were used to interpolate, with a maximum of five samples per drillholes. The smooth local means interpolated in drillhole and block models were used as the local mean parameter of SKLM to represent grade trends at deposit scale. The sample selection and simple kriging weights were tested (as shown in Figure 14-12B) to ensure the estimate works as intended.

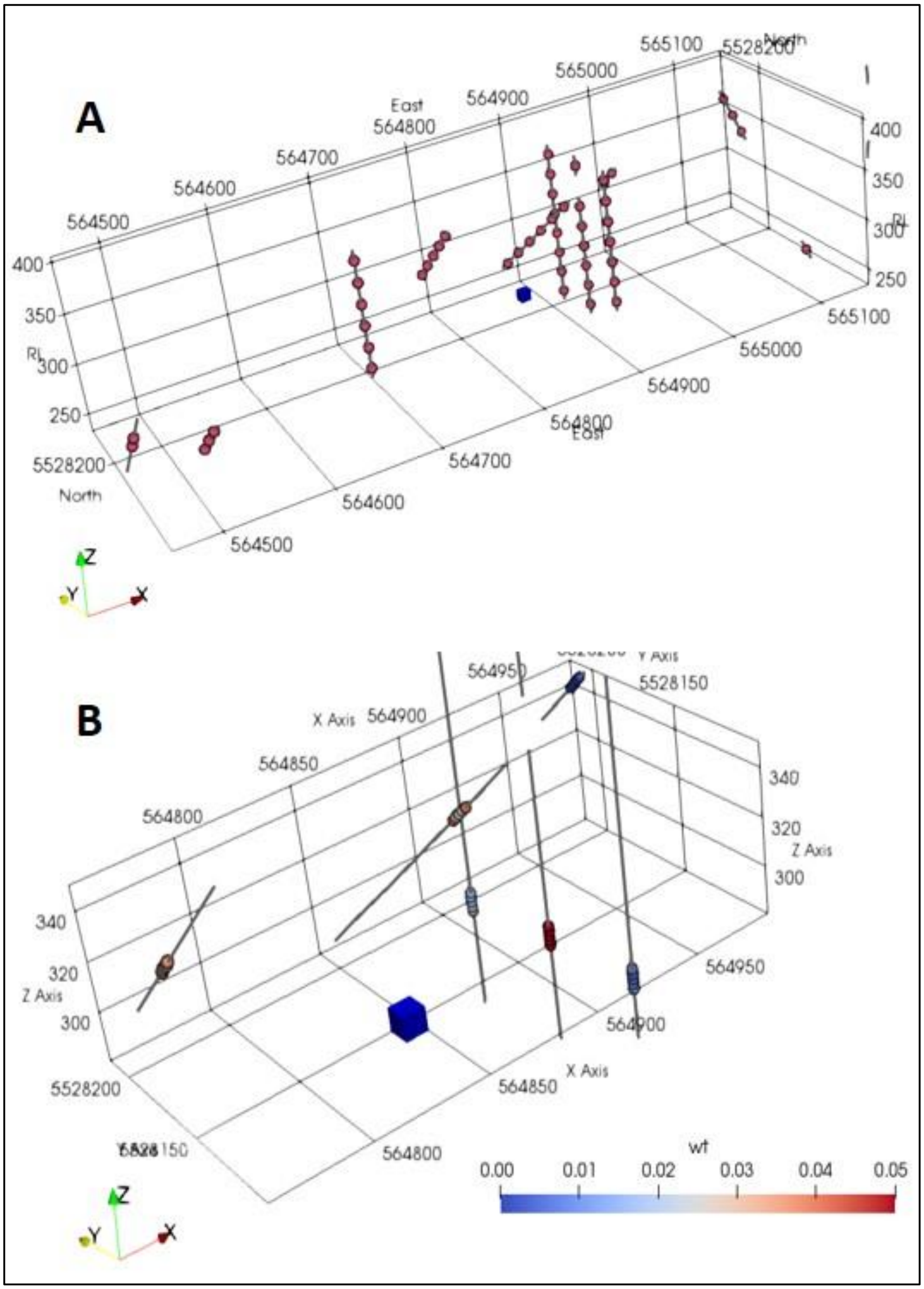

Figure 14-12: Visual validation of the interpolation parameters in South Zone

A: 20 m composites (in red) used to interpolate local means in one block (blue), and drillhole traces (grey).
B: 2 m composites used to interpolate with simple kriging with local mean colored by kriging weight.

This combined approach using both larger length and smaller length composites allows integration of all the data available, while maintaining a resolution appropriate to the level of detail in the sampling.

14.10.2 Grade in Concentrate Estimation

The Al_2O_3, Fe_2O_3, MgO, SiO_2, TiO_2, Fe_2O_3, and V_2O_5 grades in magnetite concentrates were interpolated using the same approach and interpolation parameters used to estimate local means or trends.

14.11 Model Validation

Model validation consisted of visual comparison of drillholes and blocks in sections, comparison of average grades and statistical distributions, validation with swath plots, and global change of support.

Table 14-3 and Table 14-4 show the comparison between means in block model and composites. It shows that means were reproduced. Means calculated with composites in the South Zone used de-clustering weights. Visual validations consisted of a comparison of grade in drillholes and in block model to ensure the local estimate and main trends were reproduced in the estimate (Figure 14-13). Swath plots were used to validated local trends, and bias, in the estimate. The global change of cut-off compares the volume and grade over certain cut-off obtained from the model and with theoretical grade-tonnage curves estimated with the discrete Gaussian model (Figure 14-14).

The author is of the opinion that all the model validations were satisfactory, and the estimates are appropriate for mineral resource reporting.

Table 14-3: Mean comparison – South Zone

Variable		Mean in composite (%)	Mean in model (%)	Difference in mean (%)	Number of composites	Number of blocks
Fe_2O_3	Head grades	28.7	28.5	-0.5	3,586	109,218
TiO_2		1.19	1.20	1.2	4,561	115,525
Percent of magnetite		26.7	25.4	-4.9	3,586	109,218
V_2O_5	Grades in concentrate	0.51	0.47	-7.3	338	117,479
Fe_2O_3		90.0	94.8	5.3	177	117,479
TiO_2		1.4	1.3	-0.9	430	117,479
MgO		3.5	3.5	-0.0	428	117,479
Al_2O_3		0.35	0.34	-2.9	428	117,479
SiO_2		2.7	2.6	-1.3	428	117,479

Table 14-4: Mean comparison – North Zone

Variable		Mean in composite (%)	Mean in model (%)	Difference in mean (%)	Number of composites	Number of blocks
Fe_2O_3	Head grades	39.7	38.6	-2.7	1,384	262,706
TiO_2		1.22	1.24	1.1	1,493	262,706
Percent of magnetite		38.5	37.0	-4.0	1,384	262,706
V_2O_5	Grades in concentrate	0.59	0.59	-0.4	189	261,967
Fe_2O_3		91.5	90.7	-0.9	191	261,967
TiO_2		1.8	1.9	7.2	191	261,967
MgO		3.4	3.7	9.0	189	261,967
Al_2O_3		0.94	0.93	-0.8	189	261,967
SiO_2		4.1	4.4	7.2	189	261,967

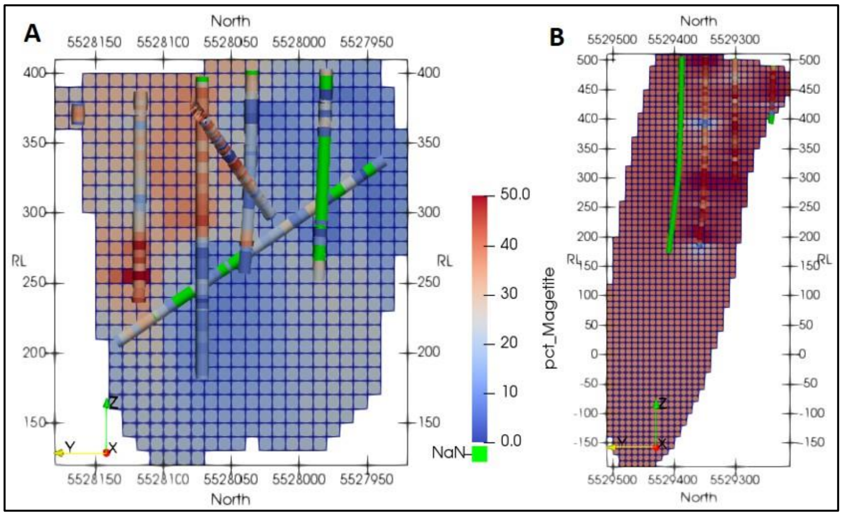

Figure 14-13: Visual validation in sections

A: South Zone section along E 543611 with percent of magnetite estimated in block model and in assay intervals.
B: North Zone section along E 563097 with percent of magnetite estimated in block model and in assay intervals.

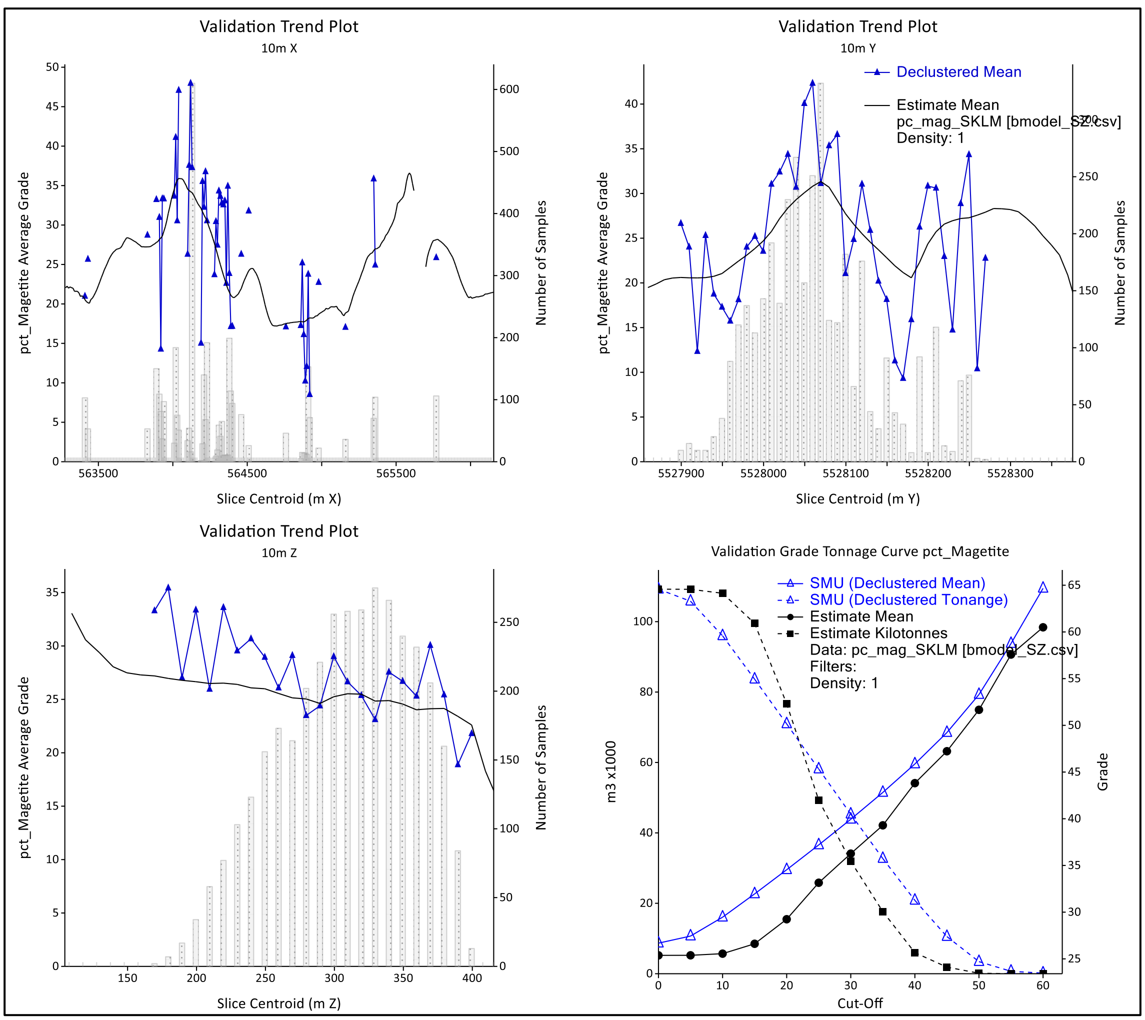

Figure 14-14: Swath plots (top row and below left) and global change of support (below right) of percent of magnetite estimate in the South Zone

14.12 Mineral Resource Classification

14.12.1 Reasonable Prospects for Eventual Economic Extraction

The aim of this Project is to produce a saleable magnetite concentrate, with potential bonus value added from the vanadium (V_2O_5) content of the concentrate. In order to assess reasonable prospects of eventual economic extraction, the following assumptions were made (see Section 24 for more information):

- The magnetite concentrate is assumed to be 65% Fe (93% Fe_2O_3) and is assumed to be saleable at US$90/dmt
- The assumed price of V_2O_5 is US$30,864.68/t (US$14/lb)
- It is assumed that VONE will realize 50% of the value of the V_2O_5 value contained in the concentrate; i.e. US$15,432.34/t (US$7/lb)
- The cost of mining and milling mineralized material is assumed to be US$ 13.80/t
- The assumed cost of transporting the concentrate from site to the buyer (assumed to be in Asia) is US$40/t
- There is an assumed cost of US$1.5/t for disposal of tailings.

It is assumed that the extraction will be via an open pit mine, and the assumptions above were used to derive theoretical pit shells for both the North Zone and the South Zone; however, for both deposits the entire unconstrained block model fell within the theoretical pits. This means that for both deposits all mineralization falls within pits shells derived using the price and cost assumptions above. No assessment of environmental constraints on potential pits (e.g. the proximity to the nearby lake) has been carried out.

Figure 14-15 shows a comparison of the cost of mining one metric tonne of material and its assumed value for different averages grade of V_2O_5 in the concentrate. If V_2O_5 grade in the concentrate is zero or is not considered, the head grade cut-off could be approximately 30% magnetite, or around 32–34% Fe_2O_3 (22–24% Fe), as per regression formulas that are shown in Figure 14-1. However, the average grade of V_2O_5 in the concentrate is between 0.5% and 0.6%, and usually over 0.2% (Figure 14-16, Table 14-3 and Table 14-4). This allows for a cut-off as low as 10–20% magnetite, which is equivalent to 15–27% Fe_2O_3 (or 10–19% Fe).

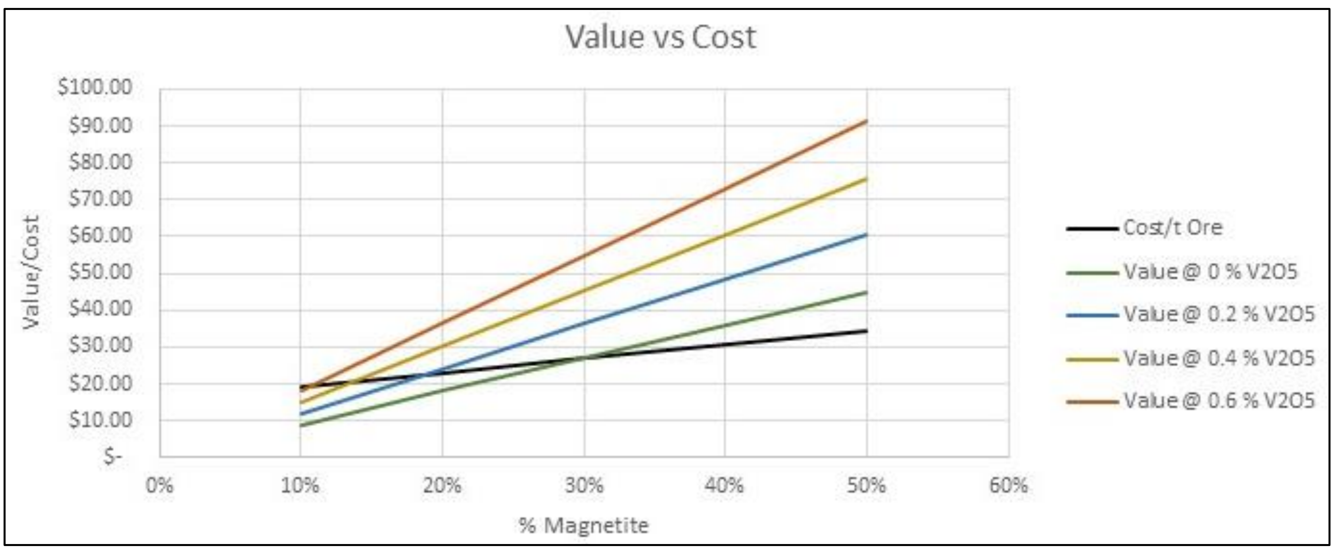

Figure 14-15: Value vs cost of the one tonne of material as a function of the percentage of magnetite, assuming different average grades of V_2O_5

A head grade of 20% Fe_2O_3 (or 14% Fe) was selected as the reference cut-off for resource reporting, assuming a minimum V_2O_5 grade in the concentrate of 0.2%. This cut-off value is also close to the value at which the V_2O_5 recovery to the concentrate begins to decline (Figure 11-2, Section 11.3.1).

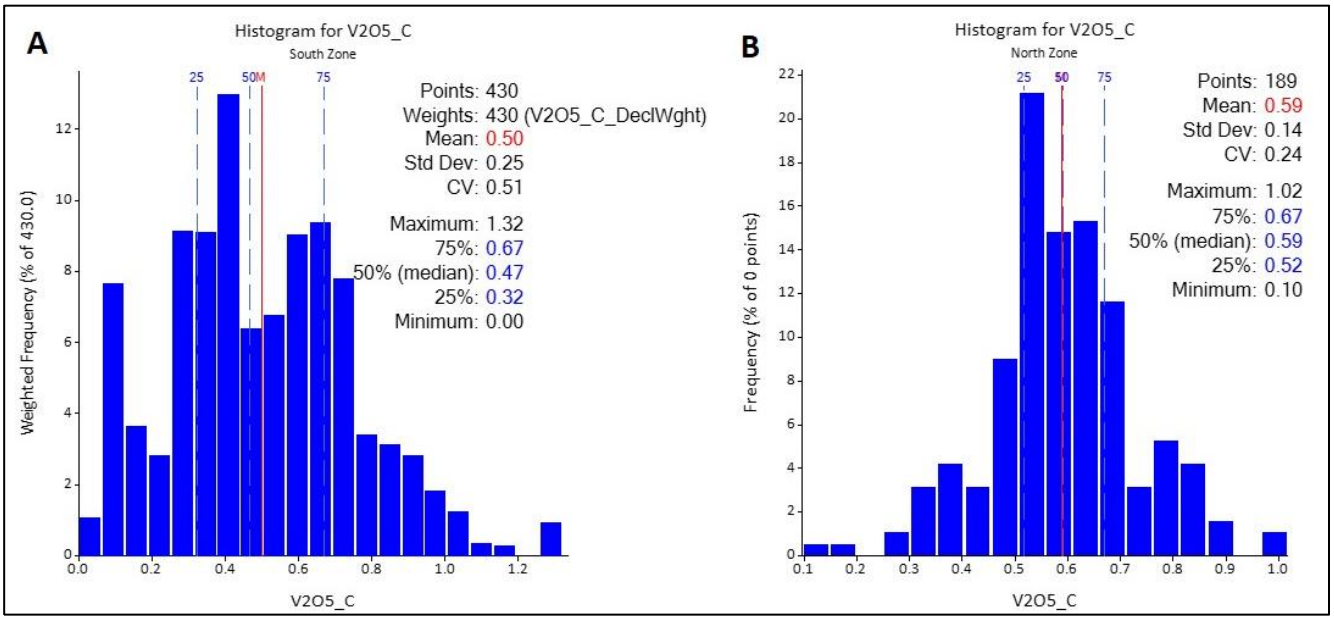

Figure 14-16: Histograms of V_2O_5 calculated in 20 m composites for the South Zone (A) and North Zone (B)

14.13 Mineral Resource Reporting

The resource classification definitions used for this estimate are in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves (CIM Council, 10 May 2014). Only Mineral Resources are estimated – no Mineral Reserves are defined.

Mineral Resources in areas with drillhole spacing between 400 m and 200 m were classified as Inferred Resources. Areas with drillhole spacing between 200 m and 100 m, and mostly drilled in recent campaigns, were classified as Indicated Resources. Blocks located more than 50–70 m below drilling were not classified. Blocks without interpolated values of percent of magnetite, Fe_2O_3 head grade, or V_2O_5 in the concentrate were not classified.

As all modelled blocks fell within theoretical pit shells, the maximum depths of the reported Mineral Resources have been manually constrained using classification polygons manually digitized along drillhole sections. For the North Zone, resources were cut at a maximum of 50–70 m below the deepest drilled 1963–1974 interval but cut at the deepest intersection of 2013–2018 drilling (i.e. no resources were estimated below the deepest intersection for the North Zone (Figure 14-17A). For the South Zone, resources were cut at a maximum of 50–70 m below the deepest drilled interval (Figure 14-17B). The maximum depths below surface for reported resources are 500 m in the North Zone and 310 m in the South Zone.

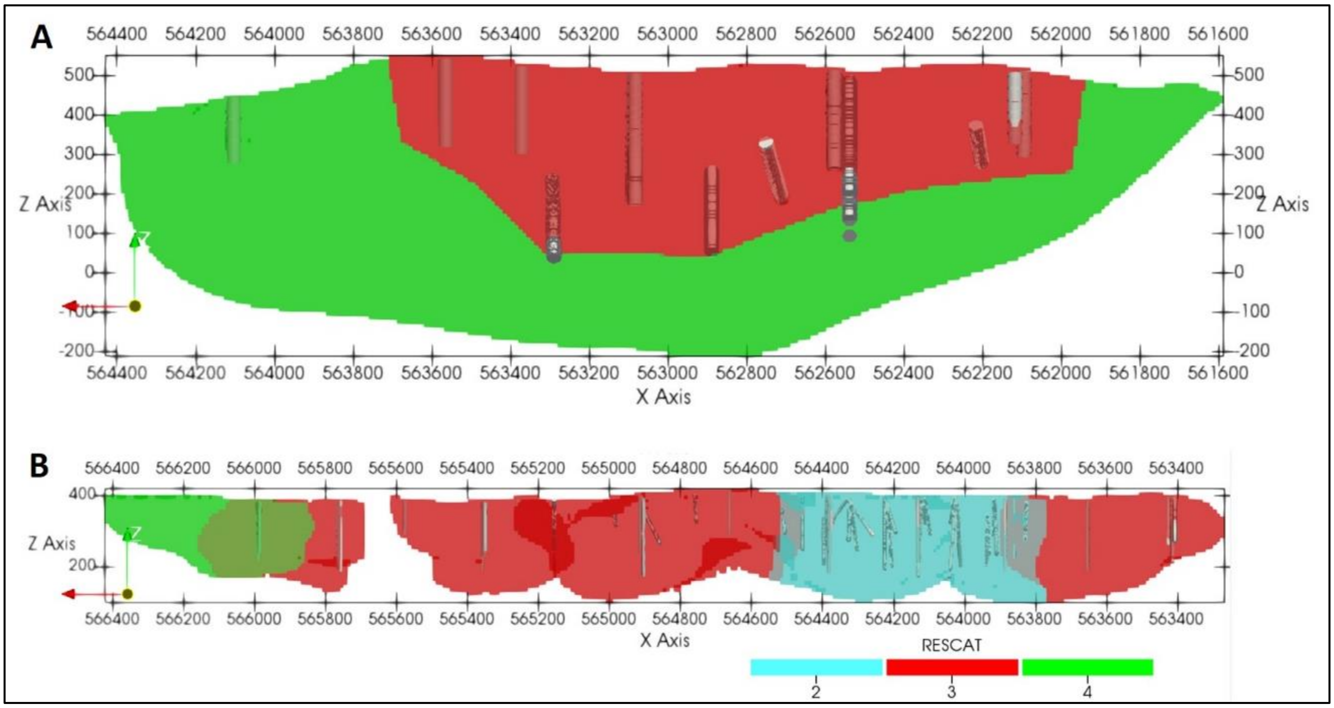

Figure 14-17: Longitudinal sections through both the North Zone (A) and South Zone (B), looking south

Note: Red blocks (RESCAT=3) are Inferred, blue blocks (RESCAT=2) are Indicated, green blocks (RESCAT=4) are unclassified (i.e. excluded).

Mineral Resources reported over a cut-off of 20% Fe_2O_3 head grade (or 14% Fe) is shown in Table 14-5. A sensitivity analysis for different cut-off grades is shown in Table 14-6 and Figure 14-18.

Table 14-5: MRE for the Mont Sorcier Project effective 23 April 2019; cut-off grade is 20% Fe_2O_3 (14% Fe)

Zone	Category*	Tonnage		Head grade		Grade in concentrate					
		Rock (Mt)	Concentrate (Mt)	Fe (%)	Magnetite (%)	Fe (%)	V_2O_5 (%)	Al_2O_3 (%)	TiO_2 (%)	MgO (%)	SiO_2 (%)
South	Indicated	113.5	35.0	22.7	30.9	65.3	0.6	0.3	1.2	3.8	2.8
	Inferred	144.6	36.1	20.2	24.9	66.9	0.5	0.4	1.0	3.4	2.5
North	Inferred	376.0	142.2	27.4	37.8	63.7	0.6	1.0	1.8	3.5	4.2
TOTAL	**Indicated**	**113.5**	**35.0**	**22.7**	**30.9**	**65.3**	**0.6**	**0.3**	**1.2**	**3.8**	**2.8**
	Inferred	**520.6**	**178.3**	**25.4**	**34.2**	**64.4**	**0.6**	**0.8**	**1.7**	**3.5**	**3.9**

Notes:

1. *Numbers have been rounded to reflect the precision of Inferred and Indicated MREs.*
2. *The reporting cut-off was calculated for a saleable magnetite concentrate containing 65% Fe with price of US$90/t of dry concentrate, 50% of the price of V_2O_5 contained in the concentrate, a V_2O_5 price of US$14/lb, a minimum of 0.2% of V_2O_5 contained in the concentrate, an open pit mining operation, a cost of mining and milling feed mineralization of US$13.80/t, a cost of transporting concentrate of US$40/t; and a cost of tailing disposal of US$1.5/t.*
3. *The QP and VONE are not aware of any current environmental, permitting, legal, title, taxation, socio-economic, marketing or political factors that might materially affect these MREs.*
4. *Resource classification, as defined by the Canadian Institute of Mining, Metallurgy and Petroleum in their document "CIM Definition Standards for Mineral Resources and Mineral Reserves" of 10 May 2014.*
5. *Mineral Resources are not Mineral Reserves and by definition do not demonstrate economic viability. This MRE includes inferred Mineral Resources that are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.*

Table 14-6: Grade-tonnage sensitivity

Zone	Category	Cut-off		Tonnage		Head grade		Grade in concentrate					
		Fe_2O_3 (%)	Fe (%)	Rock (Mt)	Conc. (Mt)	Fe (%)	Mag (%)	Fe (%)	V_2O_5 (%)	Al_2O_3 (%)	TiO_2 (%)	MgO (%)	SiO_2 (%)
South Zone	Indicated	10	7.0	124.3	36.6	21.8	29.4	65.3	0.6	0.3	1.2	3.8	2.8
		15	10.5	123.2	36.5	21.9	29.6	65.3	0.6	0.3	1.2	3.8	2.8
		20	14.0	113.5	35.0	22.7	30.9	65.3	0.6	0.3	1.2	3.8	2.8
		25	17.5	91.6	30.7	24.3	33.5	65.2	0.6	0.3	1.2	3.8	2.8
		30	21.0	68.7	24.9	26.0	36.2	65.1	0.6	0.4	1.2	3.8	2.8
	Inferred	10	7.0	167.3	39.1	19.1	23.4	66.8	0.5	0.3	1.0	3.4	2.5
		15	10.5	164.0	38.8	19.3	23.7	66.8	0.5	0.4	1.0	3.4	2.5
		20	14.0	144.6	36.1	20.2	24.9	66.9	0.5	0.4	1.0	3.4	2.5
		25	17.5	95.7	26.8	22.4	28.1	67.2	0.5	0.4	1.0	3.4	2.3
		30	21.0	54.8	17.5	24.8	32.0	67.4	0.6	0.3	0.9	3.3	2.1
North Zone	Inferred	10	7.0	376.2	142.2	27.4	37.8	63.7	0.6	1.0	1.8	3.5	4.2
		15	10.5	376.1	142.2	27.4	37.8	63.7	0.6	1.0	1.8	3.5	4.2
		20	14.0	376.0	142.2	27.4	37.8	63.7	0.6	1.0	1.8	3.5	4.2
		25	17.5	375.4	142.1	27.4	37.9	63.7	0.6	1.0	1.8	3.5	4.2
		30	21.0	371.3	141.2	27.5	38.0	63.7	0.6	1.0	1.8	3.5	4.2
TOTAL	**Indicated**	**10**	**7.0**	**124.3**	**36.6**	**21.8**	**29.4**	**65.3**	**0.6**	**0.3**	**1.2**	**3.8**	**2.8**
		15	**10.5**	**123.2**	**36.5**	**21.9**	**29.6**	**65.3**	**0.6**	**0.3**	**1.2**	**3.8**	**2.8**
		20	**14.0**	**113.5**	**35.0**	**22.7**	**30.9**	**65.3**	**0.6**	**0.3**	**1.2**	**3.8**	**2.8**
		25	**17.5**	**91.6**	**30.7**	**24.3**	**33.5**	**65.2**	**0.6**	**0.3**	**1.2**	**3.8**	**2.8**
		30	**21.0**	**68.7**	**24.9**	**26.0**	**36.2**	**65.1**	**0.6**	**0.4**	**1.2**	**3.8**	**2.8**
	Inferred	**10**	**7.0**	**543.5**	**181.4**	**24.8**	**33.4**	**64.4**	**0.6**	**0.8**	**1.6**	**3.5**	**3.9**
		15	**10.5**	**540.2**	**181.0**	**24.9**	**33.5**	**64.4**	**0.6**	**0.8**	**1.6**	**3.5**	**3.9**
		20	**14.0**	**520.6**	**178.3**	**25.4**	**34.2**	**64.4**	**0.6**	**0.8**	**1.7**	**3.5**	**3.9**
		25	**17.5**	**471.1**	**169.0**	**26.4**	**35.9**	**64.3**	**0.6**	**0.9**	**1.7**	**3.5**	**3.9**
		30	**21.0**	**426.1**	**158.7**	**27.2**	**37.2**	**64.2**	**0.6**	**0.9**	**1.7**	**3.5**	**4.0**

Note: The preferred (base-case) cut-off grade is 20% Fe_2O_3 (14% Fe) and has been highlighted in the table.

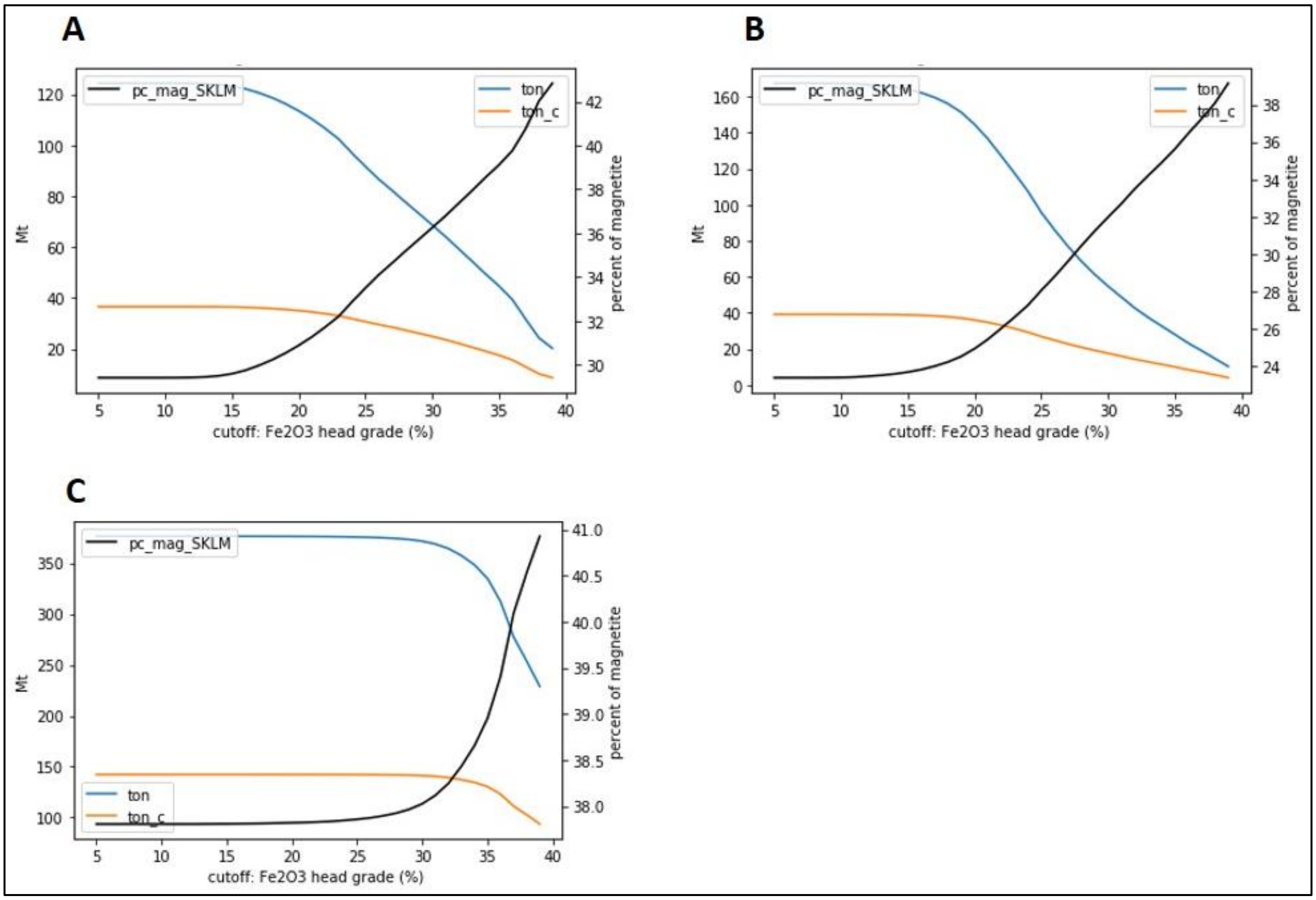

Figure 14-18: Grade-tonnage curves (A: SZ "Indicated"; B: SZ "Inferred"; C: NZ "Inferred")

14.14 Previous Mineral Resource Estimates

There is no previous MRE for the Property reported in accordance with NI 43-101. However, the Ministère de l'Énergie et des Ressources Naturelles of Québec published a 1975 report where historical, non-compliant reserves estimated by Campbell Chibougamau Mines Ltd for both the South Zone and North Zone are reported. These reserves were estimated with a cut-off of 17.0% Fe (or 24.3% Fe_2O_3), using polygonal methods and excluding polygons (or blocks) with 1.75% TiO_2 in the concentrate. The informing data used to produce this estimate were composites created from core assay with Fe head grade over 15%. The total reserves reported were 102.1 Mt and 171.6 Mt, with 67.7% Fe and 66.1% Fe, and 0.68% V_2O_5 and 0.57% V_2O_5 in the concentrate, for the South Zone and North Zone, respectively. These reserves are considered historical in nature and were classified using categories other than the ones set out in Sections 1.2 and 1.3 of the NI 43-101 of 9 May 2016. A Qualified Person has not done the work necessary to verify the historical estimates as current estimates under NI 43-101 and as such they should not be relied upon. The authors, CSA Global and VONE are not treating the historical estimates as current Mineral Resources or Mineral Reserves and are instead presented for informational purposes only.

The author compared sections reported by Campbell Chibougamau Mines Ltd with drillhole data and block model, as shown in Figure 14-19, in order to understand differences with previous resources and reserve estimates. This comparison clearly shows that the main difference is in volume of the material reported. The historical resources are more restrictive and were heavily constrained at depth. Recent drilling has extended the known depths of mineralization substantially deeper than the historical drilling, but still within the limits of a theoretical pit shell as per the assumptions defined in Section 14.12.1.

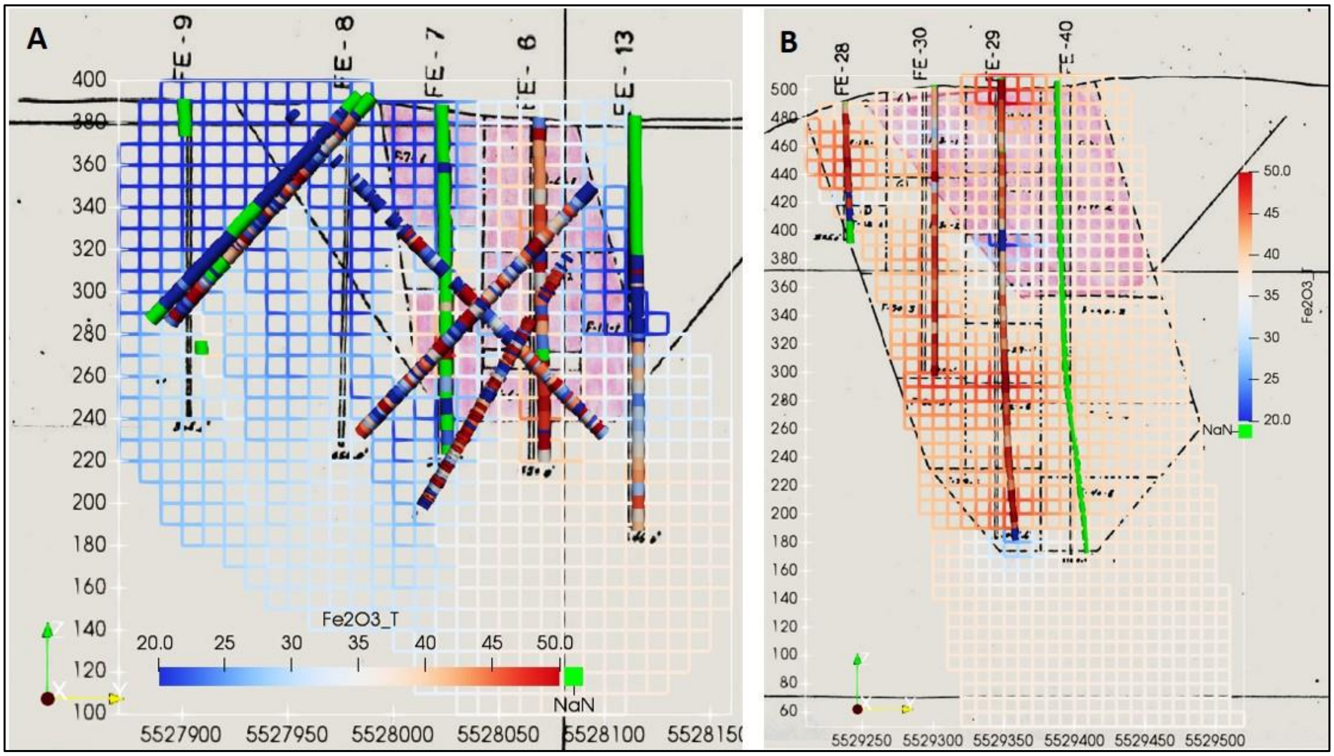

Figure 14-19: Comparison of historical reserves (hand-drawing background), the block models, and drillhole data, coloured by Fe_2O_3

A: Section E 563887 of the South Zone; B: Section E 563083 of the North Zone.

15 Mineral Reserve Estimates

This section is not applicable to the current report.

16 Mining Methods

Mont Sorcier is modelled to be mined using traditional truck and loader open pit mining methods, focusing on extraction of magnetite mineralized material and waste materials. During its life, two mining areas will be developed – a large open pit on the north side of the mine and a smaller pit to the south. The south mining area may operate up to four distinct open pits:

- South Main (the largest of the south area pits)
- South 1, 2 and 3 (relatively small pits to the east of the South Main pit).

The mine will need to support a processing plant with nominal output of 5 Mtpa of dry concentrate. The plant recovery will depend on quality of mineralized material and concentration of the primary mineral – magnetite. Based on an average magnetite concentration in the mineralized material, it is expected the pits will deliver up to 15 Mtpa of mineralized material on average. The waste mining will be on average at about 13 Mtpa, with the maximum currently predicted not to exceed 45 Mtpa. This combined with relatively low waste to mineralized material strip ratio, would allow for bulk mining of both waste and mineralized material.

The material is mostly fresh and therefore drilling and blasting will need to sufficiently fragment the rock to allow for efficient loading and hauling of rock from the pits. The near vertical dip of the mineralization is in favour of a simple bulk mining operation. It is expected that the dilution and mineralized material loss during blasting and loading will be minimal.

The planned main production fleet would consist of two large excavators and a wheel loader, waste and mineralized material hauling would require up to 14 large haul trucks. Purchase of equipment is spread over a number of years, in line with the mine production schedule. Table 16-1 lists the primary mine production equipment.

Table 16-1: Primary heavy mobile equipment list

Pit production equipment	Fleet no.
Hydraulic Excavators/Face Shovels	2
Wheel Loader – pit and dump	1
Wheel Loaders – rail only	2
Mining Trucks	14
Track Dozers – D9	3
Wheel Dozer – 10.1 m^3 SU blade	1
Motor Graders – large blade	2
Water Trucks – 20,000 gallons	2
Hydraulic Excavators – 49 t	2
Production Drills – 203 mm holes	6
Auxiliary Drills – 140 mm holes	2
Impact Breaker	1
Utility Wheel Loaders – stemming	2
Utility Articulated Dump Trucks – stemming	2

The primary mining equipment would require a number of support or auxiliary equipment to support pit operation and maintenance of equipment, roads, dewatering, fleet management, lighting and carry the workforce from the town and around the production areas. Table 16-2 lists the ancillary and support transport equipment.

Table 16-2: Ancillary and support equipment list

Ancillary and support equipment	Fleet no.
Mechanic Service Trucks	2
Integrated Tool Carrier	2
Tire Service Truck	1
Fuel and Lube Trucks	2
Dispatch System	1
Lowboy Trailer – 150 ton	1
Lowboy Tractor Head	1
Pit Busses	2
Pickup Trucks	20
Portable Lighting Plants	8
Excavator w/Impact Hammer	1
Pit Sump Pumps	TBA

16.1 Pit Optimization

The pit optimization and PEA-level mining schedules were prepared using Geovia's Whittle software ("Whittle").

16.1.1 Pit Optimization Parameters

Optimization parameters are divided into a number of groups related to various aspects of the pit optimization process and software project set-up.

The Mont Sorcier deposit will be mined with a traditional drill and blast and truck and loader (shovel or excavator) mining method. The plant would process mineralized material feed with wet magnetic separation to produce vanadium-enriched magnetite concentrate. The concentrate would be loaded and railed to the Port of Saguenay, Québec, Canada. From there, the concentrate would be stored, loaded and shipped to the market, assumed to be a China based steel producer.

The block model has been converted from the original proportional to a sub-celled model, to enable the Whittle software to import and convert into the format employed internally by the software. The model framework and block size are detailed in Table 16-3.

Table 16-3: Block model framework dimensions

Category	Item	Unit	Cost/Parameter
Block model (CSA Global Geology)	Model name	bmodel.csv	
	Software used	PyGSLIB	
	Model author	Adrian Martinez Vargas	
		Minimum	**Maximum**
	Easting (X)	561,270	566,830
	Northing (Y)	5,527,300	5,530,200
	RL (Z)	-210.0	560.0
	Block size (X)	10.0	10.0
	Block size (Y)	10.0	10.0
	Block size (Z)	10.0	10.0
	Model rotation (°)	0.00	

Pit optimization derives the size of the open pit from physical (block model) and economic parameters. The most significant economic parameter is the product price VONE can realize through a fixed contract or on an open market. The price for the concentrate, including vanadium credits, was sourced from a desktop marketing study (see Section 19 Market Studies). The estimate of concentrate market value is in Table 16-4.

Table 16-4: Concentrate market price estimate

Category	Item	Unit	Cost/Parameter
Financial (Client)	Metal price for iron concentrate (62%/65% Fe, +V_2O_5 credit, FOB Canada)	C$/dmt	$141.0
	Price for vanadium (V_2O_5)	C$/lb	(included in above)
	Payability for iron in concentrate	%	100%
	Payability for V_2O_5 in concentrate	%	100%
	Iron and V_2O_5 royalties	%	3.0%
	Total royalties estimate	C$/dmt	$4.23
	Equivalent net metal (product) price	C$/dmt	$136.7/t

Mining costs are driving the pit optimization to maintain stripping ratio (waste mining) of an outer-most pit shell in balance with revenue generated from the mineralized material. Some of the items – such as drilling and blasting cost, cost and price of fuel – are not detailed in the Table 16-5. The bulk mining method is expected to cause some dilution and mineralized material loss, for the purpose of this study, they were kept at around 5% each. Many of the parameters in the optimization study were adopted from similar operations (reports) from Canadian mines.

Table 16-5: Pit optimization mining costs and parameters

Category	Item	Unit	Cost/Parameter
Mining (CSA Global/Client)	Fixed mining costs	C$/t	N/A
	Mining cost base	C$/t	$2.29/t
	Depth incremental mining cost	C$/t/m depth	0.004
	Mining dilution	%	5.0%
	Mining mineralized material loss	%	5.3%
	Mining swell factor	%	25%
	As dumped main rock type density	t/LCM	2.06
	Minimum mining width	m	45
	Pushback sinking rate – vertical advance per annum	m/a	80
	Overall slope angle – Overburden	°	37.0
	Overall slope angle – Fresh	°	52.0

Many of the costs, usually associated with processing of mineralized material, were expressed in terms of value per tonne of concentrate, and therefore moved into the concentrate cost section. This included cost items such as General & Administration (G&A), Processing (includes Crushing, Milling, Concentrating, Labour, Reagents, Consumables, Maintenance, Power), Mining and Plant Sustaining Capital and Tailings disposal cost. As a result, the processing cost only includes ROM re-handling cost to the crushing plant (Table 16-6). The study further assumes that up to 75% of plant feed would be directly tipped to the crusher bin and only 25% would be re-handled at a cost of $0.75/t of mineralized material. The plant recovery is directly derived from and variable with the content of magnetite in mineralized material. It is anticipated that almost two-thirds of the plant feed will end up in the tailings storage facility (TSF).

Table 16-6: Plant processing parameters

Category	Item	Unit	Cost/Parameter
Processing (Client)	Direct feed proportion	%	75%
	Crusher feed to plant (re-handle)	C$/t feed	$0.75/t
	ROM re-handle per tonne of plant feed	C$/t feed	$0.19/t
	Mineralized material differential mining cost	C$/t feed	N/A
	Tailings as a fraction of plant feed	%	65%
	Total processing costs	**C$/t ROM feed**	**$0.19/t**
	Plant (mass) recovery	wt%	35.5%
	Magnetite recovery	%	as above
	V_2O_5 recovery	% Concentrate	50%
	Product moisture	To be added to dry product tonnage	10%

As mentioned earlier, many cost items were expressed in terms of $/t of concentrate and the last table (Table 16-7) is also the most important to drive the pit optimization process and discrimination between waste and plant feed material.

Table 16-7: Concentrate production costs

Category	Item	Unit	Cost/Parameter
Concentrate and Transport	Metals to be smelted	Iron and vanadium	At destination (China)
	OPEX costs for flotation circuit	C$/t concentrate	$0.00/t
	G&A costs	C$/t concentrate	$4.0/t
	Processing costs (includes Crushing, Milling, Concentrating, Labour, Reagents, Consumables, Maintenance, Power)	C$/t concentrate	$11.7/t
	Tailings Disposal cost	C$/t concentrate	$0.36/t
	Concentrate rehandle at rail head	C$/t concentrate	$0.81/t
	Concentrate by rail to port	C$/t concentrate	$17.34/t
	Loading and handling ($/t concentrate)	C$/t concentrate	$8.00/t
	Port and general infrastructure	C$/t concentrate	$1.75/t
	Concentrate shipment to China	C$/t concentrate	$27.20/t
	CN fuel surcharge	C$/t/km	$0.12/t
	CFR (China)	CFR (China)	$72.36/t
	Total Selling Cost (C$/t)	**C$/t concentrate (dry)**	$72.36/t

The other parameters are assisting in setting up scheduling parameters, Whittle software was used to schedule quantities in selected pit shells (see Table 16-8 below). Some of the assumption were defined in order to target and sustain plant production capacity and concentrate shipping quantity.

Table 16-8: Mine scheduling parameters and constraints

Category	Item	Unit	Cost/Parameter
Other (CSA Global +Client)	Mining rate	Dry Mtpa	as demanded
	Moisture content of mineralized material	Average moisture content	2.5%
	Dry SG	Average SG (same as block models)	3.30
	Wet SG	Wet SG at in-situ moisture	3.30
	Plant ramp-up year 1 only	Dry concentrate [Mtpa]	2.50
		Wet concentrate [Mtpa]	2.50
		Dry tonnes of mineralized material to plant	0.09
	Plant throughput (year 3 to LOM)	Dry concentrate [Mtpa]	5.00
		Wet concentrate [Mtpa]	5.00
		Dry tonnes of mineralized material to plant	0.18
	Mine to rail head distance	km	25.0
	Rail to port distance	km	360.0
	Discount rate	%	7.5%

Other constraints applied were a 15 m step-out from the lake high water mark to ensure south area pits do not cut into the lake. This distance may need to be reviewed once more information is available – impact of fractured rock for water leakage into the pit, wind and wave impact on pit limit, perhaps necessity to build a protective wall around the shoreline and even abandoning the area, if the risk of flooding may be too high.

- The North mineralized area had a cut-off grade applied (Fe_2O_3 >= 25%)
- The South area had no cut-off grade applied
- Both Indicated and Inferred Resource categories were considered as a potential source of mineralized material
- A Rock_ID field has been set-up to control optimization and enabled more detailed reporting (= "1000 +100*ZONE +RESCAT").

16.1.2 Pit Optimization Results

The graphical results of pit optimization of the North area (see Figure 16-1) and the South area (see Figure 16-2) are pictured below.

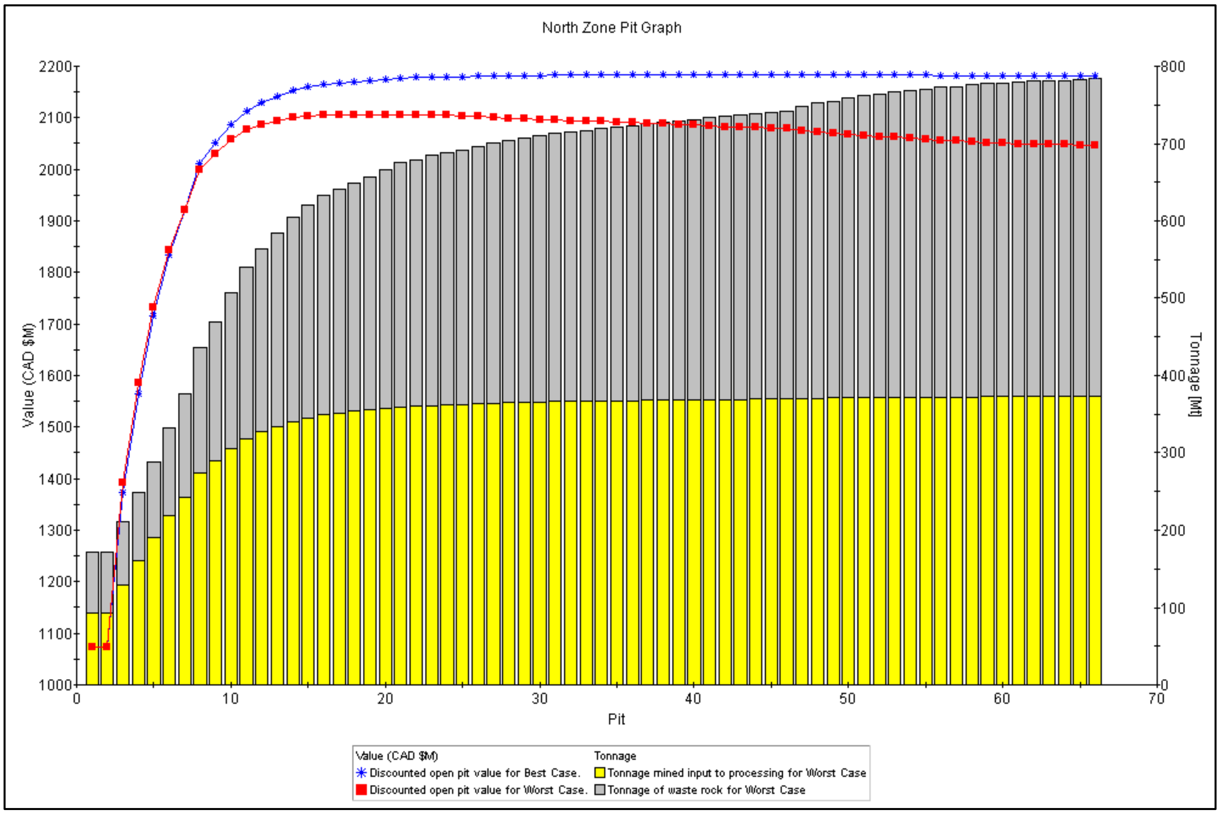

Figure 16-1: North Zone pit shells graph

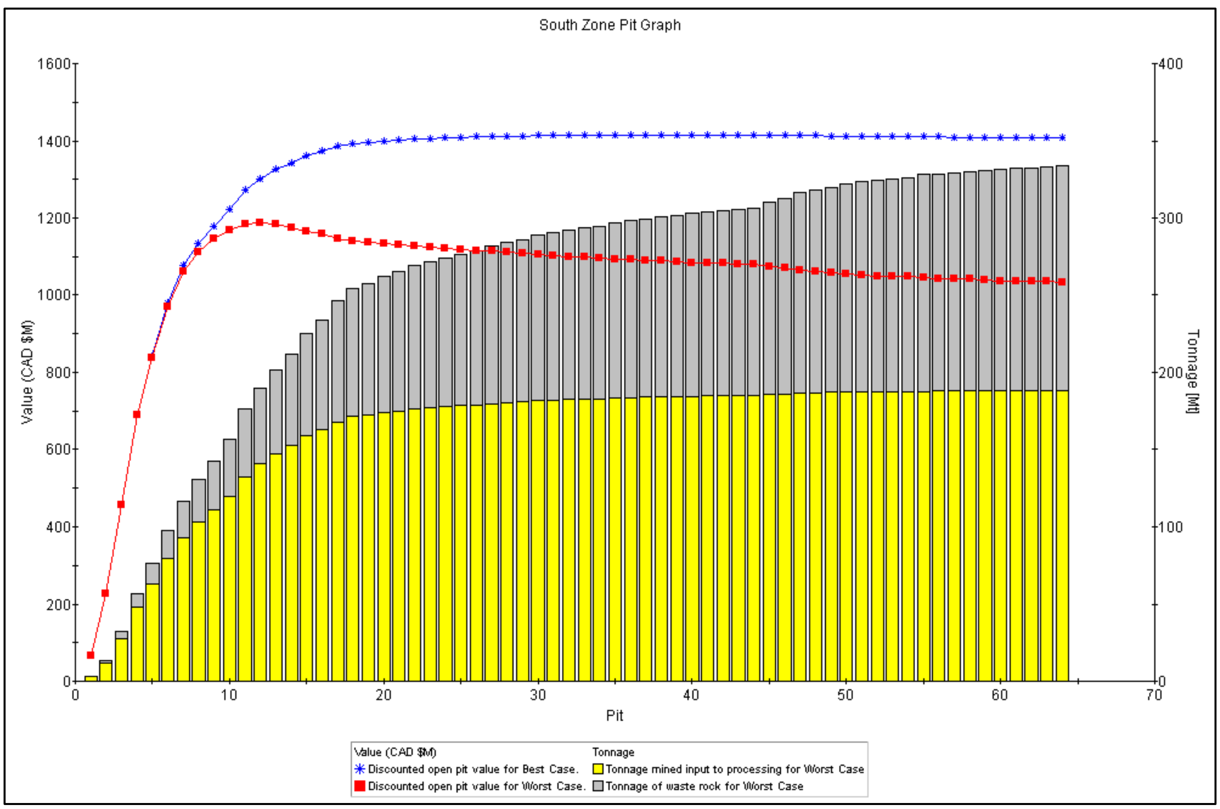

Figure 16-2: South Zone pit shells graph

Given the high proportion of Inferred Resources (especially in the North Zone), and the early stage of study a Revenue Factor (RF) 1.0 (the largest undiscounted cash flow), pit shells were selected for the scheduling and design stage. For the North Zone, the RF 1.0 pit shell was shell 46, while for the South Zone the selected pit shell was 44.

The selection of pit shells for pushbacks was driven by allocating approximately the same total tonnage between the individual pushbacks, allocating approximately eight benches lead between the pushbacks and maintaining maximum dropdown rate of eight benched (80 m vertical advance):

- North pushbacks to pit shells: 1, 4, 7, 12, 46
- South pushbacks to pit shells: 4, 8, 44.

16.1.3 Pit Optimization Schedules

The Milawa algorithm is a strategic scheduling tool which differs from most other scheduling software in that it is designed specifically for long term or strategic scheduling. It can operate in either NPV mode where it will seek to maximize NPV or balancing mode, where it will seek to maximize the use of production facilities during the life of the mine. In Mont Sorcier's case, Milawa Balanced mode was selected to produce a schedule that would demand a maximum of 35 Mtpa of total movement in the North Zone and 25 Mtpa in the South Zone, while producing the required 5 Mtpa of concentrate.

The schedule for the South Zone was produced first and the gaps (concentrate shortfalls) in the schedule were reflected in the set-up of period targets for magnetite metal production limits for the North Zone (see Table 16-9).

Table 16-9: Milawa scheduling setup (Mtpa)

	Period															
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**	**P10**	**P11**	**P12**	**P13**	**P14**	**P15**	**P16+**
South	2.5	5.0	5.0	5.0	5.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0
North					0.3	2.5	2.5	2.9	3.5	2.9	2.5	2.5	2.5	2.5	4.2	5.0
Limits	2.5	5.0	5.0	5.0	5.3	5.0	5.0	5.4	6.0	5.4	5.0	5.0	5.0	5.0	6.2	5.0

The scheduling has produced a 15-year schedule for the South Zone and 33-year LOM plan for the North Zone. The combined schedule ended up being a 37-year long plan. The visual description of individual and combined schedules can be seen in Figure 16-3 to Figure 16-5. The "area chart" in cyan represents quantity of concentrate produced (secondary Y axis), the yellow part of "stacked bar" chart represents tonnage of mineralized material into processing and the grey part, tonnage of waste mined. The total height of the bar chart represents the total material mined (excluding ROM re-handling or train loading).

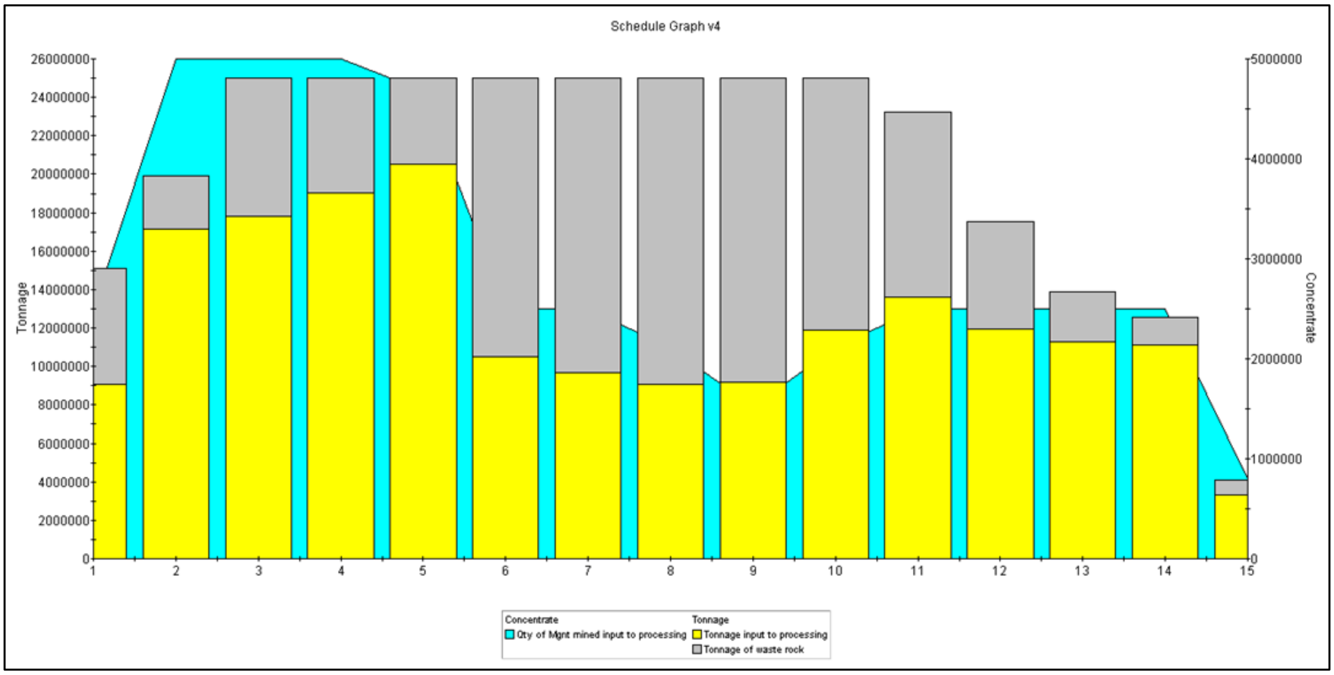

Figure 16-3: South Zone LOM schedule

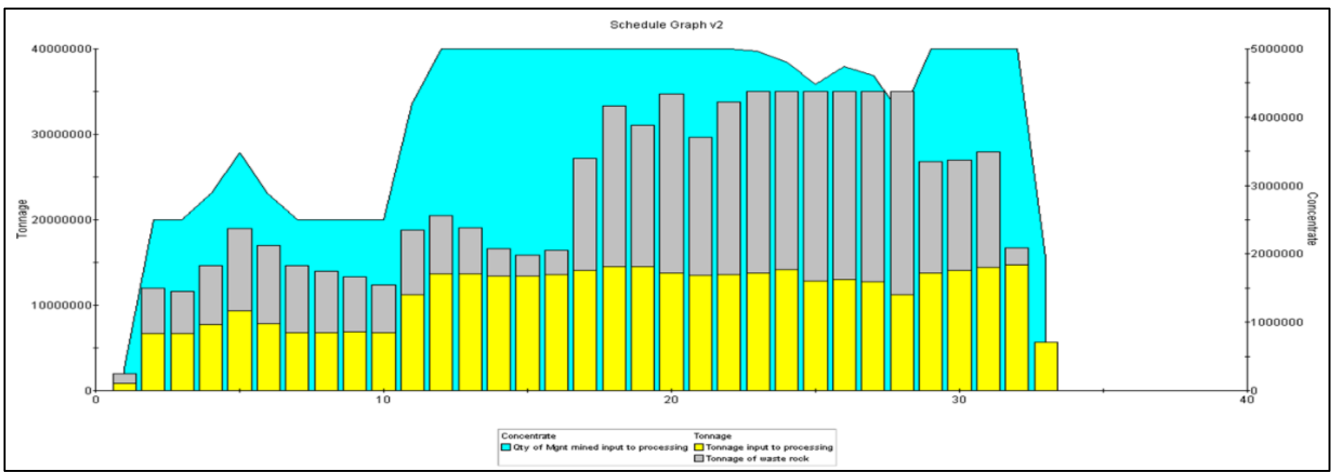

Figure 16-4: North Zone LOM schedule

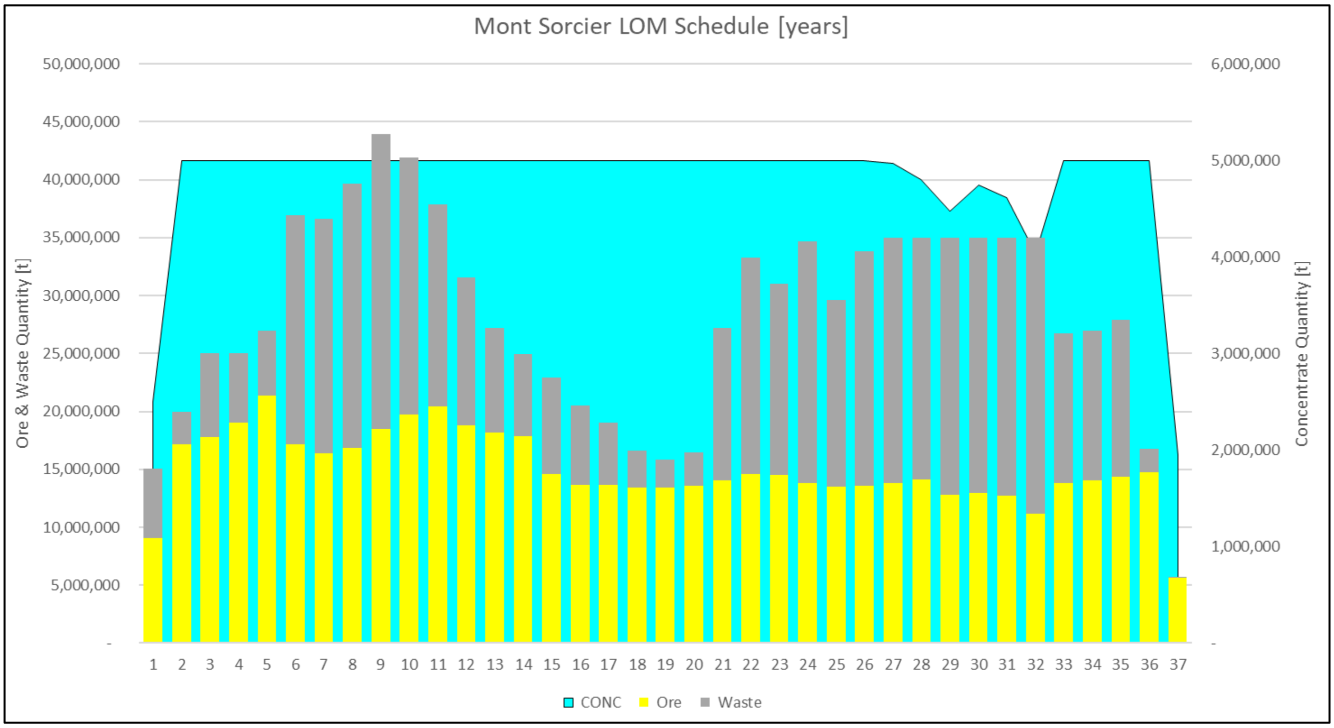

Figure 16-5: Combined LOM schedule

The average mining costs expressed in $/t of different material categories are presented in Table 16-10 below. The mining cost base rate is $2.29/t for all material mined (mineralized material and waste).

Table 16-10: Average LOM mining costs

Zone	$/t Mineralized Material	$/t All material mined	$/t Concentrate
North	4.60	2.29	12.76
South	3.95	2.38	16.81
Total	**4.32**	**2.29**	**13.55**

While the mining from the individual zones conformed to the mining limits imposed, the combined schedule has a peak demand between and including periods 6 to 11, of above 35 Mtpa. This can be smoothed further by a more aggressive pre-stripping in the first five years of the plan, or by deferring some waste mining to years after the period 11 (where possible, but this may affect mineralized material delivery rates later in the mine life) . Average annual total material mined (TMM) over the first 15 years is about 30 Mtpa.

After the South Zone is exhausted, the North Zone is already sufficiently stripped of waste that the TMM is manageable under the notional 35 Mtpa limit. The drop in concentrate production between years 28 and 33 suggest more stripping would be required to fill that gap. Alternatively, some build-up of ROM stockpile in the years 15 to 21 may help to cover for such a shortfall in later periods. A trade-off between stockpiling early or extra mining capacity later could be considered.

16.1.4 Scheduled Resource Categories

The North Zone pit contains only inferred resource. The mining plan has therefore considered the mining operations to start in the South Zone pit first to exploit as much of indicated resource as possible. Summary of plant feed by resource category is in the Table 16-11 below and the distribution of material by the resource category through the LOM is in the Figure 16-6.

Table 16-11: Summary tonnes in feed by resource category

Zone and resource category	Plant feed (t)
South Indicated	102,674,769
South Inferred	82,474,750
North Inferred	369,748,113
% Indicated in total	19%

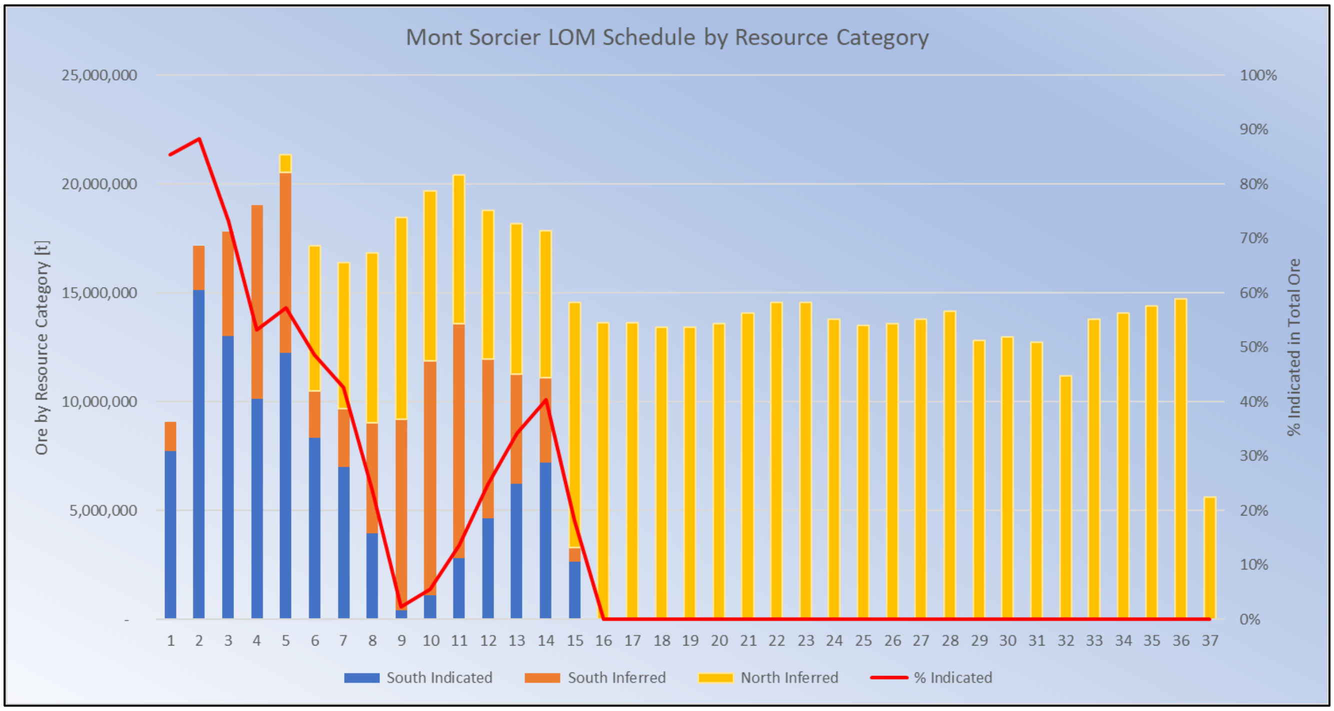

Figure 16-6: Plant feed by resource category in LOM schedule

16.2 Pit Design

Pit optimization has applied only inter-ramp angles (IRAs) of 52°, suggesting a smooth wall from the top of the pit crest to the toe of the pit. It is a normal practice to create horizontal ledges – catch berms, or bench berms – to arrest any loose rock that may otherwise gain great momentum during an almost free fall. The catch berms are inserted at each mining bench, or where the geotechnical parameters permit, at double or triple bench intervals (in our case – bench height being 10 m).

Two options were considered for Mont Sorcier (see Table 16-12):

Table 16-12: Pit wall geometry assumptions

Assumed for Mt Sorcier Option 1:				
IRA	52.0	degrees		<< 20m >>
BFA	75.0	degrees		
Berm W	10.3	meters	10.3 + 5.4	
Bench H	20.0	meters	<=== 15.6m ===>	
Double Bench Set-up				
Ramp W	33.0	meters		

Assumed for Mt Sorcier Option 2:				
IRA	52.0	degrees		<< 20m >>
BFA	80.0	degrees		
Berm W	12.1	meters	12.1 + 3.5	
Bench H	20.0	meters	<=== 15.6m ===>	
Double Bench Set-up				
Ramp W	33.0	meters		

Option 1 was selected, employing bench face angle (BFA) of 75°, bench (berm) width of 10.3 m and final wall bench height of 20 m. Bench width of 10 m is sufficient for a smaller dozer or an auxiliary excavator to clean-up debris and maintain sufficient berm width to capture any falling loose rock. Considering the harsh winter climate, ice expanding the cracks overnight with thawing during the day, may cause many rocks to dislodge and fill up the catch berm.

The second important parameter is ramp width, currently at 33 m wide for dual lanes allowing sufficient vehicle clearance and narrowing near the pit bottoms to a single lane. Additional details are in the Infrastructure section of this Report (see Section 18.2.1, page 127). The impact of haul roads on flattening of pit walls is difficult to predict and estimate in the early stages of project development such as at PEA level. The impact of ramps and geotechnical berms can be better incorporated into pit optimisation in later stages of the study – such as prefeasibility study and feasibility study.

The Mont Sorcier mining area requires the operation of five pits, two relatively large: North and South and three much smaller pits to the east of the main South pit.

The North Zone pit (see Figure 16-7) reaches the lowest level of 40 m (above sea level) using the full haul ramp width of 33 m. The main reason for allowing the full ramp width all the way to the bottom, is the width of the deposit at the pit bottom. The pit is almost 160 m wide. The pit crest is almost 5 km in length and the total area of the crest covers 126 ha. The pit crest elevation varies from just below 410 m to almost 550 m above sea level. The elevation of Lake Chibougamau is about 378 m above sea level for comparison.

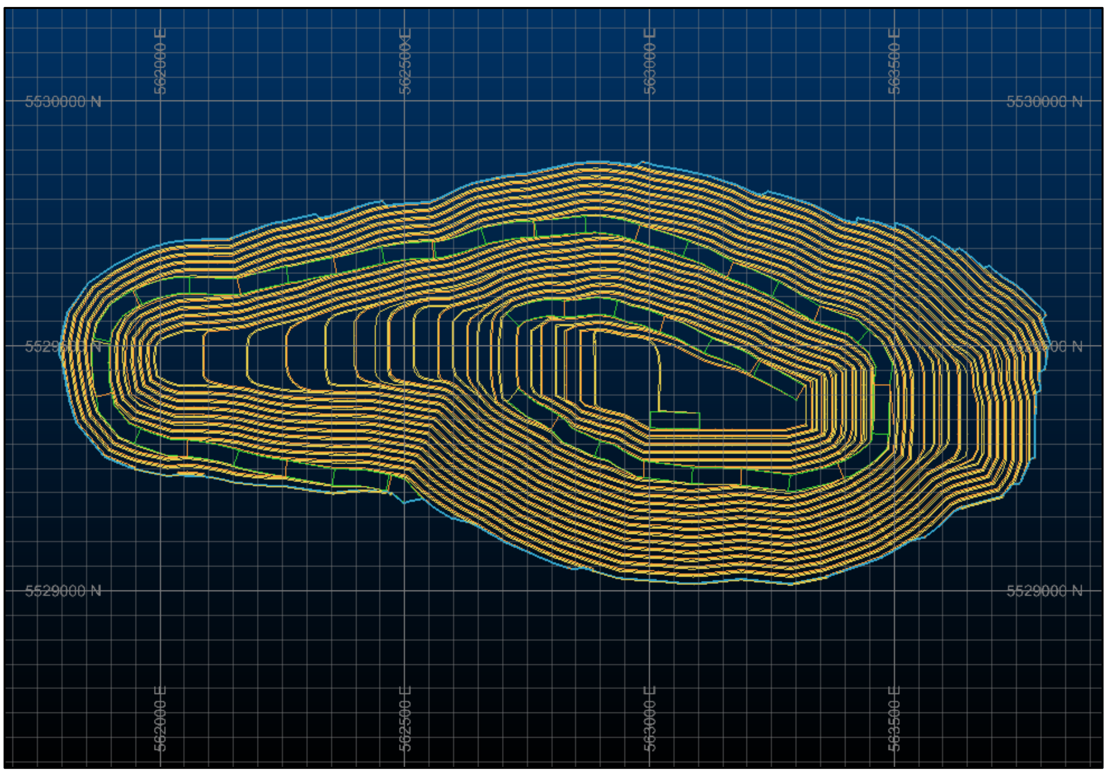

Figure 16-7: North Zone pit design

The South Zone pit (see Figure 16-8) is subdivided into two sections, one reaching the lowest level at 110 m above sea level and the second at 130 m above sea level. Due to the presence of the lake, the ramps were placed on the north side of the pit, flattening the overall slope to between 39° and 42.7° due to a number of ramp switchbacks. The western sub-pit is utilizing 15 m-wide ramps for the last 50 m vertical (at the bottom of the pit), then changing to full 33 m wide ramp. The eastern sub-pit has a 15 m-wide ramp for the last 30 m vertical (at the bottom of the pit), changing to full 33 m thereafter. The pit crest is also almost 5 km long and enclosing an area of 90 ha.

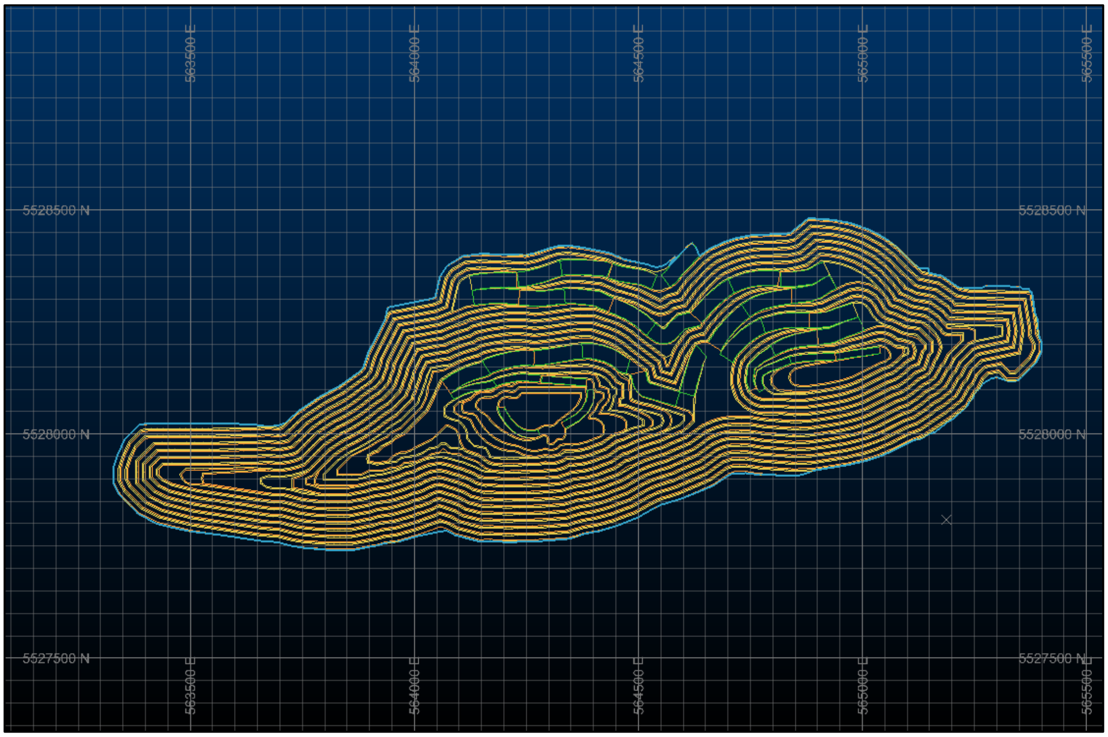

Figure 16-8: *South Zone pit design*

The closeness to the lake shore is evident from the combined picture of the North and South pits in Figure 16-9.

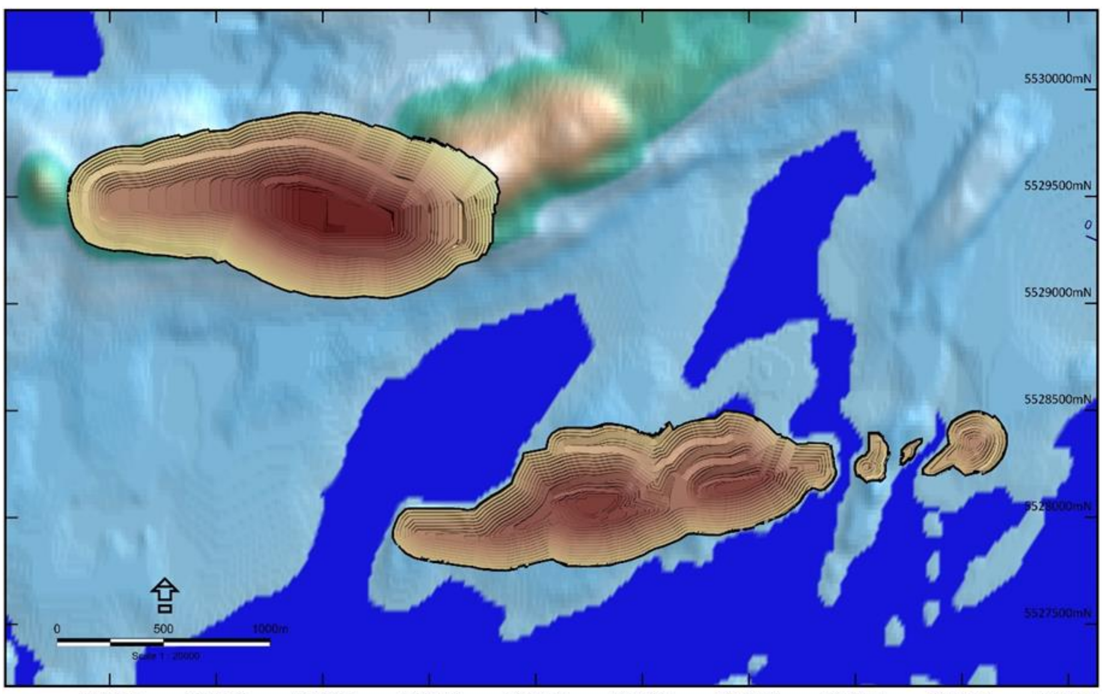

Figure 16-9: *Pit designs including the lake and area topography*

There are a further three small pits to the east of the main South pit (see Figure 16-10 and Figure 16-11). The pit optimization, using 52° slopes, combined with small block size (10 x 10 x 10 m^3), made it possible to include these as viable pit shells. The follow-up study should look at possible connection between the pits. Should it be possible to combine them into one or two, then it may be possible to mine them more efficiently. The current design relies on pit ramps of just 6 m and 12 m wide, which is not suitable for the large mining fleet selected. The pits can be excavated using smaller articulated dump trucks such as CAT 745 and a suitable excavator, perhaps towards the end of the Project's life. Should such equipment be available for the tailings storage construction, the pits can be excavated when the demand for the small fleet is low.

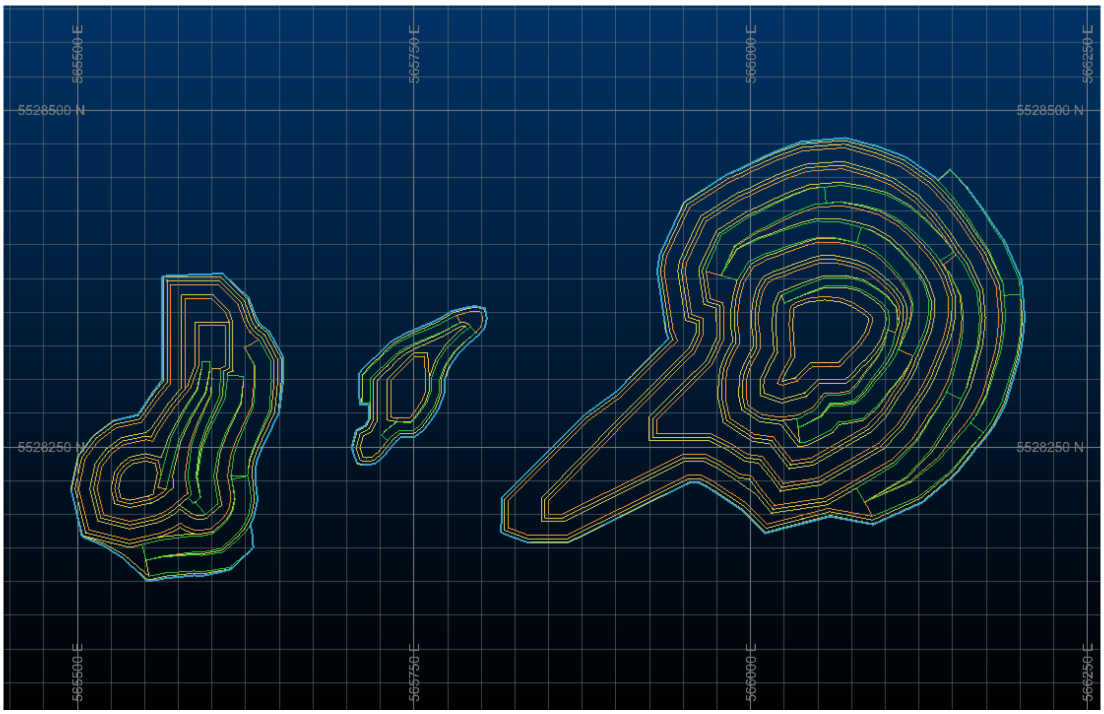

Figure 16-10: Three small pits east of South Main pit

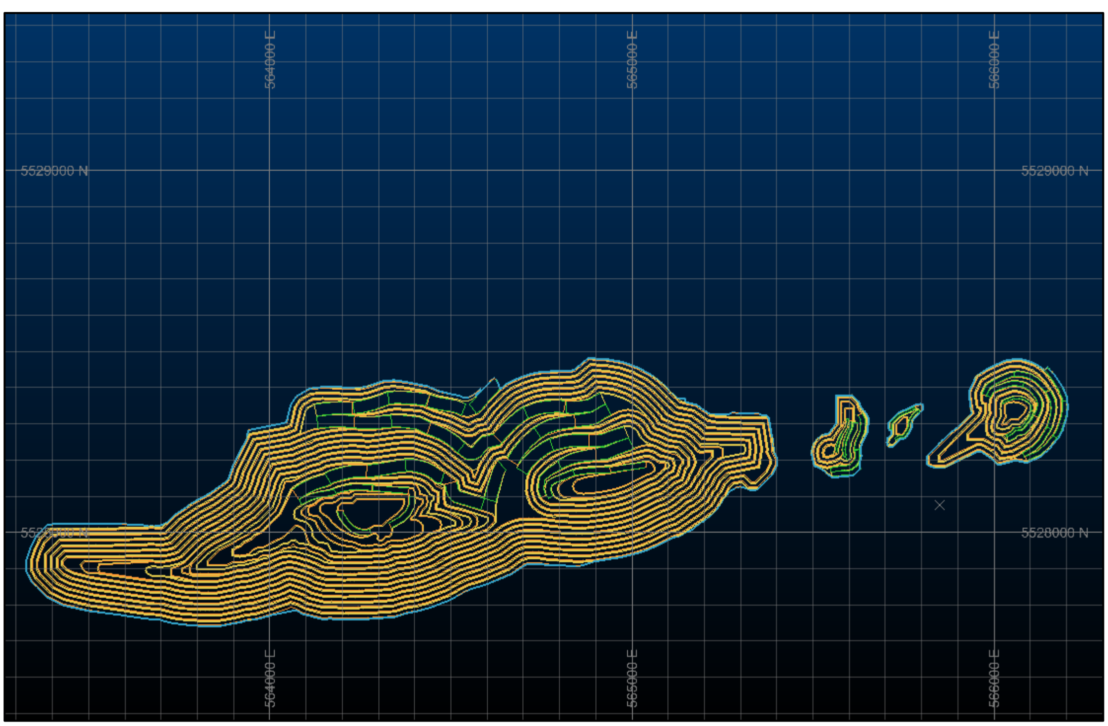

Figure 16-11: The three small pits and the South Main pit

The total volume and tonnage are different to what has been scheduled at the pit optimization stage, due to the impact of haul roads, their placement, more detailed pit slope definition as opposed to the pit-shell parameters (see Table 16-13).

Table 16-13: Volume and tonnes within designed pits

Zone	Pit design	Volume (m^3)	Tonnes (t)
North	North Main	269,532,048	811,455,189
South	South Main	117,217,739	342,692,132
	Three small pits	4,762,904	13,637,535
Total	**All pits**	**391,512,691**	**1,167,784,856**

16.3 Waste and Tailings Storage Capacity

Calculation of required storage capacities (Table 16-14) is based on simplified parameters, as follows:

- The waste-to-mineralized material ratio within the designed pits to be 1:1 (tonnage based)
- The rehabilitated waste dump slopes to be below 20° (1:3 slope)
- Maximum dump height not to exceed 100 m above the original topography
- Waste material, when transported to the waste dump, would have 25% swell factor applied
- The density of tails deposited to TSF would be at 1.6 t/m^3
- The TSF dam height to be 30 m maximum
- South Main pit can be filled with tails to the level of the lake – 378 m above sea level
- 67% of mineralized material will be stored in the TSF, 33% shipped as concentrate.

Table 16-14: Estimated TSF Requirements

AREA	Volume (m^3)	Tonnes (t)
North and South pits – total	391,512,691	1,167,784,856
Ex-pit waste to dump	195,756,346	583,892,428
Waste swelled at 25%	244,695,432	583,892,428
Ex-pit mineralization to plant	195,756,346	583,892,428
Tails to TSF at 67%	129,199,188	385,369,002
TSF storage required	244,504,954	385,369,002

The waste material will be stored in an above-ground dump, the volume to be designed needs to accommodate 244,695,432 m^3 of waste. At 100 m maximum dump height, and 1:3 dump side slopes, the dump footprint would cover an area of 2,000 x 2,000 m^2, or 400 ha.

Based on the parameters and the quantity of mineralized material produced, the total volume of tailings could be: 385,369,002 tonnes/1.6 (t/m^3) = 244,504,954 m^3. Considering that the South pit volume below the crest line of 378 m (the lake water level) can store 106,166,795 m^3, the remaining 138,338,159 m^3 (or 221,341,055 tonnes) of material will have to be stored in an external TSF. The external TSF, considering the dam wall to be on average 30 m high, would require 4,611,272 m^2 or 461 ha footprint.

Based on the assumptions above, the external TSF and the waste dump would in total require an area of 861 ha, if built independently of each other, and assuming no backfill of northern pit.

16.4 Mine Personnel Requirement

Based on the mine design work performed for the purposes of the PEA, it is expected that a total of 391 people will be required to operate the mine as per Table 16-15.

Table 16-15: Mine Personnel Requirement

Personnel by Function	No. of Personnel
Mining Operations Staff	46
Mining Operations Hourly	216
Maintenance - Staff	18
Maintenance - Hourly	111
Subtotal Staff	64
Subtotal Hourly	327
Total Mining Personnel	**391**

17 Recovery Methods

The various metallurgical test programs presented in Section 13 of this Report are the basis for the process design and the processing flowsheet proposed in this section with the respective design criteria, material and water balance, equipment selection and sizing. The design basis and criteria of the processing plant are presented together with the basic process description for each of the processing areas providing the basis for the processing plant and related capital and operating cost estimates.

17.1 Process Plant Design Basis (DB) and Process Design Criteria (PDC)

Table 17-1 summarizes the general parameters upon which the beneficiation plant (the concentrator) design have been based.

The process plant is designed to produce 5.0 Mtpa of magnetite concentrate over a 37-year mine life. The ROM is calculated based on a magnetite plant weight recovery of 45%.

A design factor of 20% is applied on nominal requirements to ensure that the process equipment has enough capacity to take care of the expected feed variation.

The process plant design is based on testwork performed to date (see Section 13), knowledge acquired in the processing of magnetite-rich deposits in the Iron Range in Northern USA and comparable projects in Eastern Canada.

The concentrator operates on a 365 days per year, 24 hours per day schedule with 80% crusher plant equipment utilization and 90% main concentrator area equipment utilization.

Concentrator feed is assumed to be 97% solid, including 3% of moisture content.

Table 17-1: Design criteria summary

Parameters	Value	Units
Concentrator – general		
Operating schedule		
Operating hours per day	24	hours
Annual operating days	365	days per year
Equipment utilization – main plant	90%	%
Annual operating time – main plant	7,884	hour per year
Equipment utilization – crushing	80%	%
Annual operating time – crushing	7,008	hours per year
Power requirements		
Concentrator power requirements (installed designed)	75,000	kW
Material characteristics		
Concentrator feed		
Magnetite (Fe_3O_4) grade	32.2	%
Vanadium (V_2O_5) grade	0.52	%
Solids %	97	%
Concentrator product		
Iron concentrate grade	66.5	%
Vanadium concentrate grade	0.68	%
Silica (SiO_2) grade	2.5	%
Concentrator production – nominal		
Crushing		
ROM (dry)	11,843,520	tonnes per annum
ROM (dry)	1,690	tonnes per hour
Concentrator		
Concentrator solids feed	11,826,000	tonnes per annum
Concentrator solids feed rate	1,500	tonnes per hour
Concentrate		
Solids concentrate production	5,321,700	tonnes per annum
Solids concentrate production rate	675	tonnes per hour
Concentrator weight recovery	45%	%

17.2 Process Flowsheet

A simplified block flow diagram of the concentrator is presented in Figure 17-1. The equipment list is based on the flowsheet diagrams and the equipment sizing is based on the mass balance (Table 17-2).

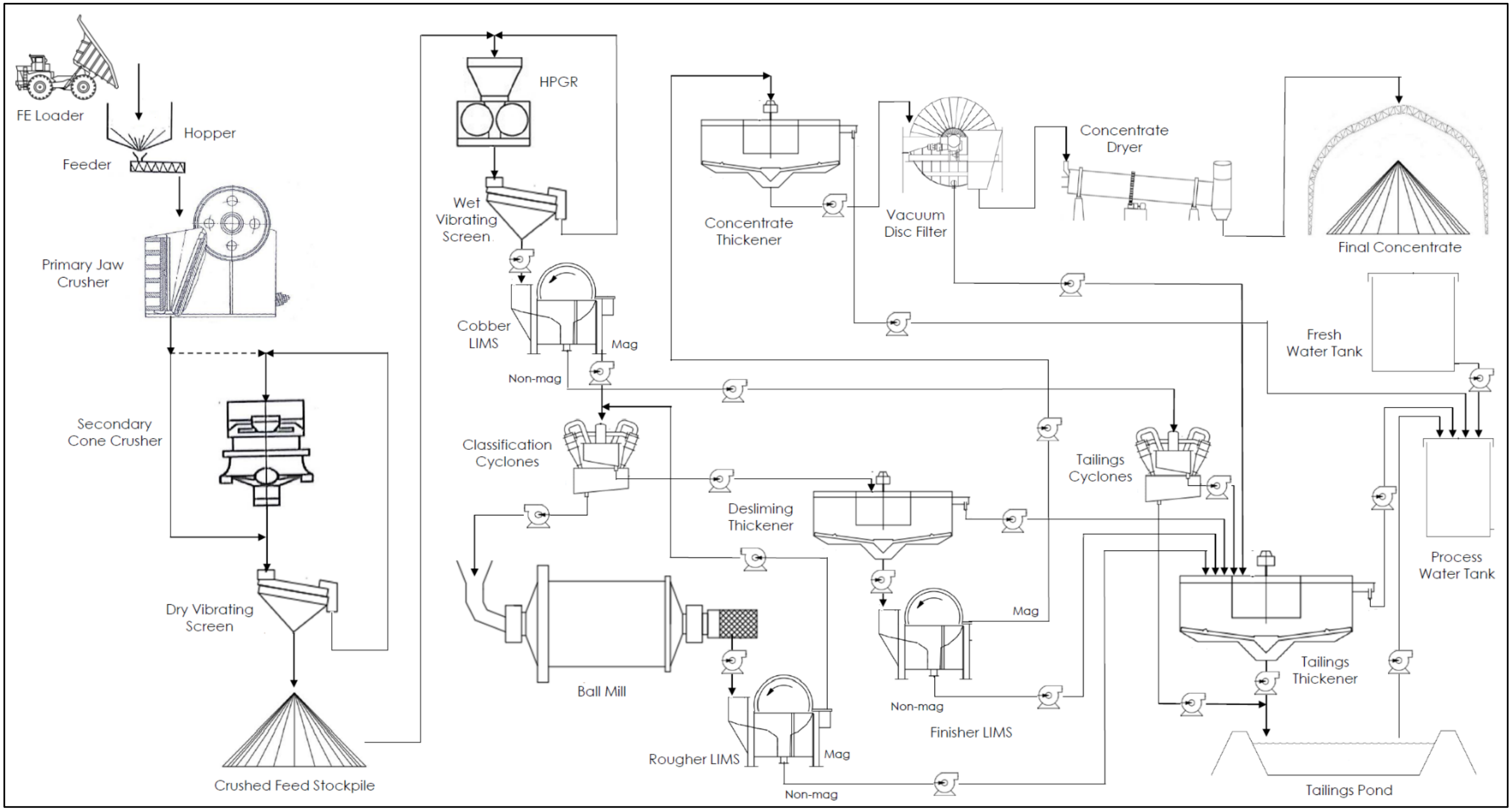

Figure 17-1: Concentrator block flow diagram

17.3 Material and Water Balance

A material (mass) and water balance summary for the concentrator is presented in Table 17-2.

Table 17-2: Concentrator mass balance (nominal) for magnetite concentrate production

Stream name	Solids (tph)	Slurry (tph)	Slurry (m^3/h)
Crushing and stockpiling			
ROM	1,800	1,856	-
Crusher scalping screen U/S	1,878	1,936	-
Crusher scalping screen O/S	1,690	1,742	-
Primary grinding			
Primary grinding mill fresh feed	1,690	1,742	-
Primary grinding mill product	3,651	3,803	-
Primary grinding Screen O/S	1,961	2,064	-
Primary grinding Screen U/S	1,690	1,878	-
Secondary grinding and magnetic separation			
Cobber LIMS feed	1,690	4,226	3,032
Cobber LIMS mag	1,116	1,716	902
Cobber LIMS non-mag	575	2,499	2,115
Classification cyclone U/F	948	2,107	1,475
Classification cyclone O/F	167	797	667
Ball Mill feed/product	948	2,371	1,654
Rougher LIMS mag	834	1,284	643
Rougher LIMS non-mag	100	1,001	926
Desliming thickener feed	1,015	2,901	2,160
Desliming thickener U/F	863	1,438	745
Desliming thickener O/F	152	1,463	1,463
Finisher LIMS mag	760	1,168	614
Finisher LIMS non-mag	104	450	381
Concentrate thickening and handling			
Final concentrate dewatering thickener feed	760	1,168	614
Final concentrate dewatering thickener O/F	0	-97	-97
Final concentrate dewatering thickener U/F	760	1,266	655
Dried concentrate	760	775	164
Final concentrate disc filter filtrate	0	16	16
Dryer vent	0	16	16
Tailings			
Tailings thickener feed	778	3,966	3,438
Tailings thickener O/F	0	2,798	2,798
Tailings thickener U/F	701	1,168	709

17.4 Process Description

An overview process description of the concentrator circuit based on the metallurgical testwork, design criteria and mass balance follows.

17.4.1 Crushing Area

The ROM mineralized material is hauled to the primary crushing area, where the trucks discharge directly (or from a crushing area feed stockpile by the means of front-end loader) into a hopper. The hopper discharges to the primary jaw crusher via a vibrating feeder. The crushed product is transported by conveyor to the secondary crushing area and into a cone crusher, which operates in a closed loop with a dry vibrating screening system. The screen oversize reports back to the cone crusher, while the screen undersize is conveyed to a crushed feed stockpile.

Auxiliary equipment like dust collectors, pneumatic rock breakers, overhead cranes and monorails will support the operation and maintenance of the primary and secondary crushers and related equipment.

17.4.2 Grinding and Magnetic Separation Area

The crushed mineralized material is transferred from the crushed stockpile by apron feeders onto the crushed stockpile conveyor. The latter reports to the feed bin of the primary grinding unit comprising high pressure grinding rolls (HPGR). The discharge from each HPGR feeds a wet vibrating screening system working in a closed loop with the HPGR. The screens oversize reports back to the HPGR, while the screens undersize reports to the first stage of magnetic separation – the cobber LIMS units. The cobber non-magnetic product reports to the tailings thickener via tailings cyclones, while the cobber magnetic product reports to the classification cyclones.

The classification cyclones' undersize reports to a secondary grinding process comprising two ball mills units operating in parallel, and the ball mills' product reports to the rougher LIMS area. The rougher LIMS magnetic product reports back to the classification cyclones and the rougher LIMS non-magnetic product reports to the tailings thickener.

The classification cyclones' oversize reports to a desliming thickener and the thickener overflow reports to tailings, while the desliming thickener undersize is fed to a finisher LIMS area.

The finisher LIMS non-magnetic product is pumped to the tailings thickener and the finisher LIMS magnetic product reports to the concentrate dewatering area.

The final LIMS concentrate reports to a dewatering and drying area which starts with a concentrate thickener. The concentrate thickener overflow is pumped back to the process water tank for water re-use and the thickener underflow reports to a vacuum disc filter for further moisture reduction.

The vacuum disc filter filtrate is pumped to the tailings thickener and the filter cake is fed to a rotary dryer to reduce the final concentrate moisture to <2%. The dryer product is conveyed via a covered conveyor to the final concentrate stockpile, which is also located in an enclosed area to avoid concentrate loss and exposure of the concentrate to rain and snow.

17.4.3 Reagents Area

Since there is no flotation or any other chemical separation processes considered for the flow sheet, the reagents area is small, consisting only of flocculant storage and a mixing and holding system to serve the concentrate and tailings thickening processes.

17.4.4 Concentrate Thickening and Handling

There is one magnetite concentrate thickener. Thickener underflow, at 60 % solids, is pumped to the concentrate disc filter while overflow is pumped to the process water tank. Flocculant requirements to secure clear water at the overflow will be confirmed by future testwork.

A vacuum disk filter is used to reduce the moisture of the concentrate from the concentrate thickener underflow down to 11 %. Dewatered concentrate is conveyed to the concentrate dryer. A rotary dryer is included to reduce the final concentrate moisture below 2 %. Dried concentrate is conveyed to the concentrate loading area.

17.4.5 Tailings Thickening Area

The tailings thickener (as described above) receives the pumped products from several streams, including:

- Rougher LIMS non-magnetic product
- Finisher LIMS non-magnetic product
- Desliming thickener overflow
- Tailings cyclones overflow
- Vacuum disc filter filtrate.

The tailings thickener overflow is pumped back to the process water tank, and the tailings thickener underflow is pumped to the tailings management facility (TMF).

17.4.6 Utilities and Services Area

The concentrator utilities and services area include:

- Fresh water tank for plant use that is filled from the nearby lake system
- Process water tank, that receives the process water overflow streams for process re-use
- Plant air compressor and dryer, and instrument air compressor and dryer systems for plant air services
- Fire water system
- Gland water system.

17.5 Concentrator Personnel Requirement

Based on the concentrator design work performed for the purposes of the PEA, it is expected that a total of 138 people will be required to operate the facility including concentrator management, shift management, operators, maintenance personnel, and mobile equipment operators supporting the overall concentrator operations (Table 17-3).

Table 17-3: Concentrator Personnel Requirement

Personnel by Function	Personnel
Concentrator Operations	82
Concentrator Maintenance	26
Supporting Mobile Equipment Operations	25
Supporting Mobile Equipment Maintenance	5
Total Personnel	**138**

18 Project Infrastructure

18.1 General Infrastructure

The Mont Sorcier Property is located approximately 20 km east of the town of Chibougamau, Québec, Canada. The Property is easily accessible by an all-weather gravel road heading east from Highway QC-167 some 10 km east-northeast of Chibougamau (Figure 4-1). This gravel road passes through the northern claims and forestry roads give access to lakes and different sectors in the southern and central portions of the Property.

The overall mine and plant infrastructure consist of open pit, waste and overburden dumps, crushing plant as well as buildings, such as concentrator, offices and workshops, service areas and buildings. Drainage ditches will be constructed around the open pit and dumps to direct water runoff to settling ponds to avoid contamination. The mineralized material will be hauled by the mine haul trucks to the crusher area adjacent to the concentrator. A haulage road will be constructed between the mine and the crushers. All crushed material will be sent via conveyor system to the cone crushing and screening plants, stockpiled, and, subsequently transported to the concentrator via a short conveying system.

The annual production of 5 Mt of iron concentrate will be conveyed to a covered storage stockpile area. The stored iron concentrate will be loaded into rail cars on a newly constructed railway loop at the stockpile area. The concentrate will be transported via the new, 18 km-long railway spur line to connect with the existing CN rail infrastructure, from where it will be transported for approximately 360 km to the Saguenay port. The rail transportation system involves six trains each with 120 gondola-type railcars operating throughout the year. At port, the iron concentrate will be loaded directly into ocean freight vessels.

No permanent accommodation camp will be constructed with the accommodation strategy involving mining and milling personnel commuting on a per shift basis from the town of Chibougamau. A new 315 kV powerline will be built along with a substation to connect to the main powerline.

18.2 Mine Area

The open pit locations are illustrated on Figure 18-4.

It is difficult at this early stage to estimate location of the waste dumps and the tailings storage dam. The rough guide considering 1:1 waste to mineralized material ratio and 33% mineralized material to concentrate conversion and 25% waste swell factor is presented. If we consider the dump height to be limited due to surrounding topography, and that the rehabilitated dump slopes to be 20°, the footprint of such a dump could be approximately 400 ha.

Current strategy considers using the South pit, once excavated, to be used as a second tailings storage. An above-ground tailings storage at 30 m tailings average depth may require securing an area of approximately 461 ha. The external TSF and the waste dump would require an area of approximately 861 ha in total. More details and volumes involved are described in Section 16.3 on page 119.

18.2.1 Haulage Roads and Site Roads

The in-pit roads and ramps will be, for most of the pit depth, dual lane with some exceptions of single lane roads for the small pits of the South mining area and in general near the bottom of each large pit.

The selection of road width and other parameters and dimensions are derived from the parameters of the largest piece of equipment to be used a road or a ramp. For the PEA study, three different truck sizes were considered; the CAT 789 D class was selected as more suitable to the task, considering quantities to be moved and excavators selected as a primary loading unit. Table 18-1 contains the main dimensions of equipment considered and relevant to define haul roads and ramps.

Table 18-1: Equipment parameters relevant to haul roads

Equipment parameters	Overall length (m)	Loading height (m)	Operating width (m)	Tyre type	Tyre diameter (m)	Inside turning radius (m)	Outside turning radius (m)
CAT 785 C	11.02	4.97	6.64	33.00R51	3.06	20.86	27.5
CAT 789 D	**12.72**	**6.50**	**7.65**	**37.00R57**	**3.42**	**22.58**	**30.2**
CAT 795 AC	15.15	7.80	8.95	56/80R63	3.77		

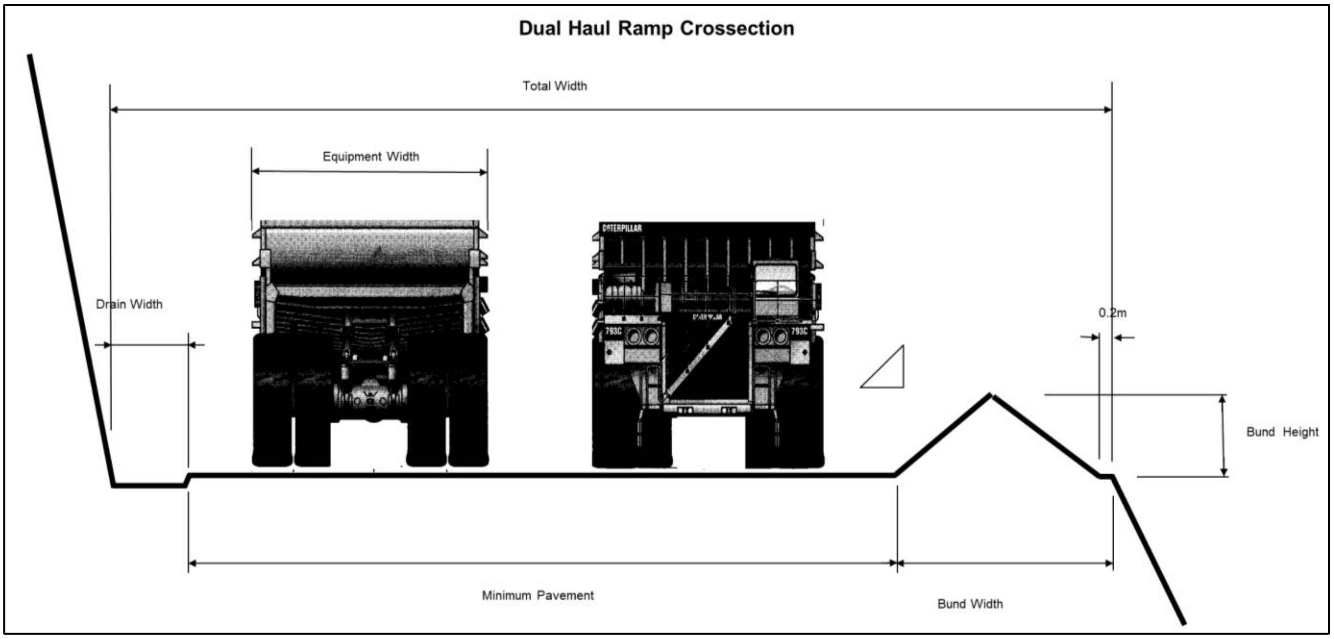

Figure 18-1: Design and parameters of a dual pit haul ramp

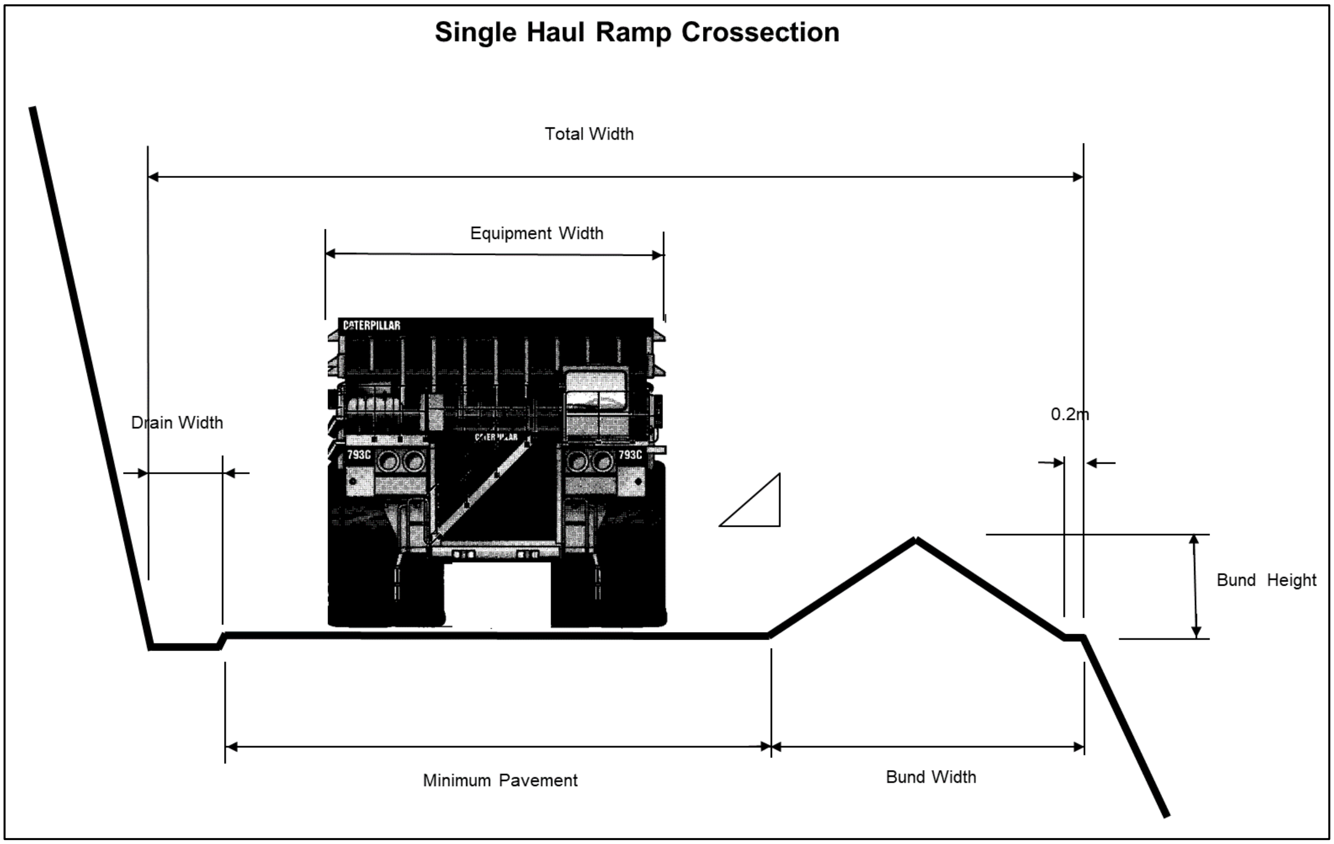

Figure 18-2: Design and parameters of a single pit haul ramp

Dimensions or roads and ramps are estimated in Table 18-2 to Table 18-4 below. The truck width multiplier is a factor determining the main parameters.

Table 18-2: Dual haul road parameters (truck multiplier – 4; angle of repose – 45°)

Equipment	Road parameters			Dual haul road (truck multiplier: 4)		
	Bund height (m)	Bund width (m)	Drain width (m)	Minimum pavement width (m)	Total width with drain (m)	Total width without drain (m)
CAT 785 C	1.53	3.06	1.50	26.56	31.12	29.62
CAT 789 D	**2.28**	**4.56**	**1.50**	**30.60**	**36.66**	**35.16**
CAT 795 AC	2.52	5.03	2.50	35.80	43.33	40.83

Table 18-3: Dual haul ramp parameters (truck multiplier – 3.5; angle of repose – 45°)

Equipment	Road parameters			Dual haul road (truck multiplier: 3.5)		
	Bund height (m)	Bund width (m)	Drain width (m)	Minimum pavement width (m)	Total width with drain (m)	Total width without drain (m)
CAT 785 C	1.53	3.06	1.50	23.24	27.80	26.30
CAT 789 D	**2.28**	**4.56**	**1.50**	**26.78**	**32.83**	**31.33**
CAT 795 AC	2.52	5.03	2.50	31.33	38.86	36.36

Table 18-4: Single haul ramp parameters (truck multiplier – 1.5; angle of repose – 45°)

Equipment	Road parameters			Single haul ramp (truck multiplier: 1.5)		
	Bund height (m)	Bund width (m)	Drain width (m)	Minimum pavement width (m)	Total width with drain (m)	Total width without drain (m)
CAT 785 C	1.53	3.06	1.50	9.96	14.52	13.02
CAT 789 D	**2.28**	**4.56**	**1.50**	**11.48**	**17.53**	**16.03**
CAT 795 AC	2.52	5.03	2.50	13.43	20.96	18.46

The haul roads outside of the pit would generally have the following features and measurement (see Figure 18-3 below).

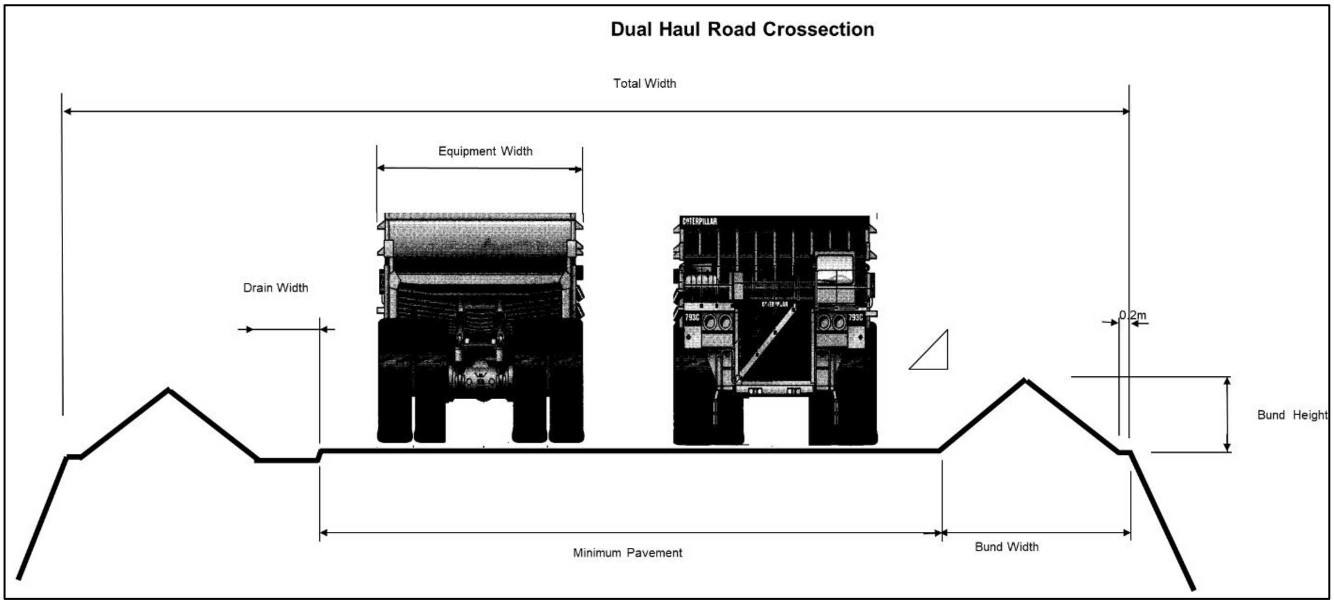

Figure 18-3: Design and parameters of a dual haul road

The haulage roads from the mine area are designed with a width of 33 m, the same width as the roads in the open pits, in order to accept 227-tonne (240-ton) rigid frame haul trucks. All roads are designed to minimize cut and fill and respect a maximum grade of 8% (10% in-pit ramps). The earth excavation will be used to backfill the lower points on the road alignment. The rock excavation will be used, without further crushing, for the sub-base thickness of 1,000 mm. The base of the road will have a thickness of 400 mm and will be made of waste rock from the mine.

The roads in the mine area include:

- Haulage roads to the crusher area.
- Haulage road from the pit to the waste dumps and the overburden dumps.
- Access road to the explosives storage area. This road will be designed with a width of 15 m because the explosives trucks and other vehicles are much smaller than the haulage trucks.

18.2.2 Mine Equipment Workshop

The workshop for mining equipment maintenance will be a steel structure building unit 70 m long x 45 m wide, accommodating four bays. The bays will have large doors at both ends for the 227-tonne trucks.

18.2.3 Fuel Storage and Filling Station

The main storage facility for the diesel fuel for the mine equipment will be a one million litre galvanized steel tank installed and secured on a pad. The fuel tank will be connected with and will direct the fuel flow to, the equipment fuelling station, consisting of two mine truck fuelling pumps.

18.2.4 Explosives Preparation and Storage

The explosives preparation and storage facilities will be constructed in a remote area, away of the concentrator and at least 500 m from the access road to the site. A magazine for the accessories will be located approximately 200 m further along the access road to the explosive preparation building. The facilities will be designed to the specifications and requirements of the explosives supplier and government regulations. A dedicated access road will serve the explosives storage area.

18.3 Concentrator Area

The possible concentrator infrastructure location is illustrated in Figure 18-4.

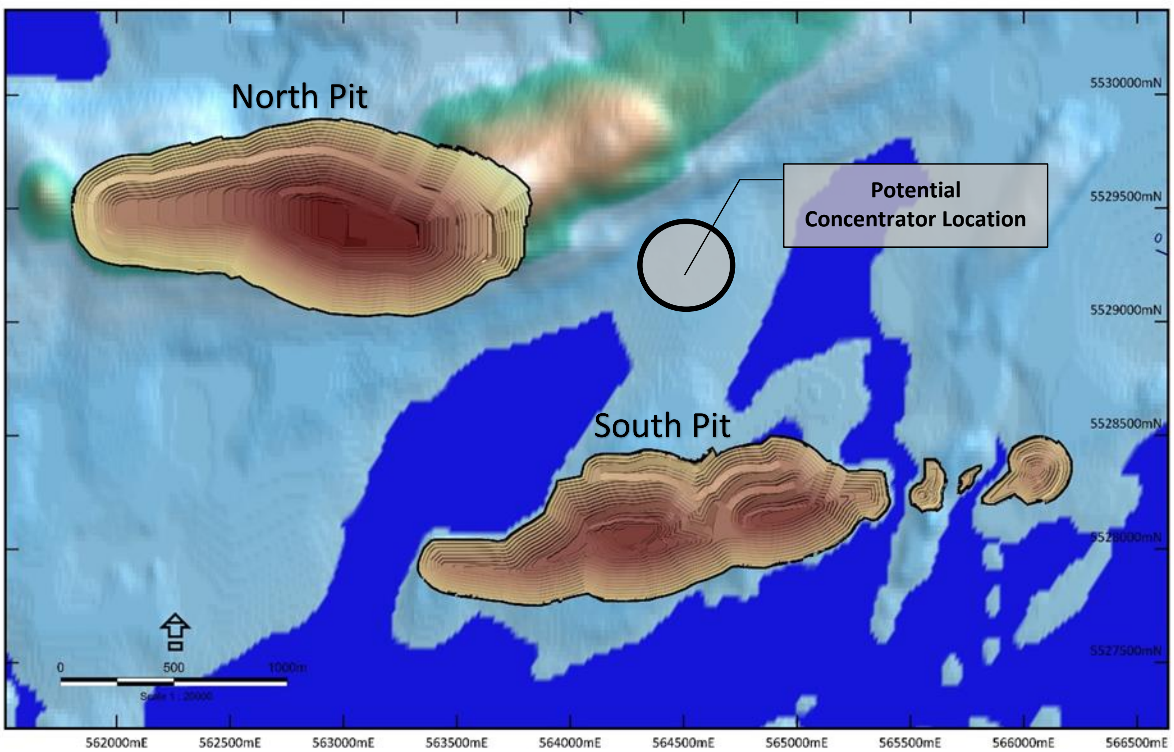

Figure 18-4: Proposed schematic of mine area

18.3.1 Crusher Plant

The mineralized material coming from the pit will be crushed in a two-stage crushing circuit involving a primary jaw crusher and a secondary cone crusher in a closed loop with dry vibrating screens working in parallel. There will be four truck dump “stations”, one on each side of the crusher dump hopper, to allow trucks to direct discharge over the primary crusher.

The secondary crusher product material will be screened and crushed as required before conveyed to the two A-frame stockpiles.

18.3.2 Concentrator

A reclaiming apron feeder system will transfer the stockpiled crushed material to the primary grinding area comprising a HPGR unit operating in a closed loop with a screen system. The HPGR product will report to the main concentrator area including a series of LIMS systems (cobber, rougher and cleaner LIMS) and a secondary grinding circuit including two ball mill units working in parallel. The final concentrate product will be de-watered in series via the means of a thickener, a filter and a dryer and then, conveyed and stored in the loading station. An emergency concentrate stockpile is planned as well. The final rejects of the concentrator plant will be partially dewatered and pumped to the tailings pond.

18.3.3 Security Gatehouse

A security gatehouse will be installed on the main access road at the entrance of the access road to the concentrator and the mine area. The guard will authorize the entry of visitors to the concentrator and mine site.

18.3.4 Accommodation and Administration Buildings

Temporary accommodation facilities will be installed at the beginning of the construction period to accommodate the construction labor workforce but there will be no permanent accommodations camp considered for the operations. Instead, mining and plant personnel will be transported on a per shift basis from Chibougamau.

The administrative building will be constructed and house the offices for the project managers and other supervisory personnel as well as the concentrator supervisors, secretarial, accounting, human resources, safety and first aid personnel. A section of the building will be reserved for the mine related operations such as offices for managers and department supervisors, surveyors, geology, engineering and mine planning personnel, as well as secretarial personnel. It will also include a boardroom, and a first aid medical clinic to serve the operations.

18.3.5 Site Roads

The access road from the guardhouse to the concentrator and to the administrative and service buildings is designed to minimize the cut and fill required; the road is 15 m wide and the maximum grade of the road is 7%. The total length of the site road system is approximately 10 km and accounts for the access road from public road system and all the roads on site. The earth excavation will be used to backfill the lower points on the road alignment. The rock excavation will be used without any further crushing for the sub-base of 1,000 mm. The final base of the road will have a thickness of 400 mm and will be made of crushed stone (MG-20).

18.3.6 Site Drainage and Settling Ponds

A storm drainage system will be excavated that will exploit the natural drainage around the pits, roads, general infrastructure and pads with a network of open ditches and culverts that will connect with one or more settling ponds.

Ditches and culverts will be designed for a 1 in 100-year recurrence event and will be checked for peak intensity flows. Sedimentation ponds will also be designed for a 1 in 100-year recurrence event.

18.3.7 Services

Electrical power will be supplied to the project from a 315 kV –35 kV substation to be built near the concentrator and will be connected to a new 315 kV powerline connecting with the main power supply line.

A 35 kV transmission line network will distribute the power needed to the substations of different areas, such as the mine site, administrative and service buildings, the concentrator and other facilities. The mine site will be powered by a 7.2 kV transmission line from a 35 kV –7.2 kV substation that will provide all the power for the electric power shovels and the electric production drills.

A pump house will be constructed at a small lake close to the concentrator. Water will be pumped to a water treatment facility located inside the concentrator. Potable water will also be pumped to the administration building. The pumping and distribution system will include a potable water reserve tank. Electrical connection and controls of all potable water equipment will be connected to the plant emergency power supply.

Central organic waste collection and on-site composting equipment will be provided, and inorganic waste will be disposed into an incinerator.

18.3.8 Communications

Telecommunications and radio systems will be provided to enable communication between individuals working in the different areas, as well as provide computer and internet services in all offices, control rooms etc. The site is currently cellular network accessible, serviced from the town of Chibougamau, but a booster tower will be installed at the site to improve the signal quality and ensure undisturbed access to the cellular network and internet around the mine and plant area.

18.4 Tailings Management Facilities Area

Ideally, the proposed tailings pond will be located in a natural valley in close proximity to the concentrator. Containment of the process solids will be made by the natural terrain and a tailings dam. Impervious dikes will also be required for the sedimentation and polishing pond. Final elevation of the process solids will be lower than the process plant. Future detailed engineering studies will need to consider:

- Dike and dam types
  - Impervious dikes
  - Peripheral dikes raised with rockfill or/and tailings (tailings dikes)
- Sedimentation and polishing ponds - water control
- Emergency spillway
- Pumping station and treatment plant

18.5 Rail Area

18.5.1 Railroad

The proposed railroad spur line starting from the existing railhead at Chibougamau, going to the site and finishing by a loop has a total length of approximately 18 km. The rail is a single line with the capacity to receive a train of 120 gondola-type railcars.

18.5.2 Rail Maintenance Workshop

The workshop for rail equipment maintenance will be a steel structure building unit. The building will be 75 m long x 40 m wide.

18.5.3 Port and Terminal Area

The iron concentrate will be transported by train via an existing railroad from Chibougamau to the port of Saguenay, Québec. There it will be unloaded from the train onto a dedicated Mont Sorcier products stockpile area before sending the concentrate to the port via a conveyor system for loading onto bulk cargo ships.

19 Market Studies and Contracts

In preparation for the PEA, VONE commissioned an Independent Market Pricing Study to determine the potential value of the vanadium-rich iron product produced by Mont Sorcier, given the lack of available quoted market index prices. The study was completed by Paul Vermeulen of Vulcan Technologies in late October 2019. The study reviewed main iron index price forecasts as well as estimates of the applicable vanadium credits.

The study reviewed a value in use methodology based upon a review of the grade and concentrate chemistry from Mont Sorcier relative to other similar iron products and the study concluded that the concentrate from Mont Sorcier should receive a US$15/t premium to the Platts 65 price iron index for the contained vanadium credits (based on a net attributable value using a long term V_2O_5 price of US$7.25/lb). The PEA used a concentrate selling price of US$107/t or C$140.79/t based on the summary consensus price assumption ranges provided in Table 19-1 below.

Table 19-1: Consensus concentrate price assumptions

	Spot price 24 Sep 2019 (US$/dmt)	Three-year average (US$/dmt)	Long term forecast consensus price range (US$/dmt)	Base case (recommended) price (US$/dmt)
Platts 62	89.6	76.3	76	76
Consensus for Platts 65% grade iron concentrate	95.6	92.5	92-104 (15-30% premium)	92
Mont Sorcier pricing		Base Price	92–104	92
		Quality premium for phosphorus and alumina	0-5	Nil
		Quality premium for MgO credits	1.5 (US$20/t dolomite x 3.8% MgO in mineralization)	Nil
		Quality premium for magnetite content	Nil	Nil
		Discount for small grind size	Nil	Nil
Vanadium premium per tonne of concentrate		Vanadium credits	0–30	15.00
Final forecasted price CFR China (including vanadium premium)		Final forecasted price CFR	92–134	107
Freight			21	21
Forecast FOB Canada			71-113	86
Exchange Rate US$:C$ (PEA used)				0.76
Final base case price C$ per tonne concentrate CFR China				**C$140.79**

19.1 Historical Pricing for Iron Concentrate Products

As detailed in the Vermeulen report, the last 10 years have demonstrated significant variation in iron concentrate pricing. High Chinese demand resulted in a peak of the 62%Fe iron concentrate price (also referred to as the Platts62 or IODEX62 benchmark) at US$193/dmt in 2011. The price later dropped to US$40/dmt in 2015, mainly driven by supply capacity increase, and later stabilized to approximately US$60-80/dmt.

From end of 2013 to approximately mid-2016 the Fe premium, defined as the price spread between the 65%Fe and the 62%Fe benchmark indices, has varied in a narrow range with the premium for 65%Fe being about 5% above the price of the 62%Fe iron product. Since mid 2016 the Fe premium has increased significantly and climbed as high as 35% above the benchmark price (Platts62 product). One key driver to this significant premium increased has been the environmental restrictions on emissions imposed by the Chinese Central and Provincial Governments. In order to comply with these restrictions and to minimize production cuts, steelmakers have resorted to an increase in quantity of higher-grade iron concentrates purchased. This increased demand for higher grade concentrates has contributed to the increase in Fe premium.

In early 2019 a tailings dam failure at one of Vale’s operations in Brazil led to a significant curtailment of iron concentrate products. This market perturbation has resulted in reduced iron concentrate supply and premiums and discounts relative to the benchmark price have largely disappeared. This event is expected to impact the short and medium term steel market and coupled with pressure on China to reduce emissions will continue to favour a 65%Fe price differential of at least 10% over the 62%Fe benchmark with seasonal fluctuations up to 30% as it has been the case in the last couple of years.

19.2 Analyst Forecast

Vulcan Technologies’ (Vermeulen, 2019) price forecast was based on a Platt62 CFR China price of US$76/dmt (Figure 19-1). Three scenarios are presented in the Vermeulen (2019) report and are based on a 15%, 20% and 30% Platts65 Fe premium over the Platts62 Fe benchmark. A premium for the Mont Sorcier iron and vanadium concentrate Fe grade of 65.5%Fe applied on a dmt unit basis of 15-30% provides a forecast of US$92-104/dmt for the Platts65 Fe product (Figure 19-2) and a vanadium premium of US$15-30/dmt can be achieved driving the price for Mont Sorcier concentrate to approximately US$92-134/dmt. A long-term price of US$107/dmt CFR China can be forecast for the Mont Sorcier concentrate given the vanadium content and high purity of the concentrate.

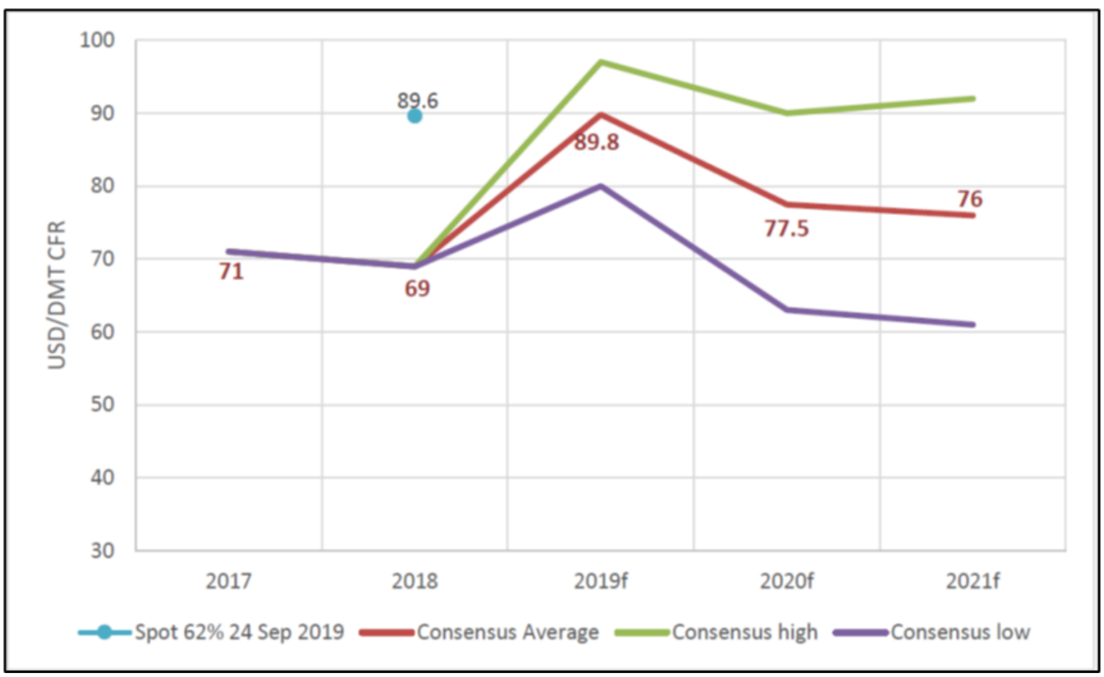

Figure 19-1: Consensus 62% Fe iron concentrate medium term forecast prices
Source: PCF Capital Group, Macquarie, BAIINFO in Vermeulen (2019)

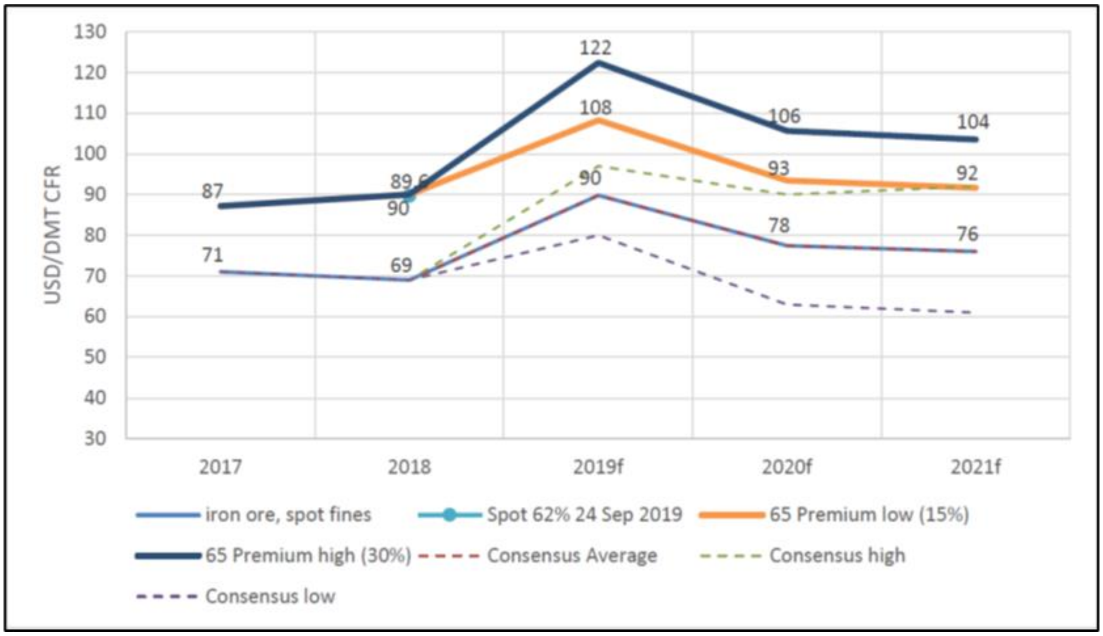

Figure 19-2: High grade Iron Concentrate (65%Fe) price forecast
Source: CRU, CLSA, Wood Mac, Vulcan Technologies in Vermeulen (2019)

A commercial outcome of zero vanadium credits will reduce the forecast long term price to US$92/dmt and upside factors such as Chinese environmental emission restrictions as well as optimised vanadium recovery methods and process flowsheets may increase the forecast price for Mount Sorcier concentrate to US$134/dmt.

19.3 Mont Sorcier Concentrate Characterization and Market Advantage

Mont Sorcier iron and vanadium concentrate is a high grade (65.5% Fe and 0.6% V), low impurity (alumina, silica, phosphorus) product. The silica level is slightly lower than that of the Platts65 benchmark, however due to low alumina and phosphorus content, it is considered a high purity iron and vanadium concentrate. This should attract improved pricing providing that customers (steel plants) that will benefit from the absence of these elements are targeted. The fine particle size may result in a customer discount depending on the market, however the magnetite content (and decreased sintering/pelletizing costs) will partially/completely offset the possible penalty.

19.4 Base Case Pricing

As per the Vermeulen (2019) report, the methods used for analysing the selling price of the 65.5% Fe Mont Sorcier iron and vanadium concentrate provide very similar results. CSA Global has used a price of US$107/dmt (C$140.79/dmt), CFR China within the financial analysis of this PEA study. It is the Qualified Person's and CSA Global's opinion that the analyst consensus forecast price falls between the spot price and long term forecast, and provides a reasonable basis for the base case proposed price.

Notwithstanding the risks that VONE may not be able to obtain the premiums assumed in the analysis presented, there is also potential for upside if VONE's marketing strategies can successfully target and secure agreements within specific regions and/or steel producers.

19.5 Risk and Opportunities Summary – Base case pricing

- VONE is unable to realize a US$15/dmt premium to Platts 65 due to vanadium credits – A range of potential customers in China, Japan and Europe must be engaged with to ensure a fair price outcome, and the production cost structure and reserves/resources of domestic VTM supply in China must be understood. An alternative may also be the creation of a processing hub close to the mine site/a nearby steel maker, through a buy-back arrangement for vanadium-rich slag, contractual sponsoring of treatment facility capital cost, or similar.

- Sulphur in mineralized material is higher than predicted – 22 out of 8500 drillhole samples suggest elevated sulphur contents of ~0.4%. This is still saleable in China, but may attract a discount – the mining block model in later stages should be used to smooth out any sulphur chemistry spikes.
- High MgO in mineralized material – environmental restrictions in China affect the mining and provision of fluxes. The supply of MgO included in the concentrate is an opportunity for the right customer. The opening commercial position should be for all credits, and this presents a potential upside in pricing.
- Environmental restrictions in China elevate premiums – this opportunity will lift the forecast 20% Platts 65 premium to closer to 30%, resulting in a Mont Sorcier price increase as well.
- 3 Mtpa concentrate production equals no pricing power – it is possible that no premium for vanadium credits is attained, and instead the product is discounted to ensure volume flow – Japan and European steel mills need to be included in the market portfolio. Concentrate production levels higher than 3Mtpa have been considered within the PEA.
- Chinese VTM price relativities are volatile – this may result in periods of lower price realization – the reasons for this behaviour need to be well-understood so that appropriate alternate customers can absorb tonnages at better prices.
- The assigned vanadium credit is low at US$15/dmt concentrate – the cost curve suggests approximately US$30/dmt concentrate total materials cost. This presents an opportunity to achieve a better price outcome.

A review of historical price data showed that high grade titanomagnetite ores in China trade at ~5% premium to the Platts 65 index, but includes some volatility due to multiple factors including iron index price, domestic production cost, port stockpile size, etc. that affect domestic concentrate pricing differently to seaborne concentrate pricing.

The Mont Sorcier mineralized material behaves well when modelled in a specialized blast furnace to partition titanium to the blast furnace slag, but its elevated magnesium oxide content poses a slag chemistry problem when the mineralized material is used at more than approximately 50% of a particular blast furnace burden. Conversely, at lower percentages the presence of the MgO is of benefit to steel makers.

A price for Mont Sorcier's concentrate grade is forecast to achieve a US$15 premium to Platts 65 index because of vanadium credits, and a long term price of US$107/dmt Mont Sorcier concentrate is forecast, with potential upside and downsides resulting in a range of US$92/dmt to US$134/dmt.

19.6 Rail transport and Port Access Agreement

Due to the Mont Sorcier Project's early stage of development there have been no negotiations with the rail transport carrier or Saguenay Port Authority as of the Effective date of this Report.

19.7 Off-takes and Contracts

As of the Effective Date of this Report, there are no contracts or off take agreements in place relevant to the development of the Mont Sorcier Property.

20 Environmental Studies, Permitting and Social or Community Impact

This section of the Report is based on the report prepared by Norda Stello for VONE titled: "Mont Sorcier Project Environmental and Social Scoping Study" dated 17 April 2019.

20.1 Environmental and Social Scoping Study

VONE commissioned Norda Stelo (a technical services firm based in Québec) to carry out an Environmental and Social Scoping Study (ESSS) on the Project (Boulé *et al.,* 2019), which has summarized available information sources and knowledge gaps with respect to:

- Physical environment components (climate and weather; air quality; topography; geology and surface deposits; hydrography and hydrology; sediment and freshwater quality; hydrogeology and groundwater quality)
- Biological environment components (protected areas and wildlife habitats; plant communities; freshwater fish and fish habitat; avifauna; herpetofauna; mammals; special status species)
- Human environment components (population and demographic trends; socio-economic profile; land tenure and zoning; main land uses in the study area; transport infrastructure; historical and current Cree traditional land use; historical and cultural resources).

Key environmental and socio-economic issues identified as part of the ESSS (Boulé *et al.,* 2019) include:

- Biophysical issues:
  - Greenhouse gas emissions
  - Dust emissions
  - Water management and effluent quality
  - Project of biological refuge
  - Impact on hydrology
  - Terrestrial habitat losses
  - Impacts on fish populations and fish habitats
  - Destruction of wetlands
  - Contamination of soil, water, plants, fish and animals
  - Destruction of bird nests
  - Disturbance of wildlife
  - Special status plant and wildlife species
  - Risk management.
- The main socio-economic issues generally raised by the Cree of Eeyou Istchee in the context of mining projects are as follows:
  - Potential for conflicts between mining activities and the traditional uses of the land
  - Environmentally and culturally sustainable development
  - Cultural and heritage protection and development
  - Human health risks
  - Economic benefits and revenue sharing

  - Provision of sustainable economic development within the region in order to provide employment and business opportunities for its members
  - Training and education programs so that members of the community might fully participate in available opportunities.
- Additional socio-economic issues raised for similar projects in the area include:
  - Contamination of traditional food
  - Access to the area
  - Hunting pressure on big game, small game and fur-bearing animals
  - Site safety
  - Social acceptability
  - Impact of feed/concentrate transport
  - Lodging/housing availability
  - Signature of a framework agreement with the local communities
  - Training and employment
  - Creation of local and regional economic benefits.

Upcoming environmental studies and project development activities that will need to be undertaken in order to advance the Project include:

- Environmental baseline studies
- Public consultations and engagement
- Project notice and description of a designated project
- ESIA
- Permitting.

20.2 Environmental Assessment Process

20.2.1 Context

The Mont Sorcier Project is located in the Nord-du-Québec Region on lands subjected to the JBNQA. The JBNQA was put in place in 1975 by the Government of Québec, the Government of Canada, the GCC(EI), and the Northern Québec Inuit Association. It enacts the environmental and social protection regimes for the James Bay and Nunavik regions. The JBNQA establishes three categories of lands, numbered I, II, and III and defines specific rights for each category.

The Mont Sorcier Project area lies over Category III lands, which are public lands in the domain of the State. The Crees have exclusive trapping rights on these lands, as well as certain non-exclusive hunting and fishing rights. The Crees also benefit from an environmental and social protection regime that includes, among other things, the obligation for proponents to carry out an ESIA for mining projects such as the Mont Sorcier Project and the obligation to consult with First Nations communities. Category III lands include all the lands within the territory covered by the JBNQA that are located south of the 55th parallel and are not included in other land categories. Category III lands are managed by the EIJBRG as established by the Act establishing the EIJBRG (chapter G-1.04). The sections below outline the legislative and regulatory framework applicable to the Mont Sorcier Project. At first, the provincial and federal environmental assessment processes are described. Then, the permitting process that may be required in order to realize the Project is presented.

20.2.2 Provincial Environmental Assessment Process

Chapter II of the Title II of the Environment Quality Act (EQA) provides for specific arrangements with regards to environmental assessment applicable to the James Bay territory located south of the 55th parallel in accordance with the provisions contained in the JBNQA. The environmental assessment process for this region differs from the provincial process in that the local First Nation peoples are active participants. The Environmental and Social Impact Review Committee (COMEX) is an independent body composed of members appointed by the governments of Québec and the Cree Nation which is responsible for the assessment and review of the social and environmental impacts of projects located south of the 55th parallel in the territory governed by the JBNQA.

As provided in Section 153 of the EQA, Schedule A of the EQA lists the projects that are automatically subject to the impact assessment and review procedure while Schedule B lists the projects that are automatically exempt from the procedure. Concerning Mont Sorcier Project, Schedule A stipulates that "all mining developments, including the additions to, alterations or modifications of existing mining developments" are automatically subject to the impact assessment and review procedure. In accordance with Section 154 of the EQA, any proponent wishing to carry out a project which is not automatically exempt from the assessment and review procedure must request a certificate of authorization or an attestation of exemption and undergo the social and environmental impacts assessment and review procedure as illustrated in Figure 20-1 and outlined below.

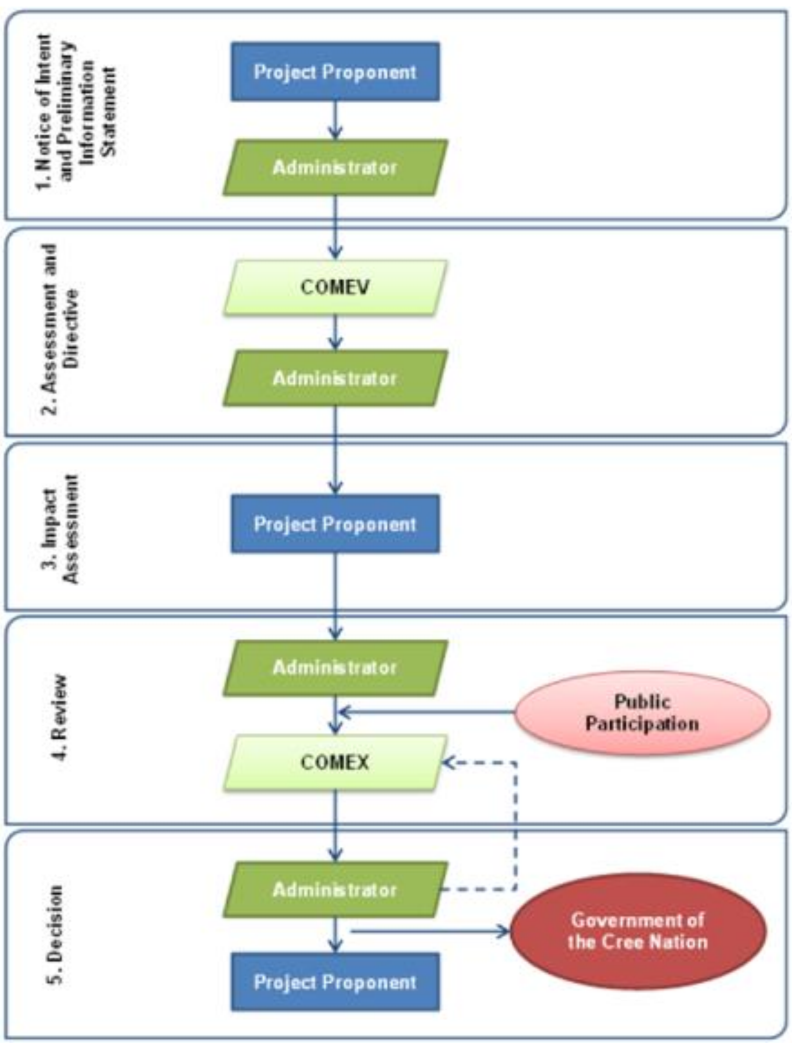

Figure 20-1: Provincial Environmental Impact Statement procedure for projects located south of the 55th parallel in the territory governed by the JBNQA

1. Notice of Intent and Preliminary Information Statement

The first step of the procedure is the Preliminary Information Statement. This step begins with the preliminary planning of the project, when the proponent is reviewing the possible project alternatives on the basis of technical, economic, environmental, and social aspects of the project in order to select the best options for further studies. The project proponent must complete a Preliminary Information Form. The content of this Preliminary Information Statement is set out under Section 2 of the Regulation respecting the environmental and social impact assessment and review procedure applicable to the territory of James Bay and Northern Québec (chapter Q-2, r. 25). This information concerns the goal, nature and scale of the project, as well as the sites considered or the various development options. In accordance with Sections 155 and 156 of the EQA, the proponent must then send to the appropriate Administrator (here the Deputy Minister of the MELCC) a notice of intent and the preliminary information on the project.

2. Assessment and ESIA Guidelines (Directive)

The Administrator sends the file to the Evaluating Committee (COMEV) which is responsible for reviewing and analyzing the preliminary information provided by proponents for projects located south of the 55th parallel. In the case of a project that is not automatically subject to or exempt from the procedure, COMEV makes a recommendation to the Administrator regarding whether or not the development project must undergo an impact assessment.

In the case of a project subject to the procedure, the COMEV issues ESIA guidelines (directive) that are a document outlining the nature and the scope of the ESIA that the proponent must undertake. The guidelines are submitted to the Administrator, who forwards them to the proponent with or without amendments. If the Administrator deems it necessary to amend a COMEV recommendation, he must first consult the COMEV. It must be noted that a general directive exists for the preparation of ESIA in Québec (MELCC, 2018d). Appendix 4 of this directive specifies additional information that is required in the case of an ESIA for a mining project.

3. Impact Assessment

During the third step, the project proponent completes an impact assessment study in accordance with the ESIA guidelines (directive) issued by the Administrator. It should be noted that Section 5 of the Regulation respecting ESIA and review procedure applicable to the territory of James Bay and Northern Québec (chapter Q-2, r. 25) defines the essential elements that must be included in an impact assessment report, such as a detailed project description, a description of the biophysical and social environment, an assessment of the project impacts, a description and comparative analysis of project alternatives, a description of mitigation and restoration measures. The accuracy of the details provided in the impact assessment must correspond to the extent and the consequences of the identified impacts. The impact assessment must also meet the expectations of the Review Committee (COMEX) and needs as set forth in the document entitled "Consultations conducted by the proponent: Expectations of the Review Committee" (COMEX, 2016).

4. Review

The project proponent submits the impact assessment to the Administrator, who forwards it to the COMEX. The COMEX analyzes each project that must undergo the environmental and social impact assessment and review process, calling on the relevant expertise from various Québec government departments and agencies as well as from the government of the Cree Nation. In the course of its analysis, the COMEX may recommend to the Administrator to ask the proponent to undertake further research or additional studies or to provide any additional information deemed necessary. The documents reviewed by COMEX are made available to the public on the COMEX's website and in MELCC's environmental assessment register, except for documents or information deemed confidential. During this step in the procedure, the public is given the opportunity to make submissions to the COMEX. The COMEX may also hold public hearings or other forms of consultations. This public participation enables the COMEX to gauge the concerns of the people in the territory, and to benefit from the traditional knowledge of the First Nation communities. The COMEX recommends refusal or authorization of the project and, if necessary, determines the applicable conditions. It is the responsibility of the COMEX to specify the amendments or additional measures it considers appropriate.

5. Decision

Taking into consideration the COMEX recommendations, the Administrator decides whether or not to authorize the project. If the Administrator cannot accept the COMEX's recommendation, he must consult the COMEX before making a final decision and informing the proponent. The final decision is also forwarded to the Government of the Cree Nation. If the project is approved, a certificate of authorization is issued in accordance with Section 164 of the EQA.

20.2.3 Federal Environmental Assessment Process

At the federal level, the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and its regulations establish the legislative basis for the federal practice of environmental assessment in most regions of Canada. The Regulations designating Physical Activities (SOR/2012-147) identifies the activities that are subject to the federal environmental assessment procedure under the CEAA 2012 by the Canadian Environmental Assessment Agency (hereafter "the Agency") or by the Canadian Nuclear Safety Commission or the National Energy Board.

The Regulations identifies types of major projects that may require an environmental assessment under the CEAA 2012. These projects have the greatest potential for significant adverse environmental effects in areas of federal jurisdiction and are called "designated projects". According to Schedule 16(b) of the Regulations, designated Physical Activities (SOR/2012-147), are subject to the federal environmental assessment procedure the construction, operation, decommissioning and abandonment of:

- A "metal mine, other than a rare earth element mine or gold mine, with an ore production capacity of 3,000 t/day or more"
- A "metal mill with an ore input capacity of 4,000 t/day or more".

The main steps that have to be completed during an environmental assessment procedure conducted by the Agency are summarized below and are illustrated in Figure 20-2. More information can be found on the Agency's website (Agency, 2018).

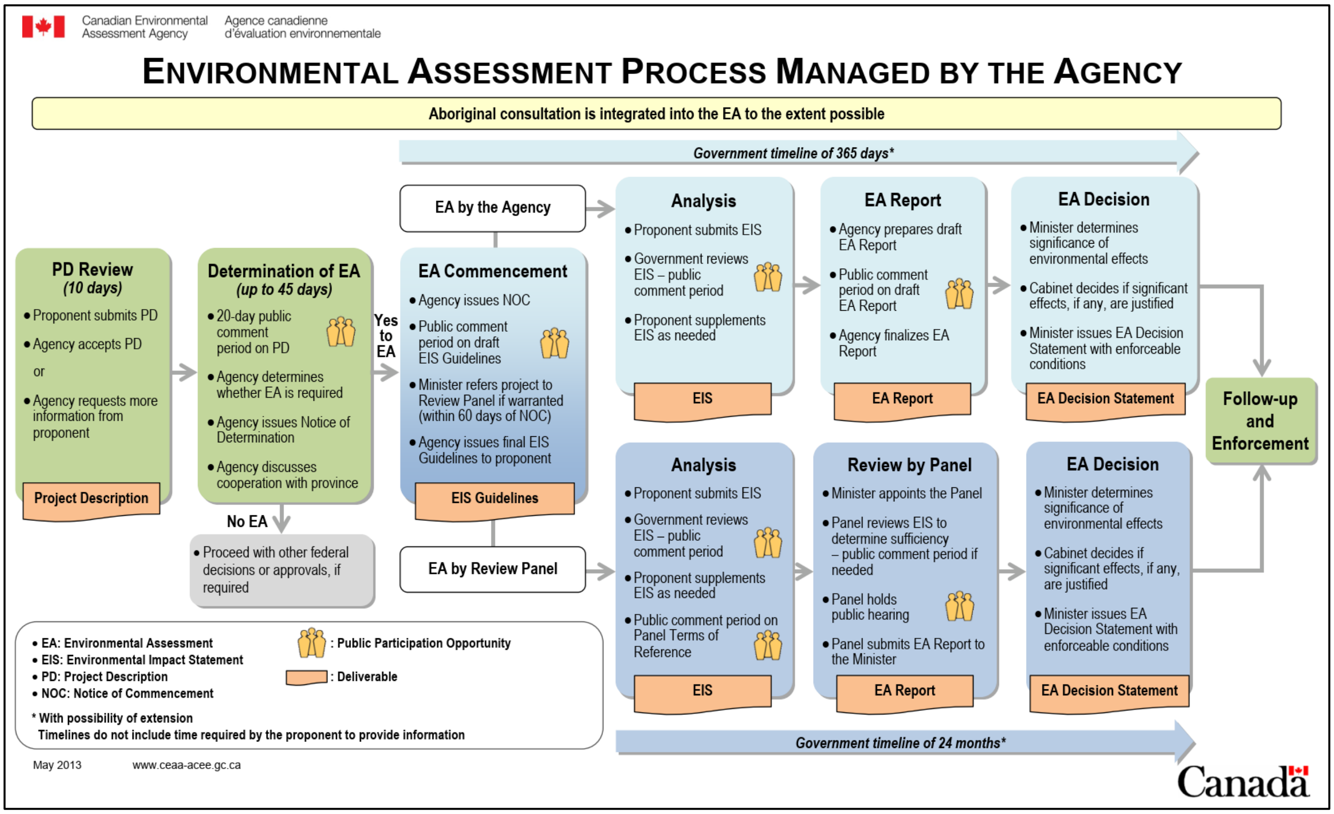

Figure 20-2: Federal assessment procedure

Source: IAAC, Canada

1. Project Description

First, the proponent must provide the Agency with a Description of the Designated Project that includes the information set out in the Prescribed Information for the Description of a Designated Project Regulations (SOR/2012-148). The "Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012" (Agency, 2015) can also be consulted for preparing the project description. The Agency accepts the project description once it is considered to be complete.

2. Notice of Consideration and Public Consultation Period

Once the project description is accepted, the Agency will post on its Registry website a Notice of Consideration stating that it is considering whether an environmental assessment will be required. A summary of the project description will also be posted along with a notice of a 20-day public comment period on the designated project and its potential for causing adverse environmental effects.

3. Determination of the Requirement of an Environmental Assessment

The Agency must decide whether an environmental assessment is required within 45 days of posting the Notice of Consideration on its Registry website. The Agency must consider the following in making a decision:

- The description of the designated project provided by the proponent
- The possibility that carrying out the designated project may cause adverse environmental effects
- Any comments received from the public within 20 days after posting the project description summary on the Registry Internet site
- The results of any relevant regional studies.

The Agency will post on the Registry website a notice of its decision (Notice of Determination) as to whether an environmental assessment is required.

4. Notice of Commencement, Comment Period and Environmental Impact Statement Guidelines

If an environmental assessment is required, the Agency will post on the Registry website the Notice of Commencement of the environmental assessment.

The Agency prepares and posts a draft of the Environmental Impact Statement Guidelines on its Registry website for public comments on the proposed studies, methods and information required in the environmental impact statement.

The Agency considers public comments, including comments from First Nation groups, as well as input from federal departments, and then issues the final Environmental Impact Statement Guidelines to the proponent.

5. Preparation of Environmental Studies and Environmental Impact Statement by the Proponent

The proponent prepares its Environmental Impact Statement according to the guidelines provided by the Agency and submits it to the Agency for review.

6. Analysis of the Environmental Impact Statement by the Agency

The Agency reviews the proponent's environmental impact statement to verify that it clearly provides the information required by the environmental impact statement guidelines (Completeness Review). If necessary, the Agency may require the proponent to provide additional information prior to starting the Sufficiency Review. The Agency reviews the proponent's environmental impact statement for sufficiency and accuracy (Sufficiency Review). The Agency may require the proponent to provide clarification or further information to understand the potential environmental effects and the proposed mitigation measures. A summary of the environmental impact statement and the environmental impact statement report (in the language in which it was produced) are posted on the Registry website. The Agency solicits comments from the public on the potential environmental effects of the project and the proposed measures to prevent or mitigate those effects. The Agency reviews the additional information submitted by the proponent for sufficiency and accuracy. If any information gaps remain or clarifications are needed, the proponent provides additional information to the Agency.

7. Preparation of the Environmental Assessment Report by the Agency

The Agency prepares a draft of the Environmental Assessment Report that includes the Agency's conclusions regarding the potential environmental effects of the project, the mitigation measures that were taken into account and the significance of the remaining adverse environmental effects as well as follow-up program requirements. The Agency solicits public comments on the draft Environmental Assessment Report. The Agency finalizes the Environmental Assessment Report and submits it to the Minister of the Environment to inform his or her environmental assessment decision.

8. Environmental Assessment Decision Statement

If the Minister decides that the project is likely to cause significant adverse environmental effects, the matter is referred to the Governor in Council (Cabinet) who will then decide if the likely significant adverse environmental effects are justified in the circumstances. The Environmental Assessment Decision Statement includes the determination of whether the project is likely to cause significant environmental effects. If the Minister's decision is that the project is not likely to cause significant adverse environmental effects or if the project is likely to cause significant adverse environmental effects that have been determined by the Governor in Council to be justified in the circumstances, the conditions with respect to mitigation measures and a follow-up program that the proponent must comply with for the proposed project to be carried out, are set out in the Environmental Assessment Decision Statement issued by the Minister.

20.3 Permitting Process

After the environmental assessment procedure has been completed and the Project has received the certificate of authorization from the MELCC and other government agencies, VONE will need to obtain specific authorizations, permits and licences from federal and provincial authorities before initiating construction activities. The provincial, federal and municipal legislation and regulations governing various authorizations, permits and licences that may be required are briefly outlined below.

20.3.1 Provincial Legislation and Regulations

Provincial legislation and regulations governing various authorizations, permits and licences that may be required are presented in Table 20-1.

Table 20-1: Provincial legislation and regulations governing the mine permitting process

Legislative act	Regulation/Policy
EQA (chapter Q-2)	Regulation respecting the application of section 32 of the EQA (chapter Q-2, r. 2)
	Regulation respecting the application of the EQA (chapter Q-2, r. 3)
	Clean Air Regulation (chapter Q-2, r. 4.1)
	Regulation respecting industrial depollution attestations (chapter Q-2, r. 5)
	Regulation respecting pits and quarries (chapter Q-2, r. 7)
	Regulation respecting compensation for adverse effects on wetlands and bodies of water (chapter Q-2, r. 9.1)
	Regulation respecting the declaration of water withdrawals (chapter Q-2, r. 14)
	Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere (chapter Q-2, r. 15)
	Regulation respecting the landfilling and incineration of residual materials (chapter Q-2, r.19)
	Regulation respecting wastewater disposal systems for isolated dwellings (chapter Q-2, r. 22)
	Regulation respecting the environmental and social impact assessment and review procedure applicable to the territory of James Bay and Northern Québec (chapter Q-2, r. 25)
	Ministerial Order concerning the fees payable under the EQA (chapter Q-2, r. 28)
	Regulation respecting snow elimination sites (chapter Q-2, r. 31)
	Regulation respecting hazardous materials (chapter Q-2, r. 32)
	Regulation respecting certain measures to facilitate the carrying out of the EQA and its regulations (chapter Q-2, r. 32.1)
	Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (chapter Q-2, r. 35)
	Québec residual materials management policy (chapter Q-2, r. 35.1)
	Water Withdrawal and Protection Regulation (chapter Q-2, r. 35.2)
	Land Protection and Rehabilitation Regulation (chapter Q-2, r. 37)
	Regulation respecting the quality of drinking water (chapter Q-2, r. 40)
	Regulation respecting a cap-and-trade system for greenhouse gas emission allowances (chapter Q-2, r. 46.1)
Act to amend the EQA to modernize the environmental authorization scheme and to amend other legislative provisions, in particular to reform the governance of the Green Fund (S.Q. 2017, c. 4)	

<table>
<tr><th>Legislative act</th><th>Regulation/Policy</th></tr>
<tr><td>Act respecting the conservation of wetlands and bodies of water (2017, chapter 14; Bill 132)</td><td></td></tr>
<tr><td>Act respecting the lands in the domain of the state (chapter T-8.1)</td><td>Regulation respecting the sale, lease and granting of immovable rights on lands in the domain of the State (chapter T-8.1, r. 7)</td></tr>
<tr><td>Watercourse Act (chapter R-13)</td><td>Regulation respecting the water property in the domain of the State (chapter R-13, r. 1)</td></tr>
<tr><td>Act respecting land use planning and development (chapter A-19.1)</td><td>Regulation respecting building permit information (chapter A-19.1, r. 1)</td></tr>
<tr><td rowspan="2">Sustainable Forest Development Act (chapter A-18.1)</td><td>Regulation respecting the sustainable development of forests in the domain of the State (chapter A-18.1, r. 0.01)</td></tr>
<tr><td>Regulation respecting forestry permits (chapter A-18.1, r. 8.1)</td></tr>
<tr><td>Act respecting the conservation and development of wildlife (chapter C-61.1)</td><td>Regulation respecting wildlife habitats (chapter C-61.1, r. 18)</td></tr>
<tr><td rowspan="4">Act respecting threatened or vulnerable species (chapter E-12.01)</td><td>Regulation respecting threatened or vulnerable wildlife species and their habitats (chapter E-12.01, r. 2)</td></tr>
<tr><td>Regulation respecting threatened or vulnerable plant species and their habitats (chapter E-12.01, r. 3)</td></tr>
<tr><td>Ministerial Order respecting the publication of a list of threatened or vulnerable plant species likely to be so designated and publication of a list of threatened or vulnerable vertebrate fauna likely to be so designated (chapter E-12.01, r. 4)</td></tr>
<tr><td>List of plant and wildlife species which are likely to be designated as threatened or vulnerable (chapter E-12.01, r. 5)</td></tr>
<tr><td rowspan="2">Mining Act (chapter M-13.1)</td><td>Regulation respecting mineral substances other than petroleum, natural gas and brine (chapter M-13.1, r.2)</td></tr>
<tr><td>Ministerial Order respecting the types of construction that the holder of a claim, a mining exploration licence or a licence to explore for surface mineral substances may erect or maintain on lands of the domain of the State without ministerial authorization (chapter M-13.1, r. 3)</td></tr>
<tr><td>Act respecting the land regime in the James Bay and New Québec territories (chapter R-13.1)</td><td></td></tr>
<tr><td>Act respecting hunting and fishing rights in the James Bay and New Québec territories (chapter D-13.1)</td><td></td></tr>
<tr><td rowspan="2">Act respecting occupational health and safety (chapter S-2.1, s. 223)</td><td>Regulation respecting the quality of the work environment (chapter S-2.1, r. 11)</td></tr>
<tr><td>Hazardous Products Information Regulation (chapter S-2.1, r. 8.1</td></tr>
<tr><td>Act respecting explosives (chapter E-22)</td><td>Regulation under the Act respecting explosives (chapter E-22, r.1)</td></tr>
<tr><td rowspan="2">Building Act (chapter B-1.1)</td><td>Construction Code (chapter B-1.1, r. 2)</td></tr>
<tr><td>Safety Code (chapter B-1.1, r. 3)</td></tr>
</table>

The Québec environmental legislative and regulatory framework has undergone significant changes in the recent past. The new EQA (chapter Q-2) entered into force on 23 March 2018. This date marks the beginning of the progressive implementation of a new environmental authorization scheme in Québec. Most implementing regulations are progressively being modified and implemented. In the meantime, the Regulation respecting certain measures to facilitate the carrying out of the EQA and its regulations (chapter 2, r. 32.1) specifies how to link the new authorization scheme with current regulations.

Consequently, an application for an authorization under Section 22 of the EQA must include the information and documents listed under Section 23 of the EQA, under Section 7 of the Regulation respecting the application of the EQA (chapter Q-2, r. 3) as well as under the third paragraph of Section 22 of the EQA as it read before 23 March 2018:

"The application for authorization must include the plans and specifications of the structure or project to use the industrial process, operate the industry or increase production and must contain a description of the apparatus or activity contemplated, indicate its precise location and include a detailed evaluation in accordance with the regulations of the Government of the quantity or concentration of contaminants expected to be emitted, deposited, issued or discharged into the environment through the proposed activity."

For mining projects, the Directive 019 on the Mining Industry is one of the main references that are used for the preparation of applications for authorization under Section 22 of the EQA.

A selection of provincial authorizations, permits and licences that may be required are presented in Table 20-2.

Table 20-2: Provincial authorizations, permits and licences that may be required for the mine permitting process

Authorizations, Permits and Licences	Provincial Ministry/Department
Authorization under Section 22 of the EQA (chapter Q-2)	Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC)
Lease for the occupation of the domain of the State under Section 47 of the Act respecting the lands in the domain of the State (chapter T-8.1)	
Forestry Permit for activities carried out by a holder of mining rights in exercising those rights under Section 73 of the Sustainable Forest Development Act (chapter A-18.1) In accordance with Section 213 of the Mining Act (chapter M-13.1)	Ministère des Forêts, de la Faune et des Parcs (MFFP)
Authorization for the extraction of a bulk sample over 50 metric tons under Section 59 of the Mining Act (chapter M-13.1)	Ministère de l'Énergie et des Ressources naturelles (MERN)
Mining Lease under Section 100 of the Mining Act (chapter M-13.1)	
Non-Exclusive Lease for the Mining of Surface Mineral Substances under Section 140 of the Mining Act (chapter M-13.1)	
Approval of the restoration plan under Section 232.1 of the Mining Act (chapter M-13.1)	
Approval for the location of a mill for the preparation of mineral substances or a concentration plant under Section 240 of the Mining Act (chapter M-13.1)	
Approval for a site to be used as a storage area for mine tailings under Section 241 of the Mining Act (chapter M-13.1)	
Lease for the occupation of the domain of the State under Section 47 of the Act respecting the lands in the domain of the State (chapter T-8.1)	
General, magazine and transport permits under Section 2 of the Regulation under the Act respecting explosives (chapter E-22, r. 1)	Ministère de la Sécurité publique
Permit for the use of high-risk petroleum equipment under Section 120 of the Safety Code (chapter B-1.1, r. 3)	Régie du bâtiment du Québec (RBQ)

20.3.2 Federal Legislations and Regulations

Federal legislation and regulations governing various authorizations, permits and licences that may be required are presented in Table 20-3.

Table 20-3: Federal legislation and regulations governing the mine permitting process

Legislative Act	Regulation/Policy
Canadian Environmental Protection Act, 1999 (S.C. 1999, c. 33)	Environmental Emergency Regulations (SOR/2003-307)
	Release and Environmental Emergency Notification Regulations (SOR/2011-90)
	Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations
Canadian Environmental Assessment Act, 2012 (S.C. 2012, c. 19, s. 52)	Regulations Designating Physical Activities (SOR/2012-147)
	Prescribed Information for the Description of a Designated Project Regulation (SOR/2012-148).
Fisheries Act (R.S.C., 1985, c. F-14)	Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations (SOR/2013-191)
	Metal and Diamond Mining Effluent Regulations (SOR/2002-222; MDMER)
Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22)	Migratory Birds Regulations (C.R.C., c. 1035)
Species at Risk Act (S.C. 2002, c. 29)	
Explosives Act (R.S.C., 1985, c. E 17)	Explosives Regulations, 2013 (SOR/2013-211)

A selection of federal authorizations, permits and licences that may be required are presented in Table 20-4.

Table 20-4: Federal authorizations, permits and licences that may be required for the mine permitting process

Authorizations, Permits and Licences	Federal Ministry/Department
Authorization to alter, disrupt or destroy fish habitat under Section 35(2) of the Fisheries Act (R.S.C., 1985, c. F-14)	Department of Fisheries and Oceans (DFO)
Notice Regarding the Identification of Substance and Place under Subsection 3(1) of the Environmental Emergency Regulations (SOR/2003-307)	Environment and Climate Change Canada (ECCC)
Explosive Factory Licence under Paragraph 7(1)(a) of the Explosives Act (R.S.C., 1985, c. E-17)	Natural Resources Canada (RNC)

20.3.3 Municipal Jurisdiction

Since the Project is located within the limits of the town of Chibougamau, municipal permits or certificates of authorization will be required for some activities in accordance with the "Règlement numéro 008-2002 (Permis et certificats)". The following elements will be required:

- Construction permit
- Certificate of authorization for soil excavation, removal of humus or cut and fill work affecting a volume of more than 50 m^3
- Certificate of authorization for construction and work that may affect the shore or the littoral.

20.4 Community Relations and Consultations

20.4.1 Legal Obligations

One of the many challenges existing for the mining industry, maybe the most important as evidenced by the news, is undoubtedly that of social acceptability (community acceptance). In light of the recent decisions from the Supreme Court of Canada in Haida, Taku River and Mikesew, the Cree Nation must be consulted at the outset of any mining project, including mining exploration taking place in the Eeyou Istchee Territory. Cree positions over such projects must be duly considered and, where necessary, accommodated.

In 2010, the GCC(EI) adopted a Cree Nation Mining Policy (GCC(EI), 2010), to develop a standardized, consistent and effective approach for Cree involvement in all mining related activities. This mining policy is based on three fundamental pillars one of which, "Transparency and Collaboration", means that the Crees believe that mineral exploration and mining activities in the territory should be a transparent and collaborative process. Through this policy, the Cree Government encourages proponents to establish direct and close liaisons with the communities and other Cree entities. Cree parties are to be involved as appropriate, at the earliest possible time in any proposed mining activity or mining projects to ensure that Cree rights, interests and benefits are properly protected and promoted.

20.4.2 Best Practices in Community Relations

Social acceptability is increasingly becoming an essential element in any project to develop energy or mineral resources, as well as projects in related economic sectors, in Québec. Citizens, regional and governmental bodies, elected officials, business, host communities, investors and environmental groups are more concerned than ever with the social acceptability of projects that are being developed on their territory. Increasingly, these stakeholders see the need for projects to be designed in collaboration with local communities (including concerned aboriginal communities) through a transparent information, consultation process and disclosure.

On 16 February 2016, the Québec Minister of Energy and Natural Resources (MERN) and Minister responsible for the Plan Nord, issued a Green Paper setting out the Guidelines regarding social acceptability (MERN, 2016). The goal of the Minister is clear: ensure that all the necessary steps are taken to promote a dialogue between the parties and reconcile economic prosperity with respect for living environments. To achieve this, the expectations and interests of local populations must be taken into account when planning and implementing land and resource development projects.

The social acceptability of a project depends, first and foremost, on implementing an effective and workable participatory process. Thus, developing mutual trust and understanding between the communities and the industry as well as an approach that respect the roles of the communities in terms 0f decision-making is a prerequisite for the success of any industrial project.

The MERN suggests that the following principles be put in place to inform and consult citizens and Aboriginal communities:

- The proponent has the primary responsibility of providing information about its project and setting up a public consultation process
- The proponent should launch the information and consultation process as soon as possible – either at the project design stage or when the project notice is accepted by MELCC, rather than when the environmental impact assessment is submitted – and continue the process throughout all subsequent stages
- The proponent is encouraged to establish a communication process based on transparency and the sharing of information
- The proponent must produce and disseminate clear, user-friendly information about the Project to make it easier to understand
- The proponent must set up a liaison committee with local elected representatives in the community concerned to gather information on regional realities and local issues and to inform them periodically about the progress of the Project.

Best practices guides and reference documents will also be produced by the MERN and distributed to proponents, municipal authorities, stakeholders, citizens and Aboriginal communities to ensure that as many players as possible participate. In addition, the MERN is currently preparing a guide for the consultation of Aboriginal communities for mining projects that will also be extended to projects in other sectors under its responsibility.

20.4.3 Stakeholder Engagement

As indicated in the Generic Guidelines for the Conduct of an Environmental Impact Assessment (MELCC, 2018d), the project proponent is strongly encouraged to adopt communication or engagement plans as part of its project development process, to begin the process of informing and consulting with the public and, where appropriate, Aboriginal communities, either before or after the filing of the project notice, involving all relevant stakeholders, including individuals, groups and communities, and ministries and other public and para-public organizations.

It is suggested that consultation be initiated as early as possible in the project planning process so that the views of stakeholders can have a real impact on the issues to be studied, the issues to be documented, the assessments, the choices and the decisions to be made. The earlier consultation occurs in the process leading to a decision, the greater the influence of the actors on the overall project, which may ultimately make it more socially acceptable. The stakeholder's information and consultation procedures undertaken by the project proponent may take different forms according to, in particular, the needs of the parties, the nature of the project, its location and its apprehended impacts on the territory of insertion. The objective is to establish a relationship of trust with the host community and, if possible, to bring about changes in project activities based on the concerns and comments expressed by the stakeholders consulted.

With respect to consultation with Ouje-Bougoumou (and maybe Mistissini), the proponent must favor the implementation of specific approaches and, to the extent possible, mutually agreed upon with them. The initiator of the project is invited to consult the following documents, which will guide him in his steps:

- COMEX (Review Committee), 2016. Consultations conducted by the proponent: expectations of the COMEX.
- Secrétariat aux affaires autochtones (SAA), 2015. Information for Developers and General Information Regarding Relations with Aboriginal Communities in Natural Resource Development Projects.
- MDDELCC, 2018. L'information et la consultation du public dans le cadre de la procédure d'évaluation et d'examen des impacts sur l'environnement – Guide à l'intention de l'initiateur de projet.

Based on Norda Stelo's past experiences in the Eeyou Istchee James Bay region and elsewhere in Québec and Canada, stakeholders to be engaged by VONE should include residents of the Chibougamau/Chapais area and the Ouje-Bougoumou Cree community as well as other potentially affected and/or interested stakeholders including municipal, provincial and federal government agencies and departments, non-governmental organizations and economic development organizations.

A preliminary list of stakeholders to engage is provided hereafter (in no specific order):

- O57 trapline tallyman (and family members, at the discretion of tallyman)
- Ouje-Bougoumou Cree Nation
- Chief and Band Council
- Local Cree Trappers Association representative.
    - The proximity of the study area and the traditional territory of Mistissini, and the fact that some members of this community shared trapline O57 with the Wapachee family until recently, suggests that the Mistissini First Nation should be added to the list stakeholders to engage (as it was the case for the Blackrock mining project). This should be discussed with the community of Ouje-Bougoumou.
- Traditional Pursuit Director (if any)
- Local Environment Administrator
- Economic development officer
- Local Cree Human Resources Development representative
- Town of Chibougamau Mayor and Council

- Développement Chibougamau.

Other stakeholders, including land users in the vicinity of the property (Pourvoirie Pomerleau, CIGAM, etc.), other communities (Chapais, Mistissini) and various ministries/agencies (MELCC, MERN, MFFP, Société du Plan Nord, etc.), will also need to be consulted in due course.

21 Capital and Operating Costs

21.1 Capital Costs

Upfront capital costs are estimated at C$457.5 million with a pay back of 3.0 years with an after-tax IRR of 33.8% (Table 21-1). Sustaining capital is estimated at C$600.7 million over the LOM and is principally related to equipment replacement. Capital costs include a continency of 15% for equipment and 30% for plant and infrastructure. It should be noted that included within mine capital costs is C$229.1 million (C$28.8 million initial CAPEX) for the mining fleet and C$226 million (C$31.5 million initial CAPEX) for rail cars for concentrate transport. Based upon expressions of interest from vendors, VONE management is of the view these items can be readily leased to reduce initial capital needs with an increase in operating costs. This will be determined at a later date, based upon the receipt of more formal quotes, as will a review of the potential benefits of using contract mining.

Table 21-1: Project CAPEX summary

Area	Capital Cost (C$)
Mining Equipment Capital	62,951,917
Rail Cars Capital	31,500,000
Process Plant Capital (incl first fill)	102,139,195
Infrastructure Capital	116,613,500
Subtotal Project Capital	**313,204,612**
Mining Sustaining Capital	478,959,606
Process Sustaining Capital	20,833,590
Infrastructure Sustaining Capital TMF	15,000,000
Subtotal Sustaining Capital	**514,793,196**
EPCM	28,420,000
Construction and Freight	36,137,553
Plant Working Capital	7,750,000
Project Contingency	129,612,498
Closure Cost	28,200,000
Subtotal EPCM and Working Capital	**72,307,553**
TOTAL CAPITAL	**1,058,117,859**

Note: EPCM – engineering, procurement and management construction.

21.1.1 Mining

The mine capital costs are estimated from quotations from equipment vendors, information supplied by rail car manufacturers, CN rail transport, and CSA Global's database of similar projects within the same area or conditions. The distribution of the capital cost is completed using the units required within a period. If new or replacement units are needed, that number of units, by unit cost, determines the capital cost for that period. There is no allowance for escalation in any of these costs.

Timing of major capital equipment costs is one year in advance of the need for that piece of equipment. The major mining equipment costs are shown in Table 21-2 and Table 21-3.

Table 21-2 Mine Capex Summary

Area	Capital Cost, (C$)
In-Pit Production Fleet	28,800,000
Support Mining Fleet	27,430,000
Auxiliary Mine Equipment	6,721,917
Rail Cars	31,500,000
Sustaining Capital	478,959,606
Subtotal Mining Equipment (incl Sustaining)	**573,411,523**
Mobile Rail Equipment Contingency (15%)	67,111,728
Total Mining Capital Cost	**640,523,251**

Replacement times for the equipment are average values from CSA Gobal's experience. Options around rebuilds and recertification of equipment such as rail cars is not considered, nor is used equipment, although that should be considered during the purchase of the mine fleet.

The balancing of equipment units based on operating hours is completed for each major piece of mine equipment. The smaller equipment was based on number of units required, based on operational experience. This includes pickup trucks (dependent on the field crews), lighting plants, mechanics trucks, etc.

The most significant pieces of major mine equipment are the haulage trucks, excavators, shovels, and FEL's. At the peak of mining, 14 units are necessary to maintain mine production.

The other major mine equipment is determined in the same manner. In some instances the loaders have a longer period of life (same number of hours between replacements) due to the sharing of hours with the other units in the fleet.

The support equipment is usually replaced on a number of year's basis. For example, pickup trucks are replaced every four years, with the older units possibly being passed down to other departments on the mine site, but for capital cost estimating new units are considered for mine operations, engineering, geology, and support.

Table 21-3 Detailed Mine Equipment Capex

Description	Initial Units	Initial Capital (C$)	Replacement Units	Total Sustaining (C$)	Total Equipment Capex (C$)
Main OP Equipment					
Excavator	2	14,200,000	5	35,500,000	49,700,000
Front End Loader	1	1,200,000	5	6,000,000	7,200,000
Haul Truck	14	57,400,000	28	114,800,000	172,200,000
Dozer	2	3,200,000	10	16,000,000	19,200,000
Wheel Dozer	1	1,800,000	3	5,400,000	7,200,000
Grader	2	3,800,000	10	19,000,000	22,800,000
Water Truck	2	3,400,000	10	17,000,000	20,400,000
Excavator	2	1,200,000	8	4,800,000	6,000,000
LH Drill	3	7,800,000	21	54,600,000	62,400,000
LH Drill	2	3,200,000	10	16,000,000	19,200,000
Rock breaker	1	150,000	5	750,000	900,000
Wheel Loader	2	1,080,000	10	5,400,000	6,480,000
Low boy track	2	1,800,000	10	9,000,000	10,800,000
Subtotal OP Equipment		**100,230,000**		**304,250,000**	**404,480,000**

Description	Initial Units	Initial Capital (C$)	Replacement Units	Total Sustaining (C$)	Total Equipment Capex (C$)
OP Support Equipment					
Mechanic service trucks	2	465,100	8	1,860,200	2,325,300
Integrated Tool Carrier	2	700,000	8	2,800,000	3,500,000
Tire service truck	1	203,500	8	1,627,700	1,831,200
Fuel & lube truck	2	639,500	16	5,115,700	5,755,200
Dispatch system	1	1,453,300	5	7,266,600	8,719,900
Lowboy trailer 150 ton	1	941,800	3	2,825,300	3,767,100
Lowboy tractor head	1	930,100	4	3,720,500	4,650,600
Pit busses	2	116,300	14	813,900	930,200
Pickup trucks	20	651,100	160	5,208,700	5,859,800
Portable Lighting plants	8	111,600	64	892,900	1,004,500
Excavator w/Impact Hammer	1	509,800	8	4,078,100	4,587,900
Subtotal Support Equipment		**6,722,100**		**36,209,600**	**42,931,700**
Rail Cars	720	63,000,000	720	63,000,000	126,000,000
TOTAL Equipment Cost		**169,952,100**		**403,459,600**	**573,411,700**
OP Equipment Contingency (15%)		16,042,800		51,068,900	86,011,800
TOTAL Equipment Capex (Incl Contingency)		**185,994,900**		**454,528,500**	**640,523,400**

21.1.2 Concentrator

The concentrator capital cost estimate covers all or some of the following areas, depending on the option:

- Crushing and stockpiling: Crushers, access ramp, retaining wall, screens, and various conveyors.
- Main concentrator area: Feed conveying from crushed mineralized material stockpiles, grinding, regrinding, magnetic separation, classification, dewatering thickeners, filter and dryer, pumps and pipelines.
- Infrastructures and services: Access and plant roads, electrical substation and distribution, process and gland seal water, reclaim water, potable water, domestic waste water treatment plant, fire water distribution, HVAC, compressed air, administration building, workshop, warehouse, security gate, tailings management facilities.

The overall capital cost for the concentrator includes the costs for the buildings and foundations as well as the costs of all mechanical equipment for the crushers, the conveyors, and main concentrator area, and other related equipment. The costs also include services, power and its distribution as well as communications. Table 21-4 shows the summary of the total estimated costs for the concentrator.

Table 21-4: Summary of concentrator capital cost estimate

Area	Capital costs (C$)
Equipment	47,582,400
Electrical	10,500,000
Structural steel	5,800,000
Concrete	6,250,000
Piping and instrumentation	14,500,000
Mill building	5,650,000
Concentrate building	790,000
Insulation	650,000
Total	**91,722,400**

21.1.3 Concentrator Infrastructure

The concentrator infrastructure includes the costs for the various site roads as well as the cost of the buildings. The main roads are the access road to the mine site, the roads between the concentrator, crushers and the mine site. The related facilities are included in this area, such as the administration building and warehouse complex.

The capital cost for the tailings facilities management includes the costs for the mobile equipment and the pump stations. It also includes the cost for the pipelines as well as that for the tailings dam construction.

A summary of the costs is shown in Table 21-5.

Table 21-5: Summary of infrastructure capital cost estimate

Area	Capital costs (C$)
Haulage roads and site roads	2,750,000
Water distribution, water wells	3,250,000
Mine equipment workshop	2,002,500
Mine warehouse	2,500,000
Fuel storage and filling station	1,694,000
Explosives magazine and preparation	250,000
Pipelines from and to plant	1,500,000
Administration/office buildings	1,980,000
Site drainage and settling ponds	1,845,000
Power	14,770,000
Communications	325,000
Security gatehouse	65,000
Tailings management facility	23,300,000
Port facility	15,000,000
Railroad	27,000,000
Rail load-out and maintenance workshop	18,382,000
Total	**116,613,500**

21.2 Operating Costs

The operating costs include manpower to run the overall operations. It is expected that a total of 557 people will be required for all operations including mining, concentrator, G&A, and mobile equipment personnel, as detailed in Table 21-6:

The LOM operating costs are estimated at C$52.38/t of concentrate produced and delivered to the port of Saguenay and loaded onto a vessel (Table 21-7). Additional selling costs related to ocean freight are expected to add C$27.78/t of concentrate assuming delivery to China. Transport costs could be reduced significantly should VONE find a North American purchaser.

Table 21-6: Total Personnel Requirements

Personnel by Area	Head Count
Mining Operations	262
Mining Maintenance	129
Sub-total Mining	**391**
Concentrator Operations	82
Concentrator Maintenance	26
Sub-total Concentrator	**108**
Supporting Mobile Equipment Operations	25
Supporting Mobile Equipment Maintenance	5
Sub-total Supporting Mobile Equipment	**30**
G& A	**28**
Total Personnel	**557**

Table 21-7: OPEX summary

Area	C$/t feed	C$/t concentrate
Mining	4.32	13.55
Processing	3.62	11.35
Rail Transport	8.02	25.12
G&A (incl TMF)	0.75	2.36
Total Opex (FOB Saguenay)	**16.72**	**52.38**
Ocean Freight to China	8.87	27.78
Total Opex (CFR China)	**25.58**	**80.16**

Note: Cash Costs is a non International Financial Reporting Standards (IFRS) financial performance measure with no standard definition under IFRS. VONE provides them as supplementary information that management believes may be useful investors.

21.2.1 Mining

The average mining costs expressed in C$/t of different material categories are presented in Table 21-8. The mining cost base rate is C$2.29/t for all material mined (mineralized material and waste).

Table 21-8: Average LOM Mining Costs

Zone	C$/t Mineralized Material	C$/t All material mined	C$/t Concentrate
North	4.60	2.29	12.76
South	3.95	2.38	16.81
Total	**4.32**	**2.29**	**13.55**

21.2.2 Processing

The processing operating costs for the Project were estimated annually, based on the mine plan developed for the purposes of the Project. The operating costs of the average LOM of operations have been detailed for each option and are considered representative of the typical average cost for the life of the mine.

The operation has been divided into four areas, namely:

- Labour
- Reagents and consumables

- Power and utilities
- Material handling.

The summary of the overall operating costs for the concentrator on an annual basis and on a cost per tonne of concentrate are presented in Table 21-9.

Table 21-9: Material produced by option

Operating cost area	Total annual cost (C$)	Cost (C$/t concentrate)
Labour	12,665,625	2.53
Reagents and consumables	15,997,073	3.20
Power and utilities	24,065,658	4.81
Material handling	4,040,400	0.81
Total operating cost	**56,768,756**	**11.35**

The G&A costs were based on C$0.64/t feed (Table 21-10) or approximately $10.05 million per year. This cost covers expected costs associated with the General Manager and other Administration personnel are included. Offices in the local area and their costs are also part of the G&A cost calculation.

The tailings management cost has been estimated based on C$0.11/t feed (Table 21-10) or approximately C$1.75 million per year. Includes the magnetic separation plant that will be generating material that will be dewatered and placed on the TSF pad for long-term disposal via HDPE pipelines.

Table 21-10: G&A Cost

G&A Cost Area	C$/t feed	C$/t con
Waste & Tailings Management	0.11	0.35
G & A	0.64	2.01
Total G&A (incl. TMF)	**0.75**	**2.36**

The project is near the town of Chibougamau and the CN rail link that is intended to be used to transfer concentrate from site storage facility to the Port of Saguenay using CN rail services and the Company's loading and unloading facilities and personnel. The company has envisioned to purchase 720 rail cars to accommodate approximately 14,000 tpd concentrate produced by Mont Sorcier project.

To overcome low temperatures, high winds and heavy rain the Company will construct a dry storage facility that can be operated year-round and will maintain the rail freight schedule without interruption. Additionally, a second storage facility and rail cars unloading arrangement will be constructed in conjunction with Saguenay Port Authority to facilitate the concentrate shipping to China. Cost associated with handling, rail transport, ship loading, and ocean freight detailed within the Table 21-11:

Table 21-11: Concentrate Transportation Cost

Concentrate Transport Cost Area	C$/t feed	C$/t con
Rail Rehandle Fee	0.27	0.83
Rail concentrate to Saguenay	5.12	16.05
Loading and Handling Saguenay Port	2.63	8.24
Subtotal Transport to Saguenay Port	**8.02**	**25.12**
Saguenay to China	8.87	27.78
Total Transportation Cost (CFR China)	**16.88**	**52.90**

22 Economic Analysis

22.1 Caution to the Reader

The reader is cautioned that the PEA reported in this Report is preliminary in nature and uses Inferred and Indicated Mineral Resources; Mineral Resources are not Mineral Reserves and by definition do not demonstrate economic viability. Inferred Mineral Resources are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that the PEA outcomes will be realized.

22.2 Model Assumptions

To analyze the economic potential of the Mont Sorcier deposit, CSA Global created a discounted cash flow (DCF) model for the Project based on the mining inventory developed during this PEA as described in Section 16. The DCF model was developed in Microsoft Excel to analyse the economic potential, including:

- Total revenue
- Operating and capital costs
- Mining royalties (3%)
- Mining duties and corporate income taxes
- Iron and vanadium concentrate transportation by rail to the port at Saguenay and shipping to China
- The IRR
- Pre-tax and post-tax cash flow
- NPVs at various discount rates.

In addition, the model calculates:

- The period required to repay the initial capital investment
- The operating cost per dry metric tonne of concentrate
- The all-in sustaining cost
- The all-in cash cost, IRRs, cash flows (pre-tax and post-tax) and NPVs at higher and lower concentrate prices and operating and capital costs.

The underlying assumptions and parameters for the DCF include:

- All units of measurement are metric unless otherwise stated
- All dollars are C$ unless otherwise stated
- No inflation or escalation is assumed (i.e. all dollars are real 2020 C$)
- The concentrate price has been based on analysts' consensus and vanadium credits CFR Port in China, as explained earlier in this Report.

CSA Global has developed one mining schedule for the two deposits at the Mont Sorcier open pit project. The DCF model for the PEA is based on mining the two deposits sequentially. Mining will commence in the South deposit at a production rate of approximately 17 Mtpa and ramp up to 20 Mtpa of mineralized material to year 5. At that time, mining will commence in the North deposit and both will be mined with a combined mineralized material production rate of 20 Mtpa until year 15 when the South deposit will be exhausted. The North deposit continues to the end of the mine life with a mineralized material production rate of 15 Mtpa. The mining schedule has been designed so that the processing plant will produce an average 5 Mtpa of iron and vanadium concentrate.

Table 22-1 summarizes the Project metrics for the PEA open pit mining.

Table 22-1: PEA results summary

	Units	Value
Assumptions		
Iron and vanadium concentrate	C$/dmt	140.79
Exchange rate	US$:C$ C$:US$	1:1.32 1:0.76
Production profile		
Total tonnes of mineralized material mined and processed	Mt	554.9
Total tonnes waste mined	Mt	492.9
Total Material Mined	Mt	1,047.8
Strip ratio	Waste:feed (tw:tf)	0.89
Peak tonnes per day mineralized material mined	Tonnes	55,950
Average iron grade in ROM	Fe_2O_3%	23.02
Total concentrate produced	Mt	177.1
Concentrate iron grade	Fe%	65.25
Vanadium grade in concentrate	V_2O_5%	0.56
Peak annual concentrate production	Mt	5.0
Mine life	years	37
Unit operating costs		
LOM average cash cost	C$/dmt	80.2
All-in sustaining cost (1,2)	C$/dmt	87.8
Project economics		
Royalties	%	3.0
Average annual EBITDA	C$ M	271.2
Pre-tax NPV 8.0% / After-tax NPV 8.0%	C$ M	2,505 / 1,699
Pre-tax IRR / After-tax IRR	%	41.5 / 33.8
Undiscounted operating pre-tax cash flow / after-tax cash flow	C$ M	8,968 / 6,214
After-tax payback period	years	3.0

(1) All-in sustaining cost per tonnes of dry concentrate represents mining, processing and site G&A costs, royalty, offsite costs and sustaining capital expenditures, divided by dry metric tonnes of concentrate produced.
(2) CSA Global has used the following definitions of Operating Costs, All-in-Sustaining Costs and All-in Costs: In the current project, Operating Costs include all operating costs. All-In-Sustaining Costs include operating costs plus sustaining capital. Finally, All-In Costs include operating costs, initial capital, and sustaining capital.

The DCF model allows for a two-year pre-production period in which to construct the processing plant, complete other required surface infrastructure including land acquisition and the initial waste stripping of the open pit. Once mining commences, the Project has a 37-year mine life.

CSA Global has estimated metal recovery of iron and vanadium based on metallurgical testwork available to date. Once commissioned, the processing plant will produce an iron and vanadium concentrate which will be transported by rail from site via Chibougamau to the port at Saguenay and shipped to China.

22.3 Market Survey

In preparation for the PEA, VONE commissioned an Independent Market Pricing Study to determine the potential value that should be recognized from the vanadium-rich iron mineralized material product produced by Mont Sorcier, given the lack of available quoted market index prices. The study is summarised in Section 19 of this Report and a concentrate selling price of US$107/t or C$140.79/t has been used in this PEA.

22.4 Mine Production Summary

The mining schedule consists of two open pit operations, North and South deposits. Table 22-2 summarises the proposed mining inventory. CSA Global has used a magnetite recovery of 35.5% magnetite (on average) and a V_2O_5 recovery of 50.0% as presented in the block model, based on metallurgical testwork available to date. An iron cut-off grade of 25% was applied to the North deposit and a zero cut-off grade to the South deposit reflecting better test magnetite recoveries from this deposit. The Mont Sorcier Project will produce an iron and vanadium concentrate that will be sent by rail and ship to China.

Table 22-2: Proposed mining inventory

Category	Unit	Total
South deposit		
Feed mined	t	185,149,518
Grade	Fe_2O_3%	28.59
Waste mined	t	121,257,362
Strip ratio	tW:tFeed	0.65
North deposit		
Feed mined	t	369,748,113
Grade	Fe_2O_3%	20.18
Waste mined	t	371,648,309
Strip ratio	tW:tFeed	1.01
COMBINED		
Total feed mined	**t**	**554,897,631**
Grade	**Fe_2O_3%**	**22.99**
Total waste mined	**t**	**492,905,671**
Strip ratio	**tW:tFeed**	**0.89**
Total Rock Mined	**t**	**1,047,803,302**

22.5 Operating and Capital Cost Summary

Operating and capital costs have been estimated by CSA Global based on variety of sources such as benchmark rates, data from CSA Global databases of similar projects, indicative quotes and on first principles. The results of this work are summarized in Table 22-3 and Table 22-4 and are reflected in the DCF model.

Table 22-3: Project operating costs

Operating costs (1)	LOM (C$ M)	$/dmt concentrate recovered
Mining costs	2,399	13.5
Processing costs	2,010	11.4
G&A costs	418	2.4
Cash Costs	**4,827**	**27.3**
Royalty (3%)	748	4.2
Offsite costs (transport and shipping costs)	9,368	52.9
TOTAL CASH COSTS	**14,943**	**84.4**
Sustaining capital	518.6	2.9
All-in sustaining cost (2)	**15,462**	**87.3**

(1) Due to rounding, some columns may not total exactly as shown.

(2) All-in sustaining cost per dry metric tonne of concentrate represents mining, processing and site G&A costs, royalty, offsite costs and sustaining capital expenditures, divided by 117.1 million dry metric tonnes of concentrate produced.

Table 22-4: Project total capital costs

Capital costs	Initial (C$ M)	Sustaining capital (C$ M)	LOM (C$ M)
Mining (including rail facilities)	170.0	403.5	573.5
Processing (including infrastructure)	218.8	35.8	254.6
Total direct costs	**388.8**	**439.3**	**828.1**
Indirect and owner's costs	72.3	-	72.3
Total indirect costs	**72.3**	-	**72.3**
Mining contingency	16.0	51.1	67.1
Plant contingency	62.5	-	62.5
Closure	-	28.2	28.2
TOTAL CAPITAL	**539.6**	**518.6**	**1058.2**

Note:

- *The mining contingency allows 15% for the initial capital costs for the mobile and railway equipment and another 15% for the replacement of the support equipment.*
- *The plant contingency of 30% has been allowed for the plant and site infrastructure costs.*

22.6 Concentrate Transport and Shipping Charges

The Microsoft Excel model assumes that all Mont Sorcier concentrate produced on site, with a moisture content of 3%, will be subsequently railed to the Port of Saguenay and then shipped to China for treatment and refining. The charges on a Cost and Freight (CFR) basis where VONE will pay for shipping the goods until the final port of destination.

CSA Global has assumed the following charges based on industry norms with the following terms:

- Rail transport from site to the Port of Saguenay C$24.39 per wet metric tonne, includes:
  - Rail re-handle fee – C$0.81/t
  - Rail costs – C$15.58/t
  - Loading and handling at the port – C$8.00/t.
- Shipping charges to China – C$27.78 per wet metric tonne.

22.7 Royalties and Taxation

22.7.1 Royalties

A pre-tax royalty of 3% revenue was used comprised of:

- Mines Indépendantes Chibougamau retain a 2% Gross Metal Royalty (GMR) on all mineral production from the property
- Globex Mining Enterprises holds a 1% GMR on all claims.

The royalty was deducted prior to the cash operating cost income.

22.7.2 Taxes

The minimum mining tax in Québec is calculated on the mine monthly output value for all the operator's mines. The minimum tax of an operator corresponds to the aggregate of the following amounts:

- 1% for the portion of the mine-mouth output value that does not exceed the C$80 million threshold
- 4% for the portion of the mine-mouth value that exceeds the C$80 million threshold.

The Québec mining tax on annual profit is calculated using progressive tax rates, with each rate applying to a portion of the annual profit as determined on the basis of the operator's profit margin. The profit margin is calculated by dividing the annual profit by the gross value of the annual output. Table 22-5 below shows the tax rate that applies to each portion of the annual profit per profit margin segment. On this occasion the profit margin calculation fell in the first segment, hence a mining tax of 16% was applied.

Table 22-5: Québec mining tax rates

Profit margin		Tax rate
First segment	**0% to 35%**	**16.00%**
Second segment	35% to 50%	22.00%
Third segment	50% to 100%	28.00%

In addition to the Québec mining tax, a combined corporate income tax of 26.5% was applied, which is made up of 15% for federal purposes plus 11.5% for Québec.

22.8 Overall Project Economics

The overall project shows potentially robust economic results with a an after-tax NPV at 8% discount rate of C$1,699 million and IRR of 33.8%. Project economics are based on a potential 37-year mine life with a three-year payback period, with positive after-tax cash flow commencing in year 1.

Total cumulative, after-tax free cash flow over the LOM is estimated at C$6,253 million, as shown in Figure 22-1.

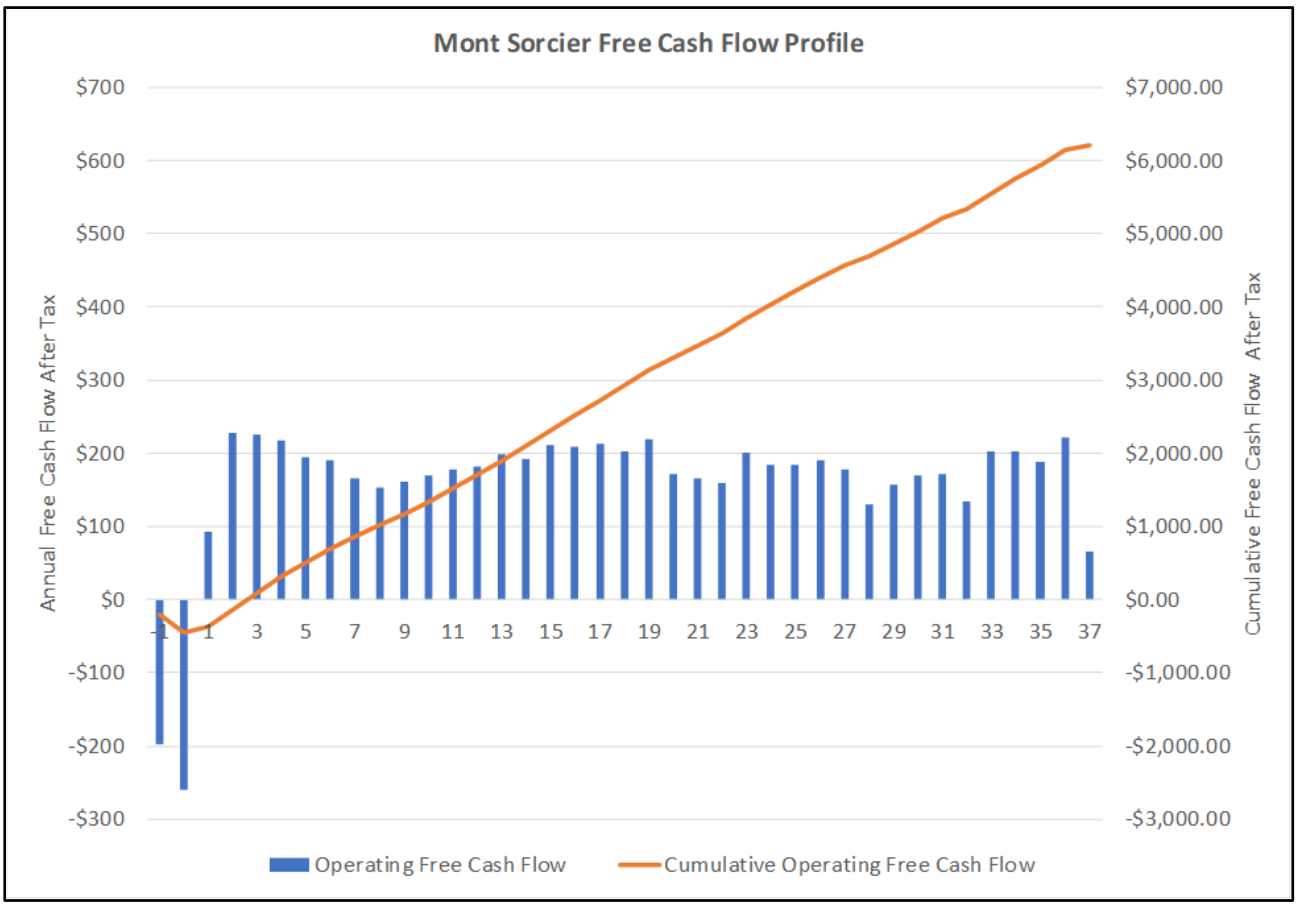

Figure 22-1: Mont Sorcier cash profile (C$ M)
Source: CSA Global, 2020

Based on the schedule and the items outlined in the preceding sections, the DCF model calculates the IRR, and the NPV of the cash flow at 5%, 7.5%, 10% and 15% discount rates. All NPVs are discounted to the mid-year. The model also calculates the "Payback Period" (the time required for the Project repay the initial capital) with the same discount rates.

The model also calculates the cash operating cost per tonne of material mined/processed and the All-In Sustaining Cost. The model calculates these variables on:

- A pre-tax basis; and
- A post-tax basis.

Table 22-6 to Table 22-8 provide the key metrics for the Project from the DCF model.

Table 22-6: EBITDA and net profit to Project with tax credit

Economic results	Total (C$ M)
EBITDA	**9,968**
Less: Book depreciation	1,019
Corporate income taxes and Québec mining duties	2,715
Net profit after taxes	**6,214**

Table 22-7: Project pre-tax results summary

Pre-tax	Total (C$ M)
IRR	41.5%
Undiscounted pre-tax cash flow	8,929
NPV at 5%	3,777
NPV at 7.5%	2,670
NPV at 8.0%	**2,505**
NPV at 10%	1,969
NPV at 15%	1,169

Table 22-8: Project post-tax results with tax credit summary

Post-tax with tax credit	Total (C$ M)
IRR	33.9%
Undiscounted post tax cash flow	6,214
NPV at 5%	2,595
NPV at 7.5%	1,816
NPV at 8.0%	**1,699**
NPV at 10%	1,320
NPV at 15%	752

A DCF model was completed for the Project based on the various inputs and costs outlined in this document. The cash flow model summary is presented in Appendix A.

22.9 Sensitivity Analysis

To better understand the economic viability of the Project, CSA Global has undertaken a sensitivity analysis of the Mont Sorcier Project. Figure 22-2 to Figure 22-5 (below) chart the sensitivity of the Project's pre-tax and post-tax IRR and NPV discounted at 8% to changes in concentrate price, capital and operating costs. Concentrate prices, capital and operating costs were varied from -30% to +30%.

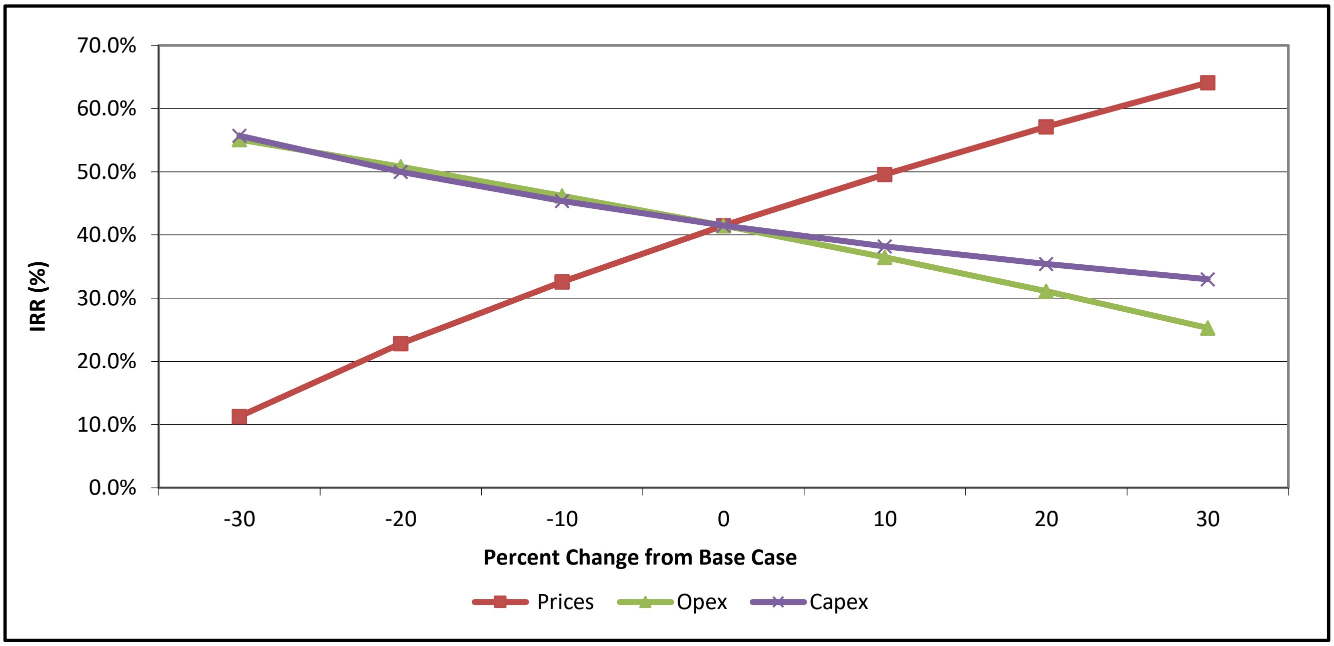

Figure 22-2: Pre-tax IRR sensitivity at a 8% discount factor with changes to concentrate price and capital and operating costs

Source: CSA Global, 2020

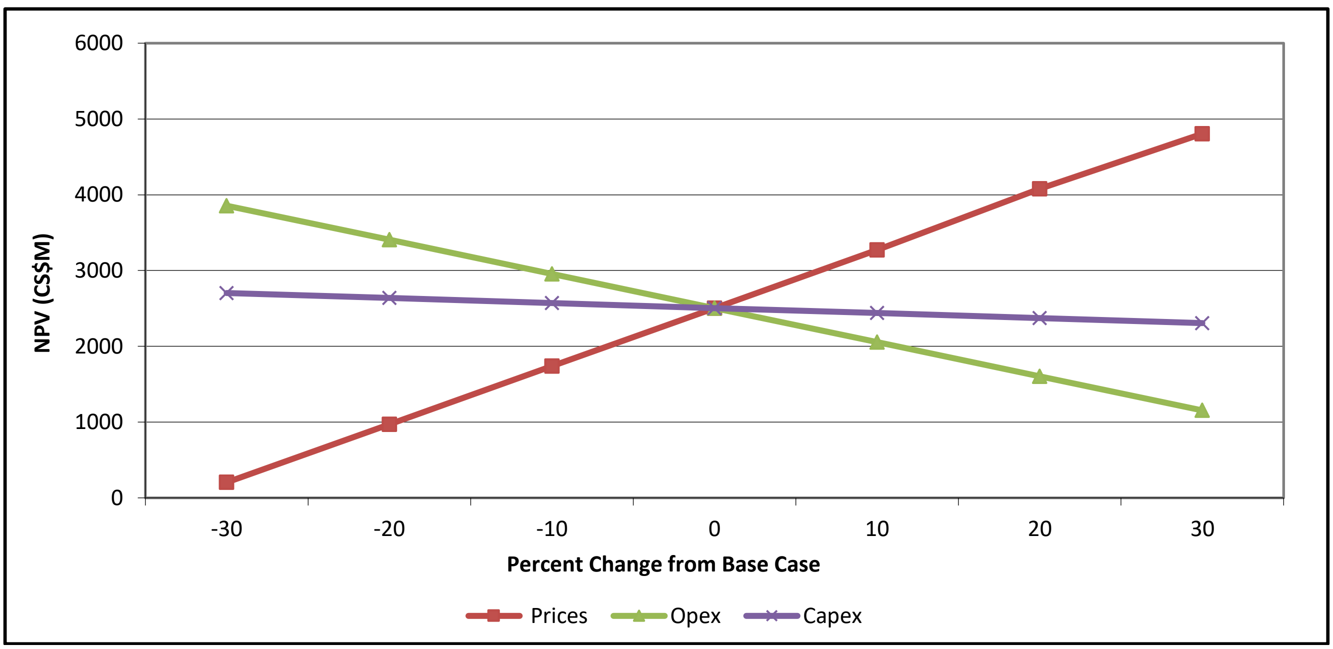

Figure 22-3: Pre-tax NPV sensitivity at a 8% discount factor with changes to the concentrate price and capital and operating costs (C$ M)

Source: CSA Global, 2020

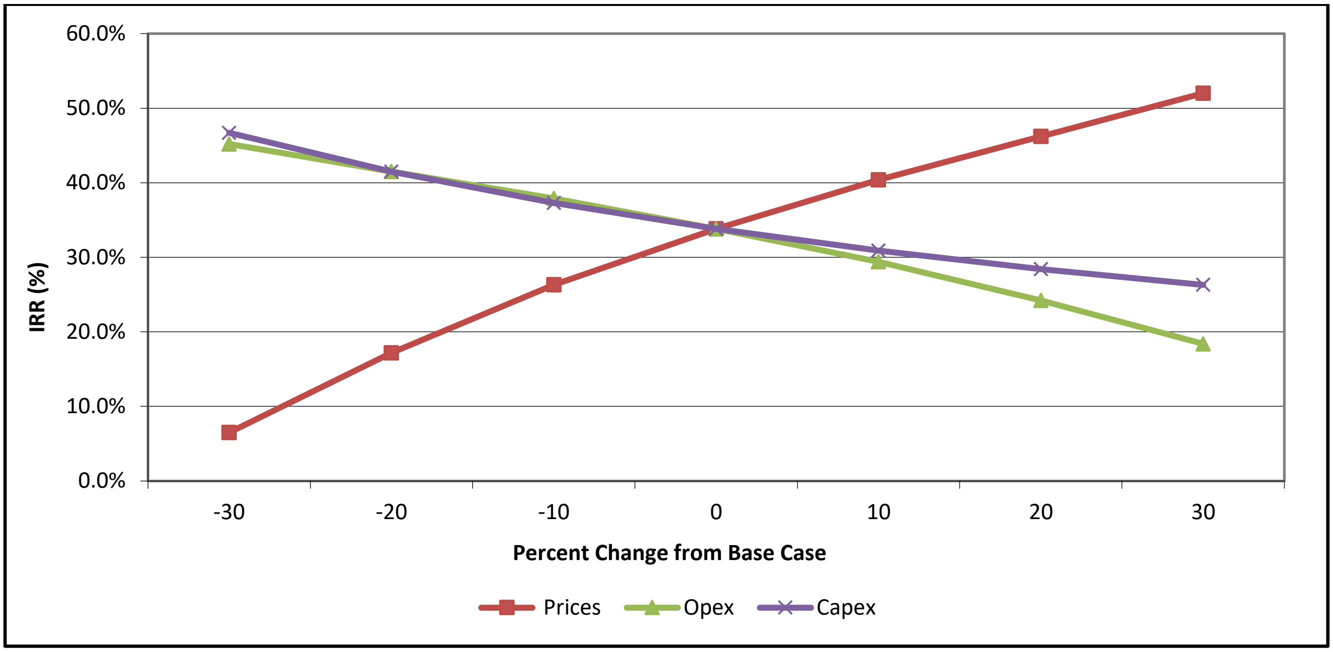

Figure 22-4: Post-tax IRR sensitivity at a 8% discount factor with changes to concentrate price and capital and operating costs

Source: CSA Global, 2020

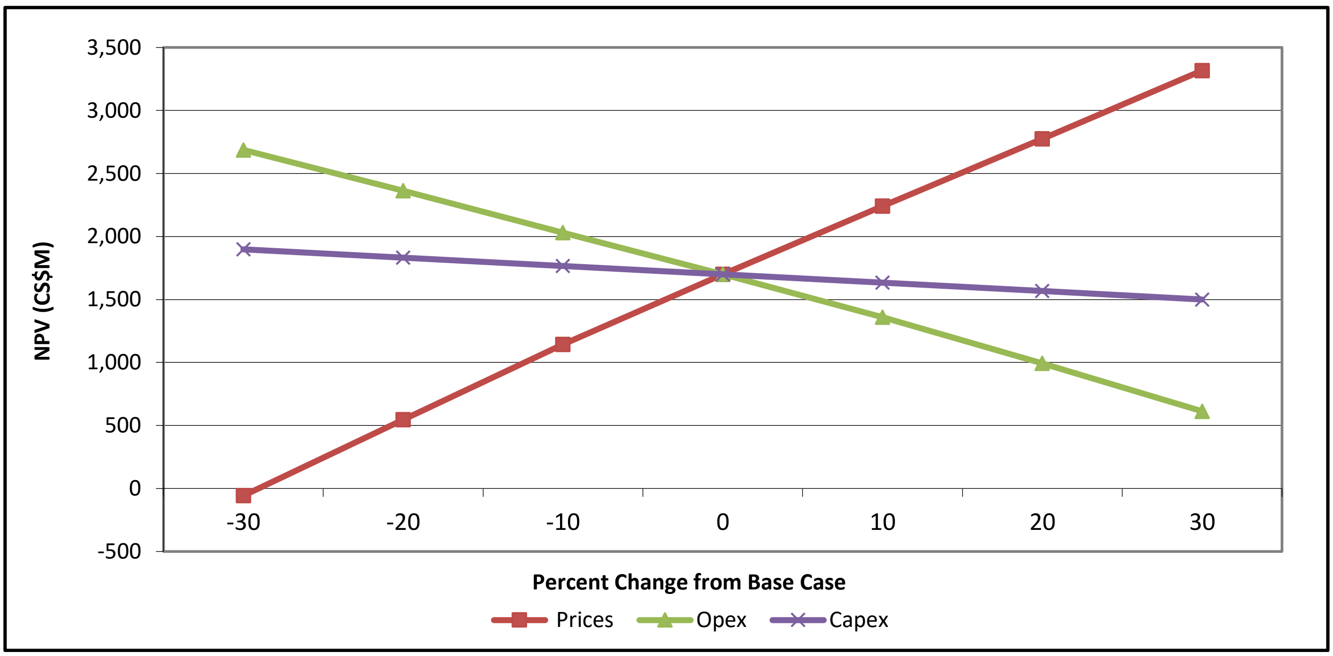

Figure 22-5: Post-tax NPV sensitivity at a 8% discount factor with changes to the concentrate price and capital and operating costs (C$ M)

Source: CSA Global, 2020

As would be expected, the Project is most sensitive to metal prices, followed by operating costs and finally capital costs. The Mont Sorcier Project is robust at a CFR concentrate price of C$140.79/dmt. Even a 20% reduction in metal prices produces a positive post-tax cash flow of C$546 million (Table 22-9).

Table 22-9: Sensitivity of Project at a base concentrate price of C$140.79/dmt ±30% post-tax with a 3% royalty

Change	Project (post-tax)			
	Base value	IRR	Cash flow (C$ M)	NPV @ 8% (C$ M)
-30%	-30%	6.5%	$767	-$57
-20%	-20%	17.2%	$2,641	$546
-10%	-10%	26.3%	$4,485	$1,143
Base	+100%	33.9%	$6,214	$1,699
+10%	+10%	40.4%	$7,918	$2,240
+20%	+20%	46.2%	$9,615	$2,774
+30%	+30%	52.0%	$11,321	$3,317

22.10 Site Operating Costs Summary (units costs)

The site operating costs are summarized in Table 22-10. The following definitions of Operating Costs, All-in-Sustaining Costs and All-in Costs have been used in the current project: Operating Costs include all operating costs. All-in-Sustaining Costs include operating costs plus sustaining capital. Finally, All-in Costs include operating costs, initial capital, and sustaining capital less by-product credits.

Table 22-10: Operating cost summary

Cost area	Total	C$/dmt
Operating costs		
Dry concentrate production (Mt)	177.1	
Operating costs including mining, processing etc. (C$ M)	$4,827	$27.3
Royalties (C$ M)	$748	$4.2
Rail Transport costs to Saguenay Port (C$ M)	$4,448	$25.1
Ocean Freight to China (C$ M)	$4,920	$27.8
Total operating costs (C$ M)	**$14,943**	**$84.4**
All-in sustaining costs (includes sustaining capital but not initial capital)		
Operating costs (C$ M)	$14,943	$84.4
Plus: Sustaining capital (C$ M)	$518.6	$2.9
All-in sustaining costs (C$ M)	**$15,462**	**$87.3**

23 Adjacent Properties

The properties to the west of the Mont Sorcier Property are currently held by Chibougamau Independent Mines Ltd, who hold several licences in the region. Many of these licences are for gold, copper, silver and zinc mineralization. The properties immediately to the west of Mont Sorcier (Figure 23-1) may host continuations of the VTM mineralization described in this Report, but this has not yet been tested.

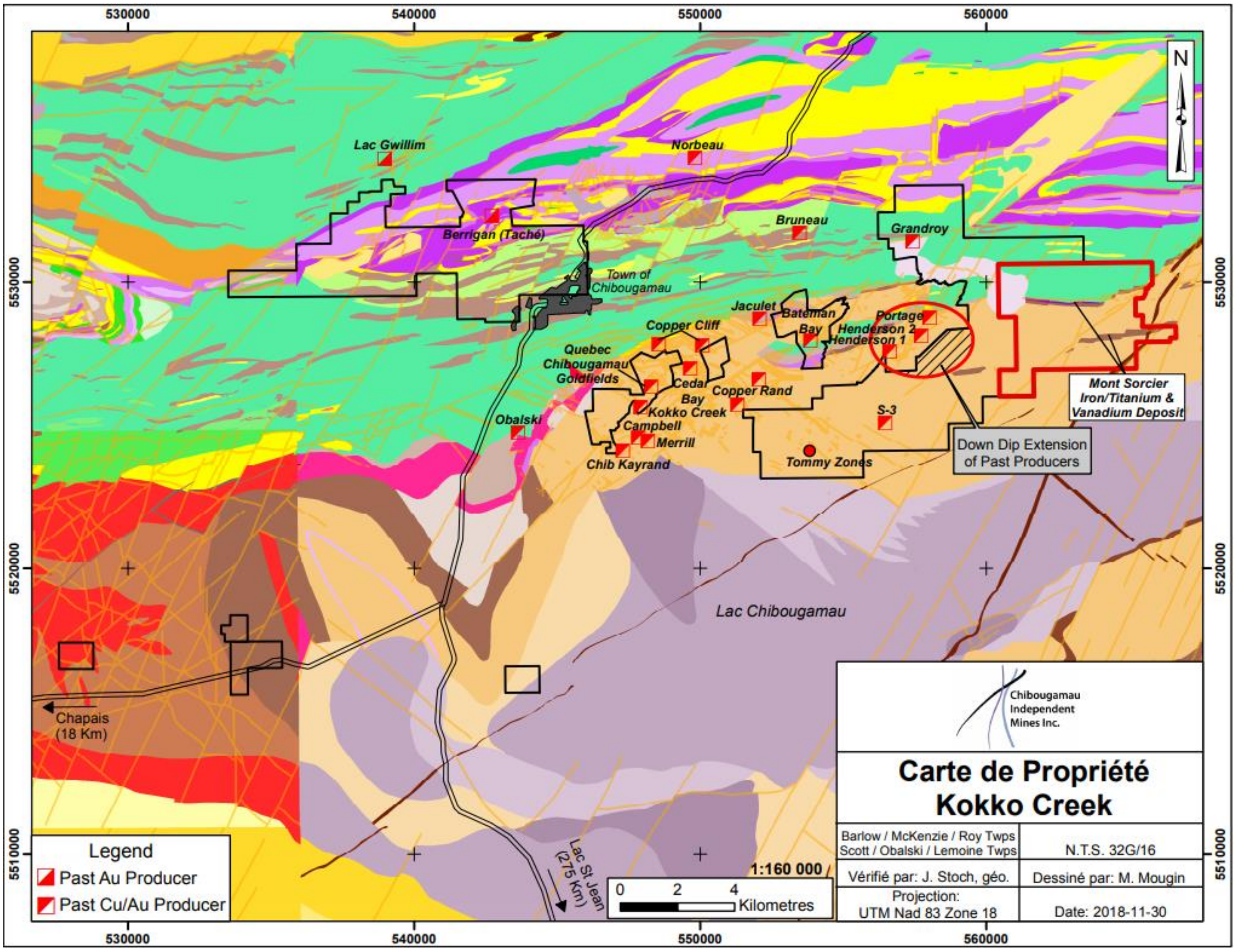

Figure 23-1: Adjacent and nearby properties and deposits held by Chibougamau Independent Mines Ltd

In addition, along the southeastern margin of the LDC, the contiguous properties of Blackrock Metals and VanadiumCorp Resource Inc. (Figure 7-2) contain layered VTM deposits. The Armitage and Southwest deposits have been the subject of a 2013 feasibility study by Blackrock Metals Inc., who is currently undertaking permitting to develop a mine on the deposits. The Lac Dore deposit, owned by VanadiumCorp Resource Inc., has also been drilled.

The author has not been able to verify the adjacent property information and the information is not necessarily indicative of mineralization on VONE's Mont Sorcier Property that is the subject of this Report.

24 Other Relevant Data and Information

After the Effective Date of this Report, VONE reported that the transfer of title and 100% ownership of all 37 claims to VONE and its filing and registration with the Ministère de l'Énergie et des Ressources naturelles (MERN) was completed on April 6, 2020.

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 Interpretation and Conclusions

25.1 Geology and Mineral Resources

VTM mineralization at the Mont Sorcier Project shows several similarities to other magmatic VTM deposits associated with layered mafic intrusive complexes; however, VTM mineralization at Mont Sorcier was likely triggered by assimilation of a carbonate-facies iron formation, resulting in a broad zone of VTM mineralization without the characteristic stratification found in other magnetite deposits, and without differentiation of highly vanadium or titanium enriched zones within the deposit. Two zones of mineralization are defined – the North Zone and the South Zone.

In the North Zone, mineralization is interpreted to occur as a subvertical, east-west striking roughly tabular body. In the South Zone, tabular mineralization has been folded around a synclinal axis with a shallow west-southwest plunging orientation. Mineralization is interpreted to vary between approximately 100 m and 200 m in true thickness in the North Zone and South Zone.

Between 2017 and 2019, VONE has carried out drilling, stripping, mapping and reprocessing of an earlier airborne geophysical survey of the property. Drill core was assayed, and samples subject to Davis Tube magnetic concentration and the concentrates were assayed. A significant amount of historical drilling data is also available for the property, and this data has been validated. Mineral Resources have been estimated, using both an older dataset based on drilling between 1963 and 1966, and data from drilling between 2013 and 2018.

Based on recent drilling by VONE, as well as historical drilling and assay results, Mineral Resources have been reported (effective 23 April 2019) at a cut-off of 20% Fe_2O_3 head grade (or 14% Fe) for the Mont Sorcier Project. Total Indicated Mineral Resources of 113.5 Mt at 22.7% Fe and 30.9% magnetite, and total Inferred Mineral Resources of 520.6 Mt at 25.4% Fe and 34.2% magnetite, have been estimated, as detailed in Table 1-1 and Table 14-5.

The grades and tonnages of Inferred Resources in this estimation are based on limited geological evidence and sampling that is sufficient to imply but not verify geological and grade continuity, and there has been insufficient exploration to define these Inferred Resources as an Indicated or Measured Resource. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, socio-political, marketing or other relevant issues.

25.2 Mining

The work completed as part of this PEA indicates that viable mining operation is possible under the assumptions outlined in this report. The mine would be a conventional drill, blast and haul operation from open pit mines, using standard, fully optioned equipment. The mine design is based on the sequential mining of the South Zone followed by the North Zone using standard open pit mining techniques of drill, blast and haul. This will allow for the South pit to be used for waste disposition in future years.

CSA Global has developed a mine plan which processes 555 Mt of the current resource base over a 37-year mine life at an average strip ratio of 0.89 to 1. Mining will reach a peak of material movement of approximately 44 Mtpa in Year 9. Mining costs are estimated at C$2.29/t of material moved. SiO_2 content will be kept under 2.5% through pit grade-control practice to maintain above 65% Fe in concentrate.

25.3 Metallurgy and Mineral Processing

Various historical and recent metallurgical test programs have been conducted for the Mont Sorcier Project. In addition, VONE conducted a test program at the COREM laboratory in Québec specifically for the purposes of the current PEA (Goudreau, 2020). In summary, the main test results showed:

The standard grindability tests average results indicated:

- Ai: The material was classified as non-abrasive.
- RWi and BWi: The material was classified as hard.
- SVT test results: The material was classified at the 82.9 percentile, which means that this material was harder than 82.9% of the materials tested by Starkey & Associate Inc.

The head analyses of the composite samples showed that:

- The average total iron grade was 30.8% Fe_T.
- The average magnetite grade, determined by Satmagan, was 37% magnetic material.
- The average V_2O_5 grade was 0.33% V_2O_5.
- The main impurities were SiO_2 (average of 22.1%) and MgO (average of 21.7%).
- Based on the Satmagan and the Fe_T values, it can be assumed that iron-bearing minerals were not only magnetite. COREM recommends detailed mineralogical analysis to identify and quantify the other iron-bearing minerals.

Preconcentration, using dry LIMS at a crushing size of 3.35 mm, led to the following metallurgical performances (average) of the magnetic products:

- Weight yield of 84.1%
- Magnetite: A 40% grade with a 98.3% recovery
- Total iron: A 32.5% grade with a 95.1% recovery
- V_2O_5: A 0.36% grade with a 95% recovery.

Based on these results, it can be concluded that preconcentration would allow to remove low-grade material, in an early stage of the beneficiation process, and thus with foreseen savings in energy (to avoid grinding waste) and CAPEX for downstream equipment.

During the concentration tests, the Davis Tube tests results showed that, at a grinding P_{95} of ~38 µm for the four composite samples, the average weight recovery of the mag product was 47.3% grading 65.8% of Fe_T, 89% of magnetite and 0.67% of V_2O_5, with corresponding recoveries of 92.0% Fe_T, 98.3% magnetite and 85.3% V_2O_5. Based upon the mine plan, Mont Sorcier is expected to produce a LOM average concentrate grading 65% iron with 0.6% V_2O_5.

The processing facilities include a beneficiation plant (Concentrator) with three stages of magnetic separation, designed to produce 5.0 Mtpa of magnetite concentrate over a 37-year mine life. The ROM is calculated based on a magnetite plant weight recovery of 45%.

A design factor of 20% is applied on nominal requirements to ensure that the process equipment has enough capacity to take care of the expected feed variation.

25.4 Mine and Plant Infrastructure

The Mont Sorcier Property is located approximately 20 km east of the town of Chibougamau, Québec, and is easily accessible by an all-weather gravel road heading east from Highway QC-167 some 10 km east-northeast of the town. This gravel road passes through the northern claims and numerous forestry roads give access to lakes and different sectors in the southern and central portions of the Property.

The overall mine and plant infrastructure consist of open pit, waste and overburden dumps, crushing plant as well as buildings, such as concentrator, offices and workshops, and service areas. Drainage ditches will be constructed around the open pit and dumps to direct water runoff to settling ponds to avoid contamination. The mineralized material will be hauled by the mine haul trucks to the crusher area adjacent to the concentrator. A haulage road will be constructed between the mine and the crushers. All crushed material will be sent via conveyor system to the cone crushing and screening plants, stockpiled, and, subsequently transported to the concentrator via a short conveying system.

In addition, the Project will also include new tailing facilities in a location to be determined after consultation with local stakeholders and additional engineering and design.

The annually produced 5 Mt of iron concentrate will be conveyed to covered storage stockpile area. The stored iron concentrate will be loaded in train cars and transported by rail via the newly constructed railway loop. This railway loop will tie-in at an existing railway system for further transport. No permanent accommodation camp will be constructed with the accommodation strategy involving mining and milling personnel to commute on a per shift basis from Chibougamau. A new 315 kV powerline will be built along with a substation to connect to the main powerline.

The concentrate will be transported via a new, 18 km long railway spur line to connect with the existing CN rail infrastructure, from where it will be transported for approximately 360 km to the Saguenay port. The rail transportation system involves six trains each with 120 gondola rail cars operating throughout the year. At port, the iron concentrate will be loaded directly into ocean freight vessels.

25.5 Environmental Studies, Permitting and Social/Community Impact

VONE commissioned Norda Stelo (a technical services firm based in Québec) to carry out an ESSS on the Project ((Boulé *et al.,* 2019), which has summarised available information sources and knowledge gaps physical environment components (climate and weather, air quality, topography, geology and surface deposits, hydrography and hydrology, Sediment and freshwater quality, hydrogeology and groundwater quality), biological environment components (protected areas and wildlife habitats, plant communities, freshwater fish and fish habitat, avifauna, herpetofauna, mammals, special status species) and human environment components (population and demographic trends, socio-economic profile, land tenure and zoning, main land uses in the study area, transport infrastructure, Cree traditional land use (historical and current), historical and cultural resources).

As part of the ESSS, Norda Stelo identified key biophysical environmental and socio-economic issues raised by the Cree of Eeyou Istchee and other local stakeholders in the context of mining which will need to be addressed in an ESIA (Boulé *et al.,* 2019).

Upcoming environmental studies and project development activities that will need to be undertaken in order to advance the Project include:

- Environmental baseline studies
- Public consultations and engagement
- Project notice and description of a designated project
- ESIA
- Permitting.

25.6 Marketing

VONE commissioned an Independent Market Pricing Study to determine the potential value of the vanadium-rich iron product produced by Mont Sorcier given the lack of available quoted market index prices. The study was completed by Paul Vermeulen of Vulcan Technologies in late October 2019. The study reviewed main iron index price forecasts as well as estimates of the applicable vanadium credits. The study reviewed a value in use methodology based upon a review of the grade and concentrate chemistry from Mont Sorcier relative to other similar iron products and the study concluded that the concentrate from Mont Sorcier should receive a US$15/t premium to the Platts 65 price iron index for the contained vanadium credits (based on a net attributable value using a long term V_2O_5 price of US$7.25/lb). The PEA used a concentrate selling price aligned with those in the Vulcan Market Study (Vermeulen, 2019) with an average value over the life of the Project at C$140.79/t.

25.7 Economic Analysis

Readers are cautioned that the PEA is preliminary in nature. It includes Inferred Mineral Resources considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty the PEA will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, socio-political, marketing or other relevant issues.

25.7.1 Tax Assumptions

For the PEA, a simple after-tax model was developed for the Mont Sorcier Project pending a more detailed review in the future. All costs are in 2020 Canadian dollars (C$) with no allowance for inflation or escalation. The Mont Sorcier Project is subject to three levels of taxation, including federal income tax, provincial income tax and provincial mining taxes:

- Québec mining tax rate of 16%
- Income tax rate of 26.5% (federal and provincial combined).

The federal and provincial corporate tax rates currently applicable over the Project's operating life are 15.0% and 11.5% of taxable income, respectively. The marginal tax rates applicable under the recently adopted mining tax regulations in Québec are 16%, 22% and 28% of taxable income and depend on the profit margin. As the Project concerns the processing of iron concentrate at the mine site, a processing allowance rate of 10% was assumed. Actual taxes payable will be affected by corporate activities, profitability and current and future tax benefits that have not been considered.

The combined effect of the three levels of taxation on the Project, including the elements described above, is an appropriate cumulative effective tax rate of 30.3%, based on Project earnings. It is anticipated, based on the current Project assumptions, that the Company will pay approximately C$2,715 million in direct tax payments to the provincial and federal governments over the life of mine based on the operating and commodity price assumptions used in the PEA.

25.7.2 Overall Project Economics

The overall project shows potentially robust economic results with a an after tax NPV at 8% discount rate of C$1,699 million and IRR of 33.8%. Project economics are based on a potential 37-year mine life with a three-year payback period, with positive after-tax cash flow commencing in year 1. Total cumulative, after tax free cash flow over the LOM is estimated at C$6,253 million.

As expected, the Mont Sorcier Project pre-tax and post-tax IRR and NPV is less sensitive to operating and capital cost and is highly sensitive to concentrate price.

25.8 Risks

25.8.1 General

Environmental, permitting, legal, title, taxation, socio-economic, marketing, and political or other relevant issues could potentially materially affect access, title, or the right or ability to perform the work recommended in this report on the Project. However, at the time of this report, the Qualified Persons are unaware of any such potential issues affecting the Project and work programs recommended in this report.

25.8.2 Mineral Resource Estimate

In addition to the general risks noted above, the following risks and uncertainties may affect the reliability or confidence in the exploration information and MRE:

- Not all historical drillhole collars have been surveyed by an independent surveyor, and no downhole deviation data is available for historical drillholes; however, those that have been located compare favourably with recorded locations.
- QAQC procedures associated with historical assay data have not been documented; however, comparison of the results of historical assays with recent assay values shows that they compare favourably.

25.8.3 Metallurgy/Mineral Processing

- Metallurgical and recovery parameters for the magnetite concentrate have not been fully assessed – the recoveries data used in the MRE is estimated from Davis Tube recovery tests.
- There is a potential requirement to further treat the concentrate to reduce the SiO_2 content to meet the buyer's specifications. Depending on further testing, additional flotation circuit may be required to improve the concentrate specifications.
- Variability testing for different mineral domains is still required to refine the recoveries of magnetite throughout the deposits.

25.8.4 Mining

- Environmental, hydrogeological and geotechnical considerations that may affect the Project have not yet been assessed (e.g. proximity to the lake and hydrogeology).
- Study of the potential effect of the open pit development and dewatering on the surrounding surface water bodies will be required and the impact on the Project is not certain.
- The currently selected 15m stand-off from the lake shore may not to be sufficient to prevent lake water to breach the pit crestline in an unexpected weather event and a wider perimeter offset of between 35 and 60m should be considered.
- Further resource drilling may change the quantities of mineralized material suitable for reserves and impact the pit sizes, mining schedules and mining fleet size and structure.
- Study of drilling and blasting parameters may impact cost of mining and size of the fleet.
- Seeking submissions from mining contractors or detailed owner mining study is required to prove up mining cost, size of equipment and the fleet size in total.
- Large footprint of waste dump and initial TSF require geotechnical study, condemnation drilling and definition of all relevant design criteria. The design of TSF may impact initial capital and operating costs.
- Rehabilitation and closure planning of pit voids, waste dumps and TSF, study into potential acid rock drainage and pit lakes management.

25.8.5 Environment, Permitting, Social and Community

Due the early stage of investigation there are significant numbers of permits and stakeholder engagement required – permits and authorisations for advancement of the Project are not guaranteed.

25.8.6 Marketing

The underlying assumptions used for the marketing and pricing for this study are predicted on the Vermeulen (2019) report. The extent to which these outcomes can be realized is not certain and requires more investigation. Ideally, the Issuer should engage with end-use buyers to establish a price for the magnetite and vanadium products likely to be produced from Mont Sorcier.

25.8.7 Economic Analysis

Readers are cautioned that the PEA is preliminary in nature. It includes Inferred Mineral Resources considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty the PEA will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, socio-political, marketing or other relevant issues.

25.9 Opportunities

25.9.1 Geology/Mineral Resource Estimate

The following opportunities have been identified with respect to further exploration:

- There is potential to extend both the North Zone and South Zone resources along strike towards the east and west by drilling the magnetic anomalies along strike from the current drilling
- Infill drilling and more detailed sampling with 2–3 m smaller sample lengths in areas of historical drilling will allow more granularity in the resource and may enable the delineation of higher-grade domains within the current resource.

25.9.2 Metallurgy/Mineral Processing

The Project has potential to:

- Optimize and simplify the process flowsheet based on detailed test program conducted as part of the next stage of the Project development. This may result in removing parts of the circuit, and/or introduce a fully dry process which will further reduce the overall capital requirements and operating costs to operate the concentrator.

25.9.3 Mining

The Project has potential to:

- Be a long-term investment into a profitable business
- Provide employment opportunities within local communities
- Provide tangible benefits to the local community and economy of the area.

25.9.4 Environment, Permitting, Social and Community

- Engagement with local community to maximise impact of employment and economic development.
- Planning closure to provide positive ongoing legacy.

26 Recommendations

Based on the positive nature of this PEA the primary recommendation is to continue the development of the Project through additional detailed investigations and higher confidence engineering studies. The aim being to complete a higher confidence engineering study as the next major project milestone.

The following recommendations are made with respect to future work on the Property. This work will be required for upgrading resources on the North Zone to Indicated category, and to advance next stage detailed engineering and economic studies. These are listed as separate phases, as increasing the confidence of the resources to Indicated or Measured category will be required prior to economic studies.

26.1 Phase 1: Work Required to Increase Confidence in the Resource

26.1.1 Geology and Mineral Resource Estimate

- Survey all remaining historic collar locations.
- More gas pycnometry SG measurements are required from the laboratory (30–50% of all samples). Additional density measurements should also be taken on 5–10% of samples using the Archimedes method (weight in air/weight in water).
- Duplicate and umpire measurements of SG required.
- Infill drilling of the North Zone, with a two-hole fence every 200 m along strike. A total of approximately 12,000 m is recommended to complete this program.
- Increase the number of round-robin assays involving more laboratories and more samples per laboratory to enable the calculation of a statically valid mean and standard deviation for the reference standards sample material.
- 5% of samples from the 2017 campaign should be sent for duplicate analyses, and 5% for umpire analyses. It is also recommended that the standards used should also be subject to magnetic separation, and the magnetic portion assayed.

26.2 Phase 2: Work Required for Advanced Engineering and Economic Studies

26.2.1 Mineral Processing and Metallurgical Testing

For the next stage of detailed engineering and economic studies, CSA Global recommends that VONE execute a metallurgical test program to further define the process parameters and optimize the process flowsheet and final product specifications.

Such a metallurgical test program includes collecting representative samples from different areas of the mine (from drill core) as designed by a metallurgical engineer:

- Prepare representative subsamples from each area and a composite from all samples
- Submit subsamples for variability testing
- Detailed mineralogy on the different subsamples including QEMSCAN™
- Conduct various studies to define the particle size distribution and optimize P_{80} passing required for optimal liberation on a grinding vs recovery evaluation basis
- Detailed magnetic separation testing including batch and locked cycle tests and various flowsheet options review
- Hydro-separation tests to confirm the ability to reduce the SiO_2 content of the final concentrate

- Flotation testwork to evaluate the viability of the flotation process for the Mont Sorcier Project
- Settling and filtration tests
- Drying tests to confirm the ability to reduce the final concentrate moisture to under 3%.

Another stream of work associated with this phase is to develop a geometallurgical model using the available information. The aim being to develop mineral domains within the deposit to reflect similar materials within the deposit. This can be used to improve the metallurgical recoveries, lower material processing costs and improve mine planning to optimize profits.

26.2.2 Mining and Infrastructure Studies

For the next stage, CSA Global recommends the following trade-offs to be undertaken:

- Mining equipment capacity and fleet size to be based on schedules derived from pit designs
- Mining equipment purchase and replacement based on effective utilization
- Mining sequence selection for cash flow optimization
- Geotechnical study, pit slope and waste stockpiles modelling based on oriented core diamond drilling, sampling, laboratory testing, and reporting
- Concentrate storage and rail car loading optimization
- Tails dry stacking and elimination of TSF embankment construction
- Hydrogeology and structural investigation of Mont Sorcier North and South deposits.

26.2.3 Detailed Marketing Studies

For the next stage, CSA Global recommends that VONE undertake a detail marketing study and to engage with potential buyers and best possible market for its final vanadium-rich concentrate product.

26.2.4 Environmental Studies, Permitting and Social/Community Impact

VONE must commence environmental base line studies. Concurrently VONE will need to initiate the ESIA process, by engaging with the appropriate federal and provincial authorities and engage in the process. Commencement and completion of the required permitting process will be dependant on timing and outcome of the ESIA.

In addition, VONE must engage in initial contacts and meetings with the various project stakeholders including local communities, First Nation groups and general public to present the Project and initiate and define communication management plan with the public with the ultimate goal to negotiate an Impact and Benefits Agreement.

26.3 Recommended Work Budget

A budget for this future work is outlined in Table 26-1.

Table 26-1: Budget for future work programs

Recommended work		Details	Estimated cost (US$)
Phase 1: Additional work to upgrade North Zone to Indicated category	Additional gas pycnometry SG measurements, plus duplicate and umpire measurements	~1,000 samples, alternate QAQC methods	~$50,000
	Infill drilling of the North Zone for Indicated Resources	Estimated 12,000 m for sufficient detail for Indicated Resources	~$3,000,000
	5% duplicate and 5% umpire analyses	100 samples (including magnetic separation and assay of the concentrate)	~$15,000
	Additional analyses of standard materials	30 samples	~$15,000
	Updated mineral resources	Interpretation modelling reporting	~$60,000
	Total estimated costs		**$3,140,000**
Phase 2: Work to advance next stage higher level engineering study	Grind optimisation and other metallurgical testwork	10 samples, bulk samples, pilot study	~$500,000
	Geometallurgical study	Additional sampling analysis and modeling	~$350,000
	Environmental studies	Commence baseline studies, stakeholder engagement, preliminary work for ESIA	~$1,000,000
	Geotechnical study	Drilling, sampling, analysis and reporting	~$300,000
	Hydrogeology and hydrology studies	Drilling, data gathering, modelling	~$1,000,000
	Mining studies		~$450,000
	Marketing studies		~$150,000
	Infrastructure studies		~$160,000
	Overall next stage higher level engineering study development	Incorporating all disciplines into single study	~1,000,000
	Total estimated costs		**~$4,910,000**
GRAND TOTAL			**~$8,050,000**

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Appendix A Summary Discounted Cash Flow Model

Mont Sorcier Financial Analysis																					
			Project year																		
	Unit	Total	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17
Production																					
Feed material mined	kt	554,898	0	0	9,085	17,144	17,813	19,018	21,364	17,160	16,405	16,836	18,483	19,702	20,422	18,788	18,176	17,847	14,569	13,632	13,644
Concentrate produced (dry)	kt	177,072	0	0	2,500	5,000	4,999	4,999	5,000	4,999	5,000	4,999	5,000	4,999	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Concentrate produced (wet)	kt	182,384	0	0	2,575	5,150	5,149	5,149	5,150	5,149	5,150	5,149	5,150	5,149	5,150	5,150	5,150	5,150	5,150	5,150	5,150
Concentrate grade/average	% Fe	65.2	0	0	66.30	65.90	65.90	66.20	66.20	66.00	66.00	66.00	66.10	66.20	66.20	66.10	66.10	65.90	65.20	64.30	65.60
Operating costs		CFR																			
Mining costs	k$	2,399,470	0	0	34,537	45,661	57,250	57,250	61,776	84,670	83,823	90,829	100,719	96,036	86,646	72,212	62,322	57,151	52,520	46,987	43,598
Processing costs	k$	2,009,764	0	0	28,375	56,750	56,742	56,742	56,747	56,742	56,749	56,740	56,745	56,744	56,750	56,750	56,750	56,750	56,749	56,750	56,750
Transport costs	k$	9,367,909	0	0	132,261	264,523	264,485	264,485	264,509	264,486	264,520	264,476	264,500	264,495	264,523	264,523	264,523	264,523	264,518	264,523	264,523
Site G&A cost	k$	417,889	0	0	5,900	11,800	11,798	11,798	11,799	11,798	11,800	11,798	11,799	11,799	11,800	11,800	11,800	11,800	11,800	11,800	11,800
Cash operating cost	k$	14,195,032	0	0	201,073	378,734	390,275	390,275	394,831	417,697	416,891	423,842	433,763	429,074	419,719	405,285	395,395	390,224	385,586	380,060	376,671
Concentrate sold																					
Total	kdmt	177,072	0	0	2,500	5,000	4,999	4,999	5,000	4,999	5,000	4,999	5,000	4,999	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Revenue	140.79																				
Revenue based on concentrate grade/average	k$	24,929,837	0	0	351,974	703,947	703,847	703,846	703,910	703,850	703,938	703,822	703,886	703,872	703,947	703,947	703,947	703,947	703,934	703,947	703,947
Gross revenue	k$	24,929,837	0	0	351,974	703,947	703,847	703,846	703,910	703,850	703,938	703,822	703,886	703,872	703,947	703,947	703,947	703,947	703,934	703,947	703,947
Capital expenditure																					
Mining (including rail car)	k$	640,523	15,750	88,145	36,215	28,539	0	2,433	18,860	3,051	23,949	30,723	14,049	13,685	11,222	13,074	1,380	17,854	1,380	7,148	4,715
Processing	k$	389,395	181,987	171,574	0	0	0	0	0	0	5,000	5,000	5,000	0	0	5,208	5,208	0	0	0	0
Closure bond	k$	28,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total capex	k$	1,058,118	197,737	259,718	36,215	28,539	0	2,433	18,860	3,051	28,949	35,723	19,049	13,685	11,222	18,282	6,588	17,854	1,380	7,148	4,715
Depreciation																					
Mont Sorcier	k$	1,018,766	0	0	148,101	112,232	78,563	55,724	44,665	32,181	31,211	32,565	28,510	24,062	20,210	19,632	15,719	16,359	11,866	10,450	8,730
Total depreciation	k$	1,018,766	0	0	148,101	112,232	78,563	55,724	44,665	32,181	31,211	32,565	28,510	24,062	20,210	19,632	15,719	16,359	11,866	10,450	8,730
Cash flow																					
Revenue	k$	24,929,837	0	0	351,974	703,947	703,847	703,846	703,910	703,850	703,938	703,822	703,886	703,872	703,947	703,947	703,947	703,947	703,934	703,947	703,947
Royalty	k$	-747,895	0	0	-10,559	-21,118	-21,115	-21,115	-21,117	-21,115	-21,118	-21,115	-21,117	-21,116	-21,118	-21,118	-21,118	-21,118	-21,118	-21,118	-21,118
Cash production cost	k$	-14,195,032	0	0	-201,073	-378,734	-390,275	-390,275	-394,831	-417,697	-416,891	-423,842	-433,763	-429,074	-419,719	-405,285	-395,395	-390,224	-385,586	-380,060	-376,671
Cash gross margin	k$	9,986,910	0	0	140,341	304,095	292,456	292,455	287,961	265,038	265,929	258,865	249,006	253,682	263,110	277,544	287,434	292,605	297,229	302,769	306,158
Depreciation	k$	-1,018,766	0	0	-148,101	-112,232	-78,563	-55,724	-44,665	-32,181	-31,211	-32,565	-28,510	-24,062	-20,210	-19,632	-15,719	-16,359	-11,866	-10,450	-8,730
Gross margin	k$	8,968,144	0	0	-7,760	191,863	213,893	236,732	243,297	232,857	234,718	226,300	220,496	229,620	242,900	257,912	271,715	276,246	285,364	292,319	297,429
EBIT	k$	8,968,144	0	0	-7,760	191,863	213,893	236,732	243,297	232,857	234,718	226,300	220,496	229,620	242,900	257,912	271,715	276,246	285,364	292,319	297,429
Less Québec mining duties	16%	-908,829	0	0	-11,679	-26,194	-25,754	-25,754	-25,756	-25,754	-25,758	-25,753	-25,755	-25,755	-25,758	-25,758	-25,758	-25,758	-25,757	-25,758	-25,758
Less Corporate income taxes	26.5%	-1,806,263	0	0	0	-20,942	-40,953	-47,005	-48,744	-45,978	-46,470	-44,241	-42,702	-45,120	-48,638	-52,617	-56,275	-57,475	-59,892	-61,735	-63,089
NOPLAT	k$	6,253,051	0	0	-19,439	144,726	147,187	163,973	168,796	161,125	162,490	156,306	152,039	158,745	168,504	179,538	189,683	193,013	199,715	204,827	208,582
Depreciation (added back)	k$	1,018,766	0	0	148,101	112,232	78,563	55,724	44,665	32,181	31,211	32,565	28,510	24,062	20,210	19,632	15,719	16,359	11,866	10,450	8,730
Gross cash flow from operations	k$	7,271,817	0	0	128,662	256,959	225,749	219,697	213,461	193,305	193,701	188,871	180,549	182,807	188,714	199,170	205,402	209,372	211,581	215,277	217,312
Less capital investment	k$	-1,058,118	-197,737	-259,718	-36,215	-28,539	0	-2,433	-18,860	-3,051	-28,949	-35,723	-19,049	-13,685	-11,222	-18,282	-6,588	-17,854	-1,380	-7,148	-4,715
Operating free cash flow	k$	6,213,699	-197,737	-259,718	92,447	228,420	225,749	217,264	194,601	190,254	164,752	153,148	161,500	169,122	177,492	180,887	198,813	191,518	210,201	208,129	212,597
Cumulative operating free cash flow	k$	6,213,699	-197,737	-457,456	-365,009	-136,589	89,161	306,425	501,026	691,280	856,032	1,009,180	1,170,680	1,339,803	1,517,295	1,698,182	1,896,995	2,088,514	2,298,714	2,506,843	2,719,440
Year			-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Discount factor		8.00%	1.000	1.000	0.926	0.857	0.794	0.735	0.681	0.630	0.583	0.540	0.500	0.463	0.429	0.397	0.368	0.340	0.315	0.292	0.270
Discounted free cash flow	k$	1,698,984	-197,737	-259,718	85,599	195,833	179,207	159,696	132,442	119,892	96,131	82,741	80,790	78,336	76,123	71,833	73,103	65,204	66,264	60,751	57,458
Cumulative discounted free cash flow	k$	1,698,984	-197,737	-457,456	-371,856	-176,023	3,184	162,880	295,322	415,214	511,345	594,087	674,877	753,213	829,337	901,169	974,273	1,039,477	1,105,741	1,166,492	1,223,950
Pre-Tax			**Post-Tax**																		
Net present value ($ M)		2,505	Net present value ($M)				1,699														
Internal rate of return		41.5%	Internal rate of return				33.8%														
Payback period (years)		3.0	Payback period (years)				3.0														
Discounted payback period (years)		3.0	Discounted payback period (years)				3.0														

Project year																			
Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37
13,430	13,428	13,584	14,073	14,567	14,545	13,794	13,511	13,599	13,786	14,143	12,831	12,978	12,730	11,196	13,792	14,069	14,395	14,743	5,615
5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	4,966	4,803	4,477	4,743	4,614	4,032	5,000	5,000	5,000	5,000	1,941
5,150	5,150	5,150	5,150	5,150	5,150	5,150	5,150	5,150	5,115	4,947	4,612	4,885	4,753	4,153	5,150	5,150	5,150	5,150	1,999
66.50	66.70	66.60	66.40	66.10	65.90	65.80	65.60	65.40	65.10	64.90	64.90	64.10	63.70	63.80	63.10	62.50	62.10	61.20	61.30
38,032	36,306	37,606	62,309	76,270	71,057	79,397	67,913	77,432	80,150	80,150	80,150	80,150	80,150	80,150	61,310	61,753	63,886	38,331	12,984
56,750	56,750	56,750	56,750	56,750	56,750	56,750	56,750	56,750	56,360	54,512	50,819	53,830	52,372	45,768	56,750	56,750	56,750	56,750	22,029
264,523	264,523	264,523	264,523	264,523	264,523	264,523	264,523	264,523	262,704	254,092	236,877	250,911	244,118	213,331	264,523	264,523	264,523	264,523	102,682
11,800	11,800	11,800	11,800	11,800	11,800	11,800	11,800	11,800	11,719	11,335	10,567	11,193	10,890	9,516	11,800	11,800	11,800	11,800	4,581
371,105	**369,379**	**370,679**	**395,382**	**409,343**	**404,130**	**412,470**	**400,986**	**410,505**	**410,932**	**400,088**	**378,412**	**396,084**	**387,530**	**348,765**	**394,383**	**394,826**	**396,958**	**371,403**	**142,276**
5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	4,966	4,803	4,477	4,743	4,614	4,032	5,000	5,000	5,000	5,000	1,941
703,947	703,947	703,947	703,947	703,947	703,947	703,947	703,947	703,947	699,106	676,188	630,375	667,724	649,645	567,717	703,947	703,947	703,947	703,947	273,257
703,947	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**699,106**	**676,188**	**630,375**	**667,724**	**649,645**	**567,717**	**703,947**	**703,947**	**703,947**	**703,947**	**273,257**
20,435	4,715	54,081	43,034	41,553	1,380	4,104	12,880	4,715	11,979	56,742	11,404	10,641	1,380	11,403	1,083	1,380	15,445	0	0
0	0	0	0	0	0	5,208	5,208	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	28,200
20,435	**4,715**	**54,081**	**43,034**	**41,553**	**1,380**	**9,312**	**18,088**	**4,715**	**11,979**	**56,742**	**11,404**	**10,641**	**1,380**	**11,403**	**1,083**	**1,380**	**15,445**	**0**	**28,200**
12,241	9,983	23,213	29,159	32,877	23,428	19,193	18,862	14,618	13,826	26,701	22,112	18,671	13,483	12,859	9,326	6,942	9,493	6,645	4,354
12,241	9,983	23,213	29,159	32,877	23,428	19,193	18,862	14,618	13,826	26,701	22,112	18,671	13,483	12,859	9,326	6,942	9,493	6,645	4,354
703,947	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**703,947**	**699,106**	**676,188**	**630,375**	**667,724**	**649,645**	**567,717**	**703,947**	**703,947**	**703,947**	**703,947**	**273,257**
-21,118	-21,118	-21,118	-21,118	-21,118	-21,118	-21,118	-21,118	-21,118	-20,973	-20,286	-18,911	-20,032	-19,489	-17,032	-21,118	-21,118	-21,118	-21,118	-8,198
-371,105	-369,379	-370,679	-395,382	-409,343	-404,130	-412,470	-400,986	-410,505	-410,932	-400,088	-378,412	-396,084	-387,530	-348,765	-394,383	-394,826	-396,958	-371,403	-142,276
311,724	**313,450**	**312,150**	**287,447**	**273,486**	**278,699**	**270,359**	**281,843**	**272,324**	**267,200**	**255,814**	**233,052**	**251,608**	**242,626**	**201,920**	**288,446**	**288,003**	**285,870**	**311,425**	**122,783**
-12,241	-9,983	-23,213	-29,159	-32,877	-23,428	-19,193	-18,862	-14,618	-13,826	-26,701	-22,112	-18,671	-13,483	-12,859	-9,326	-6,942	-9,493	-6,645	-4,354
299,483	**303,467**	**288,937**	**258,288**	**240,608**	**255,271**	**251,166**	**262,981**	**257,706**	**253,374**	**229,113**	**210,940**	**232,938**	**229,143**	**189,061**	**279,120**	**281,060**	**276,377**	**304,780**	**118,430**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
299,483	**303,467**	**288,937**	**258,288**	**240,608**	**255,271**	**251,166**	**262,981**	**257,706**	**253,374**	**229,113**	**210,940**	**232,938**	**229,143**	**189,061**	**279,120**	**281,060**	**276,377**	**304,780**	**118,430**
-25,758	-25,758	-25,758	-25,758	-25,758	-25,758	-25,758	-25,758	-25,758	-25,564	-24,648	-22,815	-24,309	-23,586	-20,309	-25,758	-25,758	-25,758	-25,758	-8,530
-63,633	-64,689	-60,838	-52,716	-48,031	-51,917	-50,829	-53,960	-52,562	-51,465	-45,279	-40,949	-46,382	-45,568	-35,815	-58,237	-58,751	-57,510	-65,037	-20,219
210,092	**213,020**	**202,341**	**179,814**	**166,819**	**177,596**	**174,579**	**183,264**	**179,386**	**176,345**	**159,186**	**147,176**	**162,246**	**159,988**	**132,937**	**195,125**	**196,552**	**193,110**	**213,986**	**89,680**
12,241	9,983	23,213	29,159	32,877	23,428	19,193	18,862	14,618	13,826	26,701	22,112	18,671	13,483	12,859	9,326	6,942	9,493	6,645	4,354
222,333	**223,004**	**225,554**	**208,973**	**199,696**	**201,024**	**193,772**	**202,125**	**194,004**	**190,171**	**185,887**	**169,288**	**180,917**	**173,472**	**145,796**	**204,452**	**203,494**	**202,603**	**220,631**	**94,034**
-20,435	-4,715	-54,081	-43,034	-41,553	-1,380	-9,312	-18,088	-4,715	-11,979	-56,742	-11,404	-10,641	-1,380	-11,403	-1,083	-1,380	-15,445	0	-28,200
201,898	**218,289**	**171,472**	**165,939**	**158,143**	**199,644**	**184,460**	**184,037**	**189,289**	**178,192**	**129,145**	**157,884**	**170,276**	**172,092**	**134,393**	**203,369**	**202,114**	**187,158**	**220,631**	**65,834**
2,921,338	**3,139,627**	**3,311,099**	**3,477,038**	**3,635,182**	**3,834,826**	**4,019,286**	**4,203,323**	**4,392,612**	**4,570,804**	**4,699,949**	**4,857,833**	**5,028,109**	**5,200,201**	**5,334,594**	**5,537,963**	**5,740,077**	**5,927,235**	**6,147,865**	**6,213,699**
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
0.250	0.232	0.215	0.199	0.184	0.170	0.158	0.146	0.135	0.125	0.116	0.107	0.099	0.092	0.085	0.079	0.073	0.068	0.063	0.058
50,525	**50,580**	**36,789**	**32,965**	**29,089**	**34,002**	**29,089**	**26,873**	**25,592**	**22,307**	**14,970**	**16,945**	**16,922**	**15,835**	**11,450**	**16,044**	**14,763**	**12,658**	**13,817**	**3,817**
1,274,475	**1,325,055**	**1,361,844**	**1,394,809**	**1,423,898**	**1,457,901**	**1,486,990**	**1,513,862**	**1,539,455**	**1,561,762**	**1,576,732**	**1,593,677**	**1,610,598**	**1,626,434**	**1,637,884**	**1,653,928**	**1,668,691**	**1,681,349**	**1,695,166**	**1,698,984**

Appendix B Glossary of Technical Terms and Abbreviations

%	percent
°	degrees
°C	degrees Celsius
µm	micrometre
1VD	first vertical derivative
3D	three-dimensional
Actlabs	Activation Laboratories
Ai	Abrasion Index
azimuth	Drillhole azimuth deviation (from north)
BIF	banded iron formation
BWi	Bond Ball Mill Work index
C$	Canadian dollars
CAPEX	capital expenditure
CEAA 2012	Canadian Environmental Assessment Act, 2012
CFILNQ	Chemin de fer d'intérêt local interne du Nord du Québec
CFR	cost and freight
clipping window	In case of display of 3D data at the plane, plus-minus the distance, within which the data is projected perpendicular to the image plane
cm	centimetre(s)
collar	Geographical coordinates of the collar of a drillhole or a working portal
compositing	In sampling and resource estimation, process designed to carry all samples to certain equal length
core sampling	In exploration, a sampling method of obtaining mineralized material or rock samples from a drillhole core for further assay
CSA Global	CSA Global Consultants Canada Limited
CSV	Digital computer file containing comma-separated text data
cut-off grade	The threshold value in exploration and geological resources estimation above which mineralized material is selectively processed or estimated
CV	Coefficient of variation
d	diameter
DB	Design basis
DCF	discounted cash flow
de-clustering	In geostatistics, a procedure allowing bounded grouping of samples within the octant sectors of a search ellipse
DEM	digital elevation model
dip	Angle of drilling of a drillhole
dmt	dry metric tonne(s)

dmtu	dry metric tonne unit(s)
EIJBRG	Eeyou Itschee James Bay Regional Government
EPCM	engineering, procurement and construction management
EQA	Environment Quality Act
ESIA	environmental and social impact assessment
ESSS	environmental and social scoping study
Expert	Laboritoire Expert
FEL	front-end loader
flagging	Coding of cells of the digital model
FOB	Free on Board
FROM	Beginning of intersection
g	gram(s)
G&A	general and administration
GCC(EI)	Grand Council of the Crees (Eeyou Itschee)
geochemical sampling	In exploration, the main method of sampling for determination of presence of mineralization; a geochemical sample usually unites fragments of rock chipped with a hammer from drillhole core at a specific interval
geometric mean	The antilog of the mean value of the logarithms of individual values; for a logarithmic distribution, the geometric mean is equal to the median
GMR	gross metal royalty
GPS	global positioning system
group sampling	In exploration and mining, method of sampling by means of union of the material of individual samples characterizing an independent mineral deposit
ha	hectare(s)
histogram	Diagrammatic representation of data distribution by calculating frequency of occurrence
HPGR	high-pressure grinding rolls
IFRS	International Financial Reporting Standards
IRA	inter-ramp angle
IRR	internal rate of return
JBNQA	James Bay and Northern Québec Agreement
JKMRC	Julius Kruttschnitt Mineral Research Centre
kg	kilogram(s)
km	kilometre(s)
kriging	Method of interpolating grade using variogram parameters associated with the samples' spatial distribution. Kriging estimates grades in untested areas (blocks) such that the variogram parameters are used for optimum weighting of known grades. Kriging weights known grades such that variation of the estimation is minimised, and the standard deviation is equal to zero (based on the model)
kV	kilovolt
KWh	Kilowatt Hour
lag	The chosen spacing for constructing a variogram

LDC	Lac Dore Complex
LIMS	low intensity magnetic separation
lognormal	Relates to the distribution of a variable value, where the logarithm of this variable is a normal distribution
LOM	life of mine
m	metre(s)
M	million or mega (10^6)
macro	A set of MICROMINE commands written as a computer program for reading and handling data
mag	Magnetic
Mag.	Magnetite
mean	Arithmetic mean
median	Sample occupying the middle position in a database
MELCC	Ministère de l'Environnement et de la Lutte contre les changements climatiques
MERN	Minister of Energy and Natural Resources
Micromine	Software product for exploration and the mining industry
ml	millilitre(s)
MLA	Mineral Liberation Analyzer
mm	millimetre(s)
MRE	Mineral Resource estimate
Mt	million tonnes
Mtpa	million tonnes per annum
NI 43-101	National Instrument 43-101
NHG	North South Grade
NLG	North Low Grade
NPV	net present value
Non-mag	Non-magnetic
O/F	Over flow product
omni	In all directions
OPEX	operating expenditure
OP	Open Pit
O/S	Over size product
overburden	All material above mineralization
PEA	preliminary economic assessment
percentile	In statistics, one one-hundredth of the data. It is generally used to break a database down into equal hundredths
PDC	Process Design Criteria
PFS	preliminary feasibility (pre-feasibility) study
population	In geostatistics, a population formed from grades having identical or similar geostatistical characteristics. Ideally, one given population is characterized by a linear distribution

probability curve	Diagram showing cumulative frequency as a function of interval size on a logarithmic scale
QAQC	quality assurance/quality control
quantile plot	Diagrammatic representation of the distribution of two variables; it is one of the control tools (e.g. when comparing grades of a model with sampling data)
quantile	In statistics, a discrete value of a variable for the purposes of comparing two populations after they have been sorted in ascending order.
range	Same as Influence Zone; as the spacing between pairs increases, the value of corresponding variogram as a whole also increases. However, the value of the mean square difference between pairs of values does not change from the defined spacing value, and the variogram reaches its plateau. The horizontal spacing at which a variogram reaches its plateau is called the range. Above this spacing there is no correlation between samples
reserves	Mineable geological resources
resources	Geological resources (both mineable and unmineable)
RF	revenue factor
RL	Elevation of the collar of a drillhole, a trench or a pit bench above the sea level
ROM	run of mine
RWi	Bond Rod Mill Work index
SAG	Semi-autogenous
sample	Specimen with analytically determined grade values for the components being studied
Satmagan	Saturation Magnetization Analyzer
scatterplot	Diagrammatic representation of measurement pairs about an orthogonal axis
SEM	scanning electron microscope
SG	specific gravity
SGS	SGS Laboratories
sill	Variation value at which a variogram reaches a plateau
SKLM	simple kriging with local mean
SHG	South High Grade
SLG	South Low Grade
standard deviation	Statistical value of data dispersion around the mean value
string	Series of 3D points connected in series by straight lines
SVT	SAG variability test
t	tonne(s)
t/m^3	tonnes per cubic metre
TMF	tailings management facility
TMI	total magnetic intensity
TMM	total material mined
TO	end of intersection
tpa	tonnes per annum
tph	tonnes per hour
TSF	tailings storage facility

U/F	Under flow product
U/S	Under size product
US$	United States dollars
variation	In statistics, the measure of dispersion around the mean value of a dataset
variogram	Graph showing variability of an element by increasing spacing between samples
variography	The process of constructing a variogram
VONE	Vanadium One Iron Corp.
VTM	vanadiferous titanomagnetite
wireframe model	3D surface defined by triangles
X	Coordinate of the longitude of a drillhole, a trench collar, or a pit bench
XRD	x-ray diffraction
XRF	x-ray fluorescence
Y	Coordinate of the latitude of a drillhole, a trench collar, or a pit bench
y	year

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