NI43-101 Technical Report on the Mustavaara Vanadium project, Finland

Prepared for Strategic Resources Inc.

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Pekka Lovén, PL Mineral Resources Services

Effective date: September 14th, 2020
Execution Date: October 21st, 2020

Certificate of Qualified Person – Ville-Matti Seppä, EurGeol

I **Ville-Matti J. Seppä**, EurGeol., do hereby certify that:

1. I am currently employed as a Section Manager of Geology & Mine Design at AFRY Finland Oy. Jaakonkatu 3, FI-01621 Vantaa, Finland.
2. This certificate is to accompany the report "NI43-101 Technical Report on the Mustavaara Vanadium project, Finland" for Strategic Resources Inc. with an effective date of September 14th, 2020.
3. I am a graduate from the University of Turku with a M.Sc. Degree in 2009 and have been professionally active since my graduation.
4. I am a European Geologist (#1286) licensed by the European Federation of Geologists.
5. I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purpose of NI 43-101.
6. I visited Strategic Resource's Mustavaara property in Finland on June 10th, 2020.
7. I am responsible for Section 1 to 27 in the report titled" NI43-101 Technical Report on the Mustavaara Vanadium project, Finland" with the effective date of September 14th, 2020.
8. I am independent of Strategic Resources Inc. applying all of the tests in Section 1.5 of NI 43-101.
9. I do not have any prior involvement to the property that is subject of the technical report.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 21th day of October 2020

"Original Signed"

M.Sc. Ville-Matti Seppä, EurGeol

Certificate of Qualified Person – Pekka Lovén

I, **Pekka Lovén**, MAusIMM(CP), MSc (Mining), do hereby certify that:

1. I am an independent consultant of PL Mineral Reserve Services, Alkutie 10 A1, Helsinki, Finland.
2. I graduated with M.Sc. degree in Mining Engineering from the Helsinki University of Technology in 1980.
3. I am a Member and Chartered Professional with the Australian Institution of Mining and Metallurgy (Member# 301822).
4. I have worked as a mining engineer for a total of 40 years since my graduation from the university.
5. I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purpose of NI 43-101.
6. I have visited the Mustavaara property in Finland between the 16th and 17th of November 2011.
7. I am responsible for the supervision of the preparation of Sections 1 to 27 in the report titled" NI43-101 Technical Report on the Mustavaara Vanadium project, Finland" with the effective date of September 14th, 2020.
8. I am independent of Strategic Resource Inc.
9. I do not have any prior involvement to the property that is the subject of this technical report.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this Dated this 21th day of October 2020

"Original Signed"

Pekka Lovén, MAusIMM

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Tables and figures

List of Abbreviations

asl	above sea level
AC	Alternating current
ADI	Adriana Resources Inc.
AFRY	AFRY Finland Oy
Al_2O_3	Aluminum oxide
Akkerman	Akkerman Exploration B.V.
BAT	Best Available Techniques
CaO	Calcium oxide
CAPEX	Capital expenditures
CB	Clarification basin
CEO	Chief executive officer
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CLGB	Central Lapland Greenstone Belt
cm	centimetre
CO_2	Carbon dioxide
CP	Chartered Professional
CSA	Canadian Securities Administrators
DC	Direct current
DD	Due diligence
DDT	Dings-Davis Tube
DGPS	Differential Global Positioning System
DTWR	Davis Tube Weight Recovery
E	East
€	Euro
EIA	Environmental Impact Assessment
ELY	Centre for Economic Development, Transport and the Environment
ESIA	Environmental and Social Impact Assessment
EurGEOL	Professional European Geologist with the European Federation of Geologists
Fe	Iron
FeV	Ferrovanadium
FS	Feasibility Study
g	gram
Ga	Giga annum
gps	Global positioning system
GTK	Geological Survey of Finland
ha	hectares
HF	High Frequency
hr	hour
ICP-OES	Inductively Coupled Plasma - Optical Emission Spectrometry
IPPC	Integrated pollution prevention and control
JORC	Joint Ore Reserve Committee
k	thousand
KAIELY	Centre for Economic Development, Transport and the Environment of Kainuu
kg	kilogram
km	kilometer
ktpa	Kilo tonnes per annum
kV	kilovolt
LAB	Eurofins Labtium Oy
lb	Pound
LGB	Lapland Greenstone Belt
LOM	Life of Mine
m	metre
Ma	Mega annum
MAusIMM	Member of the Australian Institute of Mining and Metallurgy

Mefos	Swerea Mefos Research Institute
mm	milimetre
MKOy	Mustavaaran Kaivos Oy
Mt	Million tonnes
N_2	Nitrogen
NI 43-101	National Instrument 43-101
NN	Nearest Neighbor
No	Number
NSR	Net Smelter Return
ODL	Ore disseminated layer
OLL	Ore lower layer
OML	Ore middle layer
OPEX	Operating expenditure
OUL	Ore upper layer
P	Phosphorous
PEA	Preliminary Economic Assessment
%	percent
PFS	Pre-Feasibility Study
PGE	Platinum Group Elements
POPELY	Centre for Economic Development, Transport and the Environment of North Ostrobothnia
PPC	ProspectOre Capital Corp.
ppm	parts per million
PSAVI	Northern Finland Regional Administrative Agency
pXRF	Portable X-ray fluorescence analyzer
QA/QC	Quality Assurance/Quality Control
QP	Qualified Person
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
RR	Rautaruukki Oy
RSD	Relative Standard Deviation
§	Section
SAC	Special protection zone
SG	Specific gravity (g/cm^3)
SiO_2	Silicon dioxide
Strategic	Strategic Resources Inc.
t	tonnes
Ti	Titanium
TiO_2	Titanium oxide
TMF	Tailings Management Facility
tpa	Tonnes per annum
Tukes	Finnish Safety and Chemicals Agency
μm	micrometre
US$	United Stated Dollar
V	Vanadium
V2O5	Vanadium Pentoxide
VinMC	Vanadium content in the magnetite concentrate
VTM	Vanadiferous titanomagnetite
wt. %	Percentage by weight
XRF	X-Ray Fluorescence
3D	Three dimensional

1 Summary

1.1 Introduction

Strategic Resources Inc. (Strategic) commissioned AFRY Finland Oy (AFRY) to prepare an independent mineral resource estimate on the Mustavaara vanadium deposit in compliance with the Canadian Securities National Instrument 43-101 Standards of Disclosure for Mineral Properties and Form 43-101F1.

This Technical Report was written by Mr. Ville-Matti Seppä (EurGeol) of AFRY Finland Oy and Pekka Lovén (MAusIMM) of PL Mineral Reserve Services. Both authors are independent qualified persons (QP) as defined by Canadian Securities Administrators (CSA) *National Instrument 43-101 – Standards of Disclosure for Mineral Projects* (NI 43-101) and as described in Certificate of Qualified Person of this Technical Report.

1.2 Location

The Mustavaara Project (Mustavaara or the Project) is located in north-central Finland. The Project is part of the Municipality of Taivalkoski, approximately 650 km north of Helsinki and 180 km northeast of Oulu. The geographic coordinates are 65°49'N latitude and 28°08'E longitude.

1.3 Ownership and History

Mustavaara was discovered in 1957 when samples sent to Otanmaki Oy for analyses reported vanadium. Fieldwork from 1957 and 1958 discovered a vanadium bearing magnetite deposit. Rautaruuki Oy took over the project and continued more detailed exploration work. They drilled 56 holes from 1967 to 1971 and outlined a vanadium bearing ore zone and conducted a "Feasibility Study". Construction on the mine commenced in 1973. The open pit mine and roast-leach processing plant were operational from 1976-1985. The peak annual production reached 1.6 Mt of ore, producing 240,000 t of pelletized magnetite concentrate and 3,000 t of vanadium pentoxide. Operations were suspended in 1985 after a period of very low vanadium prices (Pöyry Finland Oy, 2012).

Akkerman Exploration B.V (Akkerman) was granted the claims in 2006. Since obtaining the claims, no work is known to have taken place. There was a series of option agreements with Adriana Resources Inc. who transferred their rights to ProspectOre Capital Corp. and then to Vanadis Mines Oy. The agreement(s) were finally terminated and Akkerman regained ownership of the project. On May 19th 2011, Akkerman entered into a purchase agreement, whereby 100% of its Mustavaara mineral rights were sold to Mustavaaran Kaivos Oy (MKOy) (Pöyry Finland Oy, 2012). Shortly after, on May 28th, 2011, MKOy filed an application for a mining license over the Mustavaara mine and surrounding areas and started an exploration and due diligence program. In the fall of 2011, MKOy drilled 17 diamond drill holes and modelled airborne magnetic data over the property. In 2012, MKOy completed a pre-feasibility study and in 2013 MKOy completed a pit optimization study. MKOy then proceeded to start permitting the mine. In 2016, environmental and water permits were issued to MKOy and appealed. The courts overturned the appeal and granted the permits again on June 14th, 2018. Later that year MKOy changed its name to Ferrovan Oy. Ferrovan Oy was unable to raise the capital to build the mine and filed for bankruptcy. The permits remain under MKOy's name but could be transferred to the next company.

On February 10th 2020, Strategic Resources Inc. announced that it had successfully applied for Reservations over the Mustavaara mine area. The company also acquired all of the intellectual property, core samples from 2011 drill campaign and storage facilities associated with Mustavaara from the bankruptcy estate of Ferrovan Oy (Strategic Resources, 2020).

The Mustavaara project consists of three exploration reservations in legal force and have a surface extent of 2,660 hectares. All reservations have been approved by Finnish Safety and Chemicals Agency (Tukes) and are valid until February 9th, 2022.

1.4 Geology and Mineralization

The Mustavaara V-Fe-Ti deposit is part of a large, approximately 2.44 Ga old, layered intrusion complex, known as the Tornio-Näränkävaara intrusion belt (Karinen, Hanski & Taipale, 2015). The deposit itself belongs to the Koillismaa Intrusion. The Koillismaa Intrusion is composed of various distinct blocks of sheet-like layered intrusions, which were separated due to tectonic movements (Karinen, 2010). The 4 km wide and 20 km long Porttivaara block is the most well know part of the intrusion and the Mustavaara deposit is located in it (Karinen, Hanski & Taipale, 2015).

In the Porttivaara block the location, size, and shape of the magnetite-gabbro horizon has been interpreted from airborne and ground magnetic survey data. The gravimetric models show that the magnetite-gabbro horizon extends down to depths of 2,000 m (Saviaro, 1976; Ruotsalainen, 1977; Piirainen, et al., 1978).

The layered series of the Porttivaara block is composed mainly of norites, gabbronorites, leucogabbros and anorthosites. The deposit is comprised of four conformable ore layers, disseminated ore, upper, middle and lower layers, with a total thickness of 80 m. The ore-bearing Mustavaara magnetite-gabbro occurs in the upper part of the layered series, surrounded by anorthosite rocks. Genetically, the vanadium containing magnetite gabbro is considered to be of magmatic origin formed as a segregation from an iron-rich liquid.

1.5 Project Status

The Mustavaara Project is an advanced exploration project that has seen extensive exploration including geophysical surveys and drilling. A property wide magnetic belt has been identified for further drill testing and drilling has outlined the Mustavaara Fe-V-T mineralized zone.

1.6 Mineral resource estimates

The mineral resource estimate was generated using drill hole sample assay results and the interpretation of a geologic model based on data collected for the last JORC mineral resource estimate done by Outotec (Finland) Oy, dated August 30th, 2013. There has not been any new exploration activities concerning the property and the end products (ferrovanadium and pig iron) remain the same since the 2013 resource report. The product price, operating costs and cut-off grades have been updated from the previous estimate.

The Mineral Resource was calculated in accordance with the Canadian National Instrument for the Standards of Disclosure for Mineral Projects (NI43-101) requirements.

To ensure that the mineral resource estimate can be considered for eventual economic extraction, the following economic and technical constraints have been used:

- Total Operating Cost — €44.55/t
- Ferrovanadium Price — US$ 30/kg
- Pig Iron Price — US$ 350/t
- Exchange rate — 1.10 (US$/€)
- Cut-off grade — 11.0% magnetite
- Vanadium grade — 0.90%
- Iron grade — 61.1%
- Pit slope angle — 55 degrees

The Mineral resource estimates at Mustavaara are presented in Table 1-1.

Table 1-1 Mustavaara Estimated Mineral Resources as of the September 14th, 2020 @ 11.0% Magnetite cut-off.

Resource Class	Tonnes	Average Grade				Contained Metal		
		Magnetite	VinMC	Ti	Fe	VinMC	Ti	Fe
	Mt	(%)	(%)	(%)	(%)	(kt)	(kt)	(kt)
Measured Mineral Resource	**64.0**	**15.41**	**0.91**	**3.75**	**63.3**	**90**	**370**	**6 244**
Indicated Mineral Resource	**39.7**	**15.27**	**0.88**	**3.53**	**62.8**	**53**	**214**	**3 805**
Total M&I Mineral Resource	**103.7**	**15.36**	**0.90**	**3.67**	**63.1**	**143**	**584**	**10 049**
Inferred Mineral Resource	**42.2**	**15.11**	**0.92**	**3.75**	**62.3**	**59**	**239**	**3 971**

Note: VinMC refers to vanadium in magnetite concentrate; Ti refers to titanium in magnetite concentrate and Fe to iron in magnetite concentrate.

1.7 Conclusions

The following remarks and conclusions regarding the Mustavaara project are summarized below:

- The drilling and sampling to date supports the mineral resources estimate and there is sufficient information to be used as a basis for the mineral resource estimate.
- The drilling pattern and spacing covers the known measured, indicated and inferred mineral resources. A limited amount of new drilling down dip of the historic drilling could upgrade the indicated and inferred resources. The down-dip continuation of the magnetite gabbro remains open and is expected to continue with the same thickness and grade in the same kind of geological framework as with the known mineralization.
- The deposit geology and style of mineralization is well understood and the property has a history of successful mining activities.
- Based on the mineral resource estimate, the project is well suited to proceed to the pre-economic assessment phase.
- Land use planning for the potential reopening of the mine is at an advanced state and is a major upside as there would be limited delays to be expected in land planning matters.
- The mineral processing is very well understood, studied and tested at Mustavaara and the deposit is well suited for production.

As the project has had a previous JORC compliant pre-feasibility study completed, it should be possible with minor updates and minimal drilling to update the previous work to comply with the CIM Definition Standards 2014 and be reported in accordance with the requirements of National Instrument 43-101 “Standards of Disclosure for Mineral Projects” of the Canadian Securities Administrators.

1.8 Recommendations

Based on the mineral resource estimate, it is recommended to continue the development of the Mustavaara deposit and to move forward to a PEA study.

The estimated budget to carry out a PEA study is estimated to be between €150,000 - €200,000. The cost estimate is based on AFRY Finland OY's experience on similar sized studies in Nordic countries.

Cautionary Note Regarding Forward-looking Information and Statements

Information and statements contained in this Technical Report that are not historical facts are "forward-looking information" or "forward-looking statements" within the meaning of Canadian securities legislation and the U.S. Private Securities Litigation Reform Act of 1995 (hereinafter collectively referred to as "forward-looking statements") that involve risks and uncertainties. Examples of forward-looking statements in this Report include information and statements with respect to: Strategic's plans and expectations for the Mustavaara Project, estimates of mineral resources, and possible related discoveries or extensions of new mineralization or increases or upgrades to reported mineral resources estimates and budgets for recommended work programs.

In certain cases, forward-looking statements can be identified by the use of words such as "budget", "estimates", or variations of such words or state that certain actions, events or results "may", "would", or "occur". These forward-looking statements are based, in part, on assumptions and factors that may change, thus causing actual results or achievements to differ materially from those expressed or implied by the forward-looking statements. Such factors and assumptions include, but are not limited to, assumptions concerning base metal prices; cut-off grades; accuracy of mineral resource estimates and resource modelling; reliability of sampling and assay data; representativeness of mineralization; accuracy of metallurgical test work and timely receipt of regulatory approvals.

Forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Strategic to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. Such risks and other factors include, among others, fluctuation in the price of base and precious metals; expropriation risks; currency fluctuations; requirements for additional capital; government regulation of mining operations; environmental, safety and regulatory risks; unanticipated reclamation expenses; title disputes or claims; limitations on insurance coverage; changes in project parameters as plans continue to be refined; failure of plant, equipment or processes to operate as anticipated; accidents, labour disputes and other risks of the mining industry; competition inherent in the mining exploration industry; delays in obtaining governmental approvals or financing or in the completion of exploration, development or construction activities, as well as those factors discussed in the sections entitled "Risks and Uncertainties" in Strategic's annual Management's Discussion and Analysis. Although Strategic and the authors of this Report have attempted to identify important factors that could affect Strategic and may cause actual actions, events or results to differ, perhaps materially, from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended.

There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. The forward-looking statements in this Report are based on beliefs, expectations and opinions as of the effective date of this Report. Strategic and the authors of this Report do not undertake any obligation to update any forward-looking information and statements included herein, except in accordance with applicable securities laws.

2 Introduction

AFRY Finland Oy (AFRY) has been commissioned by Strategic Resources Inc. (Strategic) to prepare an independent mineral resource estimate on the Mustavaara vanadium deposit in compliance with the Canadian Securities National Instrument 43-101 Standards of Disclosure for Mineral Properties (NI43-101) and Form 43-101F1.

This report has an effective date of September 14th, 2020. This technical report is based on the data collected and prepared for the JORC compliant Pre Feasibility Study (PFS) for the Mustavaara vanadium iron project in 2011 (Pöyry Finland Oy, 2011) and on the report "Update Resource estimation and preliminary mining study of the Mustavaara deposit for Mustavaaran Kaivos Oy", (Outotec, 2013).

Ville-Matte Seppä and Pekka Lovén are independent "qualified persons" (QPs) within the meaning of National Instrument 43-101 – Standards of Disclosure for Mineral Projects (NI 43-101). They are responsible for the preparation of this Technical Report on the Mustavaara Project, which has been prepared in accordance with the NI 43-101 and Form 43-101F1 Technical Report (Form 43-101F1).

Mr. Seppä visited the site on June 10th, 2020. The inspection included:

- Visiting the historic open pit area.
- Visiting the tailings area.
- Overall view of the property.
- Inspection of several drill sites.
- Discussions with Jukka Pitkäjärvi, former CEO of Ferrovan Oy.

In addition to the most recent visit, Mr. Seppä has visited the core processing and sample preparation facilities located in Taivalkoski on November 29th, 2017.

Pekka Lovén visited the site between the 16th and 17th of November 2011.

AFRY has relied on information provided by Strategic to prepare this report. AFRY has no reason to believe that this information is materially misleading, incomplete or contains material errors. The content of this report as expressed by AFRY is based on the assumption that all the data provided by Strategic is complete and correct to the best of Strategic's knowledge.

All measurement units used in this report are metric, and currency is expressed in the Euro (€) unless stated otherwise. The currency in Finland is the Euro.

3 Reliance on Other Experts

This Report was prepared by Ville-Matte Seppä and Pekka Lovén. They are independent qualified persons for the purposes of NI 43-101. The QPs have relied on additional data from:

- Mineral Deposits database, Geological Survey of Finland
- The Exploration and Mining Registry (permitting), Finnish Safety and Chemicals Agency

The information, conclusions and recommendations contained in this report are based on:

- The qualified persons' field observations
- Data, reports, and other information supplied by Strategic and other third parties.

For the purpose of the report, Ville-Matte Seppä and Pekka Lovén have relied on the ownership data provided by Strategic and believe that such data and information is complete and correct. Ville-Matte Seppä and Pekka Lovén have not completed an extensive property title and ownership search on Mustavaara and express no legal opinion on the ownership status of the property.

4 Property Description and Location

The Mustavaara Project is located in north-central Finland, in the municipality of Taivalkoski, in the province of Oulu, 75 km southwest of the city of Kuusamo on the boundary of the North Ostrobothnia and Lapland provinces (Figure 4-1). The geographic coordinates are 65°49'N latitude and 28°08'E longitude.

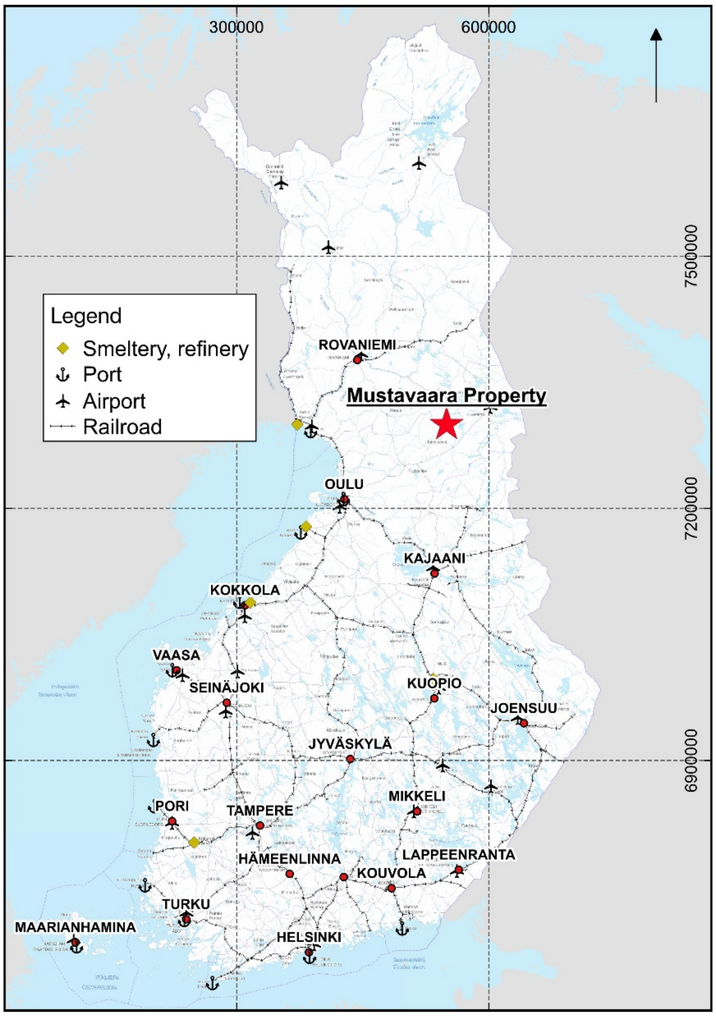

Figure 4-1 Mustavaara property location. Coordinates in ETRS-TM35FIN.

The project includes the historic Mustavaara mine, previously developed and operated by Rautaruukki Oy. The processing plant and all auxiliary buildings and infrastructure were removed from the site by 2002.

4.1 Mineral rights

The project is comprised of three exploration reservations, and has a surface area of 2,660 hectares (Table 4-1 and Figure 4-2). All reservations have been approved by Finnish Safety and Chemicals Agency (Tukes) and are valid until February 9th, 2022. All of the reservations are held by Strategic through its 100% owned Finnish subsidiary Strategic Explorations Oy.

Table 4-1 Details of exploration reservation. Data from Finnish Safety and Chemicals Agency (Tukes).

Permit Type	Name	Mining Registry Number	Area (hectares)
Exploration Reservation	Kalliolampi 1-4	VA2020:0009	355
Exploration Reservation	Mustavaara West 1-14	VA2020:0011	1,168
Exploration Reservation	Lavotta	VA2020:0010	1,137
Total			**2,660**

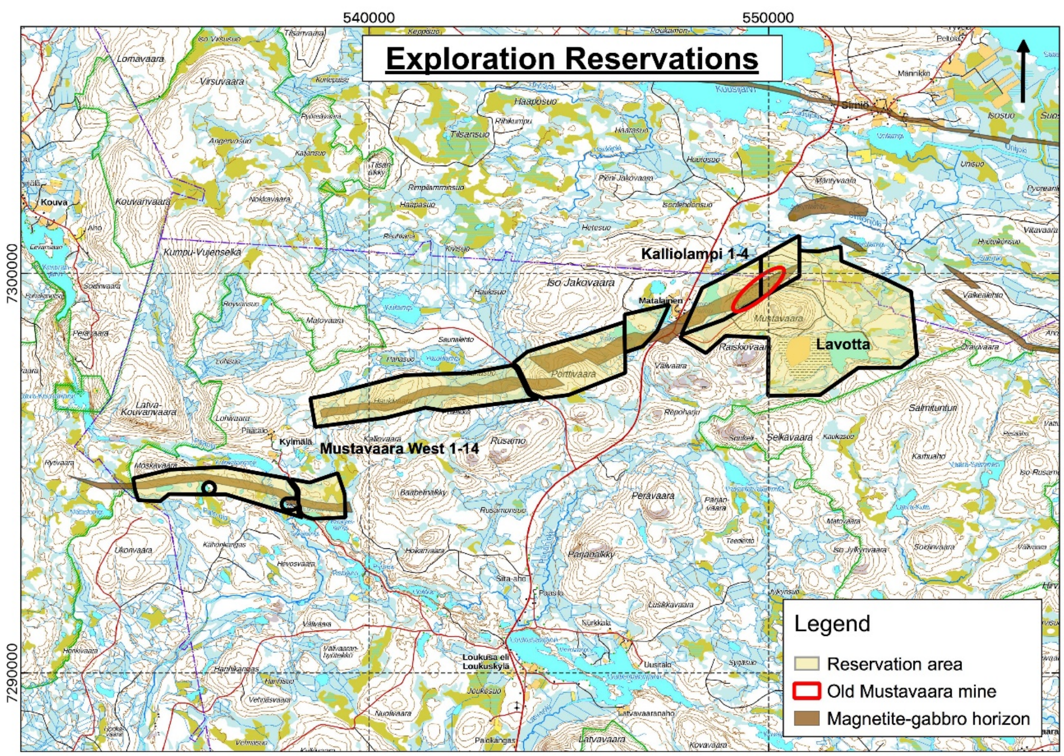

Figure 4-2 Location map of the exploration reservations relative to the local topography, the old mine workings and the position of the magnetite-gabbro horizon

4.2 Preservation areas

The Mustavaara property is located between areas that belong to Syöte national park, a Natura 2000 area (Figure 4-3).

The Natura 2000 program is European Union’s intention to stop the reduction of nature’s diversity.

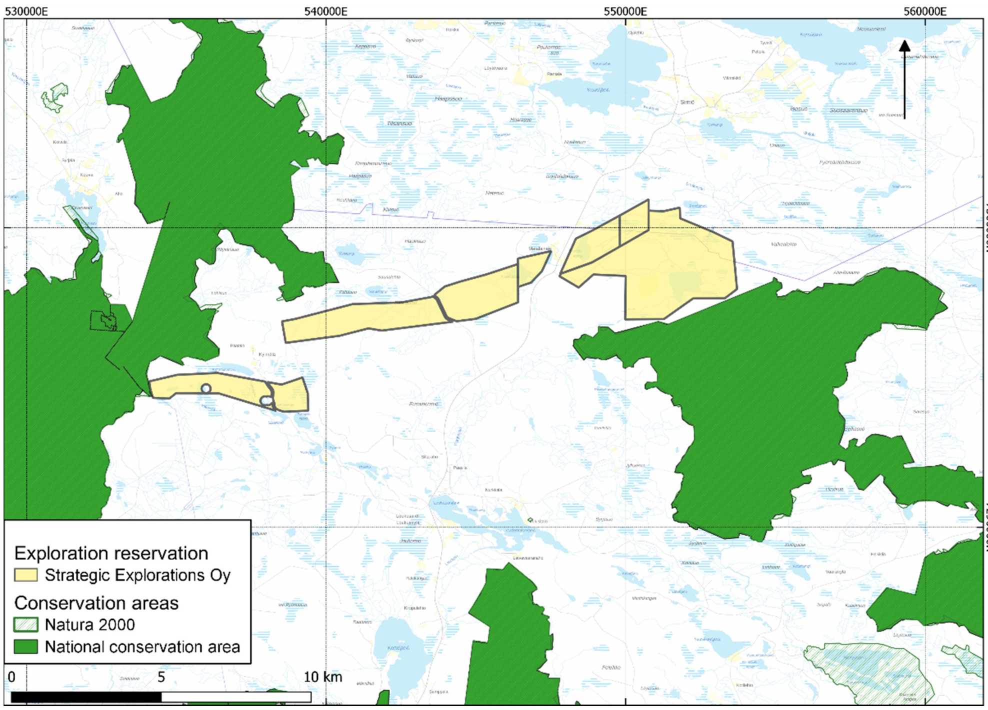

Figure 4-3 Mustavaara reservations and adjacent conservation areas

At Mustavaara, the Natura 2000 area boundary is a few kilometres to the south of the tailings facility area. The laws that govern Natura 2000 do not demand any buffer zones to be set between the conservation area and the land surrounding it. Impacts of projects or plans in or near Natura 2000 sites will be assessed unless it is certain that they will not undermine conservation objectives. The combined effects of different projects are also assessed. Projects can only be approved if the assessment has ensured in advance that they will not have a significant detrimental effect on the conservation objectives of the Natura 2000 sites. The Government may grant a permit for a project that impairs the natural values of a Natura 2000 site if it has to be implemented for an overriding reason in the public interest and there is no alternative solution. In that case, compensatory measures must be taken to maintain the coherence of the network.

At Mustavaara, a Natura 2000 assessment of the effects of the mining activities have been previously carried out and previously proposed work would not have impeded on the Natura 2000 area. The authors recommend reviewing the Natura 2000 assessment against updated work and mining plans in future studies.

4.3 Permits and compensation arrangements

The following is a breakdown of the steps needed to advance a project from prospecting to mining according to the Finnish Mining Act (621/2011).

The Environmental Impact Assessment (EIA) procedure and Natura 2000 assessment were approved by the authorities Jan 18th, 2010, POPELY/2/07.04/2010), though EIA-process was done according to the EIA-legislation valid in 2010.

Environmental and water permits issued to Mustavaaran Kaivos Oy (MKOy) were approved on March 16th, 2016 by the Regional State Administrative Agency for Northern Finland (PSAVI). The decision was appealed and the Vaasa administrative court ruled against the appeal making the permits valid on the 14th of June 2018. They remain valid under MKOy as the operator and could be transferred to the next mine operator. The EIA contains the water permit, which lapses in July 2022 and the environmental permit, which could lapse as early as July 2023. Strategic has not attempted to transfer the EIA as of the effective date of this report.

4.3.1 Reservation

The **Finnish Mining Act** grants reservations that give its holder first refusal to apply for an exploration permit. Rights to a site can be reserved for a maximum period of 2 years. Small-scale prospecting is allowed under the statutory right of public access, subject to the restrictions stipulated in the act, provided that no damage and only minor inconveniences or disturbances are caused.

4.3.2 Exploration Permit

According to the **Finnish Mining Act**, prospecting and advanced exploration are subject to an exploration permit. An exploration permit on a site entitles its holder to the following rights:

- To conduct exploration on the permit holder's own land and that owned by another landowner, or exploration area, in the area referred to in the permit
- To explore the structures and composition of geological formations
- To conduct other exploration in order to prepare for mining activity
- To conduct other exploration in order to locate a deposit and to investigate its quality, extent, and degree of exploitation, as provided for in more detail in the exploration permit
- To build, or transfer to the exploration area, temporary constructions, and equipment necessary for exploration activity, as specified in more detail in the exploration permit

An exploration permit gives its holder first refusal to apply for a mining permit to extract any minerals found within the site. An exploration permit can be granted for a maximum period of 4 years, with an option to extend the permit by 3 years at a time, up to a maximum of 15 years in total.

The permit holder is liable to pay annual compensation to any landowners affected by the permit (known as a 'prospecting fee'). The prospecting fees payable to landowners are as follows:

1) € 20 per hectare per year for the first four years of the exploration permit

2) € 30 per hectare per year for the fifth, sixth, and seventh year of the exploration permit

3) € 40 per hectare per year for the eighth, ninth, and tenth year of the exploration permit

4) € 50 per hectare per year for the eleventh year of the exploration permit and for any subsequent years

The permit holder is also liable to compensate any inconvenience and damage caused in the area by exploration activities based on the **Mining Act**.

4.3.3 Compensation payable under the environmental permit

In addition to the fees payable according to the mining permit, obligations relating to compensation and securities may also be imposed in environmental permits. Typical examples of such obligations include compensation for effects on fishing and waste management securities to ensure that the rehabilitation phase will be completed satisfactorily. Decisions relating to the environmental permit and any compensation payable under the permit rest with the Regional State Administrative Agency for Northern Finland.

4.3.4 Factors affecting work on the property

The permitting authority changed the environmental permit near the Mustavaara tailings area design because of an eagle’s nest nearby. No activities within a 400 metre radius around the nest are permitted, which could affect the previous tailings dam design proposed by MKOy. In the springtime, only if nesting is ongoing, no activities within a 1 kilometre radius around nest are allowed. At the time of this report, there has not been any active nesting recently and therefore the 1 kilometre zone is unlikely to affect potential operations.

Apart from the eagle’s nest, the author is not aware of any other significant factors or risks that would prevent the right or ability to work on the property.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Accessibility

The Mustavaara Project is located in north-central Finland at the border of North Ostrobothnia and Lapland provinces, approximately 650 km north of Helsinki and 180 km northeast of Oulu. Both paved highways and a gravel road lead to the property (Strategic Resources, 2020). The nearest town is Taivalkoski which is located about 35 km southeast of Mustavaara via route 863.

5.2 Climate

The climate in Finland is intermediate and both features of marine and continental climate are typical. The average temperatures at Mustavaara vary from +25 C in the summer to -20 C in the winter. Temperatures rarely go down to -45 C or up to +32 C (Finnish Meteorological Institute, 2012).

The annual precipitation is approximately 500-650 mm. The amount of precipitation increases towards summer, usually July and August are the rainiest months (Finnish Meteorological Institute, 2012).

Wintertime lasts approximately seven months in Central and Northern Lapland, and snow stays on the ground for over half of the year (Finnish Meteorological Institute, 2012).

5.3 Local Resources and Infrastructure

The nearest town to Mustavaara is Taivalkoski which is located about 35 km to southeast. Taivalkoski belongs to the North Ostrobothnia province and can be reached by highways number 5 and 20. Taivalkoski can provide basic goods and services for the early stages of exploration. Neighboring municipalities are Kuusamo, Posio, Pudasjärvi and Suomussalmi (Municipality of Taivalkoski, 2020).

The North Ostrobothnia province has a population of 411,887 and Taivalkoski has 3,976 inhabitants (Central Statistical Office of Finland, 2017). The nearest city is Oulu, approximately 180km southwest of Mustavaara, and has a population of 205,489 (Central Statistical Office of Finland, 2019). The city of Oulu can provide basic goods and services for early stages of exploration and mining. Oulu’s airport service daily domestic and international flights closer to the project area. Kuusamo airport, 76 km east of Mustavaara provide daily flights from Helsinki and seasonal international flights.

For international overseas shipments, the ports of Oulu and Raahe are suitable for mine operations. Mustavaara property is connected to Oulu via routes 863, 8610 and highway 20 (179 km) and to Raahe via routes 863, 8610 and highways 20 and E8 (256 km).

5.4 Physiography

Most of Lapland is characterized by lowland topography with the maximum elevations of lowland being 200 m elevation. Lowlands are located mainly from Kemi river regions to Kittilä, Sodankylä and Savukoski (Kujansuu, 2005). The Mustavaara property is located in the Kuusamo region and is approximately 290 m above sea level.

Ecologically, most lakes in Lapland, especially the larger ones, are usually in good or excellent condition. Smaller lakes typically suffer more eutrophication (Finnish Environment Institute, 2013). Surface waters (lakes and rivers), the ecological condition, and groundwater domains adjacent to Mustavaara are shown in Figure 5-1.

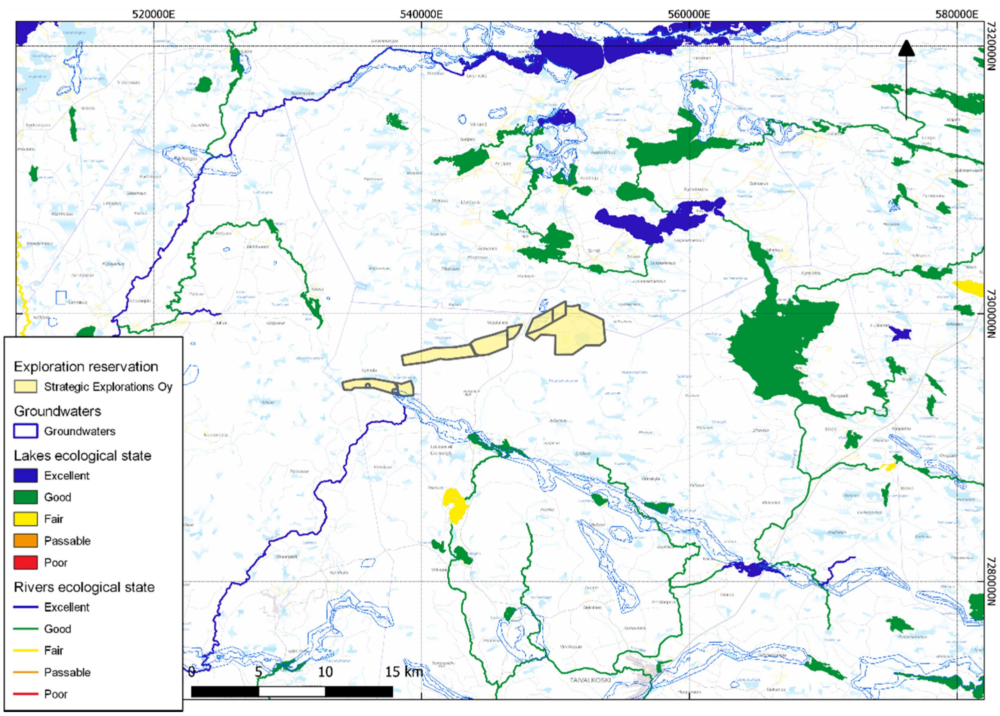

Figure 5-1 Surface waters and groundwater domains. State of lakes and rivers is indicated with different colours. Data from SYKE Vesikartta (2016)

Main parts of Lapland belong to the north boreal vegetation zone. Pine trees form the conifer forest border in the northern forest zone unlike elsewhere in the world where spruce or larch form the forest border (Hyppönen, 2002).

6 History

6.1 Prior ownership and historic results

The Mustavaara deposit was discovered by Otanmäki Oy in the 1960s' when a sample was sent to the company's laboratory for analyses and reported vanadium. A vanadium bearing magnetite deposit was outlined by field work in 1957 and 1958. Rautaruuki Oy, a former Finnish state-owned iron and steel producing company started more detailed investigations in 1961. A diamond drilling program of 56 diamond drill holes carried out between 1967 and 1971 outlined enough high-grade vanadium ore to start a commercial mining operation.

The decision to develop the mine was made in the fall of 1971 and construction began in 1973 with trial runs conducted in 1976. Figure 6-1 shows the processing plant as it was in 1976. An open pit mine and a roast-leach processing operation with a final V_2O_5 product began with a total of 300 personnel. The ultimate pit was designed to be 1,800 m in length with widths varying from 130 to 290 m, varying depths from 50 to 135 m, and with final pit wall slopes at approximately 55°. Annual production reached a peak of 1.6 million tonnes of ore, producing 240,000 tonnes of pelletized magnetite concentrate and a final product of 3,000 tonnes of vanadium pentoxide.

Table 6-1 Annual (1976-1984) Tonnes mined, Fe- and V-compositions of the concentrate in the Mustavaara Mine

Year	Tonnes	Fe (wt%)	V (wt%)
1976	730 000	60.50	0.89
1977	984 000	61.70	0.89
1978	1 256 000	61.60	0.92
1979	1 630 800	61.80	0.90
1980	1 561 600	61.30	0.89
1981	1 584 100	61.60	0.92
1982	1 619 600	61.80	0.92
1983	1 572 000	61.50	0.90
1984	1 490 100	no data	0.93

The mine operated to 1985 but closed after a period of low vanadium prices (US$1.50/ lb V_2O_5).

Figure 6-1 Aerial photo from Rautaruukki processing plant in 1976.

In July 2006, Akkerman Exploration B. V. (Akkerman) signed a 5-year option agreement with Adriana Resources Inc. (ADI), by which ADI could earn a 70% participating interest in the Kalliolampi mineral rights.

On April 6th, 2009, the Mustavaara West claim reservation (which includes the current Mustavaara West 1-14 claim) was granted to Akkerman by the Ministry, covering the western extension of the Mustavaara magnetite-gabbro horizon over a strike length of 15km. In April 2010, Akkerman applied for and was granted 14 exploration claims within the Mustavaara West claim reservation.

During March 2010, ADI transferred its rights under the 2006 Option Agreement with Akkerman to ProspectOre Capital Corp. (PCC). PCC passed its rights to its Finnish subsidiary Vanadis Mines Oy and entered into a Modified Option Agreement with Akkerman. The adverse financial market conditions did not enable Vanadis Mines Oy to raise the necessary funds as required under the modified agreement and consequently the Option Agreement was terminated in August 2010.

During the month of April 2011, Akkerman filed an official request for an extension of the original 5-year term of the Kalliolampi claims.

On May 19th, 2011, Akkerman entered into a purchase agreement, whereby 100% of its Mustavaara mineral rights were sold to Mustavaaran Kaivos Oy (MKOy).

Shortly after, on May 28th, 2011, MKOy filed an application for a Mining District over the Mustavaara mine and surrounding areas with the chief inspector of mines of the Ministry of Labour and the Economy. Total surface extent of the mining concession area applied for was 1,685 hectares.

A map with the outlines of the mining concession is shown in *Figure 6-2*.

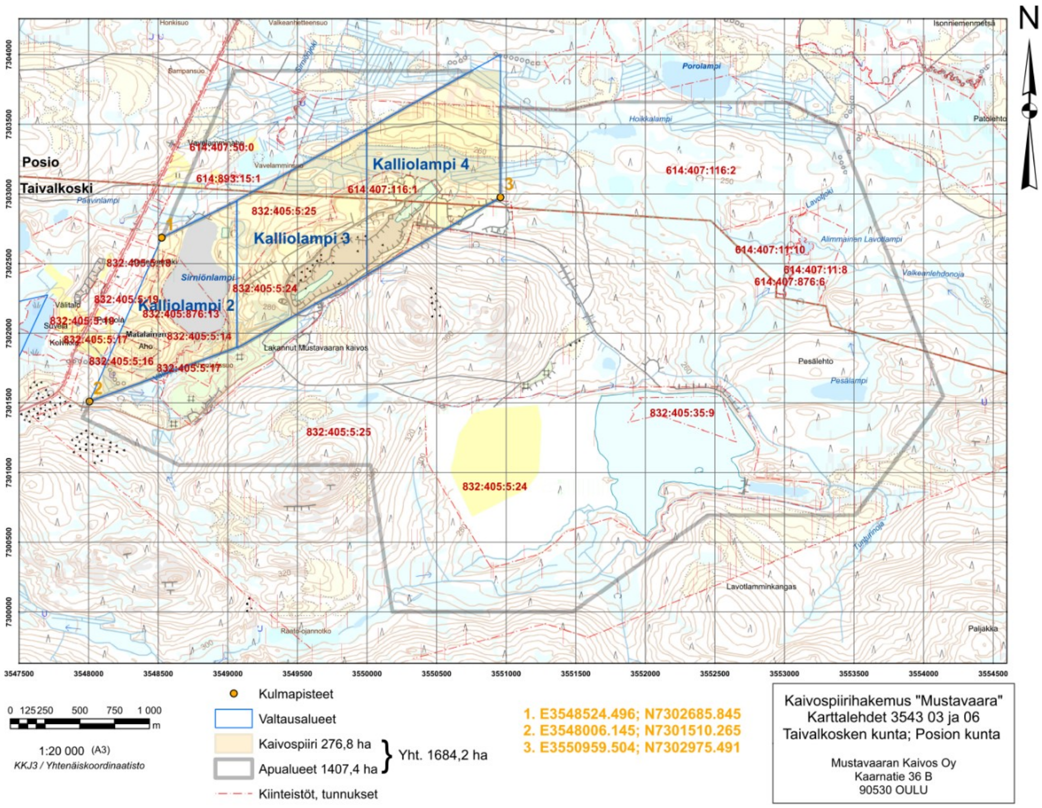

Figure 6-2 Map illustrating the outlines of the Mustavaara Mining Concession. Blue line: claim area, yellow area: mining district, grey line: auxiliary area

In the fall of 2011, MKOy drilled 17 diamond drill holes and modelled airborne magnetic data over the property. In 2012, MKOy completed a pre-feasibility study and in 2013 MKOy completed a pit optimization study. MKOy then proceeded to start permitting the mine. In 2016, environmental and water permits were issued to MKOy and appealed. The courts overturned the appeal and granted the permits again on June 14th, 2018. Later that year MKOy changed its name to Ferrovan Oy. Ferrovan Oy was unable to raise the capital to build the mine and filed for bankruptcy. The permits remain valid under MKOy as the operator and could be transferred to the next mine operator. The EIA contains the water permit, which lapses in July 2022 and the environmental permit, which could lapse as early as July 2023. Strategic has not attempted to transfer the EIA as of the effective date of this report.

On February 10th, 2020, Strategic Resources Inc. announced that it had successfully applied for Reservations over the Mustavaara mine area. The company also acquired all of the intellectual property, 2011 drill core and storage facilities associated with Mustavaara from the bankruptcy estate of Ferrovan Oy (Strategic Resources, 2020).

6.2 Historical Reserves and Resources

The first reserve estimation for Mustavaara was conducted by Rautaruuki Oy based on 57 drill holes at 100 m spaced sections.

These holes were drilled southwards along 100 m spaced cross-lines of a local mine grid with a baseline striking N71°E. Hole dips varied from -44° to -74° and depth of penetration was designed to test the magnetite-gabbro horizon down to a depth of 200 m asl (equivalent to mine level +100), which was the planned depth extent of the open pit.

The Mineral Reserve was estimated by the sectional method. The magnetite contents of the ore were determined by Davis Tube separation and the vanadium grade was determined by wet chemical analyses. The specific gravity (SG) of the orebody and waste rock were determined from laboratory measurements (weight in air and in water). The average SG of the ore was found to be 3.2 and 3.0 for waste rock.

Cut-off grades applied were 11.9% magnetite (as weight percentage recovered in the concentrate) containing 0.75% vanadium on a weighted average basis.

Rautaruukki Oy's historic non 43-101 compliant official mining reserve reported by Heikki Paarma in September 1971, amounted to 38 million tonnes grading 16% ilmenomagnetite. The magnetite concentrate that could be produced from this resource was estimated to contain an average of 0.9% vanadium.

Waste rock to be mined would have amounted to 43.7 million tonnes and overburden to be removed 1.3 million m^3. The open pit was designed with pit slopes of 55°, a total length of 1,500 m, and bench heights of 15 m.

The historical mineral resources and reserves of Mustavaara deposit are listed in Table 6-2, Table 6-3, Table 6-4, Table 6-5, and Table 6-6.

Table 6-2 Rautaruukki Oy 1971 @ 11.9% Magnetite cut-off

	Tonnes (Mt)	Magnetite (%)	VinMC (%)
Reported reserve	**38**	**16**	**0.9**

Note: VinMC refers to vanadium in magnetite concentrate

The Mineral Resource estimates created by Outotec Finland Oy are based on a 3D model constructed from cross sections taken at 100 m intervals. The cross sections include lithological and assay data. The nominal cut-off grade to be used was determined to be 8% magnetite. The dimensions of the model were extended to cover an additional 20 m in the NW-SE directions and 50 m in the vertical direction according to available drill hole results.

Drill hole samples were composited to 5 m length and the grades were estimated using an Inverse distance squared method with a maximum search distance of 500 metres.

Table 6-3 JORC compliant Mineral resource estimate as of March 10th, 2012 @ 8% Magnetite cut-off (Outotec Finland Oy)

Resource Class	Tonnage Mt	Magnetite %
Indicated Mineral Resource	**109.5**	**14.94**

Table 6-4 JORC compliant Mustavaara Ore Reserve estimate as of March 10th, 2012 @ 8% Magnetite cut-off (Outotec Finland Oy).

Reserve class	Tonnes (Mt)	Magnetite (%)	VinMC (%)	NSR (€/t)
Probable Ore Reserve	**97**	**13.79**	**0.91**	**62**

Note: VinMC refers to vanadium in magnetite concentrate.

The ore reserves are not additional to the mineral resources in Table 6-3.

The most recent Mineral Resource estimate was prepared by Outotec (Finland) Oy by Markku Meriläinen and Pekka Lovén with an effective date of August 30th, 2013. The resource estimate complies with recommendations in the Australasian Code for Reporting of Mineral Resources and Ore Reserves (Joint Ore Reserve Committee – JORC-code).

Table 6-5 JORC compliant Mineral resource estimates as of May 31st, 2013 @ 8% Magnetite cut-off (Outotec 2013).

Resource Class	Tonnage Mt	Magnetite %
Measured Mineral Resource	**63.5**	**15.13**
Indicated Mineral Resource	**48.1**	**14.70**
Total Mineral Resource	**111.6**	**14.94**

Table 6-6 JORC compliant Mustavaara Ore Reserve estimates as of May 31st, 2013 @ 8% Magnetite cut-off (Outotec 2013)

Reserve class	Tonnes (Mt)	Magnetite (%)	VinMC (%)	NSR (€/t)

Proven Ore Reserve	**64**	**13.97**	**0.91**	**66.6**
Probable Ore Reserve	**35**	**13.93**	**0.90**	**66.2**
Total Ore Reserve	**99**	**13.96**	**0.91**	**66.4**

Note: VinMC refers to vanadium in magnetite concentrate.

The ore reserves are not additional to the mineral resources in Table 6-5. “VinMC” refers to the vanadium content in the magnetite concentrate produced from the ore.

The authors have not done sufficient work to classify these historic estimates as current mineral resources and mineral reserves. The issuer is not treating the historic estimates as current mineral resources and mineral reserves.

7 Geological Setting and Mineralization

7.1 Regional Geology

The bedrock of Finland is part of the Precambrian East European Craton and Fennoscandian Shield, and forms one of the oldest parts of the Eurasian continent (Korsman & Koistinen, 1998).

The Northern parts of Finland is composed mainly of Archean and early Proterozoic rocks (Silvennoinen, 1998). The Archean rocks are approximately 3,100 – 2,500 Ma old and the Proterozoic rocks are approximately 1,930 – 1,800 Ma old (Korsman & Koistinen, 1998).

Typical rocks of the Archean period are gneissic rocks, rocks from greenstone belts, mica schists and paragneiss (Luukkonen & Sorjonen-Ward, 1998).

Major parts of Lapland's Paleoproterozoic bedrock are composed of metamorphosed volcanic and sedimentary rocks which form the Central Lapland Greenstone Belt (CLGB), the Peräpohja Schist Belt and the Kuusamo Schist Belt. Volcanic rocks are typical for CLGB. An arc shape Lapland granulite belt (LGB) is located in the north-eastern part of CLGB. LGB is composed of rocks which are metamorphosed in high pressure and temperature and pushed up in the crust by tectonic movement. Mafic layered intrusions are another typical feature in Northern Finland's Paleoproterozoic rocks. These rocks have crystallized in stable tectonic conditions and they are usually of economic importance. Central Lapland Granitoid Complex is also part of Paleoproterozoic rocks which extend from the boundary of Sweden almost to the boundary of Russia (Silvennoinen, 1998).

7.2 Local Geology

The Mustavaara deposit is a vanadium bearing magnetite gabbro horizon which is part of a large mafic layered intrusive complex, known as the Koillismaa Layered Igneous Complex. The age of the intrusion is approximately 2,400 to 2,500 Ma. This sheet like body intruded into the Archean basement as a single body with a total length of 100 km and a thickness of up to 3 km. This body has separated into at least 5 distinct large blocks due to later folding and faulting. The block containing the Mustavaara deposit is the Porttivaara Block, with a total approximate length of 19 km.

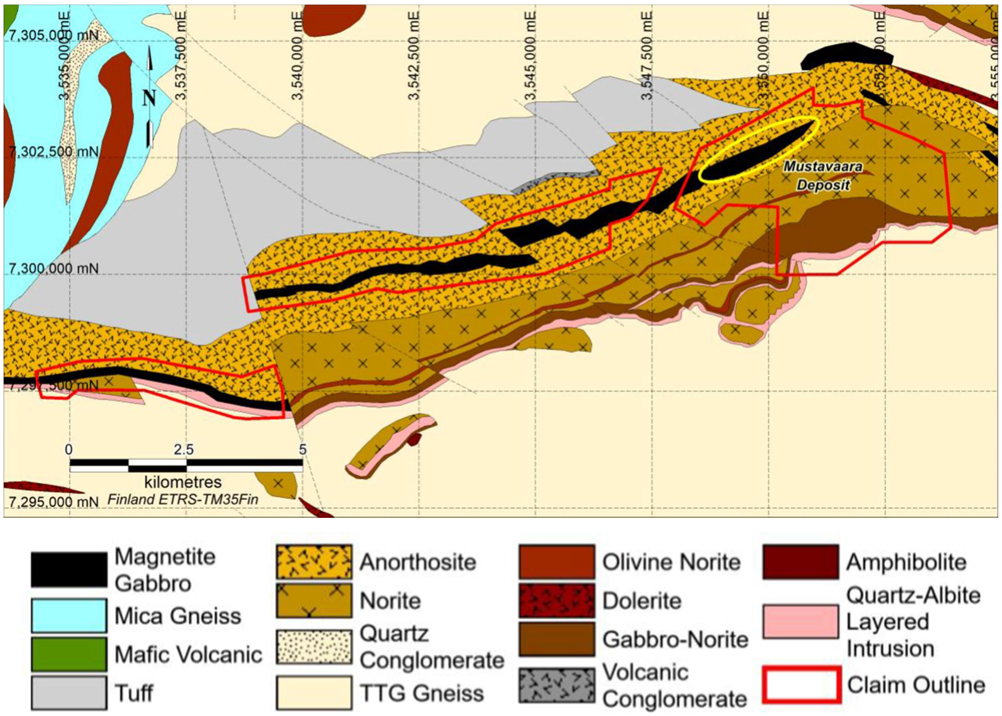

Figure 7-1 Regional geological map showing the Porttivaara block of Koillismaa Layered Intrusion. The historic Mustavaara mine is marked with a yellow circle.

The layered intrusion is divided into a marginal series (50 to 250 m thick) at the base and a thick layered series (up to 2,500 m thick) making up the bulk of the intrusion. The layered series is mainly composed of norites, gabbronorites, leucogabbros and anorthosites. The ore-bearing Mustavaara magnetite-gabbro occurs in the upper part of the layered series, surrounded by anorthosite rocks. The ore-horizon is a sheet-like body that trends east-west over a total strike length of approximately 15km within the Porttivaara Block. The ore-horizon generally dips 35°- 45° to the north. The thickness progressively increases from east to west up to a maximum of 200 m, while the average magnetite concentrate decreases to the west from 20% in the east to less than 10% in the western part.

Genetically, the vanadium rich magnetite gabbro is considered to be of magmatic origin formed as a segregation from an iron-rich liquid.

Lithological classification of the layered intrusion follows the classification used by MKOy. The lithological units presented in the Table 7-1 are included in the data base and are utilized in the geological model.

Table 7-1 Lithological units used in the geological model.

Lithological unit	Notes
Ore Lower Layer (OLL)	Coherent magnetite layer
Ore Middle Layer (OML)	Coherent magnetite layer
Ore Upper Layer (OUL)	Coherent magnetite layer
Ore Disseminated Layer (ODL)	Low grade magnetite layer
Ore	Narrow massive magnetite above the main zone
Internal Rock	Internal anorthosite
Hanging wall Rock	Anorthosite above the coherent magnetite layer
Footwall Rock	Anorthosite below the coherent magnetite layer
Peridotite	
Overburden	

The locations of the drill holes at Mustavaara are presented in Figure 7-2. Figure 7-3 and Figure 7-4 present the plan and cross section views of the deposit geology.

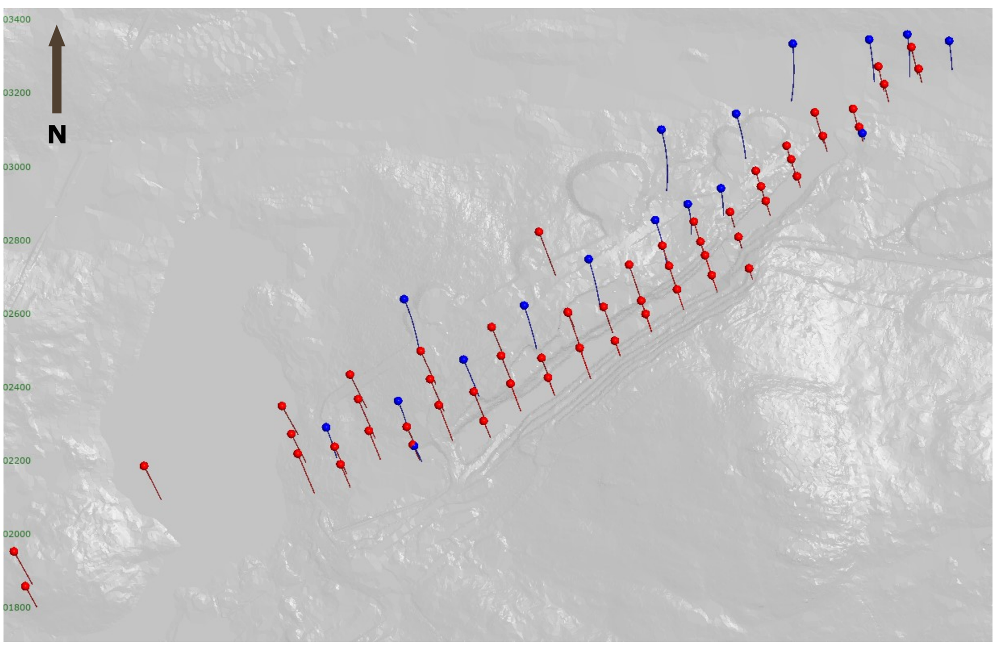

Figure 7-2 Drill hole locations at Mustavaara. Blue= 2011 MKOy drill campaign, Red= 1967-1971 Rautaruukki Oy campaign.

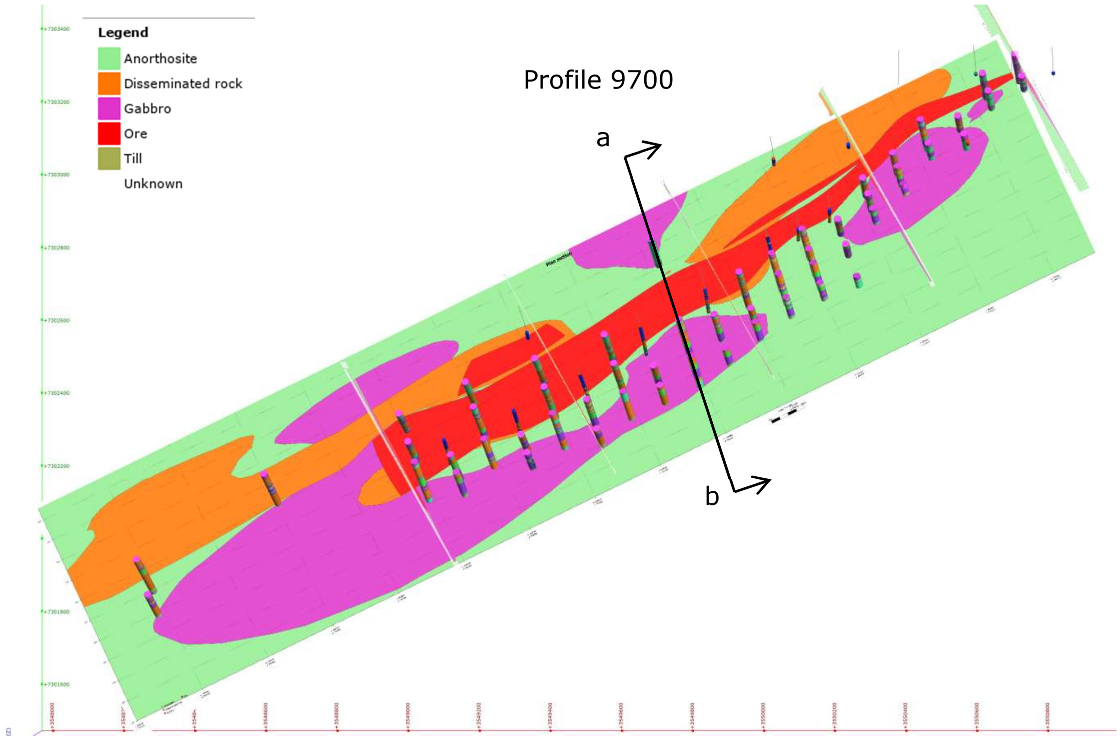

Figure 7-3 Plan view of the deposit geology and drill hole locations

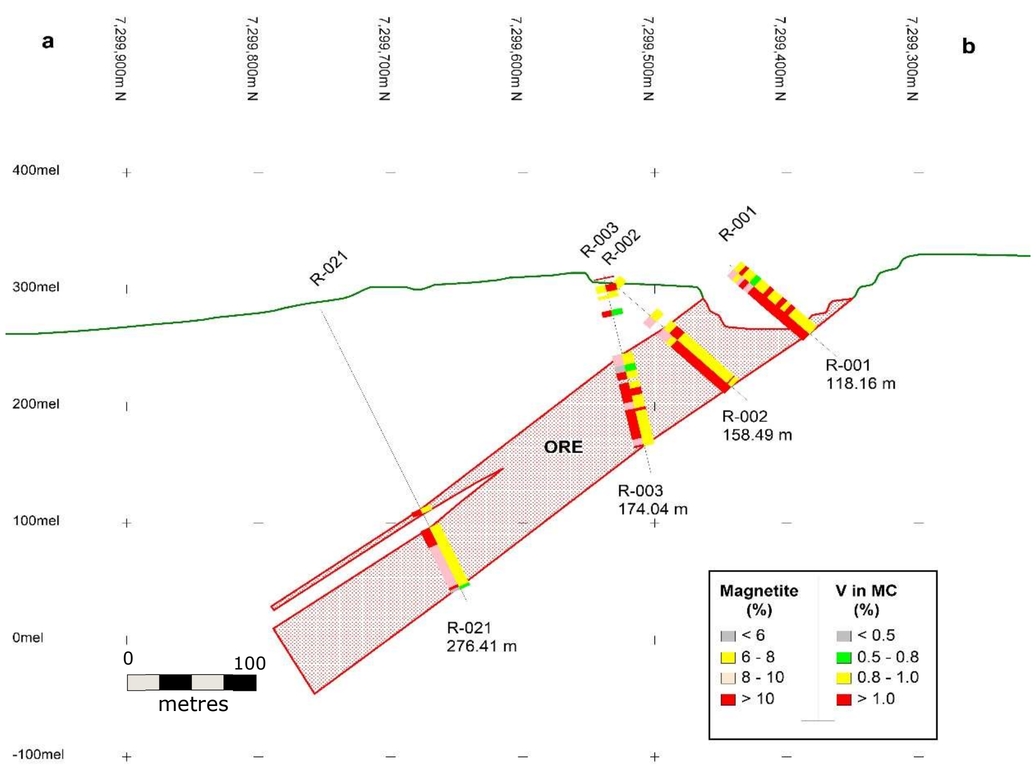

Figure 7-4 Cross section of profile 9700, with an outline of the magnetite horizon, viewing north-east. Note: pre 2011 sampling focused on ore zone only.

7.3 Mineralization

According to Karinen et al. (2015), the Mustavaara vanadiferous titanomagnetite (VTM) deposit was formed by effective gravitative concentration of oxide crystals, or by sorting of a magnetite slurry. In the Panzhihua Complex, VTM deposit formation via gravitational accumulation has been suggested as well as fractional crystallisation of Fe-Ti-V oxides (Gao et al. 2019). Repetition of these mechanisms leads to the formation of several stratified layers of magnetite ore. In Mustavaara the magnetite crystals contain thin lamellae of ilmenite and are generally referred to as ilmenomagnetite. Iron content of the ilmenomagnetite concentrate is around 62 - 63% Fe and the average vanadium contents in the magnetite concentrate from the four units is approximately 0.9% V. At Mustavaara the amount of ilmenomagnetite in magnetite gabbro changes in such a regular way that the ilmenomagnetite layer can be divided into four separate layers. The three lowermost layers comprise the main consistent Mustavaara ore deposit and they are called: ore lower layer (OLL), ore middle layer (OML) and ore upper layer (OUL). The highest ilmenomagnetite content of 20 – 35 wt. % is in OLL (footwall contact) which forms a narrow and continuous layer (0.2 – 4 m) just above and following the footwall contact. OUL (hanging wall contact) forms a thicker (20 – 40 m) and continuous layer along the hanging wall contact in the main ore layer and has ilmenomagnetite content of 18 – 25 wt. %. In the thickest (10 – 50 m) OML, ilmenomagnetite content is 10 – 15 wt. %.

The fourth layer above the hanging wall contact consists of weakly disseminated ilmenomagnetite and is labelled as the ore disseminated layer (ODL). The ODL is the most inhomogeneous layer, which contains scattered anorthosite, and anorthosite gabbro fragments and compact magnetite veins. The anorthosite gabbro waste rock blocks do not necessarily follow the general layering and are randomly oriented. Upwards, the ilmenomagnetite dissemination gradually decrease and the amount of anorthosite gabbro blocks and layers in the magnetite gabbro increase. This happens until the rock is a heterogeneous anorthosite gabbro containing specks of magnetite gabbro. In this disseminated layer the ilmenomagnetite content usually varies from 2 - 10 wt. %. Figure 7-5 shows the oblique view of Mustavaara deposit.

The magnetite gabbro horizon dips 30 to 40° to the north. In the westernmost part (800 m) the thickness of the coherent ilmenomagnetite ore layer (OLL+OML+OUL) is 60 – 95 metres. Eastward (700 m) the thickness of the ore layer is quite consistent at 40 – 50 metres. In the easternmost part, over a distance of 200 m, the dip starts to steepen from 40 to 70°. Over the same distance the thickness of the ore layer starts to become thinner, from 40 meters to 10 metres thick, until it finally dies out completely.

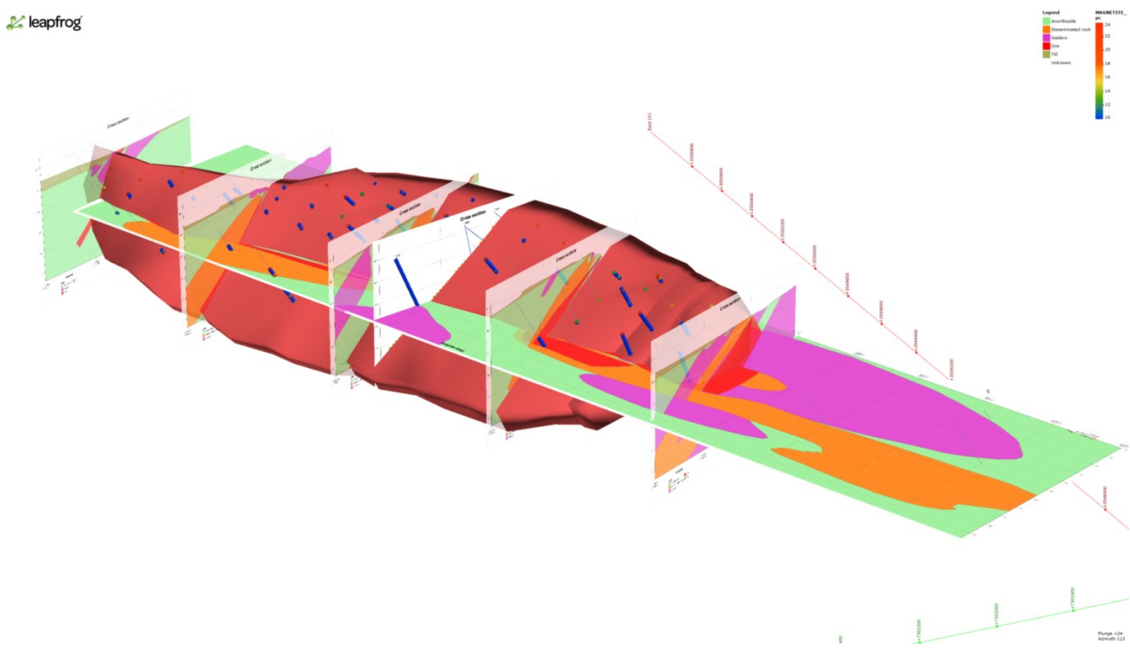

Figure 7-5 Oblique view of Mustavaara deposit, viewing southeast

8 Deposit Types

The Mustavaara deposit is characteristic of a vanadiferous titanomagnetite deposit (VTM), which are typical mafic layered intrusions. Similar VTM type deposits associated with layered mafic intrusive complexes are the Bushveld Complex (South-Africa), the Lac Doré Complex (Canada) and the Panzhihua Complex (China).

All of these deposits have the following similar chemical affinities and host-rock provenance:

- They consist of magmatic accumulations of magnetite and ilmenite and commonly contain on average 0.2 to 1% V_2O_5.
- Host rocks of VTM deposits are mainly mafic and ultramafic igneous rocks.
- The host rocks are typically deep-seated in origin and can occur in tabular bodies that are thick and laterally extensive, or as smaller lens-shaped bodies.
- The textures and mineralogy of VTM ores are very similar in that they typically form discrete layers between 0.1 and 10 m in thickness, although they can be thicker, and their oxide layers are laterally extensive with sharp lower boundaries with their host silicate rocks and gradational upper contacts.
- VTM ores can either be massive with greater than 80% titanomagnetite or disseminated with about 50% titanomagnetite and lesser amounts of clinopyroxene, olivine and plagioclase in both.
- VTM deposits can also be enriched with chromium, copper, nickel and platinum group elements.

VTM deposits associated with titaniferous magnetite layers are found from the fractionated upper portions of a layered series of igneous complexes. Typically, these deposits are subdivided into either magnetite-dominant (typically hosted by gabbroic rocks in layered intrusions, like Mustavaara) or ilmenite dominant deposits (typically hosted by massif-type anorthosites) (Gross, 1996).

Mustavaara magnetite gabbro lies in the upper part of the Porttivaara intrusion (part of Koillismaa igneous complex) where it forms a coherent layer following the general layering of the intrusion. The magnetite gabbro is plagioclase-augite-ilmenomagnetite adcumulate with sharp lower contact and gradual upper contact which is characteristic for VTM deposits.

Toplis and Corgne (2002) proved that vanadium-rich magnetite crystallizes in a rather narrow range of fO_2 conditions during fractional crystallization of basaltic melts. Furthermore, Balan et al. (2006) attested that Mustavaara ilmenomagnetite was crystallized in similar fO_2 conditions and has alike V^{4+}/V^{3+} ratio with Bushveld and Skaergaard (Greenland) vanadium-rich magnetite crystals.

9 Exploration

Exploration on the Mustavaara deposit started in 1957 with a few rock samples. Since then, there has been 9,991 m of drilling in 73 drill holes, outcrop mapping, ground and airborne geophysical surveys, and historic mining. The continuation of the magnetite gabbro beyond the former Mustavaara mine is known from the exploration work carried out by Rautaruukki Oy and MKOy. A national high-altitude airborne geophysical survey covered the area sometime between 1951 and 1972 which first confirmed the magnetite rich horizon. More detailed magnetic data modelling and ground surveys were later commissioned by MKOy in 2011, resulting in the confirmation that the magnetite gabbro extends over at least 15km to the west. Geophysical interpretations suggest progressive thickening of the horizon from 60 m around the open pit to more than 200 m in the west. The magnetite grades range from 15% in the east and appear to decrease to less than 10% in the west.

9.1 Geophysics, strike extensions

The location, size and shape of the magnetite-gabbro horizon is clearly reflected in airborne and ground magnetic survey data (Figure 9-1 and Figure 9-3). In 2011, MKOy commissioned GTK (Salmirinne 2011) to conduct some further data modelling on airborne magnetic data obtained from a GTK survey in 1998. The line spacing of the GTK airborne geophysical survey flown in 1998 was 200 m, with a terrain clearance of 30 m in both N-S and E-W directions. The main goals were to define location, depth and orientation of the almost 19 km long magnetite-gabbro reef in the Porttivaara layered intrusion and to locate sub-areas with higher concentrations of magnetite.

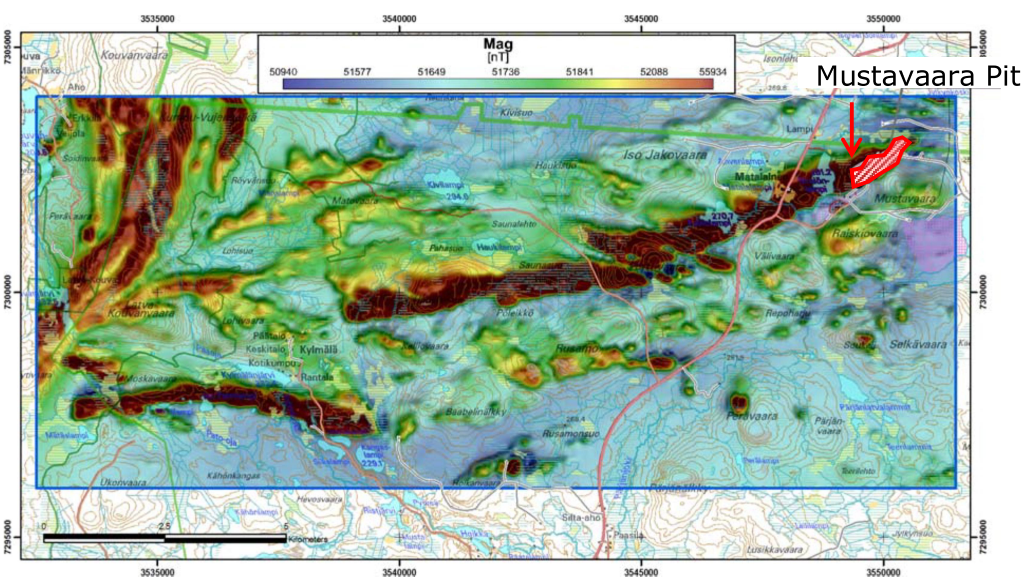

Figure 9-1 Aeromagnetic map of Porttivaara layered intrusion area showing the anomalous magnetite gabbro horizon

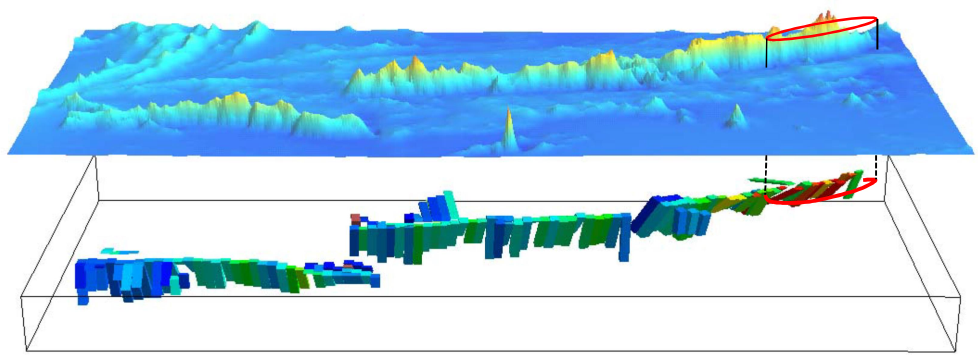

Figure 9-2 Modelled airborne magnetic data in 3D, reflecting varying magnetic intensity along strike and interpreted dips. Mustavaara pit area marked with red ellipse.

From the modelled data it can be seen that the magnetite-gabbro horizon terminates a few hundred metres to the east of the current open pit. West of the historic open pit however, the magnetite-gabbro extends over a total distance of at least 15 km. The western extension is referred to as Mustavaara West.

As a result of the modelling, the GTK geophysicist identified 3 sub-areas in Mustavaara West considered to have the best exploration potential for magnetite-gabbro. The highest priority was given to a 3 km long area extending directly west of the existing open pit.

In August 2011, this priority area was covered with a new ground magnetic survey. A line spacing of 50 m and a point spacing of 5 m was used. A total of 48,976-line kilometres and 9,674 points were surveyed. The colour shaded magnetic total field is represented in Figure 9-3.

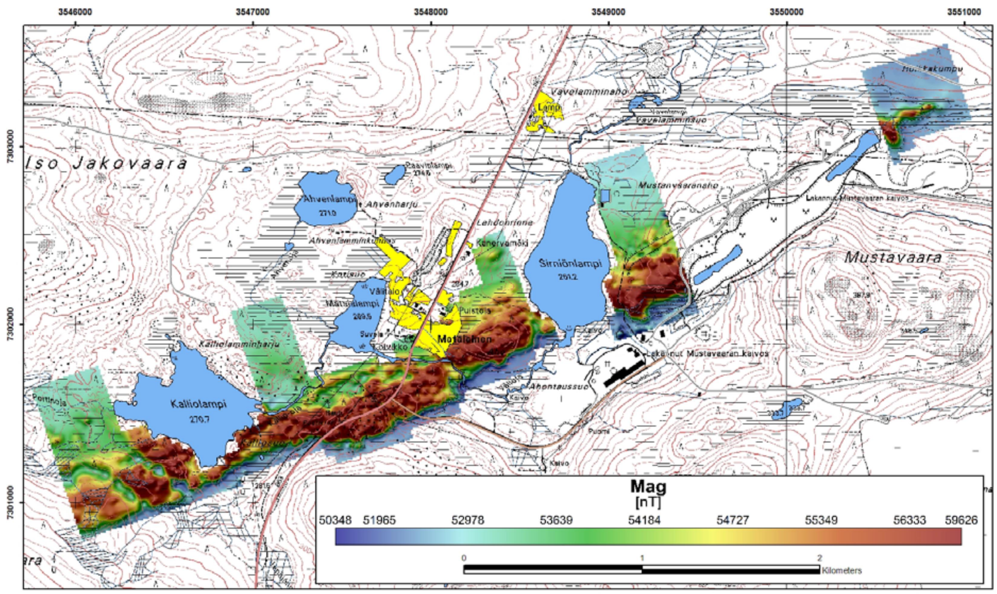

Figure 9-3 Total magnetic field, reflecting the extension of the ore horizon west of the open pit.

In the 1960s and the 1970s both Outokumpu Oy and Rautaruukki Oy carried out minimal exploration drilling at Mustavaara West. They concluded that magnetite grades were lower in the west, while the horizon became much thicker in western direction, up to 200 metres.

To date, only part of the historic Mustavaara West exploration data has been reviewed. The author is not aware of the extent of the historic exploration results: surface sampling or geological mappings etc. Some indicative intersections from Rautaruukki Oy are summarized in the table below:

Table 9-1. Drilling intersections from Rautaruukki Oy's exploration work.

Profile	Hole No	Width	% Magnetite	% V_2O_5
8900	RN 15	35	16.7	1.5
		3	21.9	1.6
8500	RN 36	77	10.2	1.5
	RN 38	137	10.5	1.4
6100	RN 3	85	8.9	1.3
	RN 4	147	10.0	1.3

10 Drilling

10.1 1967-1971 Drilling

The drilling conducted by Rautaruukki Oy between the years of 1967 and 1971 contain a total of 6,822.7 metres of drilling in 56 holes. Records of these holes exist in Finish reports and are available from MKOy's database. Additionally, approximately half of the drill hole cores are stored and available for review in GTK's Finnish Geologic Core Library. The drill locations of these holes were reported in relation to a local mine grid (Pöyry 2012). To date, no reference points of this grid have been located in the field although the grid position has been extrapolated using the topographic data of the historic mine reserve estimates to orient the mine grid. The drill hole locations have been estimated to within 10 m of their true location. The database and drill hole information does not contain a record of the drill core size but according to the available core photos and the other drilling at the same time, a wireline system WL-46 was used resulting in 28.8 mm core sample diameters. Drill core handling procedures applied to the 1967 to 1971 drilling programs were not documented in the reports provided to the authors. Locations of the drill holes are presented in Figures 7-2 and 7-3.

10.2 2011 Drilling

Mustavaaran Kaivos Oy (MKOy) conducted a diamond drill core program consisting of 17 holes totalling 3,088.50 m in the Mustavaara deposit area from September to November of 2011. Details of the program are shown in Table 10-1. The drilling was carried out by the drill contractor of Nivalan Timanttikairaus with a NQ2 size wireline system (50.7 mm core size). Holes were measured for magnetic susceptibility at 10 cm interval and surveyed with a Reflex Maxibor II system for deviation. Two drill holes (MV-59-2011 and MV-69-2011) do not have a susceptibility survey because they had extremely fractured rocks and one hole (MV-69-2011) does not have deviation measurements because it was a shallow hole. The locations and azimuths of the drill collar casings were measured by the surveying company Rovamitta Oy with the use of a Differential GPS system and a tachymeter.

Drill cores were transported by MKOy staff from the drill site to the core logging and storage facility in Taivalkoski. Logging and sampling was conducted by MKOy staff geologist along with a consulting geologist both experienced in the rock and ore types of this deposit. The information collected included geological contacts, rock descriptions, fracture information and alteration within the described intervals. Special emphasize was placed on geological contacts of the magnetite gabbro and its ore subunits for which the data of the susceptibility survey was used. The drill holes were logged in Finnish and reports remain available in the database. Drill core recovery was excellent.

The drill core was sampled in intervals up to 3 m with breaks in sample intervals based on geological contacts of different lithologies and in the case of the ore horizon, on ore subunits. Before splitting, the drill core was photographed to document the core and to include the markings for analytical intervals in the core boxes.

Table 10-1 Details of the drilling of year 2011 by MKOy

DDH	X	Y	Z (m)	Azimuth	Dip	Length (m)	Maxi -bor	Susceptibility
MV-57-2011	7302242.78	3549348.53	282.94	158.65°	57°	86.70	X	X
MV-58-2011	7302362.62	3549306.46	288.96	163.40°	60°	167.00	X	X
MV-59-2011	7302292.01	3549113.07	271.32	163.06°	60°	164.70	X	
MV-60-2011	7302634.07	3549321.86	282.94	161.74°	60°	290.60	X	X
MV-61-2011	7302473.07	3549481.58	304.66	159.76°	55°	184.60	X	X
MV-62-2011	7302617.03	3549643.06	307.79	163.31°	55°	195.30	X	X
MV-63-2011	7302740.79	3549814.69	300.45	163.19°	50°	199.80	X	X
MV-64-2011	7302844.92	3549991.76	285.29	159.00°	50°	179.30	X	X
MV-65-2011	7302887.93	3550078.78	280.69	164.03°	60°	150.60	X	X
MV-66-2011	7302929.91	3550167.14	278.11	167.56°	63°	152.50	X	X
MV-67-2011	7303087.51	3550008.20	262.25	164.55°	60°	299.70	X	X
MV-68-2011	7303129.71	3550208.01	259.12	159.70°	60°	228.30	X	X
MV-69-2011	7303078.19	3550545.18	258.51	156.16°	58°	31.70		
MV-70-2011	7303317.15	3550359.50	257.81	172.31°	55°	244.90	X	X
MV-71-2011	7303328.43	3550563.56	256.28	164.41°	58°	205.60	X	X
MV-72-2011	7303341.83	3550665.50	260.23	167.38°	58°	193.70	X	X
MV-73-2011	7303324.61	3550777.16	260.38	165.76°	50°	113.50	X	X

X = latitudinal location in Finnish KKJ grid (zone 3), Y= longitudinal location in Finnish KKJ grid (zone 3), Z = altitude asl, Azimuth = measured azimuth, dip = planned dip.

The drill program was designed to outline and infill the down-dip continuation of the magnetite gabbro to at least 50 m down from the topographic level +200 used in the historic reserve and resource estimates by Rautaruukki Oy. Drill sites were planned into the old mine grid.

The main objective of the 2011 drilling program was to confirm enough tonnage for a minimum mine life of 20 years. The second objective was to check the accuracy of Rautaruukki Oy's historic diamond drill holes for their locations and metal grades. Two of the diamond drill holes in the MKOy program were designed to twin historic holes with the remainder testing down dip extension.

10.3 Quality assurance and quality control results

10.3.1 Location of drill sites

Due to the uncertainties of the location of the historic drilling site coordinates, the twined hole locations were the best estimated location to within 10 m. The drilling sites of MKOy were originally positioned using a handheld GPS and properly surveyed after drilling with a differential GPS. The final location of MV-57-2011 was within less than 5 m of the estimated location for historical hole R-053, and up to 20 m between drill holes MV-69-2011 and historical hole R-032. Of the two twined holes drilled by MKOy, hole MV-57-2011 matched well with its rock intervals and assay results against hole R-053 drilled by Rautaruukki Oy (Figure 10-1). The second twined hole, MV-69-2011, did not match as well with hole R-032.

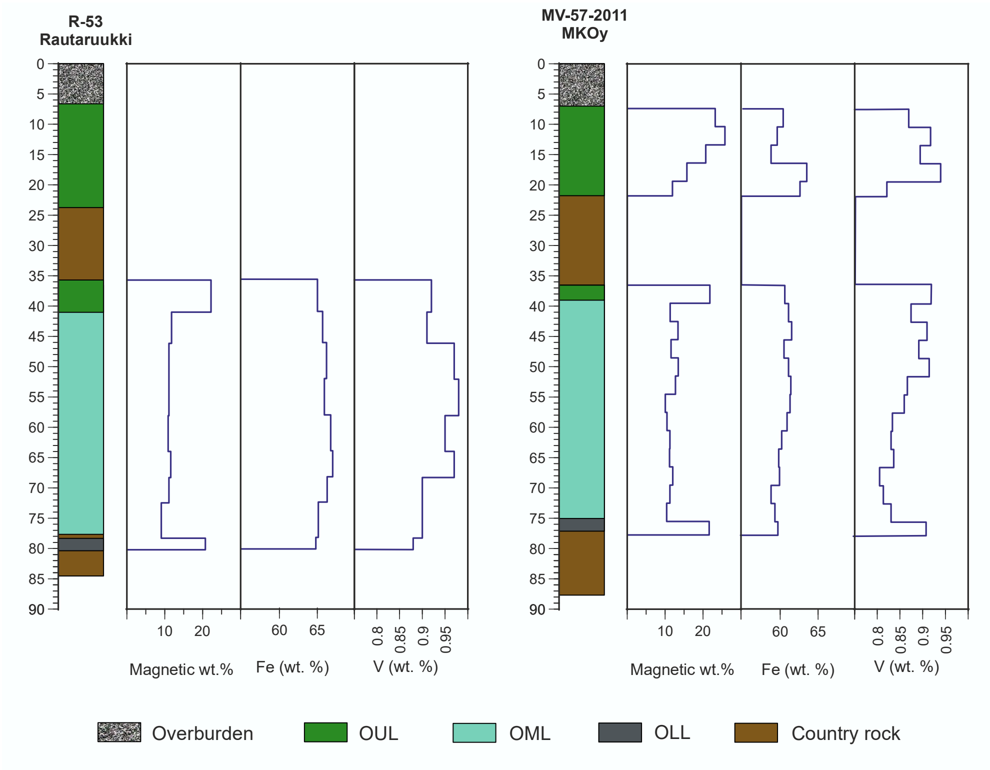

Figure 10-1 Stratigraphic Section of drill holes R-053 (Rautaruukki Oy) and MV-57-2011 (MKOy) showing geology, variation in the amount of magnetic minerals (Magnetic wt. %), and contents of vanadium and iron in concentrate. Contents of magnetite, vanadium and iron were not measured in the upper part of hole R-53.

11 Sample Preparation, Analyses and Security

11.1 Rautaruukki Oy

Detailed reports from the 1967 to 1971 drill programs are lacking and therefore not a lot is known about Rautaruukki Oy's procedures. Once the mine was operational, and possibly prior to mining the company did operate their own sample and analytical laboratory on site. From the assay results and core that remains available for review at GTK's National Drill Core Archive, we know that Rautaruukki Oy selectively sampled ore bearing intervals up to 3 m long and consistently ended the sample interval at geologic breaks in the run. Rautaruukki Oy also ran their samples through Davis Tube Separation or some other magnetic concentrator as the values obtained for vanadium, and titanium are recorded to be values in concentrate. The total amount of samples analysed with surveying records for the Rautaruukki Oy program was 599 samples.

11.2 MKOy, Chain of custody and sample preparation

For the 2011 drill program, the drill core and samples were handled with normal security measures throughout the handling process. The drill core was picked up by the geologist from the drill site and moved to their secure logging and processing facility. Samples were marked in up to 3 m intervals with emphasis on geological contacts of different lithologies and in the case of the ore horizon, on ore subunits. Before splitting, the drill core boxes were photographed so that the markings for analytical intervals were visible and documented.

The core was split using a Cedima CTS-175 rock saw operated by an experienced contracted sawyer and then sent to Eurofins Labtium Oy (Labtium) laboratory in Rovaniemi for crushing, milling and assay.

During MKOy's QA/QC check of the historic data, the resampling of the old drill cores was done by consulting geologist Markku Iljina. Rautaruukki Oy sample intervals were marked out on the historic core and the remaining core was quartered. The samples were sawed by GTK staff and sent to Labtium for assay. The total amount of historical samples rerun was 18 and the total amount of samples in the 2011 drill campaign was 436 bringing the total MKOy samples to 454.

11.3 Laboratory assay preparations and protocols

For MKOy's 2011 drill program, the core samples were shipped to Labtium for preparation and analysis. Labtium is an ISO/IEC 17025:2005 accredited laboratory. Part of the assay procedure was done by GTK's Mineral Technic Laboratory (Mintec) mineral processing laboratory in Outokumpu Figure 11-1.

The core samples, each weighing up to 3 kg, were sent for geochemical analyses to Labtium, Rovaniemi. Once in the lab, the samples were dried at 70° C if they needed drying, after which they were crushed and split in a rotary splitter to form a subsample and a reject (Labtium codes 10, 32, 34 and 38). The coarse subsample (< 2 mm particle size) was pulverized with a carbon steel bowl (< 0.2% Fe, no base metal contamination) in an LM2 pulverizing mill (>90% < 100μm grain size, Labtium code 52). The specific gravity for hole MV-70-2011 was measured (Labtium code 880F). The sample analysis procedure is outlined in Figure 11-1.

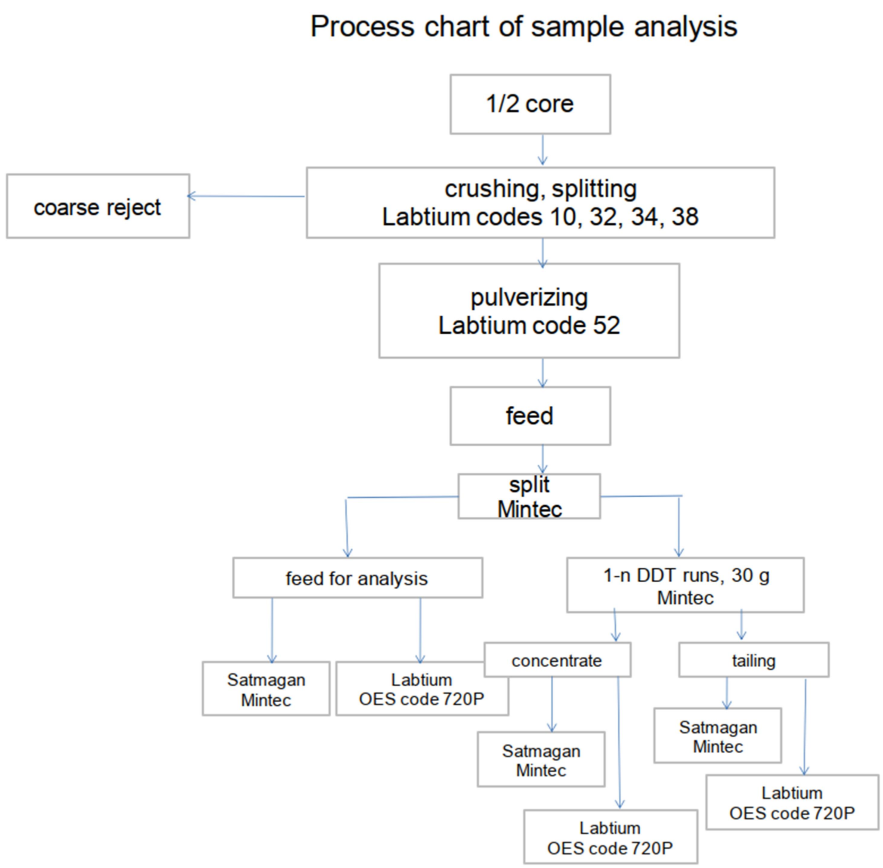

Figure 11-1 Process chart of sample analysis

Dings-Davis Tube

Dings-Davis Tube (DDT) testing is considered to be a simulation of industrial wet magnetic separation techniques and gives a "probable" concentrate grade at any given grind size. The quality of DDT concentrates are process sensitive and dependent on the sample (feed) size, magnetic field strength, tube tilt angle, wash water flow and tube oscillation, among other parameters.

Magnetic separation using approximately 30 g of the pulverized sample known as the "feed" was performed using DDT machines for wet fractionations of small samples yielding a strongly magnetic subsample known as the "concentrate" and a nonmagnetic subsample known as the "tail". The separation was carried out by Mintec of GTK, using a laboratory testing magnet (Type TM) of the KHD Humbold Wedag AG. In addition, Satmagan analyser for determining magnetic value in the feed, concentrate and tailing was used in the same laboratory. The Satmagan of Mintec is calibrated to indicate by its value the amount of magnetic minerals in wt. % in a sample.

Prior to the DDT runs, the wet suspensions of feed samples were dispersed ultrasonically for 1 minute. The DDT run duration was usually about 10 minutes per sample where during the first minute the feed sample was water flushed to a separation tube of the DDT machine through a funnel. The conditions of DDT runs at Mintec were:

- Tube sliding speed frequency setting “90”, this is equivalent to 112 rpm
- Magnetic flux density setting “70” (magnetic flux density approximately 0.25 Teslas in the middle and approximately 0.75 Teslas on the wall of the separation tube)
- The tilt angle of the separation tube was constant at 45°
- Pumping speed of flushing water was constant at approximately 1.0 litre/minute

The pre-treatment method for geochemical analyses by Labtium was sodium peroxide fusion for 0.2 g of the feed, concentrate and tailing. The multi-element analysis of 27 elements was performed with inductively coupled plasma optical emission spectrometry (ICP-OES) at the geochemical laboratory of Labtium (Labtium code 720P). According to Labtium, the sodium peroxide fusion and multi-element analysis by ICP-OES is close to total analysis. The ICP-OES analysis by Labtium is covered by the scope of accreditation according to ISO/IEC 17025 from the Finnish Accreditation Service FINAS. The detection range of the ICP-OES (Labtium code 720P) for iron is 0.01 - 70.0% and for vanadium is 0.005 - 5.0%.

The remaining half-split cores, coarse and pulverized sample rejects were returned to MKOy and are currently stored in a storage warehouse for Strategic in Taivalkoski.

11.4 Quality assurance and control

11.4.1 Assay result repeatability

For the 2011 drill campaign samples and for the due diligence on the historic samples Labtium completed duplicate sample checks. For the repeatability assessment every 20th sample was duplicated by Labtium. The quality of the assay duplicates has been illustrated in Figure 11-2.

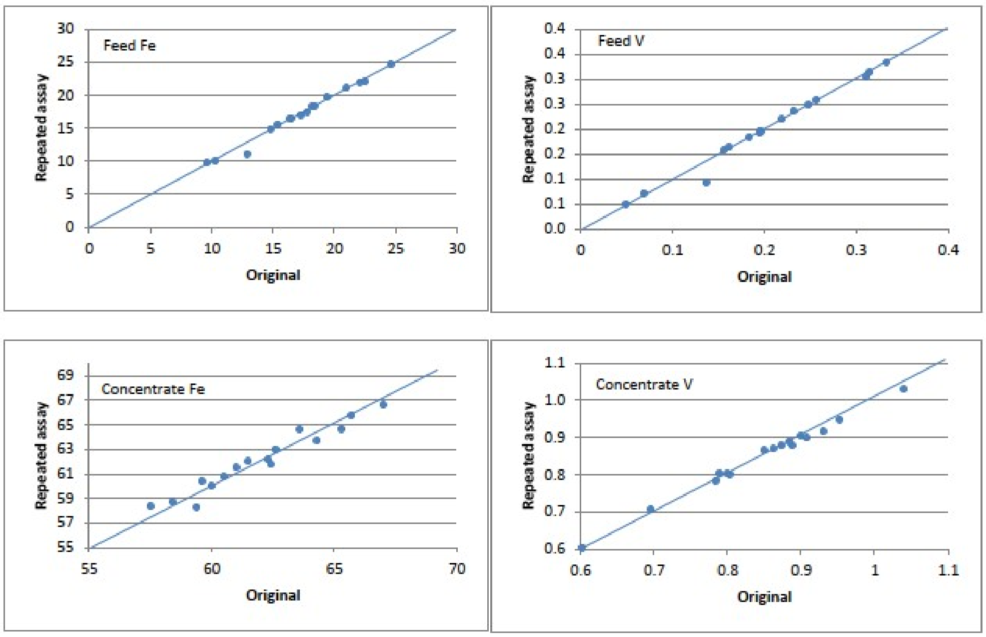

Figure 11-2 Assay duplicates versus original assay results for feed and concentrate fractions. Concentrations in wt. % and 1:1 trendline is shown.

The visual analysis of Figure 11-2 shows high repeatability and is supported by the calculated Relative Standard Deviation (RSD), which is generally <<1%. The Fe content of concentrate fraction showed the widest scattering, with an average RSD of 0.59% and the maximum RSD of 1.32%. RSD of less than 3% in assay duplicates is considered to indicate good laboratory performance.

11.4.2 DDT run and Satmagan precision and accuracy

The quality of DDT runs and Satmagan measurements was tested by doing separate runs for duplicate samples (Figure 11-3) and comparing measured and calculated Satmagan values of the feed. The calculated values were derived from the Satmagan values of the concentrate and tailing fractions and their respective weights (Figure 11-4).

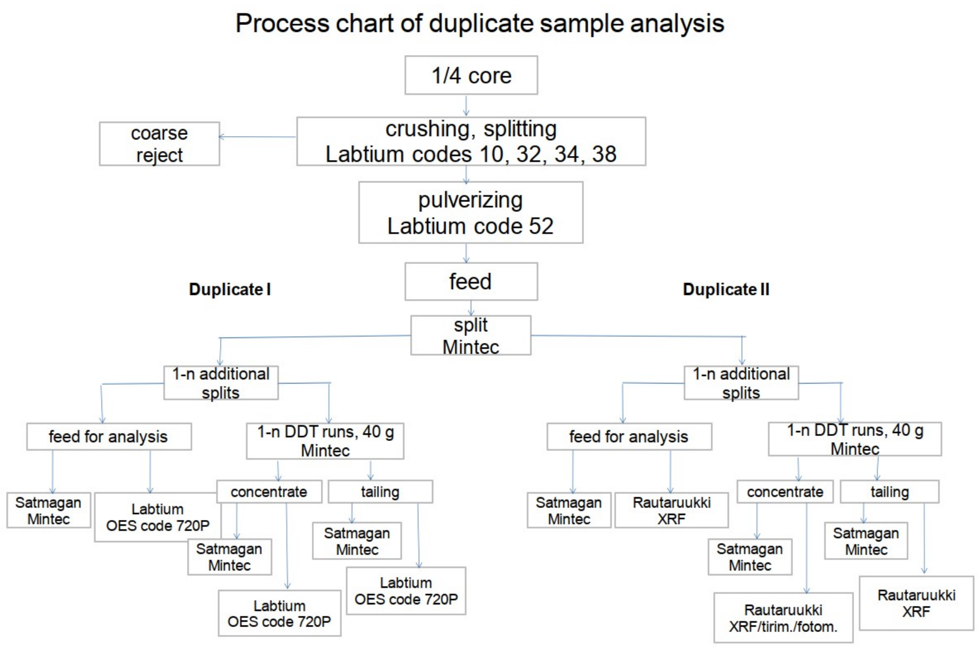

Figure 11-3 Process chart for duplicate sample handling and analysis.

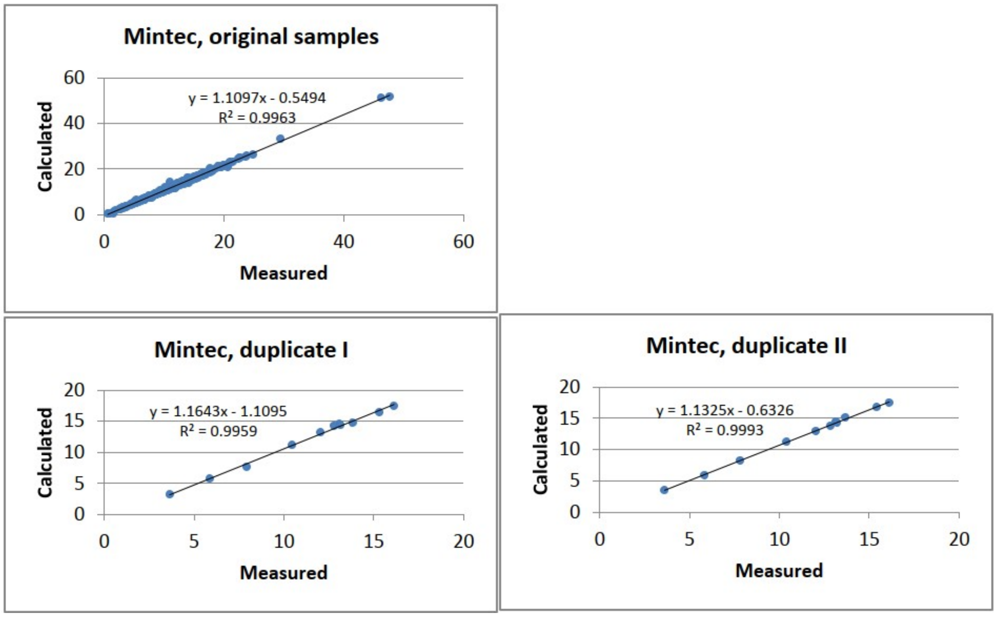

Figure 11-4 Satmagan values (wt. % of magnetic minerals) of the feed calculated from Satmagan values of the concentrate and tailing and their respective calculated weight versus measured values.

The DDT runs made at Mintec showed a good correlation with a slight tendency for the calculated values to increase very slightly above the measured magnetite content of the feed at higher grades.

Satmagan measurements

The reproducibility of the Satmagan samples was studied by comparing both, the original feed and concentrate values with duplicate I, and duplicate I and II sample sets (Figure 11-5).

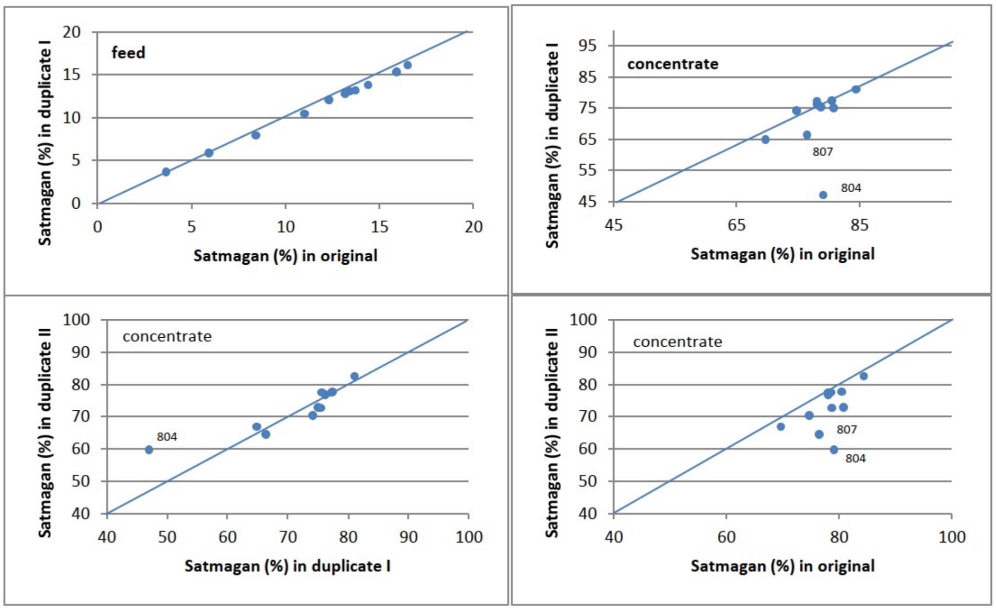

Figure 11-5 Comparison of the Satmagan values of the feed and concentrate against the original, duplicate I and II samples.

The comparison between the feed samples of the original and duplicate I showed a good correlation as did the concentrate duplicate I versus the duplicate II. However, the comparison between the concentrate original and the duplicates I and II showed a wider scattering. This scattering was studied in more detail by calculating the RSD, which showed values of less than 10%, except for one outlying sample (Table 11-1).

Table 11-1 Satmagan readings of the concentrate fraction of original, duplicate I and II sample sets with calculated Relative Standard Deviation (RSD).

Sample ID	Original	Duplicate I	Duplicate II	RSD
800	69.71	64.87	66.89	3.6
801	78.10	76.22	76.85	1.2
802	80.84	75.04	72.86	5.4
803	78.12	77.30	77.49	0.6
804	79.12	47.04	59.68	26.1
805	78.57	75.68	77.54	1.9
806	84.45	81.06	82.61	2.1
807	76.52	66.42	64.55	9.3
808	74.76	74.16	70.38	3.2
809	78.72	75.46	72.71	4.0
810	80.51	77.47	77.72	2.1

Common bounding values of RSD for inter-laboratory reproducibility tests are considered good if they are <5%, satisfactory if they are <10% and unsatisfactory if they are >10%. Satmagan is a less precise measurement technique and the apparent scattering may be attributable to a higher variability within this population. Taking this into account, the Satmagan measured reproducibility was generally good.

DDT runs and mass recovery

An essential part of the resource estimate is the percentage of magnetic concentrate recovered in the DDT run. Davis Tube weight recovery (DTWR) results of the original and duplicate I and II samples were compared in Figure 11-6. The DTWR represents the percentage of the concentrate (by weight) from the sum of the concentrate and tail.

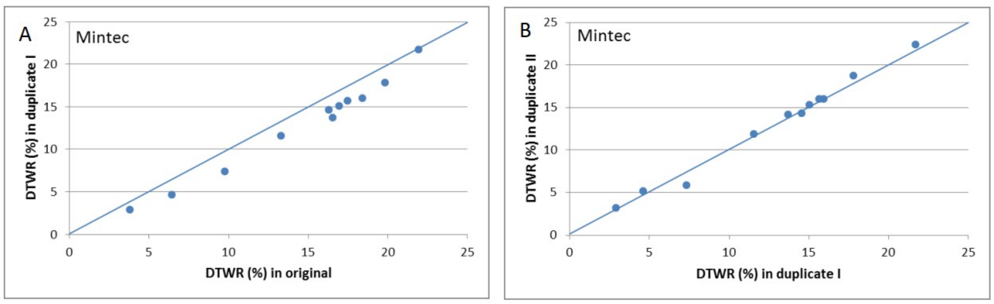

Figure 11-6 DTWR correlation in DDT runs from 11 samples.

The duplicate I and II samples showed very good correlation with each other (Figure 11-6B). The correlation between the original and duplicate I samples was good (Figure 11-6A although, the original samples showed systematically greater values than the duplicate I samples). Calculated RSD between original and duplicate I averaged 11.7% (0.9 - 23.2%), which has been considered acceptable. Nevertheless, the systematic difference in the increased original values should be recognised. The reason for this systematic difference may be attributed to differing sample load weights (30 g for the original versus 40 g for the duplicate).

11.4.3 Assay precision and accuracy

The precision of Labtium laboratory has been statistically and visually assessed through bivariate plots of iron- and vanadium-contents for the original and the duplicate samples representing feed, concentrate and tail materials (Figure 11-7 and Figure 11-8). The iron and vanadium feed samples both had good precision. For iron-content the correlation coefficient was 0.88 (Pearson's coefficient) with 12.50 - 22.30 wt. % Fe in the original analyses and 12.80 - 22.10 wt. % Fe in the duplicate analyses. The vanadium-content in the feed samples showed the correlation coefficient to be 0.92 with 0.13 - 0.27 wt. % V in the original samples and 0.14 - 0.28 wt. % V in the duplicate samples.

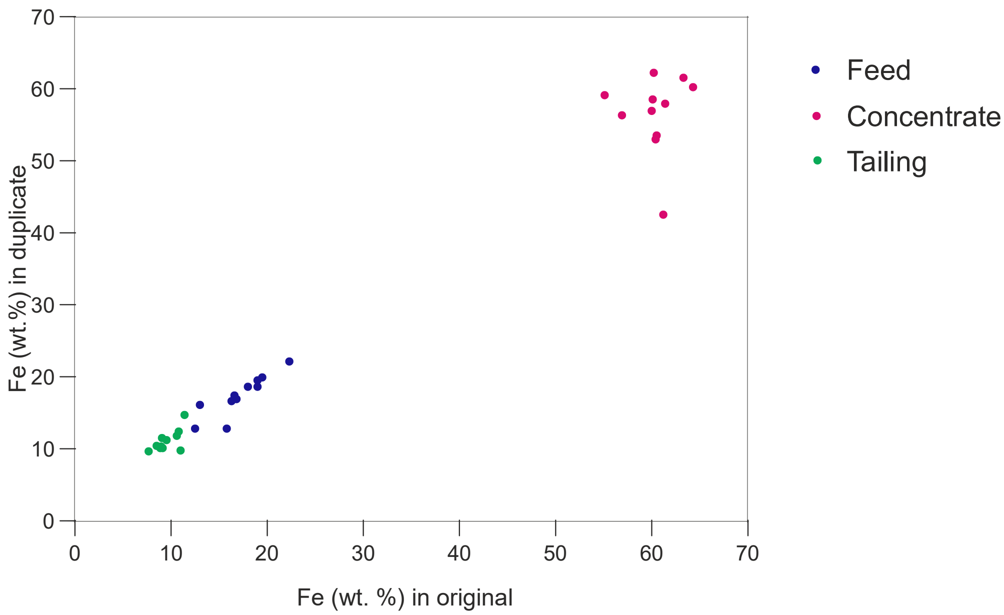

Figure 11-7 Correlation between Fe contents in original and duplicate samples (n = 11) analysed by Labtium

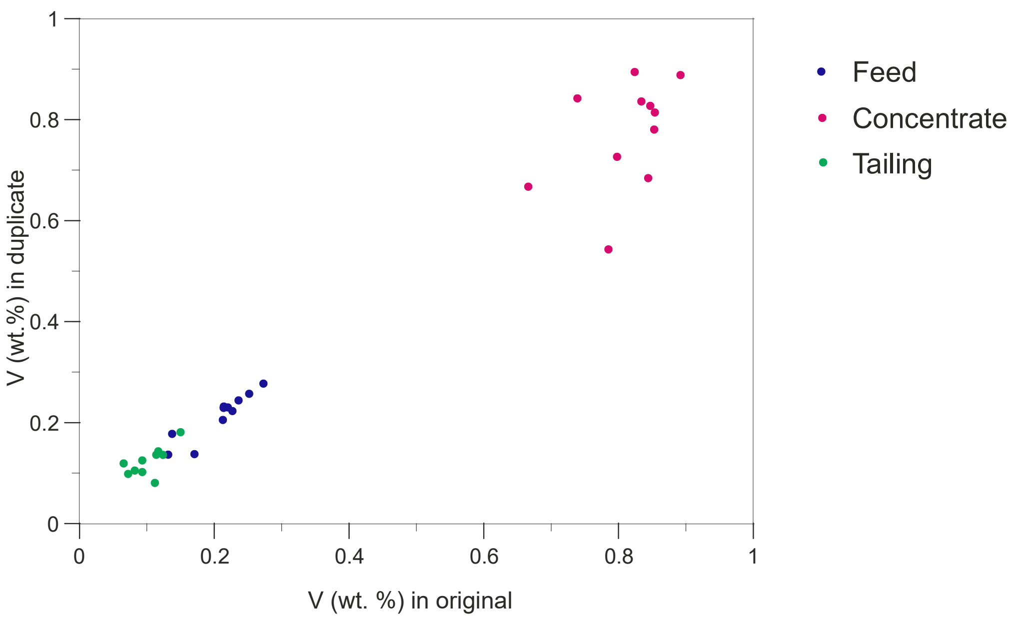

Figure 11-8 Correlation between V contents in original and duplicate samples (n = 11) analysed by Labtium

The concentrate and tail samples appeared to have significant differences between the contents of iron and vanadium in the original samples compared to the duplicate samples. The iron content in the concentrate samples had a correlation coefficient of 0.03 (meaning no correlation) where the variation was 55.10 - 64.30 wt. % Fe in the original samples and 42.50 - 62.20 wt. % Fe in the duplicate samples. Vanadium content showed similar features. The correlation coefficient for vanadium in the original and their duplicate concentrate samples was 0.45 with 0.67 - 0.89 wt. % V in the original and 0.54 - 0.89 wt. % V in the duplicate samples. The results representing the tail display similar features to the concentrate. The correlation coefficient of iron was 0.67 with 7.67 - 11.40 wt. % Fe in the original and 9.65 - 14.70 wt. % Fe in the duplicate samples. The correlation of vanadium content of original and duplicate samples representing the tail was 0.69 with 0.07 - 0.15 wt. % V in the original and 0.08 - 0.18 wt. % V in the duplicate samples.

The results indicate that the precision of the Labtium laboratory was good. The duplicate rock samples were collected from the drill core and therefore the variation in the composition of feed samples is a sum of rock composition and analytical error, but with a minor error in precision.

In the case of sample compositions after grinding and DDT runs, i.e. the compositions of concentrate and tail samples, it became clear that the principal error came from either the grinding and/or the DDT runs. This is because these procedures were performed separately with different analytical submissions for the original samples and their duplicate samples from ¼ resampled drill core.

The correlation between specific gravity (g/cm^3) and mass fraction of magnetic phases in rock (magnetic mass %) was estimated (*n* = 60) from drill holes R-002, R-003 and MV-70-2011 (Figure 11-9). The equation is defined with best fitting linear trendline. The specific gravity was measured for the sampled intervals of the drill hole MV-70-2011. The specific gravity was measured to be 3.2 g/cm^3 for the ore.

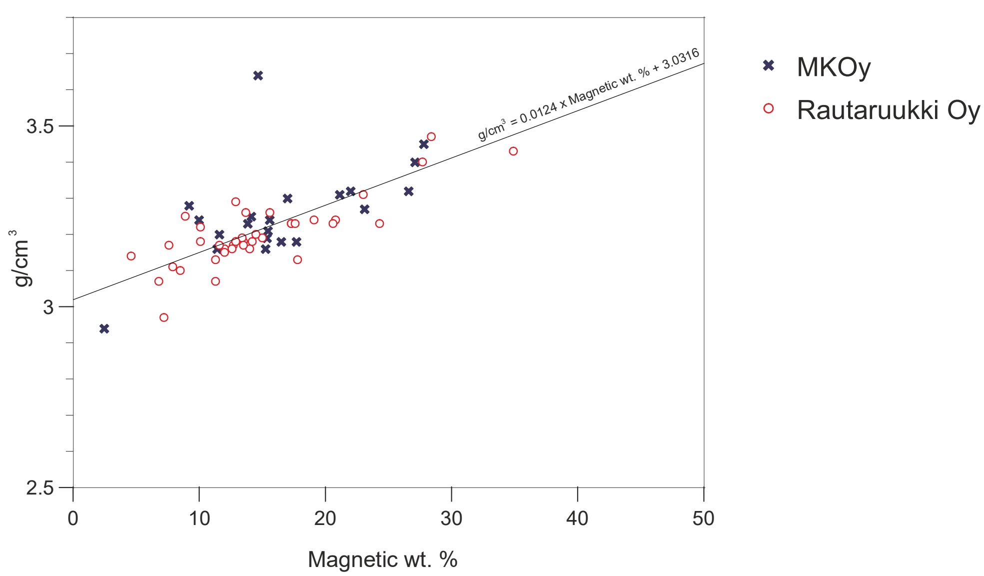

Figure 11-9 The correlation between specific gravity (g/cm^3) and mass fraction of magnetic phases in rock

Accuracy of the assays

To test the accuracy of Labtium's ICP-OES run samples, fine rejects of the feed, concentrate and tail were sent for secondary analyses to Rautaruukki laboratory in Raahe where the samples were analysed utilizing XRF-techniques. Because the analysed material for these analyses were fine rejects, the analyses were independent of grinding and DDT run variability. The accuracy of these duplicates compared to their original results has been plotted for iron and vanadium contents, representing the feed, concentrate, and tail samples (Figure 11-10 and Figure 11-11).

On the basis of the XRF analysis by Rautaruukki laboratory, the accuracy of the ICP-OES method of Labtium was good. According to the best fitting trendline the FeLab/FeRR ratio was 1.05 and the VLab/VRR ratio was 0.90 (RR stands for Rautaruukki Laboratory and Lab for Labtium).

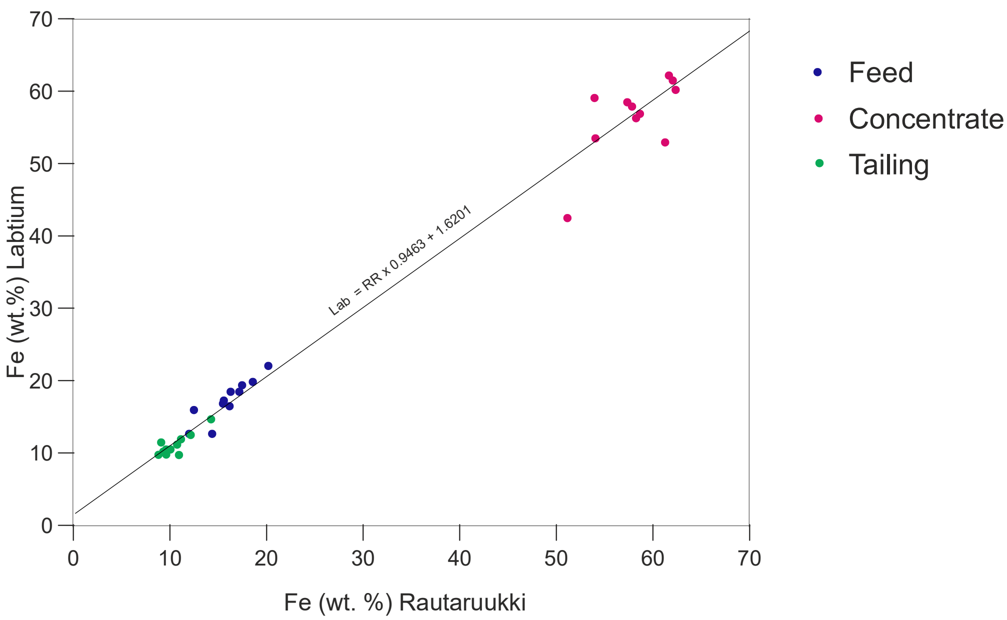

Figure 11-10 Correlation between the Fe contents in duplicate sample analyses determined with different analytical methods. The equation defined the best fitting linear correlation.

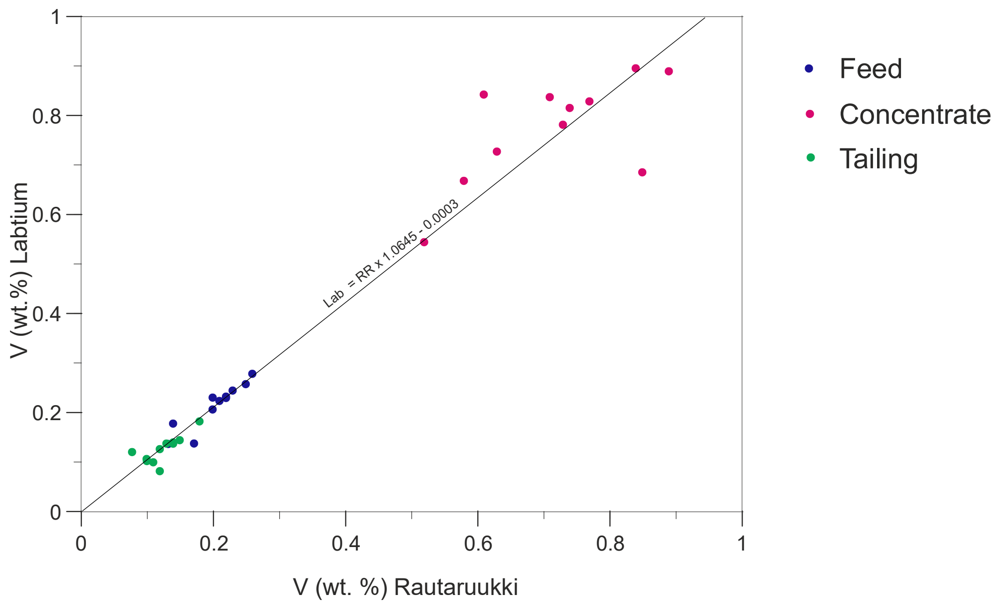

Figure 11-11 Correlation between V contents in the duplicate sample analyses determined with different analytical methods. The equation defines the best fitting linear correlation.

11.4.4 Grinding and DDT runs

The precision test of the ICP-OES method of Labtium showed that the concentrate and tail samples had poor correlations with their original and duplicate sample compositions. The source of the error was either grinding, DDT method, or both.

Grinding may have affected the DDT result and thereby changing the assay results of a sample. This would have been because the grinding procedure on rocks of different physical properties, such as varying textures and mineralogy, may have responded differently to pulverization.

The particle size data of the 5 concentrate samples indicated that in spite of different physical properties of the Mustavaara ore (Table 11-2), the grinding by Labtium worked well. The grain size distributions of the concentrate samples are similar. In all samples more than 90% of grains were less than 100 μm in size (Figure 11-12).

Table 11-2 Descriptions of the concentrate samples used in the grinding test

Sample	**Drill Core**	**Subzone**	**Magnetic mass%***	**Satmagan in tail****	**Fe in conc. (wt. %)**	**V in conc. (wt. %)**
001	MV-57-2011	OUL	23.19	1.60	60.40	0.87
211	MV-62-2011	OML	15.57	1.22	59.40	0.87
212	MV-62-2011	Ore	30.72	1.45	58.10	0.83
213	MV-62-2011	OML	12.13	0.89	60.60	0.81
239	MV-63-2011	OUL	18.82	2.41	58.30	0.80

*mass fraction of magnetic phases in feed sample according to DDT run.

** mass fraction of magnetic phases in tailing sample according to Satmagan.

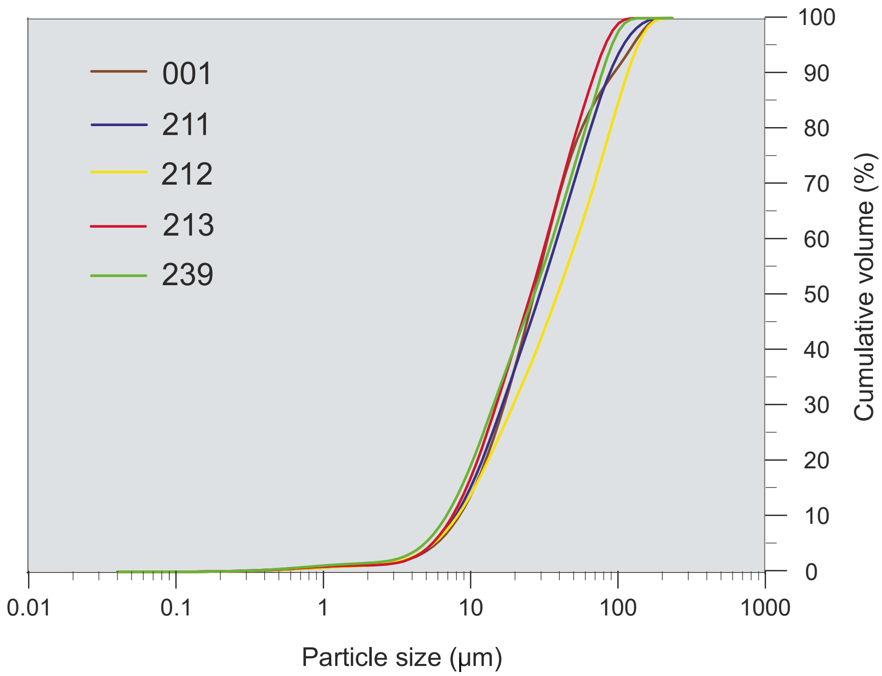

Figure 11-12 Cumulative grain size distribution of concentrate samples chosen for particle analysis

The DDT appears to have been the most critical parameter in view of quality assurance and control. This has been illustrated with the determinations of mass fraction of magnetic phases (Magnetic wt. %) and Satmagan readings of tail samples (Satmagan_tail) (Figure 11-13). The correlation between these two parameters indicates that during runs Mintec's DDT machine failed to collect all magnetic phases to concentrate, which was clearly related to the amount of magnetic phases in the feed sample.

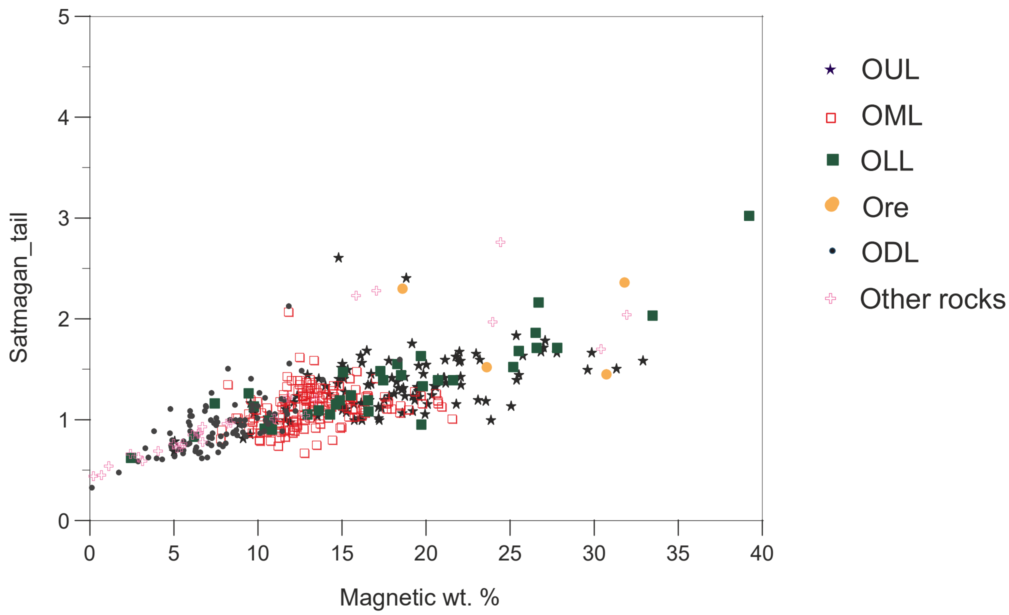

Figure 11-13 Relation between Satmagan values of the tail samples (Satmagan_tail) with mass fraction of magnetic phases (Magnetic wt. %) from the drill core collected by MKOy. Note that the Satmagan value indicates the amount of magnetic minerals (in wt. %) in the tails, whilst the mass fraction of magnetic phases is the volume of the concentrate in the total weight of the rock, was determined using the DDT run results. Classification was made on the basis of lithology.

11.5 Results of 2011 drilling

The drillers placed the drill core into wooden boxes. Wooden tags marked with downhole depth were placed in the box. The core was strapped together with a lid placed on the uppermost box and loaded into a vehicle. The core was then transported to MKOy's logging and processing facility. At the drill site, a Reflex Maxibor II downhole survey was done once the hole was completed to determine drill hole deviation. All of the holes showed a small amount of right hand deviation, with two holes (MV-67-2011 and MV-70-2011) showing significant downhole deviations of 15-20°. All of the drill holes in the 2011 program intersected the ore zone, which has been confirmed with the susceptibility surveys of each hole.

The assay results of the MKOy drill program showed that the ICP-OES multi-element analyses correlated well with the earlier analytical results from the historic drill programs conducted by Rautaruukki Oy. In the concentrate samples, the analyses by MKOy have similar vanadium and iron values as with the Rautaruukki Oy holes, but the MKOy holes show a wider spread towards lower values (Figure 11-14). The increase in lower vanadium and iron values in the data was related to MKOy's processing procedures and them choosing to sample the entire hole and not just the ore horizon as done with Rautaruukki Oy's program (Figure 11-15).

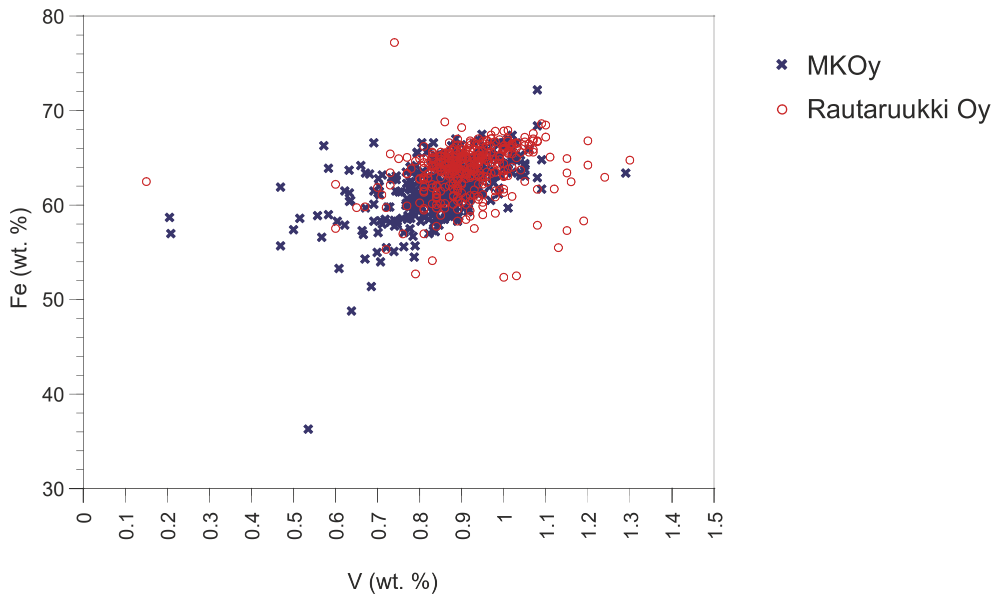

Figure 11-14 Fe vs. V diagram illustrating the composition of the magnetic fraction (concentrate) in the samples from Rautaruukki Oy and MKOy

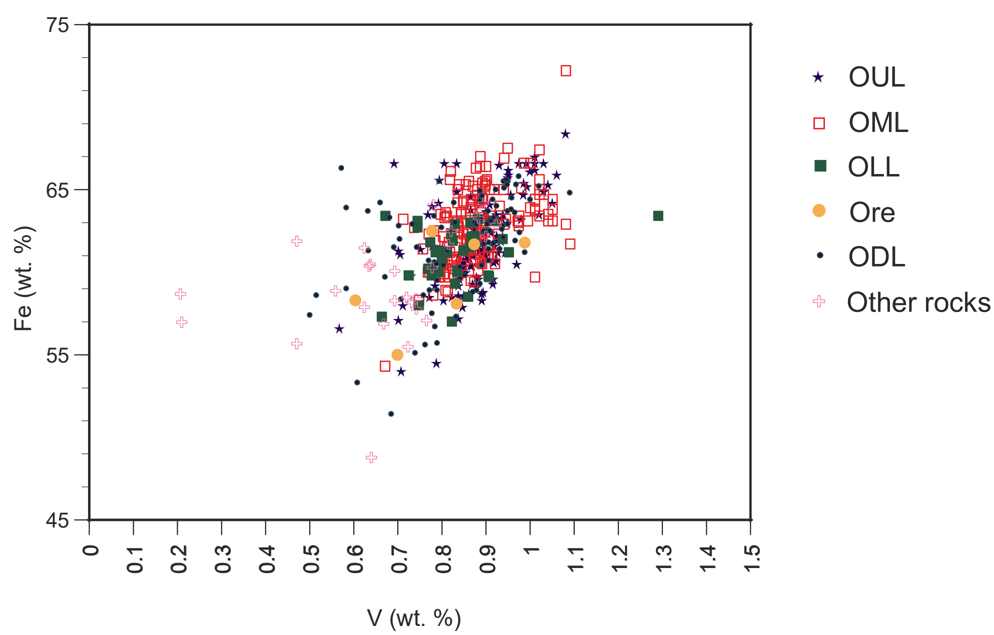

Figure 11-15 Fe vs. V diagram illustrating the composition of the magnetic fraction (concentrate) in the samples of MKOy. Classification is made on the basis of rock type

Figure 11-16 compares the Mintec Satmagan and DDT results from the 2011 drill holes with the results from the historic drill holes completed by Rautaruukki Oy. As with the analytical results, the 2011 drill holes appear to be similar with the historic data, while also showing a wider spread with increased lower values due to increased assaying of unmineralized material.

In all of the ore types there appeared to be a negative correlation with the Satmagan values of concentrate and mass fraction of magnetic phases. This was a textural feature of the ore, that indicated the samples containing the highest amounts of oxides showed the highest amounts of ilmenite lamellae in oxide grains.

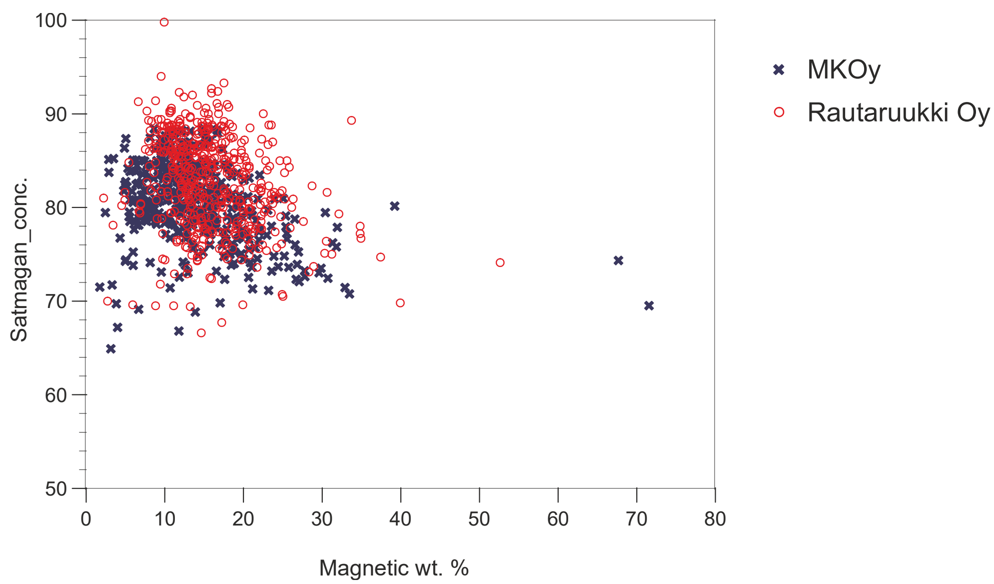

Figure 11-16 The correlation between Satmagan values of concentrate (Satmagan_conc.) with mass fraction of magnetic phases (Magnetic wt. %) in the samples collected from the drill cores of Rautaruukki Oy and MKOy. Note that the Satmagan value indicates the amount of magnetic minerals (in wt. %) in concentrate, whilst the mass fraction of magnetic phases is the weight volume of concentrate in a rock sample, determined using DDT run results.

11.6 Due Diligence Check

Strategic conducted their own due diligence (DD) checks in December of 2019 and January of 2020 prior to the purchase of the property. As part of the DD checks, pulps from the 2011 concentrate samples were recovered from Ferrovan Oy’s core storage warehouse. 151 of the historic pulp concentrates were analysed with a handheld XRF. Of those samples, 50 were selected at random for additional DD checks and were sent to ALS Laboratory for Davis Tube analyses. The XRF pulp concentrate values were compared to the original database values and shown in Figure 11-17. The ALS pulp concentrate Davis Tube reruns were compared to the database values and shown in Figure 11-18.

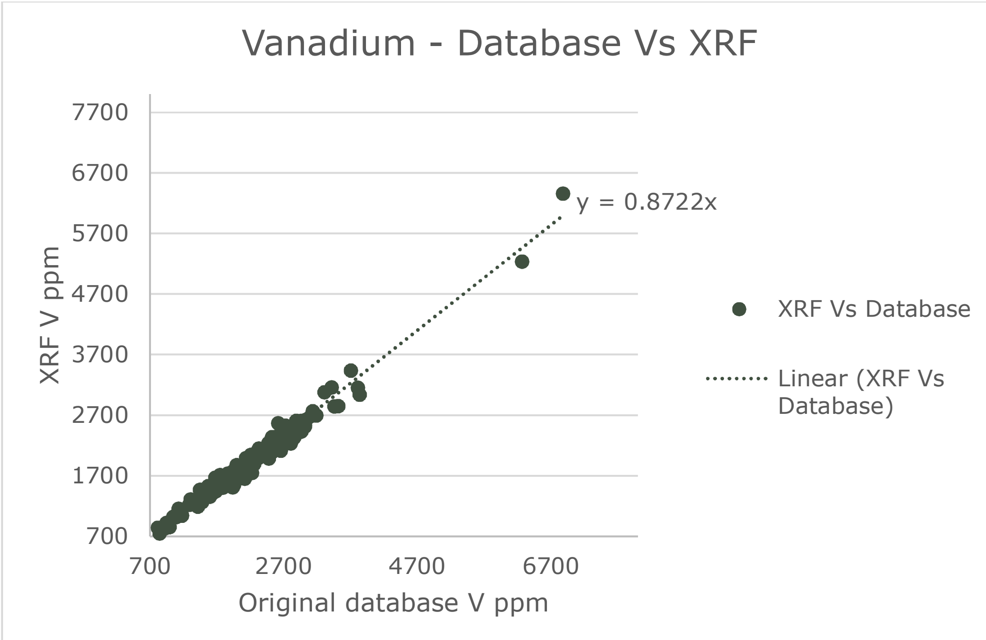

Figure 11-17 Pulp concentrate –XRF pulp concentrate values versus original database values.

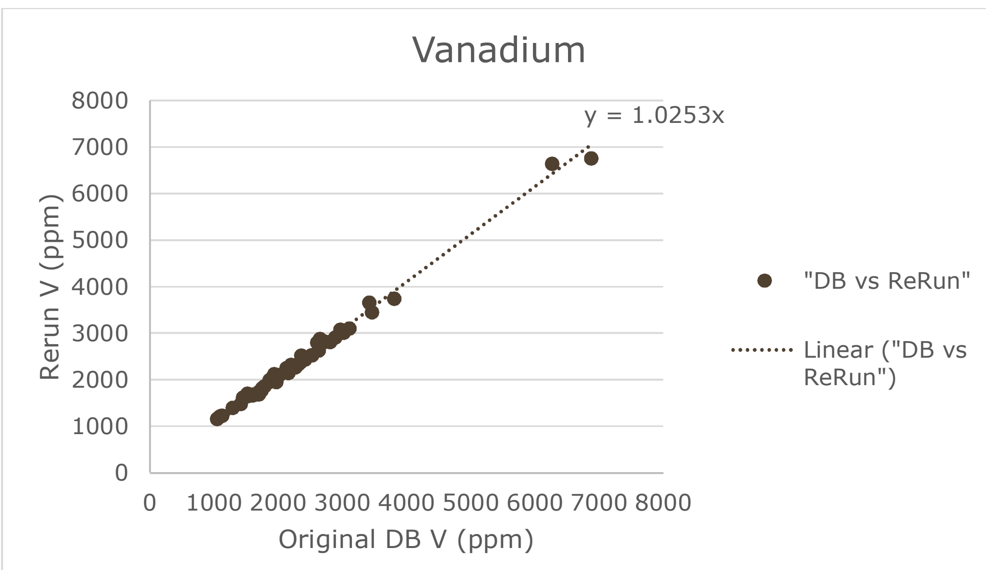

Figure 11-18 Pulp concentrate – ALS pulp concentrate Davis Tube reruns versus original database values.

The second part of the DD checks included XRF measurements on 8 historic Rautaruukki Oy drill holes, photographing 10 drill holes and sampling 13 intervals from 2 historic drill holes from GTK's National Drill Core Archive. It was noted that limited material remains available for resampling as much of the core has been resampled by previous owners of the property. These quartered core samples were sent to ALS laboratory for Davis Tube reassay analysis.

Figure 11-19 shows the reassayed historic core samples versus the original database values. It was concluded that there was an acceptable correlation between the original concentrate values and the pulp reassayed values. The resampled core versus the historic database did show a little bit more variation but it was also considered acceptable. Variation in the core resampling was to be expected considering the age of the core and the amount of times it has been moved and looked at by previous geologists. There is also generally greater sample variations when a sample has been recut, crushed and pulverized since the mineralogy may have changed with subtle variations in this new section of ¼ core.

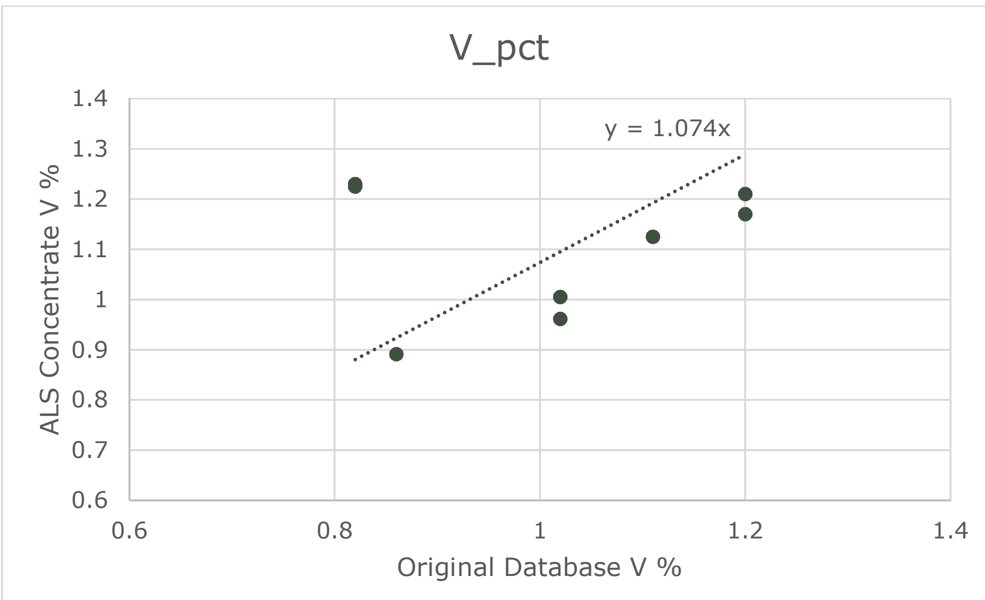

Figure 11-19 Concentrate values from resampled core versus the original database concentrate values.

12 Data Verification

12.1 Database Validation

The drill core database was checked for errors, no duplicates, unmatched values or overlapping samples were found.

12.2 Down-Hole Survey Validation

Only the new (2011 drill campaign) drill holes have been downhole surveyed for azimuth and dip. The data was validated by checking the consistency of consecutive survey results.

12.3 Assay Verification

The collar, geology, survey and assay files were provided in Excel®. All From-To data are either zero or a positive value. No intervals exceeded the total depth of its drill hole. Intervals with no assay data were listed as -1.0 in the database. Those negative values were changed to zero. The core recover for the 2011 drill program was excellent. There is no indication that grade is related to core recovery.

12.4 Geologic Data Verification and Interpretation

The author has compared the lithological drill core loggings against the drill core photos taken during the due diligence work.

12.5 QA/QC Protocol

Quality control and quality assurance work is documented by independent consultant Markku Iljina from GeoConsulting as part of the mineral resource estimation work done in 2013. For this report the author has reviewed this information and has found the data to be adequate.

12.6 Conclusion

After reviewing the available data the author considers the drill hole data to be suitable for estimation and reporting of the Mineral Resource estimate.

13 Mineral Processing and Metallurgical Testing

13.1 2011 Testwork results

The Swerea Mefos research institute (Mefos) located in Luleå, Sweden has done research on behalf of MKOy regarding ferrovanadium production for Mustavaara. The following topics have been studied and reported on during the years 2008 to 2009.

- Titanium-removal from pig iron obtained from reduction of Mustavaara iron concentrate - summary of results from trials in the Mefos 150 kg induction furnace, 16.2.2009.
- A novel process for vanadium and iron recovery from the Mustavaara iron-titanium-vanadium concentrate - summary of results from reduction and oxidation tests in a 150 kg induction furnace, 5.9.2008.
- Summary of results from reduction trials of Mustavaara magnetite ore for vanadium-recovery, 28.4.2008.

The most relevant reports and results have been summarized below from Appendix VII in the Pre-feasibility study completed by Pöyry Finland Oy in 2012.

Summary of results from reduction trials of Mustavaara magnetite ore for Vanadium recovery, 28.4.2008

Anthracite, slag formers and concentrate were placed inside a crucible and were melted in the Mefos Tamman furnace in an inert nitrogen atmosphere at 1,650 °C. Slag and metals were weighed and sampled. The determination of the mixture ratios was based on the theoretical calculations of the anthracite needed and practical experiences on the reduction kinetics and slag chemistry. A total of four tests were carried out, the mixtures differed in the amount of reductant in order to control the reduction degree of V_2O_5 and TiO_2, crucible material and slag former additions. Lime was added in the aim of obtaining a CaO/SiO_2-ratio of 1.20. Fluorspar was added in two of the tests to lower the viscosity and thereby improving metal and slag separation.

- A vanadium recovery of 84% in the metal was obtained
- An iron recovery of almost 100% in the metal was obtained
- A titanium recovery of 99% in the slag was obtained

A novel process for vanadium and iron recovery from the Mustavaara iron-titanium-vanadium concentrate - summary of results from reduction and oxidation test in a 150 kg induction furnace, 5.9.2008

The process concept based on pyrometallurgical treatment of Mustavaara iron-titanium-vanadium concentrate for co-production of iron and ferrovanadium consisted of three steps:

Step 1: Total reduction of the ore concentrate making a metal with about 1.3% vanadium

Step 2: Selective oxidation of the metal from Step 1 to enrich vanadium in a slag phase aiming at a vanadium/iron ratio greater than 1

Step 3: Final reduction of the vanadium slag for production of ferrovanadium

Step 3 is already practiced commercially and not considered in this study. Step 1 was tested in 3 kg scales at Mefos.

The original Mustavaara concentrate for production of the metal needed was used in Step 2. About 82 kg of iron melt was successfully produced from the 150 kg Mustavaara iron concentrate using anthracite as reductant. The reduction work was performed in the Mefos 150 kg induction furnace with a graphite crucible. The highest iron and vanadium recovery achieved was 99.6% and 93.3% respectively producing a metal with 1.23% vanadium.

- By using iron oxide combined with a synthetic slag containing Al_2O_3-CaO, liquid slag containing up to 13% vanadium could be obtained at approximately 1,550 °C. The targeted vanadium/iron ratio >1 in the slag was easily achieved.
- The vanadium content in the metal phase was lowered from 1.19% to 0.24% corresponding to a vanadium recovery of 80%. This could however easily be increased to >90% by further oxidizing the vanadium to less than 0.1%.

It was also found that for reduction heats with high vanadium yields the titanium-level was also high and the slag became more viscous.

Titanium removal from pig iron obtained from reduction of Mustavaara iron concentrate - summary of results from trials in the Mefos 150 kg induction furnace, 16.2.2009

Since the iron concentrate from Mustavaara would have high contents of titanium oxide, some of the titanium will also be reduced to the metal phase together with iron and vanadium. This was discovered in the reduction tests previously mentioned. To obtain a high vanadium recovery the typical pig iron produced will contain about 1.2% vanadium, 0.6 - 1% titamium, 4 – 5% carbon and 0.5 - 0.8% silica. The high Ti content is a potential problem for the vanadium recovery step (Step 2).

With this background it was decided by Akkerman Exploration B.V. and Adriana Resources Inc. to test a titanium removal concept proposed by Mefos in the autumn of 2008. The primary purpose of this study was to find a suitable method for efficient titanium removal with the lowest possible loss of vanadium using oxygen and nitrogen based reagents. Both preliminary thermodynamic calculations and trials in the Mefos 150 kg scale induction furnace have been conducted to prove the concept.

The main results and conclusions are summarized below:

- The test results from the 150 kg scale tests have proved that the proposed concept for titanium removal is technically feasible. The titanium content could be efficiently lowered from over 1% down to below 0.1% (>90% titanium removal) and at the same time keeping the vanadium content stable at about 1.1% in the metal.
- All tested reagents including magnetite fines (Fe_3O_4), CO_2, N_2 and FeSiN, have shown good capability for titanium removal. The degree of titanium removal from the oxygen based reagents was up to 96% and for the nitrogen based reagents was up to about 80% without any additional optimization of the process.
- The chosen slag formers based on the CaO-SiO_2-MgO system seemed to be efficient with good slag fluidity and high titanium capacity. A slag with up to 30% $Ti0_2$ has been achieved with low vanadium contents, about 1% or lower. The titanium oxide content could probably be increased to 50%.
- In accordance to the theoretical study the oxygen based reagents were more efficient than the nitrogen based reagents.

Based on the experimental results of this series of testwork it has been suggested to use iron oxide for the purpose of titanium removal as it would be simple and efficient. The best choice for this would be to use the Mustavaara iron concentrate as it would be the most cost efficient.

13.1.1 Summarizing conclusions

- Vanadium, iron and titanium recoveries of 84%, almost 100% and 99% respectively can be obtained through conventional smelting.
- Reduction and oxidation tests yielded the highest iron and vanadium recovery of 99.6% and 93.3% respectively producing a metal with 1.23% vanadium.
- Smelting tests at a 150 kg scale have confirmed that using oxygen and nitrogen based reagents, it is possible for titanium to go from over 1% to below 0.1% while keeping the vanadium content stable at about 1.1% in the metal. Oxygen based reagents proved more effective removing up to 96% of the titanium.

14 Mineral Resource Estimates

The Mineral Resource estimate has been prepared by Ville-Matti Seppä and Pekka Lovén. The data was collected and compiled during the last mineral resource estimate work done by Outotec (Finland) Oy, dated August 30th, 2013. Since the release of the last resource estimate, there has been no material changes and there has not been any new exploration activities concerning the property and the end products (ferrovanadium and pig iron) have remained the same. The design and modelling parameters have remained the same as the previous resource estimate, along with the after product price and operating costs.

Mr. Ville-Matti Seppä (EurGeol) of AFRY Finland Oy and Pekka Lovén (MAusIMM) of PL Mineral Reserve Services are the qualified persons (QP) for reporting of the Mineral Resource estimate. The Mineral Resource is reported in accordance with the Canadian National Instrument for the Standards of Disclosure for Mineral Projects (NI43-101) requirements.

The QPs are not aware of any known environmental, permitting, legal, title, taxation, socioeconomic, marketing, political or other similar factors that could materially affect the stated Mineral Resource estimate.

14.1 Data

The Mustavaara database was provided by Strategic in the form of Excel® spreadsheets containing collar locations, down-hole survey information, geologic data and assay results along with digital copies of drill core photos, historic reports and drill logs. The resource database contains drill hole data from 73 drill holes with a total length of 9,911.2 m. A total of 1,156 intervals are included in the database with 1,036 intervals that have assay data and 120 intervals with no assay data. Half of the 120 intervals with no data were in unmineralized sections either in the hanging wall or footwall of the deposit with 58 samples that were possibly believed to be mineralized but did not have enough magnetic content in the sample to return a value from the assay lab. The drill core samples have been assayed for (ilmeno)magnetite, VinMC (Vanadium in magnetite concentrate), V_2O_5_eq (VinMC converted to vanadium pentoxide equivalent), titanium (in magnetite concentrate) and iron (in magnetite concentrate). The magnetic susceptibility has also been included in the assay database. Individual sample lengths vary from 0.23 m to 15.82 m with an average of 4.90 m for the 1957 - 1976 program and 2.71 m for the 2011 program. Ilmenomagnetite is labelled as magnetite within the database and also in related resource tables. The database contains calculated density values which were used for ore, while waste rock was assigned a value of 3.0 g/cm^3. Downhole survey data was only available for holes in the 2011 drill hole program.

Geologic information was gathered during the various drill phases and include six main rock units with five ore subunits.

14.2 Drill hole compositing

The resource estimate was based on resource intersections defined using the wireframes of the mineralized zones. Intersection data was used to extract samples for statistical analysis and for compositing the data for grade interpolation. Drill hole sample composites were generated in order to standardize the data for further statistical evaluation which would eliminate any adverse effects related to sample length. The average length of the composite was defined as 4 m according to the average assay interval for samples above 5% magnetite. Basic statistics related to the composites used in grade estimates are presented in Table 14-1. The data set shows low Coefficient of Variation which indicates low variability of the data.

Table 14-1 Basic statistics of the composited data used in the grade estimations

Variable	**4 m composites**			
	Ore			
	Magnetite_%	**VINMC_%**	**Ti_%**	**FE_%**
Number of samples	741	741	496	497
Minimum value	5.04	0.55	1.34	55.55
Maximum value	39.21	1.29	9.12	68.57
Mean	15.69	0.90	3.91	63.43
Median	15.07	0.90	3.71	63.72
Geometric Mean	15.17	0.89	3.70	63.39
Variance	17.40	0.01	1.81	5.36
Standard Deviation	4.17	0.09	1.35	2.31
Coefficient of variation	0.27	0.10	0.34	0.04

14.3 Ore body modelling and block model

The resource outline for the 3D model was constructed using cross sections taken at 100 m intervals. The nominal cut-off grade to be used in creating the 3d solid was determined to be 8% magnetite. The cut-off value was reconsidered while calculating the resource estimation. An 11% magnetite cut-off value was selected based on break even review of the assumed operating expenses and revenues.

Compared to the 2013 geologic model, the dimensions for the current geological model was extended to cover an additional 50 to 100 m along the depth of the ore body. Figure 14-1 illustrates the plan view of the Mustavaara ore body.

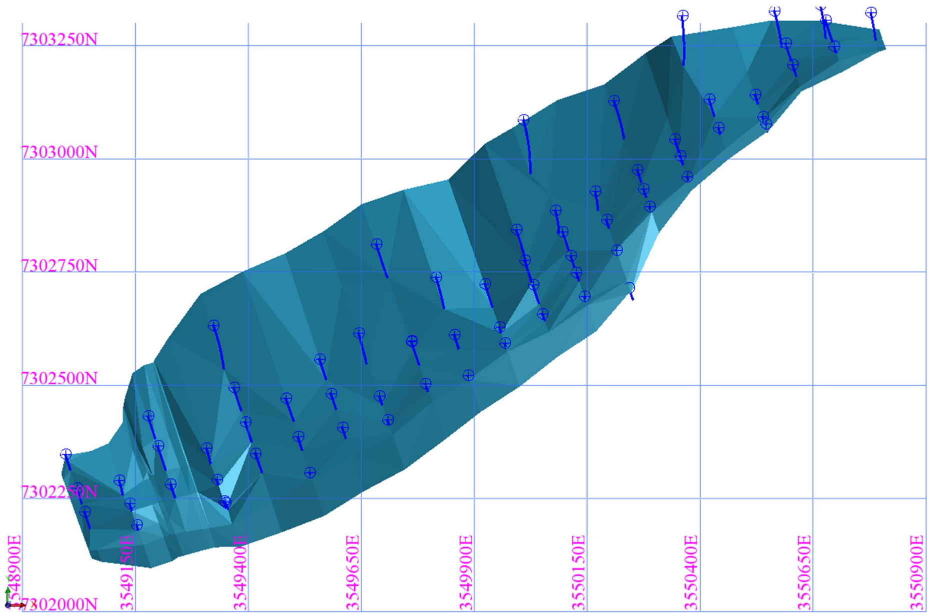

Figure 14-1 Plan view of the Mustavaara 3-D ore body model with drill hole traces

The resource block model was created using GEOVIA Surpac™ software. The block sizes for the resource model were selected to measure 20 m x 20 m x 12.5 m, based partly on the basis of drilling density and partly on the smallest mining unit. The summary of the block model parameters are given in the Table 14-2.

Table 14-2 Mustavaara block model parameters

Type	**Y**	**X**	**Z**	
Minimum Coordinates	7302500	3548250	-100	
Maximum Coordinates	7305500	3549750	350	
User Block Size	20	20	12.5	
Minimum Block Size	10	10	6.25	
Rotation	55	0	0	
Attribute Name	Type	Decimals	Background	Description
an_dist_to_nearest_sample	Real	3	-99	Anisotropic distance to nearest sample
avg_true_dist_to_samples	Real	3	-99	Average true distance to samples
avgdst	Float	1	-1	Average search distance
density	Float	2	3	Density
dst2ns	Float	1	-1	Distance to nearest sample
fe_pc	Float	1	0	Fe in magnetite concentrate
magnetite	Float	2	0	Magnetite %
magn_nn	Float	2	0	Magnetite %, Nearest neighbor estimation
material	Integer	-	1	1=waste, 2=ore, 3=ovb,4=sirnionlampi, 5=air
ns	Integer	-	0	Number of samples used in estimate
num_of_dh	Integer	-	-99	Number of drill holes used in estimate

resource_class	Integer	-	0	1=measured, 2=indicated, 3=inferred
ti_pc	Float	2	0	Titanium in magnetite concentrate
vinmc_pc	Float	2	0	Vanadium in magnetite concentrate
vinmc_pc_nn	Float	2	0	Vanadium in magnetite concentrate, Nearest neighbor estimation

14.4 Grade interpolation

4 m downhole composites were generated from the assay data prior to grade interpolation with consideration of the mineralized lens boundaries. The length of the composites were defined by the average length of the samples inside the mineralized envelopes. Interpolation of the magnetite and VinMC grades within the blocks was achieved by using the Inverse Distance squared method.

Three rounds of estimations were run with varying search radiuses that were based on geo-statistical results. Search ellipsoid parameters are presented below in Table 14-3.

Table 14-3 Anisotropy Ellipse Parameters

Parameter Value	**Value**

Bearing	**55.6284**
Plunge	**0.0000**
Dip	**43.3694**
Anisotropy factors	
Parameter	**Value**
-------------------------	
major / semi-major	**2.576**
major / minor	**7.701**
Search ranges	
Round 1	**500**
Round 2	**250**
Round 3	**125**

A maximum search distance of 500 m was used to fill the blocks within the wireframes. The search ellipsoid was oriented according to the main continuity directions of the ore lenses. Block grades were estimated using a minimum of 5 and a maximum of 20 composites with respect to the search distances.

14.5 Validation

Validation of the block model was performed visually against the drill hole data in cross section views (Figure 14-2 and Figure 14-3). The block model was also validated in the domain level by comparing the mean values of the composited and estimated data (Table 14-4). These reviews did not reveal any inconsistencies between block model results and drill hole assays.

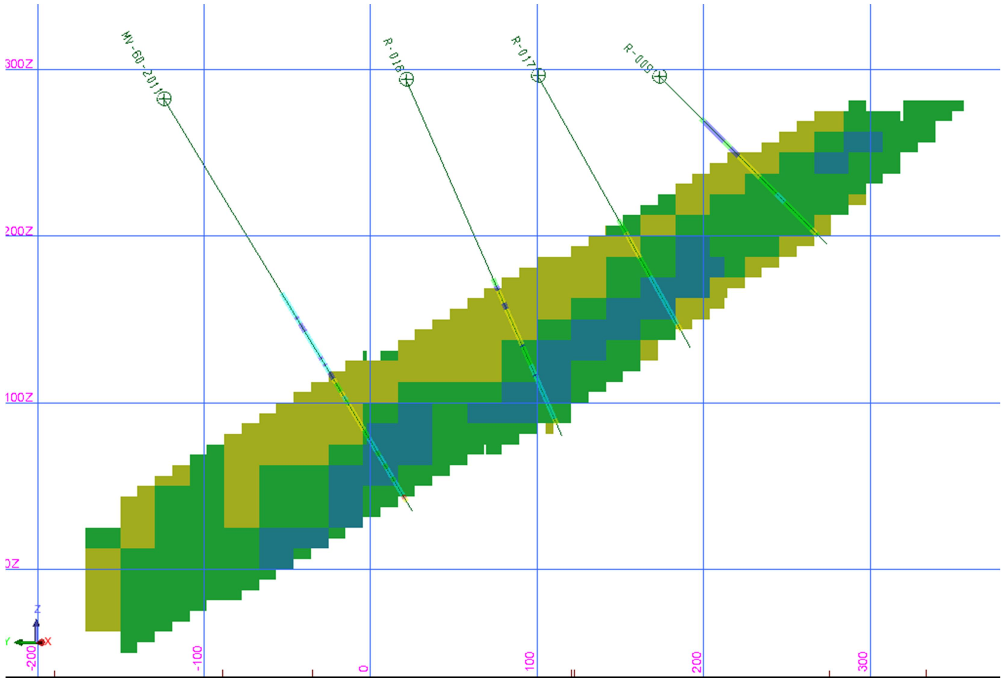

Figure 14-2 Section 9,700E viewing East displaying magnetite grades in blocks and drill holes. Turqoise indicates grades between 6 – 12%, green between 12 – 15% and yellow 15 – 25%.

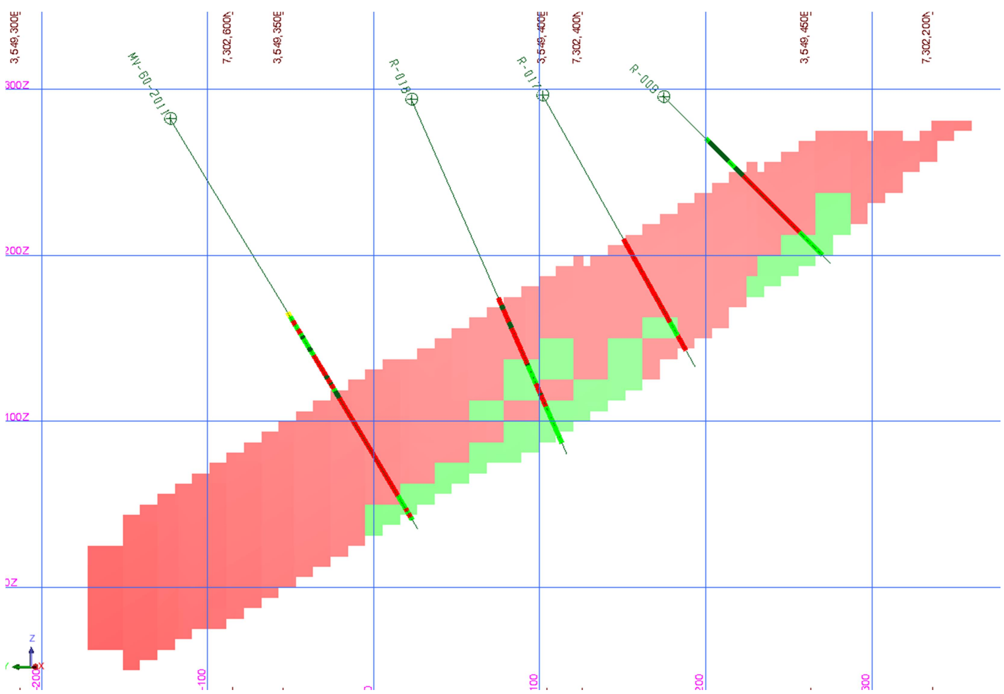

Figure 14-3 Section 9,700E viewing East displaying vanadium in magnetite concentrate grades in blocks and drill holes. Green indicates grades between 0.7 – 0.9% and red between 0.9 – 1.3%.

Table 14-4 Basic statistics of the block model and composites used to estimate the block grades.

	4 m composites		Blockmodel	
	Ore		Indicated Resource	
Variable	**Magnetite %**	**V in Mag. Conc.**	**Magnetite %**	**V in Mag. Conc.**
Number of samples	741	741	11,876	11,876
Minimum value	5.04	0.55	8.90	0.63
Maximum value	39.21	1.29	25.57	1.17
Mean	15.69	0.9	15.39	0.90
Median	15.07	0.9	15.14	0.90
Geometric Mean	15.17	0.89	15.15	0.90
Variance	17.4	0.01	7.48	0.00
Standard Deviation	4.17	0.09	2.74	0.07
Coefficient of variation	0.27	0.1	0.18	0.07

According to the basic statistics there was an acceptable variation between the estimated values and the composited values.

When comparing the volume of the geological 3D solids against the block model cells, a good congruence between the volumes can be seen. Figure 14-4 illustrates an oblique view of the Mustavaara 3D ore solid and the block model.

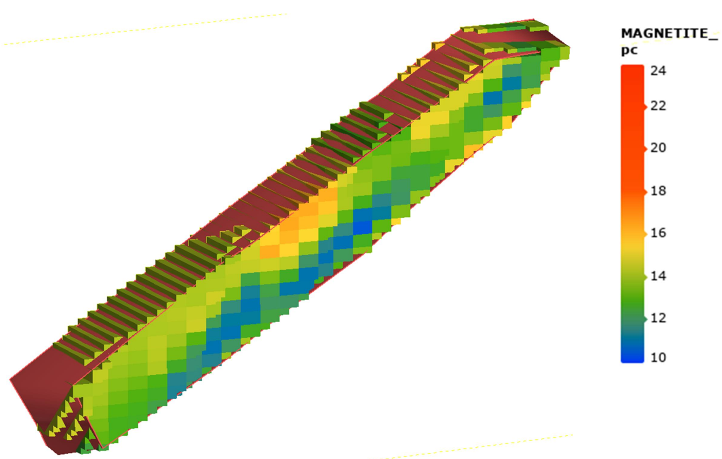

Figure 14-4 Volume comparison of 3D solid vs block model

The total volume difference between the 3D solid and the block model is only 0.36% (Table 14-5) and can be concluded that the volume difference is in a good range.

Table 14-5 Volumes of the 3D solid and the reported block model cells

Volume of 3D solid	**50 417 238 m^3**
Volume of reported block model cells	**50 596 875 m^3**
% difference	**0.36%**

The nearest neighbour (NN) method was a fast way to do a global validation of the resource model and it was used for the initial check in blockmodel validation. Table 14-6 shows the comparison between the inverse distance estimation method and the NN method. The inverse distance method and nearest NN produced fairly similar grades.

Table 14-6 Comparison between estimation methods

		Magnetite %		VinMC	
Resource Class	Tonnes	Inverce distance	Nearest neighbor	Inverce distance	Nearest neighbor
	Mt	%	%	%	%
Measured	64.0	15.41	15.32	0.91	0.91
Indicated	39.7	15.27	15.49	0.88	0.87
Total M&I	103.7	15.36	15.39	0.90	0.89
Inferred	42.2	15.11	14.95	0.92	0.88

Swath plot analysis showed good correlation between the composited magnetite and VinMC grades versus the estimated grades from the block model. Swath plot analyses for magnetite grade are presented in Figure 14-5 and in Figure 14-6 and for VinMC grades in Figure 14-7 and Figure 14-8.

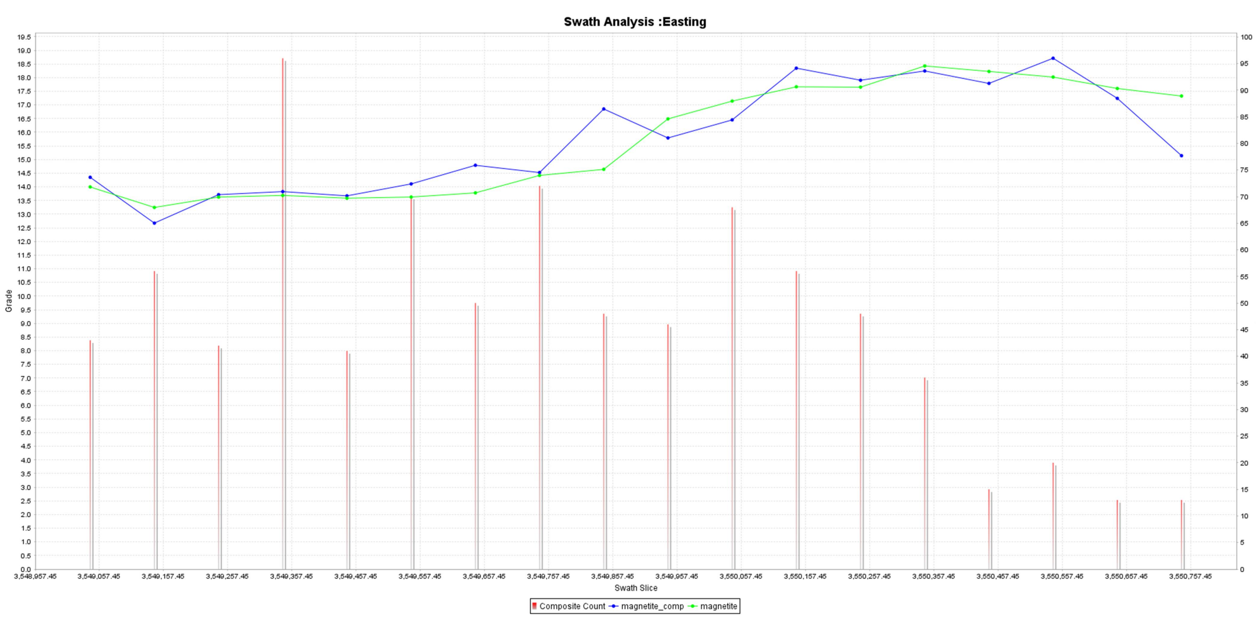

Figure 14-5 Swath plot analysis, Easting. Blue= Magnetite grade from composite file, Green= Magnetite grade from block model

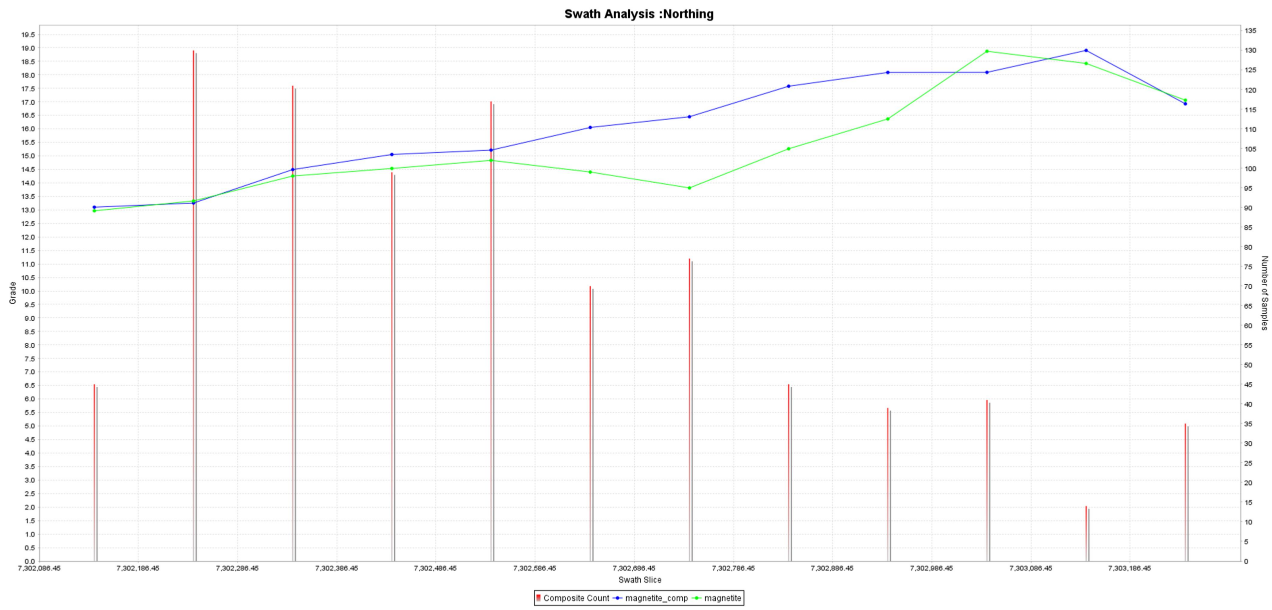

Figure 14-6 Swath plot analysis, Northing. Blue= Magnetite grade from composite file, Green= Magnetite grade from block model

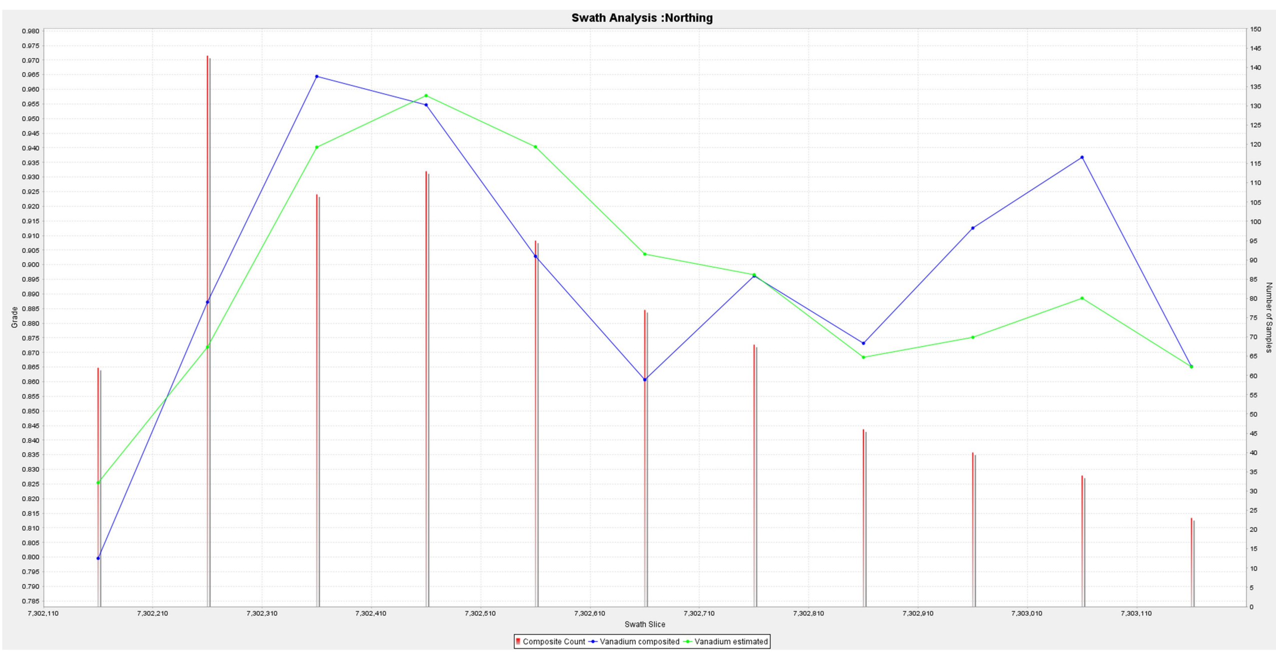

Figure 14-7 Swath plot analysis, Northing. Blue=VinMC grade from composite file, Green= VinMC grade from block model

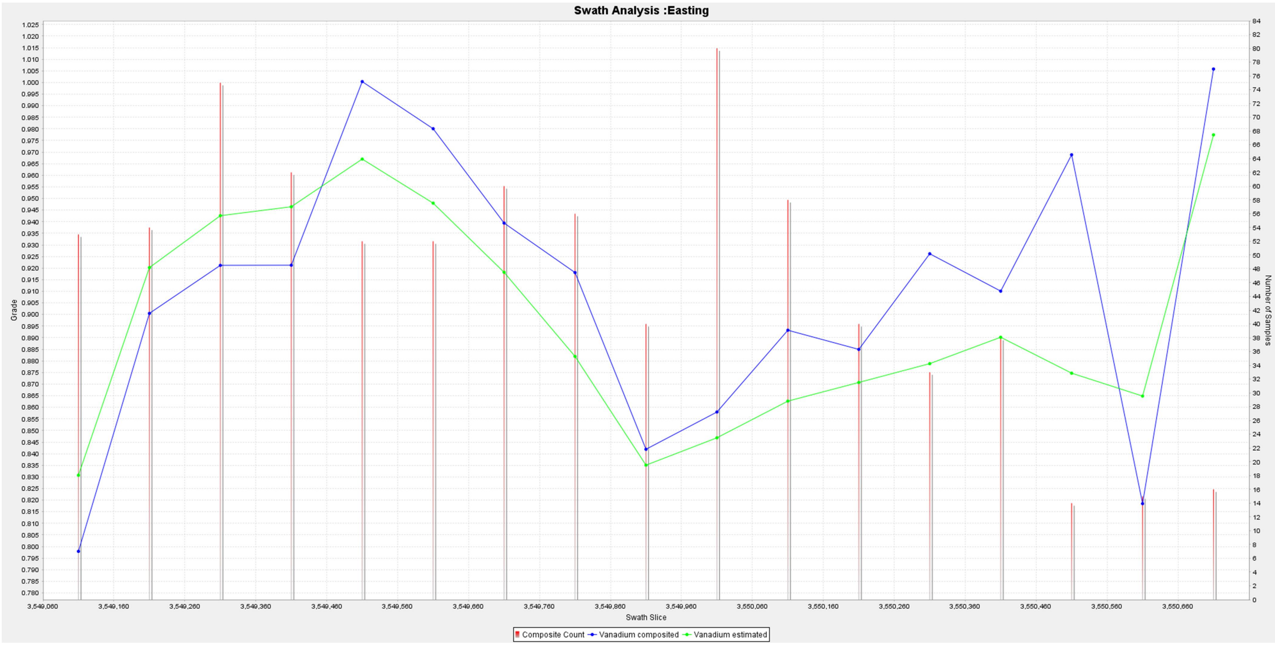

Figure 14-8 Swath plot analysis, Easting. Blue=VinMC grade from composite file, Green= VinMC grade from block model

14.6 Mineral Resource classification

According to the Outotec Finland Oy report, the Mustavaara main magnetite layers (OLL, OML and OUL) are classified according to the current data as Measured and Indicated Mineral Resources. The classification is based on a very simple and well understood geological framework, the drilling density, detailed magnetic survey data, and confirmed continuities of magnetite gabbro layers in the historic 1,800 m long, 50 to 135 m deep open pit. The statistical and geostatistical analysis has shown that the magnetite and therefore vanadium content of the host rocks show geostatistical ranges greatly in excess of the current drill spacing.

The Measured Mineral Resource estimate has classified the mineralization using a drill spacing of 100 m by 50 m. The mineralization has a down-dip continuation from the bottom of the old open pit.

The Indicated Mineral Resource has classified the mineralization, which continues directly downward from the measured resource, using a drill spacing of 100 – 200 m by 100 m.

The Inferred Mineral Resource has classified the mineralization, which is projected to continue directly downward from the indicated resource, and continues 100 to 150 m downward from the deepest drill hole.

The geological framework controlling the uppermost measured mineralization continues unchanged to the indicated mineralization. To the west, the indicated classification has ended at the first indication of an internal anorthositic waste block. The volume of the anorthositic waste block cannot be determined with the current drill spacing density in that area. In the east the magnetite gabbro layer is known to thin and eventually die out. To the east, the indicated classification includes known mineralization with a thickness of at least 5 m.

The uppermost disseminated magnetite layer (ODL) has not been added to the Mineral Resource because the of its variable nature. The true width, volume and exact location of anorthosite waste blocks do not follow a predictable pattern and remain more or less open even with increased drilling density.

The westward continuation of the magnetite gabbro can be considered good exploration potential. The downward continuation of the magnetite gabbro remains open and is estimated to continue with the same thickness and grade in the same kind of geological framework as with the known mineralization. Future drilling downdip of known mineralization can generate additional indicated and inferred resources. Figure 14-9 illustrates the Mustavaara mineral resource classes.

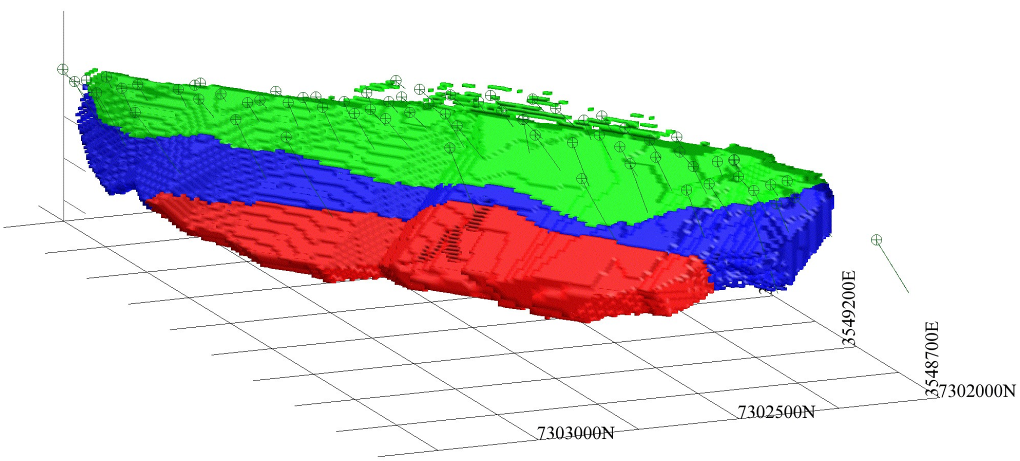

Figure 14-9 Oblique view of Mustavaara mineral resources, green = measured resources, blue = indicated resources, red = inferred resources

14.7 Mineral Resources

CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) define a mineral resource as:

"[A] concentration or occurrence of solid material of economic interest, in or on the Earth's crust in such form, grade or quality and quantity, that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."

The "reasonable prospects for eventual economic extraction" requirement generally implies that quantity and grade estimates meet certain economic thresholds and that mineral resources are reported at an appropriate cut-off grade that takes into account extraction scenarios and processing recovery

To ensure that the mineral resource estimate can be considered for eventual economic extraction, the following economic and technical constraints have been used:

- Total Operating Cost €44.55/t
- Ferrovanadium Price US$ 30/kg
- Pig Iron Price US$ 350/t
- Exchange rate 1.10 (US$/€)
- Cut-off grade 11.0% magnetite
- Vanadium grade 0.90%
- Iron grade 61.1%
- Pit slope angle 55 degrees

Cut-off value for magnetite was estimated by using a Net Smelter Return (NSR) calculation. The NSR was calculated from the magnetite and represents the combined metal values for iron and vanadium in the ore to produce pig iron and ferrovanadium.

The metal prices were provided by Strategic, metallurgical performance was based on the pre-feasibility study (Pöyry 2012) and the mining costs were estimated assuming contractor mining and using AFRY Finland Oy in-house prices from similar sized mining operations.

Table 14-7 summarizes the assumed costs, product prices and recoveries that were used in the cut-off calculation and the resource estimates.

Table 14-7 Assumed economic and technical parameters for the Mustavaara resource estimate cut-off grade calculation

Operating Cost			€/tonne
	Waste mining		1.78
	Ore mining		1.63
	Mine overheads		0.02
	Concentrator		6.50
	Metallurgical Plant		34.54
	Product freight		0.00
	Administration		0.11
Total OPEX			44.55
Product prices			
Pig Iron		US$/t	350.0
Ferrovanadium		US$/kg	30.0
Exchange rate		US$/€	1.1
Magnetite Concentrate			
Recovery of concentrate			98.0%
Iron			61.1%
Vanadium			0.9%
Metallurgical Plant			
	Pig Iron		
	Fe recovery		98.0%
	Fe grade		96.4%
	Ferrovanadium		
	Vanadium recovery		85.5%
	Vanadium grade		80.0%

The NSR values (€/ tonne) for a mined ore tonne were calculated using varying magnetite grades. The NSR was then compared against the operating cost (OPEX) broken down in Table 14-7 to see what the break-even value and the related cut-off grade should be. Using the assumed metal prices, operating costs and metallurgical recoveries the cut-off grade is estimated to be 11% Magnetite (Figure 14-10). It should be noted that the NSR calculation is based on assumed economic and technical parameters presented in Table 14-7.

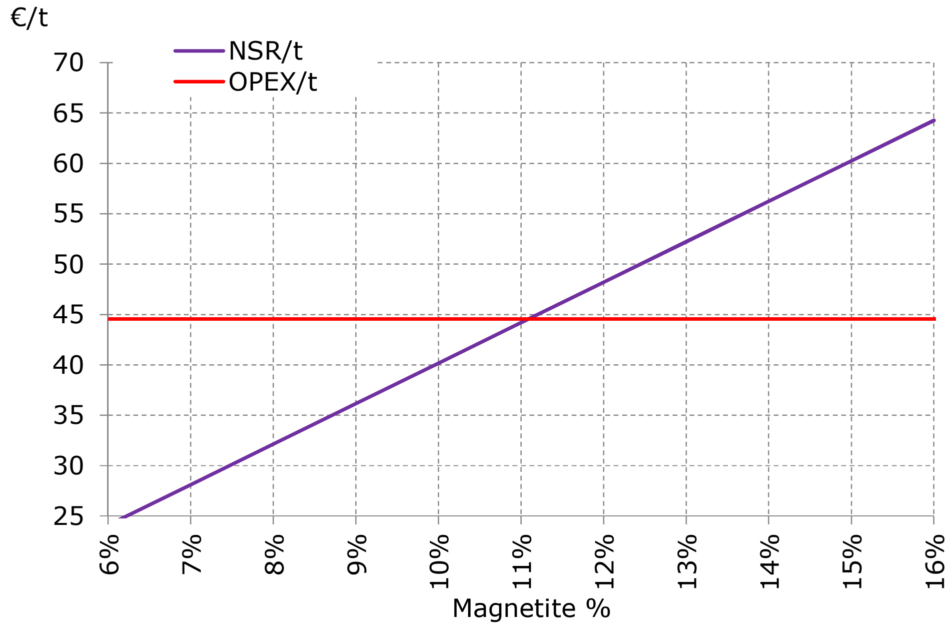

Figure 14-10 Cut-off breakeven calculation

Table 14-8 below summarizes the mineral resources using a magnetite cut-off grade of 11%. The author is not aware of any factors related to environmental, permitting, legal, title, taxation, socioeconomic, marketing, political or other relevant factors which could materially affect the mineral resource estimate contained in this Report.

Table 14-8 Mustavaara Mineral Resources as of the September 14th, 2020 @ 11% Magnetite cut-off

Resource Class		Average Grade				Contained Metal		
	Tonnes Mt	Magnetite (%)	VinMC (%)	Ti (%)	Fe (%)	VinMC (kt)	Ti (kt)	Fe (kt)
Measured Mineral Resource	**64.0**	**15.41**	**0.91**	**3.75**	**63.3**	**90**	**370**	**6 244**
Indicated Mineral Resource	**39.7**	**15.27**	**0.88**	**3.53**	**62.8**	**53**	**214**	**3 805**
Total M&I Mineral Resource	**103.7**	**15.36**	**0.90**	**3.67**	**63.1**	**143**	**584**	**10 049**

Note: VinMC refers to vanadium in magnetite concentrate, Ti refers to titanium in magnetite concentrate and Fe to iron in magnetite concentrate.

The depth extent of the mineral resources of the ore body is classified as Inferred Mineral Resources (Table 14-9). Although there is evidence that imply the geological and grade continuity in the depth extents of the ore body there is not sufficient data to categorise it into Indicated resources. Most of the inferred mineral resources can be upgraded to indicated mineral resource with diamond drilling.

Table 14-9 Mustavaara Inferred Mineral Resources as of the September 14th, 2020 @ 11% Magnetite cut-off

Resource Class		Average Grade				Contained Metal		
	Tonnes	Magnetite	VinMC	Ti	Fe	VinMC	Ti	Fe
	Mt	(%)	(%)	(%)	(%)	(kt)	(kt)	(kt)
Inferred Mineral Resource	**42.2**	**15.11**	**0.92**	**3.75**	**62.3**	**59**	**239**	**3 971**

Note: VinMC refers to vanadium in magnetite concentrate; Ti refers to titanium in magnetite concentrate and Fe to iron in magnetite concentrate.

14.8 Sensitivity of Mineral Resources

The relationship between the magnetite cut-off grade and the resource tonnage is shown in Figure 14-11. The effects of selected cut-off grade to Measured and Indicated Mineral resource are shown in Table 14-10. In Table 14-11 the sensitivity Inferred Mineral resources is shown against varying cut-off grades.

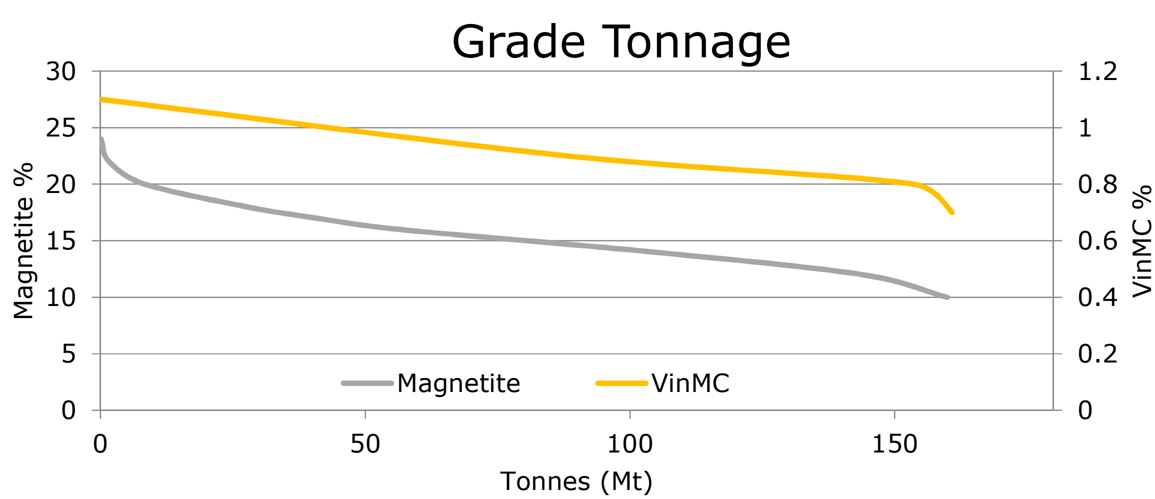

Figure 14-11 Mustavaara Grade-Tonnage curve

Table 14-10 Sensitivity of Measured + Indicated Mineral Resource to varying cut-off grades

		Average Grade				Contained Metal		
Cut-off	Tonnes Mt	Magnetite (%)	VinMC (%)	Ti (%)	Fe (%)	VinMC (kt)	Ti (kt)	Fe (kt)
6	150	15.14	0.9	3.68	62.9	205	838	14,323
8	107	15.17	0.9	3.64	63.2	146	593	10,281
10	106	15.26	0.9	3.65	63.2	146	590	10,219
11	**104**	**15.36**	**0.90**	**3.67**	**63.1**	**143**	**584**	**10,049**
12	95	15.71	0.9	3.72	63	134	555	9,394
14	67	16.81	0.9	3.8	62.9	102	430	7,115
16	39	18.11	0.9	3.91	62.6	64	277	4,436
18	18	19.46	0.9	4.11	62.3	32	144	2,181

Table 14-11 Sensitivity of Inferred Mineral Resource to varying cut-off grades

		Average Grade				Contained Metal		
Cut off	Tonnes Mt	Magnetite (%)	VinMC (%)	Ti (%)	Fe (%)	VinMC (kt)	Ti (kt)	Fe (kt)
6	43	15.00	0.92	3.76	62.3	60	244	4,045
8	43	15.00	0.92	3.76	62.3	60	244	4,045
10	43	15.00	0.92	3.76	62.3	60	244	4,044
11	**42**	**15.11**	**0.92**	**3.75**	**62.3**	**59**	**239**	**3,971**
12	38	15.46	0.92	3.79	62.2	55	225	3,687
14	28	16.41	0.91	4.00	62.2	41	181	2,820
16	11	18.59	0.85	4.87	61.8	17	98	1,245
18	6	19.95	0.86	5.00	62.2	10	59	737

The effects of varying vanadium grade to NSR is presented in Figure 14-12. The NSR calculations are based on assumed economic and technical parameters presented in Table 14-7.

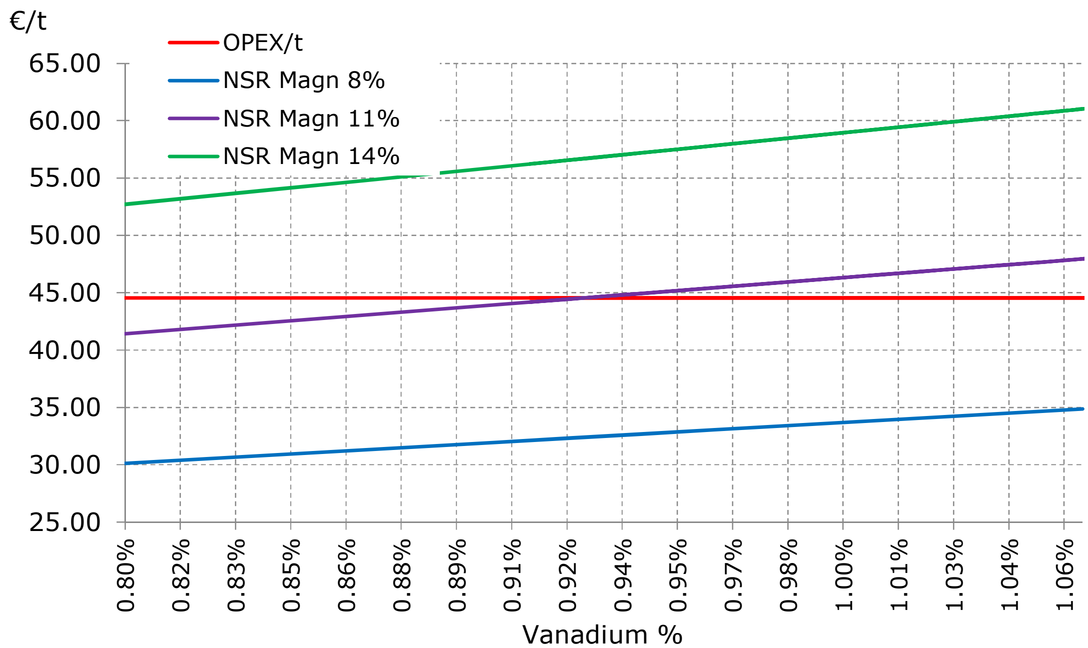

Figure 14-12 Vanadium grade sensitivity analysis

It should be noted that the vanadium grade has a much smaller effect on the NSR value than the magnetite grade.

15 Mineral Reserve Estimates

This section is not applicable to this Report.

16 Mining Methods

This section is not applicable to this Report.

17 Recovery Methods

This section is not applicable to this Report.

18 Project Infrastructure

18.1 Tailings pond

Due to historic mining, a tailings pond is located on the property. The length of the dam is approximately 1,550 m. The dam structure consists of supporting embankment, a sealing layer, a filter layer, and a slope protection layer. Supporting embankment and slope protection layers have been made of blasted rock (waste rock) from the open pit. The sealing layer was made from glacial moraine material from the soil removal of the open pit. The filter layer was made from crushed aggregate from site (crushed waste rock). A filter cloth was installed between the supporting embankment and the sealing layer as well as between the sealing layer and the slope protection layer.

Soil replacement needs to be done below the dam due to the presence of peat. Peat should be removed and replaced with blasted rock.

A crushed aggregate layer was constructed on the top of the dam (road structure) but should be upgraded.

An overflow pipe with an overflow well and valve well will need be constructed at the tailings pond seeping into the water clarification basin. Currently, approximately 1/5 of the tailings area is used for agriculture (Figure 18-1).

Figure 18-1 Viewing East towards the current tailings area.

18.2 Plant area

Once mining was ceased, the mining plant and all other buildings associated with the mine were deconstructed. Massive earthworks have been carried out in the old plant area to seal the contaminated land. Overburden was removed from the old plant area between the Sirniönlampi and the mine access road.

18.3 Roads, fence and drainage

Roads were originally developed to support the mining operation. Since the closure of the mine, minimal to no upkeep has been done on most of the internal roads. The existing access road and internal roads would need to be improved, and in some cases rebuilt.

Open ditches should be excavated around the tailings pond and around the open pit so that external water will not flow into them.

There is currently a chain-link fence surrounding the past producing open pit.

19 Market Studies and Contracts

This section is not applicable to this Report.

20 Environmental Studies, Permitting and Social or Community Impact

In the following chapter, a general outline of the Finnish environmental permitting process is described. The purpose of this section is to provide an overview about the environmental aspects of the project as a whole, and to describe a road map that shall be followed to successfully complete the required permitting procedures.

20.1 Mining permit

A mining permit is required for mining activities under the **Mining Act**. Applications for mining permits are processed by the Finnish Safety and Chemicals Agency (Tukes). Mining permits are usually granted for an unlimited period of time. Temporary licences are only issued if special reasons for this exist. The land survey associated with the mining site and any auxiliary areas is called a mining survey. The objective of the process is to establish rights to the mining site, to agree on the compensation payable, and to carry out technical surveys on the affected properties. The mining survey replaces the so-called mining concession procedure referred to in the old Finnish Mining Act.

The permit holder is liable to pay annual compensation to any landowners affected by the mining site (known as an 'excavation fee'). The annual excavation fee payable to each of the affected landowners is € 50 per hectare. In the event that the permit authority has extended a mining licence under the third paragraph of Section 68 of the Finnish Mining Act, the compensation payable according to the second paragraph is € 100 per hectare (incremental compensation) until mining activities commence or resume.

A statutory mining royalty of 0.15% of the value of the exploited mineral / metal is also payable to the landowner. Permit holders may also be liable to pay compensation for by-products. The affected landowners are entitled to a percentage of the value derived from any mining by-products not reused within the mining site each year (known as a 'by-product fee'). Unless otherwise agreed, the by-product fee can be up to 10 percent of any revenue generated from the sale of by-products.

In addition to a mining permit, mining activities are also subject to an environmental permit. Other considerations include possible land use planning and building permits. Issues relating to nature conservation need to be factored into not just the EIA procedure but also the environmental permit and the mining permit.

20.2 Permitting procedures

In Finland, environmental permits are needed for all activities involving risk of pollution to the air, water, or ground. One important condition for all permits is a requirement to use Best Available Techniques (BAT). Mining projects are subject to a number of permits and plans, the necessity and scope of which are governed by a number of different laws and regulations. These permits cover and outline procedures for everything mining related including the mining process itself, the various permit procedures, environmental protection and nature conservation, different kinds of safety considerations, archaeological sites, and the storing of waste and hazardous substances. The most important regulations are listed in Table 20-1.

Table 20-1. Key legislations governing mining projects.

Area / Issue	**Legislative reference**	**Notes**
Environmental impact assessment EIA/ESIA	Environmental Impact Assessment Procedure Act (252/2017) and Government Decree on Environmental Impact Assessment Procedure 252/2017 and 277/2017	EIA process
Natura 2000 assessment	Act on Environmental Impact Assessment Procedure 252/2017 and Nature Conservation Act (109671996)	Nature Conservation Act 65 §
Nature Conservation	Nature Conservation Act (109671996) Nature Conservation Decree (160/1997)	Natura 2000 issues, protection of organism's exceptions
Environmental Protection	Environmental Protection Act (527/2014) and Environmental Protection Decree (713/2014)	Permitting process
Water related issues	Water Act (587/2011) and Water Decree (1560/2011)	The use of water resources, permitting if operation is affecting constructions in water, springs or the water supply. Groundwater use in the operation, groundwater table position or quality changes.
Extractive waste Management	Government Decree on Extractive Waste (190/2013) Government Decree on Waste (179/2012) (Appendices 3-5) Government Decree on Waste Facilities 331/2013.	Mining waste
Land use planning and building permits	Land Use and Building Act (132/1999) Land Use and Building Decree (895/1999)	Regional plans, Municipal general plans (master plans) and Municipal detailed plans, building permits process
Mining permit	Mining Act (621/2011) and Mining Decree (391/2012)	Mineral rights, Mining permitting process

Dam safety	Dam Safety Act (2009/494)	classification, monitoring, prevention of accidents

Overview of the EIA procedure

Environmental Impact Assessment (EIA) procedure precedes the environmental permitting procedure assuming the project exceeds certain criteria set out by the legislation.

The primary objective of the EIA is to produce information about the potential effects of the project on the environment and local residents in order for these to be factored into the plans alongside economic and technical considerations. A secondary objective is to increase the opportunities of citizens and interested parties to have a say in the plans. No final decisions will be issued or permits granted in the course of the EIA procedure. The EIA procedure is a statutory requirement in Finnish law, governed by the following regulations:

Environmental Impact Assessment Procedure Act (No 252/2017)

Environmental Impact Assessment Procedure Decree (No 277/2017)

The EIA procedure is characterized by studying different alternatives, encouraging participation, and promoting transparency. According to Section 2 of the Finnish Act on the Environmental Impact Assessment Procedure, an EIA is a procedure that involves investigating and assessing the environmental impacts of specific projects as well as seeking opinions from public authorities and comments from parties whose conditions or benefits may be affected by said projects and from organisations and foundations that operate within sectors that may be affected by said projects.

One of the most important objectives of the EIA procedure is to give citizens and stakeholders an opportunity to have a say in project plans. The EIA procedure is carried out in close cooperation with the supervising authority and the most affected interested parties.

The key stages of the EIA procedure are shown in Figure 20-1.

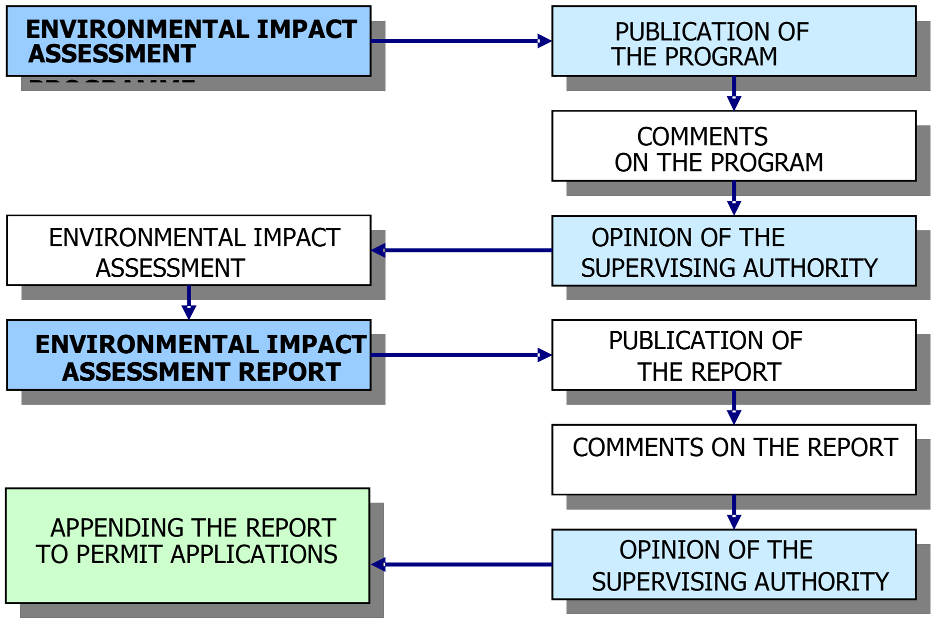

Figure 20-1 Progress of the Environmental Impact Assessment procedure

The Act and Decree on the EIA Procedures lay down provisions on the contents of the EIA program and the report.

The EIA program includes a description of the project and a plan for assessing its potential environmental impacts. The supervising authority is responsible for publishing information about the project and the EIA program and for arranging an opportunity for interested citizens and organisations to comment on the project in question. The supervising authority is then responsible for issuing an opinion on the basis of any comments made on the program as well as any other issues raised and other relevant information, identifying which aspects of the EIA program need to be revised, if any.

The project's environmental impacts are then assessed on the basis of the EIA program and the opinion of the supervising authority, and the findings of the assessment are described in the EIA report.

The aforementioned Finnish Act and Decree on the Environmental Impact Assessment Procedure lay down provisions on the contents of the EIA report. According to the definition given in the act, the EIA report is a document that describes the project and the proposed alternatives and gives a comprehensive assessment of the associated environmental impacts. The EIA report

- describes the proposed alternatives and the associated environmental impacts;
- describes the current state of the environment in the area;
- assesses the environmental impacts associated with the proposed alternatives and their relative significance;
- compares the proposed alternatives against each other;

- describes how any potential adverse effects can be prevented and mitigated; and
- proposes a plan for monitoring the project's environmental impacts.

The supervising authority is responsible for publishing a notice for the EIA report and for organising an event where the findings are discussed. Any necessary opinions on the report are then sought from the relevant authorities and an opportunity reserved for interested parties to comment on the adequacy of the report. The supervising authority also issues a justified conclusion on the report. The EIA procedure is concluded once the supervising authority issues its justified conclusion to the project coordinator. The EIA report is appended to any subsequent applications for permits and other similar documents. Any decisions on subsequent permit applications will explain how the EIA report and the supervising authority's conclusion have been taken into account.

Status of Mustavaara with regards to an EIA

In the case of Mustavaara, the preceding EIA procedure for associated mining activities has already been completed and approved by the authority, North Ostrobothnia Centre for Economic Development, Transport and the Environment (18.1.2010, POPELY/2/07.04/2010) in 2010. The mine EIA procedure's Natura 2000 assessment has been undertaken and approved by the authorities. The EIA process was done according to the EIA legislation valid that time.

Strategic would need to transfer the EIA in order to utilize it. Strategic has not attempted to transfer the EIA as of the effective date of this report.

20.2.1 Environmental permits

An environmental permit is required for the mining operation to restart at Mustavaara. The need for a permit is based on the Finnish Environmental Protection Act (No 86/2000) and the associated Finnish Environmental Protection Decree (No 169/2000).

The application for an environmental permit needs to be addressed to the Regional State Administrative Agency for Northern Finland (PSAVI). An environmental permit has to be granted once the proposed project meets the requirements set in the Finnish Environmental Protection Act and the Finnish Waste Act as well as any associated decrees. The EIA procedure must have been concluded before the application can be processed. A typical permitting procedure is presented in Figure 20-2.

There are different technical studies and reports needed for environmental permitting. Part of them (or preliminary versions of them) should already be available at the Environmental and Social Impact Assessment (ESIA) stage. Generally, management of primary risks is addressed with rather detailed studies.

Certain reports are required as permit application attachments. Extractive waste management plan (as required in Government decree on extractive waste 190/2013) is always a necessary attachment in mining permit applications. A dam safety and dam classification report must also be included to the permit application. Depending on the type and quantity of chemicals stored on the site, a safety declaration should be attached to the permit application (ref. Government decree on storage and handling of hazardous chemicals 390/2005). Depending on the sored chemical quantity, this may be a slightly lighter declaration of operating principles or the actual safety declaration. A safety permit from Tukes is generally needed for industrial storage of chemicals onsite too.

Typically, the delivery time for environmental permits ranges between 1 – 1.5 years depending on the size and complexity of the project and various other factors. Environmental permits may take even longer. Possible appeals to court instances may substantially extend the time before the granted permit is legal. However, the applicant may apply for permission to start operations regardless of possible appeals. In general, the permission is granted if solid reasoning has been presented. However, in such a case, the start-up of the operations happens at the applicant's own risk.

The environmental and water permit for MKOy's Mustavaara proposed mine were approved on the 16th of March 2016 by PSAVI. The decision was appealed on June 14th, 2018, and the Vaasa administrative court ruled against the appeal. The EIA remains valid under MKOy as the operator. Should a mining decision be made, the permit will have to be transferred to the name of the mine operator.

If construction at Mustavaara has not commenced before the 14th of July 2022, the water permit and parts of the environmental permit will be terminated. If construction has not started before the 14th of July 2023, the environmental permit could be terminated. It is possible to apply for an extension of up to 3 years as according to the Environmental Act 91 §. It is recommended that the mine project operator communicates with the supervising and permitting authorities beforehand.

Typically, the permitting authority has approved slightly higher figures in environmental permit (10 to 20% higher production) in the permitting phase than what was estimated in EIA. Significant production increase, either annual or for the life of mine (LOM) will require a new EIA procedure. The same applies to changes in the facilities either upgrades or rebuilds along with earthwork changes a like a new rock waste dump or significant heightening of the tailings management facility.

The current mineral resource estimates at Mustavaara are significantly higher than what was originally proposed in EIA stage by MKOy. Thus, the annual and LOM production figures will be higher in the future than what was stated in MKOy's Pre-Feasibility Study. A new EIA procedure will have to be completed by the mine operator but the current, valid EIA can be used for at least the first 10 years of production if the scope of the project remains the same as what was accepted, once the operator has transferred the name on the original title.

In the granted environmental permit, there is a specific statement related to a bond for site water and waste management facility reclamation. The bond is to be used in case the operator goes bankrupt, etc. thus ensuring that adequate reclamation measures are carried out.

The bond is dependent on the type and extent of the facilities. Typically, the bond consists of a lump sum component and additional payments based on the area exploited each year. The bond will have to be paid prior to starting waste deposition and will be checked annually based on the area utilised and any closure efforts undertaken.

During operations the bond is revised annually and increased based on any area expansions (waste management facilities). The unit rates will not necessarily stay the same during the life of mine and are revised based on the general market costs to of reclamation work.

If progressive reclamation measures are undertaken during the mine life, portions of the bond will be returned accordingly.

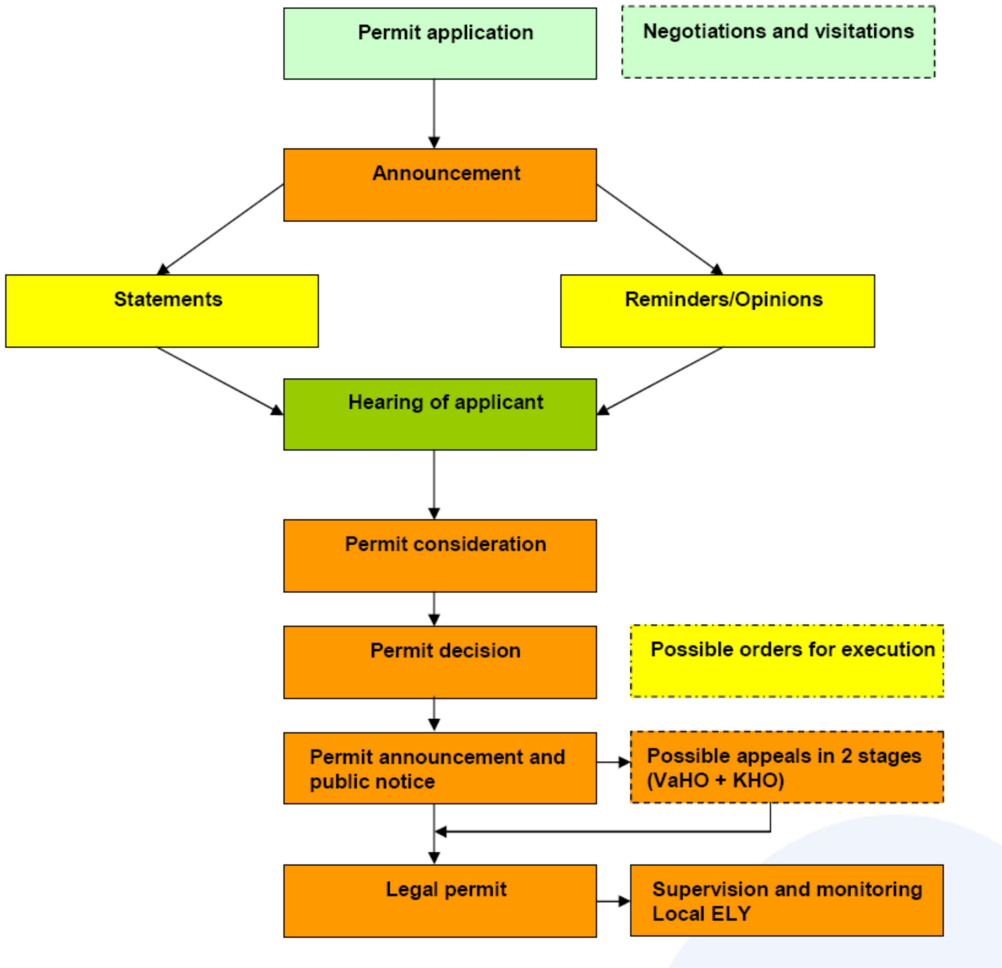

Figure 20-2 Typical environmental and water permitting procedure

Status of the Mustavaara with regards to Environmental Permits

An environmental and water permit to MKOy was approved on the 16th of March 2016 by the permitting authority PSAVI. The decision was appealed and the Vaasa administrative court overturned the appeal on the 14th of June 2018. The environmental and water permit remains valid at the time of this report under MKOy as the operator.

If mine construction has not started before the 14th of July 2022, the water permit parts of the environmental permit will be terminated. If mine construction has not started before the 14th of July 2023, the environmental permit will be terminated. It possible to apply for an extension (maximum of 3 years) according to the Environmental Act 91 §. It is however recommendable that the operator commences discussions with the supervising and the permitting authorities beforehand.

The permitting authority has changed the environmental permit for the tailings area design because of its proximity to an eagle's nest. No work is permitted within a 400 metre radius around the tree in which the nest is located and therefore the tailings area design must be changed in the case of future production. Additionally, in the spring, if nesting is underway no work is permitted within a 1,000 metre radius around the tree where the nest is located. The open pit would remain unaffected by the eagle's nest at that distance. If the mine was to reopen, Strategic should consider minimizing disturbances to the eagles by making artificial nests with the co-operation of Metsähallitus and ELY-center (nature protection) further from the project in hopes of the eagles moving, or find a new area for the tailings pond. At the time of this report, there has not been any active nesting recently and therefore the 1,000 metre zone is unlikely to affect potential operations.

20.2.2 Compensation payable under the environmental permit

In addition to the fees payable under the mining licence, obligations relating to the compensation and collateral may also be imposed under the environmental permits. Typical examples of what these fees cover include compensation for the effects on fishing, or reclamation bonds to ensure that the rehabilitation phase of the project will be completed satisfactorily. Decisions relating to the environmental permit and any compensation payable under the permit rest with PSAVI.

20.2.3 Permits issued by Tukes

Tukes is responsible for monitoring the regulatory compliance of mining activities from the perspective of mining legislation, chemicals legislation, and the Explosives Act. The primary objective of permits granted by Tukes is to ensure the health and safety of personnel and to prevent damage to property.

A master plan of the mining site needs to be presented to Tukes, including a detailed description of operational arrangements and issues that may contribute to safety.

Applications for permits required under the Decree on the Industrial Processing and Storing of Hazardous Substances (No 856/2012) also needs to be addressed to Tukes. Tukes also issues permits for the handling of explosive materials and for the use of explosives (explosives permit) along with extraction techniques, hoists, and electrical apparatus, to name a few. The explosives permit needs to be applied for by the operator who will eventually be undertaking the related works.

20.2.4 Permits required under the Finnish Land Use and Building Act

- Land Use and Building Act (132/1999)
- Land Use and Building Decree (895/1999)

Land use planning procedures

Land use planning in Finland normally takes place on three different levels:

- Regional Planning on the state or regional level

- Master planning on the municipal level
- Detailed planning on the local level

Ultimately land use planning procedures are needed to obtain building permits for project infrastructure.

Regional Planning

The regional land use plan transfers national and regional land use goals to the local level. A regional land use plan exists for each region in Finland (18 parcels). These general plans set out medium-term and long-term objectives for regional land use strategies that guide regional development and steer decisions on issues that are of a trans-municipal or regional nature. Regional land use plans are drafted by regional councils. Council members represent the region municipalities. Stakeholders (ie. individual citizens and non-governmental organizations) are encouraged to participate in the planning process. Regional land use plans are also approved by the regional councils. Once approved, the plans are then submitted to the Ministry of the Environment, where the legality of the plans are assessed before final ratification.

Contents of a regional land use plan

A regional land use plan sets out a general framework for the more detailed local plans. These in turn are prepared by the municipalities. The regional council must also ensure that the plan promotes proper implementation of the national land use guidelines. Key elements in regional land use planning are:

- appropriate regional and community structure of the region
- ecological sustainability of land use
- environmentally and economically sustainable transportation and technical services arrangements
- sustainable use of water and extractable land resources
- local business conditions
- protection of landscape, natural values, and cultural heritage
- adequate availability of recreational areas

Regional land use plans are legally binding. However, they leave plenty of options for the municipalities to resolve local land use and development issues. To ensure that regional land use plans provide suitable guidelines for the local plans, they are reassessed and updated regularly according to the changing conditions.

Status of Mustavaara with regards to the Regional Land Use Plans

The possible reopening of the Mustavaara mine was approved on the 27th of May 2015 by the Regional Land Use plan. In the regional plan of the Council of Oulu Region (Figure 20-3) MKOy’s mine site application has been marked as a mining site (marked as “EK” in the regional plan map).

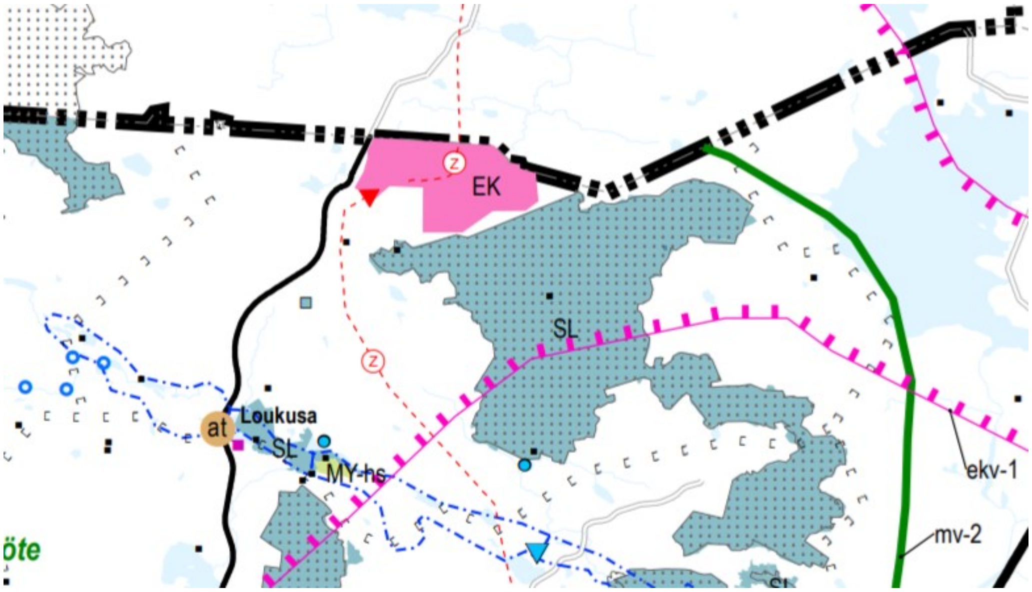

Figure 20-3. MKOy's proposed mine area, marked by a solid pink region labelled "EK", from the regional plan of the Council of Oulu Region. Regional plan combined map (11.6.2018).

Master planning

The master plan guides the detailed land use plans. The master plan is a general level land use plan for the municipality. Its function is to coordinate municipality operations such as residential areas, services and workplaces as well as recreational areas and the connections between these operations. Mining projects need to be included in the master land use plan for their respective municipalities. This plan needs to cover the entire project area. It is important that the plan is as flexible as possible, to ensure reasonable freedom for concrete project planning.

The master plan may concern the entire municipality or just a part of it when the plan is called a partial master plan. Also, municipalities may prepare a common master plan. The plan is presented on a map with attached legends, plan regulations and a report. The municipality takes care of the master planning. The plan is approved by the city or municipal council. In the case of joint master planning (several municipalities) the approval is done by a joint institution and ratified by the Ministry of the Environment.

Contents of a master plan

Based on the Land Use and Building Act 39 § the following are considerations that are included in a master plan:

- functionality, economics and ecological sustainability of the community structure
- utilisation of the existing community structures
- needs for housing and availability of services

- possibilities for practical arrangements of traffic especially public and pedestrian transport as well as energy, water and waste management considering the sustainable use of natural resources and minimal environmental impacts
- possibilities for safe, healthy and balanced environment for various population groups
- operational preconditions of the municipality economic life
- mitigation of environmental impacts
- cultivation of built environment, scenery and nature values
- sufficiency of recreational areas

Status of Mustavaara with regards to the Master Plan

The municipality of Taivalkoski approved the Mustavaara mine proposal area in their master plan on the 27th of May 2015. Likewise, the municipality of Posio has also approved the Mustavaara mine proposal area in their master plan in 2015.

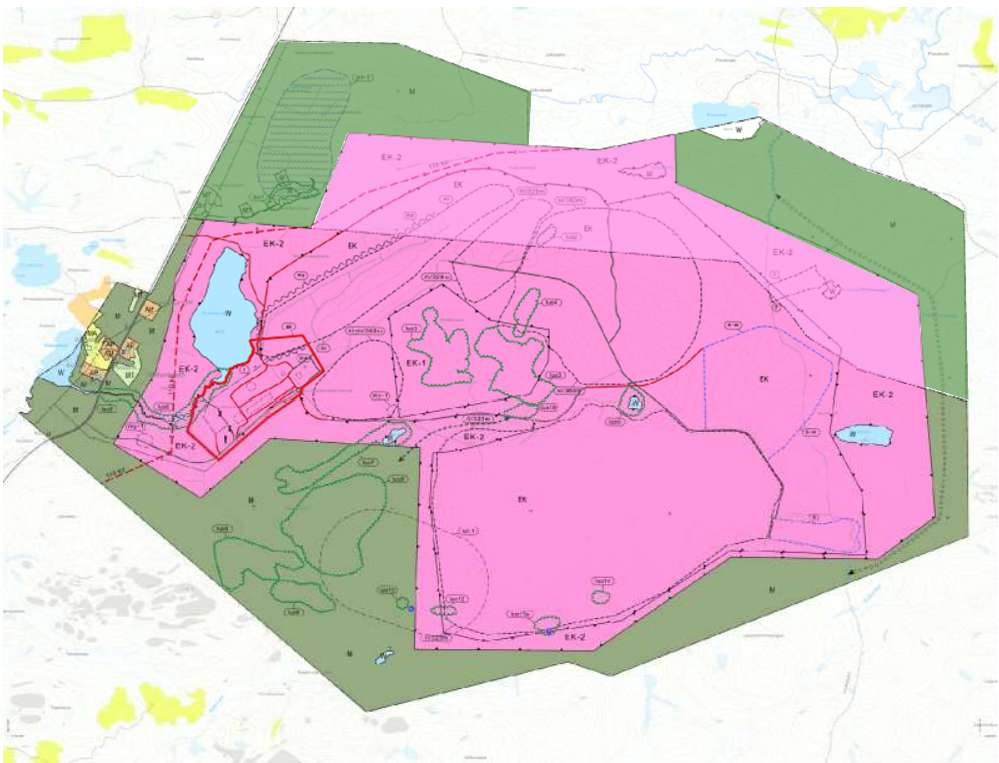

Figure 20-4. Mustavaara mine proposal area (pink region) in Taivalkoski's and Posio's approved master plans, 2015.

Detailed land use planning

The detailed plan guides municipal building works. Future use of each area is determined in the detailed plan: what is being retained, what can be constructed and how the construction shall be undertaken. For example, the plan may regulate the size, location and purpose for each building.

The detailed plan may concern entire residential areas or a single lot. The municipality is responsible for establishing the detailed plan. For shore areas (e.g. lakes) the guidance may be undertaken by shore land use plans that are prepared by the landowners.

The detailed plan is presented on a map with attached legends, plan regulations and a report. The report describes the essential characteristics of the detailed plan.

Contents of the detailed plan are presented in 54 § of the Land Use and Building Act:

The detailed plan shall be prepared so that a healthy, safe, and comfortable environment is possible. Local availability of services and traffic arrangements shall be considered. Built and natural environments shall be cultivated and related special values may not be destroyed. Recreational areas shall be available in the area or vicinity. If the detailed plan is prepared for an area with no legally binding master plan the detailed plan shall be considered the master plan requirements to the appropriate extent.

Status of Mustavaara with regards to the Detailed Plan

The municipality of Taivalkoski approved the Mustavaara proposed mine plan in their detailed land use plan on the 26th of August 2015.

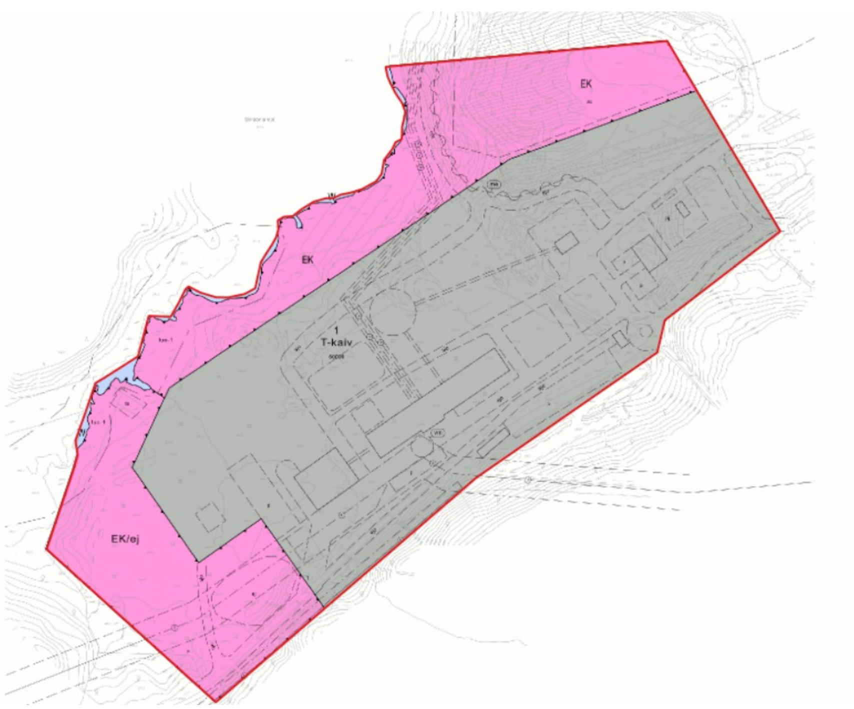

Figure 20-5. Mustavaara proposed mine plan area (as pink and grey solids) in the Taivalkoski detailed land use plan, 2015.

Building related permits

Permits required under the Land Use and Building Act include building permits, alteration permits and notices, landscape alteration permits, demolition permits and notices, exemptions, special development orders, and expropriation permits. Building permits must be obtained prior to the construction of a mineral processing plant and other facilities required for mining and smelting. Appropriate Municipal authorities of respective locations are the issuers of these permits.

20.2.5 Dam safety permits

With regards to the dams associated with the Mustavaara proposed mine area, the supervising authority for Economic Development, Transport, and the Environment is the Kainuu Centre (KAIELY). The supervising authority is responsible for consulting with the competent dam safety authority in order to establish the regulatory compliance of any proposed dams prior to authorising the construction and use of said dams under the Water Act, the Environmental Protection Act, and the Land Use and Building Act. The dam safety authority must evaluate the scope of any proposed dams from the perspective of dam safety, where applicable. All dams must also be rated for safety before commissioning and a risk assessment and a control plan must be produced and approved from the dam safety authority. Environmental aspects of mine dams are governed by the environmental permit but dam safety permitting is a separate issue and typically undertaken closer to the project implementation phase.

20.2.6 Other permits

The storing and distribution of fuels is subject to a registration notice under Finnish Government Decree No 444/2010. The appropriate authority governing the potential mine fuel distribution is PSAVI. The validity time frame of this permit is similar to that of environmental permits.

Heat generation (power plant) for project sites may be applied for with a separate environmental permit according to the Government decree No 445/2010, depending on the size of the power plant. However, to simplify the permitting processes, a permit for the construction and use of a power plant can be connected to the comprehensive environmental permits of the site. The appropriate authority for this decision is PSAVI.

Construction works on mining sites are subject to the provisions of the Antiquities Act (No 295/1963). The preservation of archaeological sites is supervised by the Finnish National Board of Antiquities. Any archaeological finds made in connection with earthworks on the site must be left untouched.

If any such discoveries are made, the work must cease and the National Board of Antiquities or the Provincial Museum of Lapland notified immediately. Any necessary investigations, removal of such artefacts and the cost thereof will then be discussed with the National Board of Antiquities, after which construction works can resume normally. In some circumstances, the project coordinator can apply to the regional Centre for Economic Development, Transport and the Environment (ELY) for permission to destroy the find under Section 11 of the Antiquities Act, subject to consultation with the National Board of Antiquities. No such occurrences are known to exist on project area.

20.3 Project permitting roadmap

The preliminary plan for project permitting roadmap will be described below considering the current status of the mine permitting plan, including a tentative schedule for the main applications to provide a fluent timeline for the project. With careful planning the bottlenecks caused by the permitting procedures can be minimized.

Project scheduling framework steers scheduling of the different subtasks and is roughly described in Figure 20-6 below. In the middle of the figure, an orange arrow represents the project risk management approach. Potential environmental and social (and other) project risks should be identified in rough extent as early as possible. This enables initiating early potential critical investigation requiring long time frames. This also steers which detailed baseline studies are needed for different potential impact reduction categories. Baseline studies over a long period of time increases information and detail levels while decreasing uncertainties. Possibilities to avoid or minimize risks can be identified more accurately – as well as impact management measures can be added to the plans.

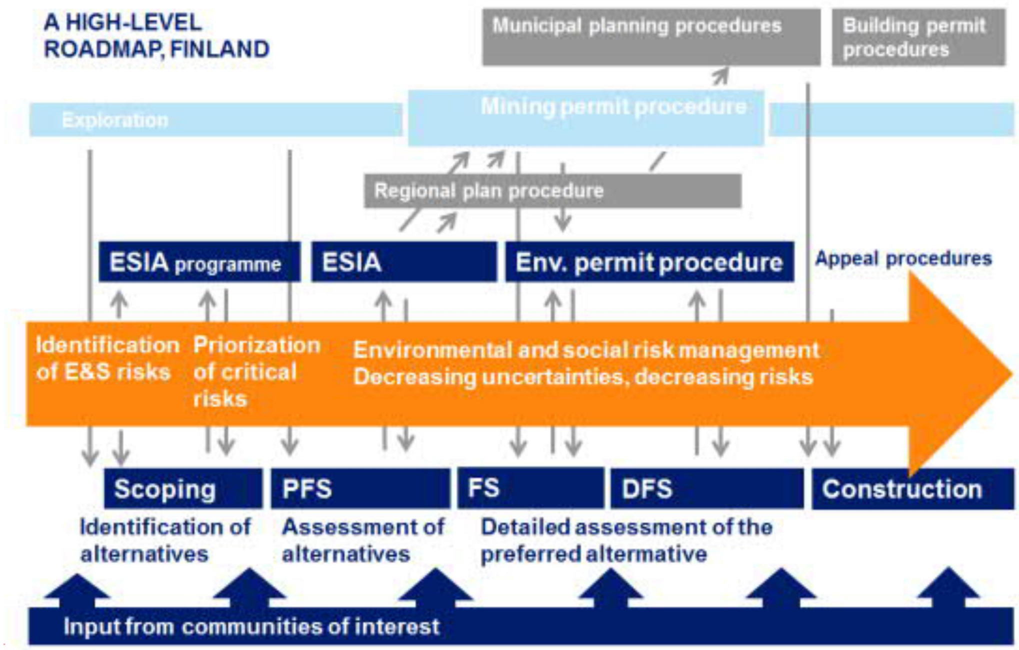

Figure 20-6.General mining project schedule.

During the scoping study and ESIA program phase, project alternatives are defined. Both technical-economic and environmental-social aspects should be studied simultaneously. Identified key risks form the core of the ESIA program. Also, the pre-feasibility study (PFS) and the ESIA-report phase have similar roles to project viability. During the feasibility study (FS) and environmental permitting stages, primary plans are developed and studied further.

The ESIA report and related coordination authority statements are needed to prepare the environmental permit application, and are also necessary for submitting the mining permit application. The ESIA report is also important for land use planning procedures. The mining permits cover the entire operational area along with mining infrastructure onsite and therefore the layout of the mine site must be well planned and baselines well documented.

Through the entire process, good stakeholder engagement is highly recommended. Transparency and community engagement improve the relationships to stakeholder groups and also provide local information that is valuable for the planning procedures. During the ESIA and permitting procedures, as well as during land-use planning procedures, there are also some authority driven formal stakeholder consultation proceedings.

Issues to be aware of for the Mustavaara project

MKOy had begun some negotiations with the reindeer grazing association (paliskunta) during their permitting process. Paliskunta were worried that increased traffic in the mine area would increase traffic accidents with reindeers.

During their land use planning process, MKOy held some meetings with the municipalities of Taivalkoski and Posio along with public meetings. Meetings with nearby villages flagged concerns about noise disturbances and dust nuisances.

Closure plan

When preparing the environmental permit, a preliminary closure plan including cost estimates shall be included. The authority uses the estimate when considering the initial bond requirements. In addition to closure of the waste management facilities that are included in the bond, the closure plan shall also include all other components of the mine such as the pit and the plant area.

20.3.1 Mine powerline building permit

Based on the Act on Electric Market, 18 §, the Energy Market Authority grants building permits for constructing power lines for 110 kV and higher. The permit application shall include sufficient environmental baseline descriptions and impact assessments. Typically, this capacity of power lines do not require a separate EIA procedure but this needs to be confirmed with the local ELY prior to submitting the building permit application.

The power line from the historic mining operation has been decommissioned but the route reservation still exists in the regional land use plans of Western Lapland and Northern Ostrobothnia (Länsi-Lappi and Pohjois-Pohjanmaa). This remarkably simplifies the permitting procedure as there is no need for further land use planning.

An important aspect of the permit is that the granted permit only justifies the building works. Rights for land use under the power line route has to be applied for in a separate process with the landowner(s). This can involve redemption of land or agreement for right to use the land. A granted permit is typically valid for 5 years. If the power line is not finished within the timeframe the permit must be renewed.

20.3.2 Property formation for the mine

The current claim on the Mustavaara project area is not currently valid for a mine. The reservation will have to be upgraded to an exploration claim followed by a mining claim.

20.3.3 Pre-construction permits for the mine

Building permits will have to be applied for before starting mine construction. Building permits are processed by the municipality of Taivalkoski and the process time is typically rather fast. Based on preliminary knowledge no other specific building related permits are needed (section 20.2.4 building related permits).

A chemical permit will have to be applied for from Tukes for storage and handling of chemicals before undertaking mine construction. As the chemicals use in the mine operations are quite limited the extent of the application should be modest.

A mine safety permit is also needed according to the Mining Act 621/2011 (chapter 12 of the Mining Act). This permit governs all safety related issues and is granted by Tukes. The permit has to be applied for prior to starting production. Permits issued by Tukes are usually granted relatively fast.

With regards to infrastructure works, a **dam safety assessment report** must be submitted to KAIELY at least 2 months prior to starting dam construction works. The report must include the safety proposal for the appropriate class of dams and a program for dam safety monitoring. The dam safety report is updated during construction with the build schematics and other relevant data (like quality control etc.). Consequent, dam safety documentation must then be updated regularly throughout the operation of the mine. Approvals for commissioning of dams is given through a different inspection done by KAIELY.

20.3.4 Other mining related permits and official procedures

The **preliminary mine closure plan** needs to be included in the environmental and water permit application. A more detailed plan may be submitted to PSAVI prior to the start of operations based on the specific environmental permit statements.

The mine closure plan is based on Government Decree on Extractive Waste No 379/2008 (5.6.2008), and its amendment No 717/2009 (24.9.2009). The mine closure plan is a general plan and includes procedures on reclamation of the tailings and waste rock areas, what is to be done with surface structures and puts forth the actions required to make pits and other areas safe. Characteristics of waste and post-closure use of the site after mining must also be considered. The mine closure plan includes a landscaping plan, which shows how the pits, dump areas, buildings, and other areas will look like after mining has ended and how the areas will be incorporated into the landscape.

A plan for post-closure environmental monitoring must be included and updated into the mine closure plan as mining progresses.

With regards to the environmental permitting, **a Mine waste management plan** must be prepared and submitted to PSAVI prior to commencing operations. The content and objectives of the mining waste management plan are enacted by Government Decree on Extractive Waste (No 190/2013). All the required data on the exploitable deposit, the waste generated during mining operations, waste deposit sites and waste exploitation must be presented in the waste management plan. The possible environmental risks, actions to prevent the risk and collateral security estimations must also be presented in the plan. This plan may be provided after the environmental permit is granted as specific permit statements will be given to be included in this plan.

An **Energy efficiency plan** will most likely be required in connection to the environmental permitting procedure based on permit descriptions. The plan is to be submitted to PSAVI. The requirements set for the energy efficiency plan are based on the European Union Article 17(2) of the IPPC Directive 2008/1/EC. The IPPC directive concerns cover the energy efficiency comparison to the Best Available Techniques (BAT). The preparation of the plan requires very detailed information on the following aspects: equipment types, suppliers and characteristics.

Environmental monitoring of the mine construction works and operational phase is governed by ELY. Recent mining projects have implemented a pre-construction phase monitoring with some projects implementing environmental monitoring during the exploration phase of the project. Environmental monitoring includes water, air quality, groundwater, noise, vibration and biological monitoring.

For each monitoring phase a monitoring plan must be prepared and submitted to ELY. After approval, the monitoring is carried out accordingly.

Mining related permits and legal procedures are presented in Table 20-2.

Table 20-2 Permit and other legal procedures to be undertaken for the Mine development

Permit/procedure	Authority	Start/Applied	Finished/Granted	Notes
Project development phase				
Exception(s) for Nature protection act 48 § (if needed)	ELY/Oulu	Q1/2012 to check if needed and apply accordingly from ELY	If needed ELY statement needed before applying for the environmental permit	
Mine environmental & water permit application	PSAVI/ Oulu	Started Q1/2012 Applied 5/2012	Legal decision 14th of July 2018	
Mine area land use planning	Municipality/ Regional Council		2015	Regional plan was approved on May 27th, 2015. In the regional plan of the Council of Oulu Region Municipality of Taivalkoski has approved Mustavaara area in their master plan on May 27th, 2015 Municipality of Taivalkoski approved detailed land use plan on August 26, 2015
Land access strategy				
Building permit for 110 kV line from Energy Market Authority including the required environmental studies	Energy Market Authority/ Helsinki	Not applied	- Permit valid typically 5 years from granting	Old powerline decommissioned. The line reservation exists in the provincial land use plan. Need of EIA to be checked from local ELY. Needed permits/ contracts for land use to be agreed separately
Construction phase (before starting operations)				
Mine closure plan	PSAVI/Oulu	As defined in environmental permit		Must be updated, closing costs
Mine waste management plan	PSAVI/Oulu	As defined in environmental permit		Must be updated, closing costs
Environmental monitoring plan (Operational phase)	ELY/Oulu	Prior to starting operations		

21 Capital and Operating Costs

This section is not applicable to this Report.

22 Economic Analysis

This section is not applicable to this Report.

23 Adjacent Properties

Although there are a few vanadium occurrences in the area, there are no nearby published mineral reserves or resources. No information from any adjacent properties has been used in the estimate of the mineral resources at Mustavaara.

24 Other Relevant Data and Information

There are no other relevant data or information.

25 Interpretation and Conclusions

The following remarks and conclusions regarding the Mustavaara project are summarized below:

- The drilling and sampling to date supports the mineral resources estimate and there is sufficient information to be used as a basis for the mineral resource estimate.
- The drilling pattern and spacing covers the known measured, indicated and inferred mineral resources. A limited amount of new drilling down dip of the historic drilling could upgrade the indicated and inferred resources. The down-dip continuation of the magnetite gabbro remains open and is expected to continue with the same thickness and grade in the same kind of geological framework as with the known mineralization.
- The deposit geology and style of mineralization is well understood and the property has a history of successful mining activities.
- Based on the mineral resource estimate, the project is well suited to proceed to the pre-economic assessment phase.
- Land use planning for the potential reopening of the mine is at an advanced state and is a major upside as there would be limited delays to be expected in land planning matters.
- The mineral processing is very well understood, studied and tested at Mustavaara and the deposit is well suited for production.

As the project has had a previous JORC pre-feasibility study completed, it should be possible with minor updates and minimal drilling to update the previous work to comply with the CIM Definition Standards 2014 and be reported in accordance with the requirements of National Instrument 43-101 “Standards of Disclosure for Mineral Projects” of the Canadian Securities Administrators.

26 Recommendations

Based on the mineral resource estimate, it is recommended to continue the development of the Mustavaara deposit and to move forward to a PEA study.

The estimated budget to carry out a PEA study is estimated to be between €150 - €200 k. The cost estimate is based on AFRY Finland OY's experience on similar sized studies in Nordic countries.

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