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NI 43-101 Technical Report and Maiden Mineral Resource Estimate for the Crater Lake Project, Quebec, Canada

Prepared for

Imperial Mining Group Ltd.
410 Saint-Nicolas, Suite 236,
Montreal, QC, Canada H2Y 2P5

Project Location
Latitude: 55°20' North; Longitude: 63°54' West
Province of Quebec, Canada

Prepared by:

Marina Iund, P.Geo., M.Sc.
Paul Daigle, P.Geo.
Carl Pelletier, P.Geo.
InnovExplo Inc.
Val-d'Or (Quebec)

Effective Date: September 17, 2021
Signature Date: November 4, 2021

SIGNATURE PAGE – INNOVEXPLO

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Effective Date: September 17, 2021

(Original signed and sealed)

Marina Iund, P.Geo., M.Sc.
InnovExplo Inc.
Quebec City (Quebec)

Signed at Quebec on November 4, 2021

(Original signed and sealed)

Paul Daigle, P. Geo.
InnovExplo associate
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Signed at Toronto on November 4, 2021

(Original signed and sealed)

Carl Pelletier, P. Geo.
InnovExplo Inc.
Val-d’Or (Quebec)

Signed at Val-d’Or on November 4, 2021

CERTIFICATE OF AUTHOR – MARINA IUND

I, Marina Iund, P.Geo., M.Sc. (OGQ No. 1525, NAPEG No. L4431, PGO, No. 3123), do hereby certify that:

1. I am employed as Senior Geologist in mineral resources estimation by InnovExplo Inc. located at 725, Boul. Lebourgneuf, Suite 312, Quebec, QC, Canada, G2J 0C4.
2. This certificate applies to the report entitled "NI 43-101 Technical Report and Maiden Mineral Resource Estimate for the Crater Lake Project, Quebec, Canada" (the "Technical Report") with an effective date of September 17, 2021, and signature date of November 4, 2021. The Technical Report was prepared for Imperial Mining Group Ltd. (the "issuer").
3. I graduated with a Bachelor's degree in Geology from Université de Besançon (Besançon, France) in 2008. In addition, I obtained a Master's degree in Resources and Geodynamic from Université d'Orléans (Orléans, France), as well as a DESS degree in Exploration and Management of Non-renewable Resources from Université du Quebec à Montreal (Montreal, Quebec) in 2010.
4. I am a member of the Ordre des Géologues du Québec (OGQ No. 1525), the Association of Professional Geoscientists of Ontario (PGO, No. 3123), and the Northwest Territories and Nunavut Association of Professional Engineers and Professional Geoscientists (NAPEG licence No. L4431).
5. I have practiced my profession in mineral exploration, mine geology and resource geology for a total of 12 years since graduating from university. I acquired my expertise with Richmont Mines Inc. and Goldcorp. I have been a project geologist and then a senior geologist in mineral resources estimation for InnovExplo Inc. since September 2018.
6. I have read the definition of a qualified person ("QP") set out in Regulation 43-101/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 QP for the purposes of NI 43-101.
7. I have visited the property that is the subject of this report from May 7 to 9, 2021 for the purpose of this Technical Report.
8. I am responsible for the overall supervision of the Technical Report and I am the principal author of and responsible for items 1 to 13, 23 and 27 as well as co-author of and share responsibility for items 14 and 25 to 26.
9. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
10. I have had no prior involvement with the property that is the subject of the Technical Report.
11. I have read NI 43-101, and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 4th day of November 2021 in Quebec City, Quebec, Canada.

(Original signed and sealed)

Marina Iund, P.Geo. (OGQ No. 1525), M.Sc.

InnovExplo Inc.

Marina.iund@innovexplo.com

CERTIFICATE OF AUTHOR – PAUL DAIGLE

I, Paul Daigle, P. Geo. (OGQ No. 1632), do hereby certify that:

1. I am an associate resource geologist with InnovExplo Inc. with a business address at 859, Boulevard Jean-Paul Vincent, Suite 201, Longueuil, QC, Canada, J4G 1R3.
2. This certificate applies to the report entitled "NI 43-101 Technical Report and Maiden Mineral Resource Estimate for the Crater Lake Project, Quebec, Canada" (the "Technical Report") with an effective date of September 17, 2021, and signature date of November 4, 2021. The Technical Report was prepared for Imperial Mining Group Ltd. (the "issuer").
3. I graduated with a Bachelor's of Science degree in Geology from Concordia University (Montreal, QC) in 1989.
4. I am a member of the Ordre des Géologues du Québec (No. 1632).
5. I have worked as a geologist continuously for a total of thirty-two (32) years since graduating from university. My relevant experience with respect to rare earth metals includes: the Strange Lake REE deposit in Quebec (technical report and resource estimate), the two Tom REE deposit in Newfoundland (technical report and resource estimate, and most recently, the Misery Lake Property (now Crater Lake) (technical reports in 2014 and 2017).
6. I have read the definition of a qualified person ("QP") set out in Regulation 43-101/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 QP for the purposes of NI 43-101.
7. I visited the property for two days on September 30 and October 1 in 2014.
8. I am the co-author of and share responsibility for sections 14, 25 and 26.
9. I am independent of the issuer applying all the tests in section 1.5 of NI 43-101.
10. I have had prior involvement with the property that is the subject of the Technical Report as QP and author of "NI 43-101 Technical Report on the Carater Lake Sc-Nb-REE Project, Quebec, Canada".
11. I have read NI 43-101 and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 4th day of November 2021 in Toronto, Ontario, Canada.

(Original signed and sealed)

Paul Daigle, P.Geo. (OGQ No. 1632)

Associate with InnovExplo Inc.

paul.daigle.geo@gmail.com

CERTIFICATE OF AUTHOR – CARL PELLETIER

I, Carl Pelletier, P.Geo. (OGQ No. 384, PGO No. 1713, EGBC No. 43167 and NAPEG No. L4160), do hereby certify that:

1. I am a professional geoscientist and Co-President Founder of InnovExplo Inc., located at 560, 3e Avenue, Val-d'Or, QC, Canada, J9P 1S4.
2. This certificate applies to the report entitled "NI 43-101 Technical Report and Maiden Mineral Resource Estimate for the Crater Lake Project, Quebec, Canada" (the "Technical Report") with an effective date of September 17, 2021, and a signature date of November 4, 2021. The Technical Report was prepared for Imperial Mining Group Ltd. (the "issuer").
3. I graduated with a Bachelor's degree in Geology (B.Sc.) from Université du Québec à Montréal (Montreal, Quebec) in 1992. I initiated a Master's degree at the same university for which I completed the course program but not the thesis.
4. I am a member of the Ordre des Géologues du Québec (OGQ, No. 384), the Association of Professional Geoscientists of Ontario (PGO, No. 1713), the Association of Professional Engineers and Geoscientists of British Columbia (EGBC, No. 43167), the Northwest Territories Association of Professional Engineers and Geoscientists (NAPEG, No. L4160), and the Canadian Institute of Mines (CIM).
5. My relevant experience includes a total of 29 years since my graduation from university. My mining expertise has been acquired at the Silidor, Sleeping Giant, Bousquet II, Sigma-Lamaque and Beaufor mines. My exploration experience has been acquired with Cambior Inc. and McWatters Mining Inc. I have been a consulting geologist for InnovExplo Inc. since February 2004.
6. I have read the definition of a qualified person ("QP") set out in Regulation 43-101/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 QP for the purposes of NI 43-101.
7. I have not visited the property for the purpose of the Technical Report.
8. I am the co-author of and share responsibility for sections 14, 25 and 26.
9. I am independent of the issuer applying all the tests in section 1.5 of NI 43-101.
10. I have not had prior involvement with the property that is the subject of the Technical Report.
11. I have read NI 43-101 and the items of the Technical Report for which I am responsible have been prepared in compliance with that instrument.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed this 4th day of November 2021 in Val-d'Or, Quebec, Canada.

(Original signed and sealed)

Carl Pelletier, P.Geo. (OGQ No 384)

InnovExplo Inc.

carl.pelletier@innovexplo.com

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1. SUMMARY

Introduction

Pierre Guay, Vice President of Exploration for Imperial Mining Group ltd. ("Imperial"), retained InnovExplo Inc. ("InnovExplo") to prepare a technical report (the "Technical Report") to present and support the results of a mineral resource estimate (the "2021 MRE") for the Crater Lake Project (the "Project" or the "Property") in accordance with National Instrument 43-101 Respecting Standards of Disclosure for Mineral Projects ("NI 43-101") and Form 43-101F1.

The effective date of this Technical Report is September 17, 2021.

The Project is wholly owned by Imperial. It consists of the TGZ target at an advanced exploration stage, with a mineral resource estimate, and several target areas at an early exploration stage.

Imperial is a Canadian-based exploration and development company focused on advancing its Quebec properties for copper-zinc, gold and technology metals. The corporate headquarters is at 410 Saint-Nicolas, Suite 236, Montreal, Quebec, H2Y 2P5. Imperial is a public company trading on the Toronto Stock Exchange (TSX) under the symbol "IPG".

InnovExplo is an independent mining and exploration consulting firm based in Val-d'Or, Quebec.

Contributors and Qualified Persons

This technical report was prepared by InnovExplo employee Marina Iund (P.Geo.), Senior Resources Geologist, Carl Pelletier (P.Geo.), Co-President Founder of InnovExplo, and by InnovExplo associate, Paul Daigle (P.Geo.), Senior Resources Geologist. All are qualified persons ("QPs") as set out in NI 43-101.

Ms. Iund is a professional geologist in good standing with OGQ (licence No. 1525), NAPEG (licence No. L4431) and PGO (licence No. 3123). She is responsible for the overall supervision of the Technical Report and is the principal author of and responsible for items 1 to 13, 23 and 27 as well as co-author of and share responsibility for items 14 and 25 to 26.

Mr. Pelletier is a professional geologist in good standing with the OGQ (licence No. 384), PGO (licence No. 1713), EGBC (licence No. 43167) and the NAPEG (No. L4160). He is the co-author of and share responsibility for sections 14, 25 and 26.

Mr. Daigle is a professional geologist in good standing with the OGQ (licence No. 1632). He is the co-author of and share responsibility for sections 14, 25 and 26.

Property Description and Location

The Property is located near the Quebec-Labrador provincial border, approximately 200 km northeast of the city of Schefferville, Quebec, 190 km southwest of Nain, Newfoundland and Labrador ("NL"), and 300 km northwest of Happy Valley–Goose Bay, NL.

The Property comprises 96 mineral claims and covers approximately 47.0 km^2.

Geological Setting and Mineralization

The syenite intrusion of Crater Lake is located in the Churchill Province. It intrudes or is coeval with the southeast end of the Mistastin Batholith, which covers an area of approximately 5,000 km^2. The dominant lithologies of the batholith are granite and quartz monzonite with pyroxene, which are cut by younger biotite-hornblende granite, which is in turn intruded by a smaller olivine syenite, the Crater Lake syenite. Uranium-lead dating of three zircons places the age of the batholith at approximately 1.4 Ga (Petrella 2011).

The Crater Lake syenites are interpreted to be a late differentiate product of the Mistastin Batholith. The dominant exposed lithology is coarse- to medium-grained, massive syenite, which is mainly composed of perthitic K-feldspar and 1 to 10% by volume of interstitial ferromagnesian minerals (Petrella 2012). A magnetic and melanocratic unit, ferro-syenite, which commonly contains greater than 50% by volume of ferromagnesian minerals, occurs as large continuous to discontinuous subvertical and conical bodies, sills, narrow dikes and inclusions in the felsic syenites. Three large ferro-syenite bodies have been found on the property: TGZ, Boulder Lake and STG. Petrella (2012) interpreted the narrow ferro-syenite dikes as having formed by fractional crystallization of ferromagnesian minerals, leaving behind a residual magma that produced the felsic syenites. Assay results from surface samples and from 2014-2021 drill core indicate that the different types of ferro-syenite are the main host to the scandium and REE mineralization at Crater Lake.

At Crater Lake, scandium was enriched in the residual liquid of the parent Mistastin granite magma following extensive fractionation of feldspar, in which scandium is incompatible. This residual liquid became the Crater Lake quartz monzonite magma, which was enriched in scandium and iron. Ring faults developed as a result of caldera collapse, and the magma and minerals were emplaced as a slurry into these faults. The ferro-syenite formed by *in situ* fractionation of hedenbergite crystals, magnetite and hastingsite, and their physical segregation with the previously crystallized minerals. The extremely high FeO/FeO+MgO content of the quartz monzonite liquid resulted in high partition coefficients for scandium in the hedenbergite and hastingsite, allowing scandium to be incorporated into these minerals at exceptionally high concentrations under magmatic conditions. The physical segregation of hedenbergite and hastingsite in ferro-syenite cumulate rocks through gravitational settling and/or flow differentiation spatially concentrated the Sc-bearing minerals within the intrusion, resulting in the first known scandium deposit hosted by syenite. (Beland, 2021).

The REE mineralization is contained in small primary idiomorphic zircon and hydroxyapatite crystals (identified by XRD analysis). The latter locally form aggregates that were wholly or partly replaced by britholite-(Ce). Hydroxyapatite commonly occur as inclusions in pyroxene, amphibole and, less commonly, fayalite.

Mineral Resource Estimates

The mineral resource estimate for the Crater Lake Project (the “2021 MRE”) was prepared by Marina Iund, P.Geo., Paul Daigle, P.Geo., and Carl Pelletier, P.Geo., using all available information.

The studied area covers the mineralized domains collectively known as the TGZ target.

The 2021 MRE was established for scandium, lanthanum, praseodymium, neodymium, terbium and dysprosium. Other REEs were not included in the estimate.

The resource area has a NE-SW strike length of 500 m, a width of 120 m, and a vertical extent of 250 m below the surface. The 2021 MRE was based on a compilation of recent diamond drill holes ("DDH") completed by the issuer.

The Surpac database contains all 25 DDH, which corresponds to all the holes drilled on the Project. The holes cover the strike length of the Project at a regular drill spacing of 50 m.

The geological model was modelled in Leapfrog. The main lithologies of the deposit are massive syenite ("SYN") intruded by olivine ferro-syenite ("OLFESYN"), four (4) pyroxene ferro-syenites ("PXFESYN") and an intermediate syenite ("INTSYN"). Later pegmatitic dykes ("PEG") and intermediate porphyries ("POM") cut all units. The OLFFESYN, PXFESYN and INTSYN solids were used as mineralized domains. These domains are subvertical with an NE-SW strike.

The authors believe that the current mineral resource estimate can be classified as Indicated and Inferred mineral resources based on geological and grade continuity, data density, search ellipse criteria, drill hole spacing and interpolation parameters. The authors also believe that the requirement of "reasonable prospects for eventual economic extraction" has been met by having a cut-off grade based on reasonable inputs amenable to a potential open-pit extraction scenario.

The 2021 MRE is considered reliable and based on quality data and geological knowledge. The estimate follows CIM Definition Standards.

The following table displays the results of the 2021 MRE for the Project at the official 110.8 C$/t NSR cut-off.

2021 Crater Lake Project Mineral Resource Estimate for an open pit scenario

Category	NSR Cut-off (C$/t)	Tonnage (Mt)	NSR Total (C$/t)	Sc_2O_3 (g/t)	Dy_2O_3 (g/t)	La_2O_3 (g/t)	Nd_2O_3 (g/t)	Pr_2O_3 (g/t)	Tb_4O_7 (g/t)
Indicated	110.8	7.3	413	282.01	65.72	605.82	595.78	160.41	11.65
Inferred	110.8	13.2	386	264.24	62.24	568.63	573.04	154.02	11.13

Notes to accompany the Mineral Resource Estimate:

1. The independent and qualified persons for the mineral resource estimate, as defined by NI 43 101, are Marina Iund, P.Geo. (InnovExplo Inc.), Paul Daigle, P.Geo. (InnovExplo Inc. associate) and Carl Pelletier, P.Geo. (InnovExplo Inc.). The effective date of the estimate is September 17, 2021.
2. These mineral resources are not mineral reserves, as they do not have demonstrated economic viability. The mineral resource estimate follows current CIM Definition Standards.
3. The results are presented in situ and undiluted and considered to have reasonable prospects of economic viability.
4. The estimate encompasses three mineralized domains using the grade of the adjacent material when assayed or a value of zero when not assayed.
5. High-grade capping supported by statistical analysis was done on raw assay data before compositing: La_2O_3 (3690 g/t), Pr_2O_3 (1380 g/t), Nd_2O_3 (2100 g/t), Dy_2O_3 (215 g/t). No capping was applied to Sc_2O_3 and Tb_4O_7.
6. The estimate was completed using a sub-block model in GEOVIA SURPAC 2021 with user block size of 5m x 5m x 5m and minimum block size of 1.25m x 1.25m x1.25m. Grades interpolation was obtained by ID2 using hard boundaries.
7. Bulk density values were applied by lithology (g/cm3): INTSYN, OLFESYN = 3.13; PXFESYN = 2.91; SYN = 2.7; POMSYN = 2.77; PEG = 2.63 and OB = 2.0.
8. The mineral resource estimate is classified as indicated and inferred. The Indicated mineral resource category is defined with a minimum of three (3) drill holes in areas where the drill spacing is less than 60 m, and reasonable geological and grade continuity have been demonstrated. The Inferred category is defined with a minimum of two (2) drill holes in areas where the drill spacing is less than 120 m, and reasonable geological and grade continuity have been demonstrated. Clipping boundaries were used for classification based on those criteria.
9. The mineral resource estimate is pit-constrained with a bedrock slope angle of 45° and an overburden slope angle of 30°. It is reported at a NSR cut-off of 110.8 C$/t .The NSR cut-off was calculated using the following parameters: processing cost = C$14.89; transportation cost (concentrate transportation from mine site to processing plant): C$7.19; refining and selling costs = C$ 88.71; Sc_2O_3 price = US$1,500/kg; La_2O_3 price = US$0.6/kg; Pr_2O_3 price = US$29/kg; Nd_2O_3 price = US$29/kg; Tb_4O_7 price = US$386/kg; Dy_2O_3 price = US$124/kg; USD:CAD exchange rate = 1.25; scandium recovery to high grade scandium oxide product = 76.0%; REE recovery to mixed REE carbonate = 63.0%. The cut-off grades should be re-evaluated in light of future prevailing market conditions (metal prices, exchange rates, mining costs etc.).
10. The number of metric tons was rounded to the nearest thousand, following the recommendations in NI 43 101 and any discrepancies in the totals are due to rounding effects.
11. The authors are not aware of any known environmental, permitting, legal, title-related, taxation, socio-political, or marketing issues, or any other relevant issue not reported in the Technical Report, that could materially affect the Mineral Resource Estimate.

Interpretation and Conclusions

The authors conclude the following:

- The database supporting the 2021 MRE is complete, valid and up to date.
- The geological and grade continuity of scandium and REE mineralization in the OLFESYN and PXFESYN domains has been demonstrated, supported by a 50-m drilling grid.
- The 2021 MRE is classified as indicated and inferred resources. There are no measured resources.
- The 2021 MRE was prepared for a potential open-pit scenario at an NSR cut-off of 110.80 C$/t.

The 2021 MRE for the TGZ target at the Crater Lake Project, at a 110.80 C$/t NSR cut-off grade, comprises:

- Indicated Resource of 7,315,500 t grading 282 g/t Sc_2O_3, 66 g/t Dy_2O_3, 606 g/t La_2O_3, 596 g/t Nd_2O_3, 160 g/t Pr_2O_3, 12 g/t Tb_4O_7 equivalent to a 413 C$/t NSR
- Inferred Resource of 13,158,400 t grading 264 g/t Sc_2O_3, 62 g/t Dy_2O_3, 569 g/t La_2O_3, 573 g/t Nd_2O_3, 154 g/t Pr_2O_3, 11 g/t Tb_4O_7 equivalent to a 386 C$/t NSR.

Recommendations

Based on the results of the 2021 MRE, InnovExplo recommend that the Project move to an advanced phase of exploration, which would involve the preparation of a Preliminary Economic Assessment (PEA) for the TGZ target.

InnovExplo recommends the following work program:

- Complete a PEA.
- Complete a 4,000 m drilling program on the southern portion of the TGZ target (Sections 0N to 350N) and at depth (sections 450N and 500N). The goal of this program is to investigate the extensions of the TGZ mineralized domains.
- Complete the exploration program currently underway at the STG target: detailed geological mapping, detailed channel sampling, collection of a 50t bulk sample of olivine ferro-syenite (15 t collected to date), and a 500 m drilling program.
- Perform a Lidar topographic survey to cover the entire Property.
- Perform the planned additional metallurgical testwork (solvent extraction flowsheet development and optimization; development of Al-2%Sc master alloy production technology; and mineral processing pilot program).

Update the mineral resource estimate for the Project using data from the recommended studies and test results. The Estimated cost for the recommended work program is 4,400,000 C$. InnovExplo believes that the recommended work program and proposed expenditures are appropriate and well thought out and that the character of the Project is of enough merit to warrant the recommended programs and activities. InnovExplo believes the proposed estimated budget reasonably reflects the type and number of contemplated activities.

2. INTRODUCTION

2.1 Overview or Terms of Reference

Pierre Guay, Vice President of Exploration for Imperial Mining Group ltd. ("Imperial"), retained InnovExplo Inc. ("InnovExplo") to prepare a technical report (the "Technical Report") to present and support the results of a mineral resource estimate (the "2021 MRE") for the Crater Lake Project (the "Project" or the "Property") in accordance with National Instrument 43-101 Respecting Standards of Disclosure for Mineral Projects ("NI 43-101") and Form 43-101F1.

The Project is wholly owned by Imperial. It consists of the TGZ target at an advanced exploration stage, with a mineral resource estimate, and several target areas at an early exploration stage. Prior to 2017, the Crater Lake Project was named the Misery Lake Project.

Imperial is a Canadian-based exploration and development company focused on advancing its Quebec properties for copper-zinc, gold and technology metals. The corporate headquarters is at 410 Saint-Nicolas, Suite 236, Montreal, Quebec, H2Y 2P5. Imperial is a public company trading on the Toronto Stock Exchange (TSX) under the symbol "IPG".

InnovExplo is an independent mining and exploration consulting firm based in Val-d'Or, Quebec.

The 2021 MRE herein follows CIM Definition Standards for Mineral Resources and Mineral Reserves ("CIM Definition Standards").

2.2 Report Responsibility, Qualified Persons

This technical report was prepared by InnovExplo employee Marina Iund (P.Geo.), Senior Resources Geologist, Carl Pelletier (P.Geo.), Co-President Founder of InnovExplo, and by InnovExplo associate Paul Daigle (P.Geo.), Senior Resources Geologist. All are qualified persons ("QPs") as set out in NI 43-101.

Ms. Iund is a professional geologist in good standing with OGQ (licence No. 1525), NAPEG (licence No. L4431) and PGO (licence No. 3123). She is responsible for the overall supervision of the Technical Report and is the principal author of and responsible for items 1 to 13, 23 and 27 as well as co-author of and share responsibility for items 14 and 25 to 26.

Mr. Pelletier is a professional geologist in good standing with the OGQ (licence No. 384), PGO (licence No. 1713), EGBC (licence No. 43167) and the NAPEG (No. L4160). He is the co-author of and share responsibility for sections 14, 25 and 26.

Mr. Daigle is a professional geologist in good standing with the OGQ (licence No. 1632). He is the co-author of and share responsibility for sections 14, 25 and 26.

2.3 Site Visits

Mr. Daigle visited the Property on one occasion (from September 30 to October 1, 2014). During the visits, he reviewed selected drill core and inspected the core storage facility.

He also collected drill core samples and surveyed drill hole collars for independent validation.

Ms. Iund visited the Property on one occasion (from May 7 to 9, 2021). During the visits, she reviewed selected drill core and inspected the core storage facility. She also collected drill core samples and surveyed drill hole collars for independent validation.

2.4 Effective Date

The close-out date of the mineral resource database is July 9, 2021.

The effective date of the 2021 MRE is September 17, 2021.

2.5 Sources of Information

The documents listed in items 3 and 27 were used to support this Technical Report. Excerpts or summaries from documents authored by other consultants are indicated in the text.

The 2017 NI 43-101 Technical Report (Daigle, 2017) was extensively used in the preparation of items 4 through 6. A complete list of references is provided in item 27.

The authors' assessment of the Project was based on published material and the data, professional opinions and unpublished material submitted by the issuer. The authors reviewed all relevant data provided by the issuer and/or by its agents.

The author also consulted other sources of information, mainly the Government of Quebec's online claim management and assessment work databases (GESTIM and SIGEOM, respectively) as well as Imperial's technical reports, annual information forms, MD&A reports and press releases published on SEDAR (www.sedar.com).

The authors reviewed and appraised the information used to prepare this Technical Report, and believe that such information is valid and appropriate considering the status of the project and the purpose for which this Technical Report is prepared. The authors have thoroughly researched and documented the conclusions and recommendations made in this Technical Report.

2.6 Currency, Units of Measure, and Acronyms

The abbreviations, acronyms and units used in this report are provided in Table 2-1 and Table 2-2. All currency amounts are stated in Canadian Dollars ($, C$, CAD) or US dollars (US$, USD). Quantities are stated in metric units, as per standard Canadian and international practice, including metric tons (tonnes, t) and kilograms (kg) for weight, kilometres (km) or metres (m) for distance, hectares (ha) for area, percentage (%) for copper and nickel grades, and gram per metric ton (g/t) for precious metal grades. Wherever applicable, imperial units have been converted to the International System of Units (SI units) for consistency (Table 2-3).

Table 2-1 – List of abbreviations

Acronyms	Term
43-101	National Instrument 43-101 (Canadian Securities Administrators) (Regulation 43-101 in Quebec)
ATV	All-terrain vehicle
AWG	Acidified water glass
CA	Core angle
Ce	Cerium
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CIM Definition Standards	CIM Definition Standards for Mineral Resources and Mineral Reserves
Co	Cobalt
COV	Coefficient of variation
CRM	Certified reference material
Cu	Copper
DDH	Diamond drill hole
DMS	Dense media separation
Dy	Dysprosium
Dy2O3	Dysprosium oxide
EMPA	Electron microprobe analysis
Er	Erbium
Eu	Europium
G&A	General and administration
Gd	Gadolinium
GESTIM	Gestion des titres miniers (the MERN's online claim management system)
GPS	Global positioning system
GSC	Geological Survey of Canada
HLS	Heavy liquid separation
Ho	Holmium
HPC	High pressure caustic
HREE	Heavy rare earth element
HREO	Heavy rare earth oxide
ICP	Inductively coupled plasma
ICP-MS	Inductively coupled plasma/mass spectrometry
ID2	Inverse distance squared
IEC	International Electrotechnical Commission
INTSYN	Intermediate syenite
ISO	International Organization for Standardization
IX	Ion exchange
JORC	Joint Ore Reserves Committee
La	Lanthanum
La2O3	Lanthanum oxide

Acronyms	Term
LCT	Locked cycle test
LIMS	Laboratory Information Management System
LIMS	Low-intensity magnetic separation
LMREE	Light-medium rare earth element
LREE	Light rare earth element
LREO	Light rare earth oxide
Lu	Lutecium
MD&A	Management Discussion and Analysis
MERN	Ministère de l'Énergie et des Ressources Naturelles du Québec (Québec's Ministry of Energy and Natural Resources)
MLA	Mineral liberation analysis
MRE	Mineral resource estimate
MSc	Master of Science
NAD	North American Datum
Nb	Niobium
Nd	Neodymium
Nd2O3	Neodymium oxide
Ni	Nickel
NI 43-101	National Instrument 43-101 (Regulation 43-101 in Quebec)
NL	Newfoundland and Labrador
NN	Nearest neighbour
NSR	Net smelter return
NTS	National Topographic System
OB	Overburden
OK	Ordinary kriging
OLFESYN	Olivine ferro-syenite
ON	Ontario
PEA	Preliminary environmental assessment
PEG	Pegmatitic dyke
PFS	Prefeasibility study
PLS	Primary leach solution
POM	Intermediate porphyry
Pr	Praseodymium
Pr2O3	Praseodymium oxide
PXFESYN	Pyroxene ferro-syenite
QA	Quality assurance
QA/QC	Quality assurance/quality control
QC	Quebec
QC	Quality control
QEMSCAN	Quantitative evaluation of minerals by scanning electron microscopy
QP	Qualified person (as defined in National Instrument 43-101)

Acronyms	Term
REE	Rare earth element
REO	Rare earth oxide
RQD	Rock quality designation
Sc	Scandium
Sc2O3	Scandium oxide
SCC	Standards Council of Canada
SD	Standard deviation
SEM	Scanning electron microscope
SG	Specific gravity
SI units	International System of Units
SIGEOM	Système d'information géominière (the MERN's online spatial reference geomining information system)
Sm	Samarium
SX	Solvent extraction
SYN	Syenite
Tb	Terbium
Ti	Titanium
Tb4O7	Terbium oxide
Tm	Thulium
TREO	Total rare earth oxide
USD:CAD	American-Canadian exchange rate
UTM	Universal Transverse Mercator
WHIMS	Wet high-intensity magnetic separation
XRD	X-Ray diffraction
XRT	X-Ray transmission
Y	Yttrium
Yb	Ytterbium

Table 2-2 – List of units

Symbol	Unit
%	Percent
$, C$, CAD	Canadian dollar
$/t	Dollars per metric ton
°	Angular degree
°C	Degree Celsius
cm	Centimeter
g	Gram
g/cm^3	Gram per cubic centimetre
g/t	Gram per metric ton (tonne)
ha	hectare
kg	Kilogram
km	Kilometre
km^2	Square kilometre
M	Million
m	Metre
mm	Millimeter
Ga	billion years
ppm	Parts per million
t	Metric tonne (1,000 kg)
T	Tesla
tpy	Metric tonnes per year
US$	American dollar
wt	Wet tonne
y	Year (365 days)

Table 2-3 – Conversion Factors for Measurements

Imperial Unit	Multiplied by	Metric Unit
1 inch	25.4	mm
1 foot	0.3048	m
1 acre	0.405	ha
1 pound (avdp)	0.4535	kg
1 ton (short)	0.9072	t

3. RELIANCE ON OTHER EXPERTS

InnovExplo has followed standard professional procedures in preparing the contents of this Technical Report. The data has been verified where possible, and the report is based upon information believed to be accurate at the time of writing, considering the status of the Crater Lake Project and the purpose for which the report is prepared. InnovExplo has no reason to believe the data was not collected in a professional manner.

The authors did not rely on other experts to prepare this Technical Report. It was prepared by InnovExplo at the request of the issuer. Marina Iund (P.Geo.), Paul Daigle (P.Geo.) and Carl Pelletier (P.Geo.) are the QPs responsible for reviewing technical documentation relevant to the Technical Report, preparing a mineral resource estimate on the Project, and recommending a work program if warranted.

InnovExplo has not verified the legal status or legal title to any claims or the legality of any underlying agreements that may exist concerning the Property as described in Item 4 of this report. The QPs have relied on the issuer's information about mining titles, option agreements, royalty agreements, environmental liabilities and permits. Neither the QPs nor InnovExplo are qualified to express any legal opinion concerning property titles, current ownership or possible litigation.

InnovExplo has examined the Government of Quebec's online claim management and assessment work databases, GESTIM and SIGEOM, respectively. The GESTIM and SIGEOM websites, below, were most recently viewed on September 17, 2021:

- gestim.mines.gouv.qc.ca/MRN_GestimP_Presentation/ODM02101_login.aspx
- sigeom.mines.gouv.qc.ca/signet/classes/I1102_indexAccueil?l=a

4. PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Property is located near the Quebec-Labrador provincial border, approximately 200 km northeast of the city of Schefferville, Quebec, 190 km southwest of Nain, Newfoundland and Labrador (“NL”), and 300 km northwest of Happy Valley–Goose Bay, NL (Figure 4-1).

The Property lies within 1:50,000 scale NTS map sheet 013M05 (Lac Chapiteau) at the approximate latitude and longitude of 55°20' North and 63°54' West (UTM coordinates: 441600E, 6133600N, NAD 83, Zone 20). The Property is in the administrative region of Côte-Nord, governed by the Kativik Regional Government and the Province of Quebec.

The Property is situated approximately 15 km southeast of Lac des Goélands, Quebec, and approximately 66 km southwest of Mistastin Lake, NL, two of the larger lakes in the region.

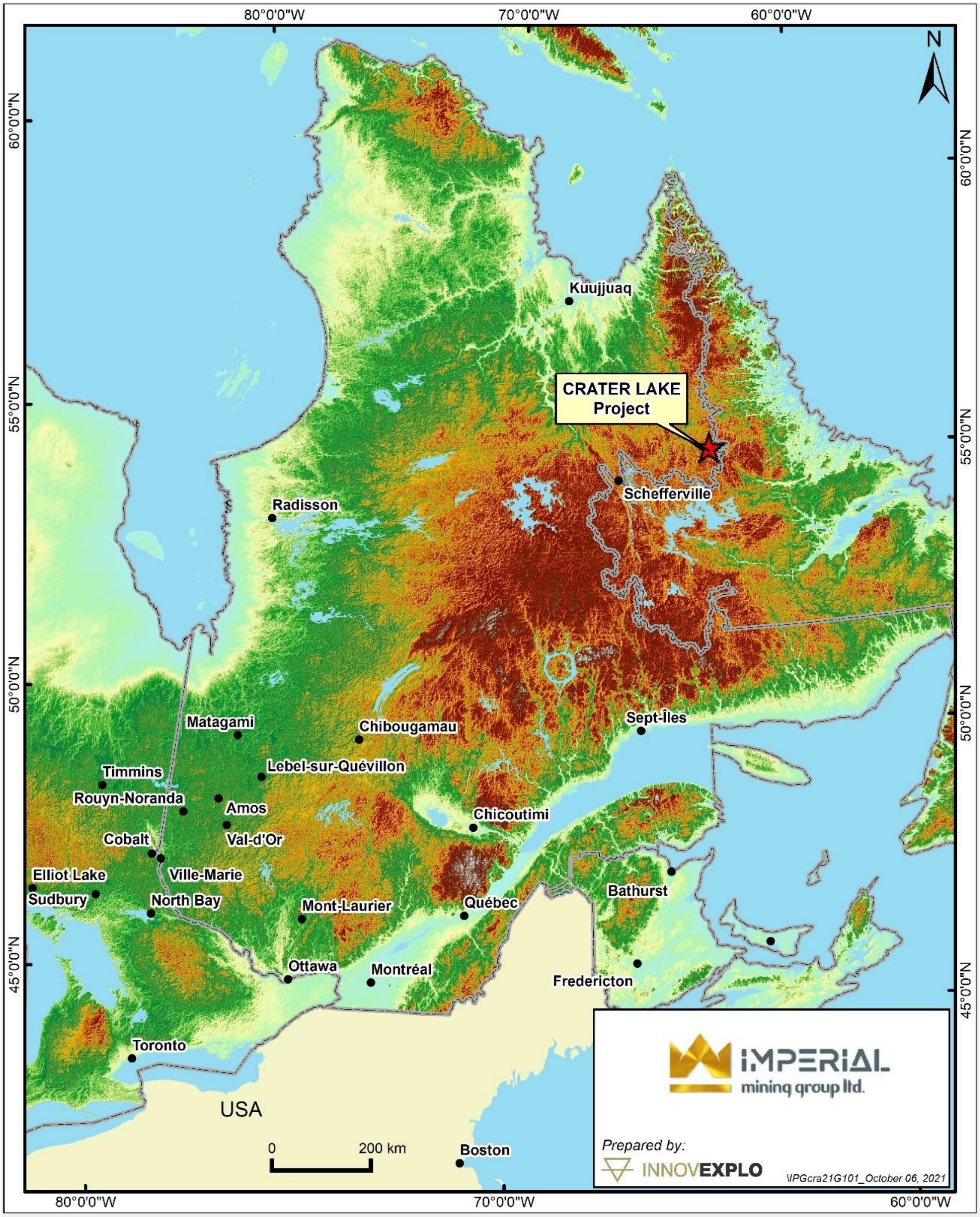


Figure 4-1 – Location of the Crater Lake Property

4.2 Mineral Titles Status

The issuer supplied all maps and tables, and a list of mineral titles comprising the Property. InnovExplo verified the status of all mineral titles using GESTIM, the Government of Quebec's online claim management system (gestim.mines.gouv.qc.ca: most recently viewed September 17, 2021).

The Property is made up of two contiguous mineral claim blocks: Crater Lake and Crater Lake Extension. The Property comprises 96 mineral claims and covers approximately 47.0 km^2.

The Crater Lake claim block (the initial Crater Lake property) was acquired in December 2017. It consists of 57 contiguous claims owned 100% by Imperial, covering a total area of 27.9 km^2. A 2% net smelter return ("NSR") royalty applies to these claims (see Section 4.4).

In 2018, Imperial acquired the Crater Lake Extension claim package, consisting of 39 mining claims covering a total area of approximately 19.1 km^2. These 39 claims are not subject to any royalties and are 100% owned by Imperial.

All claims are current. There are no known outstanding issues at the time of writing.

The claim map is shown in Figure 4-2. A list of the claims is presented in Table 4-1.

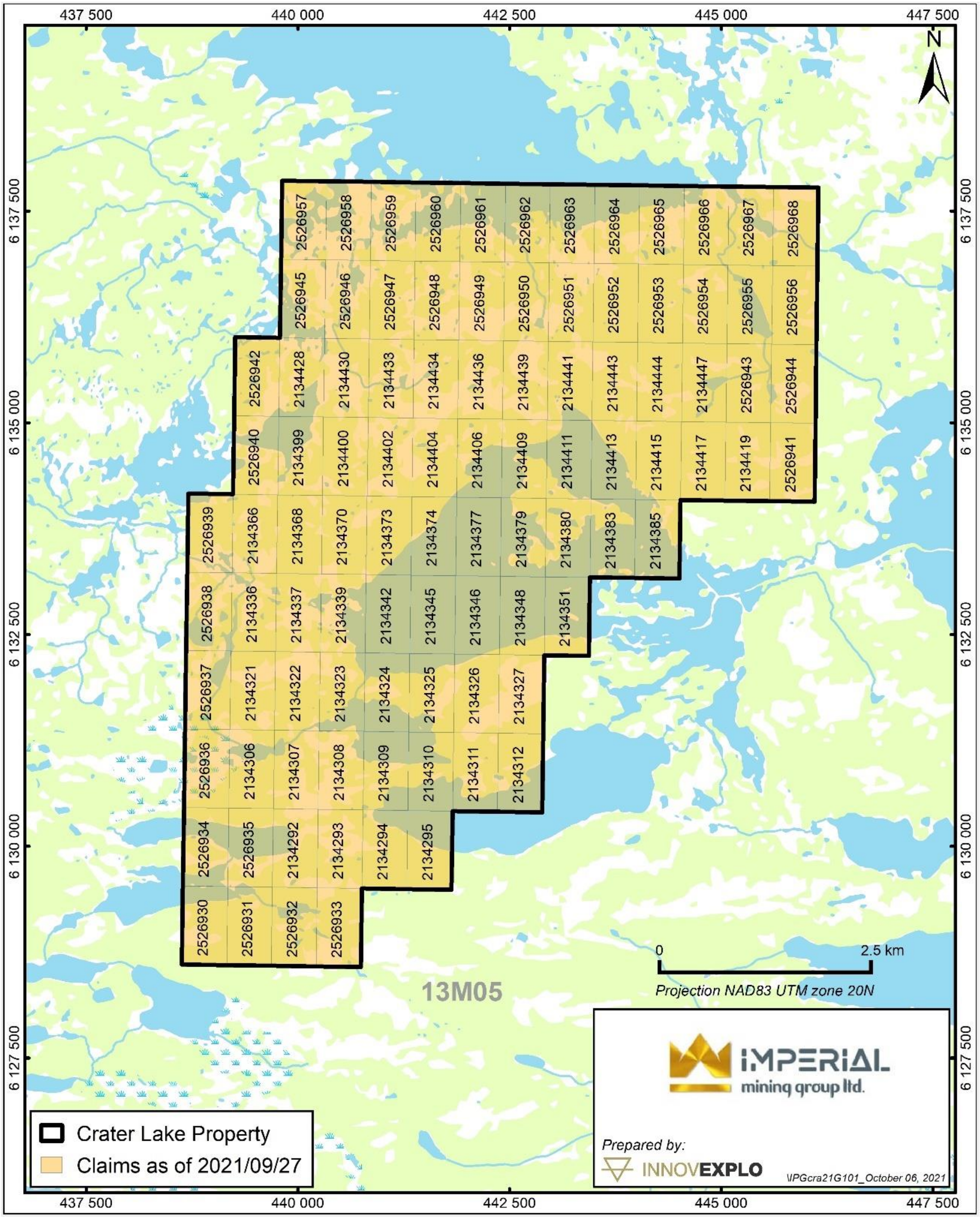


Figure 4-2 – Mining title map for the Crater Lake Property

Table 4-1 – List of claims for the Crater Lake Property

Claim No.	Expiry Date	Area (ha)	Claim No.	Expiry Date	Area (ha)
Initial Crater Lake Claims			**Crater Lake Extension Claims**		
2134292	10/29/2022	49.05	2526930	11/11/2021	49.07
2134293	10/29/2022	49.05	2526931	11/11/2021	49.07
2134294	10/29/2022	49.05	2526932	11/11/2021	49.07
2134295	10/29/2022	49.05	2526933	11/11/2021	49.07
2134306	10/29/2022	49.04	2526934	11/11/2021	49.06
2134307	10/29/2022	49.04	2526935	11/11/2021	49.06
2134308	10/29/2022	49.04	2526936	11/11/2021	49.04
2134309	10/29/2022	49.04	2526937	11/11/2021	49.03
2134310	10/29/2022	49.04	2526938	11/11/2021	49.02
2134311	10/29/2022	49.04	2526939	11/11/2021	49.01
2134312	10/29/2022	49.04	2526940	11/11/2021	49.00
2134321	10/29/2022	49.03	2526941	11/11/2021	49.00
2134322	10/29/2022	49.03	2526942	11/11/2021	48.99
2134323	10/29/2022	49.03	2526943	11/11/2021	48.99
2134324	10/29/2022	49.03	2526944	11/11/2021	48.99
2134325	10/29/2022	49.03	2526945	11/11/2021	48.98
2134326	10/29/2022	49.03	2526946	11/11/2021	48.98
2134327	10/29/2022	49.03	2526947	11/11/2021	48.98
2134336	10/29/2022	49.02	2526948	11/11/2021	48.98
2134337	10/29/2022	49.02	2526949	11/11/2021	48.98
2134339	10/29/2022	49.02	2526950	11/11/2021	48.98
2134342	10/29/2022	49.02	2526951	11/11/2021	48.98
2134345	10/29/2022	49.02	2526952	11/11/2021	48.98
2134346	10/29/2022	49.02	2526953	11/11/2021	48.98
2134348	10/29/2022	49.02	2526954	11/11/2021	48.98
2134351	10/29/2022	49.02	2526955	11/11/2021	48.98
2134366	10/29/2022	49.01	2526956	11/11/2021	48.98
2134368	10/29/2022	49.01	2526957	11/11/2021	48.97
2134370	10/29/2022	49.01	2526958	11/11/2021	48.97
2134373	10/29/2022	49.01	2526959	11/11/2021	48.97
2134374	10/29/2022	49.01	2526960	11/11/2021	48.97
2134377	10/29/2022	49.01	2526961	11/11/2021	48.97
2134379	10/29/2022	49.01	2526962	11/11/2021	48.97
2134380	10/29/2022	49.01	2526963	11/11/2021	48.97
2134383	10/29/2022	49.01	2526964	11/11/2021	48.97
2134385	10/29/2022	49.01	2526965	11/11/2021	48.97
2134399	10/29/2022	49.00	2526966	11/11/2021	48.97
2134400	10/29/2022	49.00	2526967	11/11/2021	48.97
2134402	10/29/2022	49.00	2526968	11/11/2021	48.97
2134404	10/29/2022	49.00	Total Claims: 39		
2134406	10/29/2022	49.00			

Claim No.	Expiry Date	Area (ha)	Claim No.	Expiry Date	Area (ha)
Initial Crater Lake Claims			**Crater Lake Extension Claims**		
2134409	10/29/2022	49.00			
2134411	10/29/2022	49.00			
2134413	10/29/2022	49.00			
2134415	10/29/2022	49.00			
2134417	10/29/2022	49.00			
2134419	10/29/2022	49.00			
2134428	10/29/2022	48.99			
2134430	10/29/2022	48.99			
2134433	10/29/2022	48.99			
2134434	10/29/2022	48.99			
2134436	10/29/2022	48.99			
2134439	10/29/2022	48.99			
2134441	10/29/2022	48.99			
2134443	10/29/2022	48.99			
2134444	10/29/2022	48.99			
213447	10/29/2022	48.99			
Total Claims: 57					

4.3 Property Agreements

On December 28, 2017, Imperial completed the acquisition of a 100% interest in the Crater Lake claim block from Peak Mining Corporation ("Peak Mining") in consideration of 7,500,000 Imperial shares (the "Crater Lake Acquisition").

The property acquisition agreement states:

- Peak Mining hereby agrees to sell, assign and transfer to Imperial, and Imperial hereby agrees to purchase and acquire from Peak Mining, an undivided 100% right, title and interest in and to the property, subject only to the royalties, in consideration of the purchaser issuing to Peak Mining 7,500,000 common shares in the capital of Imperial at a deemed price of $0.16 per share.
- Imperial assumes from Peak Mining, their rights and obligations under the Quest Rare Minerals Ltd. (Quest) Royalty Agreement, including for greater certainty Imperial's assumption of all obligations of Peak Mining as "Payor" under the Quest Royalty Agreement.

4.3.1 Imperial, Peak Mining and NQ Exploration Agreement

On July 11, 2017, Peak Mining signed a letter of intent with NQ Exploration Inc. ("NQ Exploration") for the acquisition of the Crater Lake claim block through a new public company and wholly-owned subsidiary (Imperial). The new subsidiary was to be created for NQ Exploration's Quebec-based properties (the Carheil and Brouillan projects; not the subject of this report) and the Crater Lake property.

On September 11, 2017, NQ Exploration announced the execution of:

- The purchase and sale agreements as well as the arrangement agreement with Imperial, a wholly-owned subsidiary of NQ Exploration, which will be spun out as a separate public company that will own a 100% interest in two other exploration projects (the Opawica and La Ronciere Gold projects; not the subject of this report), subject to the Option.
- A share exchange agreement with AM Resources SAS, an arm's-length Colombian-based private coal mining exploration company, for the reverse take-over of NQ Exploration.

Concurrent with the closing of the above two agreements, Imperial acquired the Crater Lake claim block from Peak Mining.

4.4 Royalties

Quest retains a 2% NSR royalty in the Crater Lake claim block from the acquisition and transfer of the mining rights from Peak Mining on December 28, 2017. Those royalties are retained from the original acquisition and transfer of the Property between Peak Mining and Quest on July 11, 2017 (Section 4.3.1). The royalty may be purchased at any time by the payor for an aggregate of $2,000,000 or in two transactions, each for 50% of the royalty in exchange for the sum of $1,000,000. Nothing herein shall prevent the payor from simultaneously completing the two transactions, being 100% of the royalty in exchange for the sum of $2,000,000.

4.5 Permits

Imperial has complete surface access to the Property. However, any new work programs will require that the appropriate permits and processes be completed under the MERN guidelines.

The author is not aware of any environmental liabilities on the Property.

4.6 Other Important Risk Factors

InnovExplo is not aware of any other significant factors or risks that could affect access, title, or the right or ability to estimate the mineral resources on the Property.

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

Access to the project area is restricted to fixed-wing aircraft or helicopters. Due to the lack of an airstrip at the camp, fixed-wing aircraft are equipped with floats or skis, depending on the time of year.

Aircraft are chartered from Schefferville, QC (200 km southwest), Nain, NL (190 km northeast) or Happy Valley–Goose Bay, NL (350 km southeast). There are several regularly scheduled flights to Schefferville and Goose Bay from most major cities in eastern Canada.

Fixed-wing flights from Schefferville are typically 60 minutes, and flights from Goose Bay are typically 90 minutes. Supplying for the Project is done from both Schefferville and Happy Valley–Goose Bay with support from Quest's Strange Lake Camp.

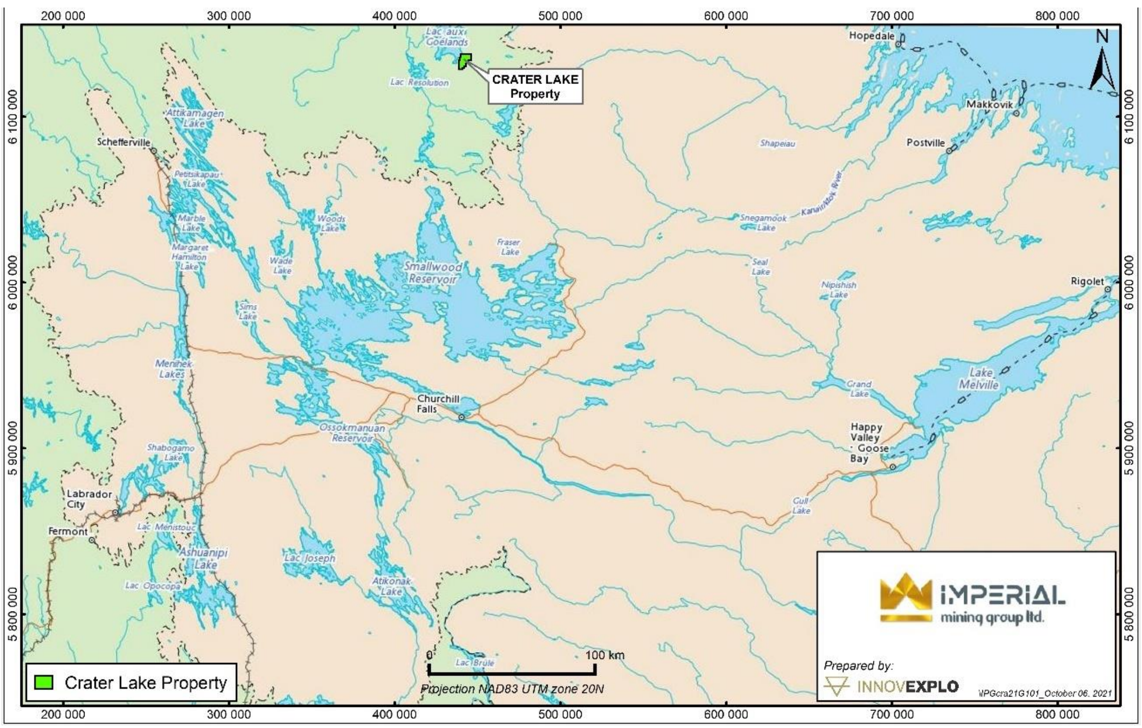


Figure 5-1 – Access to the Crater Lake Property

5.2 Climate

This region of northern Quebec is characterized by a cool subarctic climatic zone (Köppen climate classification) where summers are short and cool, and winters are long and cold with heavy snowfall. Specifically, the project is located within the Kingurutik-Fraser Rivers ecoregion of the Taiga Shield ecozone (Marsgall and Schut 1999). The ground is covered in snow for six to eight months of the year.

The closest historical weather data is taken from the Border A station from 1965 to 1979 (1965 to 1990 for annual rainfall; website: www.worldclimate.com) as displayed in Table 5-1.

Table 5-1 – Climatic data for the Project area

Weather Type	Borden A
Minimum mean annual temperature (°C)	-10.4
Maximum mean annual temperature (°C)	-1.0
Average minimum January temperature (°C)	-27.3
Average maximum January temperature (°C)	-17.4
Average minimum July temperature (°C)	5.7
Average maximum July temperature (°C)	16.2
Average rainfall (mm)	666.0
Average snowfall (cm)	350.0

Exploration activities may be conducted during the summer and autumn months (June to November) and during winter to early spring (January to April).

5.3 Local Resources

There are no local resources in or around the Property. Local labour may be hired out of Schefferville, Nain or Goose Bay; however, most skilled and professional labour must be sourced elsewhere.

The nearest mine is Vale's nickel-copper-cobalt mine at Voisey's Bay, roughly 155 km to the northeast, on the coast of Labrador.

5.4 Infrastructure

There is no developed infrastructure in or around the Property. The nearest development infrastructure is in the town of Schefferville and Nain. Nain is a coastal community that also serves as the local supply and service centre for Voisey's Bay mine. Nain has no road access, but it is serviced by regular, year-round flights from Happy Valley–Goose Bay and by coastal freighters during the summer months. Schefferville and neighbouring communities of Matimekush (pop. 850) and Naskapi (pop. 900) act as local service and supply centers for several iron mines and hydro-electric dams in the area. They are serviced year-round by passenger and freight train service and have regularly scheduled flights to Quebec City and Sept-Îles, QC, and Wabush, NL.

The nearest seaport is in Nain, 200 km east of the Property, and the nearest railhead is in Schefferville, 200 km southwest of the Property, with access to the seaport of Sept-Îles on the Bay of St. Lawrence.

There is no source of electricity on or near the Property. Power must be generated on-site. The nearest sources of electricity are in Schefferville, supplied by the hydro-electric generating stations of Menehek (200 km southwest) and Churchill Falls (210 km south).

Water sources are abundant on and adjacent to the Property.

5.5 Physiography

The Property is situated to the west of a major watershed that runs along the border between Quebec and Labrador. The terrain is glacially scoured with moderate rolling hills and lakes and elevation ranging from 450 to 700 m above sea level. Larger hills are present in the northwest part of the property.

Eskers and boulder fields are common throughout the Property. The exposure and lack of vegetation (short growing season) promote stunted and thinly spaced vegetation often confined to sheltered valleys and enclaves. The vegetation on the Property consists mainly of tamarack trees, shrubs, and caribou moss.

Lakes, rivers or bogs cover approximately 30% of the Property.

6. HISTORY

The following is a summary of previously completed work in the Project area. This summary is taken from Daigle (2017).

Prior to 1979, there were no known exploration activities on the Property.

Details of the historical work on the Property are presented below and summarized in Table 6-1 .

Table 6-1 – Historical ownership and work on the Crater Lake Property

Year	Organization	Contractor	Work	Results
1979	Geological Survey of Canada	-	Airborne gamma-ray spectrometry	Geophysical Series Map 36313G
1980		-	Lac Chapiteau and Lac Ramusio map sheets completed at 1:50,000 scale	Geophysical Series Map 6204G
1996	Major General Resources Ltd. and Donner Resources Ltd	-	Surface geological and geochemical programs on the Lac Chapiteau Property	Limited potential to host base metal mineralization
2007	Freewest Resources Canada Inc.	-	Field exploration (6 samples collected)	No reports available
2008	Freewest Resources Canada Inc. (Freewest) and Quest	-	Freewest's uranium property assets, including the current Property, were transferred to Quest Uranium Corporation (Quest Uranium)	In April 2010, Quest Uranium changed its name to Quest Rare Minerals Inc.
2009	Geological Survey of Canada	-	Open File including ten maps at 1:250,000 scale covering portions of western Labrador, north of Churchill Reservoir, and adjoining parts of Quebec	GSC Open File 6532 jointly released by the GSC, Geol Survey of Newfoundland, and the Direction Générale de Géologie du Québec
	Newfoundland and Labrador, Department of Natural Resources	-	Re-analysis of historical lake-sediment and lake-water geochemistry surveys (1978 to 2005) for additional elements and released in a new Open File	Open File LAB/1465
	Quest Rare Minerals Inc. (Quest)	-	Prospecting and sampling	"Discovery Outcrop": grab sample with 0.10% Sc, 0.29% Nb, 0.31% TREO
		MPX Geophysics Ltd. (MPX)	Helicopter-borne high-resolution magnetic and radiometric survey	
2010		Applied Petrographic Services Inc.	Petrographic study of 14 thin sections from samples collected in 2009	Description and observations in an internal report

Year	Organization	Contractor	Work	Results
		Vista Geoscience Ltd.	Glacial till survey (1,222 samples)	REE anomalies over the margins and down-ice of the circular magnetic anomalies. Most of the anomalies reflect short down-ice transport distances with till deposition at topographic barriers
		PGW Consulting Geophysicists	Models from airborne data as the starting point for modelling 4 standalone lines of ground magnetics	
		-	Drilling program (8 DDHs): 1,170.15 m drilled and 663 samples	ML10002: 0.0284%Sc over 6.50 m and 0.0506 %Sc over 18.95 m
2010-2012	Quebec MERN, McGill University and Quest	-	Joint project to complete a Master's thesis to characterize the syenite intrusion and associated REE mineralization at Crater Lake. Thesis submitted in October 2012.	The thesis (Petrella, 2012) concluded that the Crater Lake syenite intrudes the Mistastin Batholith and consists primarily of coarse-grained syenite and lesser mafic syenite; the centre of the circular intrusion consists of medium-grained syenite with lesser mafic syenite. REE mineralization includes allanite and gittinsite.
2011	Quest	Exploration Sans Frontière	Surface exploration program (prospecting, mapping and sampling). 101 stations and 199 collected samples.	Of the 199-surface samples, 40 returned values greater than 0.50% TREO
		-	Drilling program: 6 DDHs (1,894 m and 1,171 samples)	ML11009: 0.252% TREO over 344.58m (entire hole) and several thin high grade intervals in ML11010
2012		Exploration Sans Frontière	Surface exploration (prospecting, mapping, geochemical till survey). Additional mapping and channel sampling in selected areas. 261 stations, 231 grab samples, and 80 samples from 11 channels.	Till sampling survey highlighted property-scale anomalies over the margins and down-ice of the circular magnetic anomalies. 14 channel samples returned values of > 0.5% TREO, and 13 surface samples returned values of> 0.5% TREO
		-	Drilling program: 11 DDHs (2,498 m and 1,395 samples)	No significant results
		Abitibi Geophysics	Ground magnetics survey over two grids on the property to further investigate airborne geophysical anomalies	Several dyke-like structures and two NE-SW-trending magnetic highs were identified in the northeastern part of the property

Year	Organization	Contractor	Work	Results
2013			A broader ground magnetic survey to cover the entire circular geophysical anomaly.	The ground magnetic data correlate very well with the less detailed airborne magnetic data
2014		-	Drilling program: 7 DDHs (1,446 and 879 samples).	ML14026:0.0262% Sc and 1.176 TREO + Y% over 167.83 m and 0.0351% Sc and 1.7206 TREO + Y% over 27.63 m ML14028: 0.0235% Sc and 1.08 TREO + Y% over 199.69 m and 0.0280% Sc and 1.4065 TREO + Y% over 77.92 m
2015-2017	Peak Mining	-	Peak Mining did not conduct any exploration work or drilling on the Property	

6.1 1979-1980: Geological Survey of Canada

In 1979, an airborne gamma-ray spectrometry survey was run in the Mistastin Lake area, including the Property area (Geophysical Series Map 36313G).

In 1980, the Lac Chapiteau and Lac Ramusio map sheets were covered as part of an airborne magnetic survey at 1:50,000 scale, including the project area (Geophysical Series Map 6204G).

6.2 1996: Major General Resources Ltd. and Donner Resources Ltd

A reconnaissance geology and geochemistry program was carried out on the Lac Chapiteau property to evaluate the area for potential Voisey's Bay-style Ni-Cu-Co mineralization. The result of this program identified the area as having limited potential to host base metal mineralization (Wares and Leriche, 1996).

6.3 2007-2009: Freewest Resources Canada Inc. and Quest Rare Minerals Inc.

In 2007, as part of a regional evaluation program, Freewest Resources Canada Inc. ("Freewest") collected six (6) samples in the area of what is now the Property. There are no reports available on this program.

In January 2008, Quest Uranium Corporation ("Quest Uranium") was formed. Part of Freewest's uranium property assets, including the Property, were transferred to this company. In April 2010, Quest Uranium changed its name to Quest Rare Minerals Inc.

6.4 2009-2012: Federal and Provincial Government Work and McGill University

6.4.1 2009: Geological Survey of Canada

In 2009, the area was covered as part of a joint Open File release by the GSC, the Geological Survey of Newfoundland and Labrador, and the Direction Générale de Géologie du Québec. This release compiles 10 maps covering a portion of western

Labrador, north of the Churchill Reservoir, and adjoining parts of Quebec. Results are available as 1:250 000 scale full-coloured maps in pdf format. Eight (8) of these are radiometric maps, the result of the new 2009 airborne survey (Open File 6532).

6.4.2 2009: Newfoundland and Labrador, Department of Natural Resources

In 2009, the Geological Survey of Newfoundland and Labrador released lake-sediment and lake-water geochemical data collected from historical surveys. These surveys were conducted in Labrador by the Geological Survey of Newfoundland and Labrador from 1978 to 2005. Most of the data had been released previously in various Open File reports. However, as new analytical methods became available, some samples were re-analyzed for additional elements. Some of these data had not been released previously (Open File LAB/1465).

6.4.3 2009-2012: MERN and McGill University

As part of a joint project between Quest, McGill University and MERN, a Master's thesis was undertaken to characterize the syenite intrusion and associated rare earth element ("REE") mineralization at Crater Lake. The thesis was submitted in October 2012.

This work concluded that the Crater Lake syenite (under the name of Misery Lake in the thesis) intrudes the Mistastin Batholith and consists primarily of coarse-grained syenite and lesser mafic syenite; the center of the circular intrusion consists of medium-grained syenite with lesser mafic syenite. REE mineralization includes allanite and gittinsite (Petrella, 2012).

6.5 2009-2014: Exploration and Drilling Activities (Quest)

6.5.1 2009 geophysics

Quest retained MPX Geophysics Ltd. (MPX), to conduct a helicopter-borne high resolution magnetic and radiometric survey. The survey area was flown at a nominal mean terrain clearance of 70 m. The survey block was flown along north-south (0°Az) flight lines separated by 400 m line spacings, and east-west (90°Az) tie lines at a line separation of 400 m (MPX, 2009).

6.5.2 2010 petrography, geochemistry and geophysics

6.5.2.1 Petrography

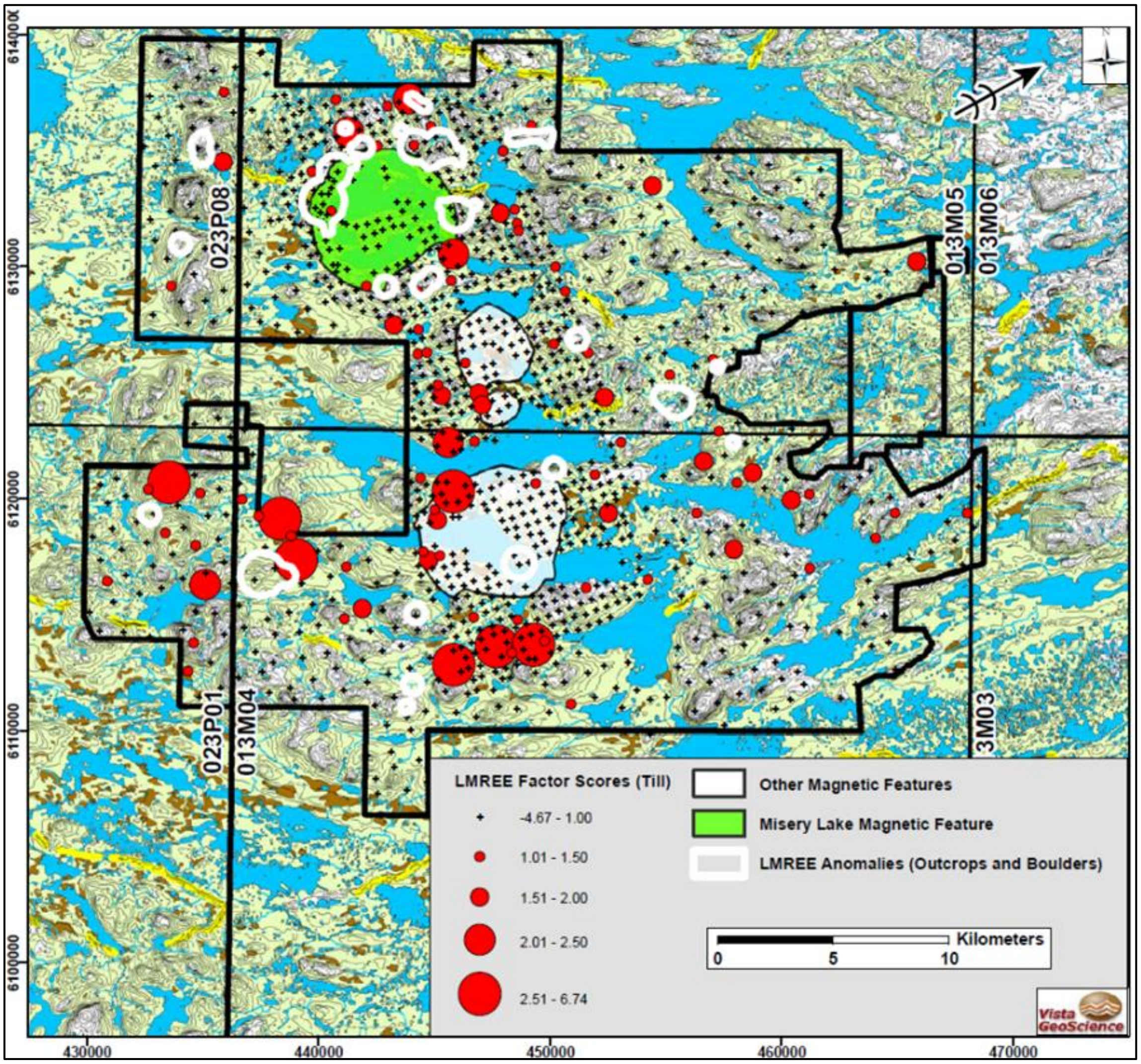
Quest contracted Applied Petrographic Services Inc. to complete a petrographic study on 14 thin sections taken from samples collected in 2009. Descriptions and observations were provided in an internal report.

6.5.2.2 Till survey

Between July and August 2010, a till survey was carried out by Vista Geoscience ("Vista") on behalf of Quest. A total of 1,222 samples of sandy till were collected, each 25-50 cm deep (Seneshen, 2011).

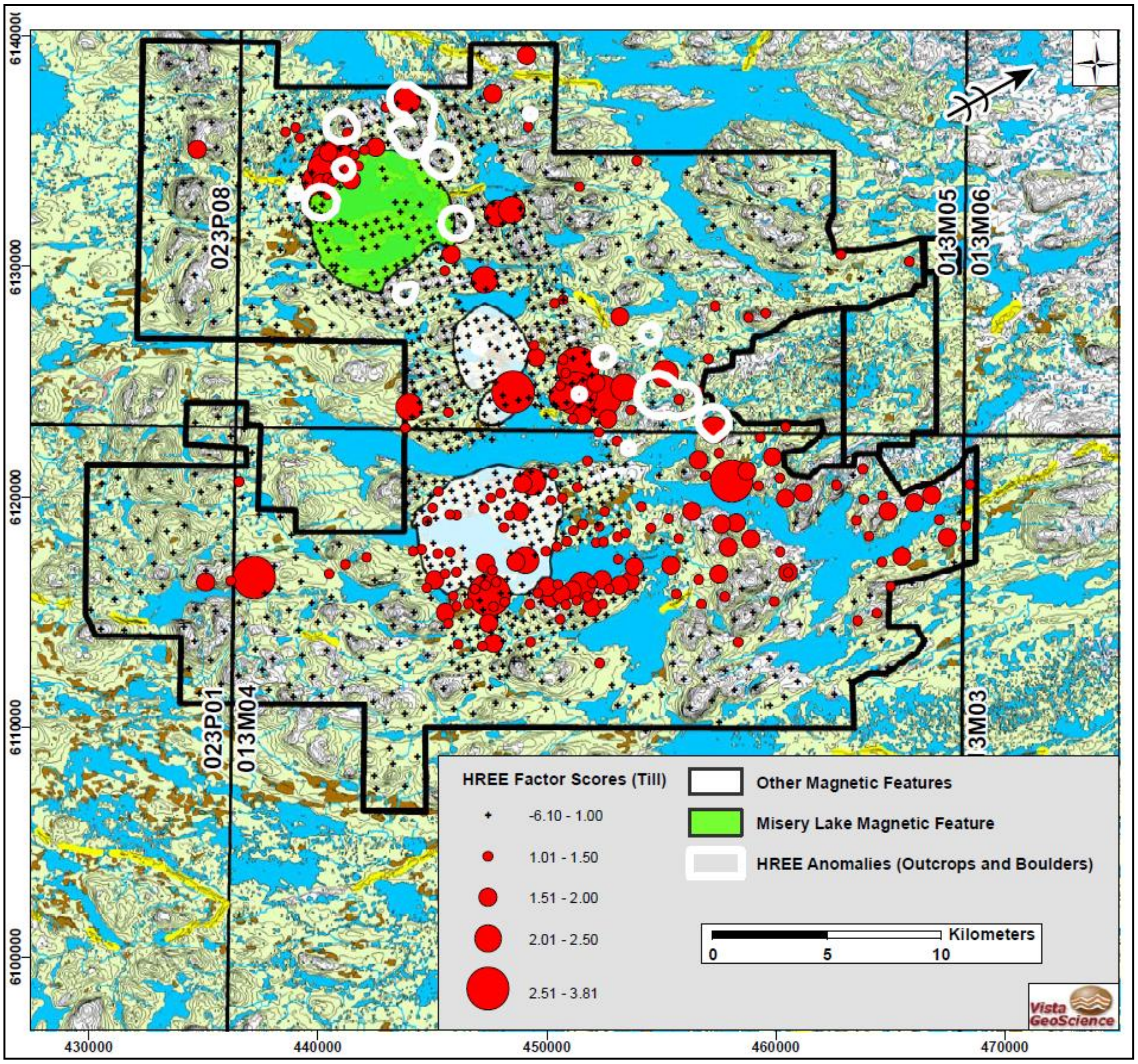
The survey revealed REE anomalies over the margins of and down-ice from the circular magnetic anomalies. Previous exploration by Quest and its contractors showed glacial transport distances of at least 7 km at Crater Lake. Most of the anomalies reflect short down-ice transport distances with till deposition at topographic barriers.

Figure 6-1 and Figure 6-2 display the light-medium REE ("LMREE") and heavy REE ("HREE") results and anomalies. Note that the LMREE results include europium and gadolinium.



Source: Vista (2011)

Figure 6-1 – LMREE results for till samples from 2010



Source: Vista (2011)

Figure 6-2 – HREE results for till samples from 2010

6.5.2.3 Geophysics

PGW Consulting Geophysicists ("PGW") was retained by Quest to interpret the airborne geophysical data from four (4) standalone lines of ground magnetic data. The lines were completed independently of each other over the outer response of the Crater Lake magnetic ring.

6.5.3 2010-2012 drilling programs

In September 2010, an eight (8)-hole drilling program tested magnetic anomalies from the 2009 airborne magnetic survey. A total of 1,170 m was drilled, and 663 samples were collected. The main unit encountered was syenite. No significant assay results were obtained.

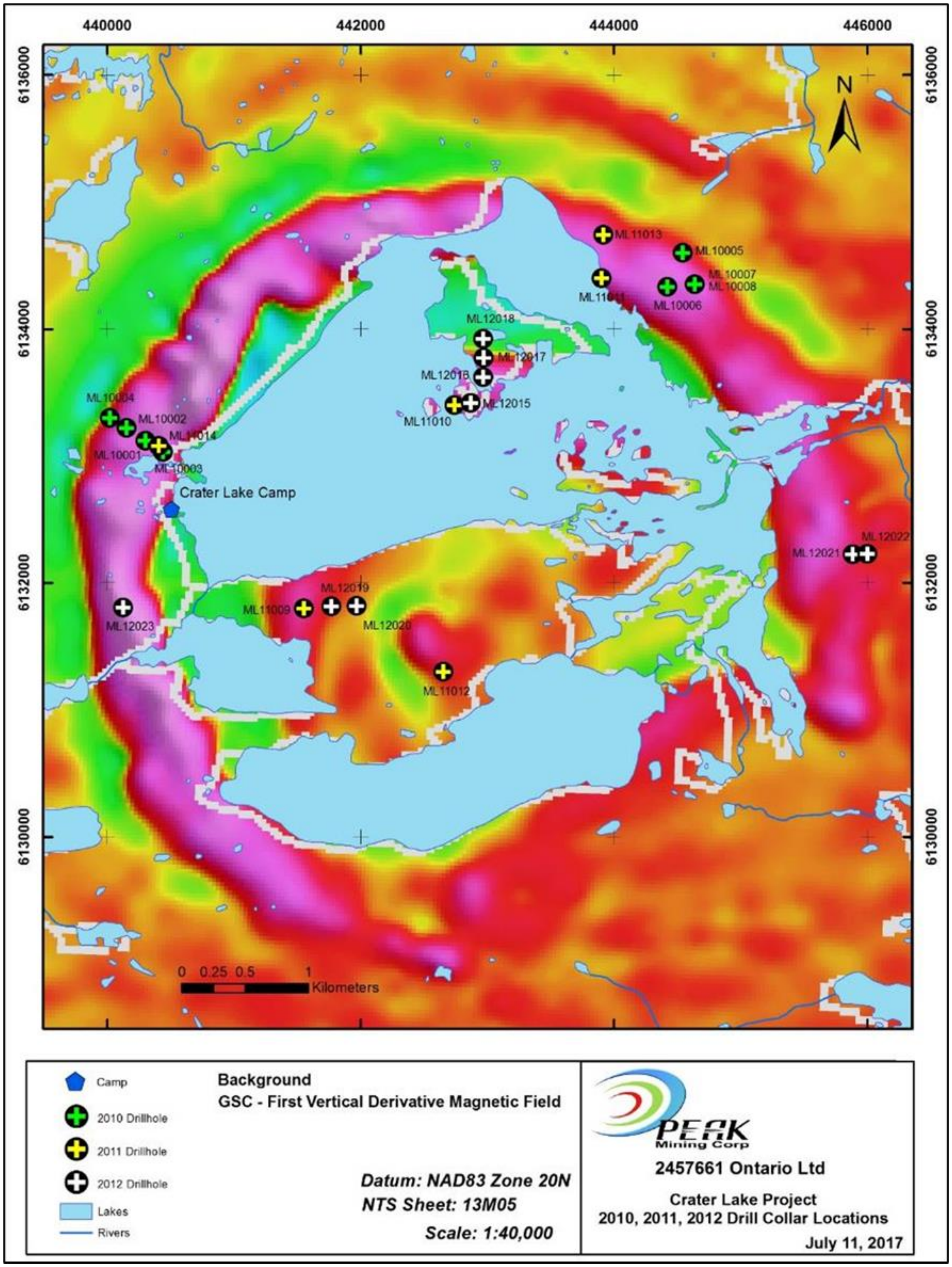
In September and November 2011, a six (6)-hole drilling program continued testing the strong magnetic responses seen in the previous airborne geophysical surveys. A total of 1,894 m was drilled, and 1,171 samples were collected (Quest, 2013).

In September and October 2012, 2,498 m were drilled in 11 holes. All holes in the Crater Lake Intrusion intersected variably textured, medium-grained syenite. Two holes were drilled outside the Crater Lake Intrusion, testing weak circular magnetic features south of the Crater Lake magnetic ring feature (Quest, 2012).

Table 6-2 summarizes the 2010 to 2012 drilling programs. Figure 6-3 shows the collar position relative to the modelled ground magnetics data.

Table 6-2 – Summary of the Crater Lake 2010-2012 drilling programs

Year	No. of Drill Holes	No. of Metres (m)	No. of Samples
2010	8	1,170	663
2011	6	1,894	1,171
2012	11	2,498	1,395
TOTAL	**25**	**5,532**	**3,229**



Source: Peak Mining (2017)

Figure 6-3 – Collar locations on a background of modelled ground magnetics data

6.5.4 2011-2012 surface exploration

From July to August 2011, Quest conducted a surface exploration program to follow up the results from the 2010 geochemical till survey conducted on the Property. A limited mapping and prospecting program was completed with a total of 101 stations; 199 samples were collected and submitted for assay, of which 40 returned grades greater than 0.50% TREO.

Between August and October 2012, geologists from Quest and prospectors from Exploration Sans Frontière conducted a surface exploration program. The work focused on areas of historical work that included prospecting, mapping and a geochemical till survey. The till survey highlighted property-scale anomalies over the margins of and down-ice from the circular magnetic anomalies.

Selected areas were chosen for more detailed work that included outcrop stripping and channel sampling. The 2011 program highlighted individual samples that returned elevated REE values, and these were followed up. A total of 261 geological stations were sampled, yielding 231 samples, 80 of which were cut from 11 different channel locations.

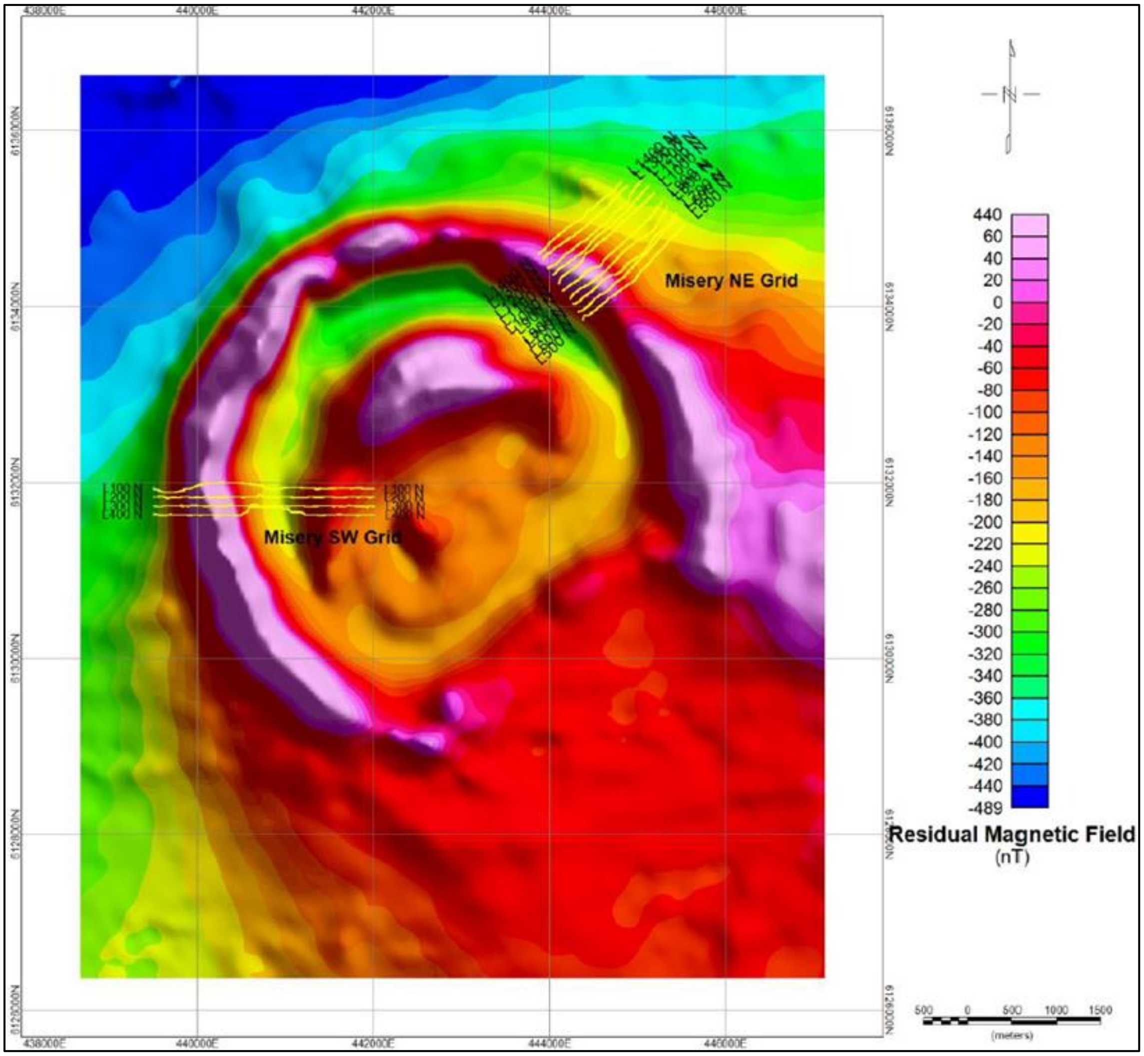
Fourteen (14) of the channel samples returned values greater than 0.5% TREO, and 13 surface samples returned values greater than 0.5% TREO.

6.5.5 2012-2013 geophysics

In October 2012, Abitibi Geophysics was contracted by Quest to conduct a small ground magnetics survey to characterize the large circular airborne magnetic feature. The aim was to identify any internal differentiation and to delineate potential domains of REE mineralization related to the intrusion.

Two grids were laid out on the northeast and southwest sides of the magnetic anomaly. A total of 24.75 line-km was surveyed at a station separation of 25 m. The locations of the two grids are shown in Figure 6.4.

The survey identified several dyke-like structures and two NE-SW trending magnetic highs in the northeastern part of the property. It was found that the two grids correlate well with the previous airborne magnetics survey (Abitibi Geophysics, 2012).

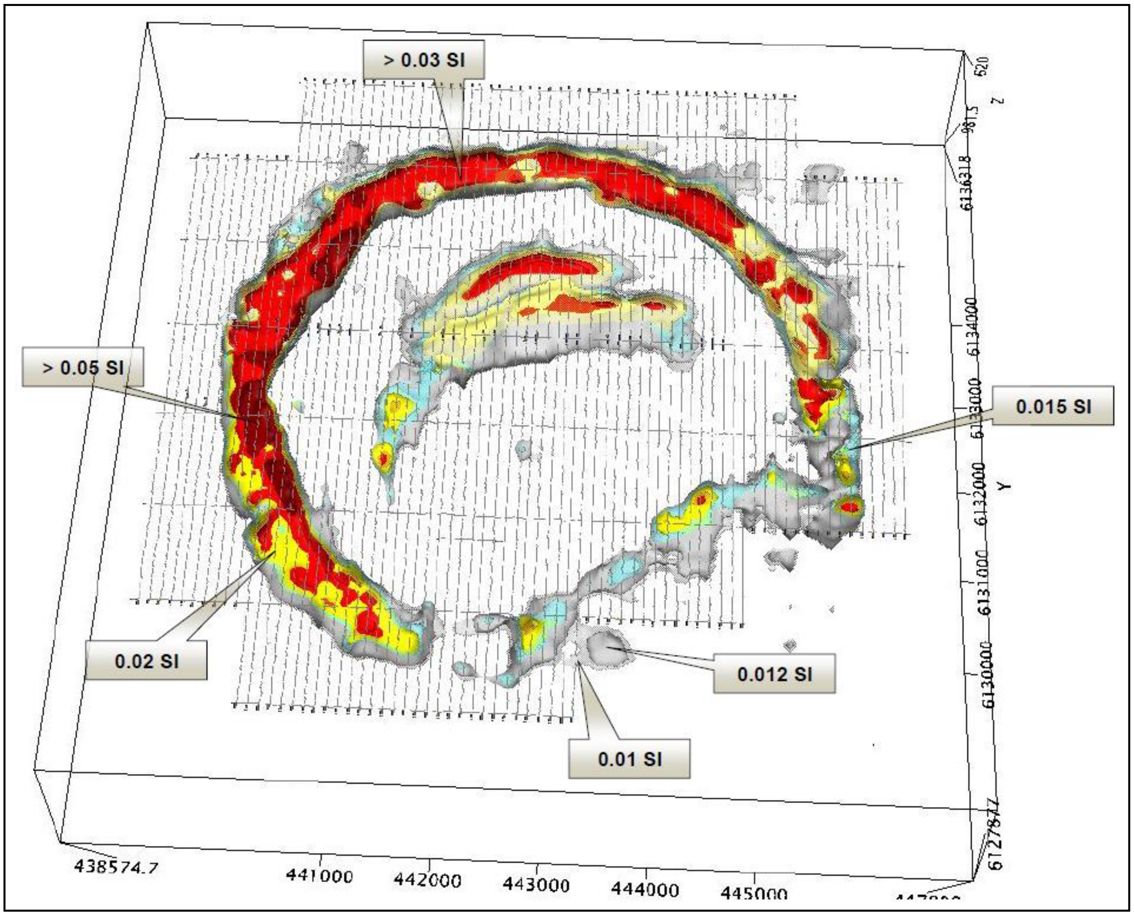


Source: Abitibi Geophysics (2012)

Figure 6-4 – Residual magnetic field, 2012 geophysical survey, showing Northeast and Southwest grids

During the winter of 2013, Quest retained Abitibi Geophysics to conduct a property-wide ground magnetics survey (Abitibi Geophysics, 2013). The data from 470.5 line-km were used to build an unconstrained 3D subsurface magnetic susceptibility model of the Property and several 2D models. The resulting 3D models and maps were used to plan the 2014 exploration and drilling program. The results of this interpretation are shown in Figure 6-5.

Overall, the ground magnetic geophysical survey correlates very well with the less detailed airborne magnetic survey. Several previously unidentified anomalies were discovered as a result of the survey.



Source: Abitibi Geophysics (2013); Note: North-South lines are at 100 m separation

Figure 6-5 – 3D rendering of the unconstrained magnetic anomaly, perspective view looking north

6.5.6 2014 drilling program

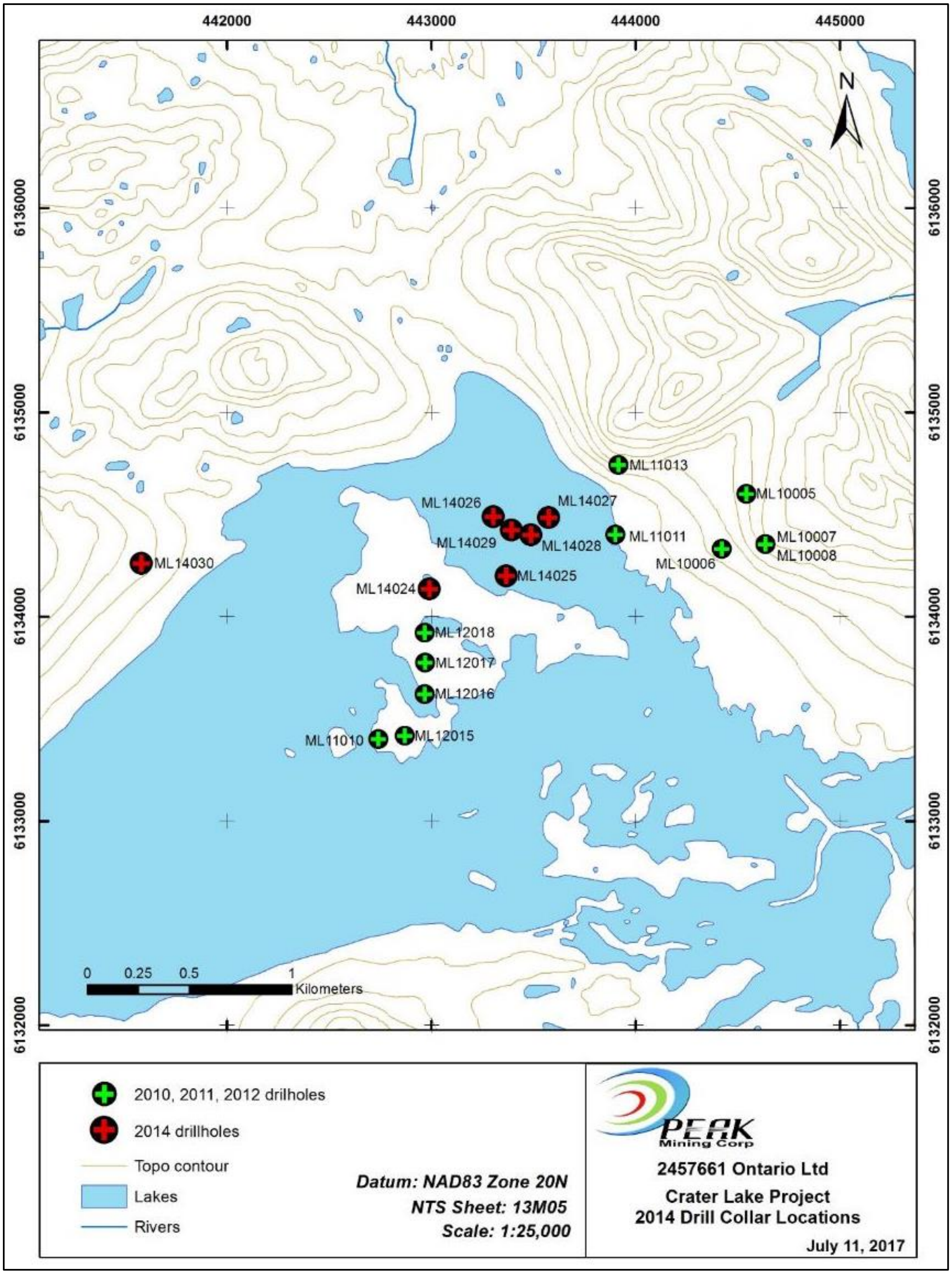
During the winter of 2014, a total of 1,446 m was drilled in 7 holes. Several previously untested exploration targets were chosen based on the 2013 geophysical survey and previous surface geochemistry data. The holes were sampled along their lengths for a total of 879 collected samples. Downhole magnetic susceptibility data were collected upon the completion of each drill hole (Quest, 2014).

Table 6-3 summarizes the best composite drill intersections. Figure 6-6 presents the collar locations.

Table 6-3 – Composited 2014 drilling results

Hole ID	From (m)	To (m)	Thickness (m)	TREO+Y[1] (wt.%)	LREO[2] (wt.%)	HREO+Y[3] (wt.%)	HREO+Y/ TREO+Y	Sc_2O_3 %
ML14026	14.77	182.60	167.83	1.1760	1.0013	0.1747	14.86	0.0262
including	14.77	42.40	27.63	1.7206	1.4686	0.2521	14.65	0.0351
including	14.77	77.55	62.78	1.4779	1.2607	0.2172	14.70	0.0304
ML14028	13.22	212.91	199.69	1.0800	0.9178	0.1621	15.01	0.0235
including	13.22	91.14	77.92	1.4065	1.1977	0.2088	14.85	0.0280
ML14029	13.35	93.40	80.05	1.3353	1.1362	0.1991	14.91	0.0286
ML14030	177.00	183.04	6.04	1.1442	0.9632	0.1810	15.82	0.0319

1. Total Rare Earth Oxides (TREO+Y) include: La_2O_3, CeO_2, Pr_6O_{11}, Nd_2O_3, Sm_2O_3, Eu_2O_3, Gd_2O_3, Tb_4O_7, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Lu_2O_3 and Y_2O_3
2. Heavy Rare Earth Oxides (HREO+Y) include: Eu2O3, Gd_2O_3, Tb_4O_7, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, Lu_2O_3, Y_2O_3
3. Light Rare Earth Oxides (LREO) include: La_2O_3, CeO_2, Pr_6O_{11}, Nd_2O_3, Sm_2O_3



Source: Peak Mining (2017)

Figure 6-6 – Location of the 2014 drill hole collars

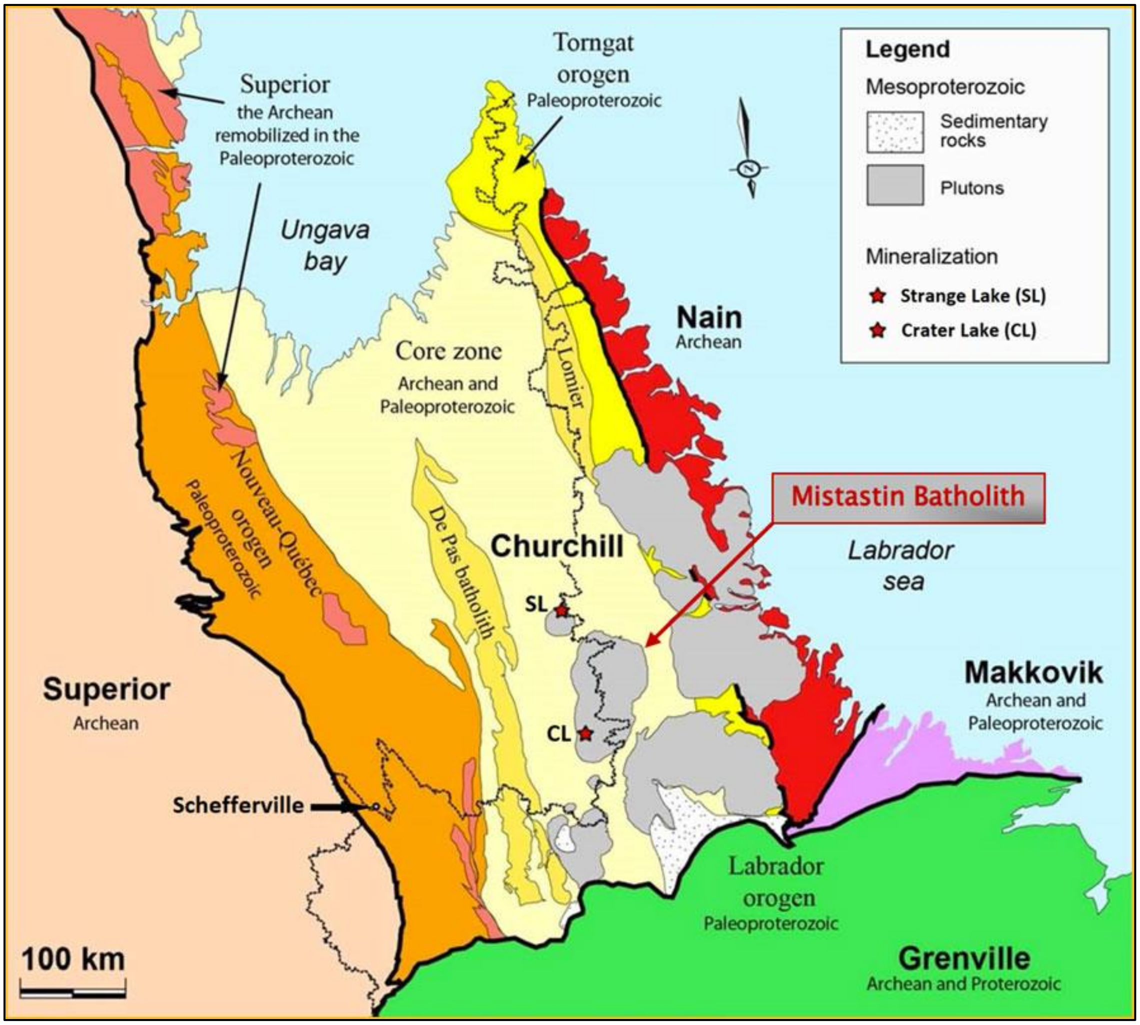
7. GEOLOGICAL SETTING AND MINERALIZATION

The following geological summary is taken from Daigle (2017).

7.1 Regional Geology

The region is underlain by five structural provinces: Nain, Superior, Churchill, Makkovik, and Grenville. Together, they record a crustal history ranging from about 3.8 to 0.6 Ga. The Nain and Superior Archean provinces are bounded by the younger Archean and Paleoproterozoic Churchill and Makkovik provinces, which in turn are truncated by the early Proterozoic Grenville Province (Figure 7-1).

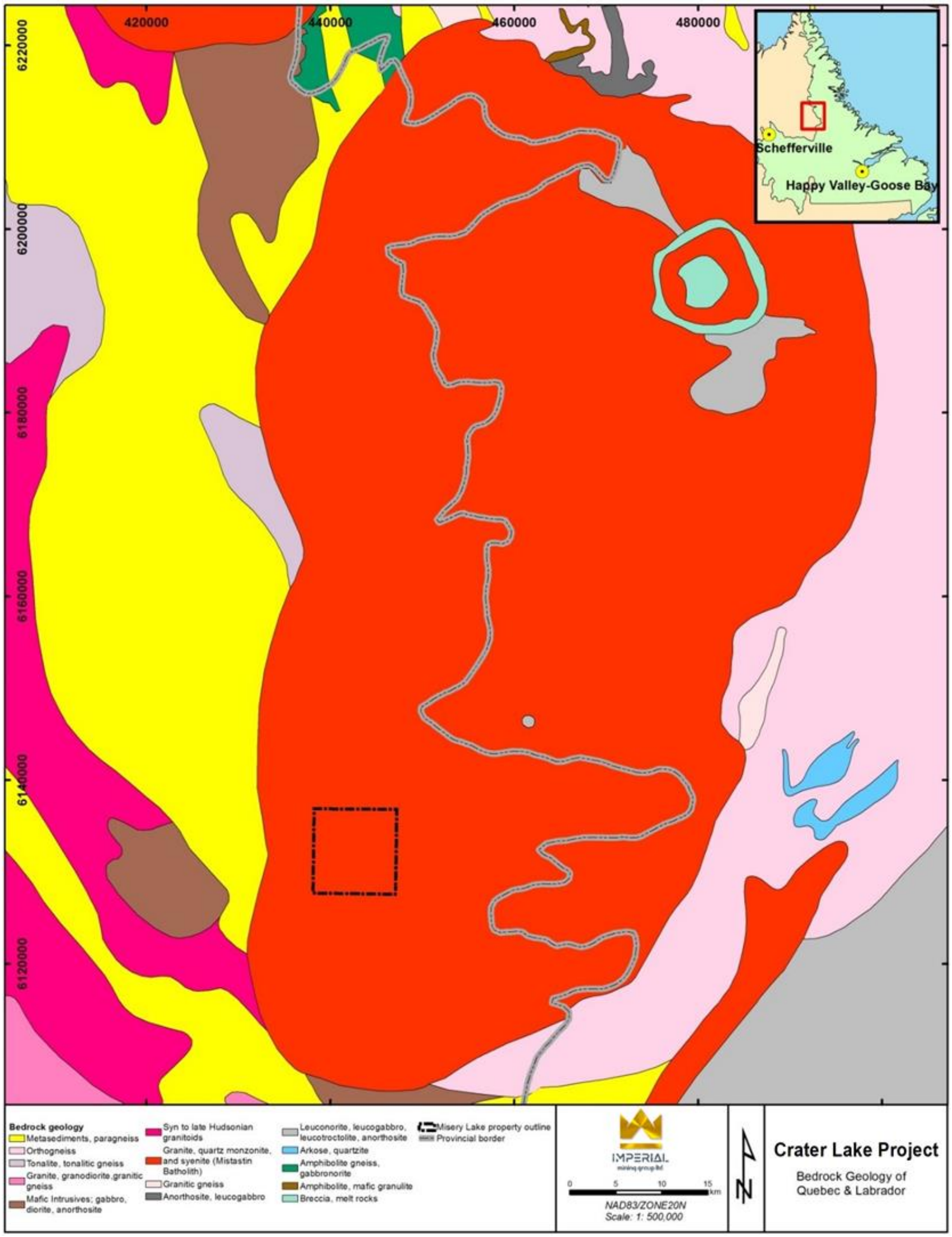
The Churchill Province is subdivided into three parts. The western part consists of low-grade sedimentary and volcanic rocks in a west-verging fold and thrust belt (the Labrador Trough). The central part comprises predominantly reworked Archean rocks, which are juxtaposed against the Labrador Trough along mylonitic shear zones. The eastern part consists mainly of anorthosite and gabbro of the Rae Province (Swinden et al. 1991).



Source: Hammouche et. al. (2012)

Figure 7-1 – Geological map of the Churchill Province showing the location of the Crater Lake and Strange Lake deposits

The syenite intrusion of Crater Lake is located in the Churchill Province. It intrudes or is coeval with the southeast end of the Mistastin Batholith (Figure 7-2), which covers an area of approximately 5,000 km^2. The dominant lithologies of the batholith are granite and quartz monzonite with pyroxene, which are cut by younger biotite-hornblende granite, which is in turn intruded by a smaller olivine syenite, the Crater Lake syenite. Uranium-lead dating of three zircons places the age of the batholith at approximately 1.4 Ga (Petrella 2011).



Source: Quest (2014)

Figure 7-2 – Regional geology of the Crater Lake Property area

7.2 Property Geology

The Crater Lake intrusion displays a gradational contact with its host, the Mistastin rapakivi granite (Figure 7-3). Both have an A-type affinity and similar trace element composition. The Crater Lake syenites are therefore interpreted to be a late differentiate product of the Mistastin Batholith. The dominant exposed lithology (much of the intrusion is covered by a lake) is coarse- to medium-grained, massive syenite, which is mainly composed of perthitic K-feldspar and 1 to 10% by volume of interstitial ferromagnesian minerals, namely fayalite (iron chrysolite, Fe_2SiO_4), hedenbergite, ferro-pargasite and annite (iron-rich biotite), accompanied by accessory quartz, iron oxides (magnetite, titanium-rich magnetite, and ilmenite), zircon, fluorite, apatite and britholite (Petrella 2012). A magnetic and melanocratic unit, ferro-syenite, which commonly contains greater than 50% by volume of ferromagnesian minerals, including cumulate fayalite, hedenbergite and ferro-pargasite, occurs as large continuous to discontinuous subvertical and conical bodies, sills, narrow dikes and inclusions in the felsic syenites. The large ferro-syenite bodies are elongated and concordant to subconcordant to the main contact between the Crater Lake syenite and the Mistastin granite intrusions. These large bodies can reach up to 700 m long, up to 120 m wide, and are open at depth. Three large ferro-syenite bodies have been found on the property: TGZ, Boulder Lake and STG. Petrella (2012) interpreted the narrow ferro-syenite dikes as having formed by fractional crystallization of ferromagnesian minerals, leaving behind a residual magma that produced the felsic syenites. With continued fractional crystallization, the felsic syenites became more enriched in alkali and silica, and only became saturated with ferromagnesian at a very late stage, which explains the interstitial crystallization of the latter in the perthite-dominated syenite.

Several major radial and concentric faults are observed in the field and drill core, and have also been interpreted from magnetic data and satellite images. Most of these subvertical and (less commonly) subhorizontal structures are concentrated inwards from the contact with the Mistastin granite to within the first 800 m of the Crater Lake intrusion. Major faults are characterized by a very intense potassic alteration with local concentrations of biotite, chlorite, epidote and magnetite. Imperial's geologists do not yet know if these faults played a role in the ferro-syenite emplacement.

The Crater Lake intrusion was interpreted by Petrella et al. (2014) to be a ring dyke complex due to the concentric lithological zonation of quartz monzonite and felsic syenite, the steep dip of the bodies toward the center of the intrusion, the presence of numerous intrusion-scale discontinuous concentric faults (interpreted from the magnetic data), and the occurrence of several late radial faults (occupied by pegmatites), all of which are characteristic features of ring complexes (e.g. Woolley, 2001; Coumans and Stix, 2016). Consistent with this interpretation, some of the Crater Lake felsic syenites feature a trachytic texture developed through the alignment of feldspar laths, indicative of flow before cooling.

There is a strong correlation between the location of known ferro-syenites and strong magnetic susceptibility. Indeed, a 3D magnetic susceptibility model (commissioned by Imperial) of the intrusion, from an iteratively reweighted inversion of data from a recent GPS-integrated ground magnetic survey, suggests that the ferro-syenite is a subvertical ring dyke with some local sill-like lateral extensions. So far, this model is supported by very thick intersections of ferro-syenite in several drill holes, and the steeply dipping layering in this unit (Beland, 2021).

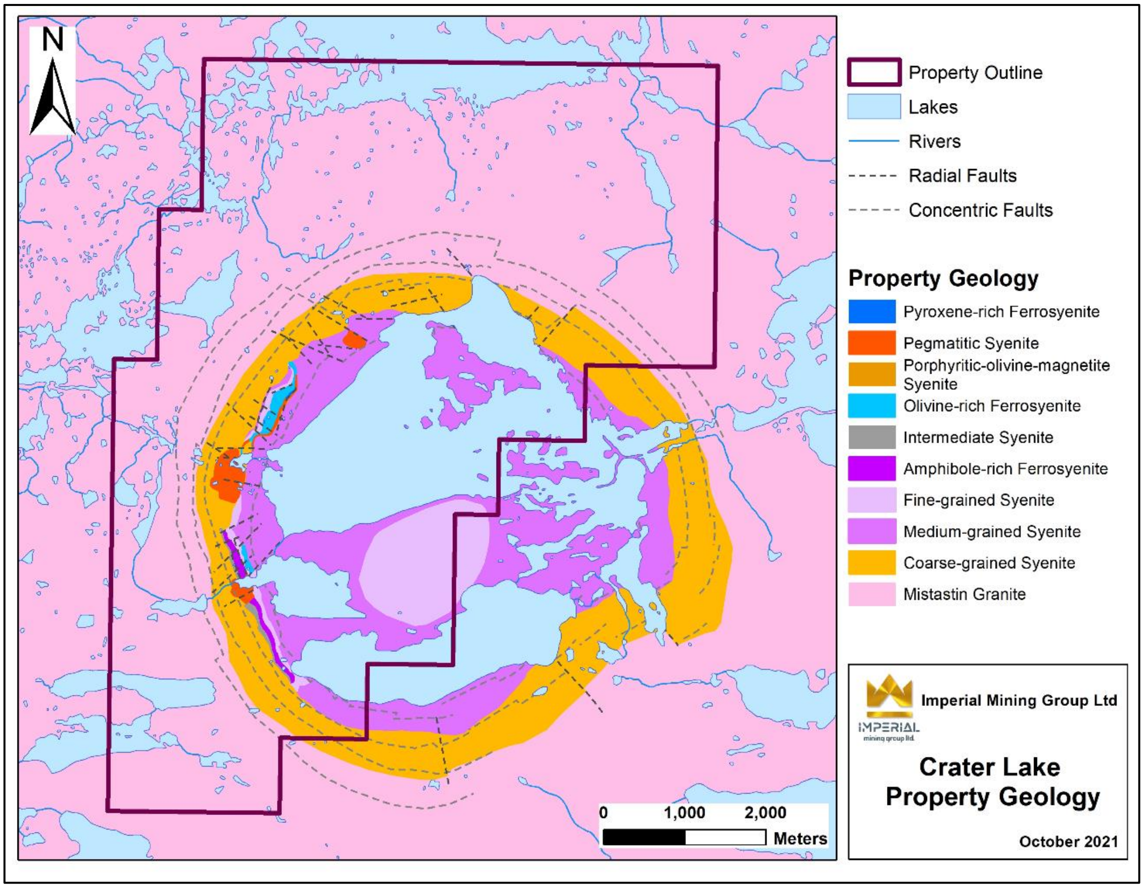


Figure 7-3 – Crater Lake intrusion geology

7.3 Geological Units: Intersected from 2014 to 2021

Prior to the start of the 2021 drilling campaign, Imperial geologists reinterpreted previous drilling results and reclassified some previously intersected units to better reflect the mineralogy of the Crater Lake lithologies. The following summarizes the units that were intersected during the drilling programs between winter 2014 through winter 2021.

7.3.1 Medium-grained syenite

Medium-grained syenite is the main unit throughout the central part of the Crater Lake intrusion. Predominately grey to pale pink-orange in colour, the mineralogy consists of approximately 70 to 90% perthitic K-feldspars, with the remainder of the unit comprising ferromagnesian minerals, including iron-amphibole and minor fayalite and titanium-rich magnetite (Petrella 2011). Trace interstitial quartz is rare. Zircon, fluorite, carbonate and pyrite can also occur at trace levels. Feldspar grains are mostly subhedral laths 1 to 1.5 cm long but can reach up to 2.5 cm. The mafic minerals are interstitial and are 5 mm in size. The unit is typically massive.

Relatively narrow (2 to 25 cm wide) mafic-rich sections occur throughout this unit. These bands or cumulates are 5 to 15 mm subhedral amphibole grains with interstitial magnetite and olivine. Minor REE mineralization can occur in these accumulations as interstitial cerium-britholite (Petrella 2011). These mafic bands/cumulates often have sharp contacts and low core angles (less than 25°).

Potassic alteration is common throughout medium-grained syenite and results in a patchy appearance. Feldspar grains often exhibit pink colour. Amphibole commonly displays partial replacement by aegirine.

7.3.2 Fine-grained syenite

The fine-grained syenite is composed of K-feldspar and amphibole crystals <1 to 4 mm in size. Feldspars are subhedral and make up approximately 90% of the unit. The remainder is interstitial amphibole, magnetite and olivine. Mafic minerals are concentrated near the upper and lower contacts of this unit in some drill holes. This unit often displays a weak preferred orientation defined by K-feldspar laths and can range from approximately 10 to 35°. Alteration can occur as pink potassic overprinting. The alteration can occur parallel to the fabric of the unit.

7.3.3 Coarse-grained syenite

The mineralogy of the coarse-grained syenite is similar to the fine-grained syenite, differing only in grain size. Coarse-grained syenite is composed of approximately 90% subhedral K-feldspar. The remainder is interstitial mafic minerals. A minor amount of disseminated pyrite occurs locally. Feldspar grains range in size from 1 to 5 cm, but in local megacrystic sections, they can exceed 10 cm. Zonation is observed in some feldspar grains, especially megacrysts. Interstitial mafic minerals are usually 1 to 5 cm in size. In megacrystic sections, subhedral amphibole, if present, can exceed 5 cm. Potassic overprinting is common, with a pink to orange colour. Amphibole is often replaced by aegirine. Complete replacement of the larger amphibole grains by epidote has been observed in several drill holes. The unit is weakly magnetic in areas with interstitial mafic minerals.

7.3.4 Variably textured syenite

As the name suggests, the variably textured syenite exhibits textural similarities with several other units. These textures, including medium-grained syenite, fine- and coarse-grained syenites and often pegmatite, are commonly distributed in a chaotic arrangement. The size of each section can range from several centimetres to a metre in length and appear to have no order. Contacts between each section can be sharp, irregular, or gradational.

7.3.5 POM syenite

The POM syenite (“POMSYN”) consists of a grey to light grey, medium-grained syenite with olivine and magnetite phenocrysts 5 to 10 mm in size. The feldspar laths are interlocking. The rims of the magnetite and olivine phenocrysts are partially altered to biotite and pyroxene, respectively. This unit is often found as inclusions in the ferro-syenite and the coarse-grained syenite. The size of these inclusions ranges from a few centimetres to less than 2 m in size.

7.3.6 Blebby syenite

The blebby syenite consists of a medium- to coarse-grained grey syenite with interlocking, medium-grained feldspar and interstitial pyroxene, amphibole, olivine and biotite. Pyroxene occurs as blebs, either rimmed or partially altered by amphibole. Specks of olivine are also observed.

7.3.7 Trachytic syenite

The trachytic syenite consists of a dark grey to grey, very fine- to fine-grained, foliated (trachytic) interlocking feldspar groundmass with up to 15% fine-grained specks of anhedral olivine and pyroxene.

7.3.8 Ferro-syenite

Different types of ferro-syenite units were identified during the 2014 through 2021 drilling programs.

7.3.8.1 Olivine ferro-syenite (“OLFESYN”)

The olivine-rich ferro-syenite consists of a dark green to dark grey, mafic cumulates, fine- to medium-grained olivine-rich unit with up to 40% olivine, up to 15 % pyroxene, up to 10% amphibole, and 10% magnetite. Mafic minerals form a net-like (interstitial) texture in the medium-grained (0.5-1 cm) feldspar groundmass. The latter also displays coarse-grained (1-3 cm) feldspar fragments that are locally digested. The mafic minerals are fine- to medium-grained, irregular and anhedral with the exception of black needle-like amphibole and amphibole clots. This unit is moderately to highly magnetic.

7.3.8.2 Pyroxene ferro-syenite (“PXFESYN”)

The pyroxene-rich ferro-syenite is a dark green-grey, medium- to fine-grained unit composed of up to 40% pyroxene, up to 15% magnetite, 10% olivine and up to 10% amphibole. The mafic cumulates (pyroxene, magnetite, olivine and amphibole) form a net-like (interstitial) texture in the medium-grained (0.5-1 cm) feldspar groundmass. This unit is highly magnetic. The PXFESYN is distinctly olivine-poor compared to the OLFESYN and seems to have more of a cumulate texture composed of pyroxene and magnetite.

7.3.8.3 Amphibole ferro-syenite (“AMPFESYN”)

The amphibole-rich ferro-syenite is a black to dark grey, coarse- to medium-grained unit composed of up to 50% amphibole, up to 15% magnetite, 5% olivine and up to 5% pyroxene. The mafic cumulates (amphibole, magnetite, olivine, and pyroxene) form a net-like (interstitial) texture in the medium-grained (0.5-1 cm) feldspar groundmass. This unit is highly magnetic. The AMPFESYN unit is olivine- and pyroxene-poor compared to the PXFESYN and seems to have more of a cumulate texture of amphibole and magnetite.

7.4 Mineralization

Assay results from surface samples and from 2014-2021 drill core indicate that the different types of ferro-syenite are the main host to the scandium and REE mineralization.

At Crater Lake, scandium was enriched in the residual liquid of the parent Mistastin granite magma following extensive fractionation of feldspar, in which scandium is incompatible. This residual liquid became the Crater Lake quartz monzonite magma, which was enriched in scandium and iron. Fluorapatite, zircon, fayalite, and the cores of zoned hedenbergite crystals saturated in this magma chamber. Ring faults developed as a result of caldera collapse, and the magma and minerals were emplaced as a slurry into these faults. The ferro-syenite formed by *in situ* fractionation of unzoned hedenbergite crystals, magnetite and hastingsite, and their physical segregation with the previously crystallized minerals. The extremely high FeO/FeO+MgO content of the quartz monzonite liquid resulted in high partition coefficients for scandium in the hedenbergite and hastingsite, allowing scandium to be incorporated into these minerals at exceptionally high concentrations under magmatic conditions. The physical segregation of hedenbergite and hastingsite in ferro-syenite cumulate rocks through gravitational settling and/or flow differentiation spatially concentrated the Sc-bearing minerals within the intrusion, resulting in the first known scandium deposit hosted by syenite. (Beland, 2021).

The REE mineralization is contained in small primary idiomorphic zircon and hydroxyapatite crystals (identified by XRD analysis). The latter locally form aggregates that were wholly or partly replaced by britholite-(Ce). Two types of hydroxyapatite and one type of britholite-(Ce) have been identified. The first type of hydroxyapatite is magmatic and occurs as euhedral to subhedral, unzoned, transparent crystals that do not show evidence of having been altered. This type of apatite is very frequently observed in the other rock types of the intrusion. The second type of hydroxyapatite also occurs as primary, magmatic crystals but is compositionally zoned, with its core similar in composition to unzoned hydroxyapatite 1. This indicates that hydroxyapatite 2 continued to crystallize after hydroxyapatite 1. Crystals of hydroxyapatite 2 are commonly replaced in their outer parts by britholite-(Ce). Both types of hydroxyapatite commonly occur as inclusions in pyroxene, amphibole and, less commonly, fayalite.

7.4.1 Scandium

Scandium is a silvery-white transition metal, often classified as a REE along with yttrium and the 15 lanthanides. High-grade, large tonnage, easily mineable scandium deposits with favourable metallurgy and location are scarce, making it a commodity that is difficult to obtain in commercial quantities. Scandium is often found in trace amounts in REE deposits and occurrences, but it has only been mined as a by-product in a few uranium and REE mines globally, such as Zhovti Vody in Ukraine and Bayan Obo in China.

Two projects hosted in nickel laterite deposits in Australia have NI 43-101 or JORC-compliant resources that include scandium as one of the major products. They are presented here for comparative purposes, despite the different geological context. The Nyngan Project (Scandium International Mining Corp.) has mineral reserves of 1.4Mt at 409 g/t and M+I mineral resources of 16.92 Mt at 235 g/t Sc at a cut-off grade of 100 g/t (Rangott et al., 2016). The Platina Scandium Project (Platina Resources Limited) has mineral reserves of 4.02 Mt at 570 g/t Sc (cut-off grade of 400 g/t) and mineral resources of 35.6 Mt at 405 g/t Sc (cut-off grade of 300 g/t) (Platina Resources Ltd, 2018).

7.4.2 Nomenclature

The nomenclature for REE and associated metals is shown in Table 7-1. References to total rare earth oxide (TREO) include yttrium oxide unless otherwise stated.

Table 7-1 – List of Elements and Oxides Associated with REE Mineralization

Element	Element Symbol	Common Oxide	Category
Light Rare Earth Oxides (LREO)			**Total Rare Earth Oxides (TREO)**
Lanthanum	La	La_2O_3	
Cerium	Ce	Ce_2O_3	
Praseodymium	Pr	Pr_2O_3	
Neodymium	Nd	Nd_2O_3	
Samarium	Sm	Sm_2O_3	
Heavy Rare Earth Oxides (HREO)			
Europium	Eu	Eu_2O_3	
Gadolinium	Gd	Gd_2O_3	
Terbium	Tb	Tb_4O_7	
Dysprosium	Dy	Dy_2O_3	
Holmium	Ho	Ho_2O_3	
Erbium	Er	Er_2O_3	
Thulium	Tm	Tm_2O_3	
Ytterbium	Yb	Yb_2O_3	
Lutetium	Lu	Lu_2O_3	
Yttrium	Y	Y_2O_3	
Niobium	Nb	Nb_2O_5	
Scandium	Sc	Sc_2O_3	

8. DEPOSIT TYPES

The following is taken from Quest (2014) and Daigle (2014):

The Crater Lake Deposit is a large, scandium- and REE-bearing alkali igneous intrusive complex. Carbonatite and alkaline intrusive complexes (as well as their weathering products) are the primary sources of REE. Apart from REE, these rock types can also host deposits of niobium, phosphate, titanium, vermiculite, barite, fluorite, copper, calcite, and zirconium. Although these types of deposits are found throughout the world, only six are currently being mined for REE: five carbonatites (Bayan Obo, Daluxiang, Maoniuping, and Weishan deposits in China, and the Mountain Pass deposit in the USA) and one peralkaline intrusion-related deposit (as a byproduct at the Lovozero deposit, Russia).

Carbonatite and alkaline intrusive complexes are derived from partial melts of mantle material. Neodymium isotopic data of these deposits consistently indicate that the REE are derived from these parent magmas. These deposits and their associated rock types usually occur within stable cratonic settings, generally associated with intracontinental rift and fault systems. Extended periods of fractional crystallization of the magma in these settings led to enrichment in REE and other incompatible elements. In alkaline intrusive complexes, mineralization of REE occur as primary phases in magmatic layering or as later-stage dykes and veins (Verplanck et al., 2014).

REE deposits pose particular environmental challenges due to the associated uranium and thorium. There is also uncertainty surrounding the toxicity of the elements themselves. Acid mine drainage is typically not an issue due to the alkali nature of the rock types and minerals. Uranium has the potential for recovery as a byproduct, but thorium remains a waste product that requires management. Additionally, in some deposits, fluorine and beryllium can pose environmental challenges (Verplanck et al., 2014).

9. EXPLORATION

9.1 Geophysical Surveys

9.1.1 2018 geophysical data modelling

In February 2018, geophysical modelling provided a better understanding of the 3D geometry of the Crater Lake intrusive complex and the vertical and lateral extent of the known areas of scandium mineralization on the Property.

9.1.2 2020 magnetic ground survey

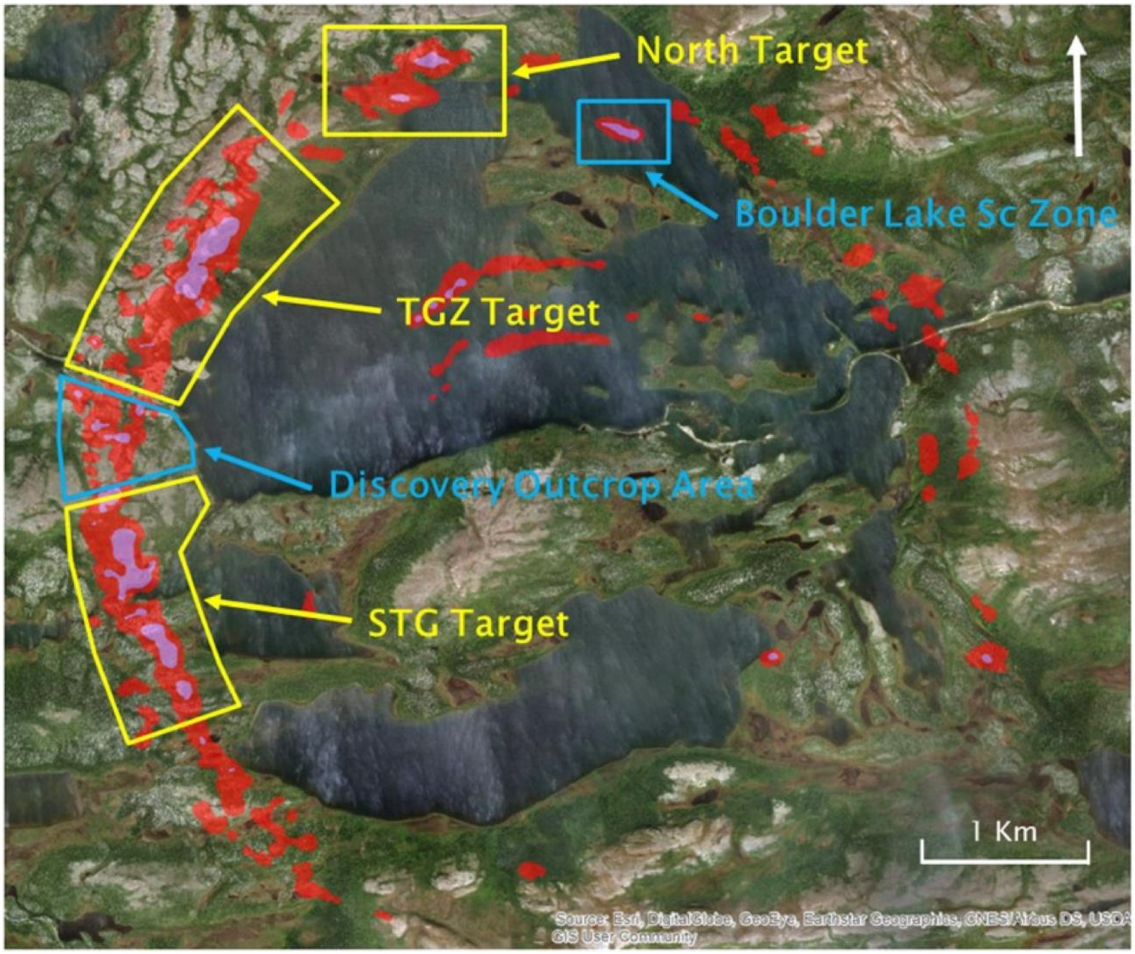
In July and August 2020, Abitibi Geophysics of Val d'Or, Quebec, completed a detailed ground magnetic survey on the western half of the Property. The survey covered 130 line-km at a line spacing of 50 m.

The survey better defined the scandium-bearing ferro-syenite rock units and fault structures controlling the concentration of scandium mineralization on the Property. Several new magnetic bodies were identified to the east and south of the STG target.

9.2 Surface Program

9.2.1 2018 summer exploration program

Imperial's 2018 summer field program consisted of detailed prospecting and geological mapping over three highly prospective scandium targets: the TGZ, STG and North Target areas (Figure 9-1). The prospecting and mapping program was followed by mechanical stripping and channel sampling. Scandium-rich outcrops and boulders in the vicinity of the TGZ and STG targets confirmed that both zones correspond to a similar scandium-rich target discovered in 2014 at the Boulder Scandium Zone. A total of 39 grab samples and 41 channel samples were collected. An additional 24 historical core samples were selected for a mineralogical study to be completed at McGill University in Montreal, Quebec. The best results from the program are illustrated in Table 9-1. Figure 9-2 displays the location of the field work results on the STG target.



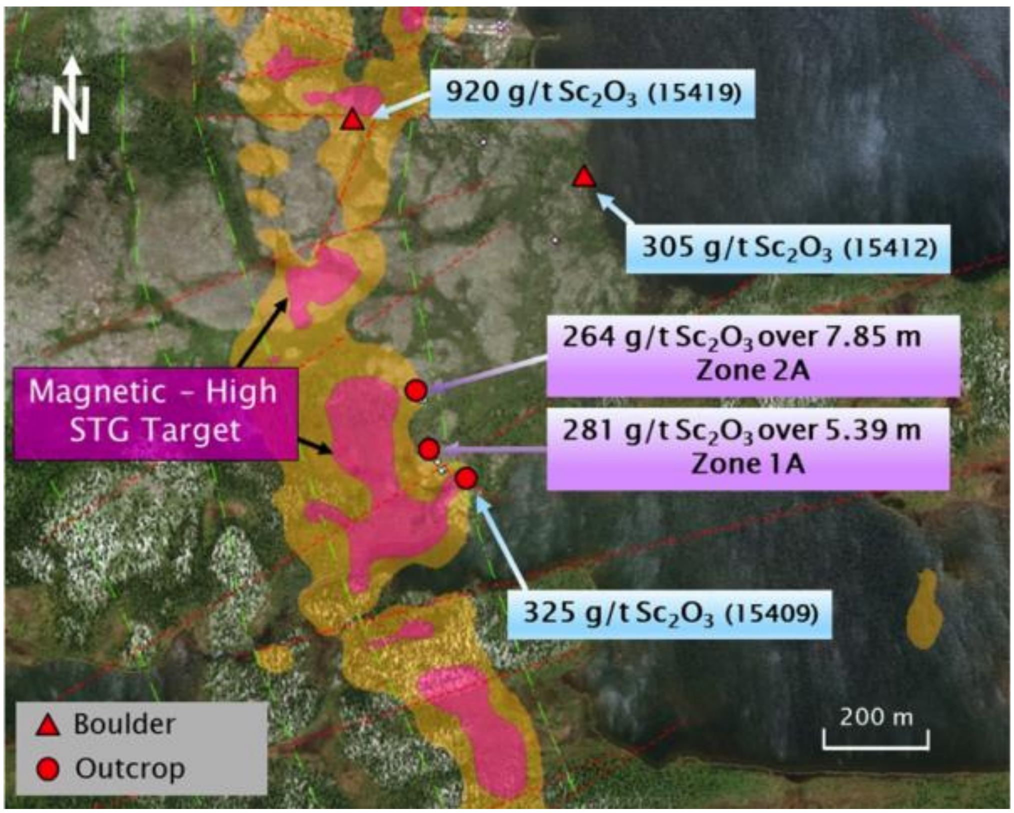
Source: Imperial (2018)

Figure 9-1 – Crater Lake exploration targets over ground magnetic map

Table 9-1 – Best scandium results on the Crater Lake Property, 2018 exploration program

Sample #	Easting	Northing	Sample Type	Target	Channel (m)	Rock Type	Sc2O3 (g/t)	TREO+Y (%)
15351	440672	6134128	Boulder	TGZ		Syenite	305	4.874
15352	440199	6133071	Boulder	TGZ		Syenite	57	8.296
15356	440222	6133196	Boulder	TGZ		Syenite	701	0.123
15402	440662	6132249	Boulder	STG		Fe-syenite	250	1.319
15403	440665	6132256	Boulder	STG		Fe-syenite	301	1.372
15407	440362	6131621	Outcrop	STG		Int-syenite	239	0.311
15409	440400	6131610	Outcrop	STG		Fe-syenite	325	0.329
15411	440662	6132249	Boulder	STG		Fe-syenite	308	1.379
15412	440665	6132256	Boulder	STG		Fe-syenite	305	1.140
15419	440168	6132371	Boulder	STG		Pyroxenite	920	1.010

Sample #	Easting	Northing	Sample Type	Target	Channel (m)	Rock Type	Sc2O3 (g/t)	TREO+Y (%)
15446	440359	6131619	Channel	STG, 1A	0.80	Intermediate-syenite	294	0.358
15501	440359	6131619	Channel	STG, 1A	0.80	Intermediate-syenite	298	0.362
15507	440.349	6131639	Channel	STG, 1B	1.00	Intermediate-syenite	305	0.358
15508	440349	6131639	Channel	STG, 1B	0.96	Intermediate-syenite	317	0.367



Source: Imperial (2018)

Figure 9-2 – STG Target grab sample results, 2018 exploration program

9.2.2 2020 summer exploration program

A prospecting and mapping program was conducted over 38.2 km of unexplored terrain on the Property. 8 grab samples, 304 historical core samples and 17 new channel samples were selected for a detailed mineralogical and geochemical study at McGill University in Montreal, Quebec.

Furthermore, strongly magnetic, boulders of ferro-syenite were found in the Hilltop target area and 300 m northeast of the STG target.

10. DRILLING

This item summarizes the issuer's 2019, 2020 and 2021 drilling campaigns (collectively, the "2019-2021 Program").

10.1 Drilling Methodology

The drilling was performed by Avataa Rouillier of Val-d'Or, Quebec, in 2019 and 2020, and by Cartwright Drilling of Happy Valley–Goose Bay, NL, in 2021. Collar locations were determined using a handheld GPS.

The drill was lined up using a Suunto compass. The downhole dip and azimuth were surveyed using a Reflex EZCOMII Shot tool. Surveys were taken at least every 30 m downhole. Prior to testing, at least 6 m of drill rods (2 rods) were removed from the hole to limit the chances of magnetic interference by the steel drill rods. Drilling contractors handled the instruments, and survey information was transcribed and provided in paper format to Imperial's geologists.

At the drill rig, the drill helpers placed core into core boxes and marked off each 3-m drill run using a labelled wooden block.

10.2 Collar Surveys

Casings were left in place with an identification tag. Collar locations were surveyed by Corriveau J.L. & Assoc. Inc of Val-d'Or after the drilling campaigns were completed.

10.3 Logging Procedures

The drill core was delivered by ATV or snowmobile and, when necessary, by helicopter, to the core shack area by drillers or by Imperial's staff, where it was cleaned of drilling additives and mud. An Imperial geologist quickly reviewed the core, checking for zones of mineralization and damaged or mislabelled core boxes. After fitting the core back together, the meterage was marked on the core and the RQD was estimated.

All data were recorded by the geologist using MX Deposit logging software. Input included descriptions of all aspects of significance: rock type, mineralization, alteration, structure, textures of interest. Photographs of selected portions of the core were taken and uploaded into the drilling software.

After samples were marked on the core, the core boxes were transferred to the core-saw shack and sawed by a technician. At this time, any thin section chips or core samples for specific gravity (SG) measurements were also cut. All thin-section cuts or SG samples were placed in a labelled sample bag and set aside. Once all sample intervals were sawed, the core technician placed one-half of the core in a labelled sample bag. The sampler stapled the sample tags to the core box underneath the half-core and re-wrote the sample interval's marks and the sample numbers on the remaining half with a red grease pencil. Bagged samples were loaded into rice bags to a total weight per bag between 10 and 20 kg. Each rice bag was labelled with the sample intervals and contact information (laboratory and company). The shipment data was entered into the shipment database.

Finally, overview photos of all core boxes were taken and uploaded into the logging software. The boxes were then transferred to the long-term core farm or temporarily placed in cross-piles.

10.4 Drill Programs

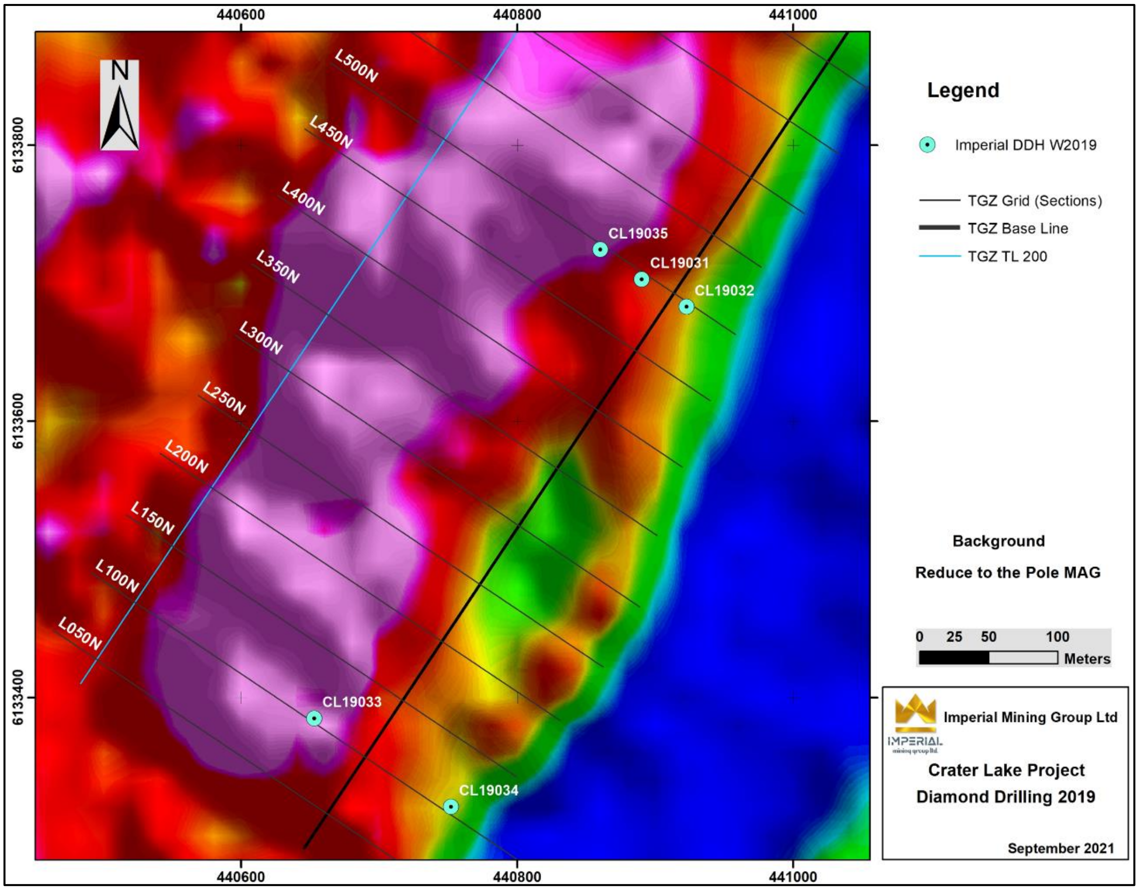
10.4.1 2019 drill program

A winter drilling program totalling 1,014 m in five (5) holes was completed in late April 2019 on the TGZ target to evaluate the scandium potential of a high-intensity magnetic anomaly (Figure 10-1). Drilling took place 600 m north of a historical drill hole that had returned scandium grades of up to 506 g/t Sc_2O_3 over 19 m along the western side of the Crater Lake intrusion along the same magnetic trend. The best assay results are shown in Table 10-1. Figure 10-2 illustrates some of those results.

Table 10-1 – Significant assay results from the 2019 drilling program

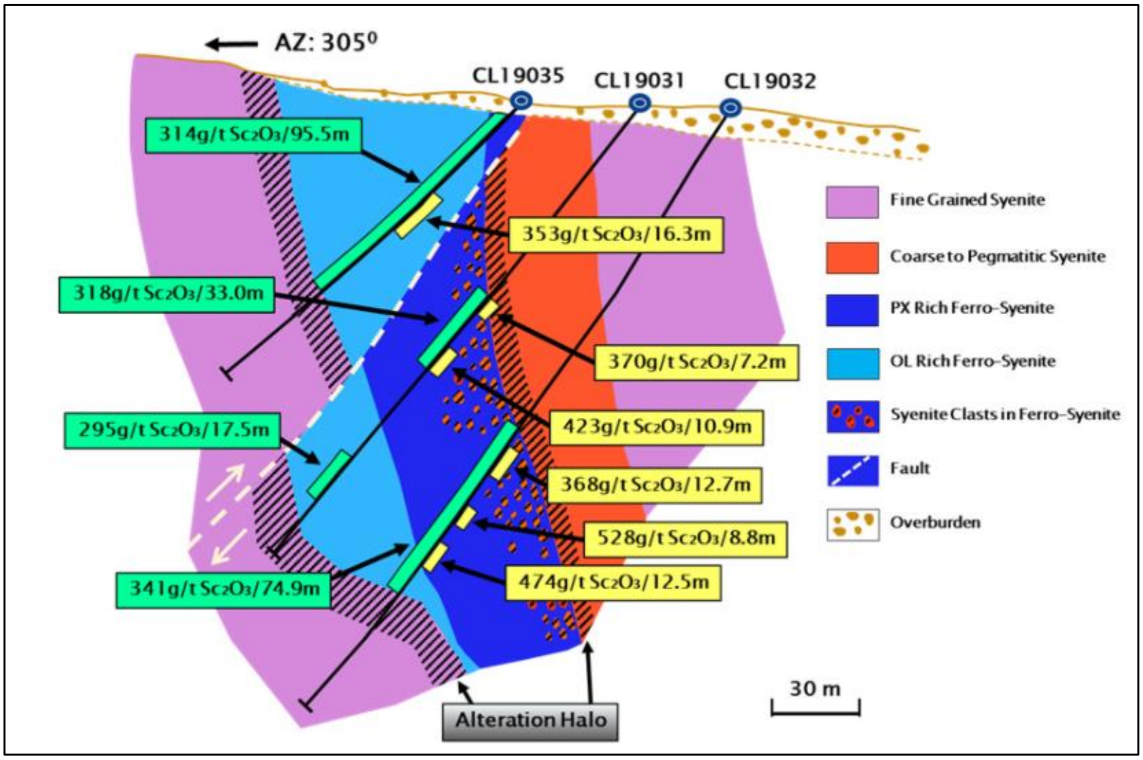
Hole #	From (m)	To (m)	Interval (m)	Sc (g/t)	Sc2O3* (g/t)	TREO+Y (%)
CL19031	115.80	148.75	33.0	207	318	0.340
	190.95	208.45	17.5	192	295	0.335
CL19032	145.15	220.00	47.9	251	341	0.421
CL19033	4.85	39.85	35	181	278	0.412
	63.75	177.65	113.9	202	310	0.370
CL19035	13.35	108.80	95.5	205	314	0.371

* 1ppm of Sc metal equals 1.5338 ppm Sc_2O_3



Source: Imperial (2021)

Figure 10-1 – Crater Lake 2019 drilling program



Source: Imperial (2019)

Figure 10-2 – DDH cross section 500N, TGZ target, 2019 drilling program

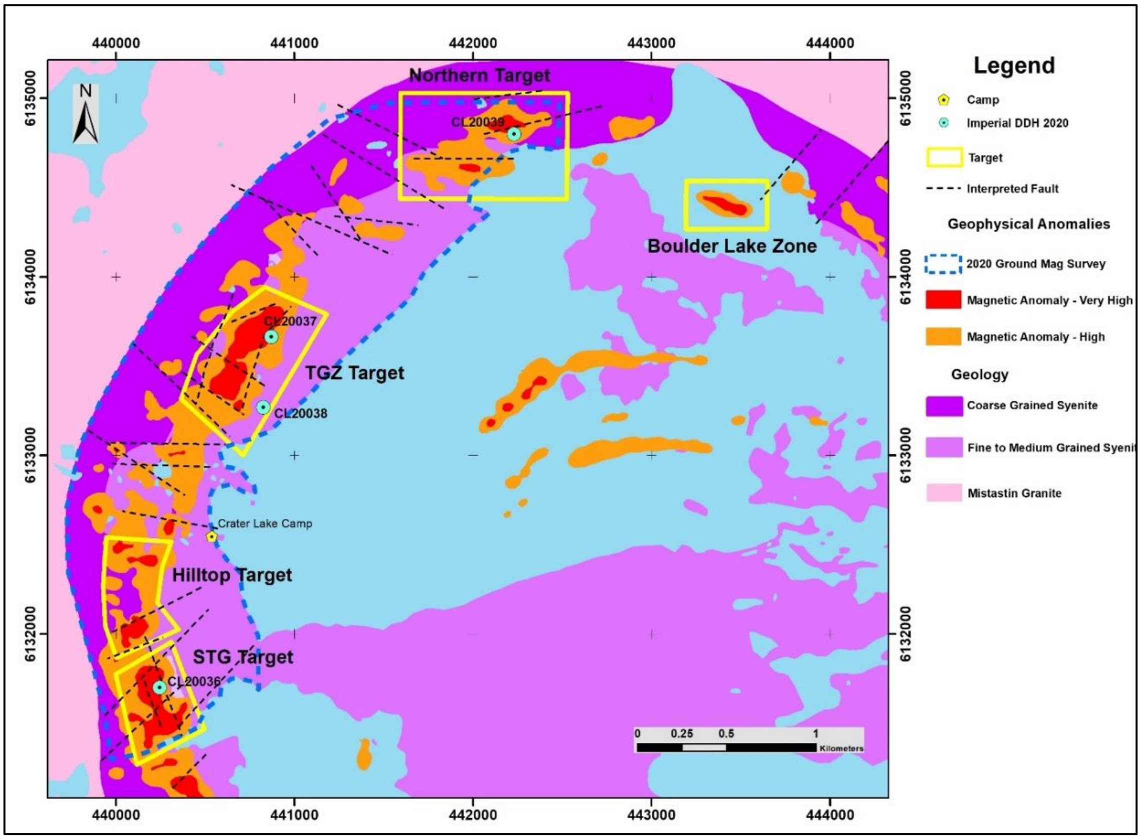
10.4.2 2020 drill program

A drilling program totalling 676 m in four (4) holes was completed between August 14 and 31, 2020. The drilling program was designed to test the scandium potential of high-intensity magnetic anomalies in the STG, TGZ and Northern target areas (Figure 10-3).

Results from the 2020 drill program include:

- CL20036: Tested a strong magnetic anomaly parallel and west of the STG target (previous surface channel grading 289 g/t Sc_2O_3 and 0.364% REE over 7.04 m). The magnetic anomaly was explained by a 90 m interval of amphibole-rich ferro-syenite. No significant Sc or REE mineralization was intersected.
- CL20037: Tested the lateral continuity of the TGZ target. The mineralized intervals (total true length of 110 m) show excellent lateral and vertical continuity of the favourable TGZ target horizon. The best Sc and REE intervals from this hole are presented in Table 10-2.
- CL20038: Tested a ferro-syenite unit that was previously intersected parallel and east of the main TGZ target. The hole intersected multiple, narrow scandium-bearing ferrosyenite intervals grading up to 244 g/t Sc_2O_3 and 0.71% TREO+Y over 2.6 m and 192 g/t Sc_2O_3 and 0.50% TREO+Y over 3.6 m.
- CL20039: Tested a strong, 350-m-long by 100-m-wide magnetic anomaly over the Northern target. The geophysical anomaly was explained by the intersection of a

coarse-grained syenite with small concentrations of pyroxene and amphibole. The hole did not yield any significant scandium or REE assays.



Source: Imperial (2020)

Figure 10-3 – Crater Lake 2020 drilling program

Table 10-2 – Significant assay results from the TGZ target, 2020 drilling program

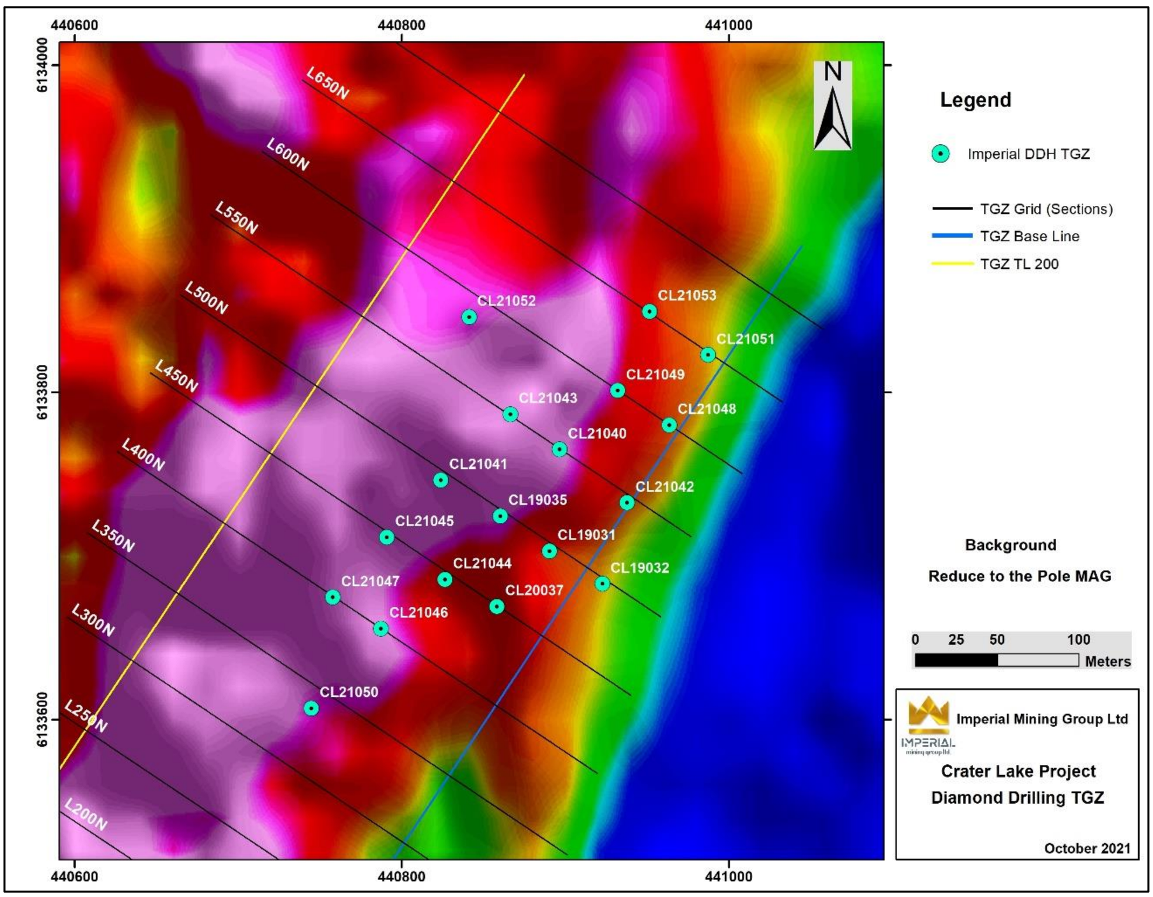
Hole #	From (m)	To (m)	Interval (m)	Sc (g/t)	Sc_2O_3 (g/t)	TRE+Y (%)	Magnet REO (%)
CL20037	127.81	156.95	29.14	165	253	0.305	24.3
	173.05	190.70	17.65	194	298	0.332	24.4
	207.82	218.52	10.70	152	233	0.389	24.4
	225.97	247.66	21.69	177	271	0.419	23.9

Note: 1 ppm of Sc metal equals 1.5338 ppm Sc_2O_3;.TREO+Y includes oxides of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu plus Y. The Magnet REOs include the total of Nd, Pr, Dy and Tb oxides as a percentage of the TREO+Y

10.4.3 2021 drilling program

A 14-hole drilling program totalling 2,049 m was completed on May 9, 2021, on the TGZ target (Figure 10-4). The objective of this drilling program was to outline mineral resources on 50- to 100-m centres.

All holes intersected the target mafic intrusive host rock and indicated that the TGZ target dips between 83° W to 70° E and strikes NNE. The true thickness of the mineralized zone varies between 55 and 135 m. Drilling has defined the mineralization on 50-m sections between sections 350N and 650N. The mineralization has been traced by drilling over 300 m in total strike length down to a vertical depth of up to 200 m. The best assay results are reported in Table 10-3. Figure 10-5 and Figure 10-6 illustrate some of those results.



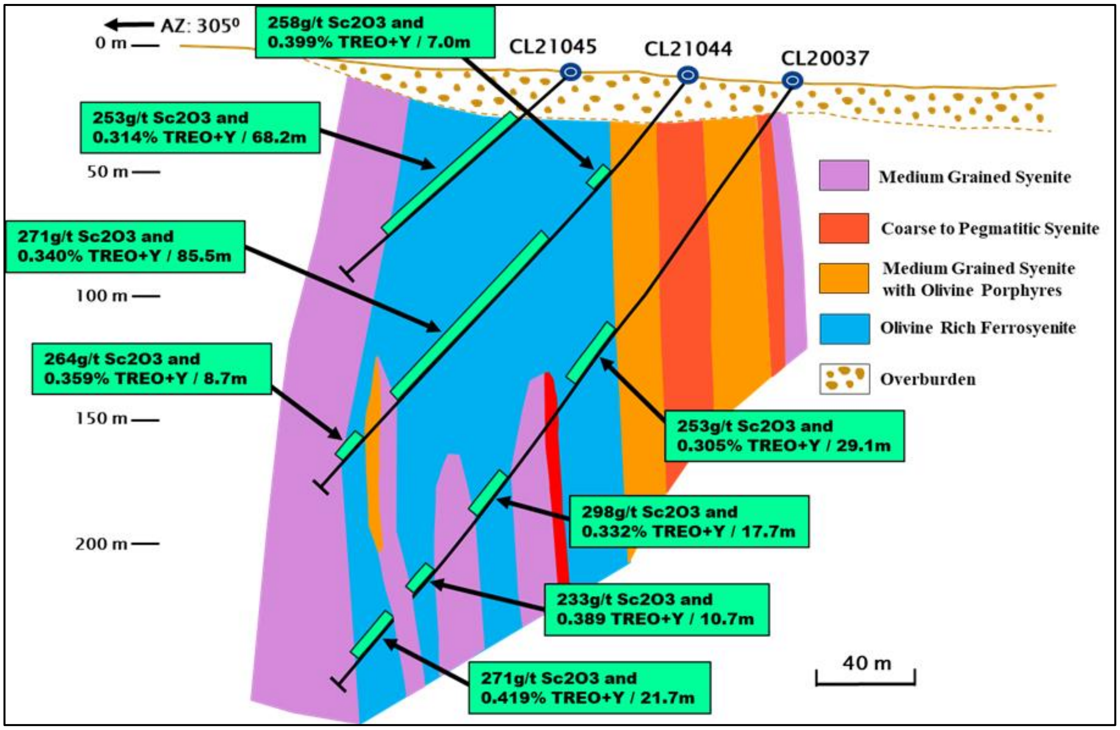
Source: Imperial (2021)

Figure 10-4– Crater Lake 2021 drilling program

Table 10-3 – Significant assay results from the 2021 drilling program

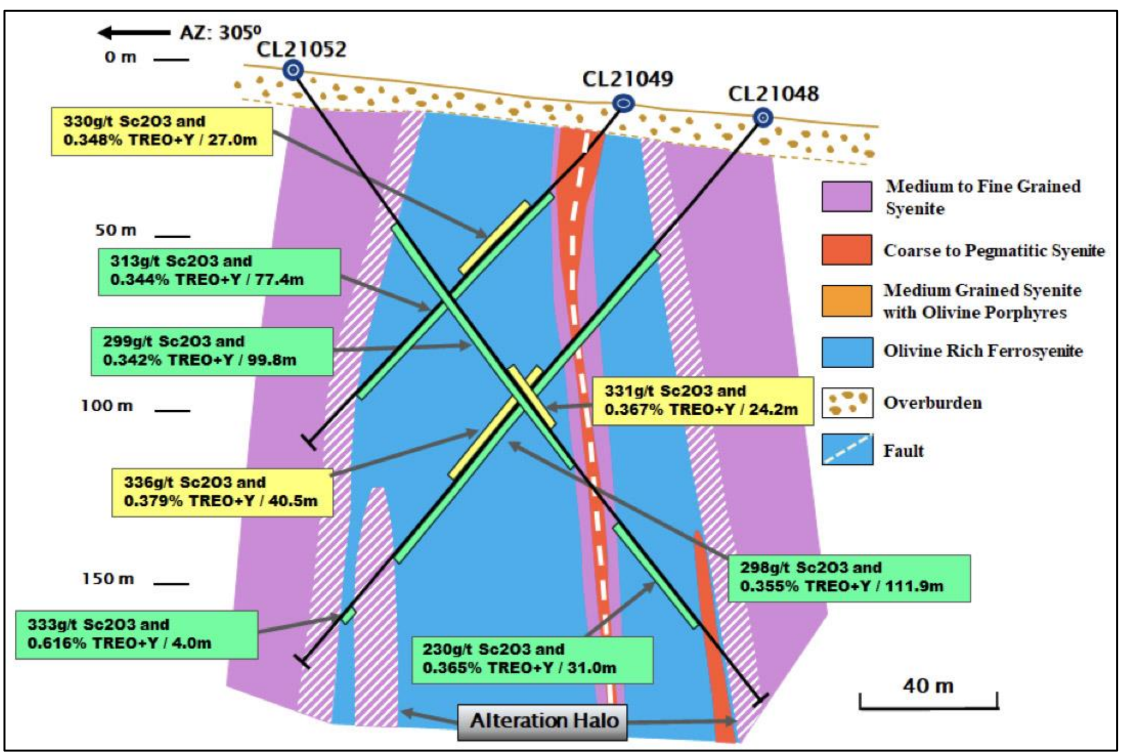
Hole #	From (m)	To (m)	Interval (m)	Sc (g/t)	Sc_2O_3 (g/t)	TRE+Y (%)
CL21040	20.85	101.5	80.2	187	287	0.320
CL21041	9.9	28.47	18.57	228	350	0.420
CL21042	46.95	81.38	34.43	198	304	0.380
	111.34	203.86	92.5	190	291	0.320
CL21043	9.4	32.40	23.0	199	305	0.390
CL21044	46.85	132.33	85.48	177	271	0.3396
	160.17	168.84	8.67	172	264	0.3590
CL21045	18.70	86.90	68.20	165	253	0.3141
CL21046	107.15	160.60	53.45	172	264	0.3258
CL21047	14.90	31.40	16.50	130	199	0.2684
	36.85	61.48	24.63	129	198	0.2633
	69.07	98.40	29.33	181	278	0.3310
CL21048	50.57	162.50	111.93	194	298	0.3547
CL21049	38.00	115.43	77.43	204	313	0.3441
CL21050	45.63	53.30	7.67	170	261	0.3305
	91.74	111.92	20.18	183	281	0.3873
CL21051	90.45	98.65	8.20	177	271	0.3197
	104.64	121.80	17.16	182	279	0.3218
	131.00	156.71	25.71	208	319	0.3481
CL21052	55.95	155.75	99.80	195	299	0.3417
CL21053	44.56	53.28	8.72	188	288	0.3720
	58.40	63.67	5.27	196	301	0.4239

Note: 1 ppm of Sc metal equals 1.5338 ppm Sc_2O_3; TREO+Y includes oxides of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu plus Y.



Source: Imperial (2021)

Figure 10-5 – DDH cross section 450N, TGZ target, 2021 drilling program



Source: Imperial (2021)

Figure 10-6 – DDH cross section 600N, TGZ target, 2021 drilling program

11. SAMPLE PREPARATION, ANALYSES AND SECURITY

This item describes the issuer's sample preparation, analysis and security procedures for the 2019-2021 diamond drilling campaigns (the "2019-2021 Program"). The issuer's geology team provided the information discussed below. InnovExplo reviewed and validated the information for the 2019-2021 Program, including the QA/QC procedures and results.

11.1 Core Handling, Sampling and Security

The drill core is boxed and sealed at the drill rigs and delivered daily by road or helicopter to the logging facility where a technician takes over the core handling. Drill core is logged and sampled by experienced geologists or by a geologist-in-training under the supervision of a qualified geologist. A geologist marks the samples by placing a unique identification tag at the end of each core sample interval. Core sample lengths vary from 0.15 to 2 m, and sample contacts respect lithological contacts and/or changes in the appearance of mineralization or alteration (type and/or strength). The technician saws each marked sample in half. One half of the core is washed with clean water and placed in a plastic bag along with a detached portion of the unique bar-coded sample tag, and the other half of the core is returned to the core box with the remaining tag portion stapled in place. The core boxes are stockpiled or stored in outdoor core racks for future reference. Individually bagged samples were placed in security-sealed rice bags along with the list of samples for delivery to the assay laboratory.

QA/QC sample tags are also placed in the core boxes. Once core sampling is complete, the sampling technician adds the corresponding barren ("blanks") and standard samples (certified reference materials or "CRMs") to the shipments. For each shipment of 100 samples, no less than two (2) blanks and four (4) CRMs are included with the core samples.

11.2 Laboratory Accreditation and Certification

The International Organization for Standardization ("ISO") and the International Electrotechnical Commission ("IEC") form the specialized system for worldwide standardization. ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories sets out the criteria for laboratories wishing to demonstrate that they are technically competent, operating an effective quality system, and able to generate technically valid calibration and test results. The standard forms the basis for the accreditation of competence of laboratories by accreditation bodies.

For the 2019-2021 Program, samples were sent and prepared at Activation Laboratories Ltd. ("Actlabs") in Ancaster, Ontario for assaying. Actlabs received ISO/IEC 17025 accreditation through the Standards Council of Canada ("SCC"). Actlabs is a commercial laboratory independent of the issuer and has no interest in the Project.

11.3 Laboratory Preparation and Assays

Samples were analyzed for REE at the Actlabs laboratory in Ancaster, Ontario. Procedures used were Inductively Coupled Plasma ("ICP") for major elements and Inductively Coupled Plasma/ Mass Spectrometry ("ICP-MS") for trace elements.

The methodology is described as follows:

- Samples are sorted, bar-coded and logged into the Actlabs Lims program. They are then placed in the sample drying room.
- Samples are crushed to 80% passing 10 mesh (2.00 mm) and split using a Jones riffle splitter. A 250-g or 500-g split is pulverized to 95% passing 200 mesh (0.07mm). Only 50 g of the 500 g is used for the analysis itself (code RX-1: 500). The remaining 450 g is returned as pulp to the issuer's office, along with the reject from the original sample.
- Assay results are provided in Excel spreadsheets and the official certificate (sealed and signed) as a PDF.
- The pulverized pulp is placed in kraft sample bags, and the un-pulverized portions returned to their original sample bags.
- The remainder of the crushed samples (the rejects) and the pulps are stored at Actlabs facility.

11.4 Quality Assurance and Quality Control (QA/QC)

The issuer's QA/QC program for drill core includes the insertion of blanks and standards in the sample stream of core samples. About 6% of the samples were control samples in the sampling and assaying process. Four (4) standard and two (2) blank samples of barren rock were added to each group of 100 samples as an analytical check for the laboratory batches. In addition, the issuer's QA/QC includes field duplicate samples that comprised 1% of the core selected as quarter core sample duplicates for comparison with the original core sample.

Imperial's geologists were responsible for the QA/QC and database compilation. Upon receiving the analytical results, the geologists extracted the results for blanks and standards to compare against the expected values. If QA/QC acceptability was achieved for the analytical batch, the data were entered into the project's database; if not, the laboratory was contacted to review and address the issue, including retesting the batch if required.

The discussion below details the results of the blanks and standards used in the issuer's QA/QC program.

11.4.1 Certified reference materials (standards)

Accuracy is monitored by inserting CRMs at a ratio of four (4) for every 100 samples (1:25). The standards were supplied by OREAS, Sudbury, Ontario. The definition of a QC failure is when the assay result for a standard falls outside three standard deviations ("3SD"). Gross outliers are excluded from the standard deviation calculation.

Between 2019 and 2021, three (3) different CRMs were used, two (2) for Sc only and one (1) for Sc and REE. Of the 82 CRMs inserted, four (4) returned results outside 3SD. From those four (4) fails, two (2) were identified as gross outliers, and the issuer took actions to explain the cause of the abnormal values. One (1) was a case of the incorrect standard recorded in the database (O460 instead of O464), and the other was an inversion between two samples (710032 and 710033). The database was corrected, and the gross outliers were removed from the QA statistics when they were identified as QC failures.

The overall success rate was 98% (Table 11-1). Overall, outliers did not show a persistent analytical bias (either below or above the 3SD limit). They were close to the 3SD threshold and appeared to be isolated errors, as other standards and blanks processed from the same batches passed. Consequently, no batch re-runs were performed.

Figure 11-1 shows an example of a control chart for the standard OREAS 464 assayed by Actlabs. A similar control chart was prepared for each CRM to visualize the analytical concentration value over time.

Table 11-1 – Results of standards used between 2019 to 2021 on the Project

CRM	No. of Assays	Metal	CRM value for Peroxide Fusion ICP (g/t)	CRM value for Acid Digestion (g/t)	Average (g/t)	Accuracy (g/t)	Precision (%)	Outliers	Gross Outliers	Percent passing QC
Oreas 180	17	Sc		41.5	42.8	3.2	3.6	0	0	100
Oreas 460	24	Sc		27.9	29.8	6.7	1.8	0	1	100
Oreas 464	41	Sc		141.0	155.2	10.1	1.8	2	1	95
		Dy	178		175	-1.7	3.5	0	1	100
		La	11700		11837.5	1.2	2.6	1	1	96
		Nd	9940		9594	-3.5	2.6	1	1	96
		Pr	2597		2539	-2.2	3.2	0	1	100
		Tb	54		52.27	-3.2	3.4	1	1	96

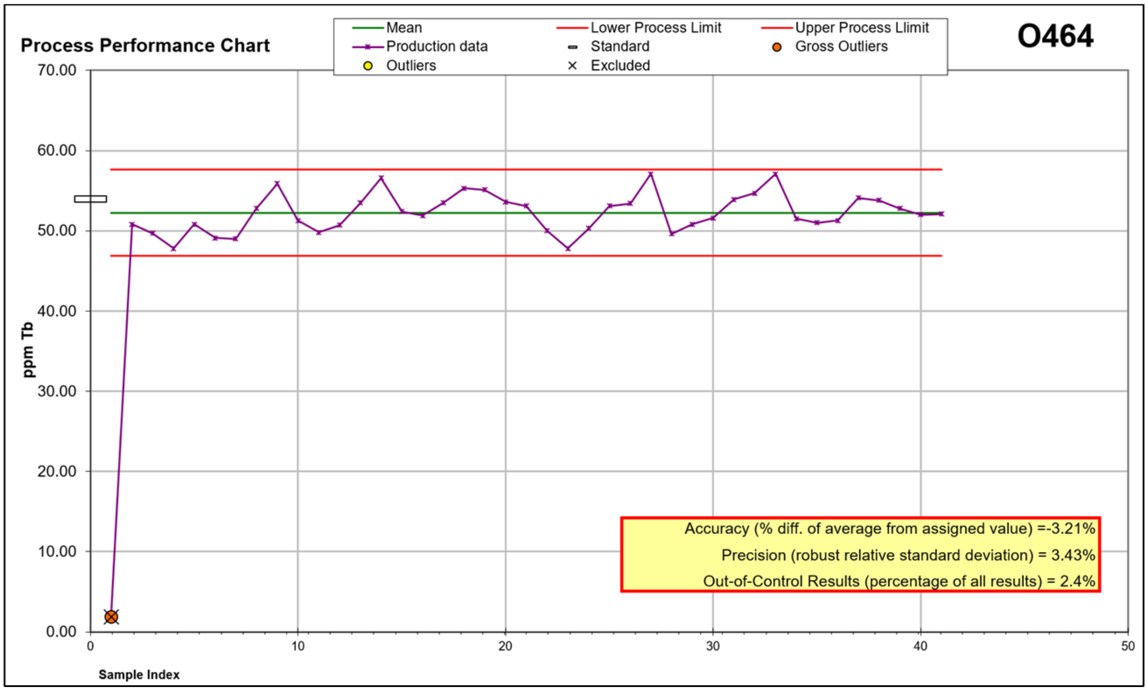


Figure 11-1 – Control chart for standard OREAS 464 assayed by Actlabs

For the scandium, the results exhibit a positive bias in terms of accuracy with an average of +7.7% and a precision of around 2.2% for representative standards. The accuracy bias can be explained by the difference of analysis methods used by OREAS and by Actlabs. OREAS standard value was defined with acid digestion while Actlabs used ICP to analyze samples. As ICP is a more precise analysis method than acid digestion, we can expect a more complete evaluation of the scandium content.

For the REE, the results exhibit a slight negative bias in terms of accuracy with an average of -1.9% and a precision around 3.1% for representative standards.

Both parameters meet standard industry criteria.

11.4.2 Blank samples

Contamination is monitored by the routine insertion of a barren sample (blank) which goes through the same sample preparation and analytical procedures as the core samples.

A total of 49 blanks were inserted in the batches from the 2019 to 2021 drilling programs. The blanks were supplied by OREAS. The blank material consists of ornamental silica pebbles. The source deposit is situated in Carboniferous sedimentary rocks of the Maritimes Basin in New Brunswick. Blank material contents in Sc and La were defined by OREAS using aqua regia digest analysis method. Dy, Nd, Pr and Tb contents were not analyzed. A general guideline for success during a contamination QC program is a rate of 90% of blank assay results not exceeding the acceptance limits of three times (3x) the detection limit. The detection limit was 1 g/t for Sc and 10 g/t for La with the aqua regia digest analysis method.

For the 2019-2021 Program, no sample returned grades higher than 3x the detection limit for Sc and La (Table 11-2, Figure 11-2, Figure 11-3). For Dy, Nd, Pr and Tb, no values are available for the blank material; therefore, it is impossible to define a precise detection limit for those elements. However, we can note that the blank material's Dy, Nd, Pr and Tb results from Actlabs are all homogenous and very low grade.

Table 11-2 – Results of blanks used between 2019 and 2021

Metal	Acceptance limit (g/t)	Quantity inserted	Quantity failed	Percent passing QC
Scandium	1	49	0	100
Lanthanum	10	49	0	100

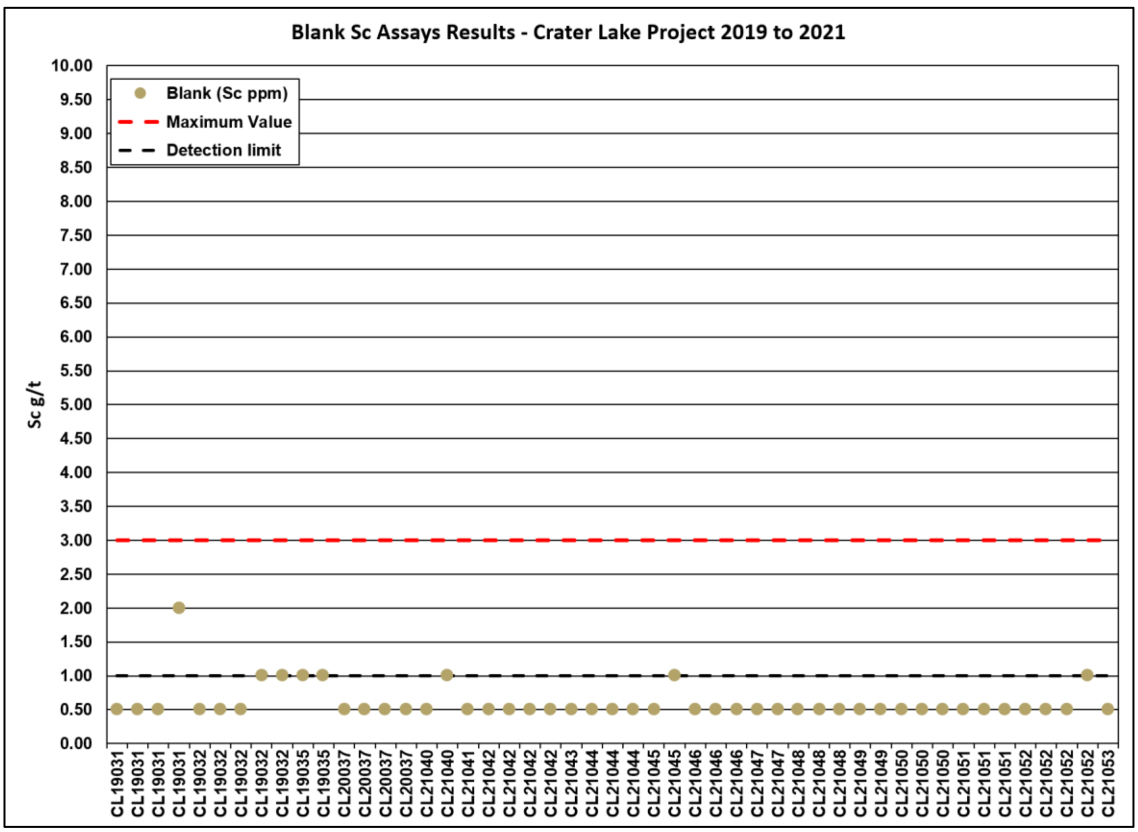


Figure 11-2– Time series plot for blank samples assayed by Actlabs between 2019 and 2021 (Sc)

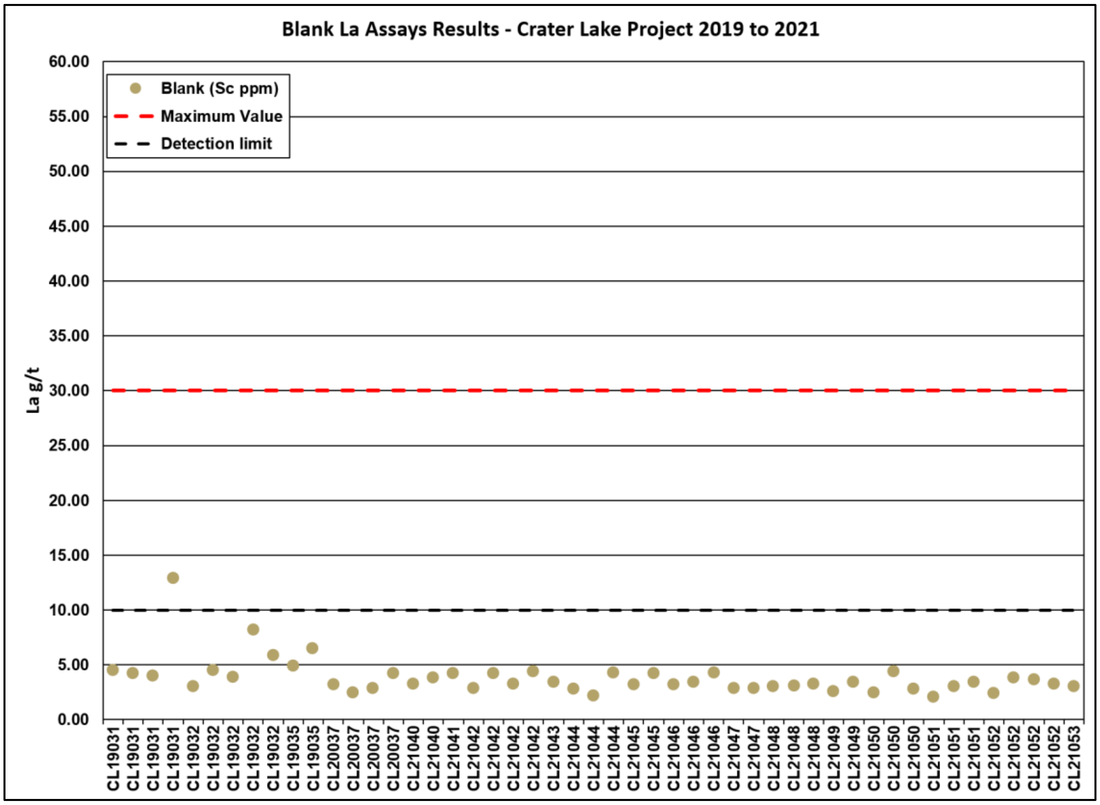


Figure 11-3– Time series plot for blank samples assayed by Actlabs between 2009 and 2021 (La)

11.4.3 Field duplicates

The 2019 Program included quarter-core duplicate samples to assess the presence of a “nugget effect” or heterogeneity of mineralization within individual intervals of sampled drill core. The issuer inserted nine (9) quarter-core duplicates into the sample stream. The difference between the original analysis and the quarter-core duplicate analysis is presented in Table 11-3. Figure 11-4 shows the scatter plots for Sc.

Results show a good precision with R^2=0.98 for Sc and an average of R^2=0.98 for La, Pr, Nd, Tb and Dy. Results also show a good accuracy monitored by the linear regression line for all studied metals (between the 10% tolerance limit). This good repeatability shows that Sc and REE distribution in the core seems homogenous.

Table 11-3 – Results of Field duplicates used during the 2019 Drilling Program

Metal	Coefficient of determination R^2 (%)
Sc	98
La	87
Pr	97
Nd	98
Tb	99
Dy	99

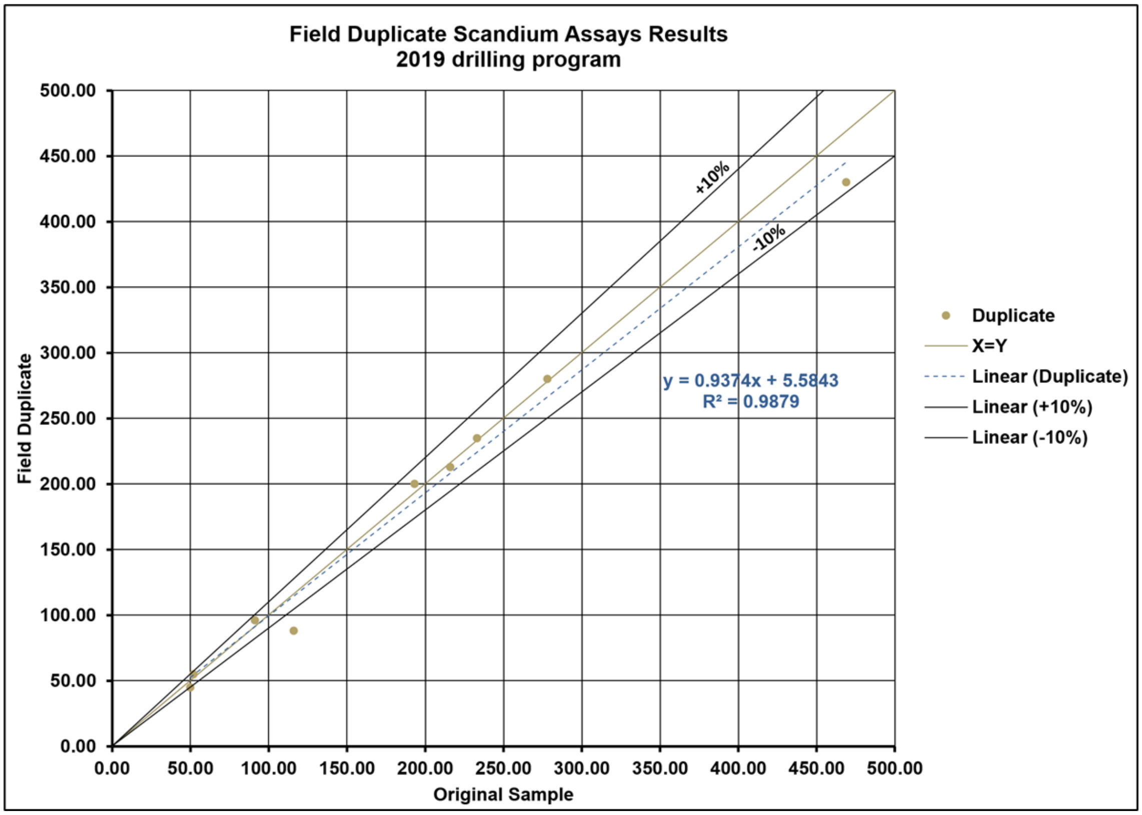


Figure 11-4 – Linear graph comparing original and field duplicate samples analyzed in 2019 (Sc)

11.5 Conclusion

The authors are of the opinion that the sample preparation, security, analysis and QA/QC protocols performed by the issuer followed generally accepted industry standards, and that the data is valid and of sufficient quality for a mineral resource estimation.

12. DATA VERIFICATION

This item covers the data verification of the diamond drill hole databases supplied by the issuer (the "Imperial Database"). The database close-out date for this Technical Report is July 09, 2021.

The author's data verification included visits to the Property, drill sites and core logging facilities, as well as an independent review of the data for selected drill holes (surveyor certificates, assay certificates, QA/QC program and results, downhole surveys, lithologies, alteration and structures).

12.1 Site visit

The author, Marina Iund, visited the Project and the issuer's core shack from May 7 to May 9, 2021. She was accompanied by Pierre Guay, the issuer's VP Exploration. The site visit focused on the TGZ mineralized domains. Onsite data verification included a general visual inspection of the property and a review of drill collar location coordinates. At the core shack, the author examined selected mineralized core intervals, reviewed the QA/QC program and the descriptions of lithologies, alteration and mineralization. She also performed independent check assays on selected intercepts.

12.2 Core Review

The core boxes are stored on pallets. The core boxes were found to be in good order and properly labelled, and the sample tags were still present. The wooden blocks at the beginning and end of each drill run were still in the boxes, and they matched the indicated footage on each box. The author validated the sample numbers and confirmed the presence of mineralization in the reference half-core samples (Figure 12.1).

A) Mineralization from hole CL21040; B) Sawing facility; C) Core shack; D) Proper labelling of the drill core boxes and sample tag stapled in core box; E) Standard; F) Blank; G) quarter splits sample collected in hole CL21040

Figure 12-1 – Photographs taken during the drill core review

The author selected representative mineralized intercepts and collected five (5) samples for independent assaying. The samples are quarter splits, sawed by the issuer's contractor (Figure 12-1 G). The samples were placed in plastic bags, sealed with plastic zip ties and packed in rice bags for transport to the independent assaying laboratory. Marina Iund transported the samples to the AGAT laboratory facility in Quebec City.

The results of the independent re-assaying show a general correlation between the original and re-assayed scandium and REE values. All five (5) mineralized samples yielded subeconomic to economic values for the intercepts (Table 12-1).

The author believes the field duplicates from the independent resampling program are reliable and consistent with the database.

Table 12-1 – Results of InnovExplo's independent sampling

Sample type	Hole ID	From (m)	To (m)	Sample ID	Sc (g/t)	Dy (g/t)	La (g/t)	Nd (g/t)	Pr (g/t)	Tb (g/t)
Original (Imperial)	CL21047	17.52	19	711946	199	71	673	639	171	12
	CL21041	23	24.5	711328	251	76	752	699	193	13
	CL21040	80.5	82	711278	202	60	525	548	142	10
	CL19035	35.5	37	710735	210	60	535	524	141	10
	CL20037	151.5	152.37	711033	198	59	490	513	135	10
Field Duplicate (InnovExplo)	CL21047	17.52	19	K504275	261	62	523	513	137	11
	CL21041	23	24.5	K504276	318	73	668	701	182	13
	CL21040	80.5	82	K504277	254	51	278	294	79	9
	CL19035	35.5	37	K504278	193	47	424	448	117	8
	CL20037	151.5	152.37	K504279	249	54	460	517	133	10
Difference					24%	-15%	-29%	-25%	-25%	-8%
					21%	-4%	-13%	0%	-6%	0%
					20%	-19%	-89%	-86%	-80%	-15%
					-9%	-28%	-26%	-17%	-21%	-21%
					20%	-10%	-7%	1%	-2%	-6%

12.3 Databases

12.3.1 Drill hole locations

The drill hole collars from the 2019-2021 diamond drilling campaigns (the "2019-2021 Program") were surveyed by Corriveau J.L. & Assoc. Inc. using a GPS base station.

The author confirmed the coordinates of eight (8) selected surface holes using a handheld GPS (Figure 12-2 and Table 12-2), then compared them to the database. All results had acceptable precision.

The collar locations in the Imperial Database are considered adequate and reliable.

A) CL19032 collar; B) CL21043 collar; C) CL21048 collar.

Figure 12-2 – Examples of onsite collar location verifications

Table 12-2 – Original collar survey data compared to InnovExplo's checks

Hole ID	Original coordinates		InnovExplo coordinates		Difference (m)	
	Easting	Northing	Easting	Northing	Easting	Northing
CL19032	440922	6133684	440923	6133683	-1	1
CL19035	440859	6133724	440860	6133725	-1	-1
CL21043	440869	6133788	440866	6133787	3	1
CL21045	440792	6133712	440791	6133712	1	0
CL21046	440789	6133657	440787	6133656	2	1
CL21047	440760	6133677	440758	6133675	2	2
CL21048	440964	6133780	440964	6133780	0	0
CL21052	440841	6133848	440841	6133846	0	2

12.3.2 Downhole survey

Downhole surveys were conducted using a Reflex EZCOMII Shot tool. Single-shot survey measurements were taken every 30m as well as at the end of the hole. The downhole survey information was verified for 70% of the holes used in the 2021 MRE.

Minor errors of the type normally encountered in a project database were identified and corrected.

12.3.3 Assays

The author had access to the assay certificates for the 2019-2021 Program. The assays in the database were compared to the original certificates provided by the laboratory. The verified holes represent 70% of the Imperial Database.

Minor errors of the type normally encountered in a project database were identified and corrected.

12.3.4 Conclusions

The author believes that the data verification process demonstrates the validity of the data and the protocols for the Project. The author considers the database for the Project to be valid and of sufficient quality to be used for the mineral resource estimate herein.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

The process flowsheet developed for the Crater Lake Project consists of crushing and milling, magnetic separation, high-pressure caustic leach, followed by hydrochloric acid leach, solvent extraction and co-electrowinning of Al and Sc from alumina (Al_2O_3) and Sc_2O_3 to produce Al-2%Sc master alloy. A mixed REE carbonate will be produced as a co-product.

Between 2018 and 2021, a number of metallurgical testing programs focused on the development of an extraction flowsheet for the Crater Lake Sc/REE mineralized samples were completed:

- Phase 1 Metallurgical Development Program:
  - Mineralogy and scoping-level evaluation of several mineral processing technologies for producing a Sc/REE mineral concentrate – SGS Mineral Services ("SGS"), Lakefield, Ontario, Canada (SGS, 2018; SGS, 2019a).
- Phase 2 Metallurgical Development Program:
  - An investigation into the magnetic separation of samples from the Project – SGS (SGS, 2019b).
  - Mineralogy and bench-scale mineral processing program focused on the magnetic separation and flotation of two drill core bulk samples from the TG Zone to generate a Sc/REE mineral concentrate – M.Plan International Ltd ("M.Plan"), Hirschau, Germany (M.PLAN, 2019; M.PLAN, 2020a).
- Phase 3 Metallurgical Development Program:
  - Hydrometallurgical extraction of Sc/REE – M.Plan (M.PLAN, 2020b; M.PLAN, 2020c).
  - Evaluation of carbochlorination for the extraction of REE and Sc from Crater Lake mineralization – Hazen Research Inc. ("Hazen"), Golden, Colorado, USA (Hazen, 2021).

13.1 Phase 1, Metallurgical Development Program – SGS

A mineralogical investigation was conducted on a small bulk sample of drill core from Quest's 2014 program (the "Master Composite") and several core pieces at SGS from May to July 2018. The program was conducted in conjunction with a scoping-level mineral beneficiation test program that was also conducted at SGS. The main objective of the mineralogical investigation was to determine the overall mineral assemblage, the elemental deportment of the scandium, and for the Master Composite, determine the liberation characteristics of the various minerals phases to aid the magnetic and gravity beneficiation program.

The mineralogical study showed that the Master Composite primarily comprised of pyroxene (36.2%) and olivine (25.6%) with moderate amounts of amphibole (13.1%) and K-feldspar (9.7%), and minor levels of plagioclase (3.5%), titanomagnetite (4.3%), ilmenite (2.7%), britholite (1.8%), and zircon (1.8%). The electron microprobe analysis ("EMPA") and QEMSCAN deportment data revealed that about 82% of the scandium is hosted primarily by pyroxene and to a lesser extent (18%) in the amphiboles. The iron concentrations between the various silicates and oxides are variable.

This work was motivated by microprobe and mineralogical studies at McGill University, which showed that 100% of the scandium associated with the ferro-syenite unit is related to a single mineral, Hedenbergite, a highly magnetic clinopyroxene mineral that should be amenable to concentration through magnetic separation techniques. This offers the possibility of a relatively low-cost initial production scenario involving near surface open pit mining and production of a scandium mineral concentrate at site.

Under the Phase 1 Metallurgical Development Program, SGS evaluated a series of scoping-level mineral processing techniques, including Davis Tube low-intensity magnetic separation ("LIMS"), Mozley Table (gravity separation), and wet high-intensity magnetic separation ("WHIMS").

SGS concluded the following based on the results of the Phase 1 scoping tests:

- Among the grind sizes of 100% passing 20 mesh (850 µm), 35 mesh (500 µm), 48 mesh (300 µm), and 150 mesh (105 µm), the finest grind size of 105 µm was found to perform best for the evaluated mineral processing techniques.
- Magnetic separation was identified as the primary process technology for the recovery and concentration of scandium.
- The Davis Tube was found to recover a fairly small amount of ferromagnetic material, likely titanomagnetite, achieving a titanium recovery of 40.8% with only 3.9% of the scandium.
- WHIMS recovered the scandium-bearing minerals, pyroxene and amphiboles, but with poor selectivity versus olivine in the ore. The finest grind that was tested (-105 µm) attained a scandium recovery of 78% in 57% of the mass.
- Gravity separation on a Mozley Table recovered the majority of the zirconium (69%) in the sample, but achieved poor selectivity. A substantial amount of scandium (26%) was lost to the gravity concentrate.

13.2 Phase 2, Metallurgical Development Program

13.2.1 SGS

SGS completed its component of the Phase 2 Metallurgical Development Program on the Master Composite from October 2018 to March 2019, following the conclusion of Phase 1 test program. The Phase 2 program included magnetic separation, gravity separation, and mineralogical analyses. The goal was to build on the results of the Phase 1 test program to develop a preliminary flowsheet for scandium beneficiation, with a particular focus on the optimization of magnetic separation.

The target for the concentrate produced was the recovery of >80% of the scandium in <50% of the feed mass. A series of magnetic separation tests was conducted as part of the program, along with a handful of gravity separation tests on a Wilfley Table and a Mozley Table.

The following conclusions were drawn:

- LIMS is an important pre-concentration step to reject the majority of the titano-magnetite in the sample, as well as a proportion of the ilmenite. Scandium losses to the LIMS magnetic concentrate were fairly low (~1.5%).
- WHIMS tests in an Outotec SLon-100 resulted in a scandium upgrade at certain magnetic intensities. However, the selectivity of the WHIMS for scandium, against olivine in particular, remained a significant challenge.

- The WHIMS operating parameters had a significant impact on the magnetic separation test results, particularly in terms of the mass yield to the magnetic concentrate and magnetic intensity at which different minerals were captured. However, the highest scandium upgrade was consistently achieved in the magnetic concentrate generated at a magnetic intensity of 0.8 Tesla.
- Gravity separation tests using a Wilfley Table and a Mozley Table displayed poor selectivity for scandium. Gravity separation may be a suitable technique to concentrate zircon from the sample.

13.2.2 M.Plan

In continuation of the physical processing flowsheet development of the Project, Imperial, in September 2019 commissioned M.Plan to undertake further metallurgical testwork on the mineralization from the recently discovered TGZ target M.Plan, based in Toronto, Ontario, is a joint venture of the metallurgical service group Dorfner ANZAPLAN GmbH (Germany) and the mining consultancy Micon International Limited.

The testwork was completed on two (2) drill core bulk samples collected from the TG Zone during the 2019 drilling program. The samples represent different mineralization types encountered in the zone, yielding a best assay of 474 g/t scandium oxide (Sc_2O_3) over 12.5 m in an interval grading 341 g/t Sc_2O_3 over 74.9 m.

Two 100-kg samples, MET1 and MET2 from the TG zone, were used for this test program:

- The MET1 sample represents a pyroxene-rich ferro-syenite with decimetric to metric clasts of pegmatitic or coarse-grained felsic syenite.
- The MET2 sample represents an olivine-rich ferro-syenite with several centimetric clasts of fine-grained felsic syenite.

The objective of the current test work was to reject the major portion of olivine from the samples by testing different separation methods, including magnetic separation, electrostatic separation and flotation. The testwork program consists of two parts:

- Mineralogical characterization of both (MET1 and MET2) scandium-bearing samples
- Physical processing of the samples, targeting the production of a highly concentrated scandium mineral concentrate.

13.2.2.1 Mineralogical Characterization

Polished sections, about 40 by 25 mm in size and about 25 µm thick, were prepared and petrographically analyzed. The samples were characterized by X-ray diffraction ("XRD"). Mineral liberation analysis ("MLA"), a quantitative analytical technique, was conducted using a scanning electron microscope ("SEM").

The mineralogical characterization showed that the MET1 sample represents a pyroxene-rich ferro-syenite with decimetric to metric clasts of pegmatitic or coarse-grained felsic syenite, which is interpreted to be the cumulate variety of the ferro-syenite. The MET2 sample represents an olivine-rich ferro-syenite with centimetric clasts of fine-grained felsic syenite. It is interpreted to represent a more evolved variety. The studied thin sections from each sample are quite distinct, documenting the significant mineralogical and textural variability of these rocks.

The main mafic phases in both samples are yellow olivine (fayalite), green clinopyroxene (hedenbergite, Figure 13-1), brown and green amphibole (ferropargasite, see Figure 13-2), and opaque titanomagnetite and ilmenite. The main felsic phases are feldspars, micro-perthite and anorthoclase to albite, and especially red-brown biotite (annite) in the more evolved MET2 sample. The minor to accessory igneous and possibly late-magmatic-hydrothermal phases comprise zircon, apatite (always zoned and sometimes with britholite inclusions), various sulphides (mostly pyrrhotite, chalcopyrite, and sphalerite) and minor graphite. Texturally late alteration phases in fractures include calcite, mica, a series of unidentified Fe-rich silicates and a Ca-silicate.

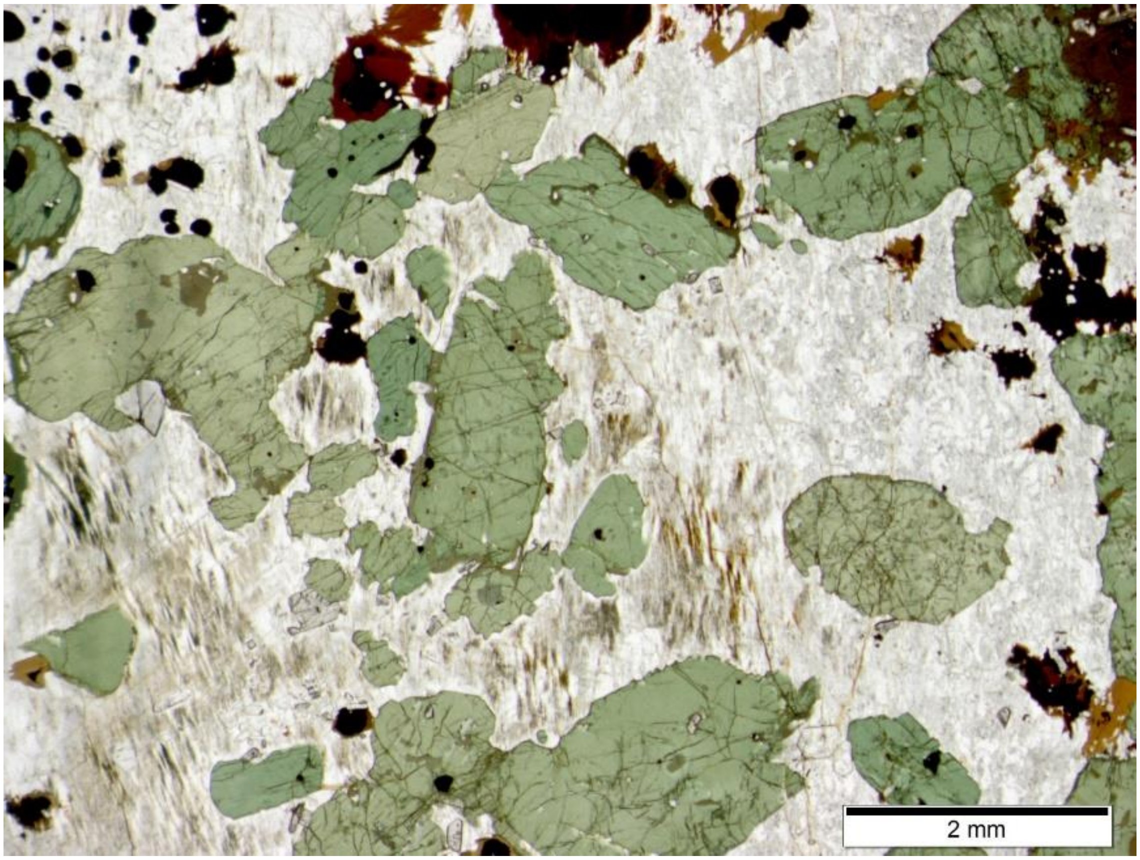


Figure 13-1 – Polished section showing anhedral pleochroic green clinopyroxene crystals in perthitic K-feldspar

The scandium content of samples MET1 and MET2 was 243 mg/kg and 238 mg/kg, respectively. The total rare earth element (TREE) content in MET1 was 4,330 mg/kg and 4,030 mg/kg for MET2, respectively. Scandium was depleted in the fine fraction (-0.02 mm) in both samples, while TREEs were enriched in this fraction.

XRD analyses showed the presence of pyroxene (hedenbergite) and amphibole (ferrohornblende/ ferropargasite), which are recognized as the Sc-bearing minerals. Different feldspars, namely albite, microcline and anorthoclase, fayalite and mica (biotite), were identified as main components. Ilmenite, magnetite and the REE-bearing phases (hydroxyl-)apatite and zircon were also identified in the samples.

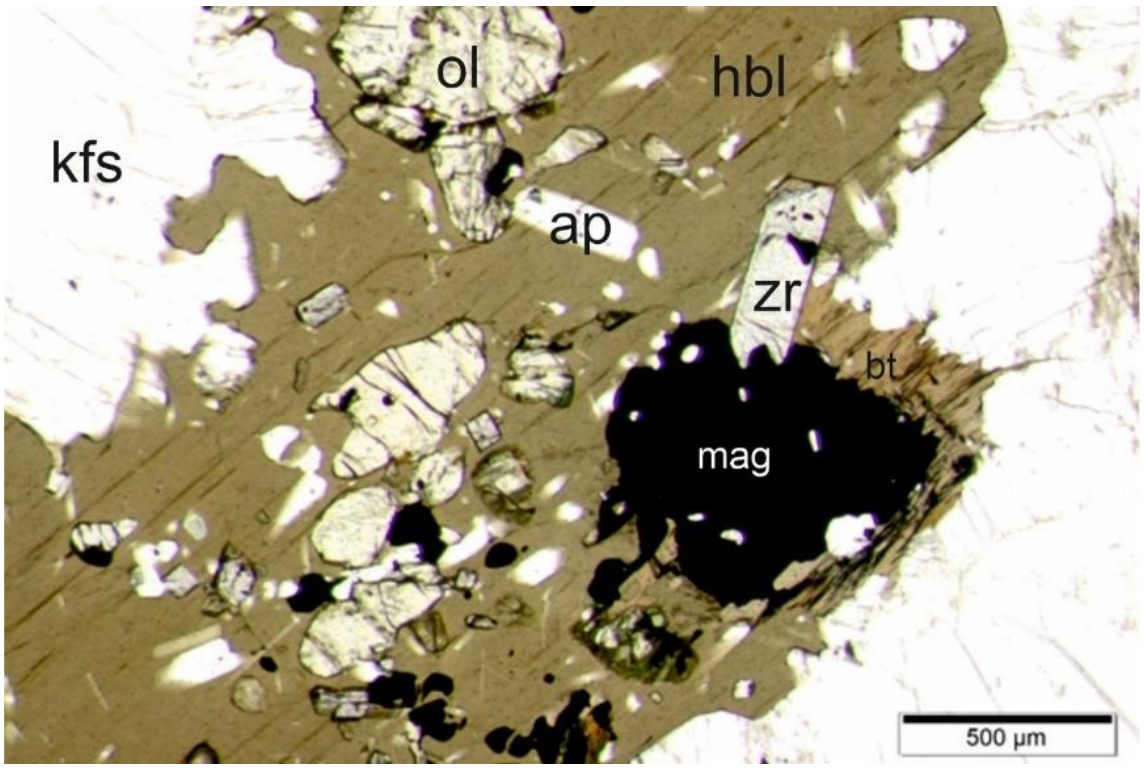


Figure 13-2 – Polished section showing poikilitic brown amphibole with inclusions of olivine, zircon, apatite, and anhedral Ti-magnetite surrounded by biotite at the contact to K-feldspar

Based on MLA, the modal mineralogy of the samples was determined (Figure 13-3). Scandium-bearing minerals pyroxene and amphibole were found to account for approx. 30 wt. % in all samples, while pyroxene (15 to 20 wt.-%) dominates over amphibole (9 to 14 wt.-%). The most dominant gangue mineral in both MET1 and MET2 samples is anorthoclase (23 to 29 wt.-%), a Na-Ca-rich "ternary" K-feldspar. MET1 was found to contain K-feldspar (23 wt.-%) as the second most dominant phase; in MET2, fayalite (15 and 19 wt.-%), an iron-bearing olivine, is very prominent.

Mineral locking was determined for samples +0.02 -0.1 mm and +0.1 – 0.3 mm of MET1 and MET2. The amount of unlocked minerals was low. In both samples, approximately 65% pyroxene and amphibole in fraction +0.02 -0.1 mm and about 40 to 50 wt% in fraction +0.1 -0.3 mm were unlocked, with the remainder of scandium-bearing pyroxene and amphibole being mostly intergrown with each other.

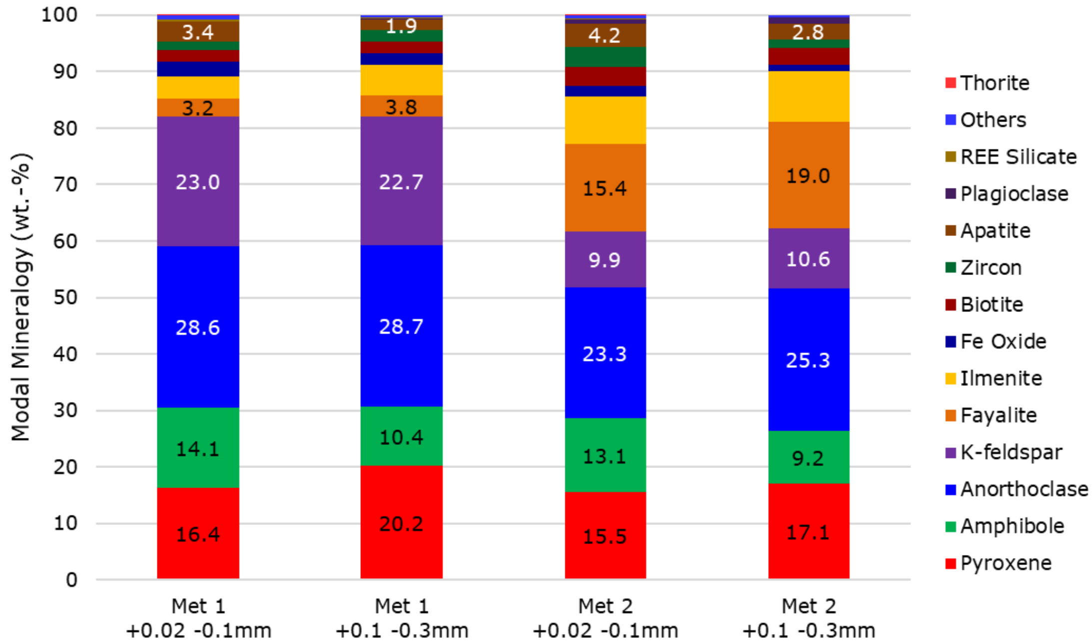


Figure 13-3 – Modal Mineralogy of fractions +0.02 -0.1 mm and +0.1 -0.3 mm of MET1 and MET2 samples

13.2.2.2 Mineral Processing

Various mineral processing technologies including sensor-based ore sorting, as well as magnetic, density and electrostatic separation techniques and flotation were evaluated under this program for the production of Sc-REE bearing mineral concentrate from MET1 and MET2 samples.

MET1 and MET2 samples were crushed in a jaw crusher and further grain size reduction of the samples was achieved by a double roll mill. The gap between both rolls was adjusted step by step after every passage of coarse material. The gap width was set between 1 mm at the beginning and 0.2 mm at the end of the comminution sequence. After each passage through the mill, the ground sample was screened to separate the product fractions. The oversized material was added to the next grinding step. Dry and wet screening was applied to separate various particle size fractions. The screening machine was equipped with removable screening decks. Screen cloths made of steel were used. For desliming of fraction -0.1 mm, a 1 inch diameter hydrocyclone was used and for desliming of fraction -0.15 mm, a 50 mm diameter hydrocyclone was deployed.

Magnetic Separation: LIMS and WHIMS

A low intensity, SALA type wet drum magnetic separator, was used for the LIMS tests. The maximum magnetic field of the low intensity magnetic separator is 110 mT.

For WHIMS, a wet magnetic separator manufactured by Eriez Magnetics was used to run the tests. The nominal maximum magnetic field of the magnetic separator was 2 T.

Flotation

Three (3) and five (5) litre laboratory flotation cells manufactured by HUMBOLDT WEDAG was used for the flotation tests. SM15 collector was the main flotation reagent. Flotation pH was adjusted with the addition of sulphuric acid and acidified water glass ("AWG") or sodium silicate was used as the depressant.

Electrostatic Separation

Minerals can be separated by electrostatic (high tension) method due to differences in surface conductivity. A pilot plant free fall electrostatic separator was used. The electrostatic field of 70 kV was generated by an electrostatic generator. The feed material was initially heated in some tests to temperatures up to 200°C and dosed with a preheated vibration feeder to feed the electrostatic separator. In one test, the material was activated by heating the sample and by the addition of diluted acid to the feed material prior to heating.

Heavy Liquid Separation ("HLS")

Fraction +0.8 -6 mm was used for HLS testing. Prior to HLS tests, the sample material was washed to remove adherent fines to minimize contamination of the heavy liquid solution. HLS test work was carried out using sodium metatungstate as heavy medium. The liquid SG was adjusted downwards or upwards by diluting with water or by boiling off excess water respectively. The SG of the sodium metatungstate solution was adjusted to 2.85 g/cm3.

Sensor-based Ore Sorting

Twenty-five (25) rock pieces from each ore type (MET-01 and MET-02) were used for bench scale testing. Each rock sample was assigned an identification number and tested with regards to sensor response in optical (colour) and X-ray transmission ("XRT") analysis in cooperation with TOMRA Sorting, one of the most advanced providers of sensor-based sorting solutions in the world.

For the colour camera analyses, a high-resolution photo of each sample was taken. The COLOUR image of each sample was then analyzed using TOMRA's image-processing software. This analyzing technique is restricted to surface features, and requires clean surfaces making a washing step prior to colourmetric sorting mandatory. The material was discriminated with reference to brightness, colour and other geometric features such as size and shape.

For the XRT analysis, the samples were exposed to high energy X rays, thus allowing the sensor on the opposite side of the sample to detect transmitted X-rays. The X-ray sensor signal depends on the atomic density and material thickness and yields information about the chemical composition of the particles. This method does not require washing the mineral surface for it to be effective. Using TOMRA's image-processing software, changes in the intensity of X-ray passing through the samples are classified, either as high atomic density or low atomic density.

Test Results

The individual fractions +0.1 -0.3 mm and +0.02 -0.1 mm of MET-01 sample were subjected to separate beneficiation tests. Flotation, magnetic separation and electrostatic separation were applied to fraction +0.1 0.3 mm. Electrostatic separation was shown to be unselective regarding the scandium bearing minerals (hedenbergite and ferrohornblende). Due to the favourable liberation of pay minerals in the finer fraction, the focus in processing was on flotation and magnetic separation of fraction +0.02 -0.1 mm.

WHIMS tests in fraction +0.02 -0.1 mm showed that a magnetic field strength of 0.2 T was sufficient to separate the scandium bearing minerals in the magnetic fraction, while feldspars, being the major gangue mineral, reported to the nonmagnetic fraction, resulting in a magnetic fraction containing 94 wt.-% of the scandium in 53 wt.-% of the feed mass. Scandium and TREE recoveries and their upgrade factors for tested magnetic field strengths are presented in Figure 13-4. While a magnetic field strength of 0.2 T was sufficient to recover scandium at a high upgrade factor, a higher magnetic field strength of 0.8 T was necessary to separate apatite, the main REE bearing mineral, together with the scandium bearing minerals to the magnetic fraction. Further increase of the magnetic field strength (1.5 T) did not result in an additional increase of recoveries nor a significant improvement to the upgrading of scandium and TREE.

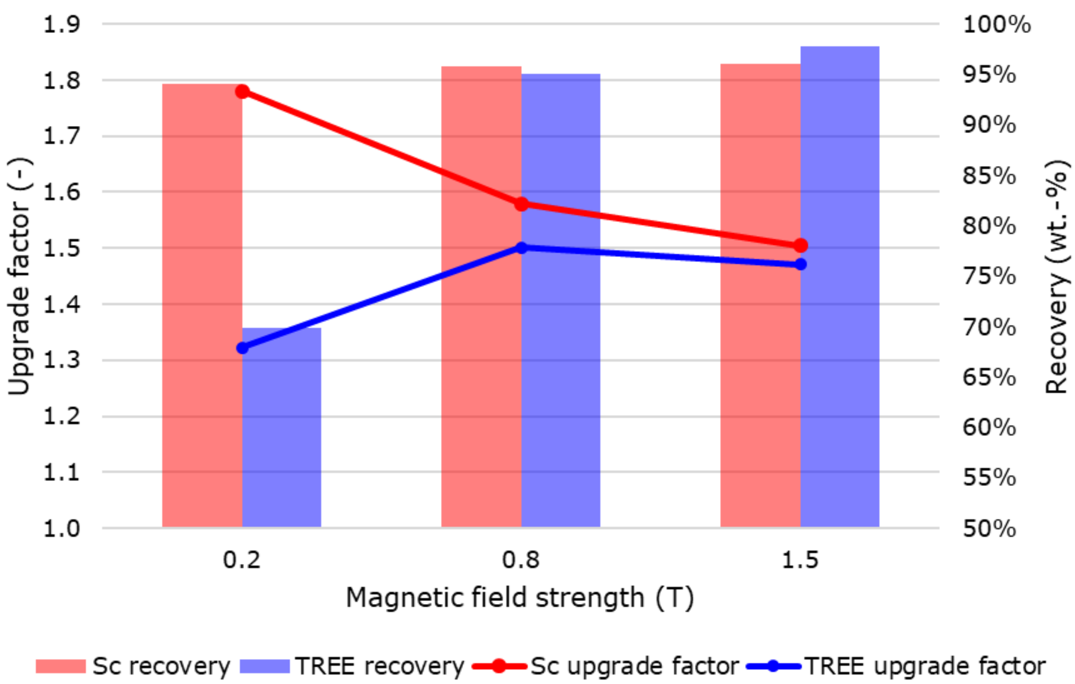


Figure 13-4 – MET1 response to WHIMS at different magnetic field strengths

Flotation kinetic tests showed that Flotinor SM15, a phosphoric acid ester as the main flotation collector reagent had the highest selectivity for the scandium bearing minerals. In the first thirty seconds of a kinetic flotation test with SM15 collector, a concentrate of 49 wt.-% of the mass was separated containing 80 wt.-% of the scandium, resulting in a scandium upgrade factor of 1.63.

In an attempt to simplify the flow sheet, fractions +0.02 -0.15 mm and -0.02 mm were tested besides fractions +0.1 -0.3 mm, +0.02 -0.1 mm and -0.02 mm. LIMS, WHIMS and flotation were applied to fraction +0.02 -0.15 mm while fraction -0.02 mm was subjected to wet high intensity magnetic separation only.

MET1 sample response to the following processing options which combine different beneficiation methods was evaluated.

- LIMS followed by WHIMS of +0.01 -0.15 mm size fraction combined with the magnetic stream from WHIMS of -0.02mm fraction
- LIMS, followed by cleaner flotation of +0.01 -0.15 mm size classification plus the magnetic product of -0.02 mm fraction.
- Flotation only of fraction +0.02 -0.15 mm combined with the magnetic product of WHIMS for -0.02 mm fraction.

The mass pull and recoveries of scandium and TREE to mineral concentrate for the different processing options and the upgrade factors for scandium and TREE are presented in Table 13-1.

Table 13-1 – Sc and TREE Recoveries and Upgrade Factor for process options for fraction -0.15 mm, MET1

Mineral Beneficiation Techniques	Recovery			Upgrade factor	
	Mass (Wt.-%)	Sc (Wt.-%)	TREE (Wt.-%)	Sc Upgrade Factor	TREE Upgrade Factor
LIMS +WHIMS	38.8	87.5	67.9	2.3	1.8
LIMS + Flotation	39.6	81.9	70.4	2.1	1.8
Flotation+ WHIMS	45.6	82.8	87.9	1.8	1.9

The combination of LIMS and WHIMS (Option 1) represents the simplest of the three considered options as it involves magnetic separation only and does not require addition of any chemicals. It results in a scandium recovery of 87.5 wt.-% and an upgrade factor of 2.3. TREE recovery was 67.9 wt.-% at an upgrade factor of 1.8. With this option, only magnetic separation at different magnetic field strengths is required. The slimes (-0.02 mm) fraction can be treated together with the nonmagnetic product from LIMS of +0.02 -0.15 mm size classification in the wet high intensity magnetic circuit.

The option of combining LIMS with cleaner flotation for fraction +0.02 -0.15 mm and WHIMS of fraction -0.02 mm (Option 2) involves both magnetic separation and flotation thus presenting a more complicated flow sheet requiring the addition of acid and flotation agents in the flotation step. It resulted in a scandium recovery of 81.9 wt.-% and upgrade factor of 2.1. TREE recovery at the identical upgrade factor of 1.8 was slightly higher (70.4 wt.-%) for Option 2 compared to magnetic separation only (Option 1). Two processing steps (LIMS and flotation) were applied to fraction +0.02 -0.15 mm and a third processing step (WHIMS) to fraction -0.02 mm. Due to the higher scandium recovery and reduced complexity of magnetic separation only, the combination of LIMS and WHIMS (Option 1) is favourable compared to Option 2 which involves the integration of flotation after LIMS.

Option 3 in which cleaner flotation only was applied to fraction +0.02 -0.15 mm and WHIMS was applied to the slime fraction -0.02 mm presents a combination exhibiting a reduced complexity of the flow sheet compared to Option 2, but still requires the use of acid and flotation reagents. Option 3 achieved relatively high scandium recovery of 82.8-

wt. % and a significantly superior TREE recovery of 87.9 wt.-% in comparison to Options 1 and 2. The mass rejection for this option is lower, resulting in reduced upgrade factors of 1.8 for scandium and 1.9 for TREE.

For both options including flotation (Options 2 and 3), recovery rates are based on the cleaner concentrate of the third cleaner stage, without considering recirculation of the cleaner tailings. Recirculation of cleaner tailings has a good potential for the optimization of scandium and TREE recovery. Locked Cycle Tests ("LCT") are recommended as a next step in order to determine yield optimization potential.

Beneficiation tests for MET2 were based on the results of tests completed on MET-01 sample. For MET2, the tests were also carried out on different size fractions. Flotation and magnetic separation were applied to fraction +0.02 -0.1 mm.

WHIMS tests showed that a magnetic field strength of 0.2 T was sufficient to separate the Scandium bearing minerals to a magnetic product from MET2 sample. In comparison to MET1, the feldspar content in MET2 was lower while the amount of fayalite present in MET2 was higher than in MET1. Since fayalite shows magnetic properties, in contrast to feldspar, a higher mass pull to the magnetic product fraction was achieved compared to MET1, resulting in a magnetic fraction containing 95.9 wt.-% of the scandium in 70.1 wt.-% of the feed mass. Scandium and TREE recoveries and upgrade factors at higher magnetic field strengths are presented in Figure 13-5. The general effects of WHIMS on MET1 are also true for MET2. While 0.2 T was sufficient to separate most of the scandium bearing minerals, 0.8 T was needed to separate the TREE bearing mineral apatite to the magnetic fraction as well.

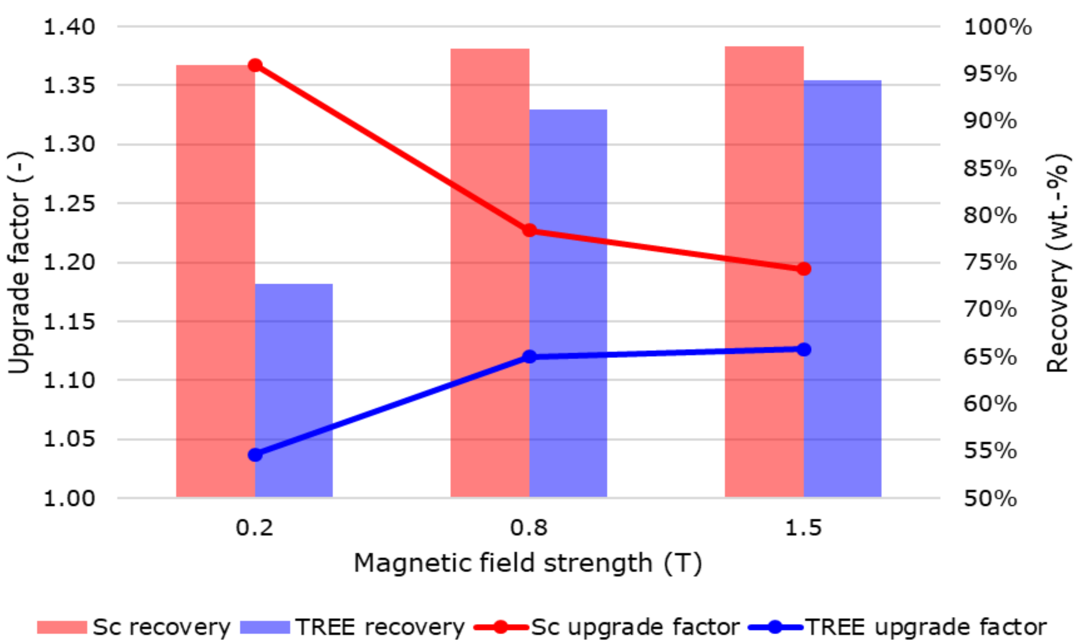


Figure 13-5 – MET2 response to WHIMS at different magnetic field strengths

Flotation kinetic tests on MET2 sample showed that SM15 reagent collector presents the highest selectivity regarding the scandium bearing minerals. In the first thirty seconds, a concentrate of 55.6 wt.-% of the mass was separated containing 66.7 wt.-% of the scandium. The scandium recovery was significantly reduced compared to the same flotation scheme applied to ore type MET1, which was due to a slightly different mineralogical composition and the reduced mineral liberation in MET2 compared to MET1.

In order to simplify the flow sheet, fractions +0.02 -0.15 mm and -0.02 mm were tested. Two processing options were considered for MET-02 sample:

- LIMS of +0.02 -0.15 mm fraction followed by WHIMS of the magnetic product from LIMS and slime fraction -0.02mm.
- Cleaner flotation of fraction +0.02 -0.15 mm combined with WHIMS of the slimes (-0.02 mm fraction).

The response of MET2 sample to different processing options are presented in Tables 13.3 and 13.4. The combination of LIMS and WHIMS (Option 1) resulted in a scandium recovery of 77.8 wt.-% and upgrade factor of 1.5. TREE recovery was 57.5 wt.-% at an upgrade factor of 1.1.

In the Option 2, flotation only was applied to fraction +0.02 -0.15 mm and WHIMS was used to process the slimes (-0.02 mm). Compared to the combination of LIMS and WHIMS only (Option 1), acid and flotation reagents have to be used. Flotation of fraction +0.02 -0.15 mm and WHIMS processing of the slimes (fraction -0.02 mm) resulted in a similar scandium recovery of 74.1 wt.-% but at significantly increased TREE recovery of 83.3 wt.-%. The mass reduction for both options is similar, resulting in comparable upgrade factors of 1.5 for scandium but at significantly superior upgrade of 1.6 for TREE due to the increased TREE recovery with flotation.

Table 13-2 – Sc and TREE Recoveries and Upgrade Factor for process options for fraction -0.15 mm, MET2

Mineral Beneficiation Techniques	Recovery			Upgrade factor	
	Mass (Wt.-%)	Sc (Wt.-%)	TREE (Wt.-%)	Sc Upgrade Factor	TREE Upgrade Factor
LIMS +WHIMS	51.5	77.8	57.5	1.5	1.1
Flotation + WHIMS	50.9	74.1	83.3	1.5	1.6

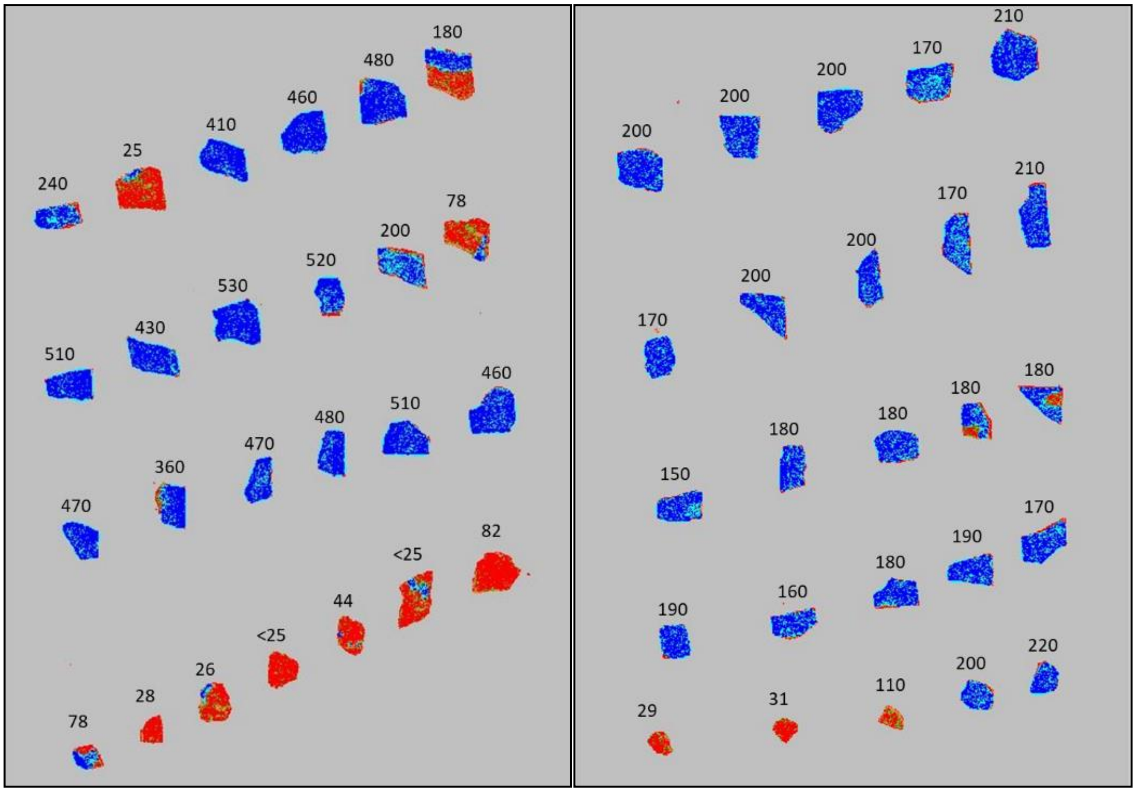
In contrast to the flotation tests carried out for ore type MET1, AWG, a mixture of 80% sodium silicate and 20% oxalic acid was used in the flotation step as depressant for MET2 sample. The aim of using AWG was to depress fayalite, as shown in the work of Yang et al. (2016) for the case of ilmenite flotation. In the case of MET2 flotation with SM15 as collector, AWG was not effective in depressing fayalite, but was successful in limiting the amount of magnetite that deported to the Sc-REE mineral concentrate. Therefore, a combination of LIMS and flotation in case of MET2 was not necessary. AWG depressant could be tested on MET1 sample to depress magnetite instead of using LIMS as a separate processing step in order to reduce the complexity of the flow sheet and to increase the scandium recovery, in case flotation is selected as the preferred option to increase the yield of both TREE and scandium.

Recovery rates of the flotation process are based on the cleaner concentrate of the third cleaner stage, not considering recirculation of the cleaner tailings. Recirculation of cleaner tailings present a potential for the optimization of scandium and TREE recovery. LCT are recommended as a next step in order to determine the potential for yield improvement.

As a pre-concentration step, HLS was used to check the general suitability of dense media separation in lab scale. HLS was applied to fraction +0.8 -6 mm of ore type MET1. For this fraction a scandium recovery of 90.6 wt.-% was achieved at an upgrade factor of 2.1. TREE recovery was 89.2 wt.-% at an upgrade factor of 2.0. Dense media separation ("DMS") is mainly used as a first concentration method prior to flotation and/or magnetic separation. HLS resulted in similar upgrade factors compared to flotation and magnetic separation at high recoveries for both, scandium and TREE. Therefore, DMS could be an option to serve as single option used in fraction +0.8 -6 mm or as a pre-concentration step prior to magnetic separation and/or flotation. In both cases, for concentration of fraction -0.8 mm magnetic separation and/or flotation must be considered. Since HLS in lab scale was performed under ideal conditions, a DMS test is strongly recommended to verify recoveries and mass reduction that can be expected at industrial scale.

Colourmetric and XRT sensors were tested on a bench scale sensor-based sorting program. Good results were achieved with both sensors, however XRT showed an enhanced waste detection and therefore better potential for the scandium ore sorting. For classification, a cut-off grade of 100 mg/kg scandium was applied. By using XRT methodology all 38 product species were classified correctly by the sensor. Only one out of 12 waste pieces was erroneously referred to the product fraction. COLOUR sensor referred all the 38 product samples to the right group but missed 2 waste species recognizing them as product. An additional advantage of XRT sorting is that, in contrast to colourmetric sorting, no water is required to clean the surface of the particles as the bulk of the mineral sample is probed.

In order to present the correlation of XRT sensor response and scandium grade, images visualizing XRT sensor response are presented in Figure 7 with scandium grade (in ppm) indicated for the individual rock pieces. Blue colour represents high density, while red colour represents low density. The higher the blue portion in the XRT sensor response, the higher the scandium grade. XRT sorting perhaps has a good potential to be used as a stand-alone processing option or as a pre-concentration step at coarser particle size prior to further comminution and upgrading of the scandium grade by other mineral processing techniques.



Left: ore type MET1; Right: ore type MET2

Figure 13-6 – XRT inclusion image of 25 rock pieces with corresponding scandium grade in mg/kg.

In summary, the mineral processing test program completed as part of Phase 2 metallurgical development by M.Plan confirmed that pyroxene (hedenbergite) and amphibole (ferrohornblende/ ferropargasite) are the only scandium bearing minerals in the mineralization. Different feldspars, namely albite, microcline and anorthoclase, as well as fayalite and mica (biotite) were identified as main components. Ilmenite, magnetite and the REE bearing phases (hydroxyl-) apatite and zircon were also identified in the samples.

A Sc mineral concentrate can be produced from Crater Lake mineralization by using simple low-cost magnetic separation techniques. A combination of LIMS and WHIMS produced a mineral concentrate yielding 88% Sc recovery as well 69% recovery of TREE for MET1. A combination of LIMS and WHIMS on MET2 sample with differing mineralogy also yielded 78% Sc and 56% TREE. Additional test work utilizing Sensor-based ore sorting and HLS methods confirm that XRT sensor-based sorting and DMS offer additional low-cost alternatives for inexpensively producing a mineral concentrate without the need of grinding, chemical reagents or extensive water consumption. DMS separation yielded recoveries of 90.6% Sc and 89.2% TREE in the mineral concentrate.

13.3 Phase 3, Metallurgical Development Program (Hydrometallurgy)

In July 2020, Imperial engaged M.Plan to carry out the Phase 3 of the metallurgical development program. This program was focused on the development of an efficient hydrometallurgical process to recover a high-purity scandium oxide product from the scandium-rich mineral concentrates.

The Phase 3 Metallurgical Development program consists of:

- Bulk production of representative magnetic concentrate products from the MET1 and MET2 composite samples to be used in subsequent downstream hydrometallurgical flowsheet development.
- Development of a hydrometallurgical flowsheet for the extraction of scandium into a scandium oxide product and REE into a bulk mixed REE concentrate.

13.3.1 Bulk mineral processing

Two mineralized MET1 and MET2 composites, weighing 100 kg each, were submitted for bulk processing to produce Sc/REE mineral concentrate for downstream hydrometallurgical test program. MET1 composite graded 180 g/t scandium and 2,735 g/t TREE, whereas the MET2 composite graded 150 g/t scandium and 3,307 g/t TREE. Jaw and roll crushing to 100% passing 3 mm was completed prior to blending and splitting into 10 kg test charges. A single confirmatory test charge of each composite was ball mill ground to 100% passing 150 microns subjected to magnetic separation, first by LIMS and then WHIMS of the LIMS non-magnetics. Once the response of the composites was confirmed, the remaining 90 kg of each sample was processed through the same scheme.

A summary of the head assay results including whole rock analysis and an ICP scan for the two samples used in this program is presented in Table 13-3. Composite head grades from MET1 and MET2 samples evaluated in the Phase 2 program are also provided for comparison.

Table 13-3 – Head Assays for MET1 and MET2 Samples used in Phase 2 and splits used in Phase 3 Development Programs

Analyte	Unit	MET 1			MET 2		
		10 kg Split	90 kg Split	Phase 2 Comp	10 kg Split	90 kg Split	Phase 2 Comp
Sc	[mg/kg]	170	180	240	160	150	240
TREE	[mg/kg]	3,100	2,700	4,300	3,400	3,300	4,000
SiO_2	[wt.-%]	50.1	50.2	51.1	46.4	46.2	43.9
Al_2O_3	[wt.-%]	12.1	11.9	11.8	10.8	10.7	9.6
Fe_2O_3	[wt.-%]	18.2	18.4	17.3	22.5	23.2	26.4
TiO_2	[wt.-%]	1.6	1.6	1.5	2.0	2.1	2.3
K2O	[wt.-%]	4.3	4.2	4.3	3.6	3.5	3.1
Na_2O	[wt.-%]	4.0	4.1	4.1	3.5	3.5	3.2
CaO	[wt.-%]	5.7	5.8	6.2	6.0	6.0	6.4
MgO	[wt.-%]	1.2	1.2	0.9	1.6	1.6	1.8
MnO	[wt.-%]	0.58	0.60	0.53	0.73	0.76	0.85

Analyte	Unit	MET 1			MET 2		
		10 kg	90 kg	Phase 2	10 kg	90 kg	Phase 2
		Split	Split	Comp	Split	Split	Comp
BaO	[wt.-%]	0.08	0.09	0.06	0.11	0.09	0.10
P_2O_5	[wt.-%]	0.96	0.84	0.77	1.38	1.34	1.24
ZrO_2	[wt.-%]	0.82	0.79	0.87	0.98	0.96	1.00
LOI	[wt.-%]	0.60	0.70	0.62	1.10	1.20	0.21
Sc	[mg/kg]	170	180	240	160	150	240
Y	[mg/kg]	260	240	370	290	290	320
La	[mg/kg]	480	440	700	550	560	570
Ce	[mg/kg]	860	700	1,500	940	860	1,600
Pr	[mg/kg]	190	170	240	200	200	210
Nd	[mg/kg]	770	680	850	860	850	760
Sm	[mg/kg]	94	96	130	110	120	83
Eu	[mg/kg]	<5	<5	<25	<5	<5	<25
Gd	[mg/kg]	91	89	110	100	110	110
Tb	[mg/kg]	14	15	<25	16	15	<25
Dy	[mg/kg]	59	55	84	65	67	74
Ho	[mg/kg]	<5	<5	<25	<5	<5	<25
Er	[mg/kg]	35	33	47	40	41	43
Tm	[mg/kg]	<5	<5	<25	<5	<5	<25
Yb	[mg/kg]	31	29	46	35	35	40
Lu	[mg/kg]	7	8	<25	9	9	<25
TREE	[mg/kg]	3,061	2,735	4,317	3,375	3,307	4,051

LIMS test work completed on –150 µm grind particle size of MET1 and MET2 samples indicated that an iron rich fraction could be generated that is low in scandium, representing approximately 7% of the initial sample mass. WHIMS test work at 0.8 T confirmed that high scandium recoveries could be achieved to a magnetic concentrate with up to 50% of the mass rejected to the non-magnetics.

The results of the magnetic separation tests for the 10 kg test charges of composites MET1 and MET2 are presented in Table 13-4 and Table 13-5.

Table 13-4 – Magnetic separation test results for MET1, 10 kg tests

MET1 10 kg	Weight recovery	Chemical Analysis					Distribution		
		Sc	TREE	SiO_2	Al_2O_3	Fe_2O_3	Sc	TREE	Fe_2O_3
	(wt-%)	(mg/kg)	(mg/kg)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)
LIMS	7.3	78	2,500	9.1	2.7	74.1	3.2	7.5	30.0
WHIMS 1 (0.2T)	25.5	430	3,200	42.7	6.6	30.8	60.9	33.6	43.4
WHIMS 2 (0.8T)	17.5	310	3,600	46.9	8.8	21.2	30.1	26.0	20.5
Non Mag (WHIMS)	49.8	21	1,600	62.1	18.0	2.2	5.8	32.9	6.1
Head (Cal)	100	180	2,422	50.6	12.4	18.1	100	100	100.0
LIMS + WHIMS	50.2	337	3,237	39.3	6.8	33.8	94.2	67.1	93.9
WHIMS 1 +2	**42.9**	**381**	**3,363**	**44.4**	**7.5**	**26.9**	**91.0**	**59.6**	**63.9**

Table 13-5 – Magnetic separation test results for MET2, 10 kg tests

MET2 10 kg	Weight recovery	Chemical Analysis					Distribution		
		Sc	TREE	SiO2	Al2O3	Fe2O3	Sc	TREE	Fe2O3
	(wt-%)	(mg/kg)	(mg/kg)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)
LIMS	6.9	92	2,800	7.4	2.1	75.3	3.9	7.8	20.4
WHIMS 1 (0.2T)	32.2	230	2,000	38.7	5.1	38.5	45.2	25.7	48.5
WHIMS 2 (0.8T)	28.2	260	3,600	45.5	9.0	23.3	44.7	40.5	25.7
Non Mag (WHIMS)	32.7	31	2,000	60.0	17.1	4.3	6.2	26.1	5.4
Head (Cal)	100.0	164	2,506	45.4	9.9	25.6	100	100	100
LIMS + WHIMS	67.3	228	2,752	38.3	6.4	35.9	93.8	73.9	94.6
WHIMS 1 +2	**60.4**	**244**	**2,747**	**41.9**	**6.9**	**31.4**	**89.9**	**66.1**	**74.1**

Low intensity magnetic separation yielded comparable mass recoveries for both composites of approximately 7.0%. The main component of the LIMS magnetic concentrate appears to be iron minerals, with Fe2O3 grades of 74.1% and 75.3%. Scandium grade in LIMS concentrates was well below the head grade, whereas the TREE grade was close to that observed for the head samples.

WHIMS separation of the LIMS magnetic tailings was carried out in two passes, at 0.2 T and 0.8 T. Both passes resulted an upgrading of scandium to the magnetic fraction, with combined scandium recoveries of approximately 90%. For MET1, 61% of the scandium was recovered in the first pass at 0.2 T, and an additional 31% was recovered from the first pass tailings at the higher intensity of 0.8 T. The scandium recovery for MET2 was essentially evenly split between the two passes.

Mass rejected to non-magnetic tailings was 50% for MET1 and 33% for MET2. As a result, MET1 achieved a better upgrade ratio, reaching 381 g/t scandium for the combined WHIMS concentrate, compared to 244 g/t scandium for MET2. Only minor upgrading of TREE to the concentrate was observed for either composite.

Based on the positive results achieved with the 10 kg batch tests, the remaining 90 kg of sample was processed through a similar flowsheet consisting of a LIMS separation followed by a single pass through the WHIMS at 0.8 T. Results of the 90 kg tests are presented in Table 13-6 and Table 13-7 respectively for MET1 and MET2 samples.

Table 13-6 – Magnetic separation test results for MET1, 90 kg tests

MET1 90 kg	Weight recovery	Chemical Analysis					Distribution		
		Sc	TREE	SiO2	Al2O3	Fe2O3	Sc	TREE	Fe2O3
	(wt-%)	(mg/kg)	(mg/kg)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)
LIMS	6.8	55	2,400	8.55	2.18	69.7	2.2	6.9	26.1
WHIMS (0.8T)	**48.6**	**340**	**3500**	**45.3**	**8**	**25.5**	**95.5**	**72.2**	**68.4**
NonMag (WHIMS)	44.7	9	1100	62.5	18	2.23	2.3	20.9	5.5
Head (Cal)	100.0	173	2354	50.5	12.1	18.1	100.0	100.0	100.0

Table 13-7– Magnetic separation test results for MET2, 90 kg tests

MET2 90 kg	Weight recovery	Chemical Analysis					Distribution		
		Sc	TREE	SiO2	Al2O3	Fe2O3	Sc	TREE	Fe2O3
	(wt-%)	(mg/kg)	(mg/kg)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)
LIMS	6.6	71	2,400	8.55	2.18	69.7	2.5	5.6	18.6
WHIMS (0.8T)	**62.7**	**280**	**3,300**	**42.3**	**7.38**	**30.5**	**95.0**	**73.6**	**77.7**
NonMag (WHIMS)	30.8	15	1,900	61.1	17.8	2.98	2.5	20.8	3.7
Head (Cal)	100.0	185	2,810	45.9	10.2	24.6	100	100	100

The 90 kg tests achieved very similar mass recoveries and grades to the LIMS concentrate. For both samples, scandium and TREE recoveries to the single WHIMS concentrate were slightly better than those observed for the combined concentrate in the 10 kg tests. Improved recovery may be the result of longer running time (minimization of start/end effects). Compared to the Phase 2 test results, the upgrading of scandium to concentrate for MET1 was lower in the present program, however, the recovery was higher despite the lower initial head grade of the samples. This suggests that the two results may lie on the same grade-recovery curve. For composite MET2, the scandium recovery and gangue rejection realized in the present program was virtually identical to that of the Phase 2 program.

Development programs for further optimization of the mineral processing flowsheet including evaluation of sensor ore sorting technology at large scale, removal of olivine, and fine-tuning the relationship between particle size, magnetic field strength and concentrate's scandium grade and recovery are planned for the near future.

13.3.2 Hydrometallurgical flowsheet development – M.Plan

13.3.2.1 Primary leach solution

The bulk mineral concentrates prepared from MET1 and MET2 samples were used as feed for the Sc/REE hydrometallurgical flowsheet development program conducted at M.Plan laboratory in Hirschau, Germany. The objective of the program was to develop an efficient hydrometallurgical process to recover a high-purity scandium oxide product and a mixed REE concentrate.

The following mineral decomposition methods were tested at bench scale to extract scandium from the mineral concentrate and ore samples:

- Acid bake of mineral concentrate with concentrated sulphuric acid at a temperature range of 250°C to 300°C, followed by water leach of the acid bake calcine.
- Heap leach of ore sample crushed to -6 mm in 20 wt-% sulphuric acid solution at ambient temperature and at 60°C for several weeks.
- High pressure acid leach of mineral concentrate in aqueous sulphuric acid solution at temperature greater than 150°C in an autoclave.
- Caustic (NaOH and/or Na_2CO_3) roasting of concentrate at 900°C, followed by water leach and wash at 90°C. The resulting residue from the roast – water leach stage was subsequently leached in mineral acid.
- High pressure caustic ("HPC") leach of concentrate, followed by water wash and mineral acid leach of the solid residues from the caustic leach stage.

While apatite, the major REE-bearing mineral in the concentrates, was easily decomposed with most of the method listed above, yielding REE extraction in the range of 43% to 74% to primary leach solution ("PLS"), the decomposition of Sc-bearing minerals, ferro-hornblende and hedenbergite, was quite challenging, with Sc recovery to PLS less than 5%.

The Sc-bearing minerals remained largely unaffected by acidic decomposition methods. Scandium extraction to PLS for acid bake - water leach was very low at less than 5%. Only heap leaching and high-pressure acid leach are the two acid decomposition methods that showed Sc recoveries above 20 wt-% but below 50 wt.-%.

A caustic roast, followed by a mineral acid leach of the solid residue, also showed very poor Sc extraction between 18 wt-% and 25 wt-%, while REE extractions to PLS were also poor between 23 wt-% and 46 wt-%.

A high-pressure leach, followed by a mineral acid leach of the solid residues, showed remarkable recovery of scandium and the REE from Crater Lake Sc/REE mineralization:

- The method showed scandium recovery to PLS of 91 wt-% for MET1, and 84% for MET2 mineral concentrates.
- The recovery of TREE including yttrium (TREE+Y) of 94 wt-% and 83 wt-% respectively for MET1 and MET2 samples.
- The high recoveries of Sc and TREE+Y from both samples show that the method has excellent efficacy in extracting Sc and REE from samples representing different mineralization.

The metallurgical balance of hydrochloric acid leach of HPC residues is presented in Table 13-8.

Table 13-8 – Elemental extraction of hydrochloric acid leach of HPC residues

Element	HPC2-HCL		HPC5-HCL		HPC7-HCL		HPC8-HCL		HPC9-HCL	
	Extraction		Extraction		Extraction		Extraction		Extraction	
	Residue	PLS	Residue	PLS	Residue	PLS	Residue	PLS	Residue	PLS
	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(wt-%)	(w.-%)	(wt-%)	(wt-%)
Na	2.2	97.8	4.0	96.0	3.8	96.2	11.7	88.3	5.1	94.9
Mg	21.9	78.1	26.6	73.4	98.6	1.4	99.4	0.6	99.1	0.9
Al	12.6	87.4	16.5	83.5	10.9	89.1	26.8	73.2	20.2	79.8
Si	94.3	5.7	96.6	3.4	91.6	8.4	97.1	2.9	98.6	1.4
P	19.3	80.7	13.4	86.6	21.7	78.3	47.7	52.3	35.0	65.0
K	13.5	86.5	22.2	77.8	25.1	74.9	62.2	37.8	32.5	67.5
Ca	22.3	77.7	26.9	73.1	99.6	0.4	99.9	0.1	99.9	0.1
Fe	15.4	84.6	20.8	79.2	8.0	92.0	27.6	72.4	12.2	87.8
Zr	97.6	2.4	99.1	0.9	97.7	2.3	99.6	0.4	98.1	1.9
Sc	30.0	70.0	33.0	67.0	9.3	90.7	16.3	83.7	11.5	88.5
TREE	10.3	89.7	12.7	87.3	6.6	93.4	16.9	83.1	9.7	90.3

13.3.2.2 Solvent Extraction ("SX") / Ion Exchange ("IX")

The bench scale development of the Sc/REE recovery flowsheet by SX and/or IX from Sc/REE primary leach solution is ongoing at M.Plan at the time of writing this report. Extraction shake-out tests for reagent screening were completed on four organic reagents diluted in kerosene. The organic reagents tested for extracting Sc from the hydrochloric acid leach solution include D2EHPA, TBP, Cyanex 272, and TOPO. D2EHPA, plus TBP as the modifier and Cyanex 272 are the reagents that have shown remarkable Sc extraction, while Cyanex 272 appears to have better selectivity for Sc over the REE.

Purolite MTS9300, a polystyrenic macroporous, iminodiacetic acid chelating resin with high capacity was the IX resin tested under this program. Two-stage scrubbing of the loaded resin was performed with 2 moles HCl solution and water.

Ethylenediaminetetraacetic acid (EDTA) was used as the stripping agent. Initial evaluation showed that the loading capacity of MTS9300 IX resin was inferior to the three of the SX extraction reagents that were tested, hence further development work on IX was discontinued.

The loaded organic from the SX reagent screening tests was used in a series of scoping level scrubbing tests which focused on the removal of co-extracted impurities such as iron, titanium, magnesium, calcium, potassium and aluminum. Two moles of sulphuric acid, plus 5% hydrogen peroxide (2M H_2SO_4 + 5% H_2O_2), oxalic acid and 120 g/L NaCl salt solutions were the scrubbing reagents tested on D2EHPA, TOPO, Cyanex 272, and TBP. For the TBP reagent, 130 g/L magnesium nitrate ($Mg(NO_3)_2$) solution was tested in place of the NaCl salt solution. The data showed that the best scrubbing regime that provided adequate impurity removal without significant loss of scandium is sulphuric acid plus hydrogen peroxide at ambient temperature.

It is well known that scandium is difficult to strip from D2EHPA. Others have used different stripping agents, including ammonium bifluoride, phosphoric acid and sodium hydroxide solution to strip scandium from loaded organics. It was decided to focus on sodium hydroxide as the preferred stripping reagent, hence several concentrations of sodium hydroxide are being tested for stripping scandium from the organic at the time of writing this report. The REE remaining in the SX raffinate will be precipitated as a mixed REE carbonate product with sodium carbonate.

Optimization of the hydrometallurgical flowsheet will be completed in future development programs, prior to the commencement of the pilot program.

13.3.3 Carbochlorination of Crater Lake mineral concentrate – Hazen

The carbochlorination technique, similar to the technology used in the titanium industry to produce titanium pigment from titanium slag, was explored as an alternative process for extracting scandium and REE from Crater Lake mineral concentrate. Carbochlorination of Crater Lake mineral concentrate and aqueous leaching of the calcine was tested at Hazen from April to July 2021.

About 5 kg of MET2 mineral concentrate produced at M.Plan for the hydrometallurgical development program was used for this program. The techniques for extracting REE and refractory metals, such as titanium by carbochlorination have been developed and practiced at an industrial scale for decades. The concept of the process is that at 800°C or higher, the majority of the metals in the mineral concentrate can be easily converted to chlorides. The chloride of impurity metals such as iron, titanium, phosphorous, aluminum, silica and zirconium have low boiling points (less than 340°C) and are quite volatile, which allows them to be easily separated from scandium and REE. The summary of carbochlorination experiments on MET2 mineral concentrate is presented in Table 13-9, and the response of payable metals and major impurities to chlorination temperature is presented in Figure 13-7 and Figure 13-8.

Table 13-9 – Carbochlorination of Crater Lake Mineral Concentrate

Experiments		Exp. 3927-120 & -121		Exp. 3927-122 & -123		Exp. 3927-124 & -125		Exp. 3927-126 & -127		Exp. 3927-128 & -129		Exp. 3927-130 & -131	
Temperature (ºC)		**800**		**700**		**900**		**1000**		**900**		**Stage I 700 ºC, Stage II 1000 ºC**	
Reaction time (h)		**2**		**2**		**2**		**2**		**5**		**Stage I 3 h, Stage II 2 h**	
Parameters		**Chlorination conversion (fraction)**	**Concentration in Primary Filtrate, (mg/L)**	**Chlorination conversion (fraction)**	**Concentration in Primary Filtrate, (mg/L)**	**Chlorination conversion (fraction)**	**Concentration in Primary Filtrate, (mg/L)**	**Chlorination conversion (fraction)**	**Concentration in Primary Filtrate, (mg/L)**	**Chlorination conversion (fraction)**	**Concentration in Primary Filtrate, (mg/L)**	**Chlorination conversion (fraction)**	**Concentration in Primary Filtrate, (mg/L)**
Metallic values	Sc	0.108	0.675	-0.0240	1.08	0.422	0.466	0.583	0.118	0.699	0.268	0.600	0.215
	Ti	0.764	< 0.5	0.655	< 0.5	0.940	< 0.5	0.973	< 0.5	0.982	< 0.5	0.989	< 0.5
	Zr	0.461	0.276	0.271	0.0380	-0.373	0.0810	0.216	0.007	-0.210	< 0.0005	0.581	< 0.005
	LREE	0.909	99.6	0.820	89.5	0.938	102.5	0.953	101.3	0.975	106.0	0.842	110.7
	HREE	0.680	7.7	0.581	6.6	0.811	8.5	0.837	7.7	0.883	9.0	0.775	10.6
	HREE + Y	0.660	15.4	0.576	13.6	0.789	17.7	0.819	16.0	0.862	18.7	0.763	21.5
	Ln	0.889	107.4	0.800	96.1	0.927	111.0	0.943	109.1	0.967	115.0	0.836	121.2
	Ln + Y	0.867	115.1	0.779	103.1	0.913	120.1	0.931	117.3	0.956	124.7	0.829	132.1
Main impurities	Al	0.457	< 2	0.286	4	0.745	< 2	0.772	< 2	0.835	< 2	0.853	< 2
	Si	0.414	2	0.162	2	0.650	3	0.643	7	0.659	2	0.781	< 2
	Mn	0.826	166	0.658	140	0.952	78.4	0.983	2.9	0.973	15.5	0.953	1.8
	Fe	0.794	27.0	0.698	52.5	0.968	7.2	0.975	6	0.976	18	0.971	< 0.5
	Th	0.497	0.105	0.338	0.237	0.697	0.0060	0.888	< 0.005	0.901	0.006	0.553	< 0.005
	U	0.628	0.0090	0.438	0.0310	0.846	0.0010	0.922	< 0.005	0.882	< 0.005	0.876	< 0.005

1. The concentration of LREE, HREE, HREE + Y, Ln, and Ln + Y was calculated with the original REE analyses.
2. The chlorination conversion was calculated on the basis of the analyses of solid residues.

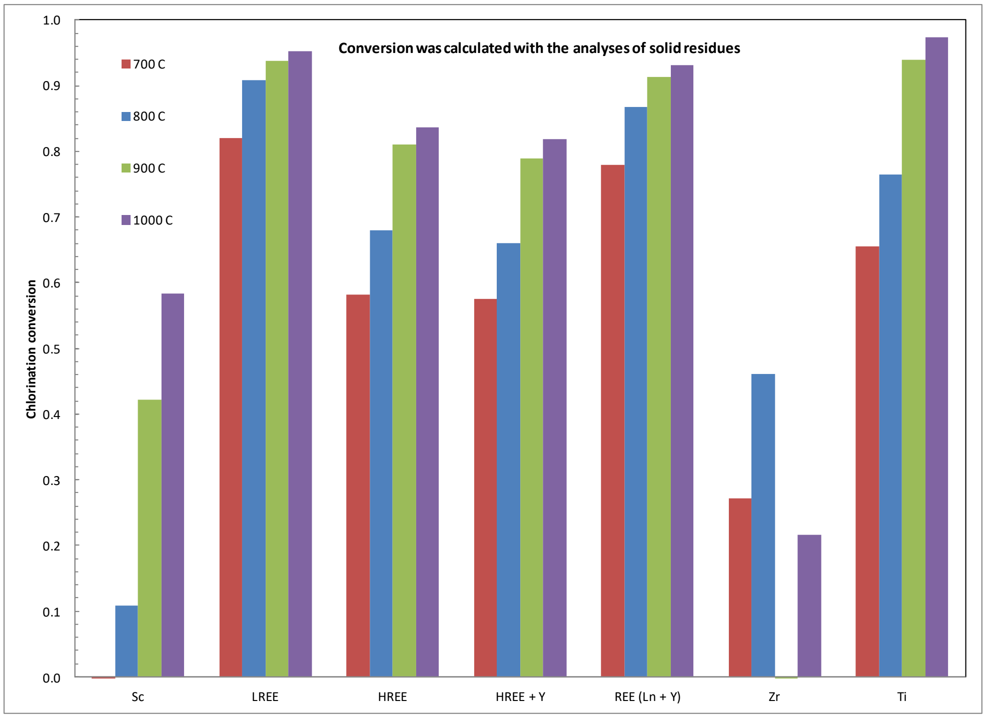


Figure 13-7 – Chlorination Conversion of Metals after 2 hours at Different Temperatures

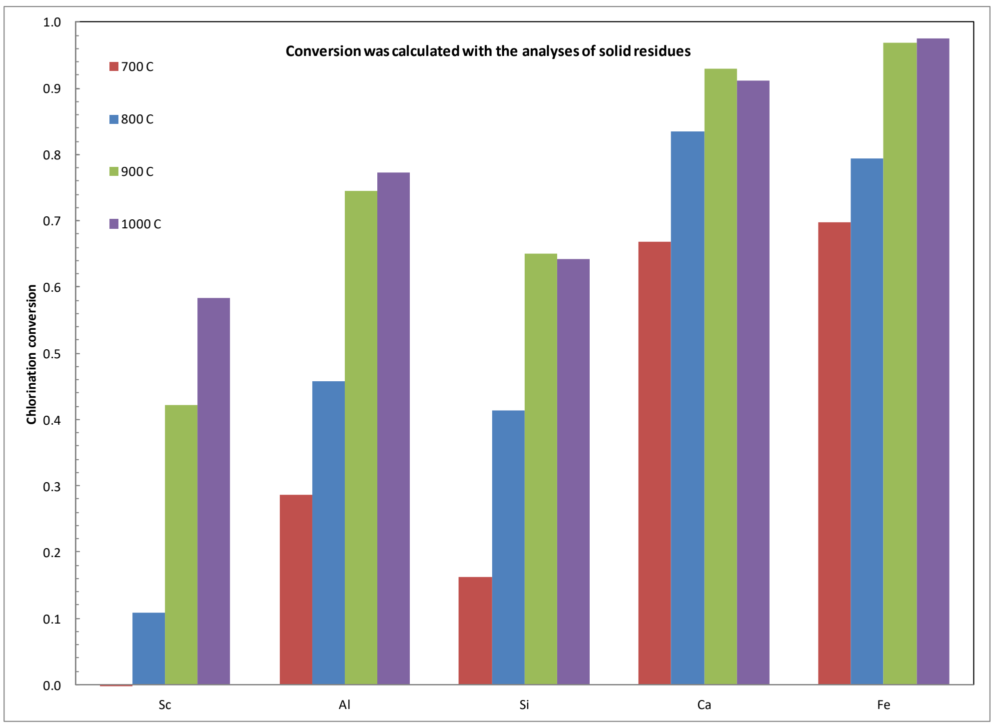


Figure 13-8 – Chlorination Conversion of Sc and Major Impurities after 2 hours at Different Temperatures

The program findings are summarized below:

- Scandium mainly reported to the gas phase together with zirconium and titanium after carbochlorination for 2 hours or longer. While Sc and REE chlorination rates rose with increased temperature, Sc chlorination rates were relatively low at less than 60% at temperatures up to 1000°C.
- The chlorination conversion of Sc was below expectation. This is attributed to its co-existence with silicates in the concentrate since the Sc-bearing pyroxene and amphibole are silicates. The low reactivity and dense structure of the silicate particles probably hindered the extraction of Sc by carbochlorination.
- The REE were relatively easily converted into their chlorides and were recovered into primary leach solution by leaching the calcine with dilute HCl solution. The REE chlorination rates increased with increasing temperature, from 78% at 700°C to 93% at 1000°C after 2 hours of chlorination.
- A substantial amount of the major impurities such as Al, Si, Fe, and Mn were removed as volatile chlorides into the gas phase. Their concentration in the primary leach solution was low, which resulted in fairly clean PLS with very low impurity content, from which a mixed REE product can easily be produced. The concentration of Mn and Fe in the primary leach solution decreases with increasing carbochlorination temperature.
- An increase in carbochlorination temperature and reaction time is beneficial for improving the chlorination conversion of Sc, but this also results in more REE chlorides deporting to the gas phase.

13.4 Process Flowsheet Selection

The process selected for the production of high-grade scandium oxide and mixed REE products is based on the metallurgical development programs completed by M.Plan between 2019 and 2021. The flowsheet consists of crushing and milling of the ROM materials, followed by magnetic separation, using LIMS and WHIMS techniques to generate a Sc/REE-rich mineral concentrate. The mineral concentrate is processed through high-pressure caustic leach to liberate scandium from the Sc-bearing silicate minerals. The solid residue from the HPC process containing the Sc and REE is subsequently leached with hydrochloric acid solution to extract the Sc/REE content into a primary leach solution. Scandium is extracted from the PLS with solvent extraction, while REE remaining in the SX raffinate is precipitated as a mixed REE carbonate product.

The scandium SX will use organophosphorus extractant (D2EHPA or Cyanex 272) to recover Sc into the organic phase. The Sc-loaded organic will be scrubbed with a solution of sulphuric acid plus hydrogen peroxide to remove impurity metals that co-extract with Sc. Scandium is stripped from the scrubbed organic with concentrated sodium hydroxide solution. The stripped scandium hydroxide is re-leached in mineral acid from where it is precipitated with oxalic acid. The scandium oxalate is calcined to produce a high-grade 99.9% scandium oxide product that can be used for the production of Al-2%Sc master alloy.

The Al-2%Sc master alloy production technology will be based on co-electrowinning of Al and Sc from alumina (Al_2O_3) and Sc_2O_3 to form a master alloy. This method offers higher recovery of scandium (90%-95%) and improved energy efficiency as it can be performed at a lower temperature, and it minimizes the formation of intermetallic with high Sc content in comparison to the aluminothermic method, which is the current state-of-the-art technology for Al-2%Sc master alloy production. The simplified process flow diagram is presented in Figure 13-9Figure 13-9 – Simplified process flow diagram.

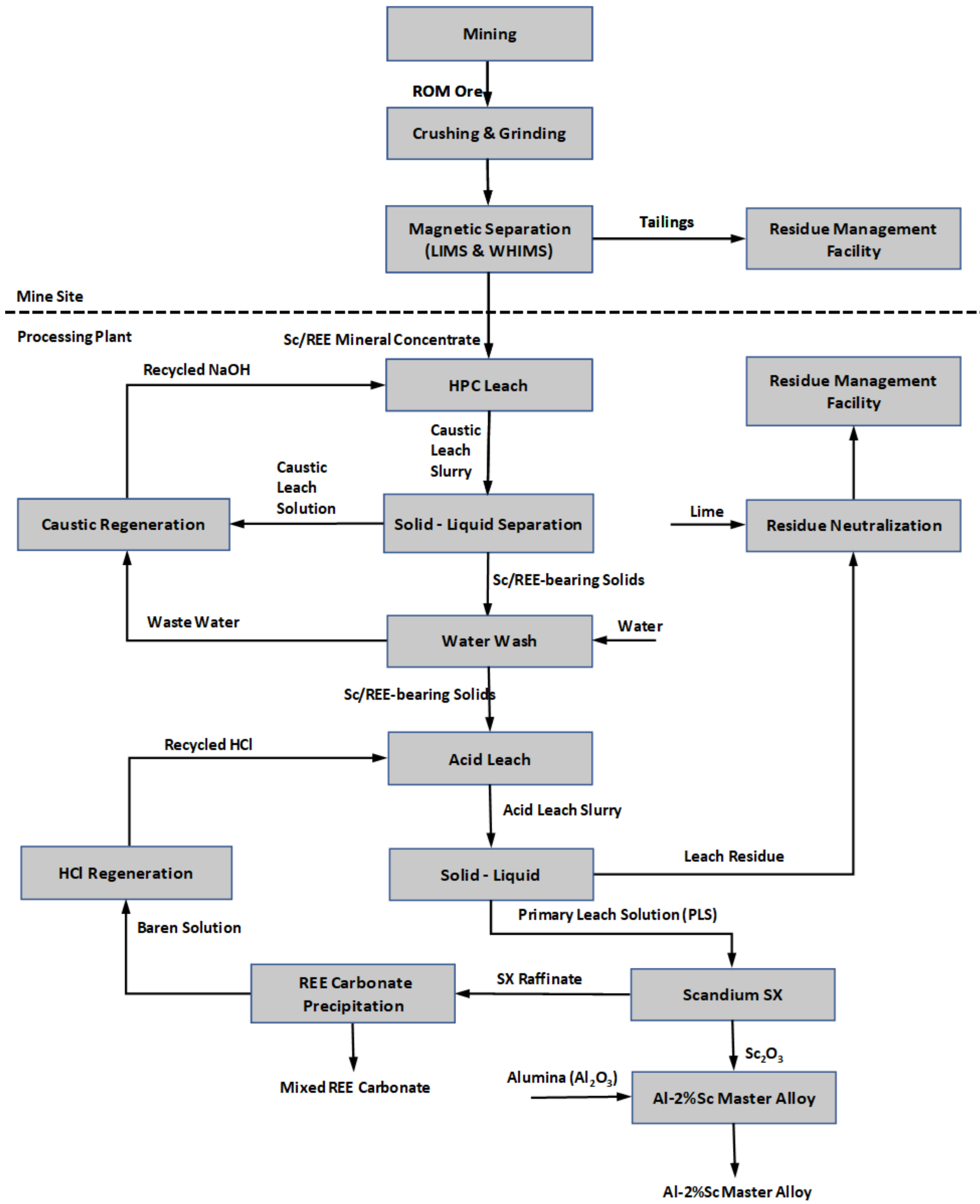


Figure 13-9 – Simplified process flow diagram

13.5 Future Metallurgical Development Programs

Most of the processes in the flowsheet have been tested at bench scale. The mineral processing flowsheet, the high-pressure caustic leach and the hydrochloric acid leach for Sc dissolution have all been tested. At the time of writing, work is ongoing on the hydrometallurgical recovery of Sc and REE from PLS at M.Plan. Another hydrometallurgical program focused on finalizing the Sc SX circuit and optimizing Sc solubilization processes is currently being planned to start in the fourth quarter of 2021 or early 2022. The Al-2%Sc master alloy development work focused on co-electrowinning of alumina and Sc_2O_3 is planned to start in 2022.

Imperial Mining Group has collected 16 t of sample from Crater Lake as part of the planned 50 t sample to feed its planned pilot programs. The pilot plant sample will feed a mineral processing pilot program which will focus on producing a Sc/REE-rich mineral concentrate. The Sc/REE mineral concentrate will feed the hydrometallurgy pilot program, commencing in 2022.

Metallurgical development programs currently planned to start in the next six months are summarized in Table 13-10.

Table 13-10 – Future metallurgical development programs

#	Program	Type	Start date
1	Hydrometallurgy optimization and SX development	Bench scale	Late 2021 / early 2022
2	Al-2%Sc Master alloy technology development	Bench scale	1st quarter, 2022
3	Mineral processing piloting	Pilot program	Late 2021 / early 2022
4	Hydrometallurgy flowsheet piloting	Pilot program	2nd quarter of 2022

14. MINERAL RESOURCE ESTIMATES

The mineral resource estimate for the Crater Lake Project (the "2021 MRE") was prepared by Marina Iund, P.Geo., Paul Daigle, P.Geo., and Carl Pelletier, P.Geo., using all available information.

The studied area covers the mineralized domains collectively known as the TGZ target.

The 2021 MRE was established for scandium, lanthanum, praseodymium, neodymium, terbium and dysprosium. Other REEs were not included in the estimate.

The effective date of the 2021 MRE is September 17, 2021.

14.1 Methodology

The resource area has a NE-SW strike length of 500 m, a width of 120 m, and a vertical extent of 250 m below the surface. The 2021 MRE was based on a compilation of recent diamond drill holes ("DDH") completed by the issuer.

The 2021 MRE was prepared using Leapfrog GEO 2021.1 ("Leapfrog") and GEOVIA Surpac 2021 ("Surpac") software. Leapfrog was used for the 3D geological modelling. Surpac was used for the estimation, which consisted of 3D block modelling and the inverse distance square ("ID2") interpolation method. Statistical, capping and variography studies were completed using Snowden Supervisor v8.13 and Microsoft Excel software.

The main steps in the methodology were as follows:

- Review and validation of the database;
- Validation of the geological model and interpretation of the mineralized units;
- Validation of the drill hole intercepts database, compositing database and capping values for the purposes of geostatistical analysis and variography;
- Validation of the block model and grade interpolation;
- Revision of the classification criteria and validation of the clipping areas for mineral resource classification;
- Assessment of the resources with "reasonable prospects for economic extraction" and selection of appropriate cut-off grades and pit shell; and
- Generation of a mineral resource statement.

14.2 Drill Hole Database

The diamond drill hole database contains 25 DDH, which corresponds to all the holes drilled on the Project. The Surpac database contains all 25 DDH (Figure 14-1 and Figure 14-2).

The holes cover the strike length of the Project at a regular drill spacing of 50 m. A total of 2,414 intervals were sampled (1,244 samples in mineralized domains), representing 2,667 m of drilled core (1,426 m drilled in mineralized domains). The resource database includes scandium, lanthanum, praseodymium, neodymium, terbium and dysprosium assays, as well as lithological, alteration and structural descriptions.

In addition to the basic tables of raw data, the Surpac database includes several tables containing the calculated drill hole composites and wireframe solid intersections required for the statistical analysis and resource block modelling.

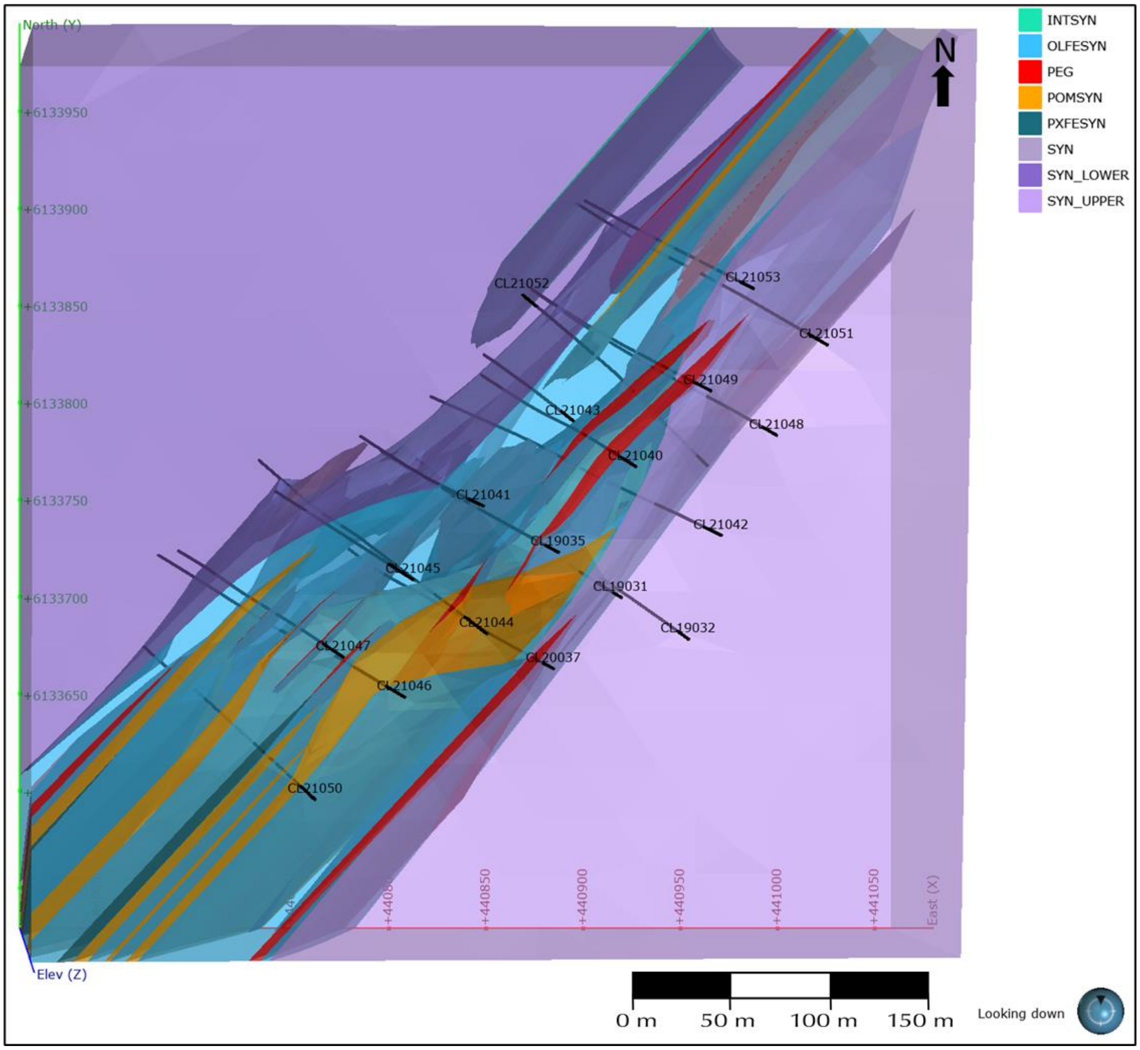


Figure 14-1 – Surface plan view of the geological model and the validated DDH used in the 2021 MRE

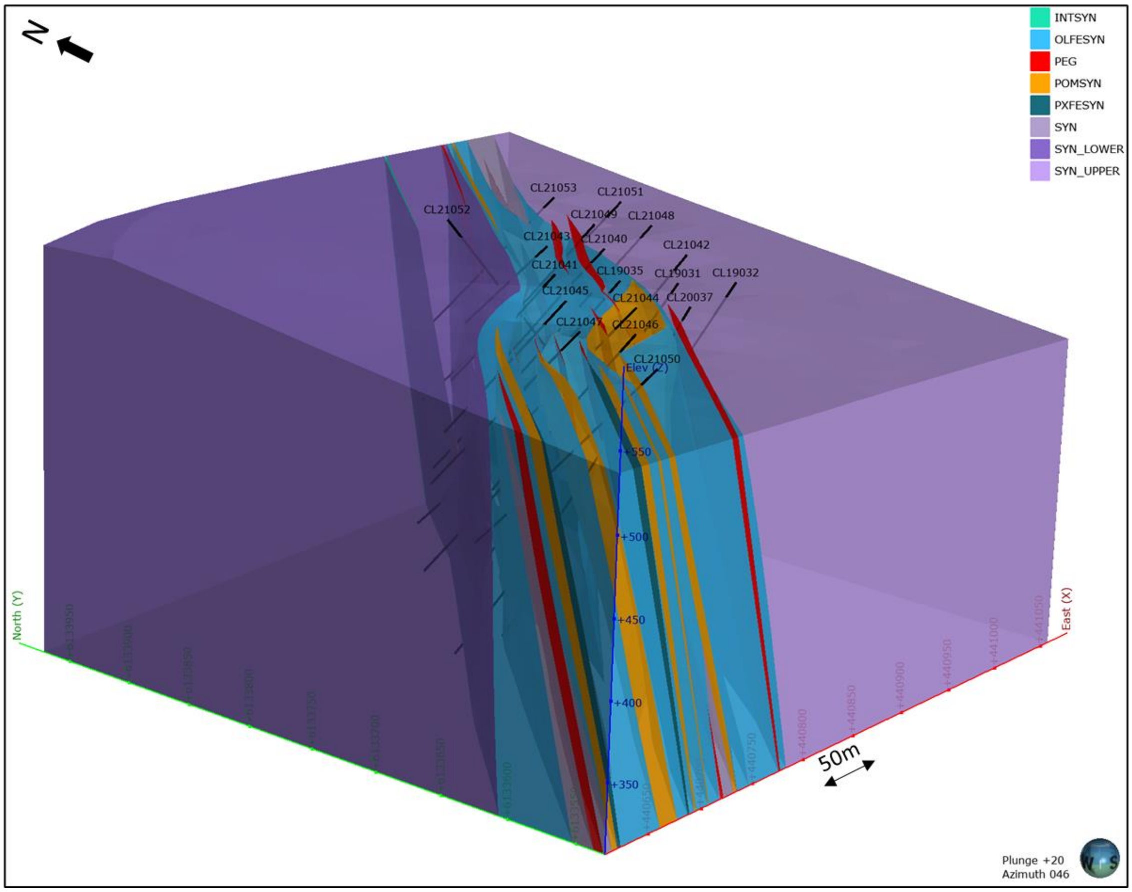


Figure 14-2– Isometric view of the geological model and the validated DDH used in the 2021 MRE

14.3 Geological Model

The drill hole data were used to create the 2021 geological model (Figure 14-1 and Figure 14-2). All geological solids were modelled in Leapfrog and snapped to drill holes.

The main lithologies of the deposit are massive syenite ("SYN") intruded by olivine ferro-syenite ("OLFESYN"), four (4) pyroxene ferro-syenites ("PXFESYN") and an intermediate syenite ("INTSYN"). Later pegmatitic dykes ("PEG") and intermediate porphyries ("POM") cut all units.

The 2021 geological model was included in the Surpac block model to assign densities to the blocks. The OLFFESYN, PXFESYN and INTSYN solids were used as mineralized domains. These domains are subvertical with an NE-SW strike.

Two surfaces were created to define the topography and the overburden/bedrock contact. The surfaces were generated from surveyed drill hole collars and a Lidar topographic survey.

14.4 High-grade Capping

Basic univariate statistics were performed on the raw assay datasets for the OLFESYN domain. The datasets for other mineralized domains were too low to yield relevant results. The results obtained for OLFESYN were applied to the other domains. The following criteria were used to decide if capping was warranted:

- The coefficient of variation of the assay population is above 2.0.
- The quantity of metal contained in the top 10% highest grade samples is above 40%, and/or the quantity of metal in the top 1% highest grade samples is higher than 10%.
- The probability plot of the grade distribution shows abnormal breaks or scattered points outside the main distribution curve.
- The log-normal distribution of grades shows erratic grade bins or distanced values from the main population.

The capping threshold decided for all domains is consistent with the combination of three criteria:

- A break in the probability plot.
- A coefficient of variation below 2.0 after capping.
- The total metals of the top 1% highest grade samples is below 10% after capping.

Capping was applied to raw assays. Table 14-1 presents a summary of the statistical analysis by metal. Figure 14-3 shows an example of graphs supporting the capping threshold decisions.

Table 14-1– Summary of univariate statistics on raw assays

Oxide	No. of samples	Max (g/t)	Uncut Mean (g/t)	Uncut COV	High Grade Capping (g/t)	No. of Cut Samples	Cut Mean (g/t)	Cut COV	% Samples Cut	% Loss Metal Factor
Sc_2O_3	1064	825.18	268.48	0.36	none	0	268.48	0.36	0	0
Dy_2O_3	1064	573.90	65.93	0.4	215	1	65.59	0.34	0.2	0.5
La_2O_3	1064	15011.84	623.95	0.85	3690	2	609.96	0.42	0.2	2.2
Nd_2O_3	1064	11780.64	600.62	0.69	2100	2	589.22	0.35	0.2	1.9
Pr_2O_3	1064	3358.80	166.89	0.71	1380	3	165.08	0.47	0.2	1.1
Tb_4O_7	1064	92.10	11.54	0.41	none	0	11.54	0.41	0	0

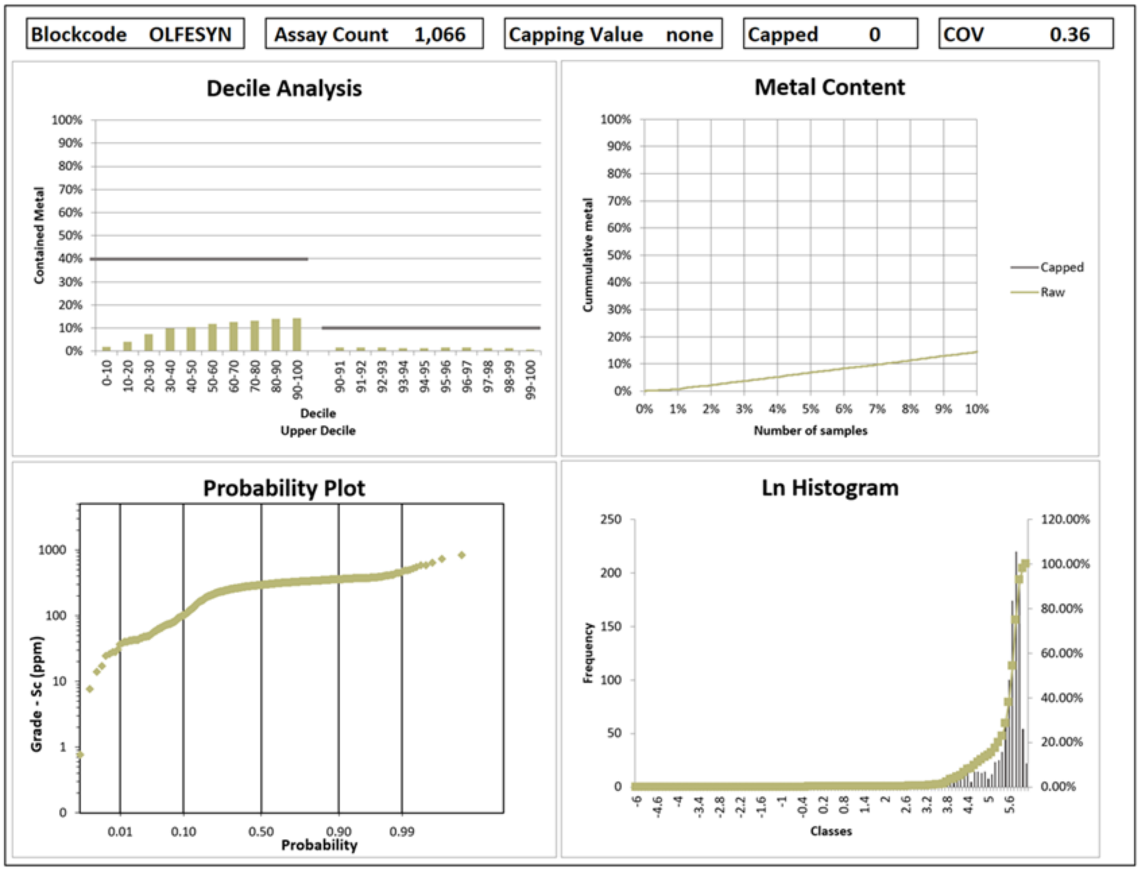


Figure 14-3 – Example of graphs supporting the no-capping decision for the Sc_2O_3 oxide in olivine ferro-syenite

14.5 Density

Densities are used to calculate tonnage from the estimated volumes in the resource grade block model.

From 2019 to 2021, the issuer submitted a total of 176 samples for specific bulk gravity ("SG") analysis. Table 14-2 presents a summary of the statistical analysis by lithological unit.

For each lithological unit, the median result was used to code the SG attribute in the block model. An arbitrary value of 2.00 g/cm³ was assigned to overburden.

Table 14-2 – Summary statistics for SG by lithology

Lithological Unit	Sample No.	Length (m)	Minimum (g/cm³)	Maximum (g/cm³)	COV	Mean (g/cm³)	Median (g/cm³)	Applied Value (g/cm³)
INTSYN	1	0.17	3.15	3.15		3.15	3.15	3.13
OLFESYN	93	17.07	2.68	3.35	0.04	3.12	3.13	3.13
PEG	3	0.65	2.62	2.69	0.01	2.65	2.63	2.63
POMSYN	18	3.21	2.74	3.29	0.04	2.81	2.77	2.77

Lithological Unit	Sample No.	Length (m)	Minimum (g/cm^3)	Maximum (g/cm^3)	COV	Mean (g/cm^3)	Median (g/cm^3)	Applied Value (g/cm^3)
PXFESYN	4		2.77	3.27		2.93	2.91	2.91
SYN	10	2.16	2.65	2.75	0.01	2.70	2.70	2.70
SYN_LOWER	32	5.8	2.65	2.78	0.01	2.71	2.71	
SYN_UPPER	15	2.63	2.68	2.76	0.01	2.70	2.7	
OB	0	0						2.00

14.6 Compositing

In order to minimize any bias introduced by variations in sample lengths, the capped assays were composited within each mineralized zone. The thickness of the mineralized solids, the proposed block size, and the original sample length were taken into consideration when selecting the composite length.

The intervals defining each mineralized domain were composited to 1.5 m equal lengths with any tail length equally distributed within each lithology. A grade of 0.00 g/t was assigned to missing sample intervals. A total of 2,073 composites were generated.

Table 14-3 summarizes the basic statistics for the raw data and composites.

Table 14-3 – Summary statistics for the raw data and composites

Oxide	Lithological Unit	Raw Assays				Composites			
		No. of Samples	Max Grade (g/t)	Mean Grade (g/t)	COV	No. of Comp.	Max Grade (g/t)	Mean Grade (g/t)	COV
Sc_2O_3	INTSYN	7	368.11	222.48	0.69	5	359.41	222.48	0.69
	OLFESYN	1066	825.18	277.49	0.31	870	825.18	277.49	0.27
	PXFESYN	176	1033.78	284.54	0.72	115	877.33	284.54	0.55
Dy_2O_3	INTSYN	7	123.95	82.51	0.49	5	120.36	82.51	0.49
	OLFESYN	1066	215.00	66.20	0.30	870	210.03	66.20	0.25
	PXFESYN	176	294.96	70.49	0.68	115	169.86	70.49	0.50
La_2O_3	INTSYN	7	1243.17	819.14	0.53	5	1206.72	819.14	0.53
	OLFESYN	1064	3690.00	611.68	0.35	867	3690.00	611.68	0.30
	PXFESYN	176	2967.18	646.12	0.67	115	1630.43	646.12	0.48
Nd_2O_3	INTSYN	7	1224.72	764.41	0.62	5	1188.47	764.41	0.61
	OLFESYN	1066	2100.00	596.11	0.30	870	2100.00	596.11	0.26
	PXFESYN	176	2892.67	633.00	0.73	115	1667.95	633.00	0.54
Pr_2O_3	INTSYN	7	335.88	211.02	0.60	5	325.48	211.02	0.60
	OLFESYN	1066	1380.00	161.01	0.42	870	1380.00	161.01	0.36
	PXFESYN	176	777.08	170.42	0.71	115	426.26	170.42	0.52
Tb_4O_7	INTSYN	7	21.17	13.81	0.54	5	20.56	13.81	0.54
	OLFESYN	1066	92.10	11.64	0.34	870	61.40	11.64	0.29
	PXFESYN	176	52.93	12.32	0.70	115	30.82	12.32	0.51

14.7 Block Model

A block model was established to enclose a sufficiently large volume to host an open pit. The model corresponds to a sub-blocked model in Surpac, rotated 42° clockwise (Y axis oriented at N042° azimuth).

The user block size was defined as 5m x 5m x 5m with a minimal sub-block size of 1.25m x 1.25m x 1.25m. Block dimensions reflect the sizes of mineralized domains and plausible mining methods. All blocks with more than 50% of their volume falling within a selected solid were assigned the corresponding solid block code.

Table 14-4 presents the properties of the block model. Table 14-5 provides details about the naming convention for the corresponding Surpac solids, as well as the rock codes and precedence assigned to each individual solid.

Table 14-4 – Block model properties

Properties	Y (rows)	X (columns)	Z (levels)
Min. coordinates	6133550	440000	300
Max. coordinates	6135000	441100	600
User block size	5	5	5
Min. block size	1.25	1.25	1.25
Rotation	42	0	0

Table 14-5 – Block model naming convention and rock codes

Solid Name	Description	Rockcode	Precedence
Air (above topography)	air	1	1
OB	overburden	33	2
PEG	waste	50	5
POMSYN	waste	55	10
PXFESYN	mineralization	101	20
OLFESYN	mineralization	100	25
INTSYN	mineralization	102	30
SYN	waste	60	50
SYN_UPPER	waste	60	50
SYN_LOWER	waste	60	50

14.8 Variography and Search Ellipsoids

3D variography, carried out in Supervisor, yielded the best-fit model along an orientation that roughly corresponds to the strike and dip of the mineralized domains. The variography analysis was inconclusive for INTSYN and PXFESYN due to insufficient information. The variography was also inconclusive in defining the range for the scandium in the Z-axis due to the lack of information. A value of one-third (1/3) of the major axis was arbitrarily applied. Variography results obtained from OLFESYN were then applied to other mineralized domains.

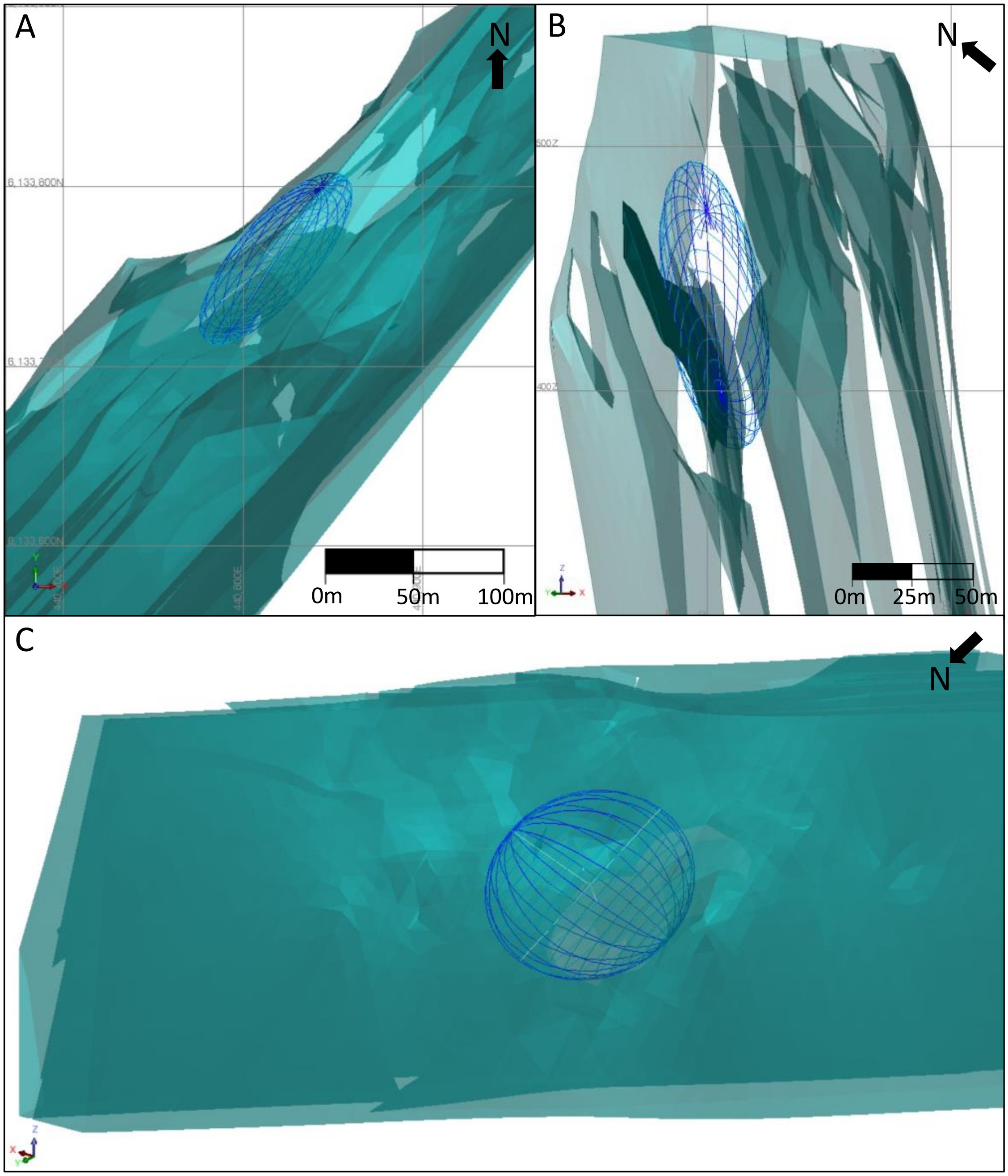
The search ellipsoid was based on the variography study. The interpolation strategy counts two (2) cumulative passes. The first pass corresponds to half (0.5x) of the variography ranges and the second pass is 1x the ranges.

Table 14-6 summarizes the parameters of the ellipsoids used for interpolation.

Figure 14-4 illustrates the shape and range of the scandium search ellipsoids for the first pass.

Table 14-6 – Variogram model parameters

Oxide	Surpac Coordinates			Model Type	Variogram Components			
	Z	X	Y		Nugget	Range X (m)	Range Y (m)	Range Z (m)
Sc_2O_3	52	-49	-75	Spherical	0.05	120	120	40
Pr_2O_3	34	29	-78	Spherical	0.1	160	140	55
Nd_2O_3	34	29	-78	Spherical	0.05	140	115	60
Tb_4O_7	34	29	-78	Spherical	0.2	145	125	55
Dy_2O_3	34	29	-78	Spherical	0.07	150	135	60
La_2O_3	32	39	-77	Spherical	0.1	155	100	55



A) Plan view; B) Section view, looking NE; C) Isometric view, looking SW

Figure 14-4 – Views of the scandium search ellipsoids for the first pass with the OLFESYN wireframe

14.9 Grade Interpolation

The variography study provided the parameters for interpolating the grade model using capped composites. The interpolation was run on point area workspaces extracted from the composite datasets (flagged by zone) in Surpac. A cumulative 2-pass search was used for the resource estimate. Pass 1 corresponds to half (0.5x) the variography ranges, and Pass 2 is 1x the variography ranges for blocks not estimated during the first pass. The interpolation profiles were applied to each mineralized zone using hard boundaries.

Several models were produced using the nearest neighbour ("NN"), inverse distance square ("ID2") and ordinary kriging (OK) interpolation methods to choose the method that best respects the raw assay and composite grade distribution for each metal. Models were compared visually (on sections, plans and longitudinal views), statistically, and with swath plots. The focus was to limit the smoothing effect to preserve local grade variations while avoiding the smearing of high-grade values. The ID2 method was selected for the final resource estimate.

For Dy_2O_3, La_2O_3, Pr_2O_3, Nd_2O_3 and Tb_2O_3, high-grade values did not show continuous distributions. The interpolation distance for the high-grade values was restricted to avoid high-grade smearing and grade over-estimation in the block model. The top grades were defined by studying the grades frequency histogram for each element. The interpolation restriction distance was defined as one-third of the major variogram range. Table 14-7 presents the restriction parameters.

The strategy and parameters for the grade estimation are summarized in Table 14-8.

Table 14-7 – High grade interpolation restriction parameters

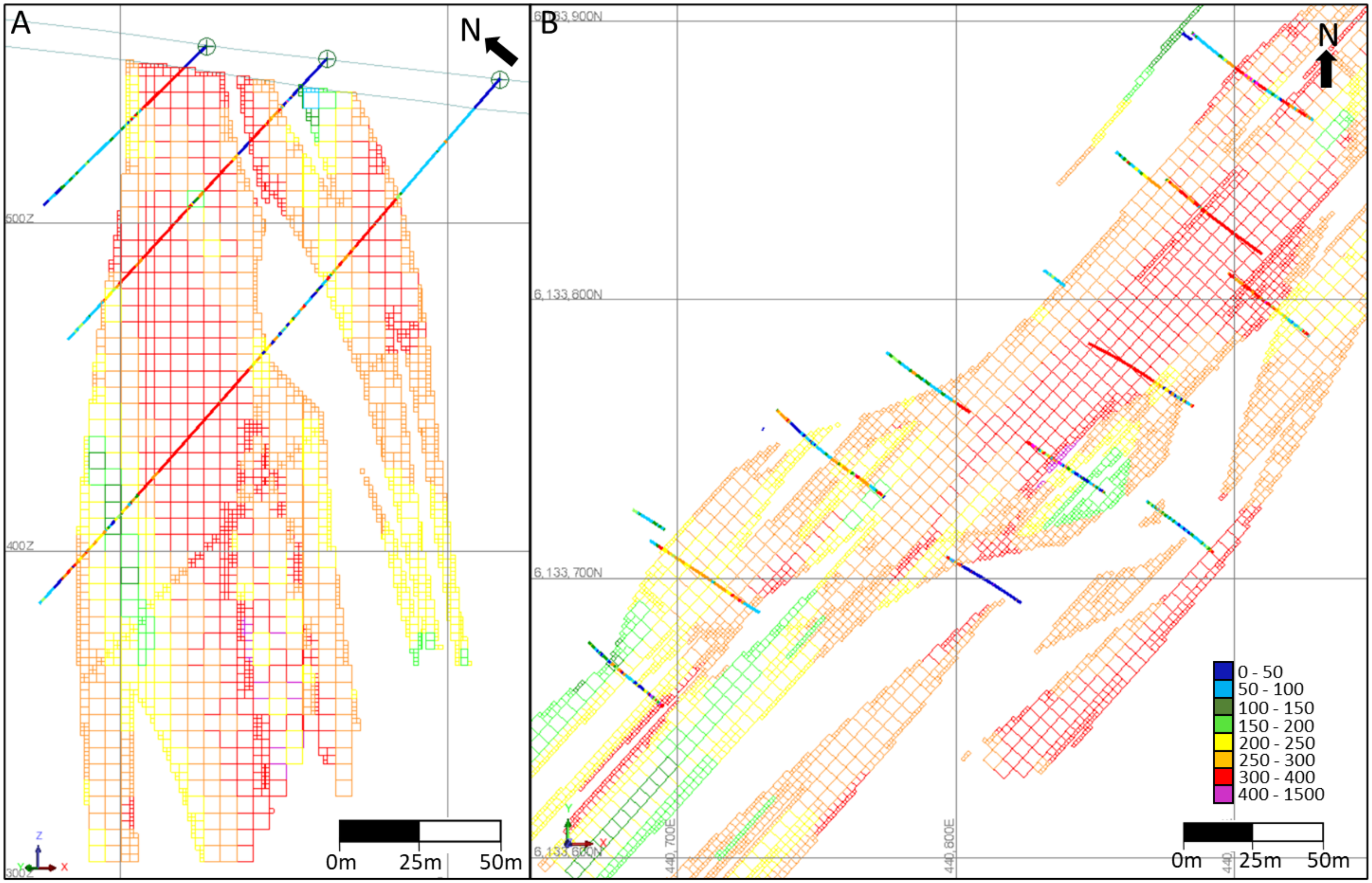
Oxide	Top Grade (g/t)	Interpolation Restriction Distance (m)
Sc_2O_3	-	-
Pr_2O_3	300	27
Nd_2O_3	1000	23
Tb_4O_7	20	24
Dy_2O_3	80	25
La_2O_3	1000	26

Table 14-8 – Interpolation strategy

Pass	Number of composites		
	Min	Max	Max per hole
1	9	18	4
2	5	18	4

14.10 Block Model Validation

Block model grades and composite grades were visually compared on sections, plans and longitudinal views for both densely and sparsely drilled areas. No significant differences were observed, and a generally good match was noted in the grade distribution without excessive smoothing in the block model. The process confirmed that the block model honours the drill hole composite data (Figure 14-5).



A) Section view, looking NE (+/- 25 m); B) Plan view (+/- 25 m).

Figure 14-5 – Scandium grade distribution

The OK and NN models were used to check for local bias in the models. The OK model matches well with the ID2 model. The differences in the high-grade composite areas are within acceptable limits. The trend and local variation of the estimated ID2 and OK models were compared to the NN models and the composite data using swath plots in three directions (North, East and Elevation). The ID2, NN and OK models show similar trends in grades, with the expected smoothing for each method compared to the composite data.

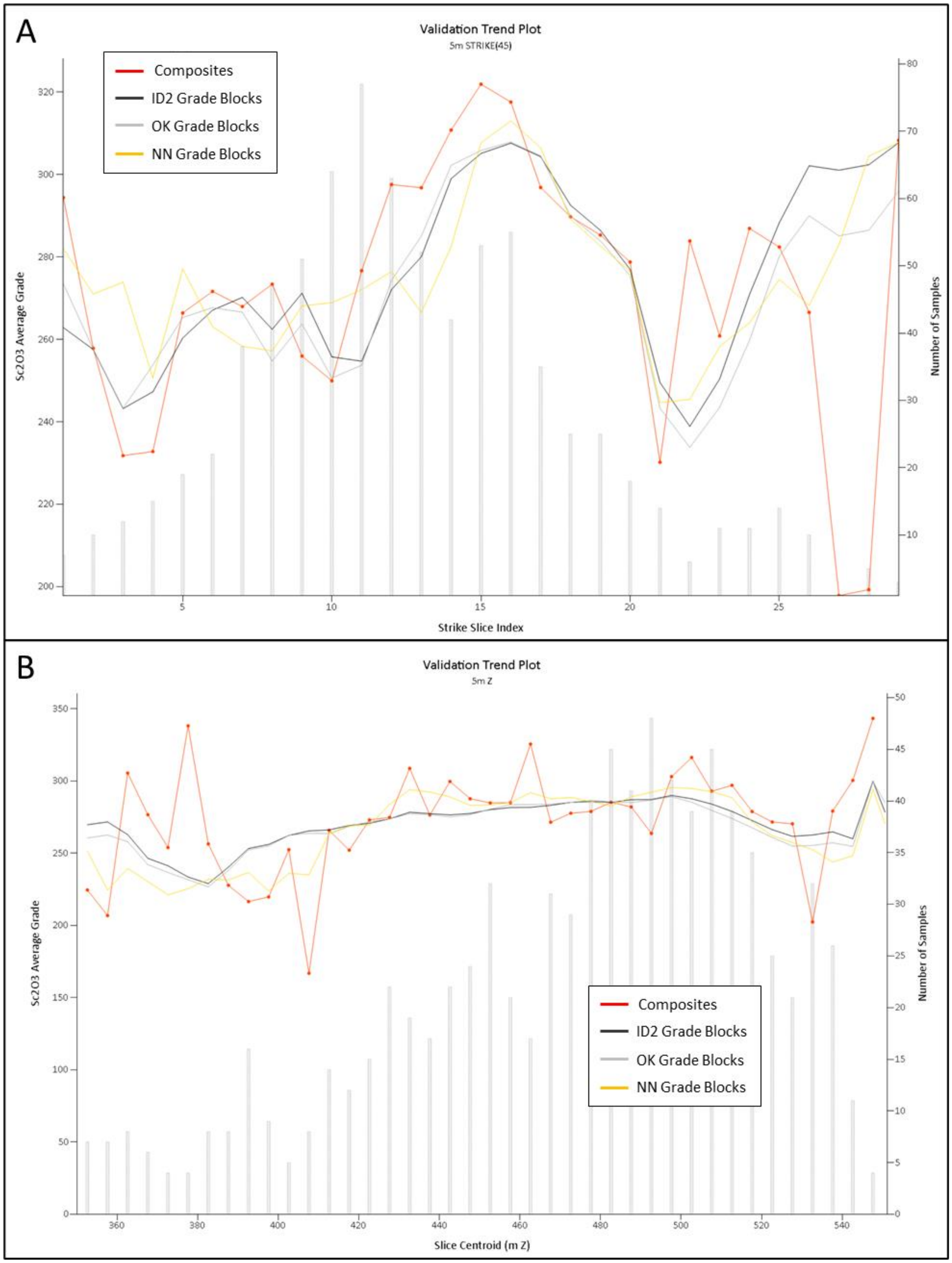
Table 14-9 compares the global block model mean for three (3) interpolation scenarios (OK, ID2 and NN) and the composite grades for each metal. Generally, the comparison between composite and block grade distribution did not identify any significant issues.

Figure 14-6 shows an example of the swath plot used to compare the block model grades to the composite grades. In general, the model correctly reflects the trends shown by the composites, with the expected smoothing effect.

Table 14-9 – Comparison of block model and composite mean grades

Oxide	Property	Composite	ID2 Model	OK Model	NN Model
Number		870	169547	169547	169547
Sc_2O_3	Mean (g/t)	277.573	276.036	273.987	276.180
	COV	0.283	0.147	0.162	0.318
Dy_2O_3	Mean (g/t)	66.460	65.700		70.924
	COV	0.271	0.158		0.452
Tb_4O_7	Mean (g/t)	11.684	11.691		12.775
	COV	0.301	0.193		0.598
La_2O_3	Mean (g/t)	615.710	613.790		
	COV	0.314	0.224		
Nd_2O_3	Mean (g/t)	598.914	596.474		
	COV	0.279	0.163		

Note: Blocks classified as Indicated only; No cut-off grade applied.



A) NW-SE cross-section; B) Elevation.

Figure 14-6 – Swath plots comparing the different interpolation methods to the DDH composites for scandium

14.11 Mineral Resource Classification

No Measured resources were defined.

Indicated resources were defined for blocks estimated in the first pass (minimum of 3 DDH) and at the boundaries, within 30 m of a drill hole, or at mi-distance to the last drill hole meeting the indicated criteria. Inferred resources were defined for the remaining interpolated blocks (minimum 2 DDH).

The resource category was assigned using clipping boundaries. In some cases, isolated blocks were upgraded or downgraded to homogenize the model with respect to the geological and grades continuity.

14.12 Cut-off Grade for Mineral Resources

Under CIM Definition Standards, mineral resources should have “reasonable prospects of eventual economic extraction”. Given the nature of the mineralization (polymetallic content, large zone width and widespread grade distribution), the cut-off grade of the Project is expressed as net smelter return (“NSR”) and the assumptions made for its calculation apply to a potential open pit scenario.

An NSR value was calculated for each element in the block model with the following formula: Metal price (C$/t) x Block Value (g/t) x recovery (%) /10^3. An NSR total was then calculated using the following formula: NSR Total (C$/t) = NSR Sc_2O_3 + NSR La_2O_3 + NSR Pr_2O_3 + NSR Nd_2O_3 + NSR Tb_4O_7 + NSR Dy_2O_3 - Concentrate Transportation Cost.

Detailed parameters used for each element are described in Table 14-10.

Table 14-10 – Input parameters used to calculate the NSR block model attributs

Attribute	Metal Price (C$/kg)	Block Value (g/t)	Recovery (%)	Concentrate Transportation Cost (C$/t ore milled)
NSR_Sc_2O_3	1875	Id2_Sc_2O_3	0.76	17.01
NSR_La_2O_3	0.6*	Id2_La_2O_3	0.63	17.01
NSR_Pr_2O_3	36*	Id2_Pr_2O_3	0.63	17.01
NSR_Nd_2O_3	37*	Id2_Nd_2O_3	0.63	17.01
NSR_Tb_4O_7	483*	Id2_Tb_4O_7	0.63	17.01
NSR_Dy_2O_3	155*	Id2_Dy_2O_3	0.63	17.01

* Prices were discounted by 70% as the Project assumes sales as a bulk TREO+Y concentrate

For the 2021 MRE, an NSR cut-off of 110.8 C$/t has been selected based on the assumptions described in Table 14-11. The selection of reasonable prospective parameters, which assume that some or all of the estimated resources could potentially be extracted, is based on an open-pit mining scenario (470,000 tpy). This is also based on the assumption of onsite mineral concentrate production and transport of the concentrate from the mine site to a processing plant.

Table 14-11 – Input parameters used to calculate the open-pit cut-off grade

Parameters	Unit	Value
Sc2O3 price	US$/kg	1,500
La2O3 price*	US$/kg	0.6
Pr2O3 price*	US$/kg	29
Nd2O3 price*	US$/kg	29
Tb4O7 price*	US$/kg	386
Dy2O3 price*	US$/kg	124
Processing cost	C$	14.89
Scandium recovery to high-grade scandium oxide product	%	76
REE recovery to mixed REE carbonate	%	63
Transportation cost (transport of concentrate from mine site to processing plant)	C$	17.01
G&A	C$	7.19
Refining and selling costs	C$	88.71
USD:CAD exchange rate		1.25

* Prices were discounted by 70% as the Project assumes sales as a bulk TREO+Y concentrate

14.13 Mineral Resource Estimate

The authors believe that the current mineral resource estimate can be classified as Indicated and Inferred mineral resources based on geological and grade continuity, data density, search ellipse criteria, drill hole spacing and interpolation parameters. The authors also believe that the requirement of “reasonable prospects for eventual economic extraction” has been met by having a cut-off grade based on reasonable inputs amenable to a potential open-pit extraction scenario.

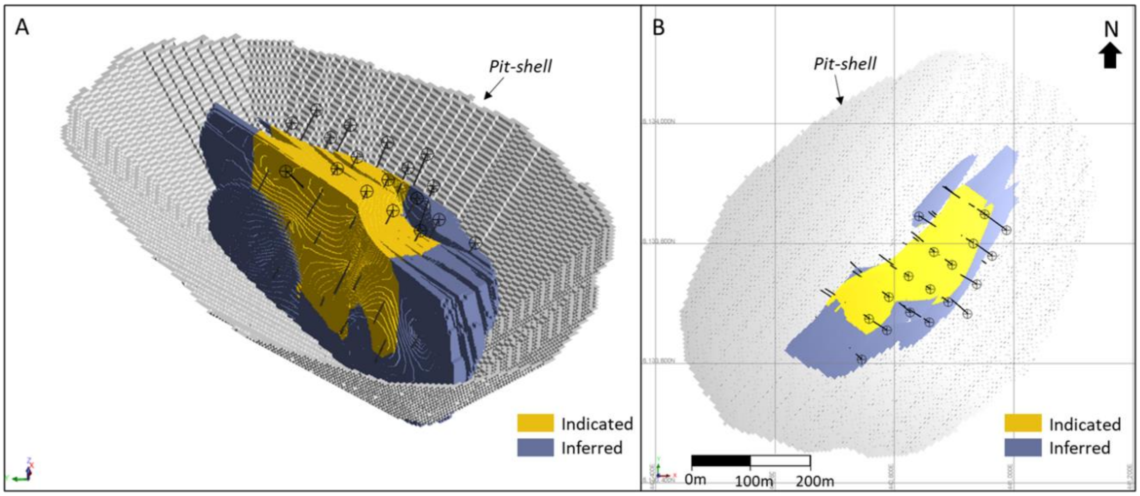


Figure 14-7 – Isometric (A) and plan view (B) showing the pit-shell and the classified mineral resources of the Crater Lake Project

The 2021 MRE is considered reliable and based on quality data and geological knowledge. The estimate follows CIM Definition Standards.

Table 14-12 displays the results of the 2021 MRE for the Project at the official 110.8 C$/t NSR cut-off.

Table 14-12 – 2021 Crater Lake Project Mineral Resource Estimate for an open pit scenario

Category	NSR Cut-off (C$/t)	Tonnage (Mt)	NSR Total (C$/t)	Sc_2O_3 (g/t)	Dy_2O_3 (g/t)	La_2O_3 (g/t)	Nd_2O_3 (g/t)	Pr_2O_3 (g/t)	Tb_4O_7 (g/t)
Indicated	110.8	7.3	413	282.01	65.72	605.82	595.78	160.41	11.65
Inferred	110.8	13.2	386	264.24	62.24	568.63	573.04	154.02	11.13

Notes to accompany the Mineral Resource Estimate:

1. The independent and qualified persons for the mineral resource estimate, as defined by NI 43 101, are Marina Iund, P.Geo. (InnovExplo Inc.), Paul Daigle, P.Geo. (InnovExplo Inc. associate) and Carl Pelletier, P.Geo. (InnovExplo Inc.). The effective date of the estimate is September 17, 2021.
2. These mineral resources are not mineral reserves, as they do not have demonstrated economic viability. The mineral resource estimate follows current CIM Definition Standards.
3. The results are presented in situ and undiluted and considered to have reasonable prospects of economic viability.
4. The estimate encompasses three mineralized domains using the grade of the adjacent material when assayed or a value of zero when not assayed.
5. High-grade capping supported by statistical analysis was done on raw assay data before compositing: La_2O_3 (3690 g/t), Pr_2O_3 (1380 g/t), Nd_2O_3 (2100 g/t), Dy_2O_3 (215 g/t). No capping was applied to Sc_2O_3 and Tb_4O_7.
6. The estimate was completed using a sub-block model in GEOVIA SURPAC 2021 with user block size of 5m x 5m x 5m and minimum block size of 1.25m x 1.25m x1.25m. Grades interpolation was obtained by ID2 using hard boundaries.
7. Bulk density values were applied by lithology (g/cm3): INTSYN, OLFESYN = 3.13; PXFESYN = 2.91; SYN = 2.7; POMSYN = 2.77; PEG = 2.63 and OB = 2.0.
8. The mineral resource estimate is classified as indicated and inferred. The Indicated mineral resource category is defined with a minimum of three (3) drill holes in areas where the drill spacing is less than 60 m, and reasonable geological and grade continuity have been demonstrated. The Inferred category is defined with a minimum of two (2) drill holes in areas where the drill spacing is less than 120 m, and reasonable geological and grade continuity have been demonstrated. Clipping boundaries were used for classification based on those criteria.
9. The mineral resource estimate is pit-constrained with a bedrock slope angle of 45° and an overburden slope angle of 30°. It is reported at a NSR cut-off of 110.8 C$/t .The NSR cut-off was calculated using the following parameters: processing cost = C$14.89; transportation cost (concentrate transportation from mine site to processing plant): C$7.19; refining and selling costs = C$ 88.71; Sc_2O_3 price = US$1,500/kg; La_2O_3 price = US$0.6/kg; Pr_2O_3 price = US$29/kg; Nd_2O_3 price = US$29/kg; Tb_4O_7 price = US$386/kg; Dy_2O_3 price = US$124/kg; USD:CAD exchange rate = 1.25; scandium recovery to high grade scandium oxide product = 76.0%; REE recovery to mixed REE carbonate = 63.0%. The cut-off grades should be re-evaluated in light of future prevailing market conditions (metal prices, exchange rates, mining costs etc.).
10. The number of metric tons was rounded to the nearest thousand, following the recommendations in NI 43 101 and any discrepancies in the totals are due to rounding effects.
11. The authors are not aware of any known environmental, permitting, legal, title-related, taxation, socio-political, or marketing issues, or any other relevant issue not reported in the Technical Report, that could materially affect the Mineral Resource Estimate.

Table 14-13 shows the NSR cut-off sensitivity analysis of the 2021 MRE. The homogeneity of the grade of the elements across the deposit as well as the high-grade nature of it makes the mineral resource low sensitive to variation of NSR cut-off.

The reader should be cautioned that the numbers provided in should not be interpreted as a mineral resource statement. The reported quantities and grade estimates at different NSR cut-off are presented in-situ and for the sole purpose of demonstrating the sensitivity of the resource model to the selection of a reporting NSR cut-off.

Table 14-13 – Cut-off grade sensitivity for the Crater Lake Project

Cut-off NSR ($/t)	Tonnage (t)	NSR total ($/t)	Sc_2O_3 (g/t)	Dy_2O_3 (g/t)	La_2O_3 (g/t)	Nd_2O_3 (g/t)	Pr_2O_3 (g/t)	Tb_4O_7 (g/t)
Indicated resource								
90	7,316,375	413	281.98	65.71	605.77	595.73	160.39	11.65
110.8	**7,315,544**	**413**	**282.01**	**65.72**	**605.82**	**595.78**	**160.41**	**11.65**
130	7,312,414	413	282.09	65.73	605.96	595.94	160.45	11.65
150	7,308,770	413	282.18	65.75	606.07	596.12	160.5	11.65
170	7,301,881	413	282.34	65.78	606.2	596.33	160.55	11.66
Inferred resource								
90	13,161,580	386	264.2	62.23	568.6	572.9	153.98	11.13
110.8	**13,158,383**	**386**	**264.24**	**62.24**	**568.63**	**573.04**	**154.02**	**11.13**
130	13,149,714	386	264.36	62.28	568.77	573.35	154.1	11.14
150	13,135,305	387	264.53	62.32	568.95	573.76	154.22	11.15
170	13,104,812	387	264.88	62.4	569.32	574.44	154.42	11.16

15. MINERAL RESERVE ESTIMATES

Not applicable at the current stage of the Project.

16. MINING METHODS

Not applicable at the current stage of the Project.

17. RECOVERY METHODS

Not applicable at the current stage of the Project.

18. PROJECT INFRASTRUCTURE

Not applicable at the current stage of the Project.

19. MARKET STUDIES AND CONTRACTS

Not applicable at the current stage of the Project.

20. ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

Not applicable at the current stage of the Project.

21. CAPITAL AND OPERATING COSTS

Not applicable at the current stage of the Project.

22. ECONOMIC ANALYSIS

Not applicable at the current stage of the Project.

23. ADJACENT PROPERTIES

As at the effective date of the Technical Report, the online GESTIM claims database shows several properties under different ownership adjacent to the Property (Figure 23-1). This public information has not been verified by InnovExplo. As at the time of writing, the authors are not aware of any active exploration work in the immediate area of the Property that would be considered relevant to the 2021 MRE.

The Strange Lake deposit, 100% owned by Torngat Metals Ltd, lies approximately 110 km to the north of the Property. The Strange Lake miarolithic pegmatite hosts 4.9 million tonnes of REO. A 2014 PEA detailed a mineral resource estimate for the B Zone, with a cut-off grade of 0.5% TREO, including indicated resources of 278.13 Mt at 0.93% TREO and inferred resources of 214.35 Mt at 0.85% TREO. Torngat Metals Ltd is currently doing piloting and engineering with a PFS to be completed by 2021/2022.

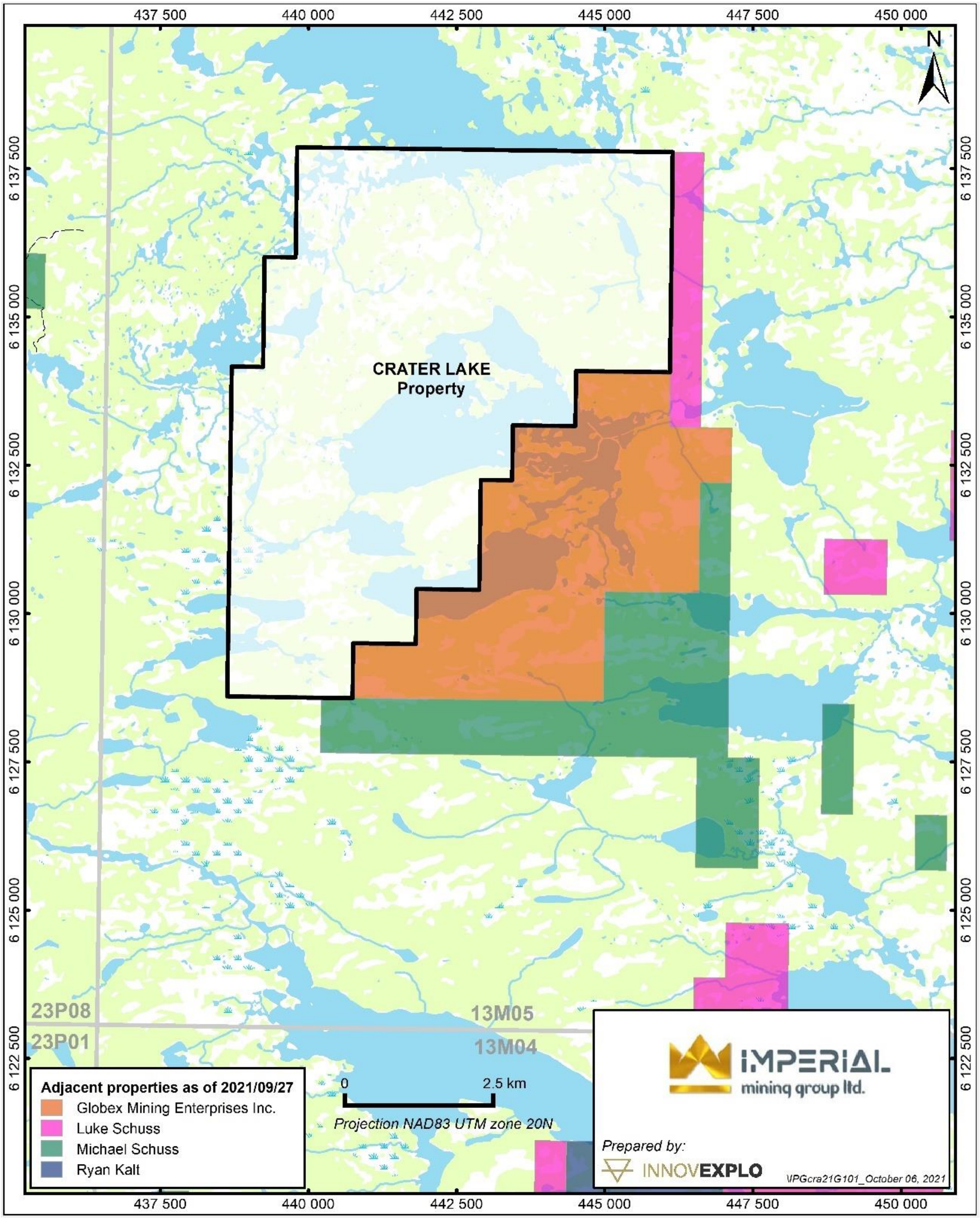


Figure 23-1 – Adjacent properties

24. OTHER RELEVANT DATA AND INFORMATION

Not applicable at the current stage of the Project.

25. INTERPRETATION AND CONCLUSIONS

The objective of the mandate assigned to InnovExplo was to generate a mineral resource estimate for the scandium-rare earth TGZ target on the Crater Lake Property (the "2021 MRE") and to prepare a supporting NI 43-101 Technical Report for the Project. InnovExplo believes that the information presented in this report provides a fair and accurate picture of the Project's potential.

The QPs from InnovExplo conducted site visits that included but were not limited to a review and validation of the data used for the 2021 MRE, including the geology and mineralization, and a review of the drilling and sampling procedures and processing methods. The QPs also validated the geological information provided by the issuer or obtained from public sources.

The Project is situated in northern Quebec, near the border of Newfoundland and Labrador, approximately 200 km northeast of Schefferville, Quebec. The Property consists of 96 contiguous mineral claims (two claim blocks) that cover the northwestern portion of the Crater Lake syenite batholith and the four principal exploration targets: TGZ, STG, North and Boulder Lake.

Current exploration and drilling on the TGZ target cover an area approximately 500 m along strike and 120 m wide, to a depth of approximately 250 m. The scandium and REE mineralization occurs mainly within the olivine ferro-syenite (OLFESYN), with minor mineralization in the pyroxene ferro-syenite (PXFESYN).

The Hill Top, STG and SCL targets cover an approximate strike length of 700 m based on geophysical surveys. Previous results and current geological observations for the STG target show a similar geological context as TGZ. An exploration program, including channel sampling and two (2) drill holes, was underway on the STG target at the time of writing. No exploration work was being planned for the SCL and Hill Top targets.

For the TGZ target, InnovExplo created a lithological model for the mineralized domains using all available geological and analytical information. To provide accurate resource modelling, the QPs based their wireframe model of mineralized domains on the drill hole database and the interpretation provided by Imperial's geologists.

The following conclusions are based on a detailed review of all pertinent information and results:

- The database supporting the 2021 MRE is complete, valid and up to date.
- The geological and grade continuity of scandium and REE mineralization in the OLFESYN and PXFESYN domains has been demonstrated, supported by a 50-m drilling grid.
- The 2021 MRE is classified as indicated and inferred resources. There are no measured resources.
- The 2021 MRE was prepared for a potential open-pit scenario at an NSR cut-off of 110.80 C$/t.

The 2021 MRE for the TGZ target at the Crater Lake Project, at a 110.80 C$/t NSR cut-off grade, comprises:

- Indicated Resource of 7,315,500 t grading 282 g/t Sc_2O_3, 66 g/t Dy_2O_3, 606 g/t La_2O_3, 596 g/t Nd_2O_3, 160 g/t Pr_2O_3, 12 g/t Tb_4O_7 equivalent to a 413 C$/t NSR
- Inferred Resource of 13,158,400 t grading 264 g/t Sc_2O_3, 62 g/t Dy_2O_3, 569 g/t La_2O_3, 573 g/t Nd_2O_3, 154 g/t Pr_2O_3, 11 g/t Tb_4O_7 equivalent to a 386 C$/t NSR.

Table 25.1 identifies important internal risks, potential impacts and possible risk mitigation measures that could affect the economic outcome of the Project. It does not over the external risks that apply to all mining projects (e.g., changes in metal prices, exchange rates, availability of investment capital, change in government regulations, etc.). Significant opportunities that could improve the economics, timing and permitting of the Project are also identified in this table. Further information and evaluation are required before these opportunities can be included in the project economics.

Table 25-1 – Risks and opportunities for the Crater Lake Project

RISK	POTENTIAL IMPACT	POSSIBLE RISK MITIGATION
Metallurgical recovery below expectations	Metallurgical tests are preliminary; recovery could be worse than what is currently assumed	Additional metallurgical testwork.
Difficulty in attracting experienced professionals	The ability to attract and retain competent, experienced professionals is a key factor in the success of the Project	The early search for professionals will help identify and attract critical people. It may be necessary to provide accommodation for key people (not included in project costs).
Niche market	It may be difficult to find a buyer	The early search for buyers will ensure commercial opportunities. It will allow the production to be adapted to the needs of the market.
Price of scandium and REE controlled by only a few producers	Price volatility	The early search for buyers will ensure commercial opportunities. It will allow the production to be adapted to the needs of the market.
OPPORTUNITIES	**EXPLANATION**	**POTENTIAL BENEFIT**
Delineation drilling	Lateral and Deep extensions still open	Likely to increase the geological and grade continuities
Exploration potential	The Property contains untested geophysical targets and under-explored targets	Potential to discover a satellite deposit
Metallurgical recovery optimization	Metallurgical tests are preliminary; additional metallurgical test work could improve the recovery	Recovery could be optimized to be better than what is currently assumed.
Price of scandium and REE controlled by only a few producers	Price volatility	Potential to benefit from the growth of green energy. The early search for buyers will ensure commercial opportunities. It will allow the production to be adapted to the needs of the market.

26. RECOMMENDATIONS

Based on the results of the 2021 MRE, InnovExplo recommend that the Project move to an advanced phase of exploration, which would involve the preparation of a Preliminary Economic Assessment (PEA) for the TGZ target.

InnovExplo recommends the following work program:

- Complete a PEA.
- Complete a 4,000 m drilling program on the southern portion of the TGZ target (Sections 0N to 350N) and at depth (sections 450N and 500N). The goal of this program is to investigate the extensions of the TGZ mineralized domains.
- Complete the exploration program currently underway at the STG target: detailed geological mapping, detailed channel sampling, collection of a 50t bulk sample of olivine ferro-syenite (15 t collected to date), and a 500 m drilling program.
- Perform a Lidar topographic survey to cover the entire Property.
- Perform the planned additional metallurgical testwork (solvent extraction flowsheet development and optimization; development of Al-2%Sc master alloy production technology; and mineral processing pilot program).
- Update the mineral resource estimate for the Project using data from the recommended studies and test results.

Table 26.1 presents the estimated cost for the recommended work program.

Table 26-1 – Estimated costs for the recommended work program for the Crater Lake Property

Budget	
1 – PEA (underway)	
2 – 4,000 m of exploration drilling on the TGZ target	
3 – 500 m of exploration drilling on the STG target (underway)	
4 – Field exploration on the STG target: detailed geological mapping, detailed channel sampling, collection of a 50t bulk sample (underway)	
5 – Lidar survey to cover the entire Property	
6 – Additional metallurgical test work	
7 – Update the MRE	
Total	**4,400,000**

InnovExplo believes that the recommended work program and proposed expenditures are appropriate and well thought out and that the character of the Project is of enough merit to warrant the recommended programs and activities. InnovExplo believes the proposed estimated budget reasonably reflects the type and number of contemplated activities.

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