Entrée/Oyu Tolgoi Joint Venture Project

Mongolia

NI 43-101 Technical Report

Prepared for:
Entrée Resources Ltd.

Prepared by:
Mr Kirk Hanson, P.E.
Mr Christopher Wright, P.Geo.
Mr. Piers Wendlandt, P.E.
Mr. Dean David, FAusIMM
Dr. Haiming (Peter) Yuan, P.E.

Effective Date:
8 October, 2021

Project Number:
247026

CERTIFICATE OF QUALIFIED PERSON

Kirk Hanson, P.E.
Wood USA Mining Consulting SLC Engineering
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I, Kirk Hanson, P.E., am employed as a Technical Director, Open Pit Mining with Wood USA Mining Consulting SLC Engineering.

This certificate applies to the technical report entitled "Entrée/Oyu Tolgoi Joint Venture Project, Mongolia, NI 43-101 Technical Report" that has an effective date of 8 October, 2021 (the "technical report").

I am registered as a Professional Engineer in the State of Idaho (#11063). I graduated with a B.Sc. degree from Montana Tech of the University of Montana, Butte, Montana in 1989 and from Boise State University, Boise, Idaho with an MBA degree in 2004.

I have practiced my profession for 32 years. I was Engineering Superintendent at Barrick's Goldstrike operation, where I was responsible for all aspects of open-pit mining, mine designs, mine expansions and strategic planning. After earning an MBA in 2004, I was assistant manager of operations and maintenance for the largest road department in Idaho. In 2007, I joined AMEC (now Wood) as a principal mining consultant. Over the past 14 years, I have been the mining lead for multiple scoping, pre-feasibility, and feasibility studies. I have also done financial modelling for multiple mines as part of completing the scoping, pre-feasibility and feasibility studies.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I have not visited the Oyu Tolgoi Project.

I am responsible for sections 1.1 to 1.2, 1.21, 1.22, 1.23.16, 1.23.17, 1.26; Sections 2.1 to 2.3, 2.5, 2.6; Section 3; Section 22; Section 24.1.9; Sections 25.1, 25.15, 25.16, 25.19; and Section 27 of the Technical Report.

I am independent of Entrée Resources Inc. as independence is described by Section 1.5 of NI 43–101.

I have previously co-authored the following technical report on the project:

- Hanson, K., Kulla G., Oshust P., Loomis, I., and Wong, H., 2018: Entrée/Oyu Tolgoi Joint Venture Project, Mongolia, NI 43-101 Technical Report: report prepared by Amec Foster Wheeler for Entrée Gold Inc., effective date 15 January, 2018.

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

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.

Dated: 21 October, 2021

"signed and sealed"

Kirk Hanson, P.E.

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CERTIFICATE OF QUALIFIED PERSON

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Wood Canada Limited
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I, Christopher Wright, P.Geo., am employed as a Technical Director with Wood Canada Limited.

This certificate applies to the technical report entitled "Entrée/Oyu Tolgoi Joint Venture Project, Mongolia, NI 43-101 Technical Report" that has an effective date of 8 October, 2021 (the "technical report").

I am registered as a Professional Geologist in British Columbia (#52476). Professional Geoscientist of The Association of Professional Geoscientists of British Columbia; 52476. I graduated from McGill University with a Bachelor of Science degree in 1997.

I have practiced my profession for 24 years. I have been directly involved in Mineral Resource estimation for base and precious metal deposits for over 20 years.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I most recently visited the Oyu Tolgoi Project from 11–21 June 2018.

I am responsible for Sections 1.1 to 1.8, 1.10, 1.11, 1.25, 1.27; Section 2, Sections 3.1, 3.2; Section 4; Section 5; Section 6; Section 7; Section 8; Section 9; Section 10; Section 11; Section 12; Section 14; Sections 25.1 to 25.4, 25.6, 25.18; Section 26 and Section 27 of the Technical Report.

I am independent of Entrée Resources Inc. as independence is described by Section 1.5 of NI 43–101.

I have previous involvement with the Project during an 11-month period from August 2017 to June 2018 when I completed extensive work with the South Oyut and Hugo North Mineral Resource and metallurgical databases and block models in the construction of geometallurgical models for these areas.

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

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.

Dated: 21 October, 2021

"signed and sealed"

Christopher Wright, P.Geo.

wood.

CERTIFICATE OF QUALIFIED PERSON

Piers Wendlandt P.E.
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I, Piers Wendlandt P.E., am employed as a Principal Mining Engineer with Wood USA Mining Consulting (Wood).

This certificate applies to the technical report entitled "Entrée/Oyu Tolgoi Joint Venture Project, NI 43-101 Technical Report" that has an effective date of 8 October, 2021 (the "technical report").

I am registered as a Professional Engineer in the State of Colorado (PE. 0047235). I graduated with a BSc. in Mining Engineering from the Colorado School of Mines in 2005, with a Master's of Public Affairs from the University of Texas at Austin in 2009, and with a Master's in Business Administration from the University of Colorado at Denver in 2019.

I have practiced my profession for 15 years. I have been employed in both site-based operations and consulting roles during my career and have extensive experience with all aspects of the mine planning process. I have been directly involved in numerous scoping, pre-feasibility, and feasibility studies in a leading capacity. As a consultant, I have supervised the inputs and coordination of specialist disciplines into the mine planning and reserves estimation process for underground metals projects around the world. I have completed underground mine plans and schedules, estimated equipment and personnel requirements, and estimated capital and operating costs. After earning an MBA, I have undertaken financial modeling in support of technical studies.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I have not visited the Oyu Tolgoi Project.

I am responsible for sections 1.1 to 1.2, 1.12 to 1.14, 1.16, 1.19, 1.20, 1.23.1 to 1.23.3, 1.23.5, 1.23.14, 1.23.15, 1.24.1, 1.24.2; Sections 2.1 to 2.3, 2.5 2.6; Section 3; Section 15; Section 16; Section 18.1 to 18.4, 18.6, 18.7; Sections 21.1, 21.2.1 to 21.2.4, 21.2.6 to 21.2.12, 21.3.1, 21.3.2, 21.3.4, 21.3.5, 21.3.7; Section 23; Sections 24.1.1 to 24.1.3, 24.1.5, 24.1.8; Sections 25.1, 25.7, 25.8, 25.10, 25.13, 25.14, 25.16, 25.17.1, 25.17.2; and Section 27 of the Technical Report.

I am independent of Entrée Resources Inc. as independence is described by Section 1.5 of NI 43–101.

I have had involvement with the Oyu Tolgoi Project since 2008, performing mine planning activities such as mine design, scheduling, and trade-off studies in support of underground mine designs.

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

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.

Dated: 21 October, 2021

"signed and sealed"

Piers Wendlandt P.E.

CERTIFICATE OF QUALIFIED PERSON

Dean David, FAusIMM
Amec Foster Wheeler Australia Pty Ltd (trading as Wood)
Level 1, 240 St Georges Terrace
Perth, WA, 6000
Australia

I, Dean David, FAusIMM (CP Met), am employed as Senior Consultant (Process) with Amec Foster Wheeler Australia Pty Ltd (trading as Wood).

This certificate applies to the technical report entitled "Entrée/Oyu Tolgoi Joint Venture Project, NI 43-101 Technical Report" that has an effective date of 8 October, 2021 (the "technical report").

I am a Fellow of The Australasian Institute of Mining and Metallurgy (FAusIMM, membership number 102351). I graduated from The South Australian Institute of Technology (now University of South Australia) with a Bachelor of Applied Science in Metallurgy in 1982.

I have practiced my profession for 40 years. I have been directly involved in mineral processing investigation, operations, management and consulting, specializing in metallurgical testwork program design and review, comminution, classification, flotation, geometallurgy, beneficiation, dense media separation, and mine-mill optimization for projects in Australia, Asia–Pacific, Africa, and South America.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I have not visited the Oyu Tolgoi Project.

I am responsible for Sections 1.1 to 1.2, 1.9, 1.15, 1.16, 1.18, 1.19, 1.20, 1.23.4, 1.23.5, 1.23.6, 1.23.14, 1.23.15; 1.27; Sections 2.1 to 2.4, 2.6, 2.7; Sections 3.1, 3.5; Section 13; Sections 14.12.1 and 14.12.2; Section 17; Section 18.7; Section 19; Sections 21.1, 21.2.1, 21.2.2 to 21.2.3, 21.2.5 21.2.6, 21.2.11, 21.3.1, 21.3.3 to 21.3.5; Section 23; Sections 24.1.4 to 24.1.6, 24.1.8; Sections 25.1, 25.5, 25.9, 25.10, 25.12 to 25.14; Section 26.4; and Section 27 of the Technical Report.

I am independent of Entrée Resources Inc. as independence is described by Section 1.5 of NI 43–101.

I have no previous involvement with the Oyu Tolgoi Project.

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

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.

Dated: 21 October, 2021

"signed"

Dean David, FAusIMM

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CERTIFICATE OF QUALIFIED PERSON

Dr. Haiming (Peter) Yuan, P.E.
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Reno NV 89521 Nevada
United States

I, Dr. Haiming (Peter) Yuan, P.E., am employed as a Senior Associate Engineer with Wood Environment & Infrastructure Solutions Inc.

This certificate applies to the technical report entitled "Entrée/Oyu Tolgoi Joint Venture Project, Mongolia, NI 43-101 Technical Report" that has an effective date of 8 October, 2021 (the "Technical Report").

I am a Professional Engineer (P.E.) in the states of Nevada (#019348), California, Idaho and Arizona. I graduated from Zhejiang University, in China in 1997 with a Bachelor of Civil Engineering degree, and obtained a Master of Science degree in Geotechnical Engineering from the same university in 2000. I graduated from Clemson University in 2003, with a doctoral degree in Geotechnical Engineering.

I have practiced my profession for 18 years. I have been directly involved in design of tailings impoundments, heap leach pads, and mine waste disposal facilities; infrastructure foundations; seismic design and liquefaction analysis; slope design, remediation and monitoring instrumentation; construction monitoring and quality control; and geotechnical numerical modelling. I have reviewed information on environmental, permitting, water management and social aspects for studies from scoping levels to closure for projects located throughout North America, South America and Asia.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I most recently visited the Oyu Tolgoi Project on 6 September, 2017.

I am responsible for Sections 1.17, 1.23.7 to 1.23.13, 1.24.3; Section 18.5, Section 20; Section 21.3.6; Section 24.1.7; and Sections 25.11, 25.17.3 of the Technical Report. I am co-responsible for Sections 1.1, 1.2; Sections 2.1 to 2.4, 2.6; Sections 3.1, 3.2, 3.3; Section 25.1; and Section 27 of the Technical Report.

I am independent of Entrée Resources Inc. as independence is described by Section 1.5 of NI 43–101.

I have previous involvement with the Oyu Tolgoi Project in 2018, when I reviewed the tailings dam design in support of a technical report being prepared for Entrée Resources Inc. on the Oyu Tolgoi Project .

I have read NI 43–101 and the sections of the technical report for which I am responsible have been prepared in compliance with that Instrument.

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.

Dated: 21 October, 2021

"signed and sealed"

Dr. Haiming (Peter) Yuan, P.E.

IMPORTANT NOTICE

This report was prepared as National Instrument 43-101 Technical Report for Entrée Resources Ltd. (Entrée) by Wood Canada Limited (Wood). The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in Wood's services, based on i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Entrée subject to terms and conditions of its contract with Wood. Except for the purposed legislated under Canadian provincial and territorial securities law, any other uses of this report by any third party is at that party's sole risk.

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1.0 SUMMARY

1.1 Introduction

Entrée Resources Ltd. (Entrée) requested that Wood Canada Limited (Wood) prepare an independent technical report (the Report) on the Entrée/Oyu Tolgoi Joint Venture Project (the Entrée/Oyu Tolgoi JV Project or the Project), in Mongolia.

The Project consists of two contiguous mining licences (MLs), Shivee Tolgoi (ML 15226A) and Javhlant (ML 15225A), and completely surrounds the Oyu Tolgoi ML held by Oyu Tolgoi LLC (OTLLC). The Shivee Tolgoi ML hosts the Hugo North Extension copper–gold deposit, and the Javhlant ML hosts the majority of the Heruga copper–gold–molybdenum deposit.

The Entrée/Oyu Tolgoi JV Project is currently divided into two contiguous areas, referred to as "properties". Entrée is in joint venture with OTLLC (the Entrée/Oyu Tolgoi JV) over the eastern portion of the Shivee Tolgoi ML and all of the Javhlant ML (the Entrée/Oyu Tolgoi JV property). The western portion of the Shivee Tolgoi ML forms the Shivee West property, where Entrée currently has a 100% interest. The Shivee West property is the subject of a License Fees Agreement with OTLLC, and may ultimately become part of the Entrée/Oyu Tolgoi JV property.

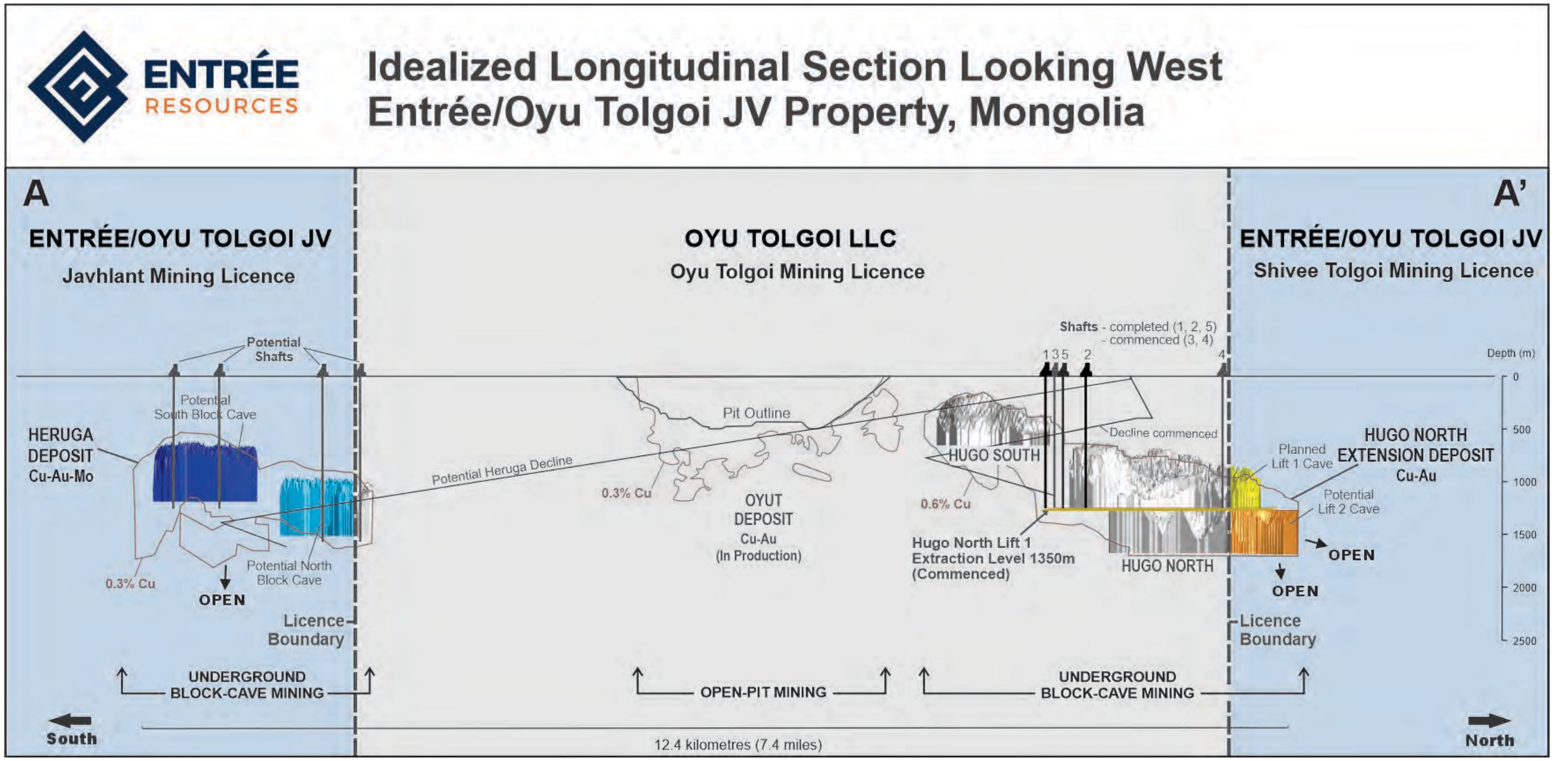
Entrée's joint venture partner, OTLLC, is jointly owned by the Mongolian Government and Turquoise Hill Resources Ltd (Turquoise Hill). Rio Tinto International Holdings Limited (Rio Tinto), which holds the majority interest in Turquoise Hill, is the operator for both the Oyu Tolgoi ML and the Entrée/Oyu Tolgoi JV property.

The Hugo North Extension deposit is at the north end of the 12.4 km long Oyu Tolgoi series of porphyry copper–gold deposits, and the Heruga deposit is at the south end (Figure 1-1).

OTLLC's Oyu Tolgoi ML contains the Oyut, Hugo North and Hugo South deposits, and the northern portion of the Heruga deposit. OTLLC is currently mining the Oyut deposit by open pit methods, and the first lift (Lift 1) of the Hugo North/Hugo North Extension deposits is under development to be mined from underground.

The Oyu Tolgoi mining operation is being developed by OTLLC in two phases. Phase 1 was designed to treat open pit material mined from the Oyut pit, and was completed with concentrator commissioning in 2013.

Figure 1-1: Longitudinal Section



Note: Figure courtesy Entrée, 2021. Infrastructure for Hugo North Extension Lift 1 is planned as part of Hugo North Lift 1, and is discussed with the Mineral Reserve estimates in this Report. The infrastructure shown for Hugo North Extension Lift 2 is discussed in the 2021 PEA in this Report. The infrastructure shown for Heruga is conceptual, and was used only to assess reasonable prospects for eventual economic extraction.

Phase 2 is under construction. It will consist of Lift 1 of the Hugo North/Hugo North Extension deposits, which will be mined by block (panel) caving methods. Phase 2 will include construction of infrastructure to support the underground mining operations such as shafts and conveyors, and modifications to the process plant such as addition of a fifth ball mill, additional roughing and column flotation, and concentrate dewatering and bagging capacity. Phase 2 is summarized in this Report in Sections 15 to 22, with a focus on elements that are relevant to the Entrée/Oyu Tolgoi JV property. The mine plan is at a feasibility-level of confidence. The evaluation of the mine plan as it pertains to Entrée's attributable interest is referred to by Entrée as the 2021 Reserves case. The portion of the 2021 Reserves case that pertains to Entrée is referred to as Entrée's 20% attributable interest in this Report.

OTLLC has conceptually proposed a second lift (Lift 2) for the Hugo North/Hugo North Extension area, as potential future development phases. Section 24 of this Report discusses, at a preliminary economic assessment (PEA) level, a conceptual mine plan for Lift 2 of the Hugo North Extension deposit (2021 PEA).

1.2 Terms of Reference

Entrée is refiling this Report to include updated information provided by OTLLC on the concentrate tonnes and grade to be produced from Lift 1 of the Hugo North/Hugo North Extension deposits. The updated concentrate information resulted in a positive impact on Entrée's attributable financial interest in Lift 1 of the Hugo North/Hugo North Extension deposits. The economic analysis for Lift 1 in Sections 1.21 and 22 of this Report was revised to include the updated concentrate data.

This Report is being used in support of Entrée's news release dated 21 October, 2021, entitled "Entrée Resources Files Amended Technical Report for its Interest in the Entrée/Oyu Tolgoi Joint Venture Property".

Units used in the report are metric units unless otherwise noted. Monetary units are in United States dollars (US$) unless otherwise stated. The Mongolian currency is the Tughrik (MTK). The Chinese currency is the Chinese Yuan Renminbi (RMB). Mineral Resources and Mineral Reserves are reported using the 2014 edition of the Canadian Institute of Mining and Metallurgy's *Definition Standards for Mineral Resources and Mineral Reserves* (the 2014 CIM Definition Standards).

For the purposes of this Report, 2020 Oyu Tolgoi Feasibility Study is referred to as the 2020 Feasibility Study, and the 2020 Turquoise Hill Technical Report is referred to as the

2020 Turquoise Hill Technical Report to differentiate from technical reports filed by Entrée.

1.3 Project Setting

The Entrée/Oyu Tolgoi JV Project is located in the South Gobi region of Mongolia, 570 km south of the capital city of Ulaanbaatar and 80 km north of the Mongolian border with China. The Project can be accessed by road and air. A railway route is under construction by the Government of Mongolia and will pass through the southwest corners of the Shivee Tolgoi and Javhlant MLs. OTLLC will make use of the Port of Tianjin in China for freight.

The South Gobi region has a continental, semi-desert climate. Mining operations are conducted year-round. Exploration activities can see short curtailments during storm activity.

1.4 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

The QPs have not independently reviewed ownership of the Project area and any underlying property agreements, mineral tenure, surface rights, or royalties. The QPs have fully relied upon information derived from Entrée and legal experts retained by Entrée for this information (see Section 3 of this Report).

1.4.1 Mineral Tenure

The Shivee Tolgoi and Javhlant MLs cover a total of about 62,920 ha and completely surround the Oyu Tolgoi ML. The Shivee Tolgoi and Javhlant MLs are valid until 2039, assuming statutory payments and reporting obligations are met, and can be extended for two subsequent 20-year terms. The Shivee Tolgoi and Javhlant MLs are currently divided as follows:

- Entrée/Oyu Tolgoi JV property: 39,807 ha consisting of the eastern portion of the Shivee Tolgoi ML and all of the Javhlant ML (Entrée/Oyu Tolgoi JV property) are subject to a joint venture between Entrée and OTLLC. The Entrée/Oyu Tolgoi JV property is contiguous with, and on three sides (to the north, east, and south) surrounds OTLLC's Oyu Tolgoi ML. The Entrée/Oyu Tolgoi JV property hosts the Hugo North Extension deposit and the majority of the Heruga deposit, and several exploration targets. OTLLC is the manager of the Entrée/Oyu Tolgoi JV. Through various agreements, Rio Tinto has assumed management of the building and operation of Oyu Tolgoi, including access to and exploitation of the Hugo North Extension deposit. Rio Tinto will also manage any potential future development of the portion of the Heruga deposit on the Entrée/Oyu Tolgoi JV property. Exploration operations on behalf of OTLLC, including exploration on the Entrée/Oyu Tolgoi JV property, are conducted under the supervision of Rio Tinto

- Shivee West property: 23,114 ha comprising the western portion of the Shivee Tolgoi ML. While the Shivee West property is currently 100% owned by Entrée, since 2015 it has been subject to a License Fees Agreement between Entrée and OTLLC and may ultimately be included in the Entrée/Oyu Tolgoi JV property. OTLLC also has a first right of refusal with respect to any proposed disposition by Entrée of an interest in the Shivee West property.

1.4.2 Joint Venture Agreement

On October 15, 2004, Entrée entered into an arm's-length Equity Participation and Earn-In Agreement (Earn-In Agreement) with Ivanhoe Mines Ltd. (Ivanhoe Mines, now Turquoise Hill). On November 9, 2004, Turquoise Hill and Entrée entered into an Amendment to Equity Participation and Earn-In Agreement, which appended the form of joint venture agreement (JVA) that the parties were required to enter into on the date upon which the aggregate earn-in expenditures incurred by Turquoise Hill equalled or exceeded the amount of earn-in expenditures required in order for Turquoise Hill to earn the maximum participating interest available (80%). On March 1, 2005, Turquoise Hill and Entrée entered into an Assignment Agreement, pursuant to which Turquoise Hill assigned most of its rights and obligations under the Earn-In Agreement, as amended, to Ivanhoe Mines Mongolia Inc. (now OTLLC).

On June 30, 2008, OTLLC gave notice to Entrée that it had completed the earn-in expenditures required in order to earn the maximum participating interest available. As a consequence, a joint venture was formed. OTLLC has an initial joint venture participating interest of 80% in the Entrée/Oyu Tolgoi JV, and Entrée has an initial joint venture participating interest of 20%. In respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the OTLLC has an initial participating interest of 70% and Entrée has an initial participating interest of 30%.

On October 1, 2015, Entrée and Entrée LLC entered into a License Fees Agreement with OTLLC, pursuant to which the parties agreed to negotiate in good faith to amend the

JVA to include the Shivee West property in the definition of the Entrée/Oyu Tolgoi JV property. In addition, under the JVA, OTLLC has a right of first refusal with respect to any proposed disposition by Entrée of an interest in the Shivee West property.

1.4.3 Strategic Deposits

Under Resolution No 57 dated July 16, 2009 of the State Great Khural, the Oyu Tolgoi series of deposits were declared to be Strategic Deposits. The Ministry of Mining has advised Entrée that it considers the deposits on the Entrée/Oyu Tolgoi JV property to be part of the series of Oyu Tolgoi deposits.

1.4.4 Investment Agreement

On October 6, 2009, Turquoise Hill, its wholly-owned subsidiary OTLLC, and Rio Tinto signed an investment agreement (Oyu Tolgoi Investment Agreement) with the Mongolian Government, which regulates the relationship among the parties and stabilizes the long-term tax, legal, fiscal, regulatory and operating environment to support the development of the Oyu Tolgoi project. The Oyu Tolgoi Investment Agreement took legal effect on March 31, 2010.

The Oyu Tolgoi Investment Agreement specifies that the Government of Mongolia will own 34% of the shares of OTLLC (and indirectly by extension, 34% of OTLLC's interest in the Entrée/Oyu Tolgoi JV property) through its subsidiary Erdenes Oyu Tolgoi LLC. A shareholders' agreement was concurrently executed to establish the Government's 34% ownership interest in OTLLC and to govern the relationship among the parties.

Although the contract area defined in the Oyu Tolgoi Investment Agreement includes the Javhlant and Shivee Tolgoi MLs, Entrée is not a party to the Oyu Tolgoi Investment Agreement, and does not have any direct rights or benefits under the Oyu Tolgoi Investment Agreement.

OTLLC agreed, under the terms of the Earn-In Agreement, to use its best efforts to cause Entrée to be brought within the ambit of, made subject to and to be entitled to the benefits of the Oyu Tolgoi Investment Agreement or a separate stability agreement on substantially similar terms to the Oyu Tolgoi Investment Agreement. Entrée has been engaged in discussions with stakeholders of the Oyu Tolgoi project, including the Government of Mongolia, OTLLC, Erdenes Oyu Tolgoi LLC, Turquoise Hill and Rio Tinto, since February 2013. The discussions to date have focused on issues arising from Entrée's exclusion from the Oyu Tolgoi Investment Agreement, including the fact that the Government of Mongolia does not have a full 34% interest in the Entrée/Oyu Tolgoi JV property; the fact that the MLs integral to future underground operations are held by more than one corporate entity; and the fact that Entrée does not benefit from the stability that it would otherwise have if it were a party to the Oyu Tolgoi Investment Agreement. No agreements have been finalized.

1.4.5 Royalty

The Minerals Law provides for the payment of a royalty for exploitation of a mineral resource (the regular royalty). In general, the regular royalty is calculated on the basis of the sales value of all extracted products sold or loaded to be sold, and of all products utilized. Depending on the type of mineral, the regular royalty ranges from a base rate of 2.5% to 5%. The applicable regular royalty rate for copper, silver, molybdenum and exported gold is 5%. In addition, an additional royalty amount may be payable depending on the market value in excess of a designated base value of the relevant product (the surtax royalty).

If the State is an equity participant in the exploitation of a Strategic Deposit, the licence holder is permitted to negotiate with the Government of Mongolia to exchange the Government's equity interest in the licence holder for an additional royalty payable to the Government (a special royalty), the percentage or amount of which would vary depending on the particulars of the Strategic Deposit, but which cannot exceed 5%. The special royalty would be paid in addition to the regular royalty and, if applicable, a surtax royalty.

1.5 Geology and Mineralization

The Oyu Tolgoi deposits, including those within the Entrée/Oyu Tolgoi JV property, host copper–gold porphyry and related high-sulphidation copper–gold deposit styles. Mineralization identified in the Shivee West property consists of low-sulphidation epithermal mineralization styles and early-stage prospects with the potential to host copper–gold porphyry-style mineralization.

The Oyu Tolgoi porphyry deposits are hosted within the Palaeozoic Gurvansayhan Terrane. Lithologies identified to date in the Gurvansayhan Terrane include Silurian to Carboniferous terrigenous sedimentary, volcanic-rich sedimentary, carbonate, and intermediate to felsic volcanic rocks. The sedimentary and volcanic units are intruded by Devonian granitoids and Permo–Carboniferous diorite, monzodiorite, granite, granodiorite, and syenite bodies, which can range in size from dykes to batholiths.

The Hugo Dummett deposits (Hugo North/Hugo North Extension and Hugo South) contain porphyry-style mineralization associated with quartz monzodiorite intrusions, concealed beneath a sequence of Upper Devonian and Lower Carboniferous sedimentary and volcanic rocks. The deposits are highly elongated to the north–northeast and extend over at least 3.5 km. The Hugo North/Hugo North Extension deposits occur within easterly-dipping homoclinal strata contained in a north–northeasterly elongated, fault-bounded block. The northern portion of this block is cut by several northeast-striking faults near the boundary between the Oyu Tolgoi ML and the Shivee Tolgoi ML. Deformation is dominated by brittle faulting.

Host rocks at Hugo North/Hugo North Extension deposits consists of an easterly-dipping sequence of volcanic and volcaniclastic strata correlated with the Bulagbayan Formation in the lower part of the Devonian Alagbayan Group, and quartz monzodiorite intrusive rocks that intrude the volcanic sequence, and a large, irregular body of post-mineral biotite granodiorite. The highest-grade copper mineralization in the Hugo North/Hugo North Extension deposit is related to a zone of intensely stockworked to sheeted quartz veins. The high-grade zone is centred on thin, east-dipping quartz monzodiorite intrusions, or within the apex of the large quartz monzodiorite body, and extends into adjacent basalt. Bornite is dominant in the highest-grade parts of the deposit (3–5% Cu) and is zoned outward to chalcopyrite (2% Cu). At grades of <1% Cu, pyrite–chalcopyrite dominates. Elevated gold grades in the Hugo North/Hugo North Extension deposits occur within the up-dip (western) portion of the intensely-veined, high-grade core, and within a steeply-dipping lower zone cutting through the western part of the quartz monzodiorite.

The Hugo North Extension occurs within moderately east-dipping (65° to 75°) strata contained in a north–northeasterly-elongate fault-bounded block. The deposit is cut by several northeast-striking faults and fault splays near the Shivee Tolgoi ML boundary with the Oyu Tolgoi ML. Other than these northeasterly faults, the structural geometry and deformation history of the Hugo North Extension is generally similar to that of Hugo North.

The Heruga deposit is the most southerly of the currently known deposits within the Oyu Tolgoi trend. The deposit is a copper–gold–molybdenum porphyry deposit and is zoned with a molybdenum-rich carapace at higher elevations overlying gold-rich mineralization at depth. The top of the mineralization starts 500–600 m below the present ground surface and plunges gently northward. Quartz monzodiorite bodies intrude the Devonian augite basalts as elsewhere in the district, however, the bodies are generally smaller than at Hugo North and Hugo North Extension. Non-mineralized dykes, comprising about 15% of the volume of the deposit, cut all other rock types. The deposit is transected by a series of north–northeast-trending vertical fault structures that step down 200 m to 300 m at a time to the west and have divided the deposit into at least two structural blocks.

High-grade copper and gold intersections show a strong spatial association with contacts of the mineralized quartz monzodiorite porphyry intrusion in the southern part of the deposit. At deeper levels, mineralization consists of chalcopyrite and pyrite in veins and disseminated within biotite–chlorite–albite–actinolite-altered basalt or sericite–albite-altered quartz monzodiorite. The higher levels of the orebody are overprinted by strong quartz–sericite–tourmaline–pyrite alteration where mineralization consists of disseminated and vein-controlled pyrite, chalcopyrite and molybdenite.

A number of prospects have been identified in the Entrée/Oyu Tolgoi JV Project through reconnaissance evaluation, geochemical sampling and geophysical surveys. Some targets have preliminary drill testing. The Entrée/Oyu Tolgoi JV Project retains exploration potential for porphyry and epithermal-style mineralization.

1.6 History

Entrée's interest in the Project commenced in 2002, when an option agreement was signed with a private Mongolian company over the Shivee Tolgoi and Javhlant exploration licences. Entrée subsequently purchased the licences in 2003, and they were converted to MLs in 2009. The details of the Entrée/Oyu Tolgoi JV are summarized in Section 1.4.

Work completed in the Project area has included: surface reconnaissance mapping; geochemical sampling (trenching, conventional and mobile metal ion soil sampling, rock chip and grab sampling, and stream sediment and pan concentrate sampling); geophysical surveys (induced polarization, gravity, regional magnetic, ground magnetometer, and high-resolution magnetotelluric surveys); interpretation of satellite imagery; reverse circulation (RC), polycrystalline (PCD), and core drilling; metallurgical testwork; mining, geotechnical, and hydrogeological studies; and social and environmental studies.

1.7 Drilling and Sampling

Approximately 263,551 m of surface drilling in about 441 drill holes has been completed within the Entrée/Oyu Tolgoi Project since 2004. Core drilling includes 248 drill holes totalling 245,445 m on the Entrée/Oyu Tolgoi Project with 51 of the drill holes totalling 74,587 m drilled into the Hugo North Extension deposit. There are 54 drill holes totalling 72,317 m on the Heruga deposit with 42 holes totalling 62,732 m drilled on the Entrée JV portion of the deposit. Entrée has completed 65 exploration core holes totalling 38,244 m and 34 RC holes totalling 4,145 m in the Shivee West property. There has been no drilling in the Shivee West property since 2011. There has been no drilling on the Entrée/Oyu Tolgoi JV property since 2019 when 17 RC exploration holes were completed.

1.7.1 Entrée/Oyu Tolgoi JV Property Drilling

Most holes at Hugo North and Hugo North Extension were collared with PQ drill rods (85 mm core diameter) and were reduced to HQ size drill rods (63.5 mm) at depths of around 500 m prior to entering the mineralized zone. A small percentage were reduced to NQ size (47.6 mm) and a few holes have continued to depths of about 1,300 m using PQ diameter. Many of the deeper holes were drilled as "daughter" holes (wedges) from a PQ diameter "parent" drill hole. Collar survey methods were similar for core and RC drill holes. Proposed drill hole collars and completed collars are surveyed by a hand-held global positioning system (GPS) unit for preliminary interpretations. After the hole is completed, it is re-surveyed using a Nikon theodolite instrument.

RC drill holes were typically not down-hole surveyed. In general, most RC holes are less than 100 m in depth and therefore unlikely to experience excessive deviations in the drill trace. OTLLC uses down-hole survey instruments to collect the azimuth and inclination at specific depths of the core drill holes for most of the diamond drilling programs. Six principal types of survey method have been used over the duration of the drilling programs, including Eastman Kodak, Flexit, Ranger, gyro, and north-seeking gyro methods.

Recovery data were not collected for the RC drill programs. OTLLC's geology staff measure core recovery and rock quality designation (RQD) during core drilling programs. In general, OTLLC reports that core recoveries obtained by the various drilling contractors have been very good, averaging between 97% and 99% for all of the deposits. RQD was not recorded for Heruga core, nor was geotechnical logging undertaken.

The logging comprised capture of geological, alteration, and mineralization data. In August 2010, OTLLC implemented a digital logging data capture using the acQuire system, replacing the earlier paper logging.

Density data have been collected using water immersion methods, with a calliper method used as a quality assurance/quality control check.

1.7.2 Entrée/Oyu Tolgoi JV Property Sampling

Drill core was halved using a saw, and sampled on 2 m intervals.

Independent analytical laboratories used during the analytical programs have included SGS, ALS (primary laboratories) and Bondar Clegg, Chemex, Genalysis, and Actlabs (secondary laboratories). ALS and SGS acted as the secondary laboratories for each other until 2015. An on-site sample preparation facility was managed by SGS and its predecessor companies from 2002 to 2014.

Sample preparation protocols were in line with industry norms, consisting of crushing to a nominal 90% at 3.35 mm, and pulverizing to a nominal 90% at 75 µm (-200 mesh).

Until September 2011, all samples submitted to SGS (Mongolia) were routinely assayed for gold, copper, iron, molybdenum, arsenic and silver. Copper, molybdenum, silver, and arsenic were determined by acid digestion followed by an atomic absorption spectroscopy (AAS) finish. Gold was determined using a 30 g fire assay fusion.

Since 2011, gold and fluorine are analyzed by SGS Mongolia. Gold analysis method is unchanged. ALS in Vancouver was appointed the primary laboratory for the high-resolution multi-element inductively-coupled plasma mass spectrometry (ICP-MS) based suite, and LECO sulphur and carbon analyses. ALS and SGS act as the secondary laboratories for each other with a nominal check rate ratio of one sample in 20. ALS and SGS acted as the secondary laboratories for each other until 2015.

A trace element composites (TEC) program was undertaken in addition to routine analyses for deleterious element modelling. The composites were subject to multi-element analyses comprising a suite of 47 elements determined by ICP optical emission spectroscopy/mass spectrometry (ICP-OES/MS). Additional element analyses included mercury by cold vapour AAS, fluorine by KOH fusion/specific ion electrode, and carbon/sulphur by LECO furnace.

Since 2015, ALS in Ulaanbaatar and in Perth, Australia have been the principal laboratories used by OTLLC.

All programs since 2003 have included submission of QA/QC samples, consisting of blank samples, standard reference materials (SRMs), duplicate samples, and check samples. For most of the drill programs, OTLLC has maintained a check assay program sending approximately 5% of assayed pulps to secondary laboratories.

Samples were always attended or locked in a sample dispatch facility. Sample collection and transportation have always been undertaken by company or laboratory personnel using company vehicles. Chain-of-custody procedures consisted of filling out sample submittal forms that were sent to the laboratory with sample shipments to make certain that all samples were received by the laboratory.

1.7.3 Shivee West Property Drilling

Core holes were either completely drilled at PQ or HQ sizes, although some holes were PQ reduced to HQ, and others PQ reduced to HQ to NQ.

Drill hole collars were surveyed at the end of each field season by Geocad Co. Ltd., a surveying company based in Ulaanbaatar, using differential GPS equipment. Entrée downhole-surveyed all core holes at approximately 50 m intervals using a Sperry Sun instrument. No downhole surveys were undertaken for RC holes. Most RC holes are shallow and vertical, and unlikely to have significant deviation. Core recoveries obtained by the drilling contractor were very good, except in localized areas of faulting or fracturing.

Core was logged for lithology, mineralization and alteration, and geological structures.

1.7.4 Shivee West Property Sampling

The 2011 RC holes were sampled on 1 m intervals from collar to planned depth.

Drill core was halved using a saw, and sampled on 2 m intervals.

Independent analytical laboratories used during the analytical programs included SGS for the core drilling, and Actlabs for RC samples.

Sample preparation of drill core consisted of crushing to 85% passing 3.35 mm, followed by pulverizing to 90% passing 75 µm. Gold analysis was undertaken using a 30 g fire assay method. Copper, silver, and molybdenum were determined by AA.

RC samples were pulverized to at least 95% passing 75 µm. Gold and silver analyses were undertaken using a 30 g fire assay method.

Field blank, commercial SRMs, and quarter-core duplicate samples (for RC programs, field duplicates) were included in the sample submissions.

Unsampled core was never left unattended at the rig; boxes are transported to the core logging facility at the camp site twice daily under a geologist or geologist-technician's supervision. Sampled core was immediately sealed and stored in a fenced facility at the camp site. Samples were delivered under lock and key by Entrée personnel directly to the laboratory in Ulaanbaatar on an approximate weekly basis and using a chain-of-custody form to record transport and receipt of samples.

1.8 Data Verification

OTLLC and its predecessor Ivanhoe Mines reviewed assay quality control sample results supporting drill hole sample assaying on a monthly basis, and prepared monthly and quarterly QA/QC reports. These reports describe a systematic monitoring and response to identified issues. In 2011 Ivanhoe Mines reported on an internal review by Dale Sketchley, including laboratory audits, quality assurance procedures, quality control monitoring, and database improvements at Oyu Tolgoi for the period 2008 to 2010. Recommendations from this review were implemented, or under advisement. No material issues were identified in these reports.

A number of data reviews have been undertaken by independent consultants as part of preparation of technical reports on the Project, including Roscoe Postle Associates in 2002; AMEC and AMEC Minproc from 2002–2014; Barry Smee, from 2002–2008; Quantitative Geoscience from 2007–2008 and again from 2010–2011, and AMC in 2020.

Mr Christopher Wright visited the Oyu Tolgoi site three times between August 2017 and June 2018 while he was an employee of Rio Tinto. Site visits included an overview of the district geology, exposures in the South Oyut open pit, review of drill core, core storage and sampling facilities. Over 11 months from August 2017 to June 2018 Mr. Wright did extensive work with South Oyut and Hugo North Mineral Resource and metallurgical databases and block models in the construction of geometallurgical models for South Oyut and Hugo North. In March 2021, as a Wood employee, Mr. Wright conducted a review of the Heruga drilling and block model and carried out interviews with OTLLC staff to confirm the database cut-off dates, block model estimation dates and that there are no material changes to the Mineral Resource databases since the database closure and model estimation for either the Heruga or Hugo North deposits.

The data verification completed by OTLLC and its predecessor companies, and the independent data verification completed by others, including Wood staff and the current QP, are sufficient to conclude the drill hole database is reasonably free of errors and suitable to support Mineral Resource estimation.

1.9 Metallurgical Testwork

Detailed metallurgical testwork has been completed on the Oyut (within the Oyu Tolgoi ML) and Hugo North/Hugo North Extension deposits, and includes flotation, comminution, locked cycle and mineralogical studies. Metallurgical studies for Heruga include liberation analysis, bulk flotation, and open circuit cleaning testwork. Included in the flotation testwork program was some work on ore hardness and grindability.

The first phase of the development of the Oyu Tolgoi mine process facilities was completed with concentrator commissioning in 2013. Testwork results and operations data have been used to develop and update the throughput models and metallurgical predictions, as well as to guide designs for the second development phase. The second phase will include a concentrator conversion, in part consisting of additional equipment required to address the changing ratio of the power required for semi-autogenous grinding (SAG) compared to the power required for ball milling. Other equipment required in the concentrator conversion is necessary to accommodate the higher grades of the Hugo North/Hugo North Extension ore compared to Oyut ore.

Throughput algorithms were developed during the design phases based on comminution models. The Phase 1 plant has achieved and exceeded design production rates with primary grind P_{80} in-line with, or better than, the model predictions. Plant surveys were carried out in November 2013, and survey samples were submitted for comminution testing. This allowed improvement of correlations between plant capacity and orebody characteristics. After comminution model calibration, it was used to conservatively predict Phase 2 performance. To predict plant capacity after the Conversion, the ball milling power was increased by 5/4 (five future ball mills vs four current mills).

A 2017 reconciliation of the MinnovEX throughput predictions by Wood showed that while the MinnovEX predictions were highly inaccurate for predicting daily performance they were a useful predictor of capacity for periods of two weeks or longer. The modelling approach was confirmed as appropriate for predicting long-term trends and the equipment required for expansion of the OTLLC processing facility.

No separate comminution model development was conducted for Hugo North/Hugo North Extension mill feed material since the range of SAG power index and modified Bond grinding index values for those deposits fall well within the range of values encountered in the Southwest zone (Oyut). Reliable throughput predictions are expected using the MinnovEX equations, which are generic for the same circuit configuration. The average throughput rates for the five new Hugo North and Hugo North Extension ore types ranged from 4,721–5,303 tonnes per operating hour (TPOH). The comminution modelling for Heruga currently assumes 3,995 TPOH.

The recovery calculations for copper, gold, and silver are taken from base data template (BDT) 38. New equations for predicting copper grades in concentrate were developed for each of the Hugo North and Hugo North Extension ore types in BDT38. For Heruga, concentrate grade is simply assumed to be 25% Cu.

Arsenic and fluorine are the only penalty elements that have been identified in the Oyut, Hugo North/Hugo North Extension deposits. Enargite is the primary arsenic carrier in these deposits, although tennantite is locally important. As long as concentrator feed composition is managed such that smelter feed rejection levels of fluorine and arsenic are avoided, penalties are expected to average <US$5/t of concentrate. Concentrate production peaks (short term) are expected to occur when treating the higher grade Hugo North ores. During these times it is intended that excess concentrate would be offered to traders able to place the concentrates with suitable end users. It may also be possible that any concentrates above the rejection rates of OTLLC's baseline customer(s) could be placed with traders for sale to end users able to blend out the effects of the problematic elements.

For arsenic in copper concentrate, the penalty model assigns a rate of US$2/t/1,000 ppm above a 3,000 ppm threshold up to the rejection level of 5,000 ppm. For fluorine, the penalty model assigns a rate of US$2/t/100 ppm above a 300 ppm threshold up to the rejection level of 1,000 ppm. The penalties are in line with terms from custom smelters.

However, it has been reported that no fluorine penalties have been applied under the contract terms in operation since sales commenced in late 2013, so some conservatism is inherent in the NSR estimates.

1.10 Mineral Resource Estimation

Mineral Resources for Hugo North Extension are estimated from a block model for the Hugo North deposit produced in 2014 by a team of geologists from OTLLC, Rio Tinto and AMEC, a Wood predecessor company. The Mineral Resource database for the Hugo North resource model was closed on February 14, 2014 and includes 51 drill holes totalling 74,587 m drilled from Entrée JV ground. No resource holes have been drilled at Hugo North since the database was closed-out in 2014.

The Mineral Resource estimate for Heruga is based on a resource model produced in 2009 by geologists from Ivanhoe, now Turquoise Hill, under the supervision of an external consultant. The Mineral Resource database for the Heruga resource model was closed on December 31, 2008. The drill hole database used in the construction of the Heruga resource model consists of a total of 54 holes and 72,317 m of core drilling. Forty-three holes and 62,732 m in the Heruga dataset were drilled on Entrée JV ground.

OTLLC produced three-dimensional (3D) geological models of the major structures and lithological units. The lithological shapes and faults, together with copper and gold grade shells and deposit zones, constrain the grade analysis and interpolation. Typically, the faults form the first order of hard boundaries constraining the lithological interpretation.

Drill hole assay composites of 5 m lengths were used for both Hugo North/Hugo North Extension and Heruga. Bulk density values were composited into 5 m fixed-length downhole values for Heruga. A straight composite was used for Hugo North/Hugo North Extension.

A strategy of soft, firm, and hard (SFH) boundaries was implemented to account for domain boundary uncertainty (dilution) and to reproduce the input grade sample distribution in the block model. Variographic analysis was completed. Both copper and gold in the Hugo North/Hugo North Extension area displayed short ranges for the first variogram structure and moderate to long ranges for the second variogram structure (where modelled). The nugget variance tended to be low to moderate in all the domains assessed. At Heruga, copper, gold, and molybdenum showed relatively short first variogram structures and long second variogram structures of 250–300 m. Copper and gold showed relatively low nuggets, whereas molybdenum was moderate to high.

The block caving method envisioned for the Hugo North/Hugo North Extension area does not allow for consideration of selectivity. A sub-celled model with parent block dimensions of 15 x 15 x 15 m and minimum sub-block dimensions down to 5 x 5 x 5 m was used for resource estimation. The actual sub-block sizes in the Hugo North/Hugo North Extension model vary as necessary to fit the specified boundaries of the wireframes used to tag the block model. The block models were coded according to zone, lithological domain, and grade shell. For Hugo North/Hugo North Extension, sub-celling was used to honour lithology, grade, and structural contacts. Blocks above topography were removed from the block model. Non-mineralized units were flagged using a lithology code and were excluded during the interpolation process. Blocks in the Hugo North/Hugo North Extension model were assigned an estimation domain using a combination of grade shells or alteration and lithology.

Modelling of Hugo North/Hugo North Extension consisted of grade interpolation by ordinary kriging (OK), except for bulk density, which was interpolated using a combination of simple kriging and inverse distance weighting to the second power (ID2). Restricted and unrestricted grades were interpolated to allow calculation of the metal removed by outlier restriction. Grades were also interpolated using nearest-neighbour (NN) methods for validation purposes. Blocks and composites were matched on estimation domain. Three estimation passes were used.

The Heruga block model was coded according to zone, lithological domain, and grade shell. Modelling consisted of grade interpolation by OK. As part of the model validation, grades were also interpolated using NN, inverse distance weighting to the third power (ID3), and OK of uncapped composites. Density was interpolated by ID3. Three estimation passes were used.

Measured, Indicated, and Inferred confidence classifications were assigned to blocks at Hugo North/Hugo North Extension using a combination of a preliminary block classification using a script based on distance to a drill hole and number of drill holes used to estimate a block, generation of probability model for the three confidence categories, and manual cleaning using polygons generated in sectional view.

There are no Measured or Indicated Mineral Resources at Heruga. Interpolated cells were classified as Inferred Mineral Resources if they fell within 150 m of a drill hole composite. All mineralization at Heruga is currently classified as Inferred Mineral Resources.

Mineral Resources for the Hugo North Extension are reported above a cut-off grade of 0.41% CuEq. The parameters for calculation of copper equivalent for Hugo North are the differentials of metallurgical recovery and metal price between copper, molybdenum, gold and silver taken from BDT38. Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb Cu, $1,292/oz Au and $19/oz Ag. BDT38 metallurgical recovery values are taken from a combination of metallurgical testwork and actual plant performance. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 93% for copper, 80% for gold and 81% for silver. Given the BDT38 assumptions for metallurgical recovery and metal prices, 0.41% CuEq cut-off grade would generate $22.80/t which is enough to cover the forecast mining, process and general and administrative (G&A) operating costs and primary and secondary development costs for Hugo North and Hugo North Extension. The Hugo North and Hugo North Extension Mineral Resources are reported inside a conceptual block cave mining shape constructed by OTLLC in 2012. The 2012 Hugo North conceptual mining shape was constructed using a 0.50% CuEq cut-off grade that would produce $21.45/t assuming a copper price of $3.00/lb and gold price of $970/oz, mining, process and G&A costs of $12.45/t and primary and secondary development costs of $8.00/t.

Mineral Resources for the Heruga deposit are reported above a cut-off grade of 0.41% CuEq. The parameters for calculation of copper equivalent for Heruga are similar to those used for Hugo North and Hugo North Extension with the addition of additional revenue from sale of molybdenum. Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb Cu, $1,292/oz Au, $19.00/oz Ag and $10.00/lb Mo. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 82% for copper, 73% for gold, 78% for silver and 60% for molybdenum.

1.11 Mineral Resource Statement

The estimated tonnages and grades in the Mineral Resource estimates are reported inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Mineral Resources are reported in Table 1-1 for Hugo North Extension and in Table 1-2 for Heruga, using the 2014 CIM Definition Standards. Mineral Resources are reported on a 100% basis within the Entrée/Oyu Tolgoi JV property. The QP for the estimate is Mr. Christopher Wright, P.Geo., a Wood employee.

Table 1-1: Mineral Resource Statement, Hugo North Extension (effective date 31 March, 2021)

Classification	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	CuEq (%)
Indicated Mineral Resources	120	1.70	0.58	4.3	2.04
Inferred Mineral Resources	167	1.02	0.36	2.8	1.23

Classification	Tonnes (Mt)	Contained Cu (Mlb)	Contained Au (koz)	Contained Ag (koz)
Indicated Mineral Resources	120	4,500	2,200	16,000
Inferred Mineral Resources	167	3,800	1,900	15,000

Notes to accompany Hugo North Extension Mineral Resource table:

1 Mineral Resources have an effective date of 31 March, 2021. Mr. Christopher Wright, P. Geo, a Wood Canada Ltd. employee, is the Qualified Person responsible for the Mineral Resource estimate.
2 Mineral Resources are reported inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
3 Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb copper, $1,292/oz gold and $19.00/oz silver. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 93% for copper, 80% for gold and 81% for silver.
4 Mineral Resources are constrained within a conceptual mining shape constructed at a nominal 0.50% copper equivalent (CuEq) grade and above a CuEq grade of 0.41% CuEq. The CuEq formula is CuEq = Cu + ((Au * 35.7175) + (Ag * 0.5773)) / 67.9023 taking into account differentials between metallurgical performance and price for copper, gold and silver.
5 A CuEq break-even cut-off grade of 0.41% CuEq for Hugo North Extension mineralization and covers mining, processing and G&A operating cost and the cost of primary and secondary block cave mine development.
6 Mineral Resources are stated as in situ with no consideration for planned or unplanned external mining dilution.
7 The contained copper, gold, and silver estimates in the Mineral Resource table have not been adjusted for metallurgical recoveries.
8 Mineral Resources are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.
9 Numbers have been rounded as required by reporting guidelines, and may result in apparent summation differences.

Table 1-2: Mineral Resource Statement, Heruga, (effective date 31 March, 2021)

Classification	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Mo (ppm)	CuEq (%)
Inferred Mineral Resources	1,400	0.41	0.40	1.5	120	0.68

Classification	Tonnes (Mt)	Contained Cu (Mlb)	Contained Au (koz)	Contained Ag (koz)	Contained Mo (Mlb)
Inferred Mineral Resources	1,400	13,000	18,000	66,000	370

Notes to accompany Heruga Mineral Resource table

1 Mineral Resources have an effective date of 31 March, 2021. Mr. Christopher Wright, P. Geo, a Wood Canada Ltd. employee, is the Qualified Person responsible for the Mineral Resource estimate.

2 Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb copper, $1,292/oz gold, $19.00/oz silver and $10/lb molybdenum. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 82% for copper, 73% for gold, 78% for silver and 60% for molybdenum.

3 Mineral Resources at Heruga has an overall geometry and depth of the deposit that make it amenable to underground mass mining methods. Mineral Resources are stated above a copper equivalent (CuEq) grade. The CuEq formula is CuEq = Cu + ((Au * 37.0952) + (Ag * 0.5810) + (Mo * 0.0161)) / 67.9023 taking into account differentials between metallurgical performance and price for copper, gold, silver and molybdenum.

4 A CuEq break-even cut-off grade of 0.41% CuEq is used for the Heruga mineralization and covers mining, processing and G&A operating cost and the cost of primary and secondary block cave mine development.

5 Mineral Resources are stated as in situ with no consideration for planned or unplanned external mining dilution.

6 The contained copper, gold, silver and molybdenum estimates in the Mineral Resource table have not been adjusted for metallurgical recoveries.

7 Mineral Resources are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.

8 Numbers have been rounded as required by reporting guidelines, and may result in apparent summation differences.

Areas of uncertainty that could materially affect the Mineral Resource estimates include the following: commodity pricing; interpretations of fault geometries; effect of alteration as a control on mineralization; lithological interpretations on a local scale, including dyke modelling and discrimination of different quartz monzodiorite phases; geotechnical assumptions related to the proposed block cave design and material behaviour; metal recovery assumptions; additional dilution considerations that may be introduced by a block cave mining method; assumptions as to operating costs used when assessing reasonable prospects of eventual economic extraction; and changes to drill spacing assumptions and/or the number of drill hole composites used to support confidence classification categories.

1.12 Mineral Reserve Estimation

The Mineral Reserve for the Entrée/Oyu Tolgoi JV property is contained within the Hugo North Extension Lift 1 block cave mining plan. The Hugo North/Hugo North Extension underground deposit is to be mined by a variant of the block cave method, panel caving. This approach is to manage the risk of drift and pillar damage associated with high abutment stresses and the high fractured rock mass (orebody). The mine planning work conducted by OTLLC was completed using industry-standard mining software and techniques, and smelter terms as set forth in the 2016 Oyu Tolgoi Feasibility Study.

The Mineral Reserve estimate is based on what is deemed minable when considering factors such as the footprint cut-off grade, the draw column shut-off grade, maximum height of draw, consideration of planned dilution and internal barren rock. Copper and gold grades for the Inferred Mineral Resources within the block cave shell were set to zero and such material was assumed to be dilution.

Key assumptions used by OTLLC in estimation included:

- Metal prices used for calculating the Hugo North Underground NSR are $3.08/lb Cu, $1,292/oz Au, and $19.00/oz Ag, based on long-term metal price forecasts as at the date the Mineral Reserve estimation process began
- The NSR was calculated with assumptions for smelter refining and treatment charges, deductions and payment terms, concentrate transport, metallurgical recoveries and royalties
- A column height shut-off of $17.84/t NSR was used to maintain grade and productive capacity and determine the point at which each underground draw point is closed
- All Mineral Resources within the block cave shell were converted to Mineral Reserves. This includes low-grade Indicated Mineral Resources and Inferred Mineral Resource that were assigned zero grade and were treated as dilution
- Mineral Reserves are reported on a 100% basis. Entrée has a 20% interest in the mineralization extracted from the Entrée/Oyu Tolgoi JV property at depths greater than 560 m, and OTLLC has an 80% interest

- The underground Mineral Resource block models used for reporting the Mineral Reserves are the models reported in the Mineral Resource section of the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

1.13 Mineral Reserve Statement

Mineral Reserves are reported in Table 1-3 for the Hugo North Extension Lift 1 deposit, using the 2014 CIM Definition Standards. Mineral Reserves were estimated by OTLLC personnel during 2020, reviewed by OTLLC as part of the 2020 Oyu Tolgoi Feasibility Study, and summarized in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The QP has reviewed the estimate, and notes that there has been no depletion or additional drilling and/or engineering to that would affect the Mineral Reserve estimate for Hugo North Extension Lift 1, and therefore the effective date of the Mineral Reserve estimate is the date of finalization of the QP review, which is 15 May, 2021.

Factors that may affect the Mineral Reserve estimates include commodity market conditions and pricing; unknowns with respect to the overall interpretation of the Hugo North/Hugo North Extension geology, including faulting and lithology; assumptions related to the design and geotechnical behaviour of the cave mining system, including, but not limited to, the flow of material (ore and dilution) relative to the upward progression and lateral advance of the cave and assumptions of the long-term performance of the mine infrastructure (both support and production); and assumptions related to the metal recovery in the mill and downstream processing, including, but not limited to, metal recovery, mill throughput, contaminant elements (particularly arsenic and fluorine).

1.14 Mining Methods

Hugo North/Hugo North Extension Lift 1, which has high copper and gold grades, will be mined as three panels, using a variant of the block caving method, panel caving. A panel is a defined contiguous portion of the overall cave footprint that is treated as a more-or-less independent and sequenced mining/production area. The Hugo North Extension area is located at the northern extension of Panel 1.

Table 1-3: Mineral Reserves Statement, Hugo North Extension, Lift 1

Classification	Tonnage (Mt)	Cu Grade (%)	Au Grade (g/t)	Ag Grade (g/t)	NSR ($/t)
Proven	—	—	—	—	
Probable	40	1.54	0.53	3.63	97.52
Total Entrée/Oyu Tolgoi Joint Venture	**40**	**1.54**	**0.53**	**3.63**	**97.52**

Classification	Tonnage (Mt)	Contained Cu (Mlb)	Contained Au (Moz)	Contained Ag (Moz)
Proven	—	—	—	—
Probable	40	1,340	676	4,613
Total Entrée/Oyu Tolgoi Joint Venture	**40**	**1,340**	**676**	**4,613**

Notes to accompany Mineral Reserves table:

1 Mineral Reserves were estimated by OTLLC personnel. Mr. Piers Wendlandt, P.E., a Wood employee, is the Qualified Person who reviewed and accepts responsibility for the Mineral Reserve estimate. The estimate has an effective date of 15 May, 2021.

2 For the underground block cave, all Mineral Resources within the cave outline were converted to Probable Mineral Reserves. No Proven Mineral Reserves have been estimated. The estimation includes low-grade Indicated Mineral Resource and Inferred Mineral Resource assigned zero grade that is treated as dilution

3 A column height shut-off NSR of $17.84/t was used to define the footprint and column heights. The NSR calculation assumed metal prices of $3.08/lb Cu, $1,292/oz Au, and $19.00/oz Ag. The NSR was calculated with assumptions for smelter refining and treatment charges, deductions and payment terms, concentrate transport, metallurgical recoveries, and royalties using OTLLC's Base Data Template 38. Metallurgical assumptions in the NSR include recoveries of 90.6% for Cu, 82.3% for Au, and 87.3% for Ag.

4 Mineral Reserves are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.

5 Numbers have been rounded as required by reporting guidelines, and may result in apparent summation differences.

The mine lateral development advance was re-started in July 2016, after an approximately three-year shutdown. Tunnelling was initially started in 2008 from the early exploration and development drifts near the bottom of Shaft 1 on the Oyu Tolgoi ML. Development and construction activities will continue through the start of initial underground production from the Oyu Tolgoi ML, initially scheduled for May 2020.

This date was defined as the point of commissioning the initial 30,000 t/d production ore handling system plus key supporting infrastructure, as well as completing sufficient footprint development and construction to prepare for undercutting and commencement of drawbell firing.

In May 2020, Turquoise Hill announced an updated block cave mine design for Panel 0. As a result of the updated design, the 2016 Feasibility Study milestone of sustainable production was delayed by 25 months, to a target date of February 2023 (range between October 2022 and June 2023).

Production will ramp up to an average of 95,000 t/d of ore to the mill during the planned peak production period for the combined Hugo North/Hugo North Extension Lift 1 from 2028 through 2036. Overall production from the combined Hugo North/Hugo North Extension Lift 1 is planned to ramp down from 2036 to completion in 2042. During the production life of the Hugo North Extension portion of Lift 1, the pre-production period is planned to begin in 2021 with the first draw-bell in 2026, and production is to be completed in 2038.

The primary life-of-mine material handling system (conveyor to surface) will transport ore to the surface by means of a series of conveyors. The nominal production rate of the underground mine, at full production, is designed to be 95,000 t/d to meet the capacity of the mill.

The majority of the mine infrastructure required to support the successful extraction of the Mineral Reserves within the Entrée/Oyu Tolgoi JV property will be located within the Oyu Tolgoi ML; however, the mining method is consistent across both Hugo North Lift 1 and Hugo North Extension Lift 1. The primary life-of-mine material handling system (conveyor to surface) will transport ore to the surface by means of a series of conveyors.

To support overall mining of Hugo North Lift 1, five shafts, approximately 211 km of lateral development, 6.8 km of vertical raising (raise bore and drop-raise) and 137,000 m^3 of mass excavations will be undertaken. The Lift 1 levels are approximately 1,300 m below surface. The orebody has average dimensions of 2,000 m long by 280 m wide. A total of 1,428 draw points are planned to be development within the mining footprint accessed from 45 extraction drifts. For Hugo North Extension Lift 1, approximately 15.4 km of lateral development and approximately 781 m of vertical raising will be required. To reach the Hugo North Lift 1 exhaust gallery from Shaft 4, approximately 1,020 m of lateral development will be required.

From the geotechnical perspective, Hugo North/Hugo North Extension is considered as highly suitable for cave mining methods, and the risks associated with caveability and propagation are considered to be low. The 2020 Oyu Tolgoi Feasibility Study work surface subsidence analysis does not raise any concern for surface infrastructure in place or planned with the exception of Shaft #1, which may be impacted after year 10 of cave mining based on current schedule. The abutment stresses, associated with the block cave, are predicted to be high and the 2020 Oyu Tolgoi Feasibility Study has placed focus on optimizing the mine design and ground support systems to manage excavation stability.

Modeling of the stability of the 2016 Feasibility Study design of Panel 0 using the latest geotechnical information and a more detailed understanding of the lower fault splay identified several critical stability risks and required modifications of the mine design. To address the stability risks, a comprehensive set of redesign options for the Lift 1 footprint were considered.

The new footprint design incorporates leaving 120 m wide pillars (measured on the undercut level) separating Panel 0 from Panel 1 and from Panel 2. The expanded pillar width was designed to provide more stability for the ore-handling system and the rim drives, while also increasing the optionality of sequencing Panel 1 and Panel 2. The footprint redesign also includes a revised undercutting sequence for each of the panels and an overall increase in extraction drive and drawpoint spacing to 31 x 18 m.

The mining layout will include:

- Apex and undercut levels to provide access drifts for production drills, blasting and mucking for the purpose of undercutting the ore deposit on the associated lift. The undercut drifts are planned to be spaced on 28 m intervals, situated 17 m above and half-way between the extraction drifts. The apex drifts will be situated 34 m above the extraction drifts at the top of the major apex pillars.
- Extraction drifts and drawbells for efficient load-haul-dump (LHD) operation to draw ore from the associated drawpoints, using an El Teniente-style (straight-through) drawbell layout on an 18 m spacing. The extraction drifts are planned to be spaced 31 m apart, on centre. The overall drawbell spacing layout is 31 x 18 m. Within the drawbells, a drawcone centroid spacing of 10 m is used to promote interactive draw from the cave
- Haulage levels to collect development and production ore material from the extraction and undercut levels, and transport it, using road trains, to crushers for size reduction. The haulage level will be located 44 m below the extraction level
- Intake ventilation system to provide fresh air to the mining footprint levels, main travel ways, mine working areas and to underground fixed facilities. Fresh air to the

footprint levels is planned to be supplied through two sets of twin intake tunnels to the extraction fringe (perimeter) drifts

- Exhaust ventilation system to remove vitiated air from the mine. Exhaust drifts in the exhaust level will run the length of the deposit along the centre of the deposit axis.

Road trains will haul from the loading chutes to the primary crushers on the west side of the mining footprint. Crushed material will be transferred by a series of conveyors directly to the surface or to the Shaft 2 hoisting system. Shaft 2 is intended to serve as the initial material handling route to surface until the conveyor-to-surface is commissioned.

Overall vertical development will include shaft development, ore/waste passes and ventilation raises. With the exception of the shafts, vertical development is planned to use several methods, including raise bore, boxhole, and drop-raise.

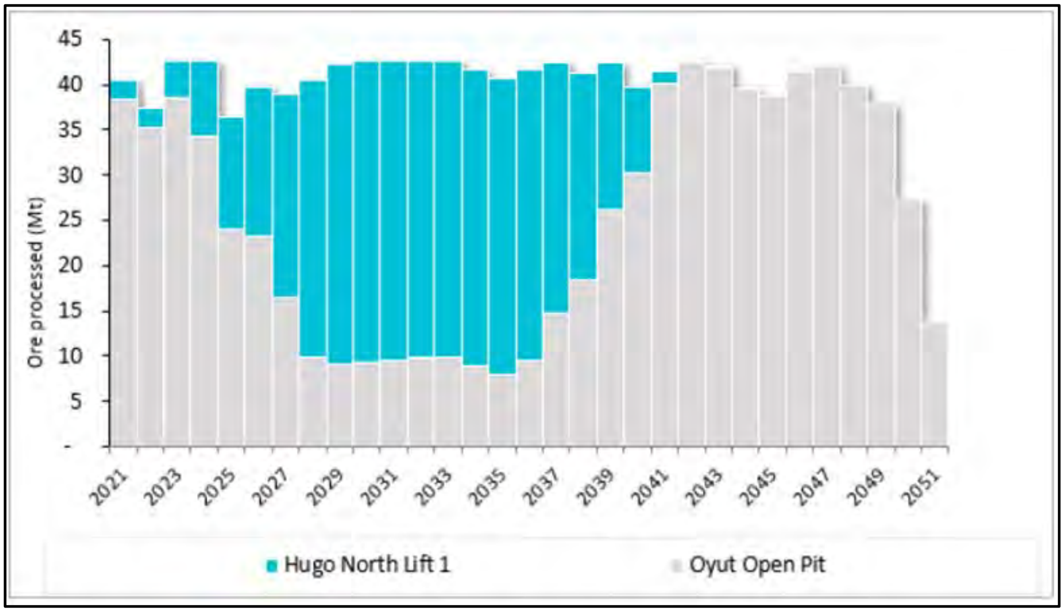
The underground mine requires a number of surface facilities to support the underground operations. At Hugo North/Hugo North Extension Lift 1 these include: Shaft 1 area, production shaft farm, Shaft 4 area, and conveyor-to-surface portal area. A batch plant may be constructed within the property area.

The underground mobile equipment fleet is classified into seven broad categories, including: mucking (LHDs); haulage (road trains and articulated haul trucks); drilling (jumbos, production drills and bolting equipment); raise bore and boxhole; utilities and underground support (flatbeds, boom trucks, fuel and lube trucks, explosive carriers, shotcrete transmixers and sprayers, etc.); surface support; and light vehicles (personnel transports, "jeeps", tractors, etc.).

Major fixed equipment will include: material handling (crushing and conveying); fans and ventilation equipment; pumping and water handling equipment; power distribution equipment; data and communications equipment; and maintenance equipment (fixed shop furnishing).

The overall processing schedule was balanced to meet the available mill hours. The forecast production schedule for Hugo North Extension Lift 1 is included in Figure 1-2.

Figure 1-2: Overall Oyu Tolgoi Reserve Case Processing Schedule



Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

1.15 Recovery Methods

Entrée's share of products will, unless Entrée otherwise agrees, be processed at the OTLLC facilities by paying milling and smelting charges. The OTLLC facilities are not intended to be profit centres and therefore, minerals from the Entrée/Oyu Tolgoi JV property will be processed at cost.

OTLLC will also make the OTLLC facilities available to Entrée at the same terms if spare processing capacity exists to process other suitable mill feed.

The Phase 1 concentrator was commissioned in early 2013. The nameplate processing capacity of 96 kt/d was achieved in August 2013. The process plant employs a conventional semi-autogenous grind (SAG) mill/ball mill/grinding circuit (SABC) followed by flotation.

Phase 1 uses two grinding lines (Lines 1 and 2), each consisting of a SAG mill, two parallel ball mills, and associated downstream equipment to treat up to 100 kt/d of ore from the Oyut open pit. Operating data have been used in Phase 2 design, which addresses the delivery of Hugo North/Hugo North Extension underground plant feed via Lift 1 in conjunction with open pit mining.

The intent of Phase 2 is to treat all of the high-value Hugo North/Hugo North Extension Lift 1 ore able to be delivered by the mine with any additional throughput capacity being satisfied by OTLLC's open pit ore. The Phase 2 concentrator development program will optimize the concentrator circuit to enable it to maximise recovery from the higher-grade Hugo North/Hugo North Extension Lift 1 ore and to allow it to handle higher tonnage throughput. Components that require upgrading to accommodate the gradual introduction of ore from underground include: ball milling; rougher flotation; cleaner columns; concentrate filtration, thickening, and bagging areas; and bagged concentrate storage facilities.

Reagents and media required will include lime, primary collector, secondary collector, frother, tailings flocculant, water treatment chemicals, and grinding media. With the addition of the concentrator conversion loads, the peak operating load demand from the existing 220 kV concentrator substation will increase by an estimated 20 MW (from 116–136 MW), and the nominal operating (diversified) load will increase by an estimated 19 MW (from 106–125 MW). The concentrator raw water demand varies seasonally. Annual average raw water demand is projected to be 0.45 m^3/t ore processed.

1.16 Project Infrastructure

Infrastructure required for Phase 1 of the Oyu Tolgoi project has been completed, and includes: access roads, airport, accommodation, open pit and quarries, tailings and waste rock storage facilities, process plant, batch plants, administration, warehousing, emergency, and maintenance facilities, power and water supply and related distribution infrastructure, water and waste management infrastructure, heating and fuel storage.

Additional infrastructure that will be required to support Phase 2, or modifications to the Phase 1 infrastructure, includes: construction of conveyor decline and shafts; construction of permanent underground facilities including crushing and materials handling, workshops, services, and related infrastructure; concentrator conversion; modifications to the electrical shaft farm substation, and upgrades to some of the distribution systems; expanded logistical and accommodations infrastructure; underground maintenance and fuel storage facilities; expanded water supply and distribution infrastructure; and expanded tailings storage (TSF) capacity.

OTLLC currently sources power for the Oyu Tolgoi mine from China's Inner Mongolian Western grid, via overhead power line, pursuant to back-to-back power purchase agreements with Mongolia's National Power Transmission Grid JSC, the relevant

Mongolian power authority, and Inner Mongolia Power International Cooperation Co., Ltd (IMPIC), the Chinese power generation company.

OTLLC is obliged under the Oyu Tolgoi Investment Agreement to secure a long-term domestic power source for the Oyu Tolgoi mine. On December 31, 2018, OTLLC and the Government of Mongolia entered into a Power Source Framework Agreement (PSFA) which contemplated the construction of a coal-fired power plant at Tavan Tolgoi, which would be majority-owned by OTLLC and situated close to the Tavan Tolgoi coal mining district located approximately 150 km from the Oyu Tolgoi mine. In April 2020, the Minister of Energy notified OTLLC of the Government's decision to develop and fund a State-Owned Power Plant (SOPP) to be located at the Tavan Tolgoi coal fields instead of an OTLLC-led plant, which would supply power to the Oyu Tolgoi mine and potentially other regional mines.

In June 2020, the Government of Mongolia and OTLLC amended the PSFA to reflect joint prioritization and progression of SOPP in accordance with and subject to agreed milestones. The agreed milestones in the amended PFSA include signing a power purchase agreement by March 31, 2021, commencement of construction by no later than July 1, 2021 and commissioning of SOPP within four years thereafter, and negotiating an extension to the existing power import agreement by March 1, 2021.

If the milestones are not met as provided for in the amendment, then OTLLC will be entitled to select from and implement the alternative power solutions specified in the PSFA (as amended), including an OTLLC-led coal-fired power plant and a primary renewables solution, and the Government of Mongolia would be obliged to support such decision.

The first two PSFA amendment milestones (execution of the extension of the existing power import agreement and execution of the SOPP power purchase agreement) were not met by the original dates of March 1, 2021 and March 31, 2021, respectively. The Ministry of Energy has proposed to OTLLC that the milestones under the PSFA amendment be extended. OTLLC is engaging to agree to a standstill period following the lapsing of the milestones and to discuss the issue of domestic power supply at the sub-working group level. During the standstill period, OTLLC would not exercise its rights to select and proceed with an alternative power solution but would not waive its right to do so in the future.

OTLLC continues to collaborate with the Government of Mongolia to ensure a secure, stable and reliable long-term power solution is implemented with an immediate focus on extending the IMPIC supply arrangements.

1.17 Environmental, Permitting and Social Considerations

1.17.1 Environmental Considerations

OTLLC has completed a comprehensive Environmental and Social Impact Assessment (ESIA) for the Oyu Tolgoi project, including the Entrée/Oyu Tolgoi JV property. The ESIA is a summary of several research programs and reports, including the following baseline studies: climate and climate change; air quality; noise and vibration; topography, geology, and topsoil; water resources; biodiversity and ecosystems; population and demographics; employment and livelihoods; land use; transport and infrastructure; archaeology; cultural heritage; and community health, safety, and security. The ESIA also sets out measures through all project phases to avoid, minimise, mitigate, and manage potential adverse impacts to acceptable levels established by Mongolian regulatory requirements and good international industry practice, as defined by the requirements of the Equator Principles, and the standards and policies of the International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), and other financing institutions.

In addition to the project elements identified above, certain other activities and facilities are expected to be developed over time, either as part of or in support of the project, that do not constitute part of the project for the purposes of the ESIA. These include project expansion to support an increase in plant feed throughput from 100,000 t/d to 160,000 t/d and the long-term power supply. While the impacts of these project elements, and their mitigation and management, are not directly addressed in the ESIA they are considered in the cumulative impact assessment of the ESIA.

OTLLC has posted environmental bonds to the Mongolian Ministry of Environment, Green Development and Tourism (MEGDT) in accordance with the Minerals Law of Mongolia for restoration and environmental management work required for exploration and the limited development work undertaken at the site.

OTLLC has implemented and audited an environmental management system (EMS) that conforms to the requirements of ISO 14001:2004.

The management plans developed for the Oyu Tolgoi project address the management of health, safety, environment, and social aspects associated with the project. The management plans form part of the mine's Integrated Health, Safety, Environment and Community Management System (HSECMS). The HSECMS has been audited and is certified to ISO 14001 and OHSAS 18001.

1.17.2 Tailings Storage Facility

The existing TSF is located 2 km east of the Oyut open pit, 5 km southeast of the process plant, and is located within the OTLLC property, outside the licenses where Entrée has a participating interest. For the first 20 years of production, the TSF will consist of two cells, each approximately 4 km^2 in size, to store a total of 720 Mt of tailings. The facility will be constructed in two stages, starting with Cell 1 and then continuing with Cell 2. Conventional thickened tailings are currently deposited in Cell 1. The current plan is to construct two more cells located east of Cell 1 and Cell 2 to store additional tailings after the first 20 years of production.

The TSF receives thickened tailings (with about 60% solids content by weight) from the tailings thickeners at the Oyu Tolgoi concentrator. A floating barge pump station returns supernatant reclaim water to the main process water pond at the concentrator for reuse. The TSF embankment is raised each year using a downstream methodology to ensure that sufficient storage capacity for ongoing tailings deposition, with flood storage and freeboard, is retained at all times.

1.17.3 Water Management

The Gunii Hooloi basin extends 35 km to 70 km north of the Oyu Tolgoi site, and is the source of raw water for the mining operations. Updated hydrogeological modelling, completed in 2013, and based on three hydrogeological investigation programs, demonstrates that the Gunii Hooloi aquifer is capable of providing 1,475 L/s. Water demand for the Oyu Tolgoi facilities has been calculated at between 588 L/s and 785 L/s, with an average yearly demand of 696 L/s, to meet a production rate of 100,000 t/d.

Water management and conservation were given the highest priority in all aspects of the Oyu Tolgoi project design. The current water budget is based on the use of 550 L/s and operating performance of the concentrator suggests this is a reasonable estimate. The water consumption compares favourably with other large operations in similar arid conditions.

Due to its proximity to the Oyut open pit, the Undai River has been diverted. The river diversion system consists of three components: a dam, diversion channel, and subsurface diversion.

1.17.4 Closure and Reclamation Planning

Current closure planning is based on a combination of progressive rehabilitation and mine design and operation schedule and plans. The Oyu Tolgoi Mine Closure Plan for OTLLC was completed in June 2012, updated in 2014, and is based on the design status at that time.

1.17.5 Permitting Considerations

The Mongolian Minerals Law (2006) and Mongolian Land Law (2002) govern exploration, mining, and land use rights for the Oyu Tolgoi project. Water rights are governed by the Mongolian Water Law and the Mongolian Minerals Law. OTLLC has studied and continues to study the permitting and approval requirements for the development of the Oyu Tolgoi project including the Entrée/Oyu Tolgoi JV property, and maintains a permit and licencing register. OTLLC personnel, working with the Mongolian authorities, have developed descriptions of the permitting processes and procedures for the Oyu Tolgoi project, including the underground development of the Entrée/Oyu Tolgoi JV property. OTLLC has stated that permits have been obtained for underground mining.

1.17.6 Social Considerations

A social analysis was completed through the commissioning of a Socio-Economic Baseline Study and the preparation of a Social Impact Assessment (SIA) for the Oyu Tolgoi project. The cumulative impact assessment examined geographical areas, communities, and regional stakeholders that could be subject to cumulative impacts from further developments at Oyu Tolgoi together with other existing or planned projects, trends, and developments within the South Gobi region.

Community and social management plans, procedures and strategies have been developed. The surrounding community (predominantly herders) and local government are kept fully informed about mine developments and provide input and review of implementation of plans, procedures and strategies that directly affect them.

1.18 Markets and Contracts

OTLLC has developed a marketing strategy for the Oyu Tolgoi project, including their portion of the mineralization within the Entrée/Oyu Tolgoi JV property.

Under the terms of the JVA (Article 12), Entrée retains the right to take the product in kind. For the purposes of this Report, it has been assumed that Entrée takes control of their portion of the bagged concentrate and that the sales of concentrate will use the same approximate smelter terms, transport and other marketing costs as for the OTLLC concentrate.

Wood did not review contracts, pricing studies, or smelter terms developed by OTLLC or their third-party consultants as these were considered by OTLLC to be confidential to OTLLC. Instead, Wood relied on summary pricing and smelting information provided by OTLLC within the 2020 Oyu Tolgoi Feasibility Study and OTLLC's BDT38. Based on the review of this summary information, the OTLLC smelter terms are similar to smelter terms for which Wood is familiar

Commodity pricing for the Mineral Resource and Mineral Reserve estimates is based on pricing from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020), which uses the 2020 Oyu Tolgoi Feasibility Study as a basis. Commodity pricing used in the economic analysis is based on the CIBC Global Mining Group's forecast pricing from April 30, 2021. Smelter terms are based on terms used in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

1.19 Capital Cost Estimates

The estimates included in the Turquoise Hill Technical Report that were derived from the 2020 Feasibility Study were modified from the 2020 Feasibility Study estimates by the exclusion of all costs prior to January 1, 2021. All capital costs are expressed in Q1 2020 US dollars with no allowances for currency fluctuations or interest during construction. Likewise, operating costs are expressed in real 2020 US dollars; therefore, they do not include escalation. The overall cost estimates presented in Section 1.19 and 1.20 are from the 2020 Turquoise Hill Technical Report.

The capital cost estimate represents the overall development for the Hugo North/Hugo North Extension Lift 1 underground mine, supporting shafts, the concentrator conversion project, and the infrastructure expansion project.

Wood reviewed the 2020 Oyu Tolgoi Feasibility Study overall capital cost and sustaining capital cost estimates for the Phase 2 expansion associated with Hugo North/Hugo North Extension Lift 1, and then proportioned the cost estimates to the Entrée/Oyu Tolgoi JV and to Entrée's 20% attributable portion based on the JVA. The proportioned estimates, together with an explanation of how the capital was proportioned are summarized in Section 1.21.

The capital cost estimate includes the costs associated with the engineering, procurement, construction management (EPCM) and Owner's project costs, and includes value-added tax (VAT) and duties. The total estimated capital cost to design, procure, construct, and commission the complete expansion, inclusive of an underground block cave mine, supporting shafts, concentrator conversion, and supporting infrastructure expansion, is US$7.358 billion which includes US$505 million in pre-restart capital.

The sustaining capital cost estimate for Hugo North/Hugo North Extension Lift 1 including closure costs is $US5.945 billion (US$9.30/t processed).

The capital cost estimate is summarized in Table 1-4.

1.20 Operating Cost Estimates

Operating costs for the Entrée 20% attributable interest in Hugo North Extension Lift 1 are summarized in Section 1.21. The operating cost estimate for Hugo North/Hugo North Extension Lift 1 is summarized in Table 1-5.

The operating costs were based on a mine plan that consists of both the Oyut open pit material and Hugo North/Hugo North Extension Lift 1 underground ore. The Oyut pit supplies the initial source of ore to the mill at a nominal capacity of 100 kt/d. Once production from underground commences, the open pit feed to the mill is continually displaced by the higher-grade ore from Hugo North/Hugo North Extension Lift 1. Production of ore from Hugo North Lift 1 ramps up from 2020 until 2027 when it reaches a steady-state production level.

Feed from the underground mine is planned to commence from 2020 and ramp up to near the target underground design tonnage of 95 kt/d. The mill operating rate at that time will be a nominal 110 kt/d, due to the higher processing throughput rate of the Hugo North/Hugo North Extension Lift 1 ore and the concentrator conversion. The underground discussion in this section describes operating costs from the underground-only mining operation through to the completion of mining North/Hugo North Extension Lift 1.

Table 1-4: Overall Capital Cost Estimate, Hugo North/Hugo North Extension Lift 1 (US$ billion)

Description	Phase 2		
	Pre-restart (US$M)	**Post-restart (US$M)**	**Total Phase 2 (US$M)**
Underground mine (Hugo North Lift 1)	270	2,735	3,005
Site development	0.0	0.0	0.0
Concentrator modifications	8	159	167
Utilities & ancillaries	0	149	149
Offsite facilities	0	159	159
Subtotal Direct Costs	*278*	*3,202*	*3,480*
Indirect costs	131	1,432	1,563
Owner's costs	96	2,039	2,135
Escalation, growth, forex, contingency	0	179	179
Subtotal Indirect Costs	*228*	*3,650*	*3,877*
Total	***505***	***6,852***	***7,358***

Notes: Phase 2 Project estimate base date is 2020. Forex = foreign exchange. Totals may not sum due to rounding.

Table 1-5: Cash Operating Cost Estimate Summary

Description	Unit	Value
Underground mining	$/t processed	8.75
Processing	$/t processed	7.44
Infrastructure and other operating	$/t processed	2.32
Total	***$/t processed***	***18.51***

Note: Cash operating costs are for Hugo North/Hugo North Extension Lift 1. VAT and duties included. Totals may not sum due to rounding.

1.21 Economic Analysis

The results of the economic analyses discussed in 1.21 and Section 1.23.16 represent forward-looking information as defined under Canadian securities law. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

Information that is forward-looking includes:

- Mineral Resource and Mineral Reserve estimates

- Assumed commodity prices and exchange rates
- The proposed mine production plan
- Projected mining and process recovery rates
- Assumptions as to mining dilution
- Sustaining costs and proposed operating costs
- Interpretations and assumptions as to joint venture and agreement terms
- Assumptions as to closure costs and closure requirements
- Assumptions as to environmental, permitting and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed
- Unrecognized environmental risks
- Unanticipated reclamation expenses
- Unexpected variations in quantity of mineralized material, grade or recovery rates
- Geotechnical or hydrogeological considerations during mining being different from what was assumed
- Failure of mining methods to operate as anticipated
- Failure of plant, equipment or processes to operate as anticipated
- Changes to assumptions as to the availability of electrical power, and the power rates used in the operating cost estimates and financial analysis
- Changes to assumptions as to salvage values
- Ability to maintain the social licence to operate
- Accidents, labour disputes and other risks of the mining industry
- Changes to interest rates
- Changes to tax rates.

The cash flows are based on data provided by OTLLC, including mining schedules and annual capital and operating cost estimates, as well as Entrée's interpretation of the commercial terms applicable to the Entrée/Oyu Tolgoi JV, and certain assumptions regarding taxes and royalties. The cash flows have not been reviewed or endorsed by OTLLC. There can be no assurance that OTLLC or its shareholders will not interpret certain terms or conditions, or attempt to renegotiate some or all of the material terms governing the joint venture relationship, in a manner which could have an adverse effect on Entrée's future cash flow and financial condition.

The cash flows also assume that Entrée will ultimately have the benefit of the standard royalty rate of 5% of sales value, payable by OTLLC under the Oyu Tolgoi Investment Agreement. Unless and until Entrée finalizes agreements with the Government of Mongolia or other Oyu Tolgoi stakeholders, there can be no assurance that Entrée will be entitled to all the benefits of the Oyu Tolgoi Investment Agreement, including with respect to taxes and royalties. If Entrée is not entitled to all the benefits of the Oyu Tolgoi Investment Agreement, it could have an adverse effect on Entrée's future cash flow and financial condition. For example, Entrée could be subject to the surtax royalty which came into effect in Mongolia on January 1, 2011. To become entitled to the benefits of the Oyu Tolgoi Investment Agreement, Entrée may be required to negotiate and enter into a mutually acceptable agreement with the Government of Mongolia or other Oyu Tolgoi stakeholders, with respect to Entrée's direct or indirect participating interest in the Entrée/Oyu Tolgoi JV or the application of a special royalty (not to exceed 5%) to Entrée's share of the Entrée/Oyu Tolgoi JV property mineralization or otherwise.

Wood apportioned the overall capital and sustaining capital costs according to Entrée's interpretation of the terms of the Entrée/Oyu Tolgoi JV agreement for use in the economic assessment. This interpretation includes:

- OTLLC is responsible for 80% of all capital expenditures incurred on the Entrée/Oyu Tolgoi JV property for the benefit of the Entrée/Oyu Tolgoi JV and Entrée is responsible for the remaining 20%
- Any mill, smelter and other processing facilities and related infrastructure will be owned exclusively by OTLLC and not by Entrée. Mill feed from the Entrée/Oyu Tolgoi JV property will be transported to the concentrator and processed at cost (using industry standards for calculation of cost including an amortization of capital costs)
- Underground infrastructure on the Oyu Tolgoi mining licence is also owned exclusively by OTLLC, although the Entrée/Oyu Tolgoi JV will eventually share usage once underground development crosses onto the Entrée/Oyu Tolgoi JV property

- Entrée recognizes those capital costs incurred by OTLLC on the Oyu Tolgoi mining licence (facilities and underground infrastructure) as an amortization charge for capital costs that will be calculated in accordance with Canadian generally-accepted accounting principles determined yearly based on the estimated tonnes of concentrate produced for Entrée's account during that year relative to the estimated total life-of-mine concentrate to be produced (for processing facilities and related infrastructure), or the estimated total life-of-mine tonnes to be milled from the relevant deposit(s) (in the case of underground infrastructure). The charge is made to Entrée's operating account when the Entrée/Oyu Tolgoi JV mine production is actually milled
- For direct capital cost expenditures on the Entrée/Oyu Tolgoi JV property, Entrée will recognize its attributable share of costs at the time of actual expenditure
- Entrée has elected to have OTLLC debt finance Entrée's share of costs for approved programs and budgets, with interest accruing at OTLLC's actual cost of capital or prime +2%, whichever is less, at the date of the advance. Debt repayment may be made in whole or in part from (and only from) 90% of monthly available cash flow arising from the sale of Entrée's share of products. Available cash flow means all net proceeds of sale of Entrée's share of products in a month less Entrée's share of costs of Entrée/Oyu Tolgoi JV activities for the month that are operating costs under Canadian generally-accepted accounting principles.

The total Hugo North Extension Lift 1 amortized capital cost within the Entrée/Oyu Tolgoi JV property is estimated at US$701.0 million, of which $140.2 million is Entrée's 20% attributable portion

The total Hugo North Extension Lift 1 mine development cost within the Entrée/Oyu Tolgoi JV property is estimated at US$275.7 million, of which $55.1 million is Entrée's 20% attributable portion.

The operating costs for the Hugo North Extension Lift 1 deposit within the Entrée/Oyu Tolgoi JV property on a per tonne milled basis averages US$46.01 over the LOM. Entrée's 20% attributable portion of the operating costs averages US$46.01 over the LOM.

Based on the above inputs, Wood completed an economic analysis for Entrée's 20% attributable portion of the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analyses. The economic analysis was prepared using the following long-term metal price estimates: copper at US$3.25/lb; gold at US$1,591/oz and silver at US$21.08/oz.

The pre-tax cash flow and the after-tax net present value at a discount rate of 8% (NPV@8%) for Entrée's 20% attributable portion (referred to by Entrée as the 2021 Reserves case) is US$449 million and US$131 million respectively. A summary of the financial results is shown in Table 1-6. Internal rate of return (IRR) and payback are not presented, because, with 100% financing, neither is applicable.

Mine site cash costs, total cash costs after by-product credits, and all-in sustaining costs per pound of payable copper are shown in Table 1-7 for Entrée's 20% attributable portion. Cash costs are those costs relating to the direct operating costs of the mine site including:

- On site operating costs (direct mining, processing, and tailings)
- Capital carrying costs (amortization charge)
- Administrative fees
- Refining, smelting, and transportation costs.

Total cash costs after by-product credit are the cash costs less by-product credits for gold and silver. All-in sustaining costs after credits are the total cash costs plus mineral royalties, reclamation accrual costs, and sustaining capital charges.

1.22 Sensitivity Analysis

Entrée's 20% attributable portion was evaluated for sensitivity to variations in capital costs, operating costs, copper grade, and copper price. Entrée's 20% attributable portion is most sensitive to changes in copper price and grade and less sensitive to changes in operating and capital costs.

Figure 1-3 is an after-tax NPV sensitivity graph for Entrée's 20% attributable portion. The copper grade sensitivity mirrors the copper price and plots on the same line.

Table 1-6: Production and Financial Results for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1 (basecase is bolded)

	Unit	Item
LOM processed material (Entrée/Oyu Tolgoi JV Property)		
Probable Mineral Reserve feed		40 Mt grading 1.54% Cu, 0.53 g/t Au, 3.63 g/t Ag
Copper recovered	Mlb	1,249
Gold recovered	koz	549
Silver recovered	koz	3,836
Entrée's 20% attributable portion financial results		
LOM cash flow, pre-tax	US$M	449
NPV(5%), after-tax	US$M	185
NPV(8%), after-tax	**US$M**	**131**
NPV(10%), after-tax	US$M	104

Notes:

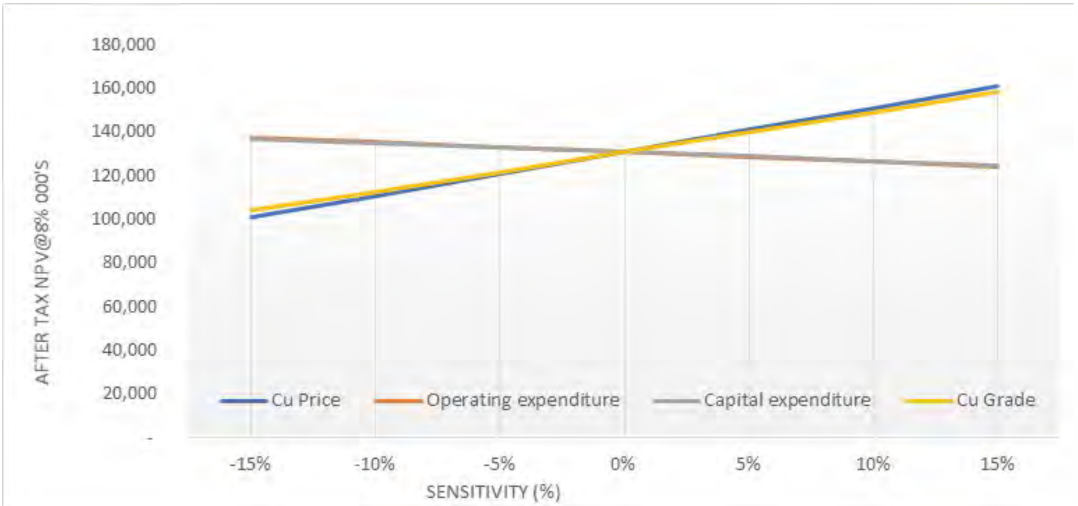
1. Long-term metal prices used in the NPV economic analyses are: copper US$3.25/lb, gold US$1,591/oz, silver US$21.08/oz.
2. The Mineral Reserves within Hugo North Extension Lift 1 are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.
3. Numbers have been rounded. Totals may not sum due to rounding.

Table 1-7: Mine Cash and All-in Sustaining Costs for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1

Description	Unit	LOM Average
Mine site cash cost	$/lb payable copper	1.29
TC/RC and transport	$/lb payable copper	0.29
Total cash costs before credits	$/lb payable copper	1.57
Gold credits	$/lb payable copper	0.72
Silver credits	$/lb payable copper	0.06
Total cash costs after credits	$/lb payable copper	0.79
Total all-in sustaining costs after credits	**$/lb payable copper**	**1.26**

Note: TC/RC = treatment and refining charges. Totals may not sum due to rounding.

Figure 1-3: After-Tax NPV@8% Sensitivity Analysis for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1



Note: Figure prepared by Wood, 2021.

1.23 Preliminary Economic Assessment

1.23.1 Introduction

The 2021 PEA that follows is an alternative development option done at the conceptual level based on Mineral Resources, which assesses the Hugo North/Hugo North Extension Lift 2.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA based on these Mineral Resources will be realized.

Sections 1.1 to 1.11, and 1.24 to 1.26 of this summary also apply to the 2021 PEA. Years presented in the 2021 PEA are for illustrative purposes only.

1.23.2 Mineral Resource Subset within the 2021 PEA Mine Plan

Mineral Resources from Lift 2 form the basis of the 2021 PEA mine plan, and include 78 Mt (Indicated) and 88 Mt (Inferred). The average expected run-of-mine feed grade of 1.35% Cu, 0.49 g/t Au, and 3.6 g/t Ag (1.64% CuEq) includes dilution and mine losses.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

1.23.3 Mine Plan

Calendar years provided in this discussion are for conceptual purposes only.

All underground mining within the Entrée/Oyu Tolgoi JV property is anticipated to be by underground, block/panel caving. This provides a low-cost method that is amenable to the massive, weak rock mass associated with the mineralization and surrounding country rock and is suitable to sustain the throughput rate to the mill.

The 2021 PEA assumes that the same methods used for Hugo North/Hugo North Extension Lift 1 will be applied to Hugo North/Hugo North Extension Lift 2. The existing Hugo North Extension Lift 1 infrastructure will be used to support the Lift 2 mine. It is anticipated that access to the Hugo Extension Lift 2 area will be by a decline system from Lift 1, and extension to Shaft 4, and internal ventilation shafts or raises to provide ventilation. Ore would be crushed, and conveyed to surface by a two-leg extension to the Lift 1 incline conveyor system.

The Hugo North Extension mine planning and optimization indicated that the ideal elevation for the second lift (Lift 2) is approximately 400 m below Lift 1 (~1,700 m below surface). The effect of the northeasterly plunge of the mineralization is evident in the total tonnage considered in the mine plan. The mine plan assumes that draw-points will be in use for production between 2038 and 2055 in the Hugo North Extension Lift 2 area.

Initial mill feed delivery from the Hugo North Extension Lift 2 is assumed to begin in 2027 when development commences in the Hugo North Extension Lift 2 area. Production from Hugo North Extension Lift 2 is anticipated to begin in 2038 with the completion of the first drawpoints, and stabilizes in 2043. The peak production from Hugo North Extension Lift 2 is expected to be approximately 40,500 t/d in 2047, and the average life-of-mine production rate (2031–2056) is planned at about 17,500 t/d.

1.23.4 Recovery Methods

The 2021 PEA assumes that no changes will be required to the process plant from those contemplated in the Phase 2 concentrator development program (see Section 1.15), and that the same mill throughput will be maintained.

1.23.5 Project Infrastructure

The majority of the primary infrastructure and facilities required for the Oyu Tolgoi project were completed during Phase 1. The 2021 PEA assumes that the infrastructure in place for Hugo North/Hugo North Extension Lift 1 will be available for Hugo North/Hugo North Extension Lift 2, and that a similar design will be employed for the underground mining operation.

Key additional infrastructure assumptions that would be needed to support the 2021 PEA mine plan in addition to that contemplated in Phase 2 include:

- Construction of permanent underground facilities including crushing and materials handling, workshops, services, and related infrastructure
- Modifications to the electrical shaft farm substation, and upgrades to some of the distribution systems
- Expanded logistical and accommodation infrastructure
- Underground maintenance and fuel storage facilities
- Expanded water supply and distribution infrastructure
- Expanded TSF capacity.

1.23.6 Market Studies and Contracts

For the purposes of the 2021 PEA, it was assumed that the marketing provisions and contracts entered into for Hugo North Extension Lift 1 production would be maintained (see Section 1.18).

The commodity pricing used for the subset of the Mineral Resource estimate that is used in the 2021 PEA is based on pricing from the 2020 Turquoise Hill Technical Report, which uses BDT38 and the 2020 Feasibility Study as a basis, and which in turn is based on reviews of long-term consensus estimates reported in public reports.

Commodity pricing used in the in the 2021 PEA economic analysis is based on the CIBC Global Mining Group's forecast pricing from April 30, 2021. Smelter terms are based on terms used in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

1.23.7 Environmental, Permitting and Social Considerations

1.23.8 Environmental Considerations

Information relating to environmental studies as discussed for Hugo North Extension Lift 1 (see Section 1.17.1), are the same for the 2021 PEA.

1.23.9 Tailings Considerations

The 2021 PEA case assumes that additional tailings cells that have a similar design and capacity to the operating Cell 1 would be used for deposition of conventional thickened tailings:

- Future cells to support the 2021 PEA case are assumed to use the similar embankment configurations as in the current TSF design
- The same concepts for tailings deposition and reclaim water return will continue to be used.

Improvements to water reclaim mechanisms to recycle as much water as practicable will continue.

These additional cells will have the capacity to contain the life of mine tailings under the 2021 PEA case. However, the cost of constructing additional cells may increase as the haul distances for mine waste and other embankment materials increase.

1.23.10 Water Management

Information relating to water management as discussed for Hugo North Extension Lift 1 (see Section 1.17.3), are the same for the 2021 PEA.

1.23.11 Closure Considerations

No closure considerations were evaluated as part of the 2021 PEA plan, due to the long timeframe envisaged before closure would be needed. It was anticipated that the closure planning would be similar to that proposed for the 2014 OTLLC closure plan (see Section 1.17.4).

1.23.12 Permitting Considerations

Information relating to permitting as discussed for Hugo North Extension Lift 1 (see Section 1.17.5), are the same for the 2021 PEA.

1.23.13 Social Considerations

Information relating to permitting as discussed for Hugo North Extension Lift 1 (see Section 1.17.6), are the same for the 2021 PEA.

1.23.14 Capital Costs

Capital cost and sustaining cost estimates were prepared as separate and independent estimates. The information basis for the capital cost estimate was provided by OTLLC as an Excel spreadsheet that documented the capital cost estimate as a single line item by year and a sustaining capital cost estimate, also as an annualized single line item. No detailed allocations of these costs were provided by OTLLC.

The capital cost estimate to develop Hugo North/Hugo North Extension Lift 2 is estimated at US$1.816 billion. The sustaining capital cost estimate was provided as US$5.018 billion.

1.23.15 Operating Costs

Operating costs are based on extrapolations from existing operations data and include estimates for mining, processing, and infrastructure for Hugo North/Hugo North Extension Lift 2. Costs are summarized in Table 1-8.

1.23.16 Economic Analysis

This sub-section provides the results of the 2021 PEA. The cautionary statements in Section 1.21 also apply to this section.

The economic analysis for Entrée’s 20% attributable portion of the Entrée/Oyu Tolgoi JV property was carried out using a financial model developed by Wood. The financial model uses the DCF approach. This method of valuation requires projecting yearly cash inflows, or revenues, and subtracting yearly cash outflows such as operating costs, capital costs, royalties, and taxes. The resulting net annual pre-tax and after-tax cash flows are discounted back to the date of valuation and totalled to determine the NPV of the project at 5%, 8%, and 10% discount rates.

This economic analysis includes sensitivities to variations in capital costs, operating costs, copper grade, and copper price. It should be noted that, for the sake of discounting, cash flows are assumed to occur at the end of each period. Cash flows are discounted to the beginning of 2027, the beginning of Hugo North Extension Lift 2 development.

Table 1-8: Cash Operating Costs, Hugo North/Hugo North Extension Lift 2

Description	Unit	Value
Mining	$/t processed	9.21
Processing	$/t processed	7.47
Infrastructure	$/t processed	2.32
Total	***$/t processed***	***19.00***

Note: Operating costs are for Lift 2. VAT and duties included. Totals may not sum due to rounding.

Wood completed an economic analysis for Entrée's 20% attributable portion of the 2021 PEA on the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analyses. Underlying assumptions in the analysis include:

- All pricing within the financial analysis is based on 2020 constant dollars. No escalation is applied
- For the analysis, Entrée have advised that under the JVA, all costs of Operations under each program and budget will, to the extent practicable, be allocated at the time the program and budget is adopted between the Entrée/Oyu Tolgoi JV property and the Oyu Tolgoi ML, based on the proportions in which each of them benefits most from such Operations. OTLLC shall pay for 100% of costs allocated to the Oyu Tolgoi ML and all associated liabilities including for environmental compliance. The balance of such costs shall be borne and paid by the participants in accordance with their respective participating interests (i.e., Entrée 20%; OTLLC 80%)
- Entrée is carried through to production by debt financing from OTLLC with interest accruing at prime (Royal Bank Prime of 2.5%) plus 2%, or approximately 4.5%. Debt repayment is made from 90% of monthly available cash flow arising from sale of Entrée's share of products. Entrée receives 10% of its share of cash flow from the Entrée/Oyu Tolgoi JV property until the loans outstanding balance is repaid and 100% thereafter.

Using a discount rate of 8%, the pre-tax NPV for Entrée's 20% attributable portion is estimated at US$413 million. The after-tax NPV@8% is US$306 million.

Table 1-9 provides a summary of key 2021 PEA financial outcomes for Entrée's 20% attributable portion of the Entrée/Oyu Tolgoi JV property. IRR and payback for the 2021 PEA are not presented in Table 1-9 because with 100% financing, neither is applicable.

Table 1-9: Summary 2021 PEA Financial Results for Entrée's 20% Attributable Portion, Hugo North Extension Lift 2(base case is bolded)

Cash Flow Before Tax		Units	Total
Cumulative Cash Flow		kUS$	1,982,208
NPV @	5%	kUS$	727,526
NPV @	**8%**	**kUS$**	**413,460**
NPV @	10%	kUS$	287,619
Cash Flow After Tax		**Units**	**Total**
Cumulative Cash Flow		kUS$	1,484,003
NPV @	5%	kUS$	540,840
NPV @	**8%**	**kUS$**	**306,246**
NPV @	10%	kUS$	212,569

Figure 1-4 provides a distribution of Entrée's 20% attributable portion cash flows over the 2021 PEA LOM.

Entrée's 20% attributable portion of the Hugo North Extension Lift 2 demonstrates a positive after-tax NPV@8% of US$306.2 million at the study copper price of US$3.25/lb. Discounting the after-tax NPV@8% to 2021 results in a reduced value of US$193.0 million. Significant positive cash flows for the 2021 PEA are not recognized until 2040.

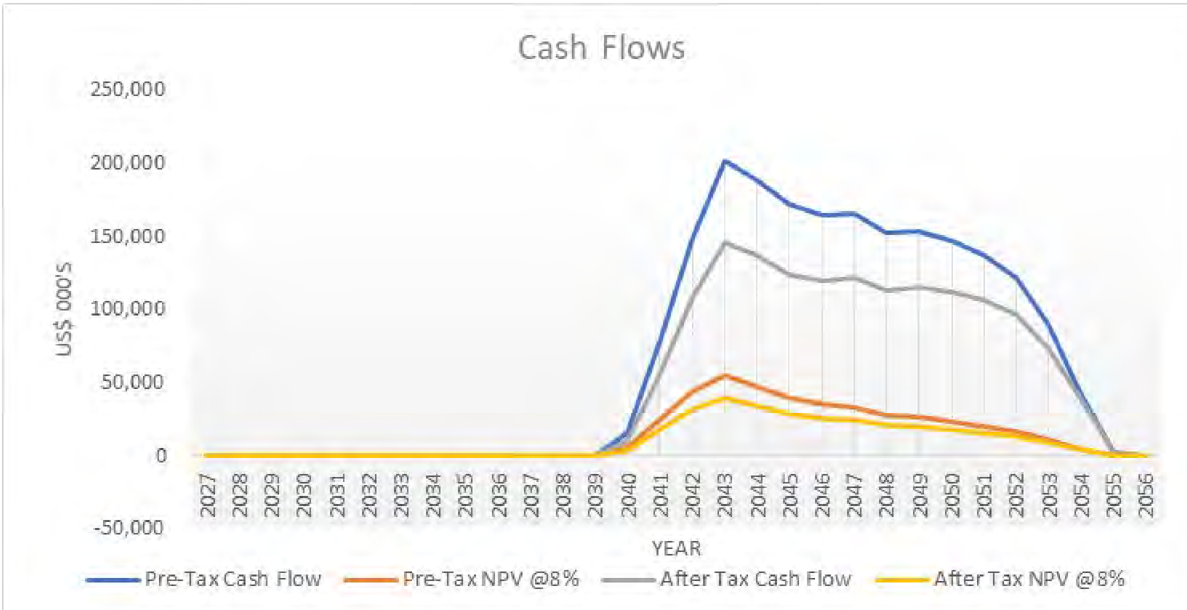
1.23.17 Sensitivity Analysis

Entrée's 20% attributable portion of the 2021 PEA is most sensitive to changes in copper price and grade and less sensitive to changes in operating and capital costs. The copper grade sensitivity generally mirrors the copper price.

Figure 1-5 shows the after-tax sensitivity results for NPV@8% for Entrée's 20% attributable portion. The copper grade sensitivity generally mirrors the copper price.

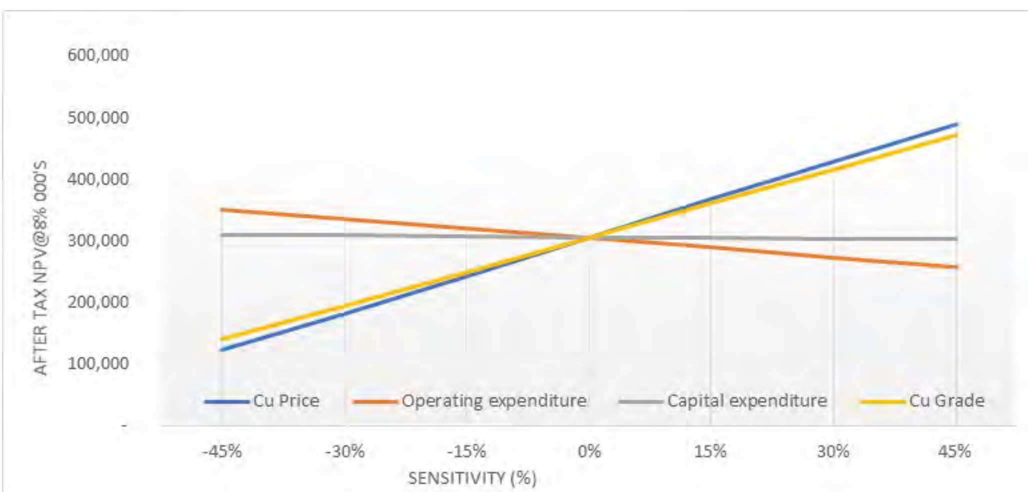
To test the Project sensitivity to timing, the project pre- and after-tax cash flows were discounted to the start of 2021 (Figure 1-6).

Figure 1-4: 2021 PEA Cash Flow for Entrée's 20% Attributable Portion, Hugo North Extension Lift 2



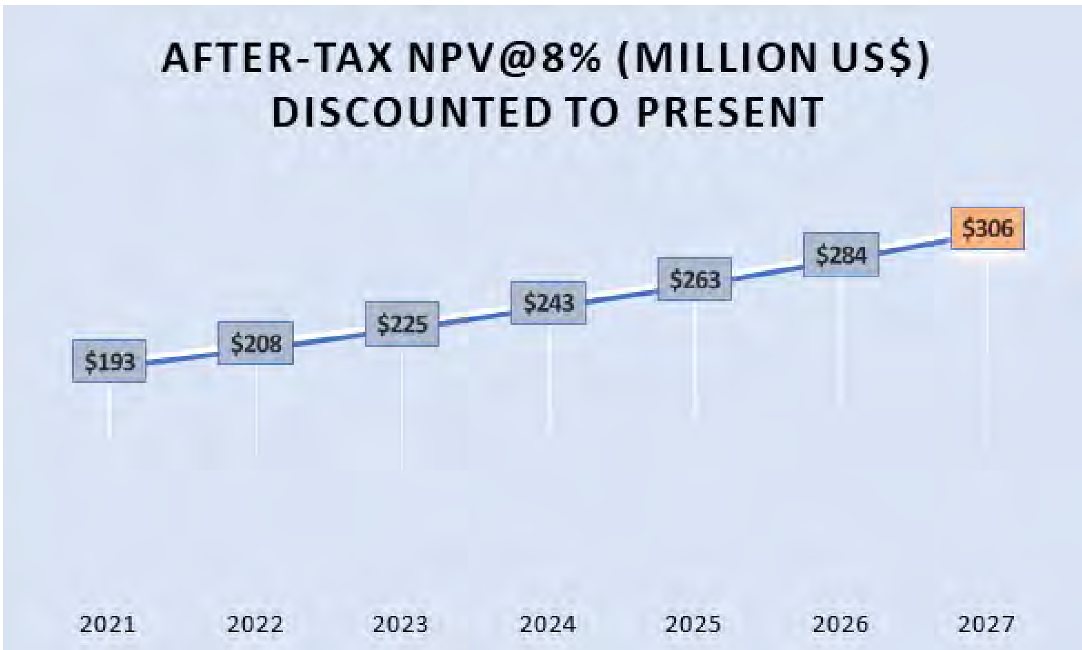
Note: Figure prepared by Wood, 2021.

Figure 1-5: 2021 PEA After-Tax NPV@8% Sensitivity Analysis, Hugo North Extension Lift 2



Note: Figure prepared by Wood, 2021.

Figure 1-6: Sensitivity to Timing for 2021 PEA After-Tax NPV@8% Results for Entrée's 20% Attributable Portion, Hugo North Extension Lift 2, Assuming Discounting Prior to Lift 2 Construction (start of construction (Base Case) highlighted in red)



Note: Figure prepared by Wood, 2021.

1.24 Risks

Due to its nature and location, the Entrée/Oyu Tolgoi JV Project is subject to many legal, commercial, and political risks associated with the agreements with OTLLC, the sovereign government of Mongolia, and other entities. Some of the key technical risks are summarized below.

1.24.1 Hugo North/Hugo North Extension Underground Development

The Hugo North Extension Lift 1 mine design in the 2020 Feasibility Study is subject to future refinements and updates. Hugo North (including Hugo North Extension) Lift 1 surface and underground drilling programs are ongoing to support the evaluation by OTLLC of different design and sequencing options for Panels 1 and 2 as part of OTLLC's planned Pre-Feasibility and Feasibility level work. There is a risk that the production build-up in Panel 1 could be slowed if geotechnical conditions in the initial undercutting area of Panel 1 are less favourable than currently anticipated. The drilling will allow OTLLC to better understand the nature and extent of any risk and develop mitigation strategies if necessary.

Neither the 2020 Feasibility Study nor this Report reflect the impacts of the COVID-19 pandemic, which are ongoing and continue to be assessed by OTLLC. In particular, progress on Shafts 3 and 4 has been delayed and the overall impact of these delays is under review by OTLLC. COVID-19 related delays to sinking activities in Shafts 3 and 4 could impact the timing to extend the footprint development into Panel 1 because of limited ventilation until these shafts are commissioned.

On December 18, 2020, Turquoise Hill announced that a Definitive Estimate that refines the analysis in the 2020 Feasibility Study and broadly confirms the economics and assumptions presented therein has been completed and delivered to OTLLC by Rio Tinto. Entrée has not received a copy of the Definitive Estimate and it was not reviewed or relied upon by Wood in the preparation of the Report. According to Turquoise Hill, the Definitive Estimate assumes COVID-19 related restrictions in 2021 that are no more stringent than those experienced in September 2020. Should COVID-19 constraints continue beyond 2021, should the COVID-19 situation escalate in 2021 leading to additional restrictions, or should COVID-19 related restrictions or other non-technical criteria result in a delay in commencement of undercutting in Panel 0, which is currently scheduled for mid-2021, the development costs and schedule in the 2020 Feasibility Study upon which this Report are based could be negatively impacted.

1.24.2 Mine Plan

Geotechnical assumptions related to the design and geotechnical behaviour of the cave mining system, including, but not limited to, the flow of material (ore and dilution) relative to the upward progression and lateral advance of the cave and assumptions of the long-term performance of the mine infrastructure (both support and production) are based on assumptions from Hugo North/Hugo North Extension Lift 1. These may not be directly applicable to the Hugo North Extension Lift 1 area.

The Mineral Reserves within the Hugo North Extension Lift 1 do not reach production until approximately six years after Hugo North Lift 1 Panel 0 within the Oyu Tolgoi ML is initiated. This delay may mitigate some of the risk associated with the mining method by providing sufficient time for OTLLC to make any changes in the event that unanticipated mining difficulties arise.

1.24.3 Tailings Storage Facility Design

The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry standards to guide design and management of TSFs. Members of International Council on Mining and Metals (ICMM), including Rio Tinto, are required to be in compliance with the GISTM within the next several years. The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently-published global tailings standard (GISTM, 2020). This may result in changes of the design criteria and potentially impact the TSF capital and operating cost estimates.

1.25 Opportunities

A number of prospects have been identified in the Entrée/Oyu Tolgoi JV Project through reconnaissance evaluation, geochemical sampling and geophysical surveys. Some targets have preliminary drill testing. The Entrée/Oyu Tolgoi JV Project retains exploration potential for porphyry and epithermal-style mineralization.

1.26 Interpretation and Conclusions

Under the assumptions presented in this Report, Entrée's 20% attributable portion of the 2021 Reserves case for the Hugo North Extension Lift 1 return positive economics.

Under the 2021 PEA assumptions presented in this Report, Entrée's 20% attributable portion of the Mineral Resource subset within the 2021 PEA mine plan for the Hugo North/Hugo North Extension Lift 2 deposit that is within the Entrée/Oyu Tolgoi JV property return positive economics.

1.27 Recommendations

The QPs were not given access to information on the portions of the Project that Entrée does not have an ownership interest in, with the exception of:

- Information on, and site visits to the process plant, TSF, and underground access development
- Access to OTLLC operations site personnel to discuss information relevant to Entrée's JV interest in the property.

The QPs are not in a position to make meaningful recommendations for further work other than for exploration and underground drilling, both of which are based on information provided by OTLLC.

An exploration work program is recommended for the Entrée/Oyu Tolgoi JV property in the area of the Castle Rock, Bumbat Ulaan and Southeast IP targets, and is termed the Phase 1 work program. Six wide-spaced core holes drilled to depths averaging about 500 m at each of the Castle Rock, Bumbat Ulaan and Southeast IP targets, for a total program of 18 core holes (9,000 m), are recommended. Assuming an all-in drilling cost of US$275/m, the proposed work program is estimated at US$2.48 million.

Drilling should be considered for Hugo North Extension, and is termed the Phase 2 work program. The program has the objective of improving confidence category of material classified as Probable Reserves and Indicated Mineral Resources and potentially converting the Inferred Mineral Resources to higher confidence categories. Based on information provided by OTLLC, the budget for ongoing surface and underground drilling of the Hugo North Extension portion of Lift 1 and Lift 2 is expected to range from $2–5 million over five years.

As the Phase 2 drill data are collected, selected core should be subject to confirmatory comminution and flotation testwork to support the metallurgical assumptions for the Hugo North/Hugo North Extension mineralization. This program is expected to require a budget of US$100,000.

All drilling, surveying, logging, sampling, assaying, and QA/QC protocols should be similar to those already used on the Entre/Oyu Tolgoi JV property.

The Phase 2 work program is independent of the Phase 1 work program, and, if appropriate, the two phases could be conducted concurrently.

2.0 INTRODUCTION

2.1 Introduction

Entrée Resources Ltd. (Entrée) requested that Wood Canada Limited (Wood) prepare an independent technical report (the Report) on the Entrée/Oyu Tolgoi Joint Venture Project (the Entrée/Oyu Tolgoi JV Project or the Project; Figure 2-1).

The Project consists of two contiguous mining licences (MLs), Shivee Tolgoi (ML 15226A) and Javhlant (ML 15225A), and completely surrounds the Oyu Tolgoi ML held by Oyu Tolgoi LLC (OTLLC). The Shivee Tolgoi ML hosts the Hugo North Extension copper–gold deposit, and the Javhlant ML hosts the majority of the Heruga copper–gold–molybdenum deposit.

The Entrée/Oyu Tolgoi JV Project is currently divided into two contiguous areas, referred to as "properties". Entrée is in joint venture with OTLLC (the Entrée/Oyu Tolgoi JV) over the eastern portion of the Shivee Tolgoi ML and all of the Javhlant ML (the Entrée/Oyu Tolgoi JV property). The western portion of the Shivee Tolgoi ML forms the Shivee West property, where Entrée currently has a 100% interest. The Shivee West property is the subject of a License Fees Agreement with OTLLC, and may ultimately become part of the Entrée/Oyu Tolgoi JV property.

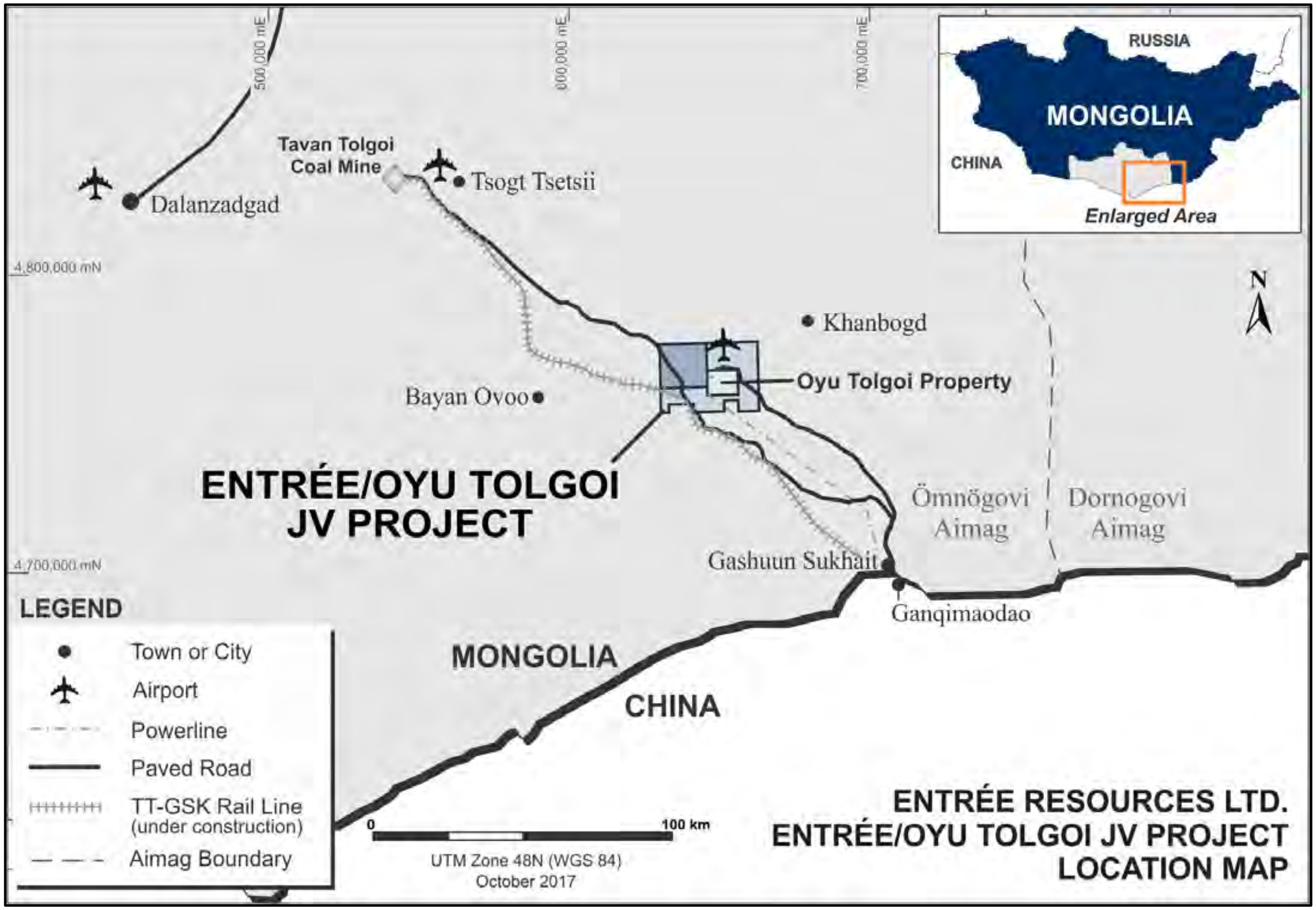
Entrée's joint venture partner, OTLLC, is jointly owned by the Mongolian Government and Turquoise Hill Resources Ltd (Turquoise Hill). Rio Tinto International Holdings Limited (Rio Tinto), which holds the majority interest in Turquoise Hill, is the operator for both the Oyu Tolgoi ML and the Entrée/Oyu Tolgoi JV property.

The Hugo North Extension deposit is at the north end of the 12.4 km long Oyu Tolgoi series of porphyry copper–gold deposits, and the Heruga deposit is at the south end (Figure 2-2 and Figure 2-3).

OTLLC's Oyu Tolgoi ML contains the Oyut, Hugo North and Hugo South deposits, and the northern portion of the Heruga deposit. OTLLC is currently mining the Oyut deposit by open pit methods, and the first lift (Lift 1) of the Hugo North/Hugo North Extension deposits is under development to be mined from underground.

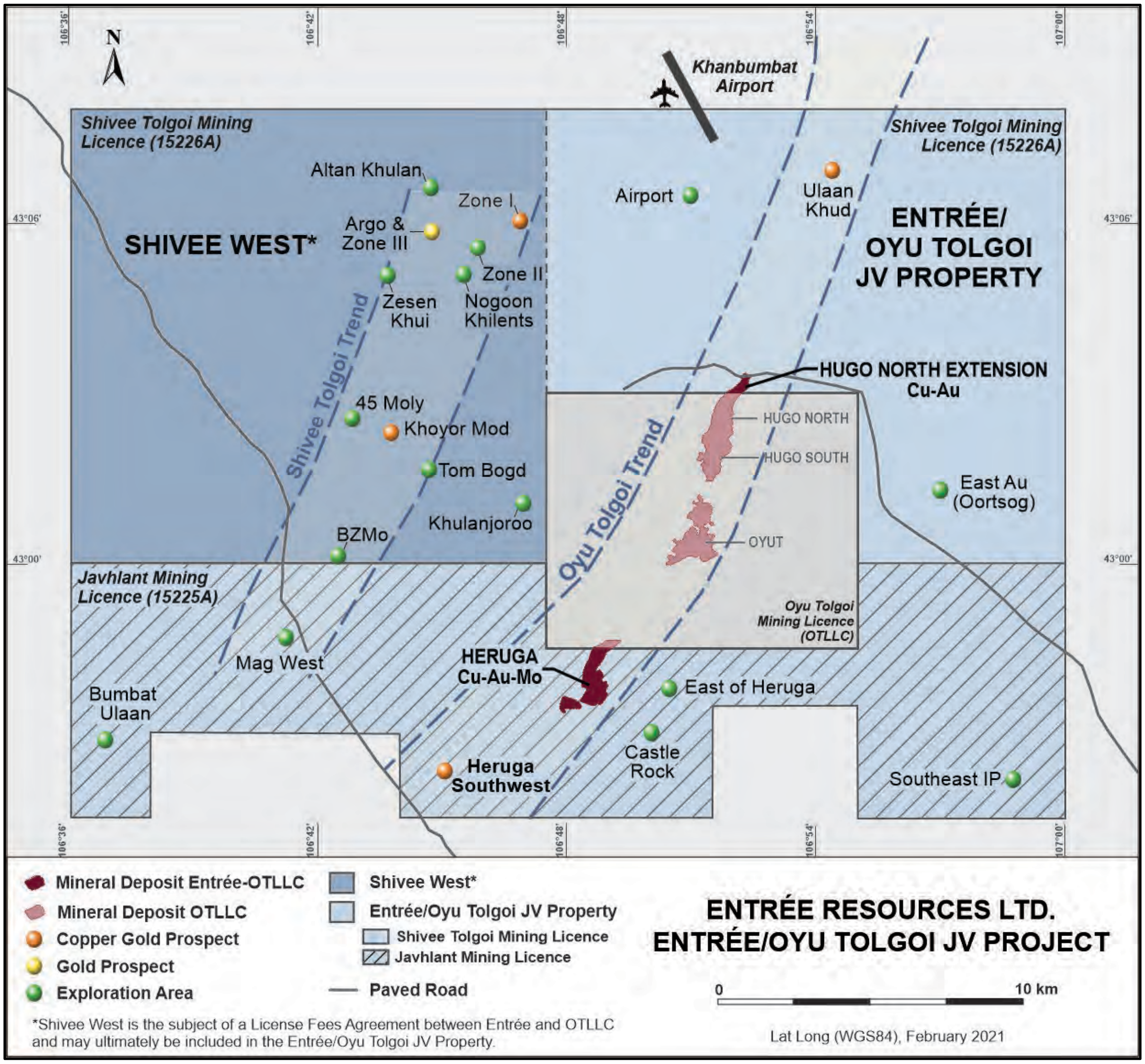
The Oyu Tolgoi mining operation is being developed by OTLLC in two phases. Phase 1 was designed to treat open pit material mined from the Oyut pit, and was completed with concentrator commissioning in 2013.

Figure 2-1: Project Location Plan



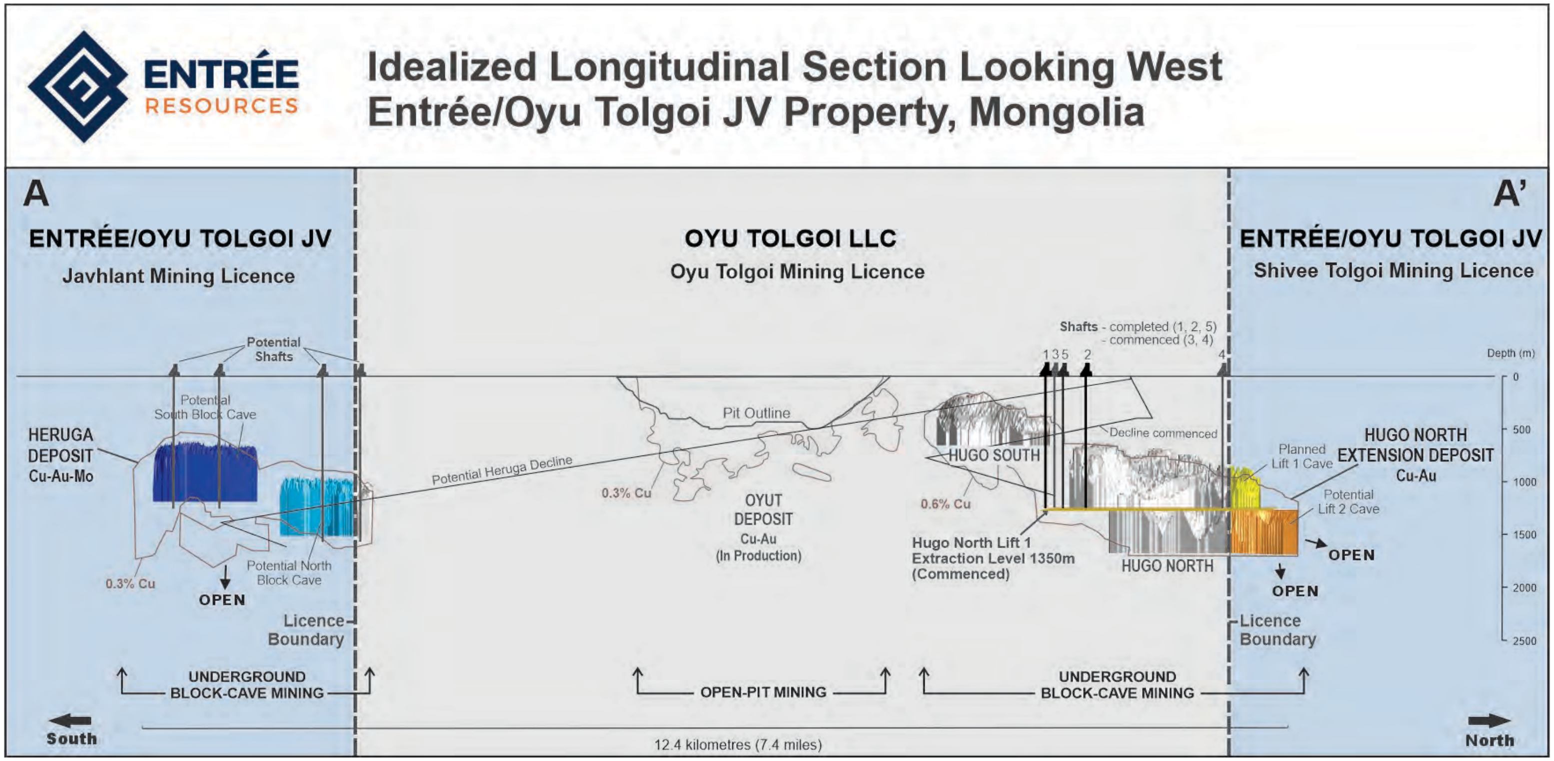
Note: Figure courtesy Entrée, 2017.

Figure 2-2: Detailed Project Location Plan



Note: Figure courtesy Entrée, 2021.

Figure 2-3: Longitudinal-Section



Note: Figure courtesy Entrée, 2021. Infrastructure for Hugo North Extension Lift 1 is planned as part of Hugo North Lift 1, and is discussed with the Mineral Reserve estimates in this Report. The infrastructure shown for Hugo North Extension Lift 2 is discussed in the 2021 PEA in this Report. The infrastructure shown for Heruga is conceptual, and was used only to assess reasonable prospects for eventual economic extraction.

Phase 2 is under construction. It will consist of Lift 1 of the Hugo North/Hugo North Extension deposits, which will be mined by block (panel) caving methods. Phase 2 will include construction of infrastructure to support the underground mining operations such as shafts and conveyors, and modifications to the process plant such as addition of a fifth ball mill, additional roughing and column flotation, and additional concentrate dewatering and bagging capacity. Phase 2 is summarized in this Report in Sections 15 to 22, with a focus on elements that are relevant to the Entrée/Oyu Tolgoi JV property. The mine plan is at a feasibility-level of confidence. The evaluation of the mine plan as it pertains to Entrée's attributable interest is referred to by Entrée as the 2021 Reserves case. The portion of the 2021 Reserves case that pertains to Entrée is referred to as Entrée's 20% attributable interest in this Report.

OTLLC has conceptually proposed a second lift (Lift 2) for the Hugo North/Hugo North Extension area, as potential future development phases. Section 24 of this Report discusses, at a preliminary economic assessment (PEA) level, a conceptual mine plan for Lift 2 of the Hugo North Extension area (2021 PEA).

2.2 Terms of Reference

Entrée is refiling this Report to include updated information provided by OTLLC on the concentrate tonnes and grade to be produced from Lift 1 of the Hugo North/Hugo North Extension deposits. The updated concentrate information resulted in a positive impact on Entrée's attributable financial interest in Lift 1 of the Hugo North/Hugo North Extension deposits. The economic analysis for Lift 1 in Sections 1.21 and 22 of this Report was revised to include the updated concentrate data.

This Report is being used in support of Entrée's news release dated 21 October, 2021, entitled "Entrée Resources Files Amended Technical Report for its Interest in the Entrée/Oyu Tolgoi Joint Venture Property".

Units used in the report are metric units unless otherwise noted. Monetary units are in United States dollars (US$) unless otherwise stated. The Mongolian currency is the Tughrik (MTK). The Chinese currency is the Chinese Yuan Renminbi (RMB). Mineral Resources and Mineral Reserves are reported using the 2014 edition of the Canadian Institute of Mining and Metallurgy's *Definition Standards for Mineral Resources and Mineral Reserves* (the 2014 CIM Definition Standards).

Nomenclature for deposits and mineral tenures has changed over time. Table 2-1 summarizes previous and current naming conventions.

Table 2-1: Deposit or Area Naming Conventions

Deposit, Prospect or Area Name Used in this Report	Description or Name Used in Previous Technical Reports
BZMo	Boundary Zone
Entrée/Oyu Tolgoi JV Project	Javhlant and Shivee Tolgoi MLs
Entrée/Oyu Tolgoi JV Project	Lookout Hill property
Heruga	Sparrow South
Heruga North	New Discovery zone
Heruga North zone	That portion of the Heruga North deposit within the Oyu Tolgoi ML
Hugo Dummett	Hugo North/Hugo North Extension and Hugo South deposits
Hugo Dummett area	Far North zone
Hugo North Extension	The portion of the Hugo North deposit that extends onto the Shivee Tolgoi mining license
Javhlant	Jahvkhlant; Javkhlant
Mag West	SW Mag
Oyut deposit group	Southern Oyu Tolgoi or SOT
Oyut deposit group	West, Southwest, South, Far South, Wedge, Bridge and Central zones
Hugo North Extension area	Copper Flats
Entrée/Oyu Tolgoi JV Project	Shivee Tolgoi
Ulaan Khud	Airport North
East Au	Oortsog

A number of abbreviations for previously-completed studies have been reported in the public domain by Turquoise Hill; these are summarized in Table 2-2 with the report original title and the abbreviations used by Turquoise Hill in their public documents.

For the purposes of this Report, the 2020 Oyu Tolgoi Feasibility Study is referred to as the 2020 Feasibility Study, and the 2020 Turquoise Hill Technical Report is referred to as the 2020 Turquoise Hill Technical Report to differentiate from technical reports filed by Entrée, as discussed in Section 2.7.

Table 2-2: Historic Report Naming Conventions

Report Name Used in this Report	Report Terminology Used in Previous Technical Reports
2005 Integrated Development Plan	IDP
2010 Integrated Development Plan	IDP-10
2010 Integrated Development and Operating Plan	IDOP
2012 Definitive Integrated Development and Operations Plan	DIDOP
2014 Oyu Tolgoi Feasibility Study	OTFS14
2015 Oyu Tolgoi Feasibility Study	OTFS15
2016 Oyu Tolgoi Feasibility Study	OTFS16
2016 Lookout Hill Technical Report	LHTR16
2016 Turquoise Hill Technical Report	2016OTTR
2020 Oyu Tolgoi Feasibility Study	2020 Feasibility Study
2020 Turquoise Hill Technical Report	2020 Turquoise Hill Technical Report

2.3 Qualified Persons

The following Wood staff serve as the qualified persons for this Technical Report as defined in National Instrument 43-101, Standards of Disclosure for Mineral Projects, and in compliance with Form 43-101F1:

- Mr. Kirk Hanson, P.E., Technical Director Open Pit Mining
- Mr. Christopher Wright, P.Geo., Technical Director Resource Estimation and Geometallurgy
- Mr. Piers Wendlandt, P.E., Principal Mining Engineer
- Mr. Dean David, FAusIMM, (CP Met), Senior Consultant, Process
- Dr. Haiming (Peter) Yuan, P.E., Senior Associate Engineer, Geotechnical

2.4 Site Visits and Scope of Personal Inspection

Mr. Christopher Wright visited the Oyu Tolgoi site three times between August 2017 and June 2018 while he was an employee of Rio Tinto. Mr. Wright's most recent site visit was from 11–21 June 2018. Site visits included an overview of the district geology, exposures in the South Oyut open pit review of drill core, core storage and sampling facilities. Over 11 months from August 2017 to June 2018 Mr. Wright did extensive work with the South

Oyut and Hugo North Mineral Resource and metallurgical databases and block models in the construction of geometallurgical models for these areas.

Dr. Peter Yuan visited the site on 6 September, 2017. During the visit, he toured the tailings storage facility (TSF) area, open pit, concentrator, as well as surface areas for the planned underground operations. He also met with Oyu Tolgoi Mine technical staff and management personnel to collect TSF design and operations data, and clarify issues.

Mr. Dean David visited the Project from 1 to 5 June 2009. Whilst on site, inspection was made of the core library, site preparations for mining and milling facilities, geological facilities, administration facilities, local infrastructure and site accommodation.

2.5 Effective Dates

There are a number of effective dates pertinent to the Report, as follows:

- Effective date of the Mineral Resource estimates:
  - Hugo North Extension: 31 March, 2021
  - Heruga: 31 March, 2021
- Effective date of the Mineral Reserves estimate: 15 May, 2021
- Effective date of the economic analysis that supports Entrée's attributable portion of the Mineral Reserves estimate: 8 October, 2021
- Effective date of the 2021 PEA: 17 May, 2021.

The overall Report effective date is taken to be the effective date of the economic analysis that supports Entrée's attributable portion of the Mineral Reserves estimate, and is 8 October, 2021.

2.6 Information Sources and References

Reports and documents listed in Section 2.7, Section 3, and Section 27 of this Report were used to support preparation of the Report. Additional information was provided by OTLLC, Rio Tinto and Entrée personnel.

The key references used in compiling the Report are:

- Oyu Tolgoi LLC, 2020a: Oyu Tolgoi Feasibility Study Update – 2020, OTFS20: report prepared by Oyu Tolgoi LLC for the Government of Mongolia, dated 1 July 2020

- Oyu Tolgoi LLC, 2020b: Base Data Template 38: internal Oyu Tolgoi LLC Excel spreadsheet
- Thomas, M., Carlson, R., Dudley, J., Kolkert, R., 2020: Oyu Tolgoi 2020 Technical Report, Turquoise Hill Resources Ltd., Ömnögovi Aimag, Mongolia: report prepared by AMC Consultants for Turquoise Hill Resources Ltd., effective date 30 June, 2020.

The QPs note that the 2020 Feasibility Study, as provided to Entrée and Wood, comprised 20 volumes of the total 22 volume study, and the majority of the provided volumes had information that had been partially redacted.

Mr. Greg Henderson, a Wood employee, provided information to Mr. David as a result of his site visit in 2017. Mr. Henderson visited the Oyu Tolgoi Mine from 3–8 July 2017. During this visit, he collected operational data, discussed operational stability and challenges with the operations team, and examined tie-in points and sequencing for the expansion. Mr. Henderson visited all parts of the above-ground operation from the crushed ore stockpile to TSF and concentrate bagging. His main area of focus was the grinding and classification circuits.

2.7 Previous Technical Reports

Since 2002, technical reports have been prepared on various aspects of the Entrée and OTLLC landholdings for a number of companies including Entrée, and Ivanhoe Mines and Turquoise Hill Resources.

Reports prepared for Entrée include:

- Cann, R., 2004: 2002–2003 Exploration Report on the Shivee Tolgoi Property, Őmnögovi Aimag, Southern Mongolia; technical report prepared for Entrée Gold Inc., effective date March, 2004
- Cinits, R., and Parker, H., 2007: Lookout Hill Project, Mongolia, NI43-101 Technical Report: technical report prepared by AMEC Americas Inc., for Entrée Gold Inc., effective date 29 March, 2007
- Cann, R., 2007: Technical Report on the Javhlant Licence Ömnögovi Aimag, Southern Mongolia: prepared for: Entrée Gold Inc., effective date 9 November, 2007

- Vann, J., Jackson, S., Parker, H., David, D., and Cann, R.M., 2008: NI 43-101 Compliant Technical Report on the Lookout Hill Project Ömnögovi Aimag, Southern Mongolia: report prepared by Quantitative Group for Entrée Gold Inc., effective date 26 March, 2008
- Vann, J., Jackson, S., Cullingham, O., David, D., Cann, R.M., and Foster, J.R., 2009: NI 43-101 Compliant Technical Report on the Lookout Hill Project Ömnögovi Aimag, Southern Mongolia: prepared by Quantitative Group for Entrée Gold Inc., effective date 10 June, 2009
- Jackson, S., Vann, J., Cullingham, O., and David, D., 2010: Lookout Hill Property, NI 43-101 Technical Report: technical report prepared by AMEC Minproc for Entrée Gold Inc., effective date 30 March, 2010
- Peters, B., Jackson, S., Foster, J.R., Chance, A., Jakubec, J., and David, D., 2012: Technical Report 2012 on the Lookout Hill Property Ömnögovi, Mongolia: technical report prepared by AMC Consultants for Entrée Gold Inc., effective date 29 March, 2012
- Peters, B., Jackson, S., Cann, R.M., Bridges, M., and Riles, A., 2013: Technical Report 2013 on the Lookout Hill Property Ömnögovi, Mongolia: technical report prepared by AMC Consultants for Entrée Gold Inc., effective date 28 March, 2013
- Peters, B., Sylvester, S., and McCann, R., 2016: Lookout Hill Feasibility Study Update, Ömnögovi Aimag, Mongolia: technical report prepared by OreWin Pty Ltd for Entrée Gold Inc., effective date 29 March, 2016
- Hanson, K., Kulla G., Oshust P., Loomis, I., and Wong, H., 2018: Entrée/Oyu Tolgoi Joint Venture Project, Mongolia, NI 43-101 Technical Report: report prepared by Amec Foster Wheeler for Entrée Gold Inc., effective date 15 January, 2018.

Reports prepared for Ivanhoe Mines and Turquoise Hill Resources include:

- Cargill, G.D., 2002: Report on the Oyu Tolgoi Exploration Project South Gobi Region, Mongolia Prepared for Ivanhoe Mines Ltd: technical report prepared by Roscoe Postle Associates Inc. for Ivanhoe Mines Ltd., effective date 11 January, 2002
- Arsenau, G., 2002: Addendum Report on the Oyu Tolgoi Exploration Project South Gobi Region, Mongolia Prepared for Ivanhoe Mines Ltd.: technical report prepared

by Roscoe Postle Associates Inc. for Ivanhoe Mines Ltd., effective date 20 March, 2002

- Arsenau, G., 2002: Second Addendum Report on the Oyu Tolgoi Exploration Project South Gobi Region, Mongolia Prepared for Ivanhoe Mines Ltd.: technical report prepared by Roscoe Postle Associates Inc. for Ivanhoe Mines Ltd., effective date 5 June, 2002
- Juras, S., 2003a: Technical Report Oyu Tolgoi, Mongolia: technical report prepared by AMEC E&C Services Inc. for Ivanhoe Mines Inc., effective date 24 February, 2003.
- Juras, S., 2003b: Technical Report Far North Deposit Oyu Tolgoi, Mongolia: technical report prepared by AMEC E&C Services Inc. for Ivanhoe Mines Inc., effective date 21 July, 2003.
- Juras, S., 2003c: Technical Report Hugo Dummett Deposit Oyu Tolgoi, Mongolia: technical report prepared by AMEC E&C Services Inc. for Ivanhoe Mines Inc., effective date 10 November, 2003.
- Hodgson, S.B., Juras, S.J., Bull, G., Oliver, R.G., 2004: Oyu Tolgoi Project, Technical Report Preliminary Assessment: technical report (filed on SEDAR as Other) prepared by the AMEC-Ausenco Joint Venture for Ivanhoe Mines Mongolia Inc. XXK, effective date 25 January, 2004
- Parker, H., and Juras, S., 2004: Technical Report, Oyu Tolgoi, Mongolia: technical report prepared by AMEC Americas Inc. for Ivanhoe Mines Inc., September, 2004
- Gingrich, D.E, 2005: Oyu Tolgoi Project Mongolia Integrated Development Plan: technical report prepared by AMEC Americas Ltd. for Ivanhoe Mines Inc., effective date 1 October, 2005
- Juras, S., 2005: Technical Report, Hugo Dummett and Southern Oyu Deposits, Oyu Tolgoi, Mongolia: technical report prepared by AMEC Americas Ltd. For Ivanhoe Mines Inc., effective date 3 May, 2005
- Peters, B., Blower, S., Haines, A., and David, D., 2006: Oyu Tolgoi Project, Southern Oyu Open Pit Technical Report: technical report prepared by GRD Minproc for Ivanhoe Mines Ltd., effective date 21 January, 2006
- Blower, S., 2006a: Technical Report Hugo North Deposit Oyu Tolgoi, Mongolia: technical report prepared by AMEC Americas Ltd. for Ivanhoe Mines Ltd., effective date 16 March, 2006

- Blower, S., 2006b: Technical Report Copper Flats Deposit, Mongolia: technical report prepared by AMEC Americas Ltd. for Ivanhoe Mines Ltd., effective date 15 March, 2006
- Peters, B., Parker, H., Cinits, R., Haines, A., and David, D., 2007: Oyu Tolgoi Project, Technical Report: technical report prepared by GRD Minproc for Ivanhoe Mines Ltd., 30 March, 2007
- Peters, B., Torr, S., Jackson, S., Vann, J., Price, J., and David, D., 2008: Oyu Tolgoi Project, Technical Report: technical report prepared by AMEC Minproc for Ivanhoe Mines Ltd, effective date 28 March, 2008
- Peters, B., Jackson, S., Vann, J., Cullingham, O., Stephan, G.R., David, D., Chance, A., Jakubec, J., and Brown, B., 2010: Oyu Tolgoi Project, Technical Report: technical report prepared by AMEC Minproc for Ivanhoe Mines Ltd, effective date 4 June, 2010
- Peters, B., Jackson, S., Vann, J., Chance, A., Stephan, G.R., Jakubec, J., David, D., and Brown, B., 2010: Lookout Hill Property, Technical Report: technical report prepared by AMEC Minproc for Ivanhoe Mines Ltd, effective date 9 June, 2010
- Peters, B., Jackson, S., Chance, A., Jakubec, J., and David, D., 2012: IDOP Technical Report: technical report prepared by AMC Consultants for Ivanhoe Mines Ltd., effective date 29 March, 2012
- Peters, B., and Sylvester, S., 2014: 2014 Oyu Tolgoi Technical Report: technical report prepared by OreWin Pty Ltd for Turquoise Hill Resources Ltd., effective date 20 September, 2014
- Peters, B., and Sylvester, S., 2016: 2016 Oyu Tolgoi Technical Report: technical report prepared by OreWin Pty Ltd for Turquoise Hill Resources Ltd., effective date 14 October, 2016
- Thomas, M., Carlson, R., Dudley, J., Kolkert, R., 2020: Oyu Tolgoi 2020 Technical Report, Turquoise Hill Resources Ltd., Ömnögovi Aimag, Mongolia: report prepared by AMC Consultants for Turquoise Hill Resources Ltd., effective date 30 June, 2020.

3.0 RELIANCE ON OTHER EXPERTS

3.1 Introduction

The QPs have relied upon the following other expert reports, which provided information regarding mineral rights, surface rights, property agreements, royalties, taxation, and marketing sections of this Report.

3.2 Mineral Tenure

The QPs have not independently reviewed ownership of the Project area and any underlying property agreements, mineral tenure, surface rights, or royalties. The QPs have fully relied upon, and disclaim responsibility for, information derived from Entrée and legal experts retained by Entrée for this information through the following documents:

- Mahoney Liotta, 2017: Entrée LLC – Mongolian Mineral Licenses: memorandum prepared for Amec Foster Wheeler, 26 December, 2017, 74 p.
- Entrée Resources, 2017: Entrée/Oyu Tolgoi JV Project, Ömnögovi, Mongolia: memorandum prepared for Kirk Hanson, Amec Foster Wheeler, 17 December, 2017, 25 p.
- Entrée Resources, 2018: Entrée/Oyu Tolgoi JV Project, Ömnögovi, Mongolia: letter prepared for Kirk Hanson, Amec Foster Wheeler, 23 February, 2018, 2 p.
- Mahoney Liotta, 2021: Entrée LLC – Mongolian Mineral Licenses: memorandum prepared for Wood, 3 March 2021, 67 p.

This information is used in Section 4 and Section 19 of the Report. The information is also used in support of the Mineral Resource estimate in Section 14, the Mineral Reserve estimate in Section 15, the financial analysis in Section 22, and the 2021 PEA financial analysis in Section 24.1.9.

3.3 Environmental

The QPs have fully relied upon, and disclaim responsibility for, information supplied by Entrée and OTLLC staff and experts retained by OTLLC for information related to environmental (including tailings and water management) permitting and social and community impacts as follows:

- Oyu Tolgoi LLC: Feasibility Study; Chapter 13, Tailings; Chapter 14, Infrastructure: internal OTLLC report, April 2016.
- Oyu Tolgoi LLC: Environmental Social Impact Assessment: internal OTLLC report, August 2012.

This information is used in Section 20 of the Report and in Section 24.1.7 of the 2021 PEA. This information is also used in support of the Mineral Resource estimate in Section 14, the Mineral Reserve estimate in Section 15, the financial analysis in Section 22, and the 2021 PEA financial analysis in Section 24.1.9.

3.4 Taxation

The QPs have fully relied upon, and disclaim responsibility for, information supplied by experts retained by Entrée for information related to taxation as applied to the financial model as follows:

- PWC, 2020: Tax Comments on Conducting Activities in Mongolia: letter prepared for Duane Lo, Entrée Resources, 27 December, 2020, 14 p.

This information is used in support of the Mineral Reserve estimation in Section 15, the financial analysis in Section 22, and the 2021 PEA financial analysis in Section 24.1.8.

3.5 Markets

The QPs have not independently reviewed the marketing or smelter terms information. The QPs have fully relied upon, and disclaim responsibility for, information derived from OTLLC staff and experts retained by OTLLC for this information through the following documents:

- Oyu Tolgoi LLC, 2013: Base Data Template 31: Excel spreadsheet.
- Peters, B., 2014: Base Data Template 31: memorandum addressed to B Scheding, OTLLC, 3 March 2014, 7 p.
- Oyu Tolgoi LLC, 2020: Base Data Template 38: Excel spreadsheet.

This information is used in Section 19 of the Report and in Section 24.1.6 of the 2021 PEA. It is also used in support of the Mineral Reserves estimate in Section 15, the financial analysis in Section 22, and the 2021 PEA financial analysis in Section 24.1.9.

Concentrate market terms and conditions are a specialized business requiring knowledge of supply and demand of smelter capacity and concentrate types, as well as the terms and conditions of smelters for different quality of concentrate. This requires direct communication with smelters and an extensive database that is outside of the purview of a QP. The QPs consider it reasonable to rely upon OTLLC for such information because OTLLC has access to experts that likely have their own databases, or to experts who are involved in discussions with smelters and have arranged smelter agreements for production from the Oyu Tolgoi operations.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Introduction

The Entrée/Oyu Tolgoi JV Project is located in the South Gobi region of Mongolia, 570 km south of the capital city of Ulaanbaatar and 80 km north of the Mongolian border with China.

The Project is centred at approximately latitude 43°02′ N and longitude, 106°45′ E, or UTM coordinates 4,766,000 mN and 644,000 mE, with datum set to WGS-84, Zone 48N. The Hugo North Extension deposit is centred at approximately latitude 43°03′10′′ N and longitude 106°52′10′′ E. The Heruga deposit is centred at approximately latitude 42°58′00′′ N and longitude 106°48′36′′ E.

4.2 Property and Title in Mongolia

Mineral resources in Mongolia are the property of the state. The Minerals Law of Mongolia regulates the prospecting and exploration for and mining of minerals within the country's territory. Numerous other laws, guidelines, and procedures govern prospecting, exploration, and mining of minerals, including the Constitution of Mongolia, the Subsoil Law, the Common Minerals Law, the Land Law, the Investment Law, the Environmental Protection Law, the National Security Law and the Water and Forest Law, among others (US Geological Survey Minerals Yearbook, 2012; GTs Advocates, 2017).

Minerals are grouped into one of three classifications in Mongolia (Ernst and Young, 2015):

- Strategic minerals have the potential to affect the national security and economic and social development of the country at the national and regional levels; a deposit also is considered strategic if it accounts for, or has the potential to account for, greater than 5% of the total gross domestic profit (GDP) in a given year
- A common deposit consists of minerals whose concentrations are abundant in sediments and rocks and that might be used as construction materials
- A conventional deposit hosts minerals that are not of strategic importance and are not classifiable as common minerals.

On 8 July 2006, the Parliament of Mongolia (Parliament) enacted a new minerals law that became effective on 26 August 2006 (the Minerals Law), superseding and replacing the Minerals Law originally adopted in 1997. The Minerals Law has been amended a total of 34 times to the effective date of the 2021 legal opinion (Mahoney Liotta, 2021).

The Mineral Resources and Petroleum Authority of Mongolia (MRPAM) is the implementing agency of the Government of Mongolia (the GOM) that has the primary responsibility for implementing the policies of Mongolia (the State) with respect to the State's mineral resources.

MRPAM and its sub-divisions, including the Cadastre Division (the Cadastre Division), the Mining Production and Technology Division (the Mining Production and Technology Division), and the Geology and Exploration Division (the Geology and Exploration Division), regulate minerals mining licenses in Mongolia. Under the Minerals Law, exploration licences (ELs) and mining licenses (MLs) are issued directly by MRPAM and registered by the Cadastre Division.

4.2.1 Strategic Deposits

For strategic deposits, the Government of Mongolia may have a joint participation of up to 50% in a state-funded venture with a private person. Where the deposit has been defined through non-state funds, the Government of Mongolia may own up to 34% of the shares of an investment to be made by the licence holder (Ernst and Young, 2015).

To date, the GOM defined the borders of eight out of the 16 Strategic Deposits that have been specified to date as such by Parliament by a set of defined coordinates. The remaining eight Strategic Deposits (including the Oyu Tolgoi group of deposits) have no defined "edges." They each consist of concentrations of mineralization in a general area that is identified only by a name—not by a set of defined coordinates. Thus, it is not feasible to definitively determine whether or not any given license area is within, or overlaps with, a Strategic Deposit until the GOM defines the borders of all such deposits.

Pursuant to certain decrees of the Chairman of MRPAM, the deposits currently identified within the Javhlant and Shivee Tolgoi ML areas and any future deposits that may be subsequently identified within the Javhlant and Shivee Tolgoi ML areas (i.e., the area of land within the most recent latitude and longitude coordinates set forth in the endorsement pages of each of the mining licences) have been designated by the GOM to be a part of the Oyu Tolgoi group of deposits.

4.2.2 Mining Title

Exploration Licence

An exploration licence is valid for a three-year period with three three-year extensions, for a total of 12 years. Prior to expiry of the exploration licence, application can be made for conversion to a ML.

Mining Licence

Pursuant to the Minerals Law, a mining license is granted for an initial period of 30 years. A mining license holder may apply for an extension of such a license for two successive additional periods of 20 years. Thus, the maximum period that a mining license may be held by one or more holders is 70 years from the date of issue. Upon the expiration of the maximum period that a mining license may be held, the license and the rights under such license will revert to the State. A mining license is subject to cancellation if applicable license fees are not timely paid or other requirements of the Minerals Law, the Licensing Law of Mongolia dated 1 February 2001, or other relevant laws are not complied with (Mahoney Liotta, 2021).

A mining license holder has the right to conduct mining activities throughout the license area and to construct permanent structures within the license area related to its mining activities. All such activities must be conducted in compliance with the Minerals Law and relevant Mongolian laws pertaining to land use, health and safety, environmental protection and reclamation. In addition, the mining license holder may conduct mineral exploration activities within the license area.

4.2.3 Surface Rights

Mineral title does not convey surface rights. A land rights certificate must be obtained, and a land use agreement must be signed with the relevant provincial governor (GTs Advocates, 2017).

4.2.4 Mining Prohibitions

The Law on the Prohibition of Exploration and Mining of Minerals within the Area of the Headstreams of Rivers, Protected Areas Surrounding Water Bodies, and Forests (the Long-Named Law) and the Law on the Implementation of the Long-Named Law (the Implementation Law), were enacted in 2009. These laws authorize the GOM to revoke all minerals exploration and mining licenses located within the areas described in the law, which include areas located:

- Within 200 m of the headwaters of rivers and lakes;
- Within 200 m of a water reservoir area as defined in the Water Law of Mongolia dated 17 May 2012;
- Within 100 m of forest areas as defined in the Forest Law of Mongolia dated 17 May 2012.

These restrictions, however, do not apply to areas designated as Strategic Deposits.

4.2.5 Environmental Licencing

Holders of mineral tenure have obligations under the Mineral Law of Mongolia with regards to environmental protection. Licence holders must deposit 50% of their environmental protection budget into an escrow account. Funds that are not used are returned to the licence holder (Ernst and Young, 2015).

4.2.6 Royalty

The Minerals Law provides for the payment of a royalty for the exploitation of a mineral resource (the regular royalty). In general, the (i) mineral license holder, (ii) minerals exporter, and (iii) entity which sold gold to the Bank of Mongolia or commercial bank authorized by the Bank of Mongolia are expected to pay the regular royalty.

The regular royalty is calculated based on the sales value of all extracted products sold or loaded to be sold, exported, and of all products utilized at a base rate of two point five to five percent (2.5–5%), depending on the type of mineral. A laboratory analysis is performed on minerals and mineral products sold domestically and internationally to determine the minerals’ grade and percentage, characteristics, and classification. For mineral products other than coal, the regular royalty is imposed on the primary product and each secondary metal and mineral by-products based on the net grade and percentage of the primary product determined by laboratory analysis and the costs for smelting, processing, refining, and transporting, as well as other operational costs, will not be deducted from the sales value of the primary product. The regular royalty is not double-charged when purchased from the domestic market and directly exported or exported after increasing the commercial grade by producing concentrate.

In addition, an additional royalty amount will be payable depending on the increase in market value and the degree of processing of the product (the surtax royalty). The Minerals Law provides that the applicable regular royalty rate for gold sold to the Bank of Mongolia or commercial banks authorized by the Bank of Mongolia is 5%, and no surtax royalty is charged. The applicable surtax royalty for secondary metals and mineral by-products of mineral products other than coal shall be imposed at a rate applicable to the "Products" classification of the processing degree. The applicable regular royalty rate for copper, silver, molybdenum, and exported gold is 5%. In addition, surtax royalty at the rates displayed in Table 4-1 are imposed for copper, silver, molybdenum, and exported gold, depending on the market prices of such products.

The Minerals Law also provides that the State may be an equity participant with any private legal entity, up to a 50% equity interest, in the exploitation of any Strategic Deposit where the deposit reserves (quantity and grade) have been determined by exploration deemed to have been funded from the State Budget.

The percentage of the State's equity interest is determined by an agreement negotiated between the GOM (acting through a State-owned entity) and the private legal entity based on the amount of investment made or deemed to have been made by the State. If the reserves of a Strategic Deposit were determined by activities that were not funded from the State Budget, the law provides that the State may participate in the exploitation of the deposit to the extent of up to a 34% equity interest.

The State's right to obtain an equity interest in a Strategic Deposit may be replaced by a royalty to be paid by the license holder for exploiting the Strategic Deposit (a special royalty), the percentage or amount of which is to be determined by the GOM on a case by case basis, but which will not exceed 5%. The special royalty is paid in addition to the regular royalty and, if applicable, a surtax royalty.

4.3 Project Ownership

4.3.1 Ownership History

In 2002, Entrée entered into an option agreement with a private Mongolian mining company to acquire the Shivee Tolgoi and Javhlant exploration licences in Ömnögovi, Mongolia.

Table 4-1: Surtax Royalty

Types of Mineral	Unit of measurement	Reference Products	Future Market Price (US$)	Surtax Royalty Rates in %, Based on the Degree of Processing		
				Ore	Concentrate	Product
Gold	Ounce	Gold (chemically pure)	0-900	—	—	0.00
			900-1,000			1.00
			1,000-1,100			2.00
			1,100-1,200			3.00
			1,200-1,300			4.00
			1,300 and above			5.00
Copper	Ton	Copper (pure metal)	0-5,000	0.00	0.00	0.00
			5,000-6,000	22.0	11.0	1.00
			6,000-7,000	24.0	12.0	2.00
			7,000-8,000	26.0	13.0	3.00
			8,000-9,000	28.0	14.0	4.00
			9,000 and above	30.0	15.0	5.00
Silver	Ounce	Silver (chemically pure)	0-25	—	—	0.00
			25-30			1.00
			30-35			2.00
			35-40			3.00
			40-45			4.00
			45 and above			5.00
Molybdenum	Ton	Molybdenum	0-35,000	0.00	0.00	0.00
			35,000-40,000	1.00	0.80	0.50
			40,000-45,000	2.00	1.60	1.00
			45,000-50,000	3.00	2.40	1.50
			50,000-55,000	4.00	3.20	2.00
			55,000 and above	5.00	4.00	2.50

The private Mongolian company was originally awarded the exploration licences by the Mongolian Government during March–April, 2001. In September 2003, Entrée and its wholly owned Mongolia subsidiary Entrée LLC entered into a purchase agreement with the private Mongolian company and its affiliate which replaced the option agreement. The Shivee Tolgoi exploration licence was transferred to Entrée LLC on October 28, 2003 and the Javhlant exploration licence was transferred on September 30, 2003.

The Shivee Tolgoi and Javhlant exploration licences were converted to MLs in October, 2009. The Shivee Tolgoi ML underwent an area reduction of 12,059.99 ha in October, 2015.

4.3.2 Current Ownership

Entrée's current ownership interest in the Entrée/Oyu Tolgoi JV Project is outlined in Figure 4-1.

4.4 Mineral Tenure

4.4.1 Shivee Tolgoi and Javhlant Mining Licences

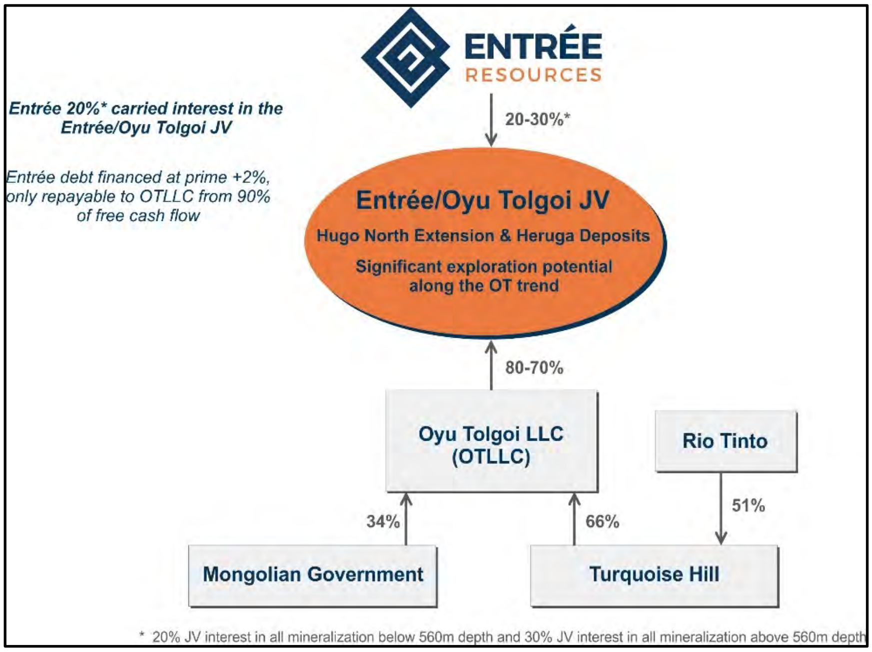
The Project comprises two MLs, Shivee Tolgoi (ML 15226A) and Javhlant (ML 15225A), which cover a total of about 62,920 ha and completely surround OTLLC's Oyu Tolgoi ML. The Shivee Tolgoi ML and Javhlant ML are held by Entrée's wholly-owned Mongolian subsidiary, Entrée LLC.

The mineral tenure listed in Table 4-2 and shown in Figure 4-2 comprises the Entrée/Oyu Tolgoi JV Project. Table 4-2 provides the co-ordinates of the boundary points shown in Figure 4-2 for the Entrée/Oyu Tolgoi JV property and Table 4-4 provides the boundary information for the Shivee West property.

The Shivee Tolgoi and Javhlant MLs are currently divided as follows:

- Entrée/Oyu Tolgoi JV property: 39,807 ha consisting of the eastern portion of the Shivee Tolgoi ML and all of the Javhlant ML (collectively referred to as the Entrée/Oyu Tolgoi JV property) are subject to a joint venture between Entrée and OTLLC. The Entrée/Oyu Tolgoi JV property is contiguous with, and on three sides (to the north, east, and south) surrounds OTLLC's Oyu Tolgoi ML. The Entrée/Oyu Tolgoi JV property hosts the Hugo North Extension deposit and most of the Heruga deposit, and several exploration targets. OTLLC is the manager of the Entrée/Oyu Tolgoi JV. Through various agreements, Rio Tinto has assumed management of the building and operation of Oyu Tolgoi, including the Hugo North Extension deposit. Rio Tinto will also manage any development of the portion of the Heruga deposit on the Entrée/Oyu Tolgoi JV property. Exploration operations on behalf of OTLLC, including exploration on the Entrée/Oyu Tolgoi JV property, are conducted under Rio Tinto's supervision

Figure 4-1: Ownership Interest



Note: Figure courtesy Entrée, 2017.

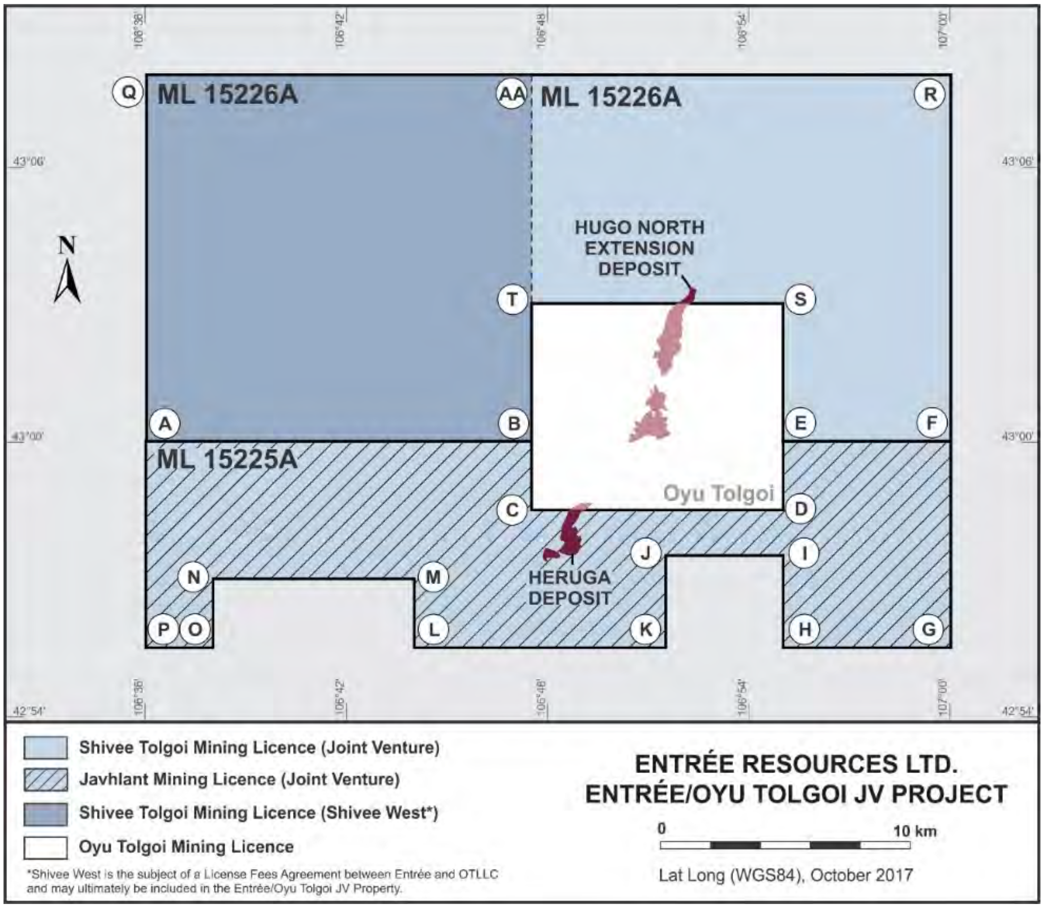
Table 4-2: Entrée/Oyu Tolgoi JV Project Mineral Tenure Table

Licence Number	Licence Name	Licence Type [2]	Total Area of Licence (ha)	Licence Award Date	Licence Expiry Date [1]	Date of Annual Licence Payment	Annual Licence Payment (US$) [3,6]
15226A	Shivee Tolgoi	Mining	42,592.6 [4]	27/10/09	27/10/39	27/10/09	638,889
15225A	Javhlant	Mining	20,327.4	27/10/09	27/10/39	27/10/09	304,911
Total	—	—	**62,920.0**	—	—	—	**943,800**

Notes:

1. Date that the initial 30-year term will expire. Two additional 20 year terms can be granted.
2. The Javhlant and Shivee Tolgoi exploration licences were converted to MLs on October 27, 2009. Fees must be paid prior to the anniversary date.
3. The total estimated annual fees to maintain the licences in good standing are approximately US$944,000.
4. ML fees were revised in February 2015 from US$15/ha to MNT21,750/ha. Despite the revised licence fees, Entrée and Oyu Tolgoi LLC continue to pay the stabilised rate of US$15/ha.
5. The Shivee Tolgoi ML was reduced by 12,059.99 ha in October 2015.
6. Entrée LLC invoices Oyu Tolgoi LLC for the annual fees in accordance with the License Fees Agreement.

Figure 4-2: Entrée/Oyu Tolgoi JV Project Area



Note: Figure courtesy Entrée, 2017. Letters on figure correspond to the boundary co-ordinates in Table 4-2 and Table 4-3.

Table 4-3: Entrée/Oyu Tolgoi JV Property Boundary Co-ordinates

Mining Licence	Point ID	Latitude / Longitude (WGS-84 (MONREF-97))		UTM (WGS-84, Zone 48N)	
		Latitude (N)	Longitude (E)	Easting (m)	Northing (m)
15226A Shivee Tolgoi ML (eastern portion only)	AA	43° 08′ 1.4″	106° 47′ 31.4″	645,752.90	4,777,222.00
	R	43° 08′ 1.4″	107° 00′ 1.5″	662,698.85	4,777,606.89
	F	43° 00′ 1.38″	107° 00′ 1.49″	663,051.79	4,762,799.00
	E	43° 00′ 1.39″	106° 55′ 1.43″	656,257.87	4,762,640.85
	S	43° 03′ 1.39″	106° 55′ 1.43″	656,131.02	4,768,193.51
	T	43° 03′ 1.39″	106° 47′ 31.44″	645,950.61	4,767,968.55
15225A Javhlant ML	A	43° 00′ 1.37″	106° 36′ 1.43″	630,446.14	4,762,099.72
	B	43° 00′ 1.38″	106° 47′ 31.43″	646,068.97	4,762,415.58
	C	42° 58′ 31.35″	106° 47′ 31.48″	646,129.37	4,759,638.32
	D	42° 58′ 31.35″	106° 55′ 1.48″	656,322.33	4,759,863.28
	E	43° 00′ 1.39″	106° 55′ 1.43″	656,257.87	4,762,640.85
	F	43° 00′ 1.38″	107° 00′ 1.49″	663,051.79	4,762,799.00
	G	42° 55′ 31.39″	107° 00′ 1.53″	663,250.93	4,754,470.41
	H	42° 55′ 31.34″	106° 55′ 1.48″	656,449.01	4,754,310.44
	I	42° 57′ 31.35″	106° 55′ 1.48″	656,364.58	4,758,012.45
	J	42° 57′ 31.35″	106° 51′ 31.49″	651,606.78	4,757,905.58
	K	42° 55′ 31.35″	106° 51′ 31.48″	651,688.44	4,754,203.86
	L	42° 55′ 31.35″	106° 44′ 1.48″	641,487.14	4,753,986.00
	M	42° 57′ 1.36″	106° 44′ 1.49″	641,430.13	4,756,762.59
	N	42° 57′ 1.37″	106° 38′ 1.48″	633,272.23	4,756,599.51
	O	42° 55′ 31.36″	106° 38′ 1.48″	633,326.19	4,753,822.92
	P	42° 55′ 31.36″	106° 36′ 1.48″	630,605.88	4,753,770.63

Note: The first point for each ML corresponds with the northwestern corner of the licence area; remaining points are cited in a clockwise direction.

Table 4-4: Shivee West 100% Entrée Area Boundary Co-ordinates

Mining Licence	Point ID	Latitude / Longitude (WGS-84 (MONREF-97))		UTM (WGS-84, Zone 48N)	
		Latitude (N)	Longitude (E)	Easting (m)	Northing (m)
15226A Shivee Tolgoi ML (western portion only: Shivee West)	Q	43° 08′ 1.38″	106° 36′ 1.43″	630,163.65	4,776,907.04
	AA	43° 08′ 1.4″	106° 47′ 31.4″	645,752.90	4,777,222.00
	B	43° 00′ 1.38″	106° 47′ 31.43″	646,068.97	4,762,415.58
	A	43° 00′ 1.37″	106° 36′ 1.43″	630,446.14	4,762,099.72

Note: The first point ('Q') corresponds with the northwestern corner of the ML; remaining points are cited in a clockwise direction.

- Shivee West property: 23,114 ha comprising the western portion of the Shivee Tolgoi ML. While the Shivee West property is currently 100% owned by Entrée, since 2015 it has been subject to a License Fees Agreement between Entrée and OTLLC, and may ultimately be included in the Entrée/Oyu Tolgoi JV property. OTLLC also has a first right of refusal with respect to any proposed disposition by Entrée of an interest in the Shivee West property.

4.4.2 Reserve Report and Feasibility Study

OTLLC must submit (on behalf of OTLLC and Entrée) an updated reserve report and feasibility study, prepared by authorised consultants, to the Mongolian Minerals Council (MMC) every five years. The MMC must accept the report for the MLs to remain current.

OTLLC submitted a reserve report to the MMC in July 2014, and an updated feasibility study, the 2014 Oyu Tolgoi Feasibility Study, in August 2014. A revised feasibility study was filed by OTLLC in March 2015, subsequently updated by OTLLC with the MMC in August 2015, and completed in May 2016 (the 2016 Feasibility Study).

In the first quarter 2020, OTLLC submitted an updated reserve report to the MMC and in July 2020 OTLLC completed a third feasibility study update (the 2020 Feasibility Study). The expert review of the updated reserve report is in progress and the 2020 Feasibility Study is expected to be considered for endorsement following acceptance of the updated reserve report.

4.4.3 Boundary Surveys

The original MLs were legally surveyed in October 2007 by Aerogeodez from Ulaanbaatar and the corners marked with steel posts. The adjacent Oyu Tolgoi ML was legally surveyed in August 2002 by Surtech International Ltd. using the internationally-recognised survey datum WGS-84, Zone 48N.

In September 2004, Geomaster Co. Ltd. (Geomaster), a licenced Mongolian land survey company, re-surveyed the Oyu Tolgoi ML corner points based on the official Mongolian survey datum 'MSK42' and marked the corners with concrete and steel pylons. In November 2004, Geomaster also surveyed the northern boundary between the Oyu Tolgoi ML and the Shivee Tolgoi ML, and marked it with wooden posts at 250–500 m intervals.

In September 2011, Geomaster completed another survey of the Shivee Tolgoi and Javhlant MLs using the newly-instated official Mongolian survey datum MONREF-97. During this survey, the corner posts were checked for accuracy as compared to the new MONREF-97 coordinates released by the Cadastre Office earlier in 2010. As of mid-November 2011, all posts were cemented in place for the Shivee Tolgoi and Javhlant MLs.

In November 2015, Geocad LLC officially surveyed and cemented new boundary posts along the new westernmost boundary of the Shivee Tolgoi ML after the licence area was voluntarily reduced in October 2015.

4.4.4 Regulations Compliance

All phases of Entrée's activities are subject to the Minerals Law of Mongolia, Land Law, the Law on Environmental Protection, and various Taxation Laws.

In Mongolia, exploration requires filing an annual exploration work plan at the beginning of the year and provision of a summary report to the local soum. The Entrée/Oyu Tolgoi JV Project is affiliated with two soums, Khanbogd and Bayan-Ovoo. A second report that includes a discussion of environmental impacts must also be filed upon the conclusion of exploration activities. In addition, companies are required to post a bond equal to 50% of the total estimated cost of any anticipated environmental reclamation, which is refunded upon completion of the reclamation work.

A copy of the environmental plan must be delivered to the local soum (but is not approved by the soum) and the environmental bond is placed with a soum government account. Mining licences require further environmental and social studies in the form of an environmental impact assessment (EIA) and annual environmental protection plan (EPP) when the licence is granted. The soums must also be compensated for water and road usage. Such payments are computed at the end of each calendar year based on the extent of use. Even if Entrée relinquishes its licences, it remains responsible for any required reclamation. Entrée has advised Wood that at the effective date of this Report, it is in compliance with all environmental requirements.

There are no towns or villages within the Entrée/Oyu Tolgoi JV Project. The area may be used by nomadic herders.

4.5 Entrée/Oyu Tolgoi Joint Venture Agreements

On October 15, 2004, Entrée entered into an arm's-length Equity Participation and Earn-In Agreement (the Earn-In Agreement) with Ivanhoe Mines Ltd. (Ivanhoe Mines, now Turquoise Hill). Under the Earn-In Agreement, Turquoise Hill agreed to purchase equity securities of Entrée, and was granted the right to earn an interest in the Entrée/Oyu Tolgoi JV property.

On November 9, 2004, Turquoise Hill and Entrée entered into an Amendment to Equity Participation and Earn-In Agreement, which appended the form of joint venture agreement (JVA) that the parties were required to enter into on the date upon which the aggregate earn-in expenditures incurred by Turquoise Hill equalled or exceeded the amount of earn-in expenditures required in order for Turquoise Hill to earn the maximum participating interest available (80%).

On March 1, 2005, the majority of Turquoise Hill's rights and obligations under the Earn-In Agreement were assigned by Turquoise Hill to what was then its wholly-owned subsidiary, Ivanhoe Mines Mongolia Inc. XXK (now OTLLC). The Government of Mongolia (through Erdenes Oyu Tolgoi LLC) subsequently acquired from Turquoise Hill a 34% interest in OTLLC, which is also the title holder of the Oyu Tolgoi ML located adjacent to, and surrounded by, the Project.

On June 30, 2008, OTLLC gave notice to Entrée that it had completed the earn-in expenditures required in order to earn the maximum participating interest available. As a consequence, a joint venture was formed, with OTLLC having an initial joint venture participating interest of 80%, and Entrée having an initial joint venture participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the initial participating interest of OTLLC is 70% and the initial participating interest of Entrée is 30%.

By letter to OTLLC of July 4, 2008, Entrée confirmed the formation of the Entrée/Oyu Tolgoi joint venture (Entrée/Oyu Tolgoi JV). Although the JVA has not been formally executed, Entrée considers that the Entrée/Oyu Tolgoi JV is operating in accordance with the terms of the JVA appended to the Amendment to Equity Participation and Earn-In Agreement. OTLLC is the manager of the Entrée/Oyu Tolgoi JV.

On December 8, 2010, the Rio Tinto subsidiary Rio Tinto International Holdings Limited (also referred to as Rio Tinto) and Turquoise Hill entered into a Heads of Agreement (the Heads of Agreement), which provides for the management structure of OTLLC and the project management structure of the Oyu Tolgoi project, among other things. Under the Heads of Agreement, Rio Tinto is responsible for management of the building and operation of the Oyu Tolgoi project, which includes the Heruga and Hugo North Extension deposits on the Entrée/Oyu Tolgoi JV property. In addition, on April 18, 2012, Rio Tinto announced that it had signed a memorandum of agreement with Turquoise Hill under which Rio Tinto assumed responsibility for all exploration operations on behalf of OTLLC, including exploration on the Entrée/Oyu Tolgoi JV property.

On October 1, 2015, Entrée and Entrée LLC entered into a License Fees Agreement with OTLLC, under which the parties agreed to negotiate in good faith to amend the JVA to include the Shivee West property in the definition of Entrée/Oyu Tolgoi JV property. The parties also agreed that the annual licence fees for the Shivee West ML would be for the account of each joint venture participant in proportion to their respective joint venture participating interests, with OTLLC contributing Entrée's 20% share as a loan. To date, no definitive amended JVA has been entered into, and Entrée retains a 100% interest in the Shivee West property.

In addition, under the JVA, OTLLC has a right of first refusal with respect to any proposed disposition by Entrée of an interest in the Shivee West property.

4.6 Oyu Tolgoi Investment Agreement

On October 6, 2009, Turquoise Hill, OTLLC, and Rio Tinto signed an investment agreement (Oyu Tolgoi Investment Agreement) with the Mongolian Government, which regulates the relationship among the parties and stabilizes the long-term tax, legal, fiscal, regulatory and operating environment to support the development of the Oyu Tolgoi project. The Oyu Tolgoi Investment Agreement took legal effect on March 31, 2010.

The Oyu Tolgoi Investment Agreement specifies that the Government of Mongolia will own 34% of the shares of OTLLC (and indirectly by extension, 34% of OTLLC's interest in the Entrée/Oyu Tolgoi JV property) through its subsidiary Erdenes Oyu Tolgoi LLC. A shareholders' agreement was concurrently executed to establish the Government's 34% ownership interest in OTLLC and to govern the relationship among the parties.

Although the contract area defined in the Oyu Tolgoi Investment Agreement includes the Javhlant and Shivee Tolgoi MLs, Entrée is not a party to the Oyu Tolgoi Investment Agreement, and does not have any direct rights or benefits under the Oyu Tolgoi Investment Agreement.

OTLLC agreed, under the terms of the Earn-In Agreement, to use its best efforts to cause Entrée to be brought within the ambit of, made subject to and to be entitled to the benefits of the Oyu Tolgoi Investment Agreement or a separate stability agreement on substantially similar terms to the Oyu Tolgoi Investment Agreement. Entrée has been engaged in discussions with stakeholders of the Oyu Tolgoi project, including the Government of Mongolia, OTLLC, Erdenes Oyu Tolgoi LLC, Turquoise Hill and Rio Tinto, since February 2013. The discussions to date have focused on issues arising from Entrée's exclusion from the Oyu Tolgoi Investment Agreement, including the fact that the Government of Mongolia does not have a full 34% interest in the Entrée/Oyu Tolgoi JV property; the fact that the MLs integral to future underground operations are held by more than one corporate entity; and the fact that Entrée does not benefit from the stability that it would otherwise have if it were a party to the Oyu Tolgoi Investment Agreement. No agreements have been finalized.

The Oyu Tolgoi Investment Agreement provides that OTLLC will pay an annual mining licence fee of US$15.00/ha of mining area granted under a mining license, and stabilized. On January 23, 2015, the Parliament of Mongolia approved an amendment to the Minerals Law of Mongolia to express the annual mining licence fee in tugriks (MNT21,750/ha). Notwithstanding the amendment, Entrée and OTLLC agreed that they would continue to pay an annual mining licence fee for the Shivee Tolgoi and Javhlant MLs at the stabilized rate of US$15.00/ha.

The annual licence fees have been paid as required.

4.7 Government Resolutions

Under Resolution No 57 dated July 16, 2009 of the State Great Khural, the Oyu Tolgoi series of deposits were declared to be Strategic Deposits. The Ministry of Mining has advised Entrée that it considers the deposits on the Entrée/Oyu Tolgoi JV property to be part of the series of Oyu Tolgoi deposits.

In June 2010, the Government of Mongolia passed Resolution 140, the purpose of which is to authorize the designation of certain land areas for “state special needs” within certain defined areas, some of which include or are in proximity to the Oyu Tolgoi project. These state special needs areas are to be used for Khanbogd village development and for infrastructure and plant facilities necessary in order to implement the development and operation of the Oyu Tolgoi project. A portion of the Shivee Tolgoi ML is included in the land area that is subject to Resolution 140.

In June 2011, the Government of Mongolia passed Resolution 175, the purpose of which is to authorize the designation of certain land areas for “state special needs” within certain defined areas in proximity to the Oyu Tolgoi project. These state special needs areas are to be used for infrastructure facilities necessary in order to implement the development and construction of the Oyu Tolgoi project. Portions of the Shivee Tolgoi and Javhlant MLs are included in the land area that is subject to Resolution 175.

It is expected, but not yet formally confirmed by the Government, that to the extent that a consensual access agreement exists or is entered into between OTLLC and an affected licence holder, the application of Resolution 175 to the land area covered by the access agreement will be unnecessary. OTLLC has existing access and surface rights to the Entrée/Oyu Tolgoi JV property pursuant to the Earn-In Agreement. If Entrée LLC is unable to reach a consensual arrangement with OTLLC with respect to Shivee West, or Shivee West is not included in the definition of Entrée/Oyu Tolgoi JV property in the JVA, Entrée LLC’s right to use and access a corridor of land included in the state special needs areas for a proposed power line may be adversely affected by the application of Resolution 175. While the Mongolian Government would be responsible for compensating Entrée LLC in accordance with the mandate of Resolution 175, the amount of such compensation is not presently quantifiable.

The Oyu Tolgoi Investment Agreement contains provisions restricting the circumstances under which the Shivee Tolgoi and Javhlant MLs may be expropriated. As a result, Entrée considers that the application of Resolution 140 and Resolution 175 to the Entrée/Oyu Tolgoi JV property will likely be considered unnecessary.

In March 2014, the Government of Mongolia passed Resolution 81, the purpose of which is to approve the direction of the railway line heading from Ukhaa Khudag deposit located in the territory of Tsogttsetsii soum, Umnugobi aimag, to the port of Gashuunshukhait and to appoint the Minister of Roads and Transportation to develop a detailed engineering layout of the base structure of the railway. On June 18, 2014, Entrée

LLC was advised by the Mineral Resources and Petroleum Authority of Mongolia (MRPAM) that the base structure overlaps with a portion of the Javhlant ML. By Order No. 123 dated June 18, 2014, the Minister of Mining approved the composition of a working group to resolve matters related to the holders of licences through which the railway passes. The Minister of Mining has not yet responded to a request from Entrée LLC to meet to discuss the proposed railway, and no further correspondence from MRPAM or the Minister of Mining has been received. It is not yet clear whether the State has the legal right to take a portion of the Javhlant ML, with or without compensation, in order to implement a national railway project, and if it does, whether it will attempt to exercise that right.

In March 2017, the Government of Mongolia passed Resolution 88, the purpose of which is to accelerate the establishment of a copper concentrate processing plant. On August 21, 2017, Entrée LLC received a letter from the State Secretary of the Ministry of Mining and Heavy Industry, advising that 150 ha of land covered by the Javhlant ML is required for a plant to be built between the proposed railway lines from the Oyu Tolgoi mine site to Tavantolgoi–Gashuunshukhait. A response was sent from OTLLC on behalf of both joint venture participants. No further correspondence from the State Secretary has been received.

4.8 Royalties and State Participation

The Minerals Law provides for the payment of a royalty for exploitation of a mineral resource (the regular royalty). In general, the regular royalty is calculated on the basis of the sales value of all extracted products sold or loaded to be sold, and of all products utilized. Depending on the type of mineral, the regular royalty ranges from a base rate of 2.5% to 5%. In addition, an additional royalty amount may be payable depending on the market value in excess of a designated base value of the relevant product (the surtax royalty).

The Minerals Law provides that the applicable regular royalty rate for gold sold to the Bank of Mongolia or commercial banks authorized by the Bank of Mongolia is 2.5% and no surtax royalty is charged. The applicable regular royalty rate for copper, silver, molybdenum and exported gold is 5%. The potentially applicable surtax royalty rates for copper, silver, molybdenum and exported gold are provided in Table 4-1.

If the State is an equity participant in the exploitation of a Strategic Deposit, the licence holder is permitted to negotiate with the Government of Mongolia to exchange the

Government's equity interest in the licence holder for an additional royalty payable to the Government (a special royalty), the percentage or amount of which would vary depending on the particulars of the Strategic Deposit, but which cannot exceed 5%. The special royalty would be paid in addition to the regular royalty and, if applicable, a surtax royalty.

4.9 Permitting Considerations

Permitting considerations are presented in Section 20.

4.10 Environmental Considerations

Environmental considerations are presented in Section 20.

4.11 Social License Considerations

Social licence considerations are presented in Section 20, and are also discussed briefly in Section 4.4.4.

4.12 Comments on Section 4

Information from Entrée and experts retained by Entrée supports the following:

- The MLs are valid, and are in good standing. The MLs are not subject to outstanding liens or encumbrances, and are not pledged in any way
- To the extent known to the QP, there are no other significant factors and risks that may affect access, title or right or ability to perform work on the Project that are not discussed in this Report.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 Accessibility

5.1.1 Road

The Entrée/Oyu Tolgoi JV Project can be accessed on a paved road to Mandalgovi and from there via an unpaved road to the Project area, which is an eight-hour drive under normal conditions.

An access road from the Oyu Tolgoi area to the Mongolian–Chinese border crossing at Gashuun Sukhait has been upgraded. The total length of 105 km from the North gatehouse to the Mongolia–China border is a public road.

On the Chinese side of the border, a provincial road connects the border town of Ganqimaodao with the Jingzang Expressway via the towns of Hailiutu and Wuyuan, providing a direct road link between the Mongolian border crossing at Gashuun Sukhait and the Trans-China Railway system.

5.1.2 Air

Ulaanbaatar has an international airport. The municipalities of Mandalgovi, Dalanzadgad, and Tsogttsetsii have regional airports. A permanent domestic airport, Khanbumbat, has been constructed at Oyu Tolgoi, 11 km north of the Oyu Tolgoi camp area, that serves as regional airport for the Khanbogd soum, and supports the transport of people and goods to the site from Ulaanbaatar. The closest regional airport in China is at Hohhot.

5.1.3 Rail

The Trans-Mongolian Railway crosses the Mongolia–China border approximately 420 km east of the property, traversing the country from south-east to north-west through Ulaanbaatar to the border with Russia. At the Mongolia–China border, the rail gauge changes from the Russian standard to the Chinese standard. There is currently no access from the Project site to the rail line within Mongolia, except along a 330 km long desert trail northeast to Sainshand.

A standard gauge, 220 km long, railway is under construction by the Government of Mongolia from the Tavan Tolgoi coal project to the Chinese border at Gashuun Sukhait and will pass through the southwest corners of the Shivee Tolgoi and Javhlant MLs. Railway construction is currently halted.

5.1.4 Port

OTLLC will make use of the Chinese Port of Tianjin, some 150 km southeast of Beijing, to import freight from overseas. The port is open year-round and has no ice restrictions during winter.

5.2 Climate

The South Gobi region has a continental, semi-desert climate, with the following climatic features noted in the Oyu Tolgoi area:

- Air temperatures range from an extreme maximum of about 50°C to an extreme minimum of about –34°C. The typical air temperature in winter fluctuates between +6°C and -21°C
- The minimum recorded ground temperature is –22°C and the maximum is +40°C
- The average relative humidity ranges from 18.7% in May to 53.3% in January. Daily relative humidity can have considerable variation
- Average annual precipitation is 57 mm/a, 90% of which falls as rain and the rest as snow. Snowfall accumulations rarely exceed 50 mm. Maximum rainfall events of up to 44 mm/h for a 1-in-10 year, 10-minute storm event have been recorded. In an average year, rainfalls occur on only 19 days, and snow falls on 10–15 days. Local records indicate that thunderstorms are likely to occur from 2–8 days each year at Oyu Tolgoi
- Wind is usually present, predominantly from the north. Very high winds are accompanied by sandstorms that often severely reduce visibility for several hours at a time. Winter snowstorms and blizzards with winds up to 40 m/s occur in the Gobi region about 5–8 days a year. Spring dust storms are far more frequent, and these can continue through June and July.

Mining operations are conducted year-round. Exploration activities can see short curtailments during storm activity.

5.3 Local Resources and Infrastructure

Although the local towns can provide the most basic mining and exploration needs for the early stages of exploration and project development (including basic labour requirements, food and other supplies), the majority of mining-related equipment and services for more advanced projects must be obtained from Ulaanbaatar or other locations in Asia. Dalanzadgad is considered a suitable centre for regional recruiting and training of staff for the Oyu Tolgoi operations.

Additional information on local resources and infrastructure for the mining operation is presented in Section 18.

5.3.1 Shivee West Exploration Facilities

Currently, Entrée does not maintain any site infrastructure or other facilities in the Shivee Tolgoi property.

5.4 Physiography

The Project elevation ranges from about 1,160 to 1,450 masl. Surface elevations in the area of the Hugo North Extension deposit range from about 1,160–1,180 masl, and at Heruga, the elevations are about 1,160–1,170 masl.

The topography varies from flat gravel-covered plains interspersed with fields of plant-stabilized, hummocky sand dunes that are about a metre in height, to rocky, rugged low hills and ridges that can reach 60 m in height. Scattered, small rock outcrops and colluvial talus are widespread within the northern, western, and southern parts of the property.

Numerous ephemeral streams cross the Project area, and flow for short periods immediately after rainfall. Water is widely available from shallow wells, while generally saline, the water is suitable for industrial uses such as drilling.

The flora in the Project area has been classified as representative of the eastern region of the Gobi Central Zone within the Central Asian Greater Zone. Vegetation tends to be homogenous across the Eastern Gobi Desert Steppe and consists of drought-tolerant shrubs and thinly distributed low grasses. Four rare plant species occur within the ML areas. Some shrubs are used for cooking and heating fires in ger dwellings. However, pressure from human use is lower near Oyu Tolgoi due to the low population density.

Vegetation in the region serves as wildlife habitat and food source for migrating wildlife and livestock.

The land surrounding the ML areas is predominantly used for nomadic herding of goats, camels, horses, and sheep by small family units. Use is based on informal traditional Mongolian principles of shared grazing rights with limited land tenure for semi-permanent winter shelters and other improvements. Initiation of the OTLLC Herder Support Program has reduced the incidence of land use conflict between current mineral exploration and grazing practices. The Project intends to maintain coexistence of traditional grazing practices and mineral development, except where there is a risk to public safety or livestock.

5.5 Seismicity

The seismicity of eastern Mongolia is generally low. The nearest known active seismo-tectonic zone to the Project site is the Mongolian Altai, approximately 50 km to 100 km to the west. Probabilistic and deterministic methods of analysis of available data concluded that the seismic risk for the Oyu Tolgoi area is low.

5.6 Comments on Section 5

There is sufficient suitable land available within the Project area for any tailings disposal, mine waste disposal, and installations such as a process plant and related mine infrastructure that might be needed to support a mining operation.

Infrastructure supporting the Oyu Tolgoi mining operation that will be used when mining Hugo North Extension Lift 1 is discussed in Section 16 to Section 18, and Section 23. Proposed infrastructure to support the 2021 PEA is discussed in Section 24.

A review of the power and water sources, manpower availability, and transport options (see Sections 18 and 20; and Section 24.1.5 for the 2021 PEA), indicates that there are reasonable expectations that sufficient labour and infrastructure will continue to be available to support declaration of Mineral Resources, Mineral Reserves, and the proposed life-of-mine (LOM) plan.

6.0 HISTORY

6.1 Exploration History

A summary of the exploration and development activities completed to date in the Oyu Tolgoi area is provided in Table 6-1. A detailed history of the exploration conducted on the Entrée holdings is provided in Section 9.

6.2 Production

There has been no production to date from the Project that is the subject of this Report.

OTLLC has an operating open pit mine at Oyut within the Oyu Tolgoi ML; however, this mining operation is outside the Entrée/Oyu Tolgoi JV Project area.

Table 6-1: Project History

Year	Company	Current Area	Work Undertaken
1980s	Joint Mongolian and Russian geochemical survey team	Oyu Tolgoi ML	Identified a Mo anomaly over the Central zone of the Oyut deposit.
1983	Garamjav	Oyu Tolgoi ML, Shivee Tolgoi and Javhlant MLs	Regional reconnaissance.
1996	Magma Copper Company	Oyu Tolgoi ML, Shivee Tolgoi and Javhlant MLs	Identified a porphyry copper leached cap over the Central zone. Magma Copper taken over by BHP.
1996–1998	BHP	Shivee Tolgoi and Javhlant MLs	Preliminary geological investigations and some reconnaissance geophysical surveys.
1997–1998	BHP	Oyu Tolgoi ML	Geophysical surveying, including airborne magnetometer survey and induced polarization (IP) survey using a single gradient array. geological, geochemical surveys, core drilling, initial Mineral Resource estimate.
1999	Ivanhoe Mines	Oyu Tolgoi ML	Acquired Oyu Tolgoi project.
2000–2001	Ivanhoe Mines	Oyu Tolgoi ML	RC drilling of supergene mineralization at Central; discovered Southwest zone through core drilling.
2001	Mongol Gazar	Shivee Tolgoi and Javhlant MLs	Awarded the Javhlant, Togoot and Shivee Tolgoi exploration licences by the Mongolian Government in March–April, 2001. Grid surveying, soil sampling and shallow gradient-type IP geophysical surveys. This work was primarily in the area of Zones I and III in the western portion of the Shivee Tolgoi Licence.
2002	Ivanhoe Mines	Oyu Tolgoi ML	Discovery of Hugo Dummett deposit, core drilling.
2002	Entrée	Shivee Tolgoi and Javhlant MLs	Optioned from Mongol Gazar in July 2002.
2002	Entrée	Shivee Tolgoi and Javhlant MLs	Rock chip and soil sampling, IP and magnetic geophysical surveys, geological mapping, and trenching.

Year	Company	Current Area	Work Undertaken
2003	Entrée	Shivee Tolgoi and Javhlant MLs	In September 2003, Entrée entered into a purchase agreement with Mongol Gazar and its affiliate MGP LLC, which replaced the option agreement. Rock chip and soil sampling, IP, gravity and magnetic geophysical surveys, geological mapping, trenching and silt and pan concentrate sampling.
2003	Ivanhoe Mines	Oyu Tolgoi ML	Mineral Resource estimate for Oyut deposit.
2004	Ivanhoe Mines	Oyu Tolgoi ML	Preliminary economic assessment on Oyut deposit. Initial Mineral Resource estimate for Hugo South deposit.
2004	Entrée/Oyu Tolgoi JV	Entrée licences	Earn-in agreement signed November 2004.
2005	OTLLC	Oyu Tolgoi ML	Mineral Resource estimate for Hugo North. Integrated Development Plan 2005 (IDP05) at PEA level, assuming open pit mining on the Oyut deposit, two block caves on Hugo North and one block cave on Hugo South. The plant capacity examined was 25.5 Mt/a with an expansion to 51 Mt/a.
2005–2006	Entrée/Oyu Tolgoi JV	Shivee Tolgoi ML	IP surveys, core drilling; discovery of Hugo North Extension. infill, geotechnical and sterilization drilling of areas planned to host infrastructure for the Oyu Tolgoi project Drill testing of Eagle IP anomaly; sterilization drilling of the X-Grid (Oortsog) gold showing; shallow RC drilling.
2005–2006	Entrée/Oyu Tolgoi JV	Javhlant ML	IP surveying; identified Sparrow South, Castle Rock, and Southwest magnetic anomalies
2006	OTLLC	Oyu Tolgoi ML	Feasibility study prepared on Oyut deposit open pit scenario only. Shaft 1 headframe, hoisting plant, and associated infrastructure completed
2007–2008	Entrée/Oyu Tolgoi JV	Javhlant ML	Core drilling initiated. Heruga deposit (formerly Sparrow South) discovered.
2008	OTLLC	Oyu Tolgoi ML	Completion of Shaft 1 to a final depth of 1,385 m.
2009	OTLLC	Oyu Tolgoi ML	Government of Mongolia obtains interest. Mongolian Feasibility Study (MFS09) presented; assumes mining scenarios of the open pit on the Oyut deposit and underground mining by

Year	Company	Current Area	Work Undertaken
			block caving on Hugo North, Hugo South, and Heruga. The plant capacity examined was 36.5 Mt/a with an expansion to 58 Mt/a.
2009	Entrée	Shivee Tolgoi and Javhlant MLs	The Shivee Tolgoi and Javhlant exploration licences, which form the Entrée/Oyu Tolgoi JV Project, were converted to MLs in October 2009. The third exploration licence, Togoot, was converted to a ML in June 2010, and was subsequently sold by Entrée in November 2011 to an arm's length private Mongolian company.
2010	OTLLC	Oyu Tolgoi ML	Integrated Development Plan 2010 (IDP10); Mineral Reserves for open pit mining of the Oyut deposit and block caving of Hugo North Lift 1. The plant capacity examined was 36.5 Mt/a with an expansion to 58 Mt/a.
2011	OTLLC	Oyu Tolgoi ML	Integrated Development and Operating Plan (IDOP) which updated IDP10, using the same production scenario. Sinking of Shaft 2 commenced in 2011.
2012	OTLLC	Oyu Tolgoi ML	Detailed Integrated Development and Operating Plan (DIDOP); examined open pit mining on Oyut and underground block caving on Hugo North Lift 1 without a plant expansion.
2014	OTLLC	Oyu Tolgoi ML	2014 Oyu Tolgoi Feasibility Study submitted to Mongolian government. Included a Reserves Case (open pit mining on Oyut and underground block caving on Hugo North Lift 1) and a Resources Case (open pit mining on Oyut and underground block caving on Hugo North Lift 1 and Lift 2, Hugo South and Heruga. Both cases were at the plant rate of 36.5 Mt/a without expansion. The Mongolian Reserves and Resources in the 2014 Oyu Tolgoi Feasibility Study were submitted to the Government of Mongolia to update the Mongolian State Reserves in 2014.
2015	OTLLC	Oyu Tolgoi ML	Statutory feasibility study, the 2015 Oyu Tolgoi Feasibility Study, based on modifications to the 2014 Oyu Tolgoi Feasibility Study, presented to Mongolian Government.
2016	OTLLC	Oyu Tolgoi ML	Statutory feasibility study, the 2016 Oyu Tolgoi Feasibility Study, based on modifications to the 2015 Oyu Tolgoi Feasibility Study, presented to Mongolian Government.
2020	OTLLC	Oyu Tolgoi ML	Statutory feasibility study, the 2020 Oyu Tolgoi Feasibility Study, presented to Mongolian Government.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Oyu Tolgoi porphyry deposits are hosted within the Palaeozoic Gurvansayhan Terrane, a component of the Altaid orogenic collage, which is a continental-scale belt dominated by compressional tectonic forces (Figure 7-1).

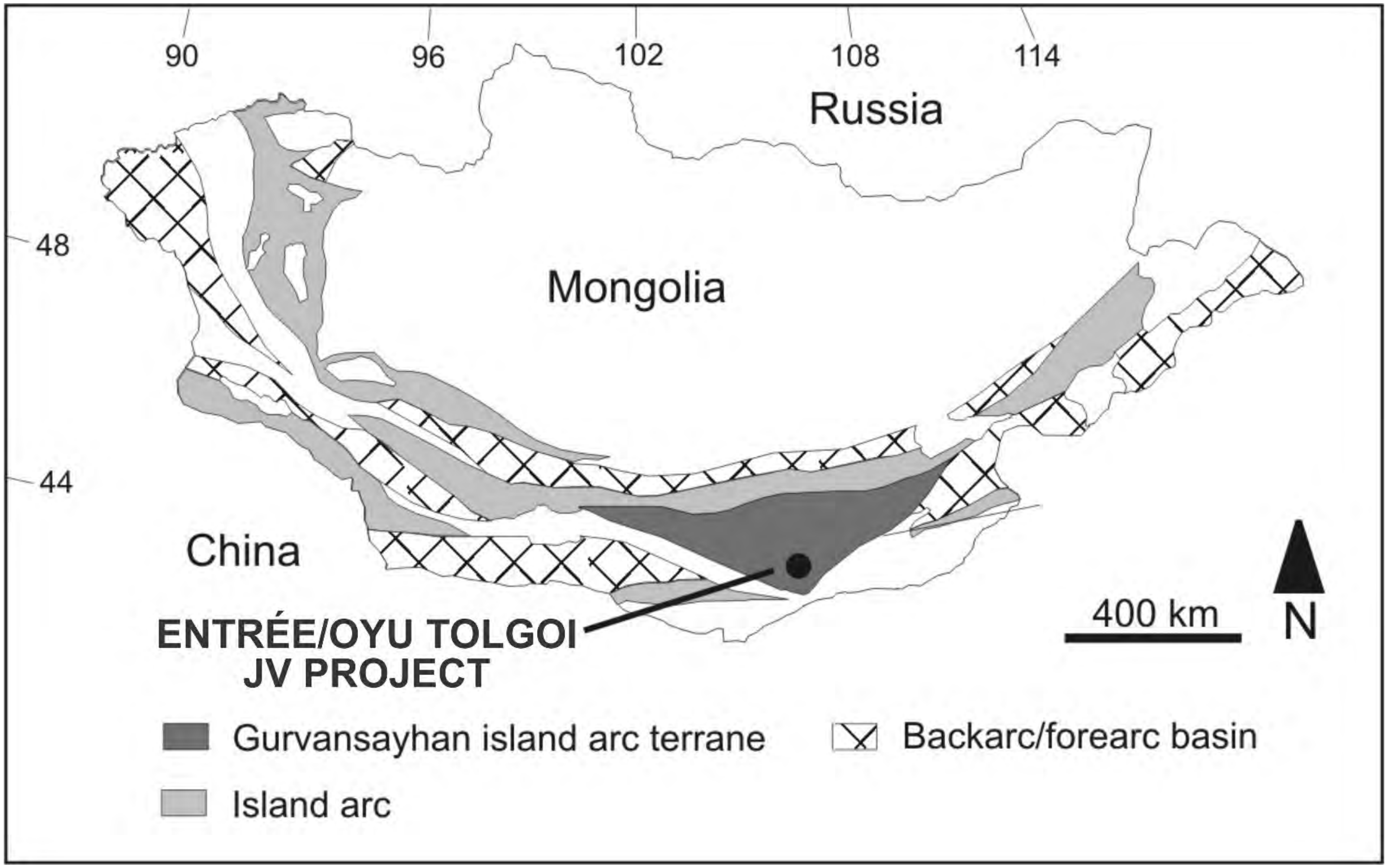
Development of the Central Asian Orogenic Belt consisted of Palaeozoic age accretionary episodes that assembled several island and continental margin magmatic arcs, rifted basins, accretionary wedges, and continental margins. Arc development ceased by about the Permian. During the Late Jurassic to Cretaceous, north–south extension occurred, accompanied by the intrusion of granitoid bodies, unroofing of metamorphic core complexes, and formation of extensional and transpressional sedimentary basins. Northeast–southwest shortening is superimposed on the earlier units and is associated with major strike–slip faulting and folding within the Mesozoic sedimentary basins.

The Gurvansayhan Terrane is interpreted to be a juvenile island arc assemblage that consists of highly-deformed accretionary complexes and volcanic arc assemblages dominated by imbricate thrust sheets, dismembered blocks, mélanges, and high-strain zones (Bardarch et al., 2002; Wainright et al., 2011). Lithologies identified to date in the Gurvansayhan Terrane include Silurian to Carboniferous terrigenous sedimentary, volcanic-rich sedimentary, carbonate, and intermediate to felsic volcanic rocks.

Sedimentary and volcanic units are intruded by Devonian granitoids and Permo–Carboniferous diorite, monzodiorite, granite, granodiorite, and syenite bodies, which can range in size from dykes to batholiths.

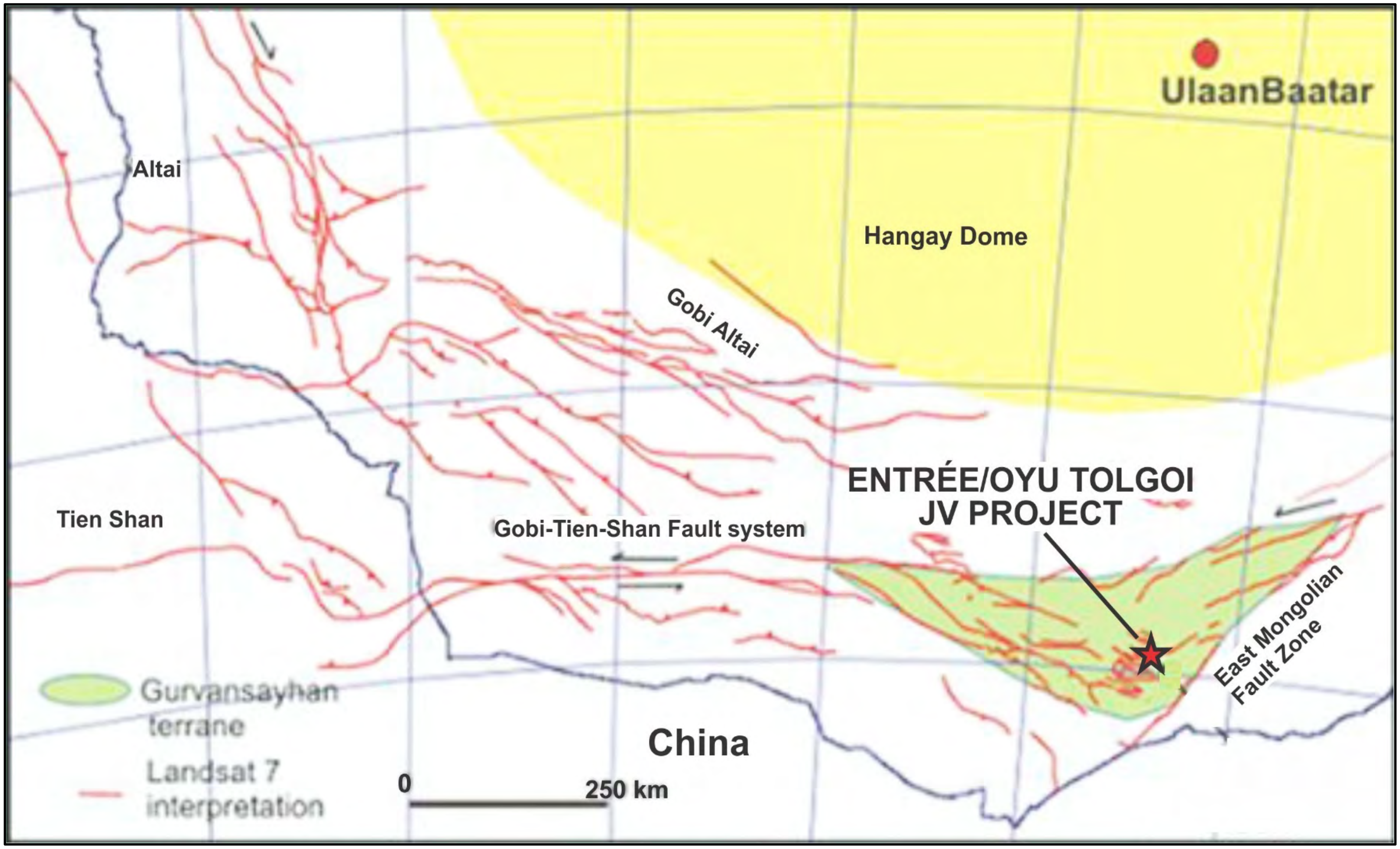
Major structures to the west of the Gurvansayhan Terrane include the Gobi–Tien Shan sinistral strike-slip fault system that splits eastward into a number of splays in the Oyu Tolgoi area, and the Gobi Altai Fault system, which forms a complex zone of sedimentary basins over-thrust by basement blocks to the north and northwest of Oyu Tolgoi (Figure 7-2). To the east of the Gurvansayhan Terrane, regional structures are dominated by the northeast-striking East Mongolian Fault Zone, which forms the southeast boundary of the terrane. This regional fault may have formed as a major suture during Late Palaeozoic terrane assembly, with Mesozoic reactivation leading to the formation of northeast-elongate sedimentary basins along the fault trace.

Figure 7-1: Regional Setting, Gurvansayhan Terrane



Note: Figure modified after Wainwright (2008); courtesy Entrée, 2017.

Figure 7-2: Regional Structural Setting, Gurvansayhan Terrane



Note: Figure courtesy Entrée, 2017. Figure north is to top of plan.

7.2 District Geology

7.2.1 Overview

The Oyu Tolgoi district is a poorly-exposed inlier of Devonian mafic to intermediate volcanic, volcaniclastic, and sedimentary rocks that have been intruded by Devonian to Permian felsic plutons. These rocks are unconformably overlain by poorly consolidated Cretaceous sedimentary rocks and younger unconsolidated sedimentary deposits. A regional geology map is provided in Figure 7-3 and Figure 7-4. A district-wide stratigraphic column that shows the relative thicknesses of the various lithologies is presented in Figure 7-5.

Two major stratigraphic sequences are recognized in the district:

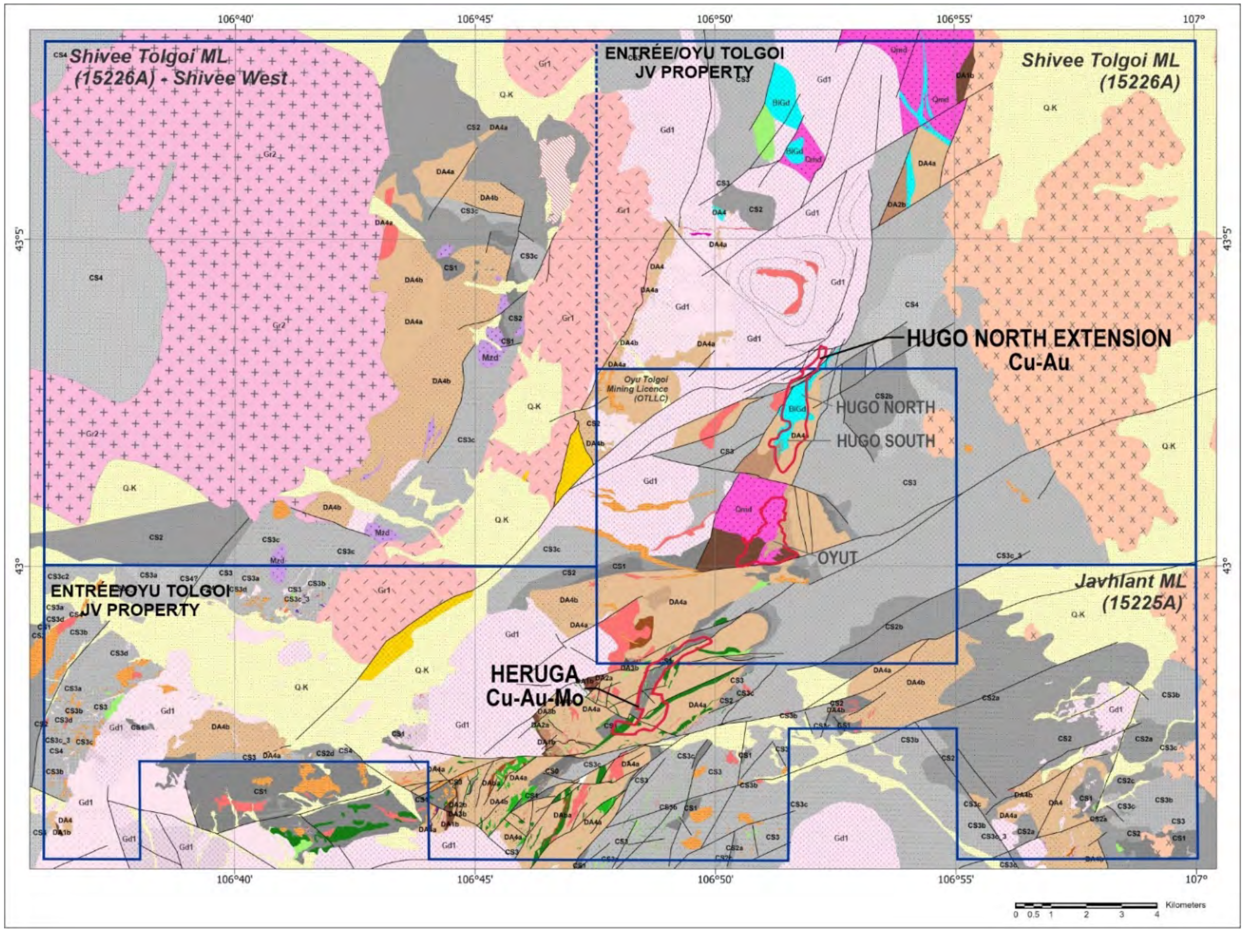
- Tuffs, basaltic rocks, and sedimentary strata of probable island-arc affinity, generally tentatively assigned to the Upper Devonian Alagbayan Group (Minjin et al., 2004). Copper and gold mineralization occurs in this sequence
- An overlying succession containing conglomerates, fossiliferous marine siltstones, sandstones, water-lain tuffs, and basaltic to andesitic flows and volcaniclastic rocks, assigned to the Carboniferous Sainshandhudag Formation, part of the Gurvankharaat Group. There is no mineralization within these units.

The two sequences are separated by a regional unconformity that, in the Oyu Tolgoi area, is associated with a time gap of about 10 Ma to 15 Ma.

A thin covering of gently-dipping to horizontal Upper Cretaceous stratified clays and clay-rich gravels overlies the Palaeozoic sequences, infilling paleo-channels and small fault-controlled basins.

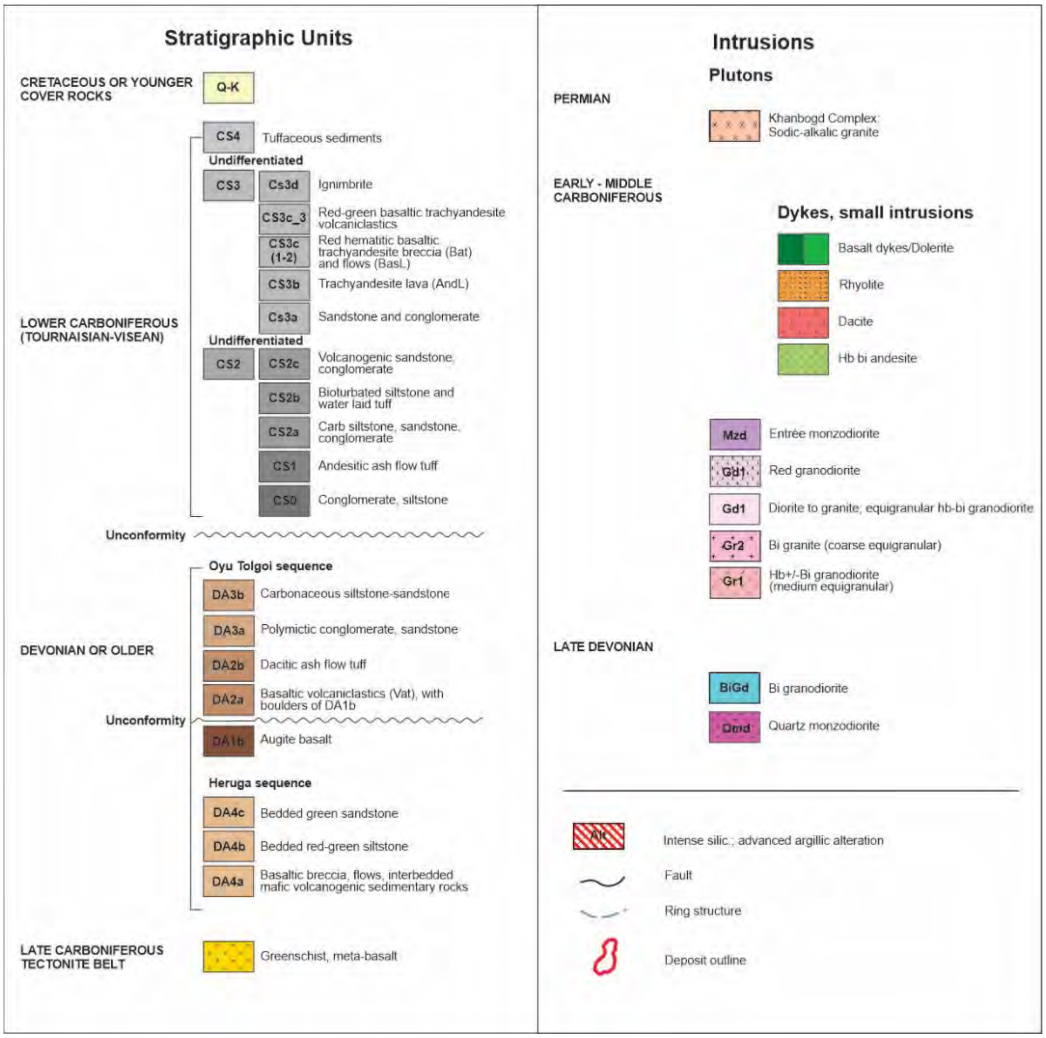
A thin covering of gently-dipping to horizontal Upper Cretaceous stratified clays and clay-rich gravels overlies the Palaeozoic sequences, infilling paleo-channels and small fault-controlled basins.

Figure 7-3: District Geology Map



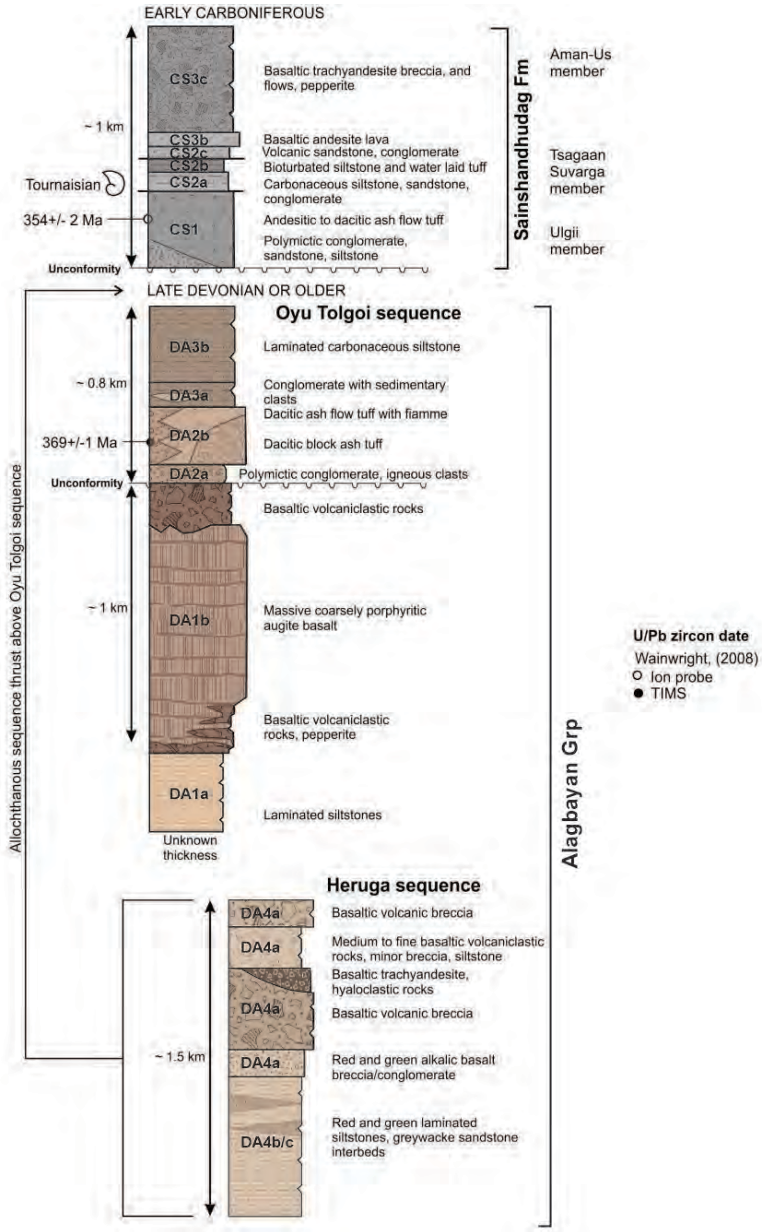
Note: Figure courtesy Entrée, 2021. Legend key is provided in Figure 7-4.

Figure 7-4: Geology Legend to Accompany Figure 7-3



Note: Figure courtesy Entrée, 2021.

Figure 7-5: Project Stratigraphic Column



Note: Figure courtesy Entrée, 2017. Figure modified from Crane and Kavalieris (2012).

7.2.2 Lithologies

Alagbayan Group

Four major lithological divisions and two named formations are present within the Alagbayan Group, and each of these divisions comprises two or more mappable subunits (Table 7-1). The lower basaltic Bulagbuyan formation (DA1) and the lower dacitic volcanic unit of the Khalzan-Ovoo formation (DA2) are commonly strongly altered and form important mineralization hosts, while the upper two volcano-sedimentary units lack significant alteration and mineralization. Unit DA4 (Heruga sequence) is separated from the underlying Alagbayan Group units by a contact-parallel fault. There is some evidence that sedimentary facing direction indicators within the DA4 unit face downwards, implying that the unit is allochthonous with respect to the underlying, upright sequence.

Sainshandhudag Formation

The Carboniferous Sainshandhudag Formation is divided into three major units at Oyu Tolgoi: a lower-most tuffaceous sequence, an intermediate clastic package, and an uppermost volcanic/volcaniclastic sequence (Table 7-2). The unit post-dates porphyry mineralization and is separated from the underlying Devonian rocks by a regional unconformity.

Intrusive Rocks

Intrusive rocks are widely distributed through the Oyu Tolgoi district and range from large batholithic intrusions to narrow discontinuous dykes and sills. At least seven classes of intrusive rocks can be defined based on compositional and textural characteristics (Table 7-3).

Copper–gold porphyry mineralization is related to the oldest recognized intrusive suite, comprising large Devonian quartz monzodiorite intrusions.

Table 7-1: Major Units of the Alagbayan Group

Formation	Unit	Lithologies	Description
Bulagbuyan	DA1	Basaltic flows and volcaniclastic rocks; several hundred metres in thickness.	Two subunits: • Lower: grey to green, finely-laminated, volcanogenic siltstone and interbedded fine sandstone (DA1a) • Upper: dark green, massive porphyritic (augite) basalt. Overlies and partially intercalated with basal unit (DA1b).
Khalzan–Ovoo	DA2	Dacite tuff/volcaniclastic rocks; at least 200 m thick	Three subunits: • Lower: monolithic to slightly polylithic basaltic lapilli tuff to volcaniclastic conglomerate/breccia. Underlies and partially intercalated with middle unit (DA2a) • Middle: buff to dark green, dacite lapilli tuff. Overprinted by intense sericite and advanced argillic alteration (DA2b_1) • Upper: weakly altered to unaltered polymictic block tuff to breccia, with lesser intercalated lapilli tuff (DA2b_2).
	DA3	Clastic sedimentary sequence; approximately 100 m thick	Two subunits: • Polylithic conglomerate, sandstone, and siltstone. Abundant in the South Oyu deposits and parts of the Hugo South deposit (DA3a) • Rhythmically interbedded carbonaceous siltstone and fine brown sandstone. Ubiquitous in drill holes in Hugo North and is also discontinuously distributed in the more southerly deposits (DA3b).
	DA4	Basaltic flows/fragmental rocks, siltstone; approximately 600 m thick	Three subunits: • Dark green basaltic volcanic breccia with vesicular, fine-grained to coarsely porphyritic basaltic clasts is the dominant lithotype; interlain with volcanogenic sandstones and conglomerates (DA4a) • Thinly-interbedded red and green siltstone, which contain subordinate basalt layers in their lower levels (DA4b) • Massive green to grey sandstone with rare siltstone interbeds (DA4c).

Table 7-2: Major Units of the Sainshandhudag Formation

Unit	Lithologies	Description
CS1	Andesitic lapilli tuff and volcaniclastic rocks; approximately 200 m thick	Andesitic lapilli tuff with abundant fiamme, and subordinate block tuff to breccia.
CS2	Conglomerate, sandstone, tuff, and coal; approximately 200 m thick	Typically shows a progression from a lower conglomerate–sandstone–siltstone-dominant unit (CS2a) to an overlying siltstone–waterlain tuff unit (CS2b). Carbonaceous siltstone and coal beds occur in the lower part of the sequence.
CS3	Basaltic and andesite lava and volcaniclastic rocks; approximately 800 m thick	Four subunits: • Basal: thin volcanic sandstone (CS3a) • Lower middle: discontinuous porphyritic basaltic andesitic lava sequence (CS3b) • Upper middle: thick basaltic breccia-to-block tuff unit (CS3c_1) • Upper: intercalated to overlying porphyritic basalt flow sequence (CS3c_2).

Table 7-3: Major Intrusive Rock Units

Unit	Lithologies	Age	Description
Intrusions	Quartz monzodiorite to monzodiorite	368–372 Ma	Texturally and compositionally varied. Generally phenocryst-crowded, with >40% plagioclase phenocrysts up to 5 mm long, and 10–15% biotite and hornblende. Abbreviated to Qmd.
Intrusion, dykes and sills	Biotite granodiorite	366 ± 4 Ma	Contain large plagioclase phenocrysts with lesser small biotite phenocrysts, within a fine-grained to aphanitic brown groundmass. Intrusions are compositionally and texturally varied and probably include several intrusive phases. Forms a large stock at Hugo North (BiGd)
Intrusions	Syenite, granite, quartz monzonite, quartz diorite, and quartz syenite	328 - 350 Ma	Large, polyphase granitic complex bounding the Oyu Tolgoi Project to the northwest.
Dykes	Hornblende–biotite andesite and dacite	343 ± 3 Ma	Typically, strongly porphyritic with feldspar, hornblende, and biotite. Quartz phenocrysts are common.
Dykes and sills	Rhyolite; range from metres to a few tens of metres wide	330–340 Ma	Aphanitic and aphyric. Intrusive breccias are common along dyke contacts, commonly

Unit	Lithologies	Age	Description
			incorporating both rhyolitic and wall rock fragments within a flow-banded groundmass.
Dykes	Basalt/dolerite; in deposit area range from metres to a few tens of metres wide; in southwest part of the project can occur as large, sill-like intrusive masses	Carboniferous	Intrude all stratified units. Typically, aphanitic to fine-grained, locally vesicular, and contain variable amounts of plagioclase phenocrysts.
Intrusions	Alkaline granite	Permian 290 ± 1 Ma	Large, circular intrusion exposed just east of the Oyu Tolgoi Project that is defined by abundant pegmatite dykes.

7.2.3 Structure

The district is underlain by complex networks of faults, folds, and shear zones. Most of these structures are poorly exposed on surface and have been defined through integration of detailed exploration data (primarily drill hole data including oriented core and more recent studies during underground development), property-scale geological mapping, and geophysical data. There is evidence for several phases of deformation and reactivation of the early faults during later deformational events.

Within the mineralized zones, the East and West Bat faults, and the Contact fault are of major importance. The East and West Bat faults control a structural high which hosts the Hugo North (including the Hugo North Extension) and Hugo South deposits. The faults offset post-mineralization stratigraphic contacts at least 1 km (east side up) for the West Bat fault and 200–300 m (west side up) for the East Bat fault.

The Contact fault is a regional low-angle thrust fault which is generally sub-parallel to bedding and occurs from Heruga in the south to the Hugo North Extension deposit in the north. The structure places overturned upper Devonian sedimentary and volcanic rocks belonging to the DA4 unit over upright Devonian sediments of unit DA3b.

7.3 Hugo North/Hugo North Extension

The Hugo Dummett deposits (Hugo North/Hugo North Extension and Hugo South) contain porphyry-style mineralization associated with quartz monzodiorite intrusions, concealed beneath a sequence of Upper Devonian and Lower Carboniferous sedimentary and volcanic rocks. The deposits are highly elongated to the north–northeast and extend over at least 3 km.

7.3.1 Lithologies

Host rocks at Hugo North/Hugo North Extension are an easterly-dipping sequence of volcanic and volcaniclastic strata correlated with the lower part of the Devonian Alagbayan Group (Bulagbuyan Formation and lower Khlanzan–Ovoo Formation) and quartz monzodiorite rocks that intrude the volcanic sequence.

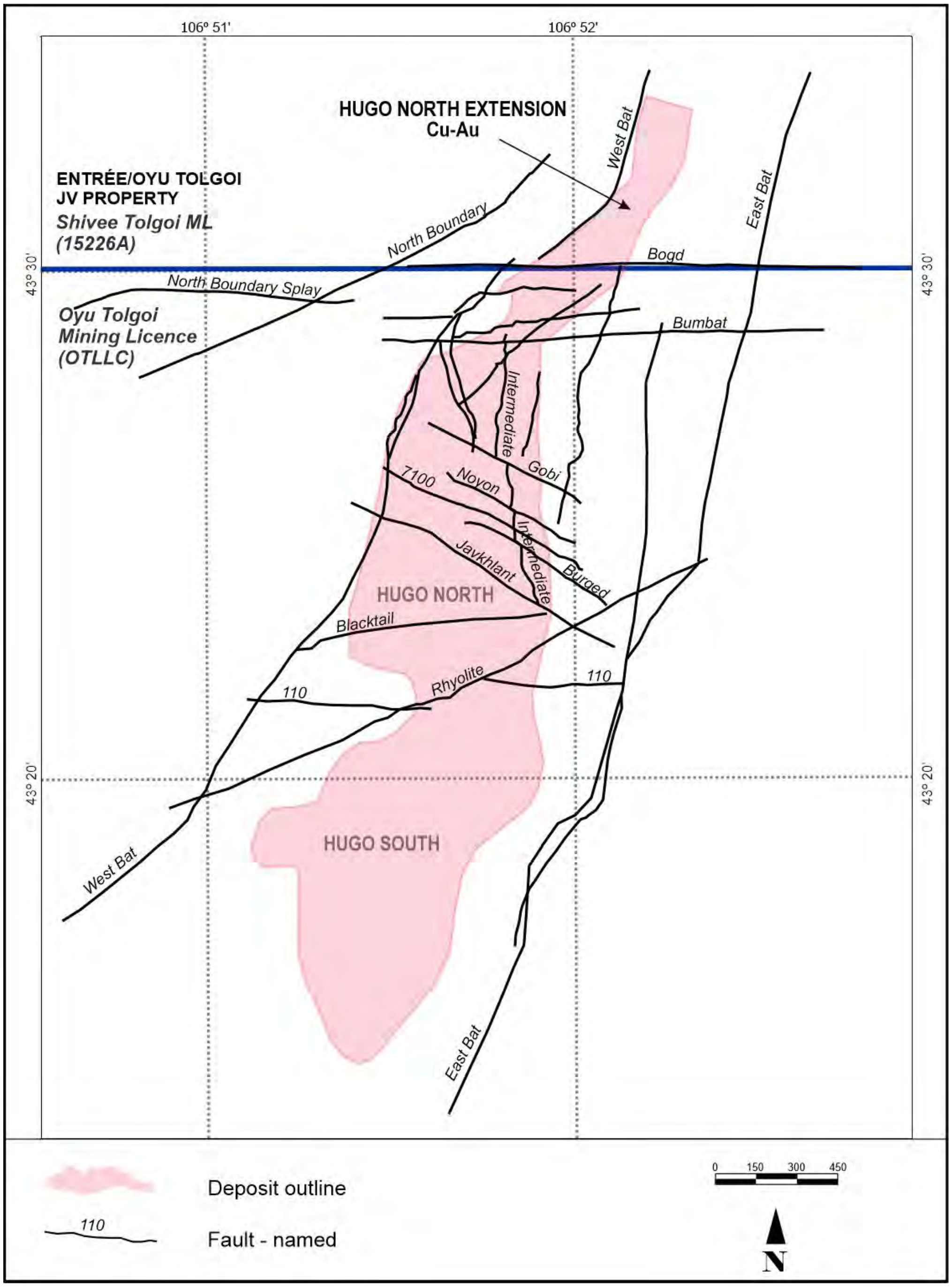
7.3.2 Structure

The Hugo North/Hugo North Extension deposit occurs within easterly-dipping homoclinal strata (Unit DA1) and quartz monzodiorite intrusions contained in a north–northeasterly elongated, fault-bounded block. Deformation of the Hugo North/Hugo North Extension deposit is dominated by brittle faulting and the northern end of this block is cut by several northeast-striking faults near the boundary between the Oyu Tolgoi and Shivee Tolgoi MLs (Figure 7-6). Faulting at Hugo North/Hugo North Extension has been divided into six classes (Porter, 2016):

- East–west striking and moderately north-dipping (e.g., 110 Fault); north-side down
- East–west striking, subvertical (e.g. Bogd, Dugant and Bumbat); oblique strike slip
- North to north–northeast striking, subvertical (e.g., East and West Bat, 160); post-mineral, partly control west limit of mineralization
- North–northeast striking, moderately east-dipping (e.g., Contact Fault – not shown in Figure 7-6); bedding-parallel, late Devonian thrust
- East–northeast striking, steep to sub-vertical (e.g., Boundary and Rhyolite); reverse movement, Boundary Fault partly controls west limit of mineralization
- Northwest striking, steep (e.g., 7100, Noyon, Gobi and Burged); north side down.

Recent underground studies have identified numerous additional, previously-unrecognized faults sub-parallel to the Intermediate Fault and within the Hugo North deposit.

Figure 7-6: Hugo South and Hugo North/Hugo North Extension Structural Setting



Note: Figure courtesy Entrée, 2021. Figure modified from Porter (2016) and Turquoise Hill (2020). Plan view at approximately 100 m RL.

7.3.3 Alteration

The Hugo North/Hugo North Extension deposit is characterized by copper–gold porphyry and related styles of alteration. These include biotite–K-feldspar (K-silicate), magnetite, chlorite–muscovite–illite, albite, chlorite–illite–hematite–kaolinite (intermediate argillic), quartz–alunite–pyrophyllite–kaolinite–diaspore–zunyite–topaz–dickite (advanced argillic), and sericite–muscovite zones.

At Hugo North Extension, the distribution of the alteration is strongly lithologically controlled: the dacite tuff typically shows strong advanced argillic alteration, whereas basalt tends to be chlorite–muscovite–hematite-altered, with pyrophyllite-bearing advanced argillic alteration in its uppermost parts. Pockets of advanced argillic alteration occur locally in the high-grade zone in the Qmd.

7.3.4 Mineralization

The highest-grade copper mineralization in the Hugo North/Hugo North Extension deposit is related to a zone of intensely stockworked to sheeted quartz veins, known as the QV90 zone (so named because >90% of the rock has >15% quartz veining). The high-grade zone is centred on thin, east-dipping, quartz monzodiorite intrusions, or within the apex of the large quartz monzodiorite body, and extends into the adjacent basalt. In addition, moderate to high-grade copper and gold values occur within quartz monzodiorite below and to the west of the intense vein zone, in the Hugo North/Hugo North Extension gold zone. This zone is distinct, and has a high gold (ppm) to copper (%) ratio of 0.5:1.

Bornite is dominant in the highest-grade parts of the deposit (3–5% Cu) and is zoned outward to chalcopyrite (2% Cu). At grades of <1% Cu, pyrite–chalcopyrite dominates. Within the upper levels where advanced argillic-altered basaltic tuff is reported, the assemblage comprises pyrite–chalcopyrite ± enargite, tennantite, bornite, chalcocite, and more rarely covellite.

The high-grade bornite zone consists of relatively coarse bornite permeating quartz and disseminations in wall rocks, usually intergrown with subordinate chalcopyrite. Pyrite is rare to absent, except locally where the host rocks are advanced argillic altered. Although chalcocite is commonly found with bornite at Hugo South, it is less common at Hugo North/Hugo North Extension. High-grade bornite is associated with minor amounts of tennantite, sphalerite, hessite, clausthalite, and gold, which occur as inclusions or at grain boundaries.

Elevated gold grades at Hugo North/Hugo North Extension occur within the up-dip (western) portion of the intensely-veined, high-grade core, and within a steeply-dipping lower zone cutting through the western part of the quartz monzodiorite. Quartz monzodiorite in the lower zone exhibits a characteristic pink to buff colour, with a moderate intensity of quartz veining (5% to 25% by volume and is characterized by finely disseminated bornite and chalcopyrite). Sulphides are disseminated throughout the rock in the matrix as well as in quartz veins. The fine-grained bornite has a black “sooty” appearance. A red coloration is attributed to fine hematite dusting, primarily associated with albite.

7.3.5 Hugo North Extension

The Hugo North Extension is a term used to delimit that portion of the Hugo North deposit that extends into the Entrée/Oyu Tolgoi JV property. The current geological and grade models extend from the licence boundary and are terminated approximately 700 m north where drilling becomes sparse and continuity of geological units becomes difficult to determine. Drilling approximately 150 m north of the northernmost extent of the model did not intersect significant mineralization and reportedly intersected an anomalously long intersection of dacitic to andesitic ash flow tuff/lapilli tuff. An east–west-trending fault is inferred to terminate and possibly down-drop stratigraphy north of the fault to depths greater than 2,000 m. This fault has not been confirmed by drilling and has not been modeled. The Hugo North extension potentially remains open to the north and at depth.

The Hugo North Extension occurs within moderately east-dipping (65° to 75°) strata contained in a north–northeasterly-elongate fault-bounded block. The deposit is cut by several northeast-striking faults and fault splays near the boundary with the Oyu Tolgoi ML. Other than these northeasterly-trending faults, the structural geometry and deformation history of the Hugo North Extension area is similar to that of the Hugo North deposit.

Deformation of the Hugo North Extension zone is dominated by brittle faulting. Major faults cutting the deposit can be grouped into three sets:

- Steep north–northeast-striking faults (West Bat)
- North–northeast-striking, moderate to steeply east-dipping faults subparallel to lithological contacts (Contact Fault)

- East–northeast-striking faults cutting across the strike of the deposit (Boundary Fault System).

The Hugo North Extension deposit remains potentially open to the north and at depth.

7.4 Heruga

The Heruga deposit is the most southerly of the currently-known deposits within the Oyu Tolgoi trend, although there are additional mineralized targets to the southwest of Heruga. The deposit is considered to be a copper–gold–molybdenum porphyry deposit and is zoned with a carapace that has elevated molybdenum grades at higher elevations overlying more gold-elevated mineralization at depth. The top of the mineralization is about 500–600 m below the present ground surface.

The deposit has been drill-tested over a 2.3 km length, is elongated in a north–northeast direction and plunges to the north. The Heruga North zone is the down-plunge extension of the Heruga mineralization within the Oyu Tolgoi ML (refer to Figure 7-3). The top of the Heruga North zone is approximately 1,100 m below surface and plunges gradually downward as it extends to the north. The Solongo Fault forms the projected northern limit of mineralization associated with the Heruga North zone.

Within the Heruga deposit, quartz monzodiorite intrusions are small compared to the stocks present in the Hugo North/Hugo North Extension and Oyut areas, perhaps explaining the lower grade of the Heruga deposit. Non-mineralized dykes, comprising about 15% of the volume of the deposit, cut all other rock types. However, the quartz monzonite body appears to flare to the east and forms a large stock within the Heruga area.

The deposit is transected by a series of north–northeast-trending vertical fault structures that step down 200 m to 300 m at a time to the west and have divided the deposit into at least two structural blocks.

Mineralized veins have a much lower density at Heruga than in the more northerly Oyut and Hugo North/Hugo North Extension deposits. High-grade copper and gold intersections show a strong spatial association with contacts of the mineralized quartz monzodiorite porphyry intrusion in the southern part of the deposit, occurring both within the outer portion of the intrusion and in adjacent enclosing basaltic country rock.

At deeper levels, mineralization consists of chalcopyrite and pyrite in veins and disseminated within biotite–chlorite–albite–actinolite-altered basalt or sericite–albite-altered quartz monzodiorite. The higher levels of the orebody are overprinted by strong quartz–sericite–tourmaline–pyrite alteration where mineralization consists of disseminated and vein-controlled pyrite, chalcopyrite, and molybdenite.

There is no oxide zone at Heruga, nor is there any high-sulphidation style mineralization known to date.

The deposit remains potentially open to the south.

7.5 Shivee West Property

The bedrock geology of the Shivee West property area consists of Devonian and Carboniferous volcanic and sedimentary rocks intruded by plutons, stocks and dykes of Carboniferous and possibly Devonian age (Figure 7-7).

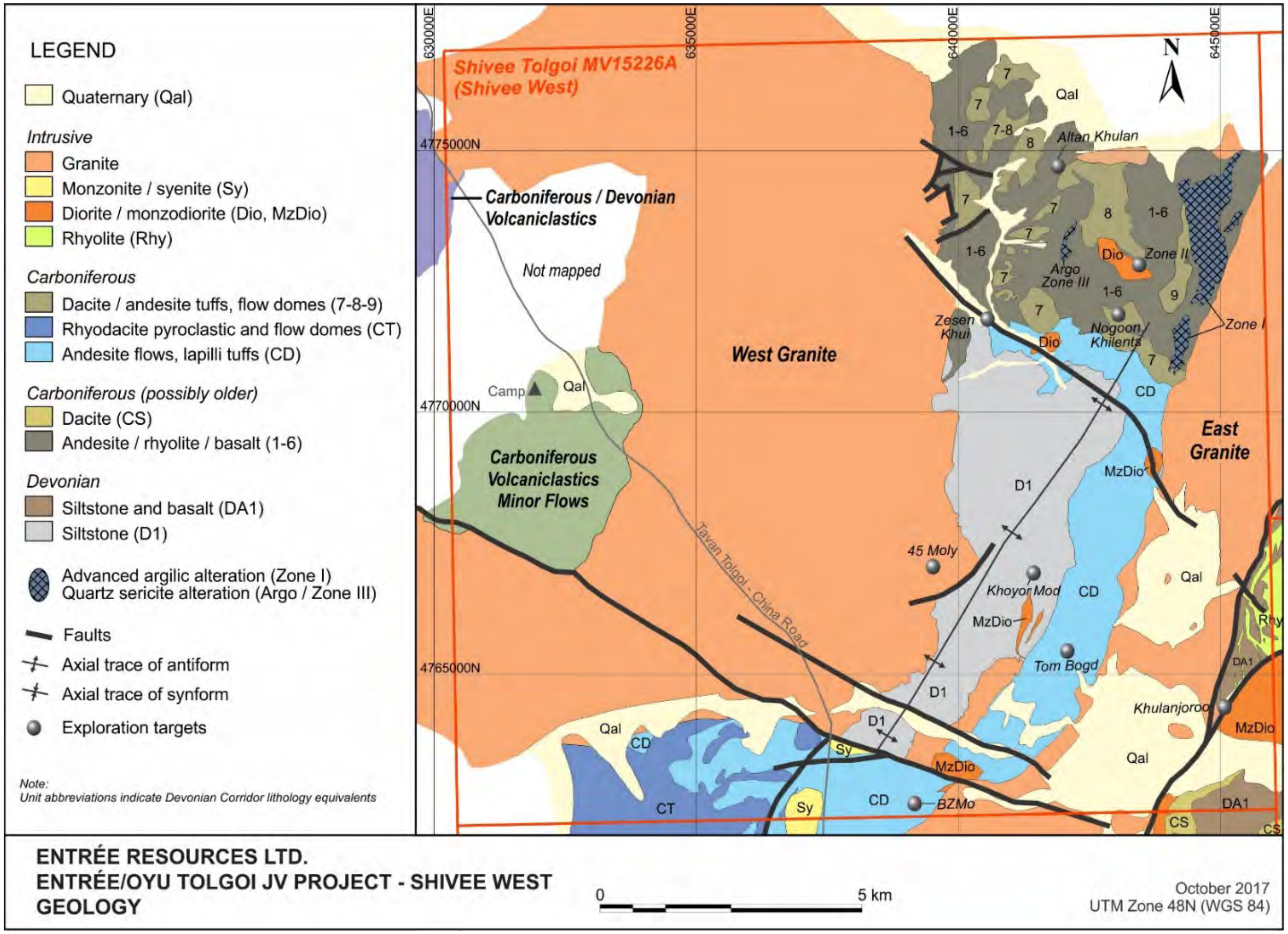
Mapping at 1:10,000 scale (Panteleyev 2004, 2005, 2006, 2007, 2008, 2010, 2011) established a number of volcanic and sedimentary units, some of which are equivalent to logging and mapping units within the Oyu Tolgoi ML, allowing correlation of the latter over a large area outside the confines of the Oyu Tolgoi ML and the Entrée/Oyu Tolgoi JV property. Permian Khanbogd alkaline intrusive rocks are not currently known to occur within the Shivee West property.

The geology of the mapped area is described in more detail in the following subsections. Stratigraphic and lithological correlations between separated areas remain tentative or unknown at the Report effective date.

7.5.1 Lithologies

Devonian and Carboniferous sedimentary and volcanic rocks form a north–northeast-trending belt (the Devonian corridor), underlying the eastern portion of the Shivee West property (refer to Figure 7-7). The Devonian corridor is bounded on the east and west by Carboniferous-aged plutons, designated as the "east granite" and "west granite" plutons.

Figure 7-7: Geology Plan, Shivee West Property



Note: Figure courtesy Entrée, 2017.

The Devonian corridor can be divided into three geomorphic areas separated by west–northwest-trending faults. These areas are also distinguished by the dominant bedrock lithologies as follows:

- Northern area: comprises Devonian volcanic and volcaniclastic rocks and lower to Upper Carboniferous volcanic lithologies
- Central, possibly uplifted area: dominated by Devonian clastic sedimentary rocks with Middle Carboniferous volcanic rocks to the east
- Southern area: underlain by Middle Carboniferous volcanic rocks.

A second area of probable Devonian rocks is located in the southeast corner of the Shivee West property adjacent to the Oyu Tolgoi ML, and a mapped area of Carboniferous volcaniclastic rocks is located in the west–central portion of the Shivee West property.

7.5.2 Stratigraphy

Devonian lithologies within the Shivee West property have been assigned that age based on their lithological and geochemical similarities to the dated Devonian sequence at Oyu Tolgoi (including the Entrée/Oyu Tolgoi JV property). In addition, uranium–lead age determinations of detrital zircons from two samples are consistent with a Devonian age. Most of the Devonian rocks within the Shivee West property are fine-grained clastic sedimentary lithologies (D1) which are correlated with the Oyu Tolgoi unit DA4b.

In the southeast corner of the Shivee West property, thin-bedded to laminated black volcanogenic siltstone, sandstone, and abundant pyroxene-phyric basalt flows (DA1) are identical to Oyu Tolgoi map unit DA1b. Alteration by pervasive and fracture-controlled chlorite, epidote, calcite, and albite imparts a 'greenstone' appearance to the rocks. In some areas, a remnant, fine-grained, equigranular texture is visible that suggests dykes or sills of diabase are present in the predominantly basaltic flow succession. Further south in the same area are dacitic welded ash flows and coarse pyroclastic rocks (CS) that are of uncertain correlation, but appear to be Carboniferous in age.

Unconformably overlying the D1 Devonian stratigraphy are Carboniferous mafic to felsic volcanic rocks and derived sedimentary rocks (see Figure 7-7, Units CS, CD, CT, 1–9). The Carboniferous volcanic rocks are generally north-striking, feldspar-porphyritic, intermediate to felsic volcaniclastic rocks, maroon to pale green in colour. The volcaniclastic rocks (in large part pyroclastic flow deposits) are usually heterolithic, poorly sorted to unsorted, with vague bedding; occasionally very well laminated base surge tuffs can be observed. Welded textures (fiamme, rheomorphic flow folding) are common.

Correlation with Oyu Tolgoi ML mapping units has not been established. However, the overall stratigraphic position suggests that the CS unit is in part equivalent to Oyu Tolgoi units CS1 (andesitic volcaniclastics) and CS2 (clastic sedimentary rocks and basaltic volcanic rocks).

An unconformity separates the lower volcanic/sedimentary and middle volcanic assemblages. A second unconformity separates the middle and upper volcanic assemblages.

Undivided volcaniclastic rocks in the west–central area of the Shivee West property (Camp Area) are predominantly dacitic pyroclastic rocks with subordinate rhyodacite and andesitic to basaltic units. All of these units are interpreted to be Carboniferous in age. Some of the ignimbritic andesite rocks are lithologically similar to rocks of Oyu Tolgoi map unit CS1. The volcanic central part of the mapped area is flanked to the east by plutonic rocks and is in fault contact to the south with intrusive rocks.

7.5.3 Intrusive Rocks

Intrusive rocks in the Devonian Corridor have been assigned to four suites (Table 7-4). None have been shown to be of Devonian age, although the monzodiorite dykes (MzDio) within D1 sedimentary rocks at Khoyor Mod may be late Devonian to early Carboniferous in age. The granite plutons are by far the most abundant.

7.5.4 Metamorphism and Structure

Devonian clastic rocks of Shivee West have undergone a pervasive mild regional metamorphism (prehnite–pumpellyite to low-grade greenschist facies) during deformation. This has imparted a very subtle foliation that is rarely measurable in the field. Based on drill hole studies in 2007, it was suggested that mineral growth logged as alteration mineralization actually formed during regional metamorphism, and should be considered to be part of the mineral assemblage pervasive in the rock (Carr, 2007).

Table 7-4: Shivee West Property Intrusive Units

Unit	Description
Syngenetic Dyke Suite	Dykes and possibly sills of no persistent strike length that cannot be shown to extend beyond the mapping unit that hosts them. Most are basaltic to andesitic dykes and some brecciated dacitic dykes within the Zone III area. Note that this unit is not represented in Figure 7-6.
Granitic Plutonic Suite	Large Carboniferous composite plutons, usually medium-grained to weakly feldspar-porphyritic intermediate to felsic rocks. The Western Granite and Eastern Granite intrude the western and eastern sides of the Devonian Corridor. The gently dipping east contact of the West Granite hosts quartz–molybdenite mineralization. South of Khoyor Mod, the Central Granite is a small granitic pluton intruding D1 rocks.
Monzonite Plutonic Suite (Dior/MzDior)	May in part be Devonian in age. These are syn-tectonic to late-tectonic mafic (diorite, monzodiorite) plutons and dykes within volcanic/sedimentary sequences. A diorite stock and a late hornblende plus feldspar dyke south of Undai Gol have ages of 350.9 ± 0.4 Ma and 341.3 ± 0.4 Ma (Davis, 2006)
Late Dyke Suite (Sy/Rhy)	Late syenitic to felsic dykes, usually cutting all other plutonic suites. A late syenitic dyke assigned to this suite is a distinctive salmon pink to orange weathering hornblende plagioclase porphyry that represents a later intrusive event around 312.9 ± 1.5 Ma (Davis, 2006; Panteleyev, 2007) Felsic dykes are dacite to rhyolite in composition, and can have hornblende, feldspar and quartz phenocrysts. A late hornblende + feldspar dyke south of Undai Gol was dated at 341.3 ± 0.4 Ma (Davis, 2006).

The Devonian stratigraphy (D1) in the Devonian Corridor forms an anticline, formed by strongly folded northeast-striking sedimentary rocks, in which the geometry of the Devonian rocks is controlled by moderately southwest-plunging asymmetric F3 folds (Carr, 2007). Dips are steep to sub-vertical, except in the nose of the anticline. Way-up criteria are almost exclusively confined to graded bedding; cross-stratification and flame structures are rarely observed.

The clastic sedimentary rocks are generally upward facing, although there can be occasional bedding reversals. At the north end of the Devonian Corridor, clastic fiamme-bearing lapilli tuffs (DA1) and pyroxene-bearing basalts appear to conformably overlie D1 sediments. This suggests the Devonian stratigraphic sequence within the Shivee West property is normal, and unlike the Oyu Tolgoi ML geology, lacks significant thrust faulting.

The unconformably-overlying Carboniferous stratigraphy appears to be moderately dipping to relatively flat-lying.

Stratigraphy does not appear overturned with the exception of an area east of Zone III, where clastic sedimentary rocks assigned to the CS2 unit show both overturned and normal facing directions. No pervasive deformation is apparent in Carboniferous rocks on surface. However, the lowermost CS1 units appear to exhibit a subtle deformation lacking in the overlying middle and upper volcanic units. Strong foliation was observed in drill core of Carboniferous volcaniclastic rocks from two deep holes drilled on the Tom Bogd target. This deformation is attributed to the influence of a major shear zone of uncertain orientation.

Most faults are interpreted from offsets in bedding or lithology across areas of overburden, by topographic lows exploited by the local drainage pattern, and by interpretation from geophysical and geochemical surveys. A fault may separate the Devonian and Carboniferous sequences on the east side of the Devonian Corridor but cannot be confirmed. There is also a prominent set of west–northwest-trending faults that have strongly influenced the local drainage pattern.

7.6 Comments on Section 7

The knowledge of the deposit settings, lithologies, mineralization style and setting, mineralization controls, and the structural and alteration controls on mineralization is sufficient to support Mineral Resource and Mineral Reserve estimation.

8.0 DEPOSIT TYPES

8.1 Deposit Model

The Oyu Tolgoi deposits, including those within the Entrée/Oyu Tolgoi JV property, host copper–gold porphyry and related high-sulphidation copper–gold deposit styles. Mineralization identified in the Shivee West property consists of low-sulphidation epithermal mineralization styles.

8.1.1 Porphyry Deposits

The following discussion of the typical nature of porphyry-copper deposits is sourced from Sillitoe, (2010), Singer et al., (2008), and Sinclair (2006).

Geological Setting

Porphyry copper systems commonly define linear belts, some many hundreds of kilometres long, as well as occurring less commonly in apparent isolation. The systems are closely related to underlying composite plutons, at paleo-depths of 5 km to 15 km, which represent the supply chambers for the magmas and fluids that formed the vertically elongate (>3 km) stocks or dyke swarms and associated mineralization.

Commonly, several discrete stocks are emplaced in and above the pluton roof zones, resulting in either clusters or structurally controlled alignments of porphyry copper systems. The rheology and composition of the host rocks may strongly influence the size, grade, and type of mineralization generated in porphyry copper systems. Individual systems have life spans of circa 100,000 years to several million years, whereas deposit clusters or alignments, as well as entire belts, may remain active for 10 million years or longer.

Deposits are typically semicircular to elliptical in plan view. In cross-section, ore-grade material in a deposit typically has the shape of an inverted cone with the altered, but low-grade, interior of the cone referred to as the "barren" core. In some systems, the barren core may be a late-stage intrusion.

The alteration and mineralization in porphyry copper systems are zoned outward from the stocks or dyke swarms, which typically comprise several generations of intermediate to felsic porphyry intrusions. Porphyry copper–gold–molybdenum deposits are centered on the intrusions, whereas carbonate wall rocks commonly host proximal copper–gold skarns and less commonly, distal base metal and gold skarn deposits. Beyond the skarn front, carbonate-replacement copper and/or base metal–gold deposits, and/or sediment-hosted (distal-disseminated) gold deposits can form. Peripheral mineralization is less conspicuous in non-carbonate wall rocks, but may include base metal- or gold-bearing veins and mantos. Data compiled by Singer et al. (2008) indicate that the median size of the longest axis of alteration surrounding a porphyry copper deposit is 4–5 km, while the median size area of alteration is 7–8 km^2.

High-sulphidation epithermal deposits may occur in lithocaps above porphyry-copper deposits, where massive sulphide lodes tend to develop in their deeper feeder structures, and precious metal-rich, disseminated deposits form within the uppermost 500 m.

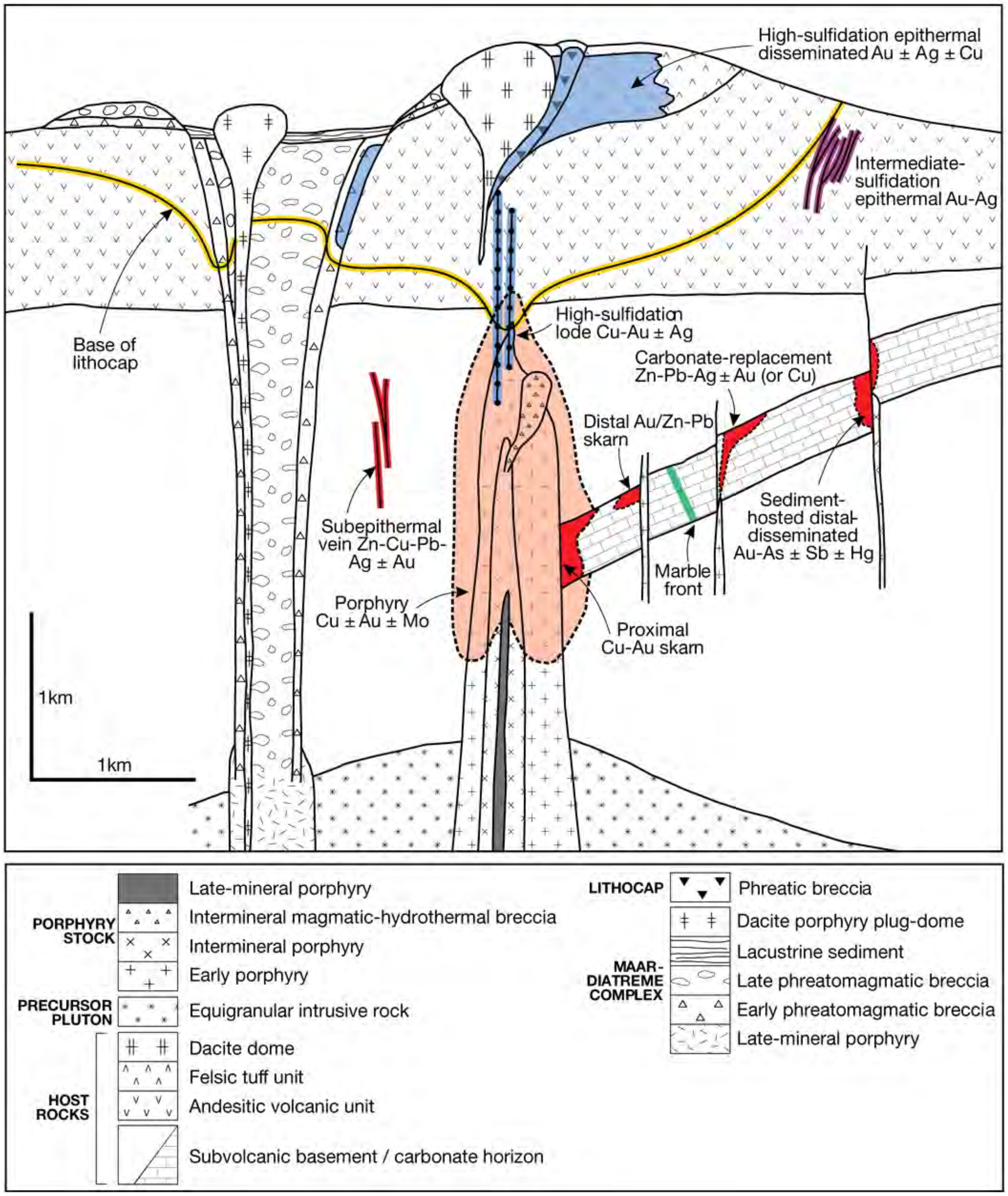
Figure 8-1 shows a schematic section of a porphyry copper deposit illustrating the relationships of the lithocap to the porphyry body, and associated mineralization styles.

Mineralization

Porphyry copper mineralization occurs in a distinctive sequence of quartz-bearing veinlets as well as in disseminated forms in the altered rock between them. Magmatic–hydrothermal breccias may form during porphyry intrusion, with some breccias containing high-grade mineralization because of their intrinsic permeability. In contrast, most phreatomagmatic breccias, constituting maar–diatreme systems, are poorly mineralized at both the porphyry copper and lithocap levels, mainly because many such phreatomagmatic breccias formed late in the evolution of systems, and the explosive nature of their emplacement fails to trap mineralizing solutions.

Copper–ore mineral assemblages are a function of the chemical composition of the fluid phase and the pressure and temperature conditions affecting the fluid. In primary, unoxidized or non-supergene-enriched ores, the most common ore–sulphide assemblage is chalcopyrite ± bornite, with pyrite and minor amounts of molybdenite. In supergene-enriched ores, a typical assemblage can comprise chalcocite + covellite ± bornite, whereas, in oxide ores, a typical assemblage could include malachite + azurite + cuprite + chrysocolla, with minor amounts of minerals such as carbonates, sulphates, phosphates, and silicates.

Figure 8-1: Schematic Section, Porphyry Copper Deposit



Note: Figure from Sillitoe, 2010.

Typically, the principal copper sulphides consist of millimetre-scale grains, but may be as large as 1–2 cm in diameter and, rarely, pegmatitic (larger than 2 cm).

Alteration

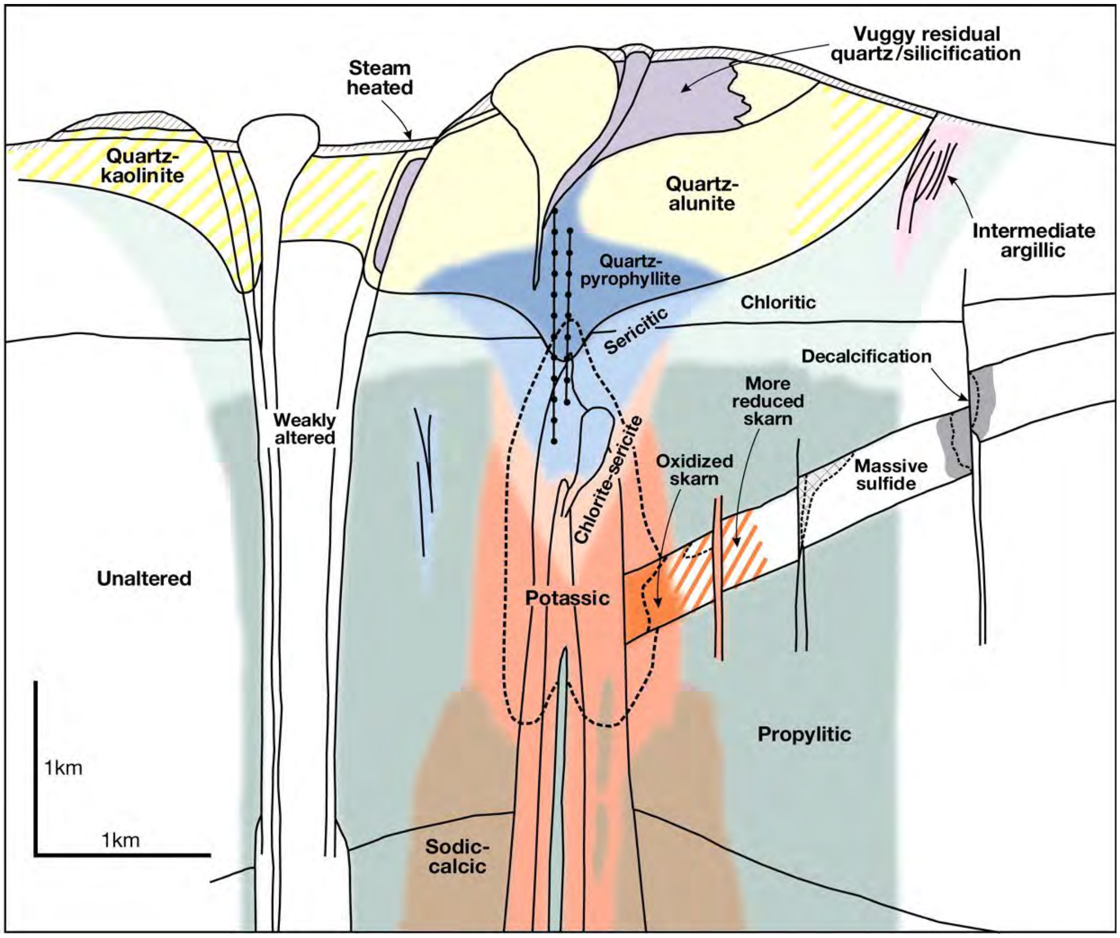
Alteration zones in porphyry copper deposits are typically classified on the basis of mineral assemblages. In silicate-rich rocks, the most common alteration minerals are K-feldspar, biotite, muscovite (sericite), albite, anhydrite, chlorite, calcite, epidote, and kaolinite. In silicate-rich rocks that have been altered to advanced argillic assemblages, the most common minerals are quartz, alunite, pyrophyllite, dickite, diaspore, and zunyite.

In carbonate rocks, the most common minerals are garnet, pyroxene, epidote, quartz, actinolite, chlorite, biotite, calcite, dolomite, K-feldspar, and wollastonite. Other alteration minerals commonly found in porphyry-copper deposits are tourmaline, andalusite, and actinolite. Figure 8-2 shows the typical alteration assemblage of a porphyry-copper system.

Porphyry copper systems are initiated by injection of oxidized magma saturated with sulphur- and metal-rich, aqueous fluids from cupolas on the tops of the subjacent parental plutons. The sequence of alteration–mineralization events is principally a consequence of progressive rock and fluid cooling, from >700° to <250°C, caused by solidification of the underlying parental plutons and downward propagation of the lithostatic–hydrostatic transition. Once the plutonic magmas stagnate, the high-temperature, generally two-phase hyper-saline liquid and vapour responsible for the potassic alteration and contained mineralization at depth and early overlying advanced argillic alteration, respectively, gives way, at <350°C, to a single-phase, low-to-moderate-salinity liquid that causes the sericite–chlorite and sericitic alteration and associated mineralization. This same liquid also is a source for mineralization of the peripheral parts of systems, including the overlying lithocaps.

The progressive thermal decline of the systems combined with syn-mineral paleo-surface degradation results in the characteristic overprinting (telescoping) and partial to total reconstitution of older by younger alteration–mineralization types. Meteoric water is not required for formation of this alteration–mineralization sequence although its late ingress is common.

Figure 8-2: Schematic Section Showing Typical Alteration Assemblages



Note: Figure from Sillitoe (2010).

Applicability of the Porphyry Model

Features that classify the Oyu Tolgoi and Entrée/Oyu Tolgoi JV property deposits as porphyry copper-type deposits include:

- Mineralization in or adjoining porphyritic intrusions of quartz monzodiorite composition
- Mineralization is spatially, temporally, and genetically associated with hydrothermal alteration of the intrusive bodies and host rocks
- Large zones of veining and stockwork mineralization, together with minor disseminated and replacement mineralization occur throughout large areas of

hydrothermally-altered rock, commonly coincident wholly or in part with hydrothermal or intrusion breccias

- Hydrothermal alteration is extensive and zoned. Major alteration minerals in the biotite–chlorite, intermediate argillic, sericite, and K-spar alteration zones include quartz, chlorite, sericite, epidote, albite, biotite, haematite–magnetite, pyrophyllite, illite, and carbonate. Advanced argillic alteration zones can contain minerals such as kaolinite, zunyite, pyrophyllite, muscovite, illite, topaz, diaspore, andalusite, alunite, montmorillonite, dickite, tourmaline, and fluorite. In the leached cap, smectite and kao-smectite can also occur. The alteration assemblages are consistent with the physico-chemical conditions of a porphyry environment
- Pyrite is the dominant sulphide, reflecting the typical high-sulphur content of porphyry copper deposits. The major ore minerals include chalcopyrite, bornite, chalcocite, covellite and enargite. In some zones, minerals such as tennantite, tenorite, cubanite, and molybdenite have been identified. Gold typically occurs as inclusions in the sulphide minerals
- Has copper grades that are typical of the range of porphyry copper grades (0.2% to >1% Cu).

The Oyu Tolgoi porphyry copper deposits display a range of mineralization styles, alteration characteristics, and deposit morphologies that are likely to reflect differences in structural controls, host rock lithology, and depth of formation. Structural influences account for the most part for the differences in shape and distribution of mineralization within the deposits. The more typical copper–gold porphyry style alteration and mineralization tend to occur at deeper levels, predominantly within basalt and quartz monzodiorite.

High-sulphidation mineralization and associated advanced argillic alteration are most common within the wall rocks (basaltic tuffs and fragmental rocks) to the quartz monzodiorite where it intrudes to levels high in the stratigraphic succession, and in narrow structurally-controlled zones. High-sulphidation mineralization often forms in steam condensate zones and then collapses back into the hypogene zone, causing overprinting and textural destruction.

The Hugo Dummett deposits have several features that are unusual when compared with typical porphyry copper systems, including:

- Anomalously high copper and gold grades, particularly in the northern part

- An unusually weakly-altered pre-mineral volcano-sedimentary cover sequence that lies just above the porphyry system
- Quartz + sulphide vein contents commonly exceeding 15%, and locally in excess of 90%, in the high-grade portion of the deposit
- A highly-elongate gently-plunging tabular shape to the high-grade stockwork system.

The formation of the known, 800 m extent, high-grade portion of the Hugo Dummett deposits as a tabular, intensely veined, sub-vertical body contrasts markedly with most porphyry copper deposits, which tend to have steep, roughly cylindrical or elongate forms. The unusual form of the Hugo Dummett deposits could be the result of emplacement within a structurally-restricted zone. The lack of alteration in the overlying sequence is likely a reflection of the chemical inertness of the siltstone sequences.

The Heruga deposit is also slightly unusual in that, unlike the other Oyu Tolgoi deposits, it has distinctly higher grades of molybdenum, which form a molybdenum-rich carapace at higher elevations overlying gold–copper-rich mineralization at depth.

8.1.2 Low-Sulphidation Epithermal Deposits

The description for the low-sulphidation epithermal model is taken from Pantaleyev (1996).

Geological Setting

Low-sulphidation epithermal deposits are formed by high-level hydrothermal systems from depths of ~1 km to surficial hotspring settings. Deposition is related to regional-scale fracture systems related to grabens, (resurgent) calderas, flow-dome complexes and rarely, maar diatremes. Extensional structures in volcanic fields (normal faults, fault splays, ladder veins and cymoid loops, etc.) are common; locally graben or caldera-fill clastic rocks are present. High-level (subvolcanic) stocks and/or dikes and pebble breccia diatremes occur in some areas. Locally resurgent or domal structures are related to underlying intrusive bodies.

Most types of volcanic rocks can host the deposit type; however, calcalkaline andesitic compositions predominate. Some deposits occur in areas with bimodal volcanism and extensive subaerial ashflow deposits. A less common association is with alkalic intrusive and shoshonitic volcanic rocks. Clastic and epiclastic sediments can be associated with mineralization that develops in intra-volcanic basins and structural depressions.

Mineralization

Ore zones are typically localized in structures, but may occur in permeable lithologies. Upward-flaring ore zones centred on structurally controlled hydrothermal conduits are typical. Large (> 1 m wide and hundreds of metres in strike length) to small veins and stockworks are common with lesser disseminations and replacements. Vein systems can be laterally extensive, but ore shoots have relatively restricted vertical extent. High-grade ores are commonly found in dilational zones in faults at flexures, splays and in cymoid loops.

Textures typical of low-sulphidation deposits include open-space filling, symmetrical and other layering, crustification, comb structure, colloform banding and multiple brecciation.

Deposits can be strongly zoned along strike and vertically. Deposits are commonly zoned vertically over 250 to 350 m from a base metal poor, gold–silver-rich top to a relatively silver-rich base metal zone and an underlying base metal-rich zone grading at depth into a sparse base metal, pyritic zone. From surface to depth, metal zones can contain: gold–silver–arsenic–antimony–mercury, gold–silver–lead–zinc–copper, or silver–lead–zinc. In alkalic host rocks, tellurides, vanadium-mica (roscoelite), and fluorite may be abundant, with lesser molybdenite.

Pyrite, electrum, gold, silver, argentite; chalcopyrite, sphalerite, galena, tetrahedrite, silver sulphosalt and/or selenide minerals are the main mineral species. Quartz, amethyst, chalcedony, quartz pseudomorphs after calcite, calcite; adularia, sericite, barite, fluorite, calcium–magnesium–manganese–iron carbonate minerals such as rhodochrosite, hematite, and chlorite are the most common gangue minerals.

Alteration

Silicification is extensive in ores as multiple generations of quartz and chalcedony are commonly accompanied by adularia and calcite. Pervasive silicification in vein envelopes can be flanked by sericite–illite–kaolinite assemblages. Intermediate argillic alteration (kaolinite–illite–montmorillonite (smectite)) can form adjacent to some veins; advanced argillic alteration (kaolinite–alunite) may form along the tops of mineralized zones. Propylitic alteration dominates peripherally and at depth.

Applicability of the Low-Sulphidation Model

On Shivee West, the Zone III/Argo zone is typical of a low-sulphidation epithermal gold mineralization based on the quartz ± sericite alteration, quartz veins and stockwork, felsic volcanic association, restricted size, and the gold–arsenic–antimony geochemical signature. Zone I alteration represents a moderately-sized high-sulphidation (advanced argillic) zone displaying quartz–alunite–pyrophyllite–topaz–kaolinite–illite, but with low base and precious metal values.

8.2 Comments on Section 8

Both a porphyry model and low-sulphidation epithermal model are valid models for exploration within the Entrée/Oyu Tolgoi JV Project.

High-sulphidation alteration may be transitional with the deeper porphyry copper environment, and the upper parts of the Central (Oyut)and Hugo South deposits on the Oyu Tolgoi ML display variable zones of high-sulphidation alteration with significant copper–gold mineralization.

9.0 EXPLORATION

9.1 Introduction

Entrée conducted exploration within the Shivee Tolgoi and Javhlant MLs from 2002 to 2004. After signing the Earn-in Agreement in October 2004, all work in the Entrée/Oyu Tolgoi JV property area was conducted by OTLLC, the Entrée/Oyu Tolgoi JV operator. Entrée continued to conduct exploration in the Shivee West property area from 2004 until 2012.

Exploration methods used by Entrée and OTLLC included satellite image interpretation, prospecting, mapping, geochemical sampling, geophysical surveying, trenching and drilling. Exploration activities within the Shivee Tolgoi and Javhlant MLs are summarised in Table 9-1.

Exploration methods are discussed in context of the Entrée/Oyu Tolgoi JV property and the Shivee West property in Section 9.3 and Section 9.4 of this Report, respectively. The majority of information for the Hugo North Extension and Heruga deposits was derived from drill data; these two deposits are discussed in Section 10 of this Report.

9.2 Grids and Surveys

9.2.1 Survey Datum

Survey datums used for the Project include Mongolian survey datum MSK42, Mongolian survey datum MONREF-97 (equivalent to WGS-84), and WGS-84. The boundary coordinates of the MLs are defined by latitude and longitude coordinates (WGS-84 datum, MONREF-97). Coordinates used for exploration on the Project are predominately the WGS-84 coordinate system, UTM, Zone 48N.

There is a small difference in the boundary coordinates of the MLs depending on the survey datum used.

Table 9-1: Exploration Activities Shivee Tolgoi and Javhlant MLs, 2002–2020

Year	Company/ Contractor	Exploration Activity	Quantity
2002	Entrée	Prospecting and reconnaissance litho-geochemistry.	75 samples
	Entrée	Trenching Zone III (576 m).	450 chip samples
	Entrée–SJ Geophysics	IP survey using pole–dipole array and 50 m electrode spacing. Two initial lines.	7–8 line-km
2002–2003	Entrée	Soil geochemistry. Samples every 50 m along lines; five lines 200 m apart with another 11 lines 100 m apart.	2,140 samples
2003	Entrée–Scott Geophysics	IP survey using pole–dipole array and 50 m to 100 m electrode spacing. Lines spaced 200 m apart.	109 line-km
	Entrée–Scott Geophysics	Ground magnetics survey. Readings 12.5 m along the lines. 10 lines spaced 100 m apart and five lines spaced 200 m apart.	55.4 line-km
2003–2004	Entrée–Abitibi Geophysics	Gravity survey. 16 lines spaced 200 m apart.	114 line-km
2004	Entrée–XDM	1:10,000 scale geological mapping	—
	Entrée–Can Asia Drilling	Diamond drilling (including 6 holes at Oortsog)	18 holes for 3,931.9 m
2004–2005	Entrée–OTLLC	Gradient array IP survey. 56 lines spaced 100 m; 11 km A-B electrode spacing initially, then 1.2 km, 2 km, 3.1 km, 5 km and 6.6 km electrode spacing in smaller areas	1,562 line-km
2005	Entrée–OTLLC	Reconnaissance and initial sampling on JV licences	100 chip samples
	Entrée–OTLLC	Soil sampling from Heruga, Castle Rock, Ulaan Khud and West Mag areas	3,605 soil samples
	Entrée–OTLLC	Diamond and RC drilling (Shivee Tolgoi ML)	40 core holes for 47,792 m 2 RC/core holes for 736 m

Year	Company/ Contractor	Exploration Activity	Quantity
			66 RC holes for 4,009 m
2006	Entrée	Acquisition and analysis of Aster satellite imagery	—
	Entrée–Can Asia Drilling and AIDD	Diamond drilling	15 holes for 8,080.5 m
	Entrée–Quantec Geoscience	IP and resistivity surveys	250 line-km
	Entrée–OTLLC	Geophysical survey interpretation	—
	Entrée–OTLLC	Quarried rock for use as aggregate in concrete for the shaft foundations and lining at Oyu Tolgoi; operations discontinued	—
	Entrée–OTLLC	Diamond and RC drilling (Shivee Tolgoi ML)	49 core holes for 33,909 m 13 RC holes for 910 m
	Entrée–Major Drilling	Diamond drilling	11 holes for 8,614.1 m
	Entrée–AIDD	RC drilling	11 holes for 1,675.0 m
	Entrée	Geological mapping at 1:10,000 scale	—
	Entrée	Gradient IP and resistivity geophysical surveys	40 line-km
	Entrée	Reconnaissance exploration	80 rock samples
	Entrée–Dr. Sharon Carr	Detailed structural and stratigraphic analysis of Devonian Corridor	—
	Entrée	Mobile metal ion (MMI) soil sampling	31 samples
	Entrée, PCIGR, University of British Columbia, Geochron Laboratories, University of Tasmania	Age dating	8 samples
	Entrée–PetraScience Consultants Inc.	Petrographic and spectral analysis	34 drill core samples and 15 rock samples
2007	Entrée–Dr. Sharon Carr	Detailed structural and stratigraphic analysis of Khoyor Mod prospect	—
	Entrée, Major, and AIDD	Diamond drilling	13 holes for 5,620.5 m

Year	Company/ Contractor	Exploration Activity	Quantity
	Entrée–Geocad	Grid surveying	Approx. 178 line-km
	Entrée–Geosan	Ground magnetometer surveying	1,739 line-km
	Entrée–XDM	1: 20,000 and 10,000 scale geological mapping	—
	Entrée	Soil sampling	3,859 samples
	Entrée	MMI soil sampling	991 samples
	Entrée	Excavator trenching + samples	970 m, 485 samples
	OTLLC–Geosan	Dipole-dipole surveys over the Airport North zone and on two 1,400 m spaced lines across Heruga and Castle Rock	—
	OTLLC–Major Drilling	Diamond drilling (Shivee Tolgoi ML)	6 holes for 5961 m
	OTLLC–Major Drilling	Diamond drilling (Javhlant ML)	34 holes for 46,701 m
	Entrée/AIDD	Diamond drilling	3 holes for 955.3 m
2008	OTLLC	Ground magnetometer survey – Heruga and Hugo North Extension	30.76 km^2 and 26.6 km^2
	OTLLC–Major Drilling	Diamond drilling (Javhlant ML)	9 holes for 15,705 m
	OTLLC–Major Drilling	Diamond drilling (Shivee Tolgoi ML)	1 hole for 721 m
2009	OTLLC	Deep penetrating IP – Hugo North Extension and Heruga	281 line-km
	OTLLC–Major Drilling	Diamond drilling (Javhlant ML)	1 hole for 229 m
	Entrée	Mapping: 1:10,000 and 1:2,000 scales	—
	Entrée	MMI soil sampling	4,610 samples
	Entrée	Rock sampling	131 samples
2010	Entrée	Whole rock sampling	34 samples
	Entrée	Excavator trenching + samples	107 m, 5 samples
	Entrée–Geosan	Gravity surveying	47 line-km
	Entrée–Geosan	IP surveying	183 line-km
	Entrée, Major, and AIDD	Diamond drilling	11 holes for 11,633.7 m

Year	Company/ Contractor	Exploration Activity	Quantity
2011	OTLLC	Deep penetrating IP – north of Hugo North Extension, Shivee Tolgoi ML	339.7 line-km
	OTLLC–Major Pontil	Diamond and RC Drilling (Shivee Tolgoi ML)	5 core holes for 8249 m 1 RC hole for 90 m
	OTLLC–Major Pontil	Diamond drilling (Javhlant ML)	3 holes for 4231 m
	Entrée	Mapping: 1:10,000 and 1:2,000 scales	—
	Entrée	Rock sampling	17 samples
	Entrée	Whole rock sampling	14 samples
	Entrée	Excavator trenching and samples	1,212 m, 629 samples
	Entrée–Geosan	Magnetometer surveying	1,670 line-km
	Entrée–Landrill	RC drilling	23 holes for 2470 m
	OTLLC–Fugro	High resolution magnetotelluric survey, Shivee Tolgoi and Javhlant MLs	1,006 stations
	OTLLC	Geological mapping (Javhlant ML)	—
2012	OTLLC–Geosan	Ground magnetometer survey	31.53 km^2
	OTLLC–Major Pontil	Diamond drilling (Shivee Tolgoi ML)	16 holes for 23,825 m
	OTLLC–Major Pontil	Diamond drilling (Javhlant ML)	4 holes for 6,766 m
	Entrée	Mapping: 1:2,000 scale	—
	Entrée	Excavator trenching and samples	1,723 m, 547 samples
	Entrée	Whole rock sampling	6 samples
	Entrée	Rock sampling	37 samples
	Entrée	Chip samples	23 samples
	OTLLC–Major Pontil	Drilling (Shivee Tolgoi ML)	52 polycrystalline drill holes (PCD) for 3,335 m 3 core holes for 3336 m
2012–2013	OTLLC–Major Pontil	Diamond drilling (Javhlant ML)	6 holes for 9,185 m
2014–2015	Entrée–OTLLC	No work undertaken	No work undertaken
2016	OTLLC	Drilling – (Shivee Tolgoi ML)	6 PCD holes for 421 m
	OTLLC	IP (Javhlant ML)	7.2 line-km
	OTLLC	Mapping: 1:5,000 (Javhlant ML)	3,310 ha

Year	Company/ Contractor	Exploration Activity	Quantity
2017	OTLLC	Soil sampling – 3 grids (Javhlant, Shivee Tolgoi MLs)	1,224 samples (incl. QC)
	OTLLC	Rock sampling (Javhlant ML)	11 samples
	OTLLC	Core re-sampling (Javhlant ML)	1,093 samples (incl. QC)
	OTLLC	Ground magnetic (Javhlant ML)	4150 ha
	OTLLC	Rock & core sampling (Javhlant, Shivee Tolgoi MLs)	1,039 samples
	OTLLC - Geomaster	Ground gravity (Javhlant ML)	3,245 stations
	OTLLC - Geomaster	Seismic (Shivee Tolgoi ML)	533 stations
2018	OTLLC - Geosan	IP (Shivee Tolgoi ML)	14 line-km
	OTLLC - Major	RC drilling (Javhlant ML)	2 holes for 477 m
	OTLLC	Soil sampling – 4 grids (Javhlant ML)	800 samples
	OTLLC	Mapping: 1:5,000 (Javhlant ML)	38,00 ha
2019	OTLLC - Major	RC drilling (Javhlant, Shivee Tolgoi MLs)	17 holes for 3,983 m
	OTLLC - Geosan	IP (Javhlant, Shivee Tolgoi MLs)	58 line-km
	OTLLC	Soil sampling (Shivee Tolgoi ML)	380 samples
	OTLLC	Mapping (Javhlant, Shivee Tolgoi MLs)	6,890 ha
2020	OTLLC	Mapping 1:5,000 (Javhlant, Shivee Tolgoi MLs)	8,645 ha
	OTLLC	Soil sampling (Shivee Tolgoi ML)	435 samples

Note: OTLLC drilling in the above table does not include holes drilled from the Oyu Tolgoi ML into the Entrée/Oyu Tolgoi JV property (only holes collared on the Entrée/Oyu Tolgoi JV property are included). When holes overlap two years, the total length of a hole is included in the start year.

9.2.2 Topographical Surfaces

Various topographical surveys have been completed within the Project area including a survey completed in 2010 by Geomaster, covering a 10 x 10 km area using an electronic total station instrument. This instrument has an accuracy of 5 cm. The survey had a contour interval of 1 m.

9.3 Entrée/Oyu Tolgoi JV Property Exploration Methods

9.3.1 Geochemical Sampling

Geochemical sampling has consisted of trenching, conventional and mobile metal ion (MMI) soil sampling, rock chip and grab sampling, and stream sediment and pan concentrate sampling.

During 2011, all previous geochemical surveys completed in the Oyu Tolgoi area were reviewed (Sketchley, 2011). Survey data were levelled, compiled into a single dataset, and the anomalies ranked according to location and type. Anomalous zones were compared to the rock chip and drill databases.

Results of the review were:

- Anomalous areas are considered to be related to known and explored mineralization or are lithologically associated
- Areas not previously covered by soil geochemistry are underlain by large intrusions, non-prospective rock exposures, or thick alluvial cover
- Highly prospective areas have been extensively drilled
- Thick cover sequences render buried mineralization undetectable by surface geochemical methods.

Soil sampling in 2016 used a hand auger for the area covered with thick soil, and shovel and crowbar for areas with significant outcrop. All samples were sieved with a 500 µm screen in the field, or after drying if wet. More recently, samples were collected using a shovel and crowbar and coarse sieved in the field into +4 mm and -4 mm fractions. The coarse fraction was used for alteration spectral testing.

Since 2016, targeted soil and rock geochemical programs were conducted each year on the Entrée/Oyu Tolgoi Joint Venture Property to test various prospects (refer to Table 9-1). To date, all the Javhlant ML was covered with soil sampling at a sample spacing varying between 400 x 400 m and 100 x 200 m. The Shivee Tolgoi ML in the area north of the Oyu Tolgoi ML was covered by soil sampling in several grids with 200 x 400 m sample spacing. Soil geochemistry since 2016 included:

- 2017: 214 soil samples taken over the Southeast IP target and 21 surface rock samples from the Bumbat Ulaan target (Javhlant ML). Six rock samples were collected from the East Au (Oortsog) target (Shivee Tolgoi ML). A rock geochemical study was also completed on core samples from Heruga (885 samples) and from the Airstrip target (127 samples) to study trace element zoning

- 2018: 1,471 soil samples collected from four different grids mainly located in the central and western areas of the Javhlant ML and covering the Bumbat Ulaan and West Mag prospects and the north end of Heruga (two lines)
- 2019: 400 soil samples were collected over the Ductile Shear feature located on the west side of the Shivee Tolgoi ML.
- 2020: 400 soil samples were taken over a grid located south of the Airstrip target to the Oyu Tolgoi ML boundary. Twenty rocks were also collected while mapping the Ductile Shear and from East Au (Oortsog) targets.

Commencing at the northern boundary of the Oyu Tolgoi ML, an induced polarization (IP) survey was run on 100 m-spaced lines oriented east–west to trace the northern projection of the Hugo North deposit into the Entrée/Oyu Tolgoi JV property. This initial IP survey, using gradient array with 11,000 m AB electrode spacing, covered an area extending 5.6 km north of the Entrée/Oyu Tolgoi JV property boundary and 10 km in width. Subsequent IP surveys covering smaller areas within the larger area were carried out with gradient arrays using 1,200 m, 2,000 m, 3,100 m, 5,000 m and 6,600 m-spaced AB electrodes. The surveys outlined a significant chargeability feature over about 4 km of interpreted strike extent of the Hugo North deposit. Additional IP chargeability targets were also revealed 2.5 km to 3 km west of the Hugo North trend.

IP surveys were carried out over the Airport, Heruga and Castle Rock areas in 2007, and in 2008 over Heruga and an area to the south of Heruga. In 2009–2010, an extensive geophysical survey was completed over Hugo North Extension and Heruga using a deep-penetrating IP system. The results were used to target additional drilling, primarily deepening existing holes to test deeper anomalies. During 2016, two IP lines were completed over the Castle Rock prospect and the area to the south of Heruga.

Regional magnetic surveys were carried out over much of the property. Detailed ground magnetometer surveys were carried out over Heruga and Hugo North Extension in 2008. Survey lines for both areas were oriented east–west at 25 m spacing with continuous readings. The surveys covered 26.6 km^2 area at Hugo North Extension and 44.2 km^2 at Heruga, of which 30.76 km^2 was in the Entrée/Oyu Tolgoi JV property area. Additional ground magnetometer surveys extended these areas in 2011.

High-resolution magnetotelluric (MT) surveying was completed over much of the Shivee Tolgoi and Javhlant licenses in 2011. The MT survey covered the Heruga deposit and the Heruga Southwest IP anomaly.

More recently from 2017 to 2020, the following targeted geophysical work has been completed:

- Seven lines (39 km) of dipole-dipole IP over the Airstrip and Ulaan Khud targets (Shivee Tolgoi ML)
- Five lines (32 km) of dipole-dipole IP completed over the Bumbat Ulaan target on the Javhlant ML
- Ground gravity (3,245 stations) infilled areas on Javhalant that had not been completed previously
- A Tromino passive seismic survey (294 stations) was conducted over the Airstrip target to model the depth of extensive Cretaceous cover in the area. The cover thickness will be used to help refine 3D modelling.

Geophysical survey grid extents are shown in Figure 9-1. Property-wide IP and ground magnetic coverage is shown in Figure 9-2.

9.3.2 Satellite Image Interpretation

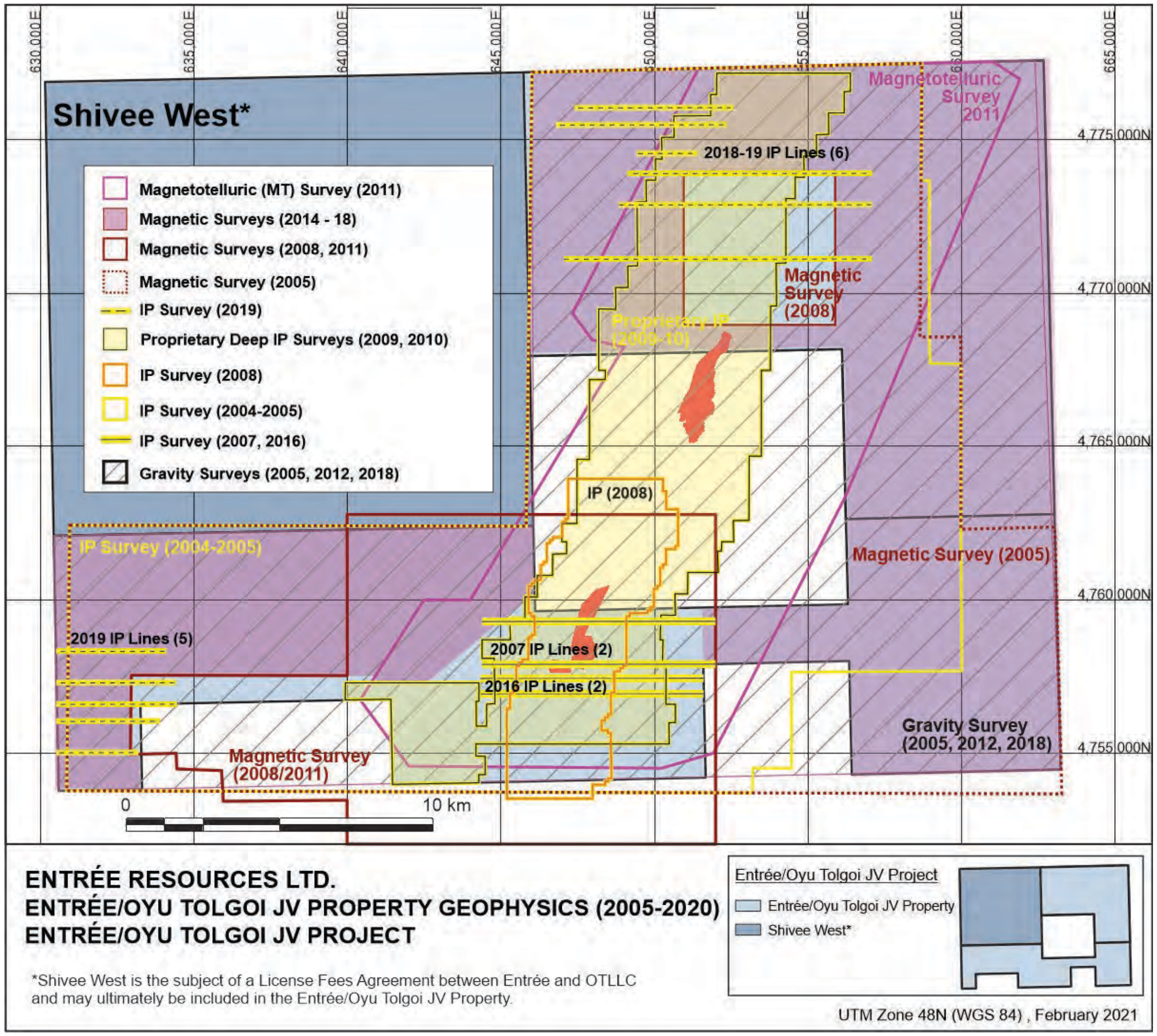
In 2001, Ivanhoe Mines commissioned Pacific Geomatics from Vancouver to produce 1:100,000 scale Landsat satellite images and a structural and alteration interpretation over a 1,500 km^2 area centred on the Project. These data were integrated into a geographic information system (GIS) database and used to in support of structural interpretations and alteration mapping.

In 2003 Ivanhoe Mines requested that Pacific Geomatics provide Quickbird imaging over the entire Oyu Tolgoi ML.

In 2012, OTLLC engaged Fugro Spatial to acquire GeoEye imagery over the entire ML areas, and extend this coverage along key infrastructure corridors (e.g., the Gunii Hooloi water bore field and the road to the China/Mongolia border). Resolution was approximately 0.5 m in the vertical and horizontal components.

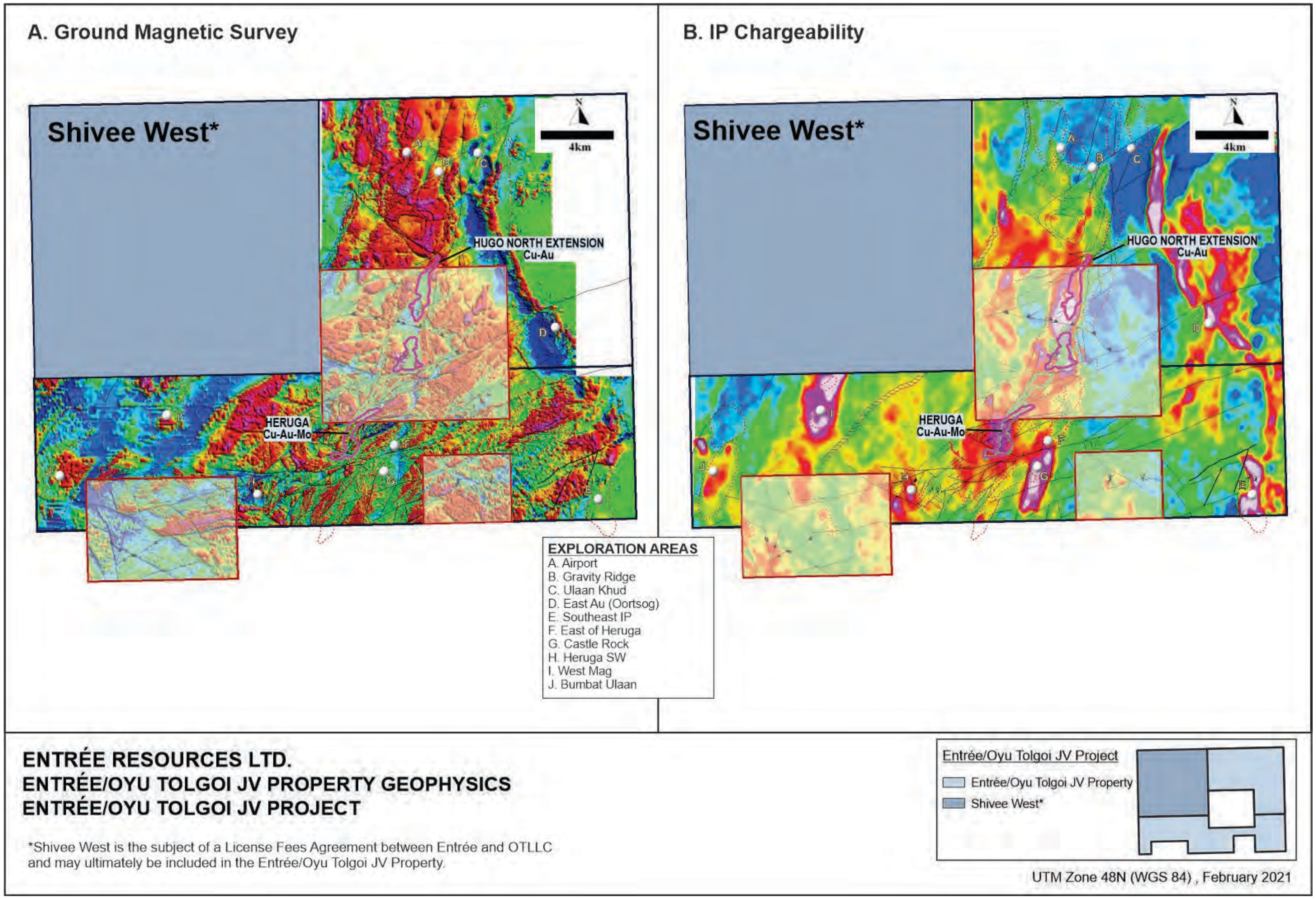
Since 2015, OTLLC has used multispectral ASTER and Sentinel-2 imagery to support district scale lithological and alteration interpretation.

Figure 9-1: Entrée/Oyu Tolgoi JV Property Geophysical Survey Plan



Note: Figure courtesy Entrée, 2021.

Figure 9-2: Entrée/Oyu Tolgoi JV Ground Magnetic and IP Summary Plans



Note: Figure courtesy Entrée, 2021.

9.3.3 Geological Mapping

Surface geological mapping programs have generally been restricted by the variable outcrop distribution in the Project area. Mapping on the Shivee Tolgoi ML comprised 1:20,000 and 1:10,000 scale regional mapping, with detailed prospect-scale mapping completed at 1:2,000, 1:2,500, and 1:5,000 scale. Much of the Javhlant ML has been covered from 2016 to 2020 by 1:5,000 scale mapping. Figure 7-3 in Section 7 is a compilation plan of the mapping completed to date.

Detailed underground geological mapping has been undertaken in the Hugo North underground workings. The mapping was done initially on paper sheets, which were scanned, imported to Vulcan software, geo-referenced, and converted to lithological and structural strings for interpretation. A total of over 24,500 m of development has been mapped since 2016 to define relationships between mineralization, lithology and fault structures.

In 2018, an in-house underground mapping tablet-based application, Facemapper, was deployed by OTLLC. Geotechnical and geological data are collected simultaneously at the face, from which a digital map is generated. The mapping data are used to help predict ground conditions in front of planned development. The mapping is used to validate and update the geology model which was initially generated from core drillholes. Where relevant, it is included in the geological model that supports the Mineral Resource estimate for Hugo North/Hugo North Extension.

There is no underground development within the Hugo North Extension area as of the effective date of this Report.

9.4 Shivee West Property Exploration Methods

Exploration by Entrée in the Shivee West property area includes satellite image interpretation, prospecting, geochemical sampling (rock, conventional and MMI soil, silt and pan concentrate), geophysical surveys (IP, gravity, airborne and ground magnetic and radiometric), detailed geological mapping, trenching, and diamond and reverse circulation (RC) drilling. Geochemical sample locations are summarized in Figure 9-3. Geophysical survey areas are summarized in Figure 9-4.

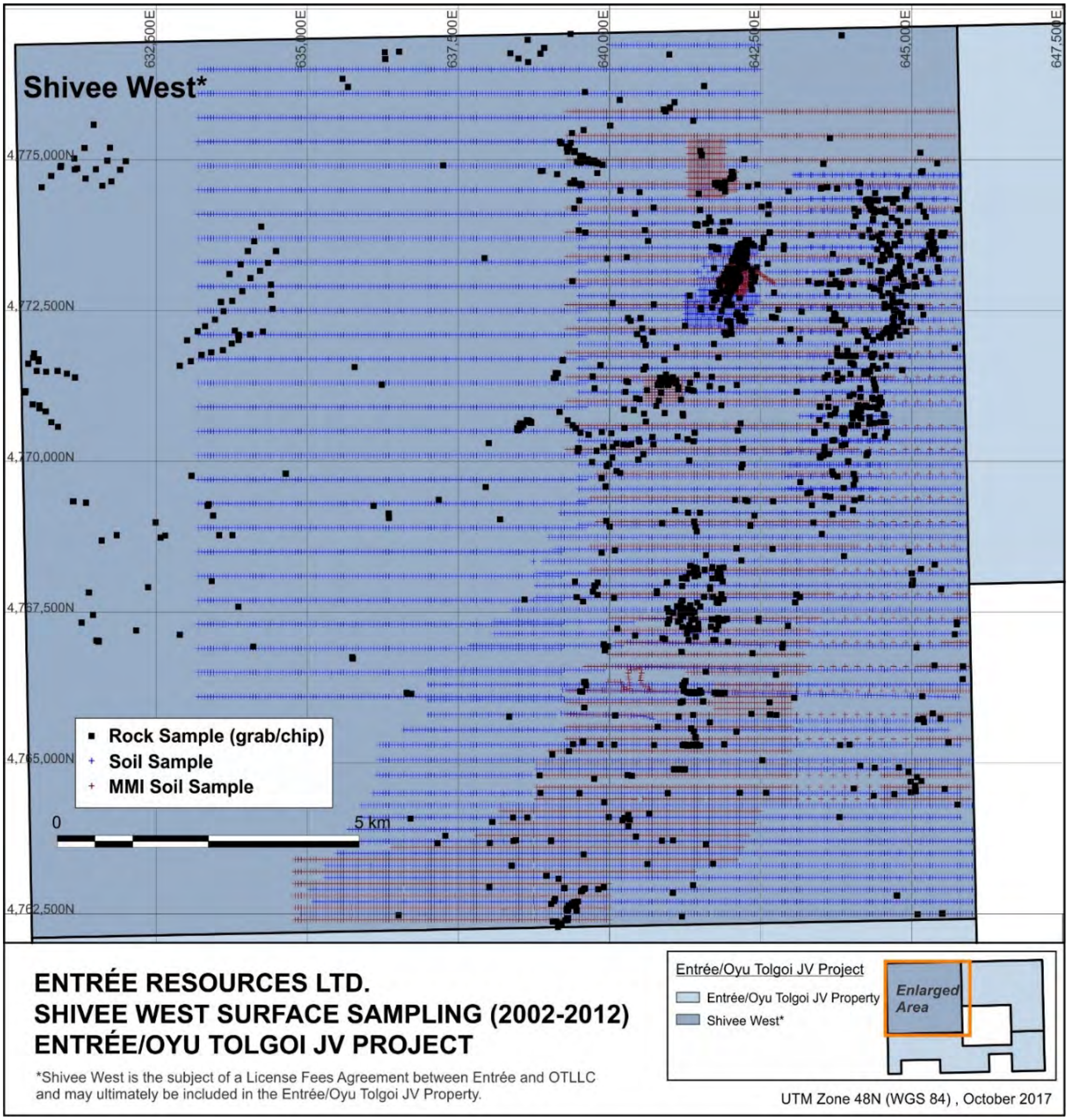
Exploration for porphyry copper mineralization in the Shivee West property area was driven primarily by geophysical surveying, in particular IP, which had been successful for finding porphyry copper mineralization in the Entrée/Oyu Tolgoi JV property area.

However, drilling of IP chargeability features within the Shivee West property has not yet led to the discovery of any deposits.

Figure 9-5 shows the various targets identified through exploration within the Shivee Tolgoi and Javhlant MLs.

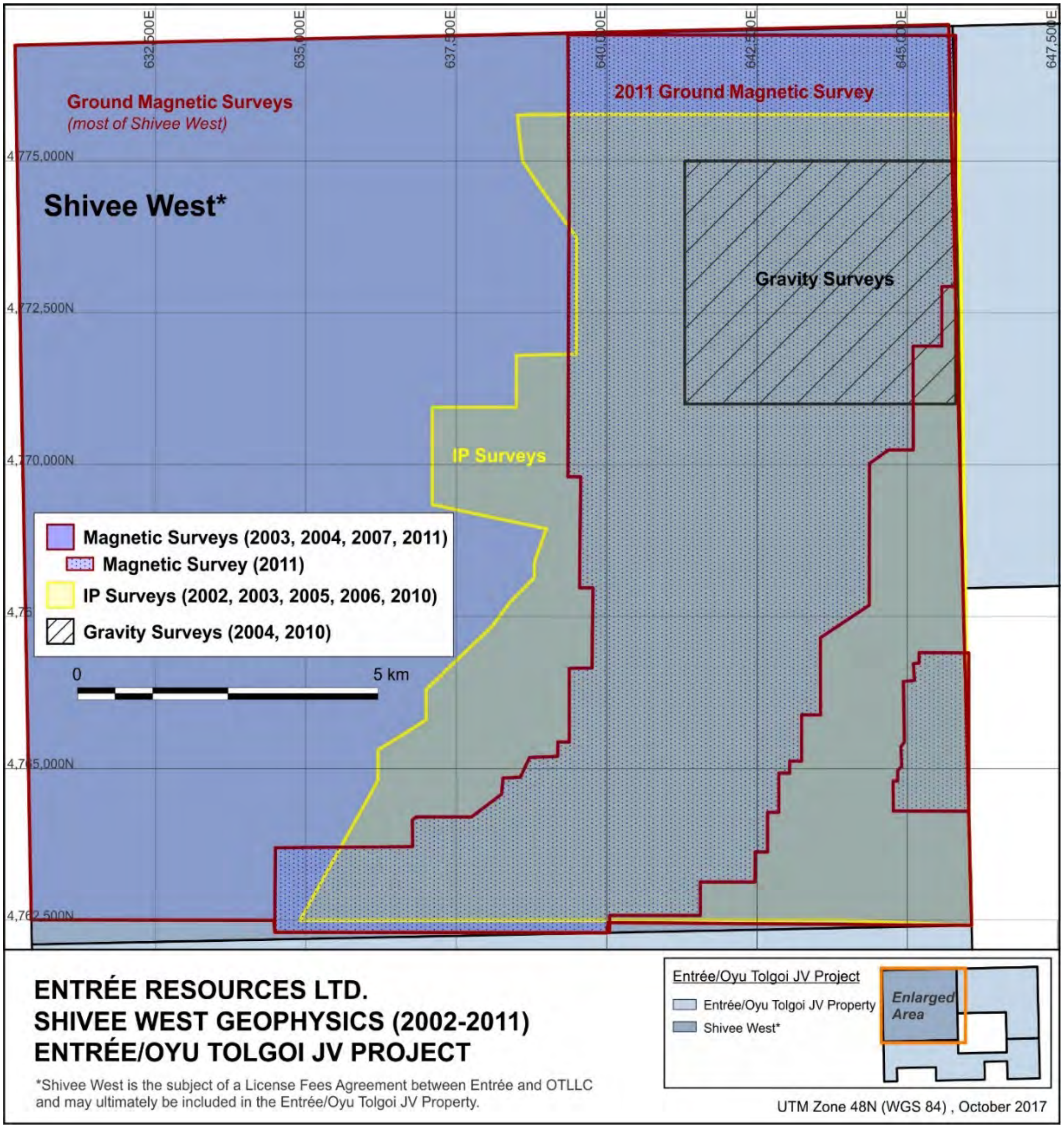
Exploration prospects are presented in the context of the Entrée/Oyu Tolgoi JV or Shivee West property areas, and are discussed in Section 9.5 and Section 9.6, respectively, of this Report.

Figure 9-3: Shivee West Geochemical Sample Plan



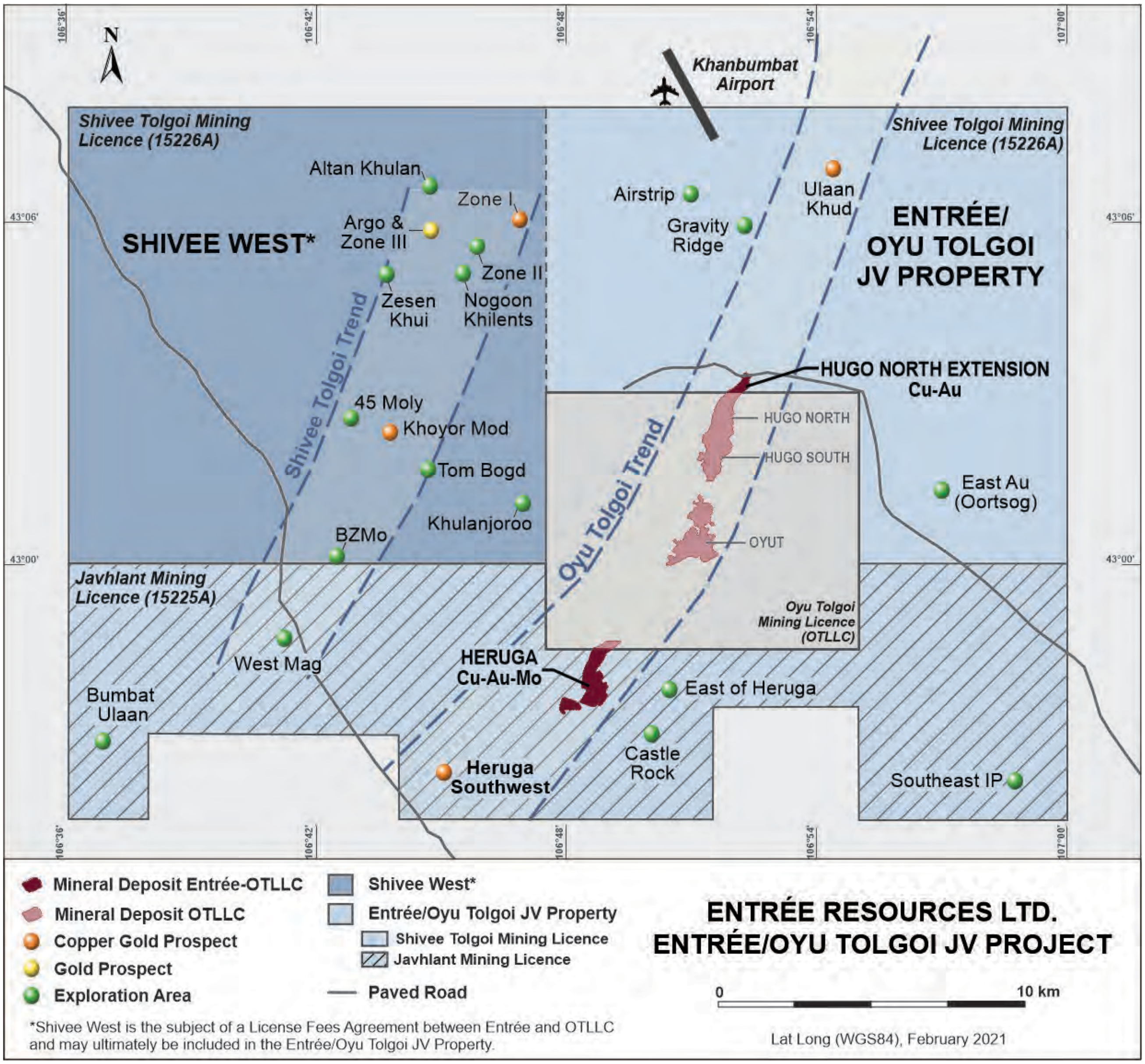
Note: Figure courtesy Entrée, 2017.

Figure 9-4: Shivee West Geophysical Survey Plan



Note: Figure courtesy Entrée, 2017.

Figure 9-5: Shivee Tolgoi and Javhlant Mining Licence Exploration Prospects



Note: Figure courtesy Entrée, 2021.

Individual exploration prospects or targets and exploration completed to date are described in the following sub-sections. Prospect locations are shown in Figure 9-5 and more detailed maps referenced below where appropriate.

9.4.1 Ulaan Khud

The Ulaan Khud prospect was discovered in 2006 through RC sterilisation drilling of possible airport locations. The prospect is about 8 km to the north of Hugo North Extension and comprises a narrow, near-surface, steeply-dipping zone of copper–gold porphyry mineralization beneath Cretaceous cover.

The zone, which was tested by 35 core holes during 2006–2007, is 30–50 m wide, 900 m long, and has been drilled over a vertical extent of about 600 m. Grades generally average <0.3% Cu with gold grades in the range of about 0.2–0.4 g/t Au. A 1 km zone remains untested from the last fence of core drill holes to the north boundary of the Shivee Tolgoi ML.

No additional work has been done at this target since 2007 except for data review and modelling in 2020; however, OTLLC have stated further exploration is planned in this area.

9.4.2 East Au (Oortsog)

The East Au, also referred to as Oortsog or X-Grid, is a gold-in-soil anomaly in silicified sediments. The prospect has been explored by soil sampling, trenching and drilling (six core holes during 2004). No significant zones of mineralization have been identified to date.

The sediments are hosted in a sequence of basaltic volcanic rocks. Less-resistant siliceous siltstone and argillite underlie the basalts and overlie the andesites. Numerous felsic dykes run sub-parallel to the nearby alkaline Khanbogd complex contact. Quartz veining ranges from 0.25 to >5 m in width.

Discontinuous limonitic veins generally less than 1 m in width, typically displaying narrow alteration envelopes, appear to be structurally controlled by small faults or fracture and shear zones within hornfels adjacent to the Khanbogd complex.

OTLLC prospected this area in 2019 and collected 13 rock samples. Some of the rock chips returned anomalous gold values.

9.4.3 Airstrip Target

The Airstrip target (also referred to as Airport target) is located in the vicinity of the Khanbumbat Airport (north boundary of Shivee Tolgoi ML) and was originally defined by a gravity-chargeability anomaly. Most of this prospect area is covered by 20–70 m of Cretaceous clay with very limited outcrop. Widely spaced, shallow drilling located prospective Devonian quartz monzodiorite intrusive and possible Devonian volcanic unit. One drill hole returned anomalous copper and gold results. Two subsequent core holes did not return any significant results.

In 2018 and 2019, five east–west-oriented lines of dipole-dipole induced polarization (DDIP) were completed and resulted in strong IP chargeability anomalies (~10mV/V) on Lines 1 and 2 that appear to widen to the north. On the western edge of Line 2, a weaker (~7mV/V) chargeability anomaly is coincident with an isolated gravity high close to the boundary of granodiorite and basalt. Seven RC drill holes totaling 1,850.9 m were drilled during 2019 to test the DDIP anomalies at relatively shallow depths (<300 m). No significant copper mineralization was intersected. It is thought that the DDIP (chargeability) anomaly might be caused by trace to 6% patchy pyrite within the host lithologies.

During 2020 OTLLC completed geological mapping covering approximately 5,745 hectares over most of the Airstrip target as well as Ulaan Khud and the Gravity Ridge target (see Section 9.4.10). A portion of this area, south from Airstrip to the Oyu Tolgoi ML boundary, was also covered by soil sampling (400 samples on a 200 x 400 m grid). Results from this work had not been received at the Report effective date. Mira Geoscience also completed an update of the constrained 3D geological model for the Airstrip area which highlighted additional prospective areas, and which can be used for further exploration. OTLLC believes the Airstrip target has potential for copper mineralization and requires further exploration.

9.4.4 Castle Rock

The Castle Rock prospect is about 1.5 km southeast of the Heruga deposit and was identified during a 2005 IP/resistivity survey. The survey shows resistivity highs (rhyolites) flanking a resistivity low (advanced argillic alteration). The magnetic response is low, and, for this area, is often indicative of Carboniferous-age sediments.

Previous soil geochemistry over the target had outlined a weak, north–northeast-trending 100–150 m-wide gold anomaly and weak copper values.

The prospect was tested with two core holes in 2007; however, no significant mineralization was logged in either of the holes and the IP anomaly was interpreted to be a result of pyrite in rhyolite and dacite with areas of advanced argillic alteration.

In 2016, the target was re-evaluated, and a new soil grid was sampled (402 samples over 400 m spaced, east–west lines with 200 m spaced sample intervals). The results were re-processed into a molybdenum–arsenic–antimony–tellurium index value resulting in a more distinct, 3 km by 2 km soil anomaly (Figure 9-6).

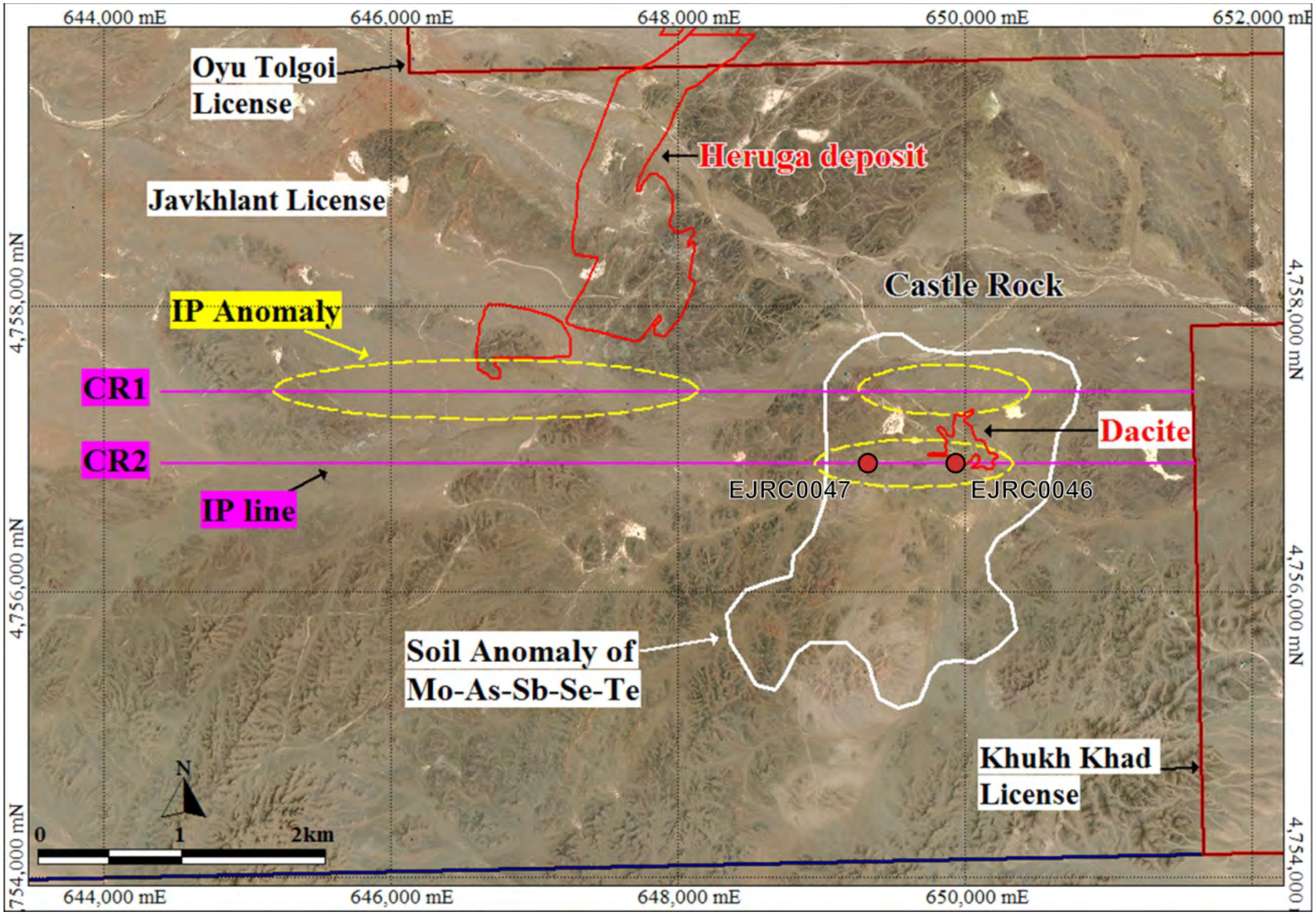
Two additional east–west oriented dipole-dipole IP lines (CR1 and CR2), each 7.2 km in length and separated by approximately 500 m, were also completed during 2016, crossing the northern half of the soil anomaly and continuing west towards the potential southern extensions of the Heruga mineralization. Survey measurements were acquired with a 30 kW Zonge system (GDP-32II receiver and GGT-30 transmitter) and 200 m electrode spacing.

Moderately-strong chargeability anomalies occur on both lines at Castle Rock, starting near surface and continuing to about 600 m depth over 1.2–1.4 km lengths. Much of the area is covered by soil, but isolated outcrops are mapped as chlorite–epidote-altered volcaniclastic rocks, and silica–illite-altered dacite, with locally abundant very fine pyrite and scattered quartz veins.

Further west, the northern line is approximately 300 m south of Heruga and returned a 2.8 km long moderately strong IP anomaly starting at depths ranging from 500–1,000 m below surface. The southern line is about 800 m south of Heruga and returned a weaker IP anomaly over a similar length.

A review of the previous two core holes at Castle Rock in conjunction with the new IP data appears to indicate that the holes may have been drilled outside of the main target area. The core (1,093 samples) was submitted for trace metal analysis using a very low detection level with the objective of identifying potential vectors towards porphyry-style mineralization. This work was not successful in identifying new targets.

Figure 9-6: Castle Rock Prospect 2016 IP, Soil Anomalies and RC Collar Locations



Note: Figure courtesy Entrée, 2021.

Two shallow RC drill holes (EJRC0046 and EJRC0047) were completed in 2018. Both holes intersected Carboniferous volcanic sequences with weak to moderate chlorite-epidote (propylitic) or weak illite-sericite (phyllic) alteration and trace to 6% pyrite mineralization. There were no copper bearing minerals or porphyry-style alteration assemblages identified in the RC chips and no significant assay results were returned. The near-surface chargeability anomaly may be due to the abundant pyrite; however, the lack of copper mineralization and porphyry alteration downgrades the near-surface exploration potential for this target.

9.4.5 East-of-Heruga

The East-of-Heruga prospect is an IP-gravity anomaly located 2 km to the east of the Heruga deposit. It has been tested by one drill hole that did not return any significant results.

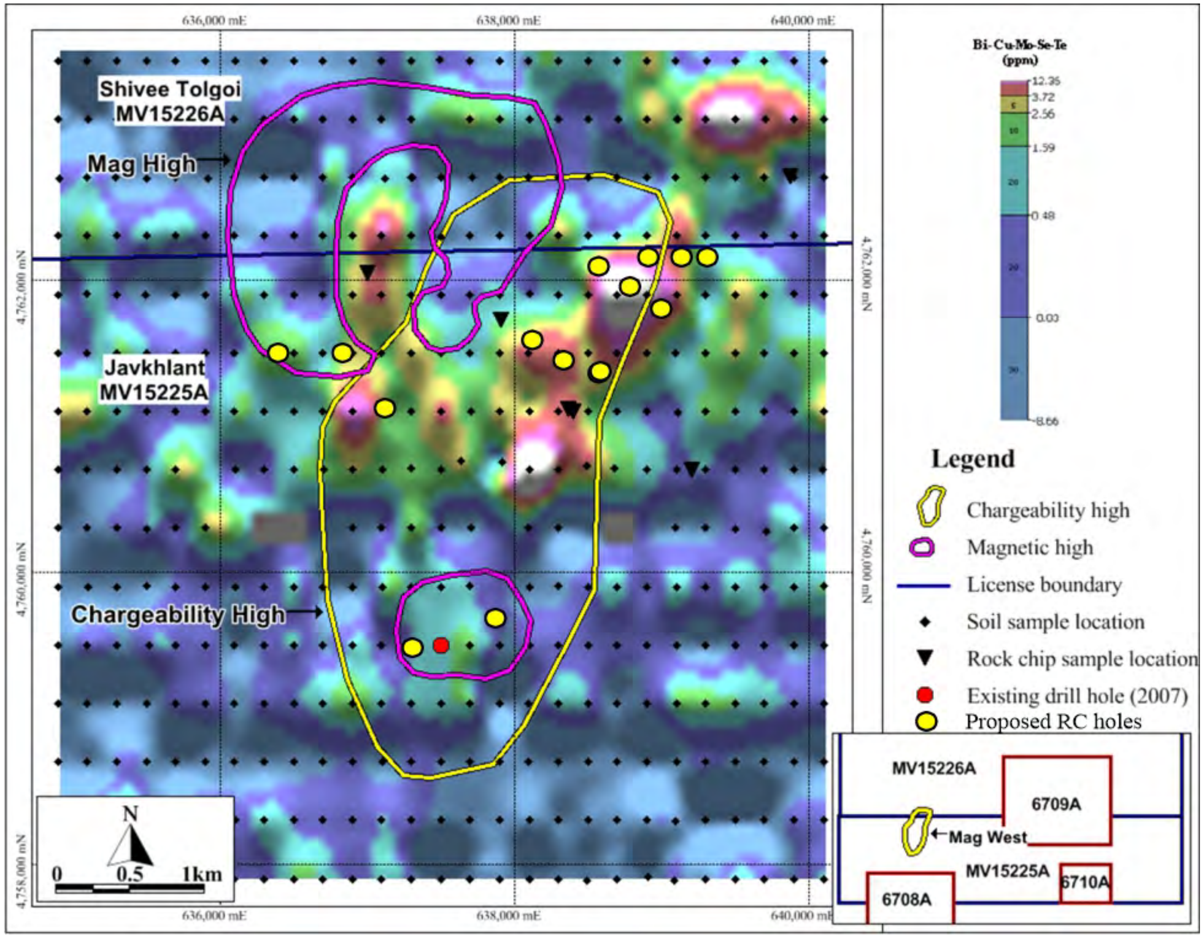
9.4.6 West Mag

The West Mag prospect, also referred to as Mag West or SW Mag, is a magnetic anomaly that has previously been tested by IP, soil sampling and one core hole. No significant zones of mineralization have been identified but a narrow zone of advanced argillic alteration has been mapped. The prospect is located marginal to the northern Javhlant ML boundary.

The anomaly is a circular, reduced-to-the-pole (RTP) magnetic high feature, approximately 1 km in diameter, which occurs on the northwest flank of a major, northeast-trending IP chargeability anomaly that covers an area of approximately 4 km by 2 km (Figure 9-7). The anomaly is developed in a mix of Carboniferous sediments, volcanic rocks and intermediate to felsic dykes.

During 2016, OTLLC further explored the area through additional soil sampling (15 east–west oriented lines separated by 400 m with samples spaced 200 m apart), and six surface outcrop samples (refer to Figure 9-7). The soil samples did not return any significant results for copper or gold; however, when combined into an index of bismuth–copper–molybdenum–selenium–tellurium, a weak, patchy north–northeast-trending anomaly is formed with a similar orientation as the chargeability anomaly. Rock chip sampling (21 samples) completed in 2019 from strongly silicified and pyritic units returned anomalous copper and molybdenum values.

Figure 9-7: Mag West Prospect Magnetic, Chargeability Anomalies and Proposed RC Holes



Note: Figure courtesy Entrée, 2021.

In 2020, OTLLC proposed drilling 11 250 m-deep RC holes to test this target; however, drilling has been delayed due to COVID-19 restrictions.

9.4.7 Heruga Southwest

The Heruga Southwest prospect is an IP anomaly that has been explored by drilling. A deep, copper-mineralized interval was returned from a core hole completed in 2010. Heruga Southwest is the most southerly of the known exploration targets, and the most southerly known extent of the mineralization along the Oyu Tolgoi trend.

9.4.8 Southeast IP

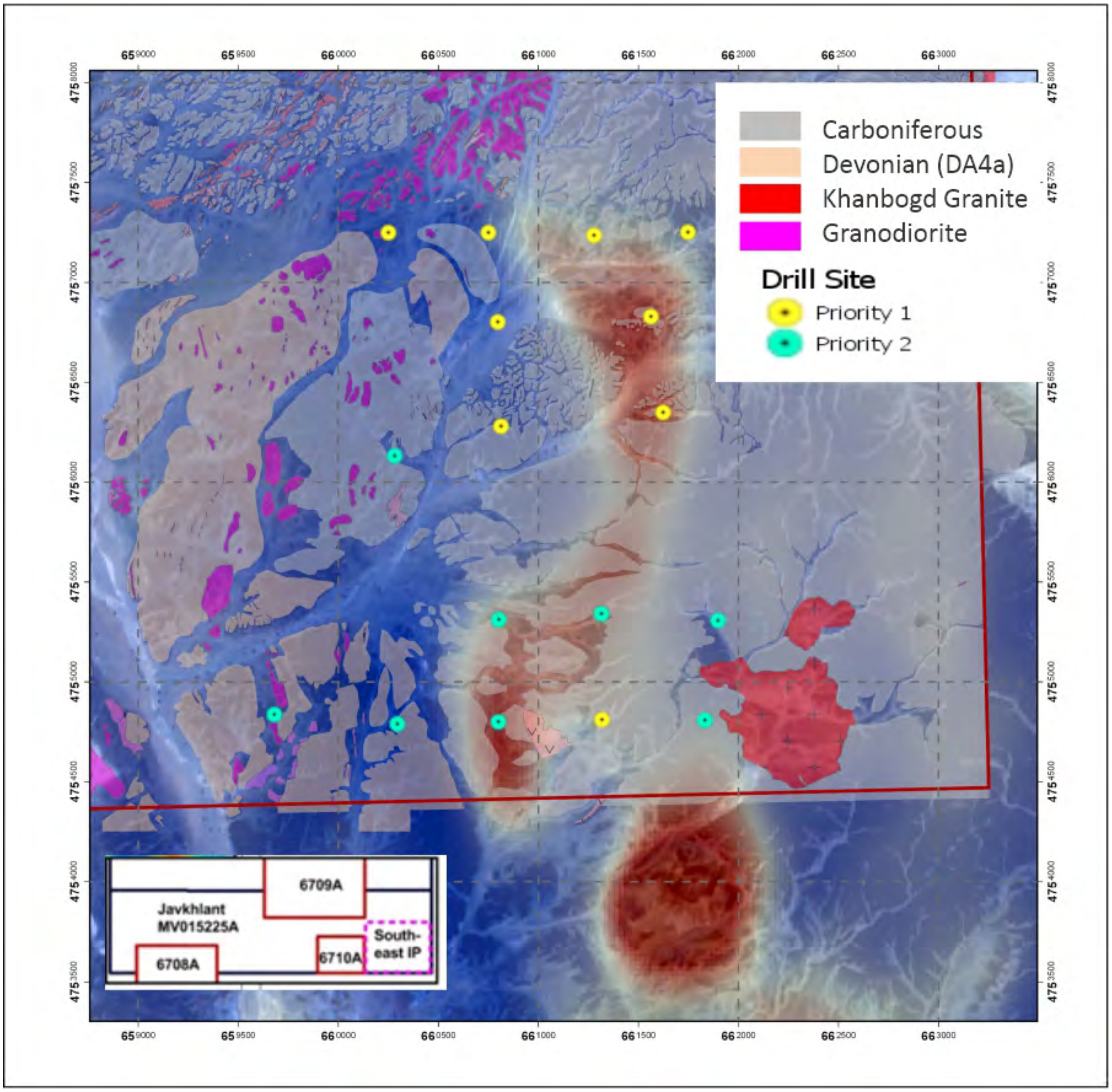
The Southeast IP prospect is located in the southeast corner of the Javhlant ML and is defined by a 4 km-long, north-south trending chargeability anomaly (Figure 9-8). OTLLC completed several campaigns of geological mapping (1:5,000 scale) from 2016 to 2020. The prospect area is underlain by a series of Carboniferous sandstone-siltstone-conglomerate units, underlain to the west by Devonian(?) basaltic volcanic-volcaniclastic rocks. A granodiorite intrusion was mapped in the north portion of the prospect, together with a small tourmaline breccia pipe. A series of felsic to basaltic dykes intrude these units.

Alteration comprises assemblages of chlorite–epidote–carbonate–magnetite, together with localized silicification and hornfels. Dense tourmaline veining occurs locally within the granodiorite and the breccia pipe. Limonite occurs within the granodiorite near the contacts. Copper mineralization (malachite, chrysocolla) occurs locally within fractures and veinlets in the granodiorite, andesitic–basaltic tuff, and dacite dykes.

During 2016, OTLLC further explored the area through additional soil sampling (12 east–west oriented lines separated by 400 m with samples spaced 200 m apart) and five surface outcrop samples. The rock samples returned assay values ranging from 0.18–0.77% Cu. The soil samples returned several clusters of copper anomalies with values ranging between 60–511 ppm Cu. Minor antimony anomalies are associated with the copper, ranging from 1.5–4.4 ppm Sb. No other elements returned anomalous values.

Ten wide-spaced RC drill holes totaling 2,131.8 m were completed in 2019. The holes targeted the IP anomaly at relatively shallow depths and did not intersect any significant copper mineralization. All rocks intersected were Carboniferous-age and no target Devonian lithologies were identified.

Figure 9-8: Southeast IP Prospect 2019 Geological Mapping, Chargeability and 2019 RC Collars



Note: Figure courtesy Entrée, 2021.

Drill hole EJRC0073 intersected minor malachite mineralization within a granodiorite dyke at 148 m depth. According to OTLLC the amount of pyrite in the rocks intersected by the drilling was insufficient to be the source of the IP anomaly and recent integrated 3D modelling has suggested additional targets. OTLLC has recommended additional mapping, IP surveys, and drilling.

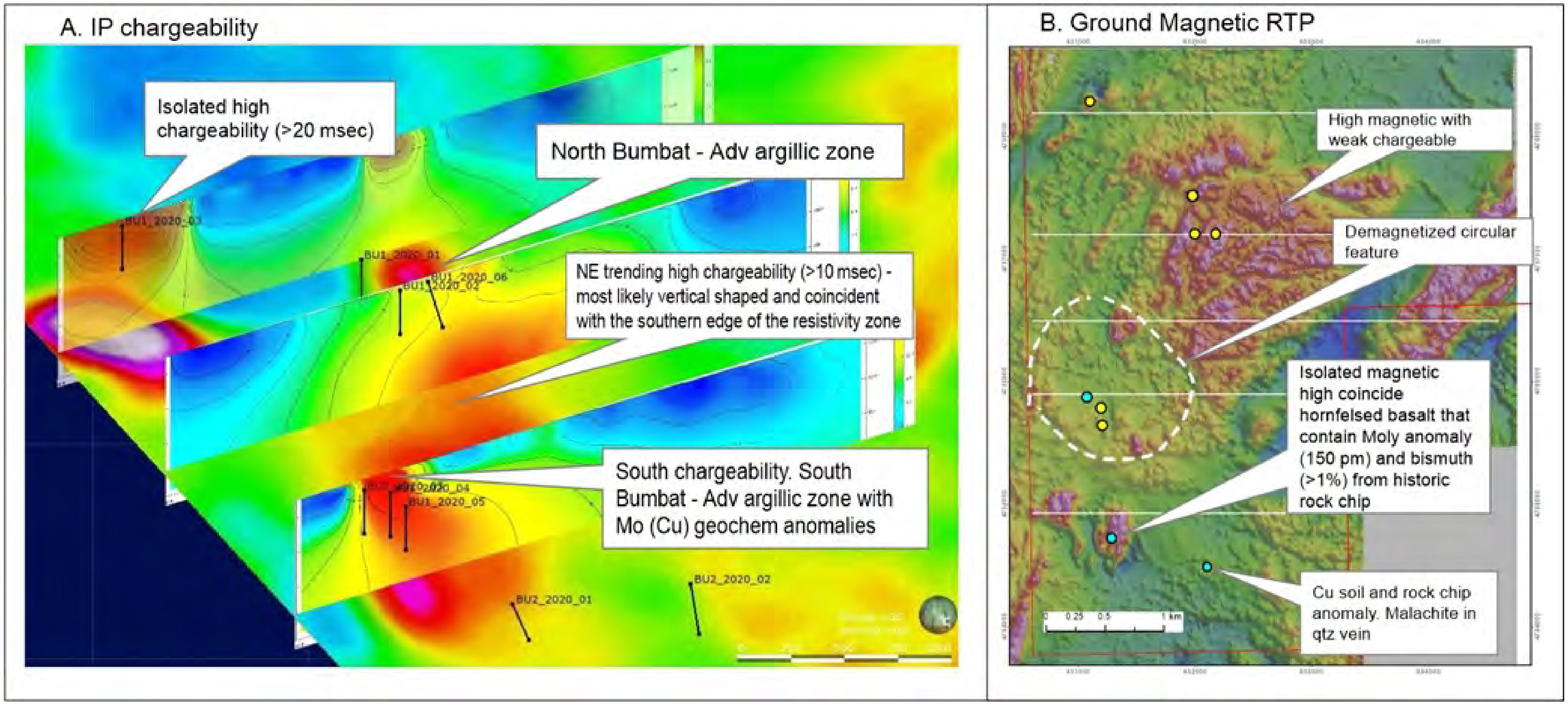
9.4.9 Bumbat Ulaan

Bumbat Ulaan is an early-stage prospect located over a previously-mapped lithocap near the western edge of the Javhlant ML. In 2018, the prospect saw additional geological mapping (1:5,000 scale over 1,050 ha), along with gravity, IP and magnetic geophysical surveys and soil sampling. An interpreted lithocap (advanced argillic alteration) trends northeast and is characterised by a series of northeast–southwest-trending silica dykes with moderate magnetite-hematite alteration, hosted within argillic-altered rhyodacite. Five separate target areas were identified based on the geophysical survey results, along with soil survey results and geological mapping/sampling.

In 2019 exploration work comprised 32 km of IP, HALO spectral mapping of soil samples, and a review of soil geochemistry. The HALO spectral measurements included 301 samples from the northern end of the target and 114 from the south portion. According to OTLLC, results of the samples show the northern area hosts a narrow advanced argillic alteration zone with pyrophyllite–topaz–muscovite–illite and minor dickite assemblages. The advanced argillic zone in the southern part is slightly larger and is dominated by pyrophyllite–alunite–diaspore with strong hematite-goethite staining. OTLLC interprets the mineral occurrences within the two advanced argillic zones to be proximal to a potential heat source. In addition to the HALO sampling, 28 outcrop rock samples were collected at South Bumbat and of these, eight returned anomalous molybdenum values ranging from 11–20 ppm. Limited copper values were associated with the advanced argillic areas, potentially due to leaching as a result of the acidic environment. One sample from the periphery of the southern advanced argillic zone returned 0.18% copper, 967 ppm manganese and 457 ppm zinc, and is considered important since an anomalous manganese and zinc halo is quite common distal to a porphyry system with depletion at the centre.

In 2019, 33 line-km of dipole-dipole IP was completed along five, east–west-oriented lines (Figure 9-9). The results of this survey showed a northeast-trending chargeability anomaly which encompasses the advanced argillic alteration.

Figure 9-9: Bumbat Ulaan Prospect (A) Dipole-Dipole IP Chargeability and (B) Ground Magnetic RTP with Proposed RC Holes



Note: Figure courtesy Entrée, 2021. Figure to the left is shown looking northeast (sections are east–west). North is to the top of the right figure, as shown by the map grid.

A second, isolated, strong chargeability anomaly is located approximately 1 km northwest of the advanced argillic alteration zone.

Eight RC drill holes to a depth of 250 m were proposed by OTLLC to test alteration and geophysical targets; however, drilling has been postponed due to COVID-19 restrictions.

9.4.10 Other Minor Targets

The Gravity Ridge target is a positive linear ground gravity anomaly which extends north–northeasterly for 8 km and is located approximately 1 km west of Hugo North Extension and Ulaan Khud (refer to Figure 9-5). The northern extent is largely under Cretaceous cover and there is no drilling in the area deep enough to test the feature. Surface geology from RC and PCD drilling is mainly Carboniferous granodiorite. OTLLC completed a desktop review in 2019 as well as a single line IP geophysical survey. OTLLC is not currently planning any exploration on this target.

The Ductile Shear is a major regional shear zone which has been mapped for over 20 km and that runs from western Javhlant ML, across the southeast corner of Shivee West and across the northwest corner of Entrée/Oyu Tolgoi JV property (Shivee Tolgoi ML). In 2019, OTLLC conducted soil sampling (400 samples), geological mapping (2,600 ha) and prospecting over the Ductile Shear where it traverses the Shivee Tolgoi ML. The results show some anomalous copper values in a linear trend coincident with the southern end of the shear and also a coincident historic linear IP chargeability anomaly, which appears to be coincident with hornfelsed Devonian sediments and basalt marginal to Carboniferous granite. It is not known if OTLLC will continue exploration in this area.

9.5 Shivee West Property Exploration Results

The Zone I, Zone II, Zone III, Argo, Moly 45, Altan Khulan, BZMo, Khoyor Mod, Nogoon Khilents, Tom Bogd, Zesen Khui and Khulanjoroo targets all lie within the "Devonian Corridor", a corridor of prospective Carboniferous and Devonian lithologies that are considered to have similarities with the lithologies within the Oyu Tolgoi trend.

9.5.1 Zone I

The Zone I prospect is a prominent 2 km long area of argillic and advanced argillic alteration that has been explored using mapping, geophysics, trenching and drilling. No significant zones of mineralization have been identified to date.

Texture-destructive alteration assemblages are imposed on intermediate to felsic Carboniferous volcanic and intrusive rocks.

The altered rocks that define Zone I form a discrete region of coalescing northerly-trending ridges that outline a topographically-prominent feature about 1.0 km by 3.8 km in size.

9.5.2 Zone II

The Zone II prospect is an IP anomaly that has been explored by trenching and drilling. No significant zones of mineralization have been identified to date.

The prospect does not crop out, but is defined as a linear series of strong chargeability anomalies which appear to be controlled by conductive shales, and by a north–south structure with apparent dextral movement.

9.5.3 Zone III and Argo

The Zone III prospect is a near-surface low-sulphidation epithermal gold target that has been explored by geophysics, soil sampling, trenching, and drilling.

Gold mineralization has been traced over 700 m along strike and forms two distinct shallow zones hosted by quartz-veined, felsic volcanic rocks.

The Argo zone is defined by six RC holes, nine trenches and surface chip sampling and measures approximately 400 m long by as much as 130 m wide. Zone III is defined by RC holes, trenching, and surface sampling, and extends over an area of approximately 215 m by as much as 150 m. Mineralization remains open in several directions.

Gold mineralization is associated with chalcedonic to fine granular quartz veinlets. The chalcedonic quartz veins appear to be small, and formed in narrow zones as fracture fillings in the brittle, siliceous host rocks. No strong or dominant structural controls are evident. The host rocks are siliceous and weakly clay altered, derived both from primary rhyolitic volcanic deposits and hydrothermally-altered rocks.

9.5.4 45 Moly and GGMM

The molybdenite-bearing quartz veins in this target area crop out sporadically along a 5.5 km length of the contact of a quartz monzonite (Western Granite) with the Devonian corridor, and are confined to the granite and within a couple of hundred metres of the contact. In outcrop, molybdenum occurs in the form of the sulphide molybdenite within the quartz veins, and more rarely as the oxide molybdite. Drilling in 2006 partially tested this mineralization with four drill holes, returning weak molybdenum values over 10 to 40 m intervals.

9.5.5 Altan Khulan

The Altan Khulan prospect is an epithermal gold target located immediately north of Zone III–Argo, and has been explored by geophysics, soil sampling, trenching, and drilling.

Occasional centimetric-scale quartz veinlets of limited strike extent crop out. Prospecting in the area has returned anomalous gold assays from three quartz vein or quartz float grab samples. In addition, a very weakly anomalous gold-in-soil response from four consecutive 50 m spaced soil samples was detected on the northernmost survey line.

Drilling intersected gold mineralization in the prospect area in 2008, but did not define a significant target.

9.5.6 BZMo

The BZMo (Boundary Zone) prospect has been explored by geophysics and drilling. The prospect crops out to the east of a strong chargeability anomaly. Drilling of the chargeability anomaly encountered disseminated to semi-massive, and locally massive, pyrite mineralization in Carboniferous intermediate volcanic rocks; however, there were no significant assay results. Despite its proximity to these drill holes, no sulphide mineralization or gossan has been observed in the BZMo area. Several grab samples of felsic dykes have returned anomalous molybdenum assay results.

9.5.7 Khoyor Mod

The Khoyor Mod prospect consists of a 250 m x 300 m area of subtle, very poorly-developed quartz stockwork within Devonian sediments which are locally cut by syenite and monzodiorite intrusive bodies. The quartz veinlets are up to several centimetres thick, can usually be traced along their strikes over several metres, and are sub-vertical to steeply dipping. The stockwork returned weakly anomalous gold and copper values, and is indicative of a porphyry target.

9.5.8 Nogoon Khilents

The Nogoon Khilents prospect has been explored by geophysics and drilling. Drilling targeted an IP chargeability anomaly and encountered Carboniferous rocks to 689.9 m, including peperitic basaltic volcaniclastic rock with minor amounts of chalcopyrite. Two minor intervals of carbonaceous siltstone may be correlated with the carbonaceous sedimentary rocks at the Tom Bogd prospect, indicating the chargeability anomaly might have a strike length of 6.5 km. Overall sulphide content was low in the core, such that a source for the chargeability anomaly was not confirmed.

9.5.9 Tom Bogd

The Tom Bogd prospect has been explored by geophysics, soil sampling, and drilling. The target is a strong chargeability anomaly coincident with weak copper and molybdenum MMI soil anomalies. No significant zones of mineralization have been identified to date.

9.5.10 Zesen Khui

The Zesen Khui prospect has been explored by geophysics, soil sampling, and drilling. No significant zones of mineralization have been identified to date.

The IP chargeability and molybdenum MMI soil anomalies are coincident with outcropping pyroxene-porphyritic Devonian volcanic rocks. Spotty albite + actinolite and silica alteration occurs in Carboniferous units.

9.5.11 Khulanjoroo

The Khulanjoroo area is a triangular zone of Devonian(?) volcanic rocks and a quartz monzodiorite intrusion about 1 km in diameter along the western boundary of the Oyu Tolgoi ML. Two drill holes tested the western contact of the quartz monzodiorite intrusion; however, no significant mineralization or alteration was encountered within the intrusion, or the adjacent augite basalt.

9.6 Comments on Section 9

The exploration tools used by Entrée and OTLLC are appropriate for early stage exploration of bulk tonnage copper and gold deposits. Geophysical surveys have proven to be a suitable exploration method for identifying porphyry copper drill targets within the Project area.

The major discoveries within the Entrée/Oyu Tolgoi JV Project to date, Hugo North Extension and Heruga, are associated with geophysical signatures. The majority of information for these targets is derived from drill results.

10.0 DRILLING

10.1 Introduction

Approximately 263,551 m of surface drilling in about 441 drill holes has been completed within the Entrée/Oyu Tolgoi Project since 2004. Table 10-1 and Table 10-2 provide a summary of the drilling, and Figure 10-1 to Figure 10-3 show the drill collar locations.

Core drilling includes 248 drill holes totalling 245,445 m on the Entrée/Oyu Tolgoi Project with 51 of the drill holes totalling 74,587 m drilled into the Hugo North Extension deposit. There are 54 drill holes totalling 72,317 m on the Heruga deposit with 42 holes totalling 62,732 m drilled on the Entrée JV portion of the deposit. Entrée has completed 65 exploration core holes totalling 38,244 m and 34 RC holes totalling 4,145 m in the Shivee West property.

There has been no drilling in the Shivee West property since 2011. There has been no drilling on the Entrée/Oyu Tolgoi JV property since 2019 when 17 RC exploration holes were completed.

Core drill holes are the principal source of geological and grade data for the Hugo North and Heruga Mineral Resource estimates. A small percentage of the drilling total comes from RC or combined RC pre-collar and core drilling (PCD).

In addition to the Mineral Resource and exploration drilling, condemnation, engineering, and water exploration drilling (RC and core) has been completed near the Hugo North Extension area.

The discussion of drilling is separated into drilling by OTLLC on the Entrée/Oyu Tolgoi JV property (Section 10.2) and work by Entrée on the Shivee West property area (Section 10.3).

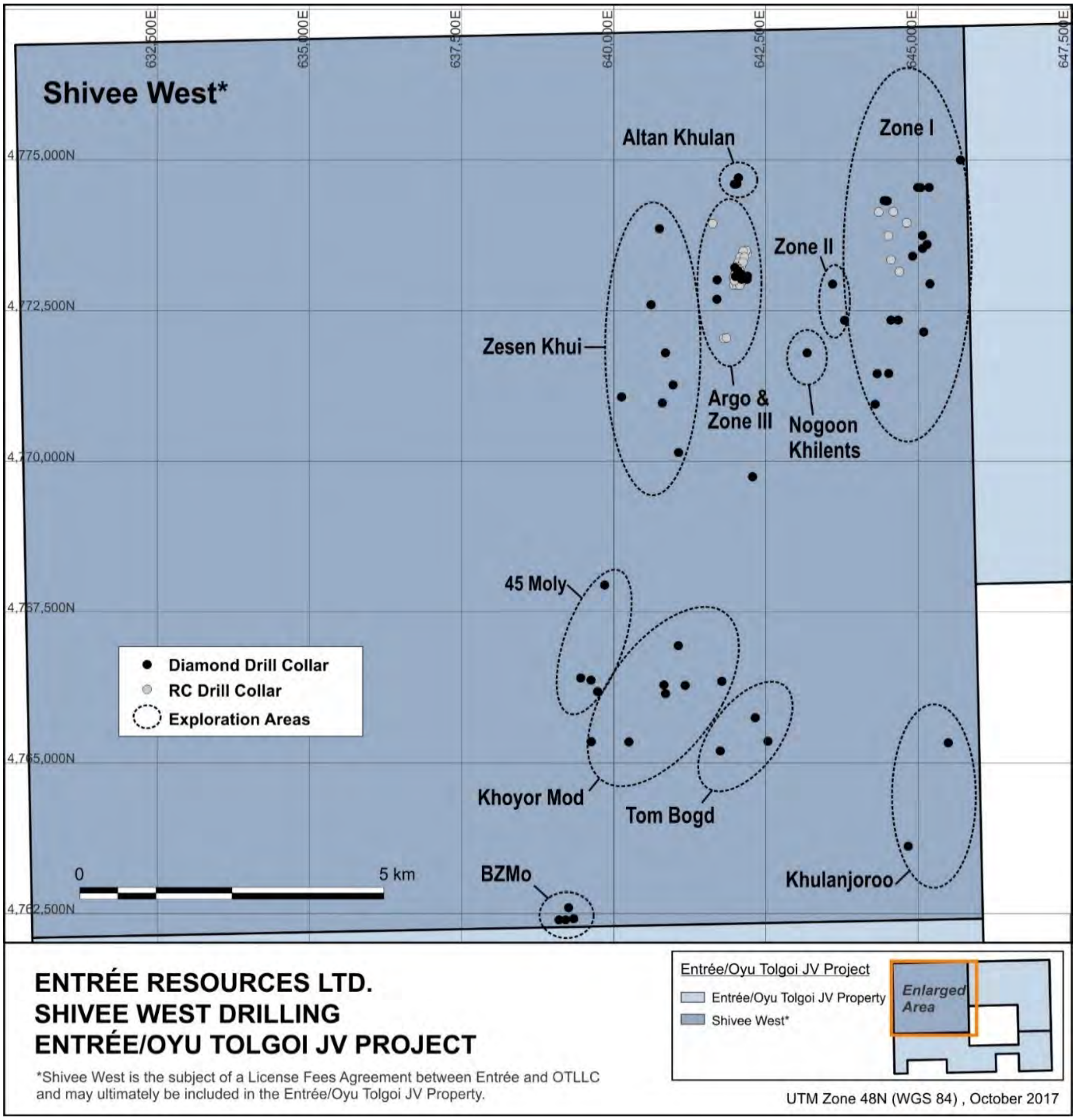
Table 10-1: Drill Summary Table, Shivee West

Prospect	Number of Core Holes	Length of Core Holes	Number of RC Holes	Length of RC Holes
45 Moly	4	1,282	0	0
Altan Khulan	3	767	0	0
BZMo	4	1,505	0	0
Khoyor Mod	9	6,906	0	0
Khulanjoroo	2	1,606	0	0
Nogoon Khilents	1	967	0	0
Tom Bogd	4	4,832	0	0
Zesen Khui	7	5,104	0	0
Zone I	18	9,325	6	914
Zone II	2	419	0	0
Zone III	10	4,293	28	3,231
Other	1	1,258	0	0
Total Shivee West	**65**	**38,263**	**34**	**4,145**

Table 10-2: Drill Summary Table, Entrée/Oyu Tolgoi JV Property

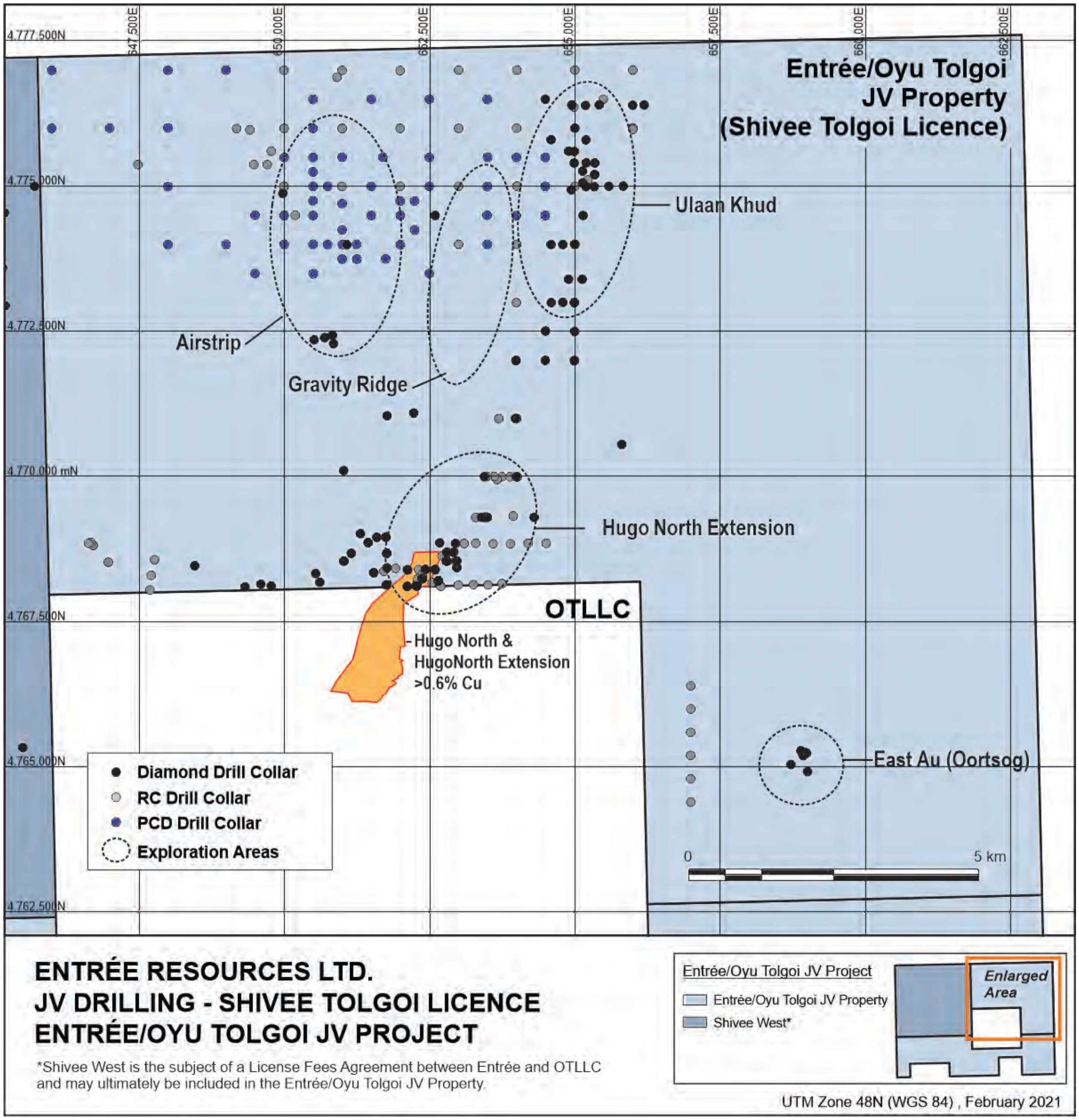
	Number of Core Holes	Length Core Holes	Number of RC Holes[2]	Length of RC Holes	Number of RCD Holes	Length of RCD Holes	Number of PCD holes	Length of PCD Holes
Shivee Tolgoi Licence (Joint Venture portion)								
Hugo North Extension	71	97,252						
Ulaan Khud	35	17,509						
Airport	2	950	7	1,851			52	3,327
Oortsog (East Au/X-Grid)	6	573						
Others	12	8,081					6	429
Total Shivee Tolgoi Licence	**126**	**124,365**	**87**	**6,860**	**2**	**736**	**58**	**3,756**
Javhlant Licence								
Heruga	46	67,844						
Heruga Southwest	6	7,777						
Castle Rock	2	2,098	2	477				
East of Heruga	1	2,005						
Mag West (SW Mag)	1	1,152						
Southeast IP			10	2,132				
Others	1	1,941						
Total Javhlant Licence	**57**	**82,817**	**12**	**2,609**	**—**	**—**	**—**	**—**

Figure 10-1: Shivee West Property Drill Plan



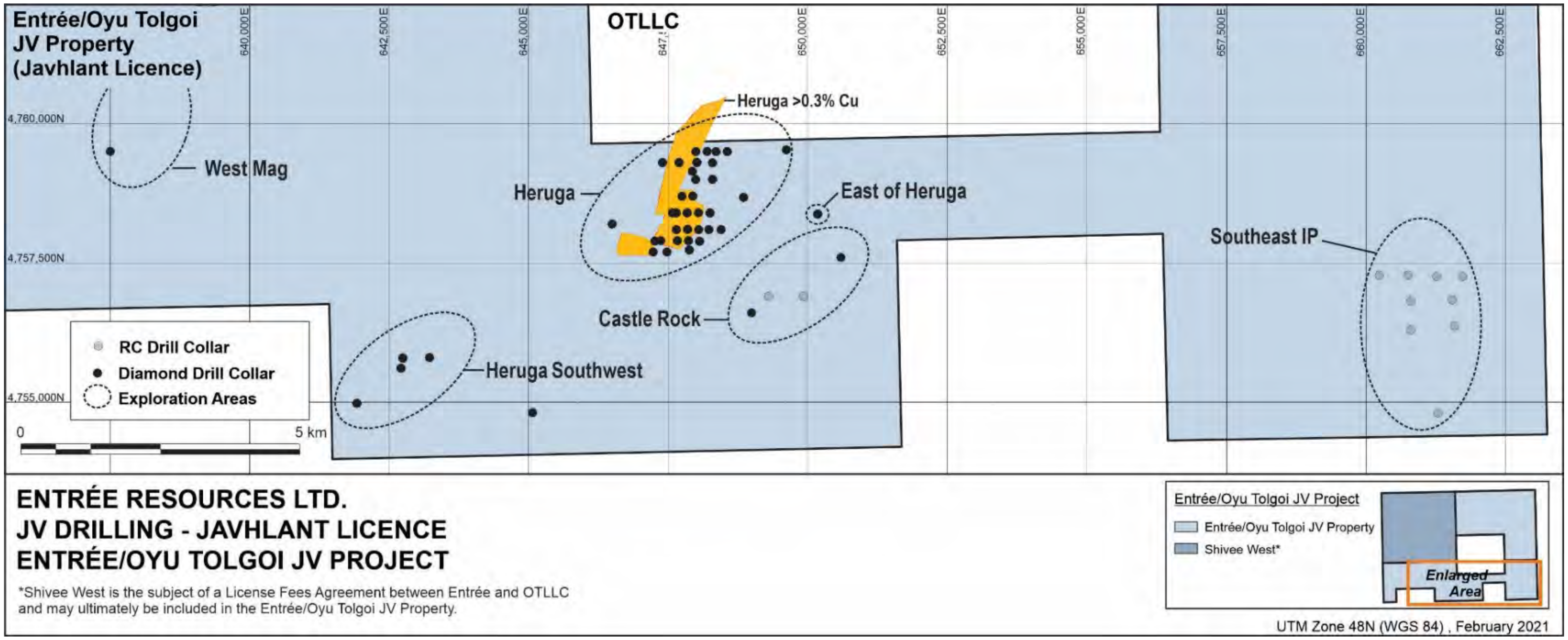
Note: Figure courtesy Entrée, 2017.

Figure 10-2: Entrée JV Hugo North Drill Plan



Note: Figure courtesy Entrée, 2021.

Figure 10-3: Entrée/Oyu Tolgoi JV Property Javhlant Licence Drill Plan



Note: Figure courtesy Entrée, 2021

10.2 Entrée/Oyu Tolgoi JV Property Drill Methods

10.2.1 Drill Contractors

A number of drill contractors have been used throughout the core drill programs on the Project. These include Australian Independent Diamond Drillers, Can Asia, Gobi Drilling, Major Pontil (Major), Mongolia Drilling Services, and Soil Trade. Most of the drilling, however, was performed by Major.

Drill rig types employed have included UDR 1000, UDR 1500, UDR 5000, Major 50 LM90, and Schramm units.

RC drilling was performed by Major, using a UDR-1000 combination drill or a P30 Schramm rig.

PCD drilling was performed by Major. These 58 shallow holes tested the lithology immediately below the Cretaceous cover around the Airport target.

10.2.2 Core Diameters

Most holes at Hugo North and Hugo North Extension were collared with PQ drill rods (85 mm core diameter) and were reduced to HQ size drill rods (63.5 mm) at depths of around 500 m prior to entering the mineralized zone. A small percentage were reduced to NQ size (47.6 mm) and a few holes have continued to depths of about 1,300 m using PQ diameter.

Many of the deeper holes were drilled as “daughter” holes (wedges) from a PQ diameter “parent” drill hole.

10.2.3 Core Handling Procedures

At the drill rig core is removed from the core barrel by the drillers and placed directly in core boxes. Drillers identify Individual drill runs with small wooden or plastic blocks, where the depth in metres and hole number are recorded. Unsampled core is never left unattended at the rig. Open boxes are transported in the back of a truck to the OTLLC core logging facility at the main camp under a geologist’s or technician’s supervision. Those holes drilled specifically for geotechnical purposes are transferred at the rig to a steel V-rail and logged on site prior to transport back to the core shed.

10.2.4 RC Chip Handling Procedures

RC drilling collected 1m samples into numbered calico bags using a Sandvik VR440 cyclone, interval drop box and rotaport cone splitter. The RC sampling process involved real time splitting of the bulk material into two representative samples each 10% of the bulk sample using the rotaport cone splitter powered by the drill rig. On average sample weights were between 2–3 kg.

10.2.5 Collar Survey Procedures

Collar survey methods were similar for core and RC drill holes.

Proposed drill hole collars and completed collars are surveyed by a hand-held global positioning system (GPS) unit for preliminary interpretations. After the hole is completed, it is re-surveyed using a Nikon theodolite or differential GPS instrument. The two collar readings are compared, and if any significant differences are noted the total station reading is re-surveyed, otherwise it is adopted as the final collar reading.

Upon completion of a drill hole, the collar and anchor rods are removed, and a PVC pipe is inserted into the hole. The drill hole collar is marked by a cement block inscribed with the hole number.

10.2.6 Downhole Survey Procedures

RC drill holes were typically not down-hole surveyed. In general, most RC holes are less than 100 m in depth and therefore unlikely to experience excessive deviations in the drill trace.

OTLLC uses down-hole survey instruments to collect the azimuth and inclination at specific depths of the core drill holes for most of the diamond drilling programs. Six principal types of survey method have been used over the duration of the drilling programs, including Eastman Kodak, Flexit, Ranger, gyro, and north-seeking gyro methods.

The first surveys by OTLLC were by the Eastman Kodak method. This method, along with gyro and Ranger methods were used interchangeably until approximately drill hole OTD397. After drill hole OTD397, gyro, north-seeking gyro, Flexit and Ranger have been the principal methods used. A small percentage of the holes in the database remain unsurveyed. Eastman Kodak, Pontil, Flexit and Ranger methods derive azimuth measurements using a magnet and are therefore subject to potential problems that can be caused by magnetic minerals.

Since January 2006, OTLLC have measured deviations initially using a Flexit instrument at approximately 60 m intervals to monitor the drill-hole progress. At completion, all holes are resurveyed with a north-seeking gyro or "SRG"-gyro instrument at approximately 5–20 m intervals. The gyro instruments are not dependent on magnetic readings, and are therefore considered to be more appropriate methods for this style of deposit and the depth of the drill holes.

OTLLC has a detailed validation program built into the database to reveal any moderate kinks or deviations in the down-hole data. All of these are checked, and if required, adjusted, prior to finalization of the database.

10.2.7 Recovery and Rock Quality Designation Measurement Procedures

Recovery data were not collected for the RC drill programs. OTLLC's geology staff measure core recovery and rock quality designation (RQD) using the following measurements:

- Block interval
- Drill run (m)
- Measured length (m)
- Calculated recovery (%)
- RQD measured length (m)
- Calculated RQD (%).

In general, OTLLC reports that core recoveries obtained by the various drilling contractors have been very good, averaging between 97% and 99% for all of the deposits. In localized areas of faulting and/or fracturing the recoveries decrease; however, this occurs in a very small percentage of the overall mineralized zones. In addition, OTLLC notes decreased recoveries near-surface in overlying non-mineralized Cretaceous clays and to a lesser extent in a portion of the oxidized rocks (generally above 100 m depth) owing to the lower competencies of these units.

Ball Mark or Ace oriented core marking systems have been used to assist with geological, structural interpretations and for geotechnical purposes.

RQD was not recorded for Heruga core, nor was geotechnical logging undertaken. Geotechnical logging should be undertaken on future programs.

10.2.8 Logging Procedures

The logging comprised capture of geological, alteration, and mineralization data. Core logging is subject to the following procedures:

- Box labels are checked
- Core is rotated to fit the ends of the adjoining broken pieces
- Core is photographed
- Core is logged for lithology, mineralization and alteration
- Core is marked with a single, "unbiased" cutting line along the entire length of the core for further processing.

Until August 2010, logging was completed on paper logs. In August 2010, OTLLC implemented a digital logging data capture using the acQuire system.

All core is stored in a secure location at the main camp. Core is stacked on pallets in a stable, 3 x 3 box configuration to a height of about 1 m (15 boxes per pallet). Each pallet is covered with a canvas tarpaulin, which is labelled with hole identification and the interval that is stacked in the pallet.

RC sample material was logged using both qualitative and quantitative components. The logging was entered directly into a Toughbook computer using the OTLLC logging system based in acQuire. Geological logging recorded colour, lithology, texture, mineralogy, alteration, veining, sulphides and sampling.

10.2.9 Density Measurement Procedures

OTLLC has collected an extensive database of specific gravity (SG) measurements for the Hugo Dummett deposits. Prior to March 2012, density measurements were made on 10 cm samples of full or halved diamond core taken at approximately 10 m intervals down the hole. The specific gravity for non-porous samples was measured using a water immersion method and then calculated by the formula:

- $SG = W_{\text{dried in air}} / (W_{\text{dried in air}} - W_{\text{water}})$.

In March 2012, the sample size was increased to 20 cm lengths of full core, and the samples were oven dried for 12 hours at 105°C. The core sample was weighed dry, immersed in water, and weighed again after excessive water was brushed off. Specific gravity was measured using a water immersion method and then calculated by the formula:

- $SG = W_{dried\ in\ oven} / (W_{saturated} - W_{water})$.

Less commonly, porous samples were dried and then coated with paraffin before measuring using the water immersion method.

In March 2012, a calliper method was introduced as a quality assurance check on the immersion method. Samples of 20 cm length were cut perpendicular to the core axis to create a cylinder for measurement. The samples were weighed, and then oven dried for 12 hours at 105°C. The dry weight was measured, and the sample was then measured using a digital calliper. Density was calculated using the formula:

- $\text{Bulk density} = W_{dried\ in\ oven} / (\pi \times (((D1 + D2 + D3) / 3) / 2)2 \times (L1 + L2) / 2)$

where: Wdried in oven = Weight of sample dried in oven; D1–3 = Diameter of the core in three positions; L1–2 = Length of the core in perpendicular position.

10.2.10 Sample Length/True Thickness

The drill holes are drilled at a wide range of azimuths and dips depending on the orientation of the mineralization, but an east to west orientation is dominant throughout the Project area. Drilling is normally oriented perpendicular to the strike of the mineralization. Depending on the dip of the drill hole and the dip of the mineralization, drill intercept widths are typically greater than true widths.

Drill spacing at Hugo North is on approximately 125 x 75 m centres. Drill spacing typically widens toward the margins of the deposit.

At Heruga, collars are on section lines 200–300 m apart, generally spaced at a distance of 150–250 m along section lines.

10.2.11 Interpretation of Drill Results

The drill results were used to interpret the Hugo North Extension and Heruga geology as described in Section 7 of this Report. Results from recent RC exploration drilling are described in Section 9 of this Report.

Figure 10-4 and Figure 10-5 are cross sections summarizing the general geological interpretation and copper and gold grade variability for Hugo North Extension and Heruga.

More detail on the mineral domains delineated for these deposits is provided in Section 14 of this Report.

10.3 Shivee West Property Drill Methods

10.3.1 Drill Contractors

Core drilling over the various campaigns from 2004 to 2010 has been carried out by Can Asia Drilling, Australasian International Diamond Drilling (AIDD), and Major Drilling Mongolia LLC. Longyear 44, UDR-1500. UDR-600 and Coretech YDX-3L core rigs, with depth capabilities of about 1000–2500 m, were used.

10.3.2 Core Diameter

Core holes were either completely drilled at PQ or HQ sizes, although some holes were PQ reduced to HQ, and others started at PQ, were reduced to HQ, and further reduced to NQ.

10.3.3 Core Handling Procedures

Once drilled, core was removed from the core barrel by the drillers, washed and placed in wooden core boxes. Core was transported with secured lids to the core logging facility twice daily by Entrée personnel.

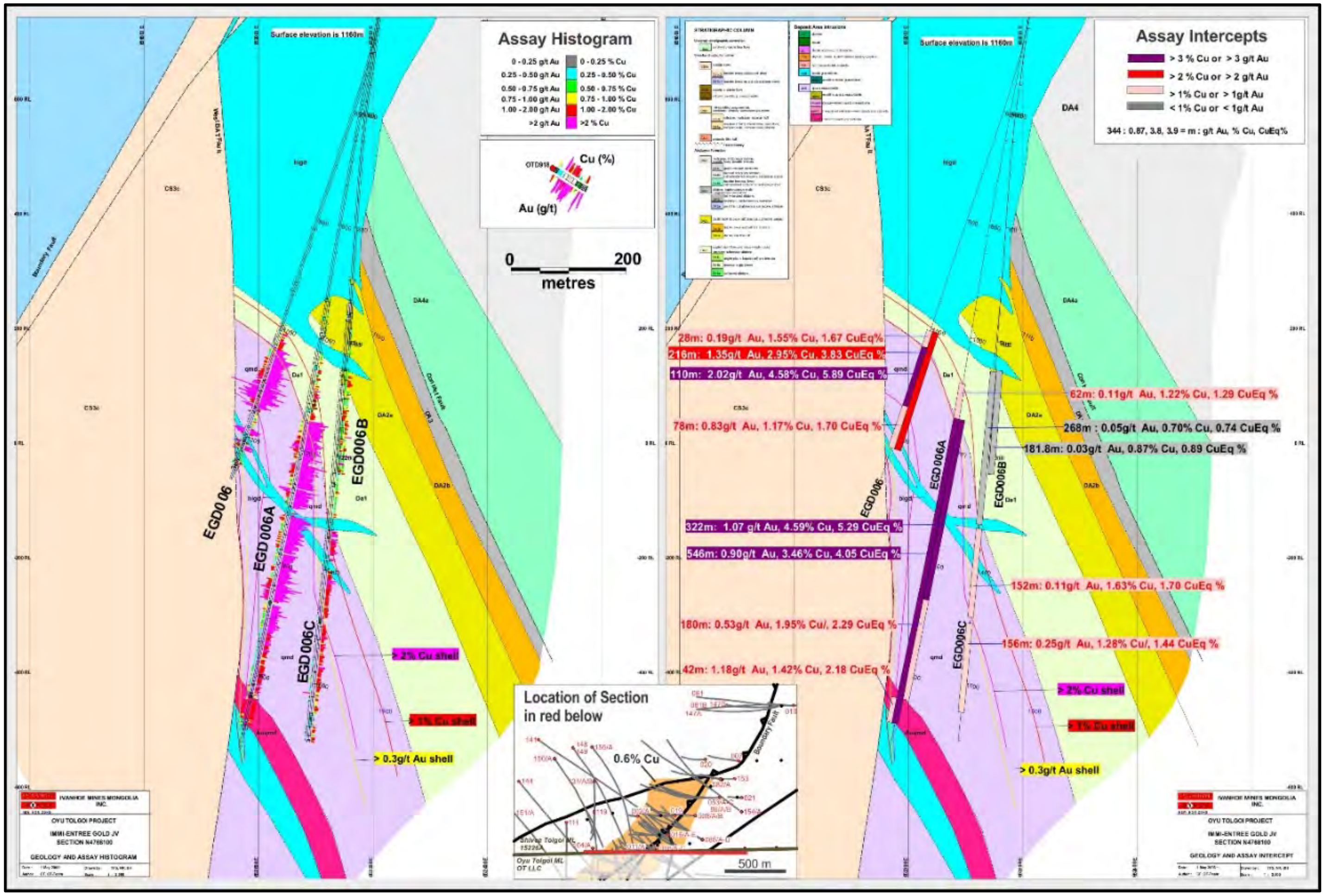
10.3.4 Collar Survey Procedures

Drill hole collars were surveyed at the end of each field season by Geocad Co. Ltd., a surveying company based in Ulaanbaatar, using differential GPS equipment.

10.3.5 Downhole Survey Procedures

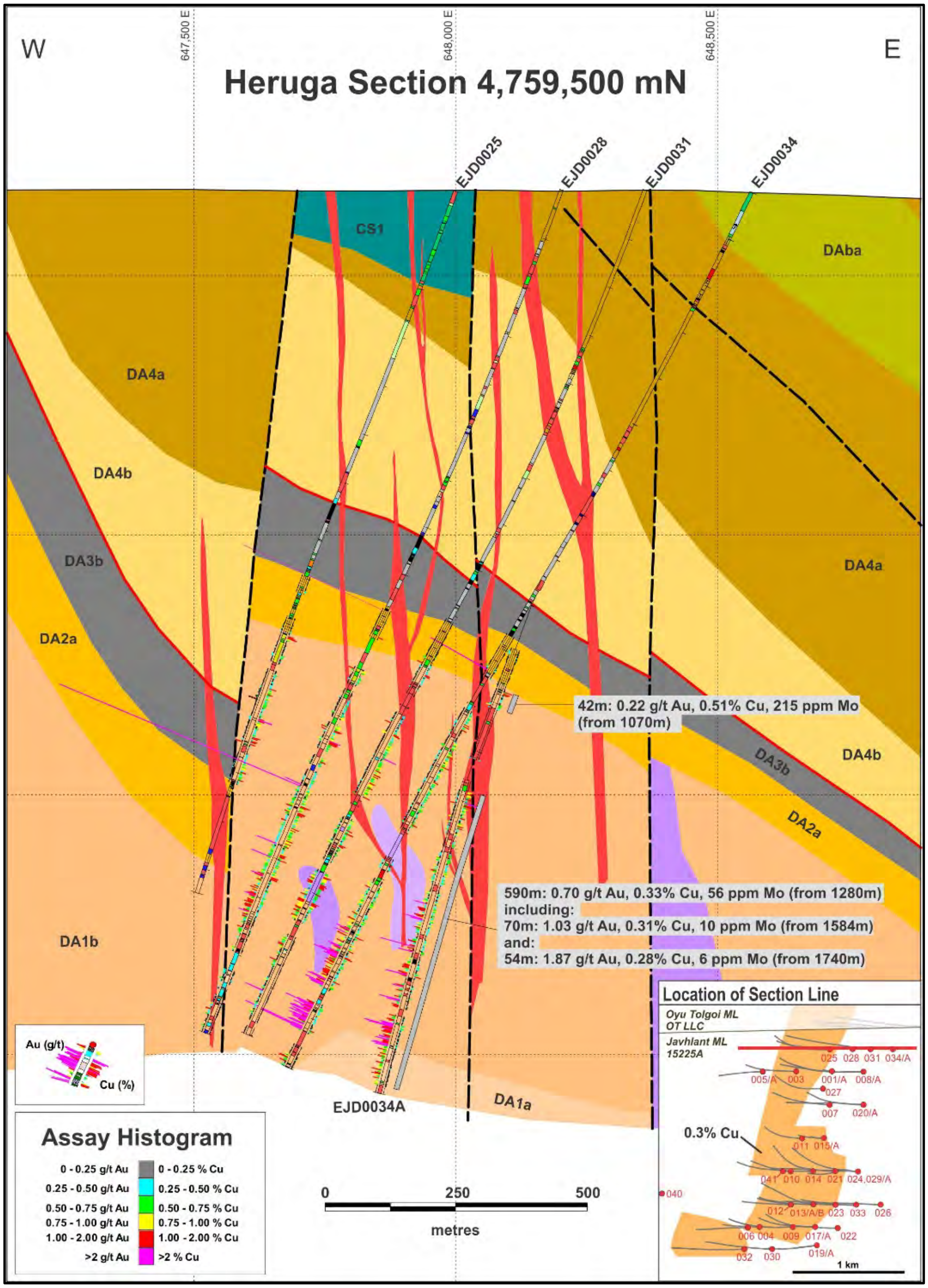
Entrée downhole-surveyed all core holes at approximately 50 m intervals using a Sperry Sun instrument.

Figure 10-4: Section 4,768,100 mN , Hugo North Extension, Shivee Tolgoi ML (looking north)



Note: Figure courtesy Entrée, 2017. Red line in drill plan inset shows location of cross section

Figure 10-5: Section looking north 4,759,500 mN, Javhlant ML



Note: Figure courtesy Entrée, 2017. Red line in drill plan inset shows location of cross section. Lithological units correspond to those in Figure 7-4.

10.3.6 Recovery and Rock Quality Designation Measurement Procedures

Geotechnical attributes are logged using pre-established codes and logging forms, including length of core run, recovered/drilled ratio, and maximum length.

Entrée reports that core recoveries obtained by the drilling contractor have been very good, except in localized areas of faulting or fracturing.

10.3.7 Logging Procedures

Upon arrival at the core shed the core was subject to the following core logging procedures by Entrée personnel:

- Core is logged for lithology, mineralization and alteration, and geological structures
- Core is marked with a cutting line and 2 m sample intervals
- Core is photographed
- Core is sent to sampling shed.

Logged data was initially recorded on paper logs and then entered into Datamine Century Database Logger files by a technician. At the completion of the logging process, the boxes were returned to the core racks.

All core from Shivee West is stored on pallets at the secure Oyu Tolgoi core facility.

10.3.8 Density Measurement Procedures

No density measurements have been taken on core from the Shivee West property.

10.3.9 Sample Length/True Thickness

Holes are inclined at a range of azimuths and dips depending upon the orientation of the drill target. Most targets are early-stage, and true widths have not been determined.

10.3.10 Reverse Circulation Methods

RC drilling programs in 2006 and 2011 were conducted by Major Drilling or by Landdrill International LLC. These companies used a track-mounted Schramm 685T rig or a custom EDM2000 rig.

A small amount of the sample was taken, sieved and washed for chip logging by the on-site geologist and for archival purposes.

Coded drill log data was entered into a Datamine Century database.

No downhole surveys were undertaken for RC holes. Most holes are shallow and vertical, and unlikely to have significant deviation.

10.3.11 Interpretation of Results

A summary of selected drill results is provided in Table 10-3 with drill hole locations provided in Table 10-4. Section 9 of this Report includes a description of the targets that were the subject of the drill programs.

Table 10-3: Selected Drilling Results from Shivee West

Drill Hole Number	Target	From (m)	To (m)	Interval (m)	Gold (g/t)	Molybdenum (ppm)
EG-04-001	Zone III	61.4	62.2	1.3	4.97	—
EG-04-002	Zone III	109.0	113.0	4.0	1.63	—
EG-04-006	Zone III	107.0	123.0	16.0	0.56	—
EG-07-052	BZMo	97.0	102.0	5.0	—	3,602
EG-07-065	Altan Khulan	172.0	182.0	10.0	1.88	—
EG-RC-06-008	Zone III-Argo	14.0	21.0	7.0	0.62	
EG-RC-11-111	Zone III-Argo	67.0	70.0	3.0	2.21	
EG-RC-11-112	Zone III-Argo	63.0	77.0	14.0	1.82	
EG-RC-11-123	Zone III-Argo	67.0	75.0	8.0	2.08	

Table 10-4: Location of Selected Drill Holes from Shivee West

Drill Hole Number	UTM Coordinates (WGS84)		Elevation (masl)	Azimuth (°)	Dip (°)	Length (m)
	Easting	Northing				
EG-04-001	642000.73	4773069.11	1214.72	135	-48	314.80
EG-04-002	642100.54	4773073.00	1215.81	270	-50	251.30
EG-04-006	642043.33	4773162.18	1214.82	135	-50	279.80
EG-07-052	639626.33	4766372.11	1198.07	225	-55	232.80
EG-07-065	641983.18	4774599.41	1221.87	270	-60	403.90
EG-RC-06-008	642162.70	4773435.66	1216.40	270	-60	100
EG-RC-11-111	642124.20	4773485.75	1217.78	0	-90	70
EG-RC-11-112	642074.33	4773385.73	1218.36	0	-90	80
EG-RC-11-123	642025.62	4773055.44	1216.06	0	-90	120

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 Introduction

Sampling, preparation, and analysis are discussed in this section in terms of work by OTLLC on the Entrée/Oyu Tolgoi JV property and work by Entrée on the Shivee West property.

11.2 OTLLC Sampling and Analysis for Entrée/Oyu Tolgoi JV Property

11.2.1 OTLLC Sampling

Core cutting protocols for core drilling completed on the Entrée/Oyu Tolgoi JV property comprised:

- Long pieces of core were broken into smaller segments with a hammer
- Core was cut with a diamond saw, following the line marked by the geologist
- Both halves of the core were returned to the box in their original orientation
- The uncovered core boxes were transferred from the cutting shed to the sampling area
- 2 m sample intervals were measured and marked on both the core and the core box with a permanent marker. A sample tag was stapled to the box at the end of each 2 m sample interval. Sample numbers were pre-determined and account for the insertion of quality control samples. Non-mineralized dykes that extend more than 10 m along the core length were generally not sampled
- Half-core samples were collected from the same side of the core and are bagged
- Each sample bag was identified with inner tags and outside marked numbers
- Samples were transferred to an on-site sample preparation facility
- The unsampled half of the core remained in the box, in its original orientation. In some cases, additional testwork has consumed the entire core, and only photographic records remain
- Core boxes were subsequently transferred to the on-site core storage area.

11.2.2 OTLLC Analytical and Test Laboratories

Between 2002 and September 2011, all routine sample preparation and analyses of the Oyu Tolgoi samples were carried out by SGS Mongolia, who operate an independent sample preparation facility at the Oyu Tolgoi site and an analytical laboratory in Ulaanbaatar. During 2002 and 2003, the on-site sample preparation facility and analytical laboratory was operated under the name Analabs Co. Ltd. (Analabs), an Australian-based company controlled by Scientific Services Limited, which was bought by the SGS Group in 2001. The operating name of the Mongolian subsidiary was changed to SGS Mongolia LLC (SGS Mongolia) in 2004. The SGS Mongolia analytical laboratory in Ulaanbaatar was recognized as having ISO 9001:2000 accreditation, and conforms to the requirements of ISO/IEC 17025 for specific registered tests. SGS is an internationally-recognized organization that operates over 320 laboratories worldwide and has ISO 9002 certification for many of their laboratories.

Since September 2011, SGS has continued to manage the on-site sample preparation facility, and SGS in Ulaanbaatar was appointed the primary laboratory for gold and fluorine analyses. ALS in Vancouver was appointed the primary laboratory for the high-resolution multi-element inductively-coupled plasma mass spectrometry (ICP-MS) based suite and LECO sulphur and carbon analyses. ALS has held ISO/IEC 17025 accreditation since 2005.

Check assays were performed in the early drill phases by Bondar Clegg and Chemex laboratories. Until May 2005, SGS Welshpool in Perth, Australia was designated as the secondary (check) laboratory. The SGS laboratory in Perth currently has ISO:17025 accreditation; the accreditation at the time analyses were completed is not known.

After May 2005, the secondary laboratory was changed to Genalysis Laboratory Services Pty Ltd. (Genalysis), also in Perth. The National Association of Testing Authorities Australia has accredited Genalysis to operate in accordance with ISO/IEC 17025 (1999), which includes the management requirements of ISO 9002:1994.

Check assays have also been performed by Actlabs Asia LLC, a part of the global Actlabs Group, which has maintained a full-service laboratory in Ulaanbaatar since 2006. The laboratory comprises sample preparation, weighing, fire assaying, wet laboratory, and instrumentation sections. It maintains an ISO 17025 accreditation and participates in CANMET and Geostats Proficiency Testing Programs.

ALS and SGS acted as the secondary laboratories for each other until 2015.

Since 2015, ALS in Ulaanbaatar and in Perth, Australia have been the principal laboratories used by OTLLC.

11.2.3 OTLLC Sample Preparation

The sample preparation protocol for Oyu Tolgoi resource samples from 2002 to 2014 was as follows

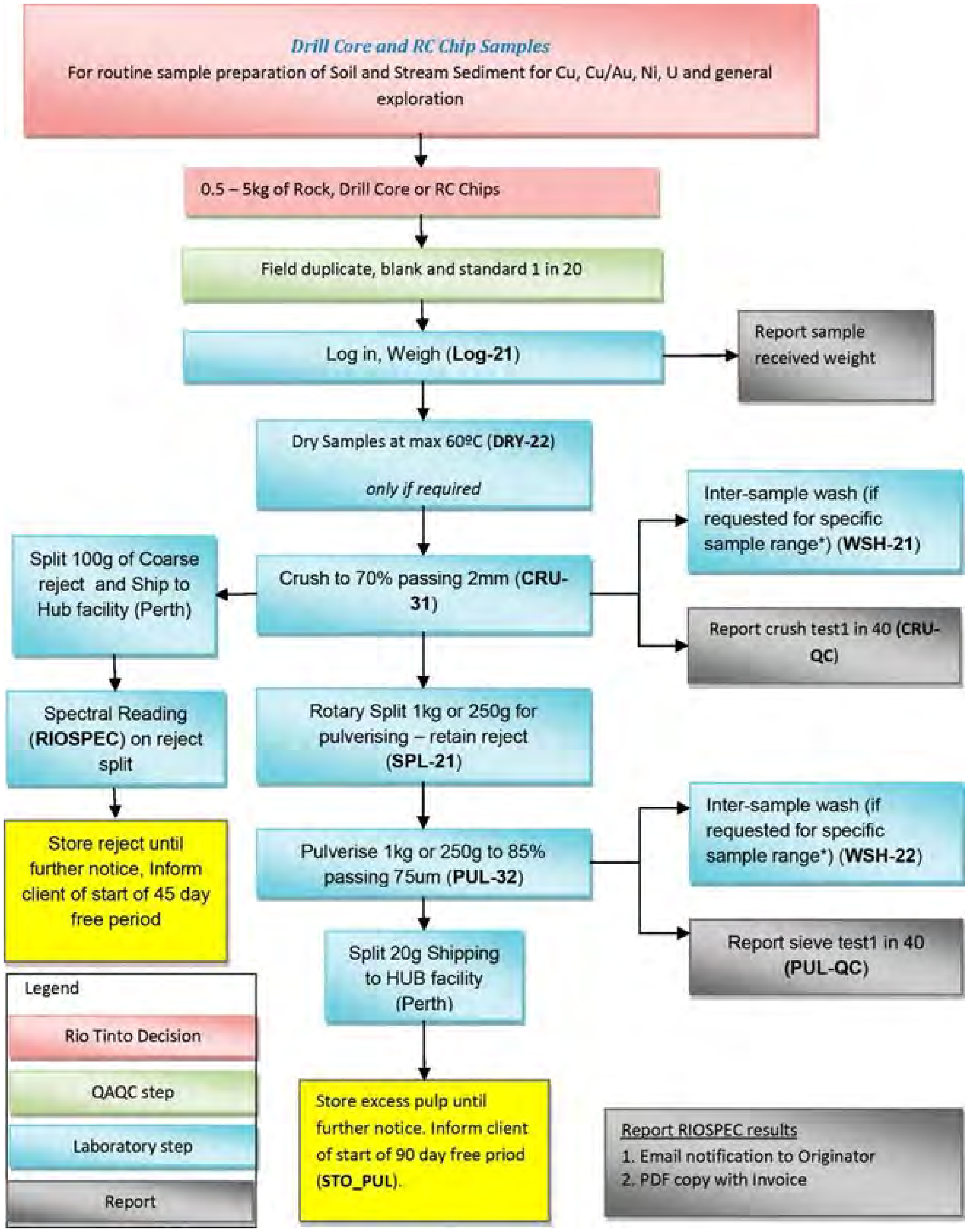
- An internal laboratory code was assigned to each sample
- The samples were dried at 75°C for up to 24 hours
- The entire sample was crushed to obtain nominal 90% at 3.35 mm
- The sample was passed twice through a nominal 1 inch (approximately 2.5 cm) Jones™ splitter, reducing the sample to approximately 1 kg
- The sub-sample was pulverized for approximately five minutes to achieve nominal 90% at 75 µm (-200 mesh). A 150 g pulverized sample is collected and sealed in a Kraft envelope
- All equipment was flushed with barren material and blasted with compressed air between each sample that is processed. Screen tests were done on crushed and pulverized material from one sample taken from the processed samples that comprised part of each final batch of 20 samples
- The pulps were put back into the custody of OTLLC personnel, and standard reference material (SRM) control samples were inserted
- The pulps were stored in a box and locked and sealed with "tamper-proof" tags. Sample shipment details were provided to the assaying facility both electronically and as paper hard copy accompanying each shipment. The box was shipped by air to Ulaanbaatar where it was picked up by SGS Mongolia personnel and taken to the analytical laboratory. SGS Mongolia staff confirmed by electronic transmission that the seal on the box was original and had not been tampered with
- Pulp rejects were stored on site for several months and then returned to the Ulaanbaatar office for storage. Reject samples were stored in plastic bags inside the original cloth sample bags and were placed in bins on pallets and stored at site.

Since 2015, surface and RC exploration samples have been shipped from site to Ulaanbaatar and processed at ALS following the protocol shown in Figure 11-1OTLLC Sample Analysis

Until September 2011, all samples submitted to SGS Mongolia were routinely assayed for gold, copper, iron, molybdenum, arsenic and silver. Copper, molybdenum, silver, and arsenic were determined by acid digestion followed by an AAS finish. Samples were digested with nitric, hydrochloric, hydrofluoric and perchloric acids to dryness before being leached with hydrochloric acid to dissolve soluble salts and made to volume with distilled water. Routine assays up to 2% Cu used a sub-sample size of 0.5 g, whereas samples that were expected to be over range, or >2% Cu, used a sub-sample size of 0.25 g. The detection limits of the copper and molybdenum methods were 0.001% and 10 ppm, respectively. The detection limits of silver and arsenic were 1 ppm and 100 ppm, respectively. Gold was determined using a 30 g fire assay fusion, cupelled to obtain a bead, and digested with aqua regia, followed by an atomic absorption spectroscopy (AAS) finish, with a detection limit of 0.01 g/t.

Since 2011, gold and fluorine is analyzed by SGS Mongolia. Gold analysis method is unchanged. ALS in Vancouver was appointed the primary laboratory for the high-resolution multi-element ICP-MS based suite, and LECO sulphur and carbon analyses.

Figure 11-1: OTLLC Sample Preparation Chart for Drill Core and Surface Rock Samples



Note: Figure from 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

11.2.4 OTLLC Sample Analysis

Until September 2011, all samples submitted to SGS Mongolia were routinely assayed for gold, copper, iron, molybdenum, arsenic and silver. Copper, molybdenum, silver, and arsenic were determined by acid digestion followed by an AAS finish. Samples were digested with nitric, hydrochloric, hydrofluoric and perchloric acids to dryness before being leached with hydrochloric acid to dissolve soluble salts and made to volume with distilled water. Routine assays up to 2% Cu used a sub-sample size of 0.5 g, whereas samples that were expected to be over range, or >2% Cu, used a sub-sample size of 0.25 g. The detection limits of the copper and molybdenum methods were 0.001% and 10 ppm, respectively. The detection limits of silver and arsenic were 1 ppm and 100 ppm, respectively. Gold was determined using a 30 g fire assay fusion, cupelled to obtain a bead, and digested with aqua regia, followed by an atomic absorption spectroscopy (AAS) finish, with a detection limit of 0.01 g/t.

Since 2011, gold and fluorine are analyzed by SGS Mongolia. Gold analysis method is unchanged. ALS in Vancouver was appointed the primary laboratory for the high-resolution multi-element ICP-MS based suite, and LECO sulphur and carbon analyses. ALS and SGS act as the secondary laboratories for each other with a nominal check rate ratio of one sample in 20.

A trace element composites (TEC) program was undertaken in addition to routine analyses. Ten-metre composites of equal weight were made up from routine sample pulp reject material. The composites were subject to multi-element analyses comprising a suite of 47 elements determined by inductively-coupled plasma optical emission spectroscopy/mass spectrometry (ICP-OES/MS) after four-acid digestion. Additional element analyses included mercury by cold vapour AAS, fluorine by KOH fusion/specific ion electrode, and carbon/sulphur by LECO furnace. Results from the TEC program were used for deleterious element modeling.

Since 2015, surface and RC samples are shipped to ALS in Ulaanbaatar for preparation of a 250 g pulp which is then shipped to ALS, Perth where the sample is analyzed for 48 elements by ICP-AES/MS (ME-MS61L) plus 30 g Au (ICP-21) for samples >35 ppb Au.

11.2.5 OTLLC Quality Assurance and Quality Control

Geological aspects of the quality assurance and quality control (QA/QC) program were set up during 2001 by Charles Forster, who was Ivanhoe Mine's manager for the Oyu Tolgoi project at the time. Simple analytical quality control procedures were followed until March 2002, when a formal program was set up under the direction of independent geologist/geochemist Dr. Barry Smee, P.Geo, an independent quality control consultant. This work included development of procedural guidelines, laboratory audits, and preparation of reference materials, with initial on-site monitoring conducted by designated Ivanhoe Mines, and later OTLLC, staff.

All sampling and QA/QC work was overseen on behalf of Ivanhoe Mines by their QA/QC Manager Dale A. Sketchley, P. Geo. From March 2002 until 2008, Ivanhoe Mines also retained Dr. Smee, to conduct semi-annual audits of both the preparation and analytical facilities. The most recent audit of QA/QC data was completed on behalf of Ivanhoe Mines by Dale Sketchley in 2011.

All programs since 2003 have included submission of QA/QC samples, consisting of blank samples, SRMs, duplicate samples, and check samples.

Field blanks are barren material obtained from fresh, unaltered, non-mineralized granite located 5 km east of Oyu Tolgoi. As of 2014, blanks were inserted at a rate of 1:20. Tolerance limits for field blanks were set at 0.06 g/t Au, 0.06 % Cu, and 10 ppm Mo. Batches were automatically failed and re-assayed if these tolerance limits were exceeded, unless values were extremely low, in which case a barren override was applied in the database, and the batch remained as is. Evaluation of the blank samples indicated a low incidence of contamination. A few cases of sample mix-ups were identified during the review of the blank performance, which were investigated at site and corrected.

The SRMs are matrix-matched using materials from the Oyu Tolgoi area. As of 2014, SRMs were inserted at a rate of 1:20. Tolerance limits for SRMs were set at two and three standard deviations from a round robin mean value of the reference material. A single batch failed when SRM assays were beyond the three-standard deviation limit, and any two consecutively-assayed batches failed when SRM assays were beyond the two-standard deviation limit on the same side of the mean. SRM monitoring and responses to missed standard deviation target thresholds has ensured the laboratories return accurate results.

Duplicates comprise core, coarse crushed rejects, and pulps. Core duplicates were collected at a frequency of 1:20 by sampling and assaying the half of the core left after routine sampling. Coarse crushed and pulp duplicates were collected at a frequency of 1:40. Assays of each type followed the parent sample in a batch. Copper generally performed well with absolute relative difference results within expected limits; gold absolute relative difference results are higher than copper but considered acceptable.

Core duplicates for both copper and gold were above the ideal arbitrary absolute relative difference value of 30%, which is interpreted as a result of uneven distribution of mineralization between core halves as typically caused by quartz vein and fracture-controlled mineralization.

For most of the drill programs, OTLLC has maintained a check assay program sending approximately 5% of assayed pulps to secondary laboratories.

Sizing tests are completed for coarse crushed and pulp material at a rate of 1:40 and 1:20 respectively.

11.2.6 OTLLC Databases

Prior to August 2010, all geological and geotechnical drill hole data were entered into an MS Access relational database. In August 2010, OTLLC migrated the Access database to an acQuire database.

All drill-hole data, prior to August 2010, were manually recorded in the field or in the core logging shed on paper logging sheets. The logging geologist then introduced logging information into the Access database, which had a series of embedded checking programs to look for obvious errors. Formational names were subsequently assigned according to the accepted geological interpretation and position within the stratigraphic column.

With the move to acQuire, direct digital data capture was instituted, with the design stubs for the logging sheets not permitting any invalid data.

The laboratories return results digitally via email and submit signed paper certificates. All hard-copy assay certificates are stored in a well-organized manner in a secure location on site. Prior to August 2010, once the assay data had been received from the laboratory, the digital assay results were imported to the Access files. This has been replaced by direct import to the acQuire database.

Final surveyed collars are entered manually into the database and are visually checked against the preliminary, hand-held GPS readings. No double data entry is applied during the entry of the final collar co-ordinates.

OTLLC checks downhole drill traces for kinks or deviations. If required, downhole survey results are adjusted prior to finalization of the database.

11.2.7 OTLLC Sample Security

Samples were always attended or locked in a sample dispatch facility. Sample collection and transportation have always been undertaken by company or laboratory personnel using company vehicles. Chain-of-custody procedures consisted of filling out sample submittal forms that were sent to the laboratory with sample shipments to make certain that all samples were received by the laboratory.

11.3 Entrée Sampling and Analysis for Shivee West Property

11.3.1 Entrée Sampling

Upon arrival at the sampling shed the core was subject to the following core sampling procedures by Entrée personnel:

- Core was cut with a diamond saw following the line marked by the geologist
- Half-core samples were collected from the same side of the core
- Samples were placed in bags properly identified with inner tags and outside marked numbers
- Sample bags were immediately sealed and stored in a fenced facility at the camp site
- Samples were delivered under lock and key by Entrée personnel directly to the laboratory in Ulaanbaatar on an approximately weekly basis.

The 2011 RC holes were sampled on 1 m intervals from collar to planned depth. Samples were collected in large plastic buckets at the drill cyclone for splitting in a mechanical splitter, and splitting on a 25/75% basis. For each assay sample (A-sample), 25% recovered from the cyclone for every metre drilled was placed into numbered cloth bags and tied with the relevant sample number tag inside. The remaining 75% (C-sample) was placed into numbered rice bags for storage in a locked container at the Shivee Tolgoi camp. A small amount of the C-sample was taken, sieved, and washed for chip logging by the on-site geologist.

11.3.2 Entrée Analytical and Test Laboratories

Routine sample preparation and analyses of Entrée's diamond drill core samples was carried out by SGS Mongolia LLC at the Ulaanbaatar facility. SGS Mongolia benchmark testing is restricted to confidential internal-SGS round-robins.

RC samples were submitted to Actlabs Asia LLC in Ulaanbaatar, Mongolia.

11.3.3 Entrée Sample Preparation and Analysis

Core

SGS Mongolia sorted the core samples, verifying the sample numbers on bags to the sample submission sheets, and assigns a laboratory job number. Sample weights were recorded; weights ranged from 1 to 15 kg, depending on core diameter and amount of core loss during drilling/sampling.

The two-stage sample crushing protocol involved firstly crushing core in a jaw crusher to 100% passing nominal -6 mm, and secondly crushing in a TM Engineering Terminator to 85% passing 3.35 mm. The crushed sample was split using an eight-bin TM Engineering rotary splitter. The sample from one bin was placed into a stainless-steel tray, with a sample number tag, for drying, and became the primary sample. The remaining seven bins, which form the coarse reject, were emptied back into the original sample bag.

The primary sample was dried at about 65–70°C in a stainless-steel tray, and then pulverised in a Labtech LM2 pulveriser using low-chromium bowls to 90% passing 75 µm. On request from Entrée on specific samples, approximately 100 g of the sample was bagged into a paper Kraft bag. More typically, the entire sample was funnelled into a paper bag for analysis.

Sizing tests were performed to assess whether the SGS Mongolia pulverising techniques were performing adequately. Sizing data were reported both in digital data and hard-copy assay certificates.

Gold analysis was undertaken using the SGS Mongolia FAE303 assay method, comprising a 30 g fire assay, with an AAS finish after di-isobutyl ketone (DIBK) solvent extraction. The lower detection limit was 1 ppb Au. Samples that assayed over 1 g/t Au were automatically re-run, using the same analytical method.

Copper, silver, and molybdenum were determined by SGS Mongolia using AAS21R method, a three-acid digestion followed by atomic absorption (AA).

RC samples

Samples were crushed to a 2 mm, mechanically riffle-split to obtain a 1 kg sample, and then pulverized to at least 95% passing 75 µm. Actlabs routinely used cleaner sand between each sample to avoid inter-sample contamination.

The 2011 RC samples were analysed for gold using Actlabs analytical method 1A2-30 (Au fire assay atomic absorption finish on 30 g splits with detection limits ranging from 1–3,000 ppb Au). Samples in excess of 1,000 ppb Au were run using a 29.16 g split from the initial pulp using Actlabs analytical method 1A3-30 (Au fire assay gravimetric finish with detection limits ranging from 0.03–1,000 ppm Au). Silver was analysed for all samples using Actlabs analytical method Code 1E M-Ag (Ag aqua regia digestion atomic absorption finish on 30 g splits with detection limits ranging from 1–3,000 ppb Ag).

11.3.4 Entrée Quality Assurance and Quality Control

Field blank, commercial SRMs, and quarter-core duplicate samples (for RC programs, field duplicates) were included in the sample submissions. The standards used were prepared by CDN Resource Laboratories Ltd, British Columbia. The field blanks consisted of locally-derived granite.

Field duplicates, field blanks and standards were inserted at random into the drilling sampling stream at a rate of one per 20 samples.

On receipt of analytical results for drilling, the laboratory sample weights were compared to field sample weights, which were checked for discrepancies. The quality of the data received from the laboratory was verified by the QA/QC module within the Century Systems database. Batches failed if the copper and/or gold values returned for a standard were greater than three standard deviations from their accepted value, or if the copper and/or gold values of a field blank were above a certain threshold.

A routine check assay program at a secondary laboratory has not been implemented.

11.3.5 Entrée Databases

SGS Mongolia digitally reported assay results to Entrée via email, and submitted hard-copy, signed, paper certificates. Electronic versions of the drill hole data were maintained in a Datamine Century Systems database.

11.3.6 Entrée Sample Security

Unsampled core was never left unattended at the rig; boxes were transported to the core logging facility at the camp site twice daily under a geologist or geologist-technician's supervision.

Sampled core was immediately sealed and stored in a fenced facility at the camp site. Samples were delivered under lock and key by Entrée personnel directly to the laboratory in Ulaanbaatar on an approximate weekly basis and using a chain-of-custody form to record transport and receipt of samples.

In late 2015, all of the core drilled on the Shivee West property was transferred to the Oyu Tolgoi project site where it is currently stored on pallets in a secure core storage facility.

11.4 Comments on Section 11

The nature, extent, and results of the sample preparation, security, and analytical procedures, and the quality control procedures employed, and quality assurance actions taken by OTLLC and Entrée provide adequate confidence in the drill hole data collection and processing.

12.0 DATA VERIFICATION

12.1 Internal Data Verification

OTLLC and its predecessor Ivanhoe Mines reviewed assay quality control sample results supporting drill hole sample assaying on a monthly basis, and prepared monthly and quarterly QA/QC reports. These reports describe a systematic monitoring and response to identified issues. In 2011 Ivanhoe Mines reported on an internal review by Dale Sketchley, including laboratory audits, quality assurance procedures, quality control monitoring, and database improvements at Oyu Tolgoi for the period 2008 to 2010. Recommendations from this review were implemented, or under advisement. No material issues were identified in these reports.

12.2 External Reviews 2002–2020

12.2.1 Data Reviews

A number of data reviews were undertaken by independent consultants as part of preparation of technical reports on the Project, including:

- Roscoe Postle Associates (RPA), 2002: Review of exploration information from earlier work by BHP and Ivanhoe and visited the project site in Mongolia and the Analabs assay laboratory in Ulaanbaatar. A suite of independent core samples was collected and assayed. Duplicate analytical datasets were examined. No biases or errors were noted that would impact Mineral Resource estimates
- AMEC and AMEC Minproc, 2002–2014: Review of QA/QC data and databases in support of Mineral Resource estimates undertaken in 2002, 2003, 2005, 2006, 2007, 2011, and 2014, and independent core check sampling. QA/QC reviews showed acceptable analytical precision, low contamination, and a small number of sample mix-up errors. The database iterations reviewed were considered sufficiently error free to support Mineral Resource estimation
- Barry Smee, 2002–2008: Review of sample preparation, analytical and QA/QC data. Inspections and reports were completed in 2002, 2003, 2004, 2005, 2006, and 2008. No significant biases or errors were noted that would affect Mineral Resource estimates

- Quantitative Geoscience, 2007–2008; 2010–2011: Data verification of previous AMEC estimates, review of onsite sample preparation facility, independent sampling, and review of geology, mineralization, core sampling, sample preparation, QA/QC and Mineral Resource modelling for the Heruga and Heruga North areas, and geotechnical drilling underway at Hugo North. No biases or errors were noted that would impact Mineral Resource estimates
- AMC, 2020: Reviewed selected inputs to the 2020 Feasibility Study to the Mineral Resource and Mineral Reserve estimates, cost estimates, and review of the production, cost, and revenue inputs to the to the financial model. The data were considered acceptable for feasibility evaluation purposes.

12.2.2 Site Visits

Greg Kulla, P.Geo., a Wood employee at the time, visited the Oyu Tolgoi site and Rio Tinto's office in Ulaanbaatar four times during 2011. During these visits Mr. Kulla reviewed drilling, sampling, and QA/QC procedures, and inspected drill core, core photos, core logs, and QA/QC reports. He also reviewed documentation supporting the migration of the drill hole database to acQuire and made spot checks comparing acQuire database results with original drill collar, down hole survey, lithology, and assay results. No significant issues were identified at that time.

During the same period, Mr. Kulla also led the preparation of updated geological models related to the Oyut and Hugo North/Hugo North Extension deposits, including the Hugo North Extension. The models for all deposits and areas other than the Oyut deposit remain the same as those Mr. Kulla was project manager for.

The drill results specific to the Heruga deposit and exploration results from geochemical and geophysical surveys within the Shivee Tolgoi and Javhlant MLs were not verified by Mr. Kulla. However, the Heruga drill results were collected using the same procedures as used for the Oyut and Hugo North/Hugo North Extension deposits and quality control sample results supporting Heruga assay results form part of the sample database reviewed.

Mr. Peter Oshust, a Wood employee at the time, visited the site on eight occasions since 2011, with the most recent visit being in 2016. During these visits to the Project, he was involved primarily in updates to the geological models and Mineral Resource estimates for the Hugo North/Hugo North Extension and Oyut deposits. While on-site in 2011 he was based at the Hugo North mine complex, and in 2012 he was based at the Oyu Tolgoi core-logging facility. He also visited the mineralogy laboratory, Oyut open pit mine, and the processing plant. The Mineral Resource estimate updates included due-diligence reviews of processes and verification of the inputs to the models including data collection and database integrity. Mr. Oshust both reviewed and participated in geological model construction, and block grade estimation, validation, and documentation.

Mr. Oshust's input remains relevant as the models for all deposits and areas other than the Oyut deposit remain the same as those prepared by Mr. Oshust.

12.3 Data Verification by the QP

Mr. Christopher Wright, the current QP for the Mineral Resource estimates, visited the Oyu Tolgoi site three times between August 2017 and June 2018 while he was an employee of Rio Tinto. Site visits included an overview of the district geology, exposures in the South Oyut open pit review of drill core, core storage and sampling facilities.

Over 11 months from August 2017 to June 2018 Mr. Wright did extensive work with South Oyut and Hugo North Mineral Resource and metallurgical databases and block models in the construction of geometallurgical models for the South Oyut and Hugo North block models.

In March 2021, as a Wood employee, Mr. Wright conducted a review of the Heruga drilling and block model and carried out interviews with OTLLC staff to confirm the database cut-off dates, block model estimation dates and that there are no material changes to the Mineral Resource databases since the database closure and model estimation for either the Heruga or Hugo North deposits.

12.4 Comments on Section 12

The data verification completed by OTLLC and its predecessor companies, and the independent data verification completed, including by the current QP, is sufficient to conclude the drill hole database is reasonably free of errors and suitable to support Mineral Resource estimation.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Detailed metallurgical testwork has been completed on the Oyut and Hugo North/Hugo North Extension deposits, and includes flotation, comminution, locked cycle and mineralogical studies. Metallurgical studies for Heruga include liberation analysis, and bulk flotation and open circuit cleaning testwork. Included in the flotation testwork program was some work on ore hardness and grindability.

The first phase of the development of the Oyu Tolgoi mine process facilities was completed with concentrator commissioning in 2013. Testwork results and operations data have been used to develop and update the throughput models and metallurgical predictions, as well as to guide designs for the second development phase. The second phase will include a concentrator conversion, consisting of additional equipment required to process the changing semi-autogenous grind (SAG):ball mill power ratio and higher-grade Hugo North/Hugo North Extension ore.

13.2 Sample Representation and Selection Criteria

Initial Hugo North/Hugo North Extension testwork was based on 239 samples from 79 core holes at Hugo North (Table 13-1). Twenty variability composites, from 72 core holes throughout the proposed Hugo North/Hugo North Extension block cave, were later collected for abrasion index and crusher work index tests. Sub-samples were taken for mineralogy, head grade, and rougher flotation testing. The primary design focus for sample selection in this later program was better definition of the northern third of the Hugo North/Hugo North Extension Lift 1 block cave envelope. The later sample locations are shown in red in Figure 13-1.

Nine composite samples from drill core representing the Heruga deposit were provided for flotation and comminution testing. The Heruga metallurgical study was conducted at G&T Metallurgical Services Ltd. (G&T) during 2008.

Table 13-1: Number of Samples used in MinnovEX Comminution Testwork

Area	SPI Tests	Ci Tests	Modified Bond Tests	BWI Tests	SPI Quantity (tests per Mt)
Hugo North	239	218	237	18	0.55

Note: See Section 13.3.1 for abbreviation descriptions

13.3 Comminution Characteristics and Process Model

13.3.1 Introduction

Initial Hugo North/Hugo North Extension testwork was based on 239 samples from 79 core holes at Hugo North (refer to Table 13-1).

Mean Hugo North/Hugo North Extension comminution index values are included as Table 13-2. In that table, TPUT (which is the instantaneous tonnage per hour achievable through grinding) and P_{80} (the 80% passing size of grinding circuit product) are derived from the generic MinnovEX Mineral Services (MinnovEX) formulae (see discussion in Section 13.3.2), and refer to the hypothetical situation where Lines 1–2 are fed with 100% Hugo North/Hugo North Extension ore.

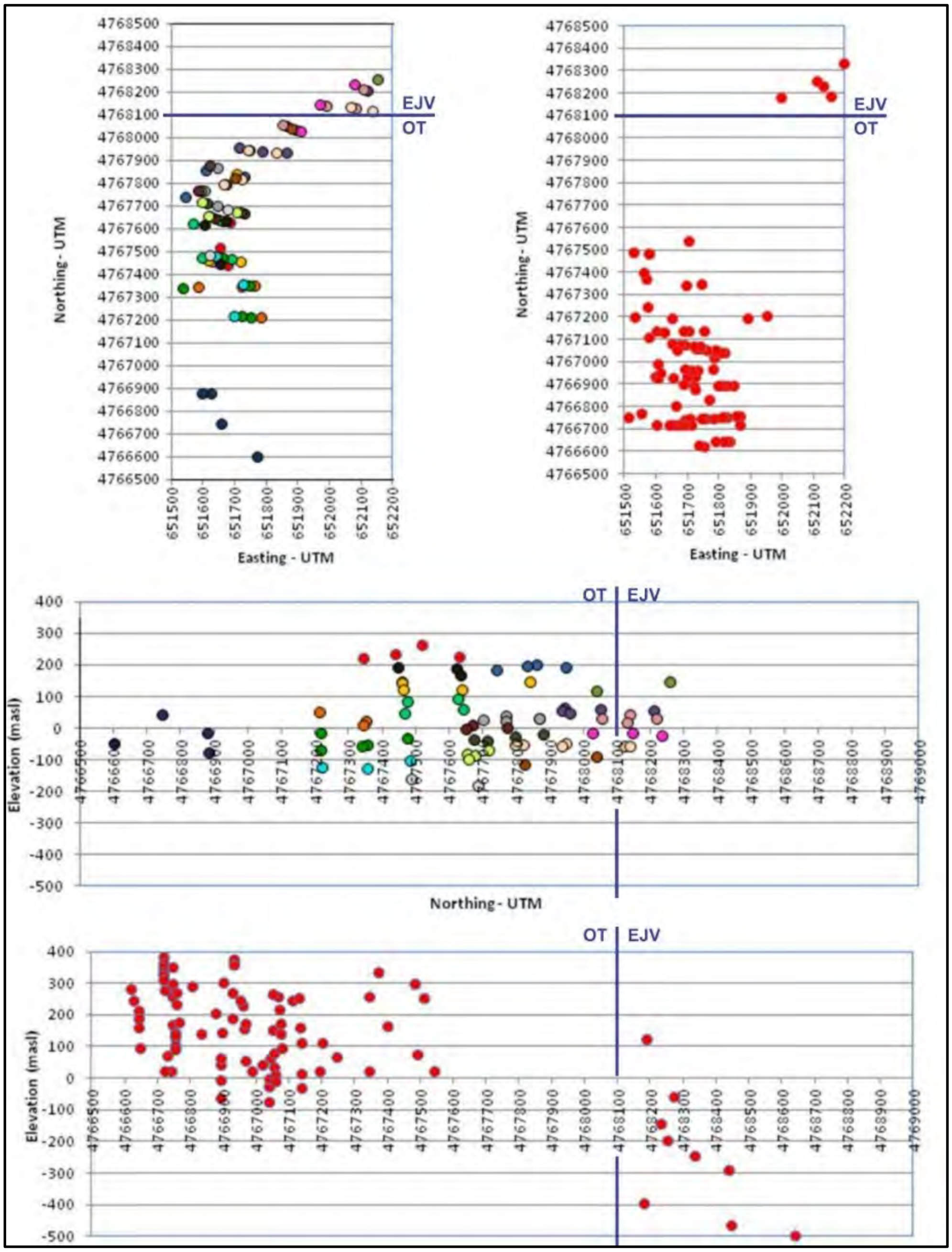
Comparison of the combined dataset with the previous dataset indicates a 5% reduction in the predicted capacity to 5.3 kt/h from the current block model derived value of 5.6 kt/h. This led to a decision to include the results from the 82 new samples in the Hugo North/Hugo North Extension block model.

The mass of each Heruga composite provided for this study was insufficient for a standard Bond ball mill test. However, an estimate of relative hardness between each composite was inferred, from the particle sizes of each composite ground for an identical period of time and calibration samples of known work indices. Inferred Bond ball mill work index values ranged from 14.6–31.1 kWh/t with an average of 23 kWh/t, indicating very hard ore samples.

13.3.2 Comminution Process Model

MinnovEX derived two generic equations to describe the capacity and the flotation feed sizing expected from Southwest zone (Oyut) ore.

Figure 13-1: Hugo North/Hugo North Extension Comminution Sample Locations



Note: Figure sourced from the 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017, modified by Entrée, 2017. Vertical blue line is the licence boundary between the Oyu Tolgoi ML (labelled as OT in the figures) and the Entrée/Oyu Tolgoi JV property (labelled as EJV in the figures). The top two vertical figures are plan views; the basal two horizontal figures are cross-section views. The two figures with only red markers represent the later sampling campaign.

Table 13-2: Hugo North/Hugo North Extension Mean Value Comminution Indices

Dataset	SPI (min^{-1})	MBI (kWh/t)	Ci	TPUT (t/h in Phase 1)	P_{80} (Phase 1 P_{80} in µm)
2011 dataset	88.1	16.1	19.5	4,906	219
Prior (earlier) dataset	76.2	19.6	17.4	5,557	231
Combined dataset	81.4	18.1	18.3	5,279	226

Note: See Section 13.3.1 for abbreviation descriptions

Both equations use the same comminution parameters as developed for use in its Comminution Economic Evaluation Tool (CEET):

- SAG mill power index (SPI), (in minutes): a closed-circuit, small-scale, dry grinding test conducted on -12.7 mm ore
- Modified Bond index (MBI) (in kWh/t): a short form of the Bond ball mill work index (BWI) test, which is calibrated or validated by several full Bond index tests
- MinnovEX crushing index (Ci): developed from the sample preparation process for SPI, which is a predictor for the fraction of material already finer than SAG discharge closing screen size.

These parameters have been used to model a large number of conventional SAG mill/ball mill (SABC) circuits, with good success in the prediction of capacity (TPUT) and grind size (P_{80}). The Phase 1 plant has achieved and exceeded design production rates with primary grind P_{80} in-line with, or better than, the model predictions.

Plant surveys were carried out in November 2013, and survey samples were submitted for comminution testing. This allowed correlation of plant capacity against orebody characteristics. Besides SPI, MBI, and Ci measurements, other tests performed on the samples included the Julius Kruttschnitt Mineral Research Centre (JK) drop weight tests to evaluate potential alternative predictive methods.

The SAG mill capacity in the surveys was greater than the MinnovEX model by about 10%, when corrected for charge level. In addition, the SAG mill was producing more fines than anticipated, leading to a finer P_{80} in flotation feed (130–150 µm) than expected. The survey ore was relatively hard with a grinding work index (MBI) of 22.6 kWh/t, Ci of 19.5, and SPI of 117.3. The survey SPI parameter is equivalent to the 40th percentile for Southwest zone (Oyut) ore SPI data set, but at the 80th percentile for Hugo North/Hugo North Extension SPI data set. The MBI was above the 90th percentile for both orebodies. With the survey breakage parameters, the MinnovEX model used in the mine plan would have predicted a P_{80} of 218 µm.

Due to the difficulties in representative sampling of coarse SAG mill feed and the impact of belt cuts on survey stability, these results must be considered indicative, but encouraging, as predictions of Phase 2 performance should be conservative.

Sensitivity analysis to JK drop weight parameters was also carried out by simulation. When the survey hardness parameters were replaced with values representing the softest Southwest zone (Oyut) ores, SAG capacity increased by 19%. When the hardest Oyut ore was modelled the capacity decreased by 16%. Both simulations were constrained to achieving product P_{80} values of 130–134 µm. This is in line with the generic model capacity predictions, but P_{80} appears to be more conservatively estimated by the MinnovEX model.

Attributable adjustments (related to the available ball milling power) were made to the predictions to allow for the effect of the fifth ball mill on both capacity and grind P_{80}.

A 2017 reconciliation of the MinnovEX throughput predictions by Wood showed that the MinnovEX predictions were highly inaccurate for predicting daily performance but were a useful predictor of capacity for periods of two weeks or longer. This analysis provided confirmation that the modelling approach is certainly appropriate for assessing likely long-term trends and predicting the requirement for future expansion of the OTLLC processing facility.

The MinnovEX mill throughput model is:

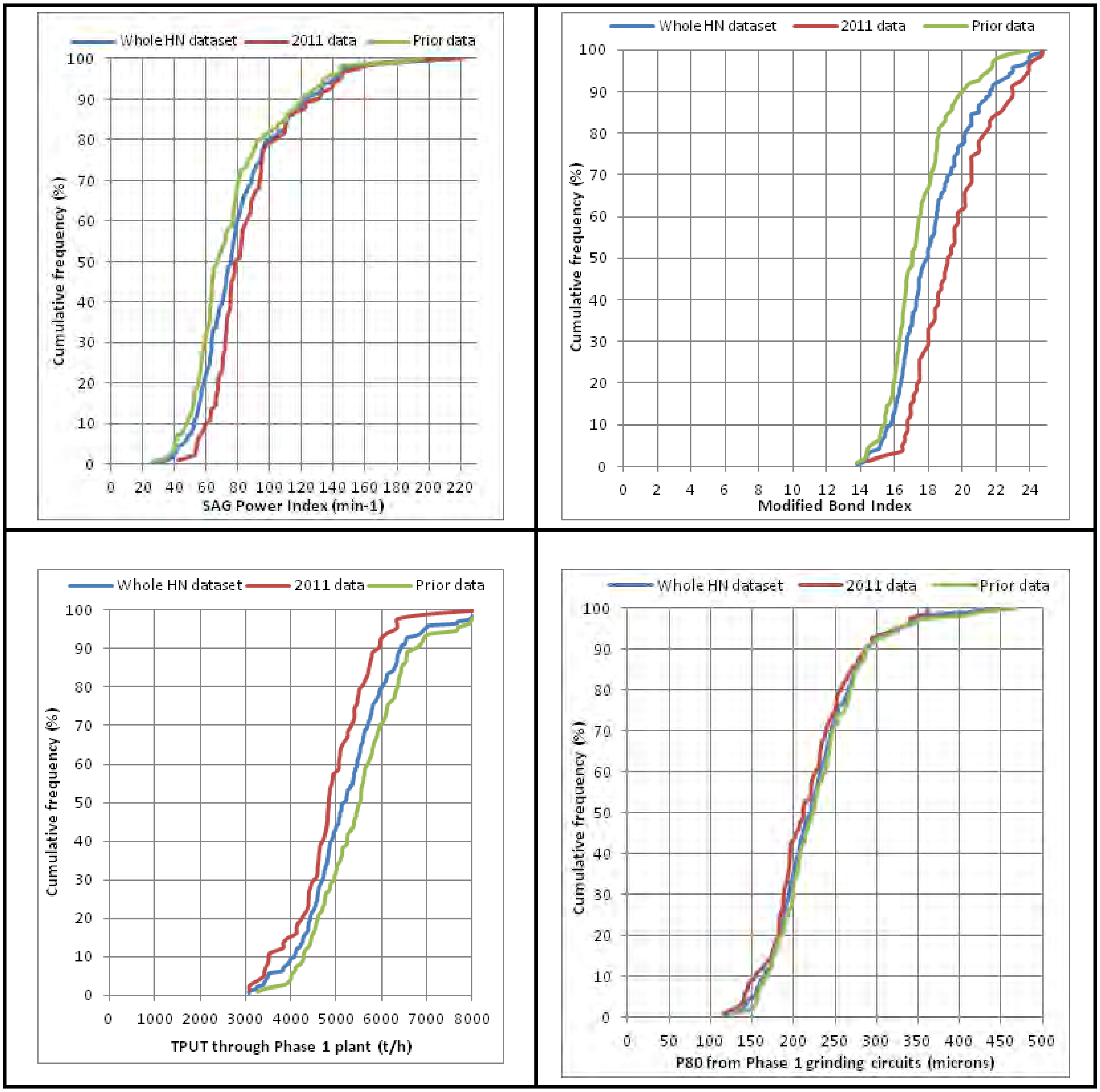
- TPOH = 29320 * SPI^-0.36 * MB^-0.24 * Ci^0.19

Where TPOH = tonnes per operating hour, SPI = SAG power index , MBI = modified Bond grind index, and Ci is the crushing work index.

Hugo North/Hugo North Extension

No separate comminution model development was conducted for Hugo North/Hugo North Extension mill feed material since the range of SPI and MB values for those deposits fall well within the range of values encountered in the Southwest zone (Oyut). Reliable predictions are expected using the MinnovEX equations, which are generic for the same circuit configuration. Figure 13-2 shows the range of all 336 comminution samples as a cumulative frequency distribution of SPI and MBI.

Figure 13-2: Cumulative Frequency Distributions of SAG Power Index, Modified Bond Index, TPUT, and P_{80} of Flotation Feed at 100% through Phase 1 Circuits – Hugo North/Hugo North Extension Samples



Note: Figure sourced from the 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Also plotted on Figure 13-2 are the distributions of 137 samples from Hugo North testing in 2007, a further 82 samples from the more northerly Hugo North/Hugo North Extension set tested in 2011, and 74 Central zone (Oyut) samples.

Plant feed is planned to change from the competent low-grade Oyut ore to softer and higher-grade underground Hugo North/Hugo North Extension ore. Consequently, the OTLLC facility throughput constraint becomes one of concentrate handling and tailings handling capacities.

During 2020–2036, it is projected that the flotation feed will be slightly above the optimum P_{80} for Hugo North/Hugo North Extension. However, the flotation test results indicate little sensitivity for recovery in the expected range of grind sizes.

MinnovEX MBI results were checked against the standard Bond index test on 18 samples, with generally good agreement, moderate scatter, and no evidence of bias. This indicated that the MBI results can be used to populate the block model and wherever else standard Bond index results may be required, such as the calculation of incremental ball milling requirements.

The average throughput rates for the five new Hugo North and Hugo North Extension ore types are given in Table 13-3. These are also the default throughput rates for blocks lacking comminution properties.

Heruga

The comminution modelling for Heruga currently assumes that the tonnes per operating hour (TPOH) = 3,995.

13.4 Metallurgical Testwork

13.4.1 Mineralogy

A large number of direct and indirect mineralogical assessments have been carried out on ore and flotation products, in the following categories:

- Routine thin sections on intervals of core in conjunction with logging to qualitatively assess the nature of the copper and gangue mineral assemblages
- Routine semi-quantitative clay mineral measurements by infrared spectroscopy to assist in alteration classification and to potentially identify rheology-modifying species that could be problematic in processing

Table 13-3: Throughput Rates by Ore Type, Hugo North/Hugo North Extension

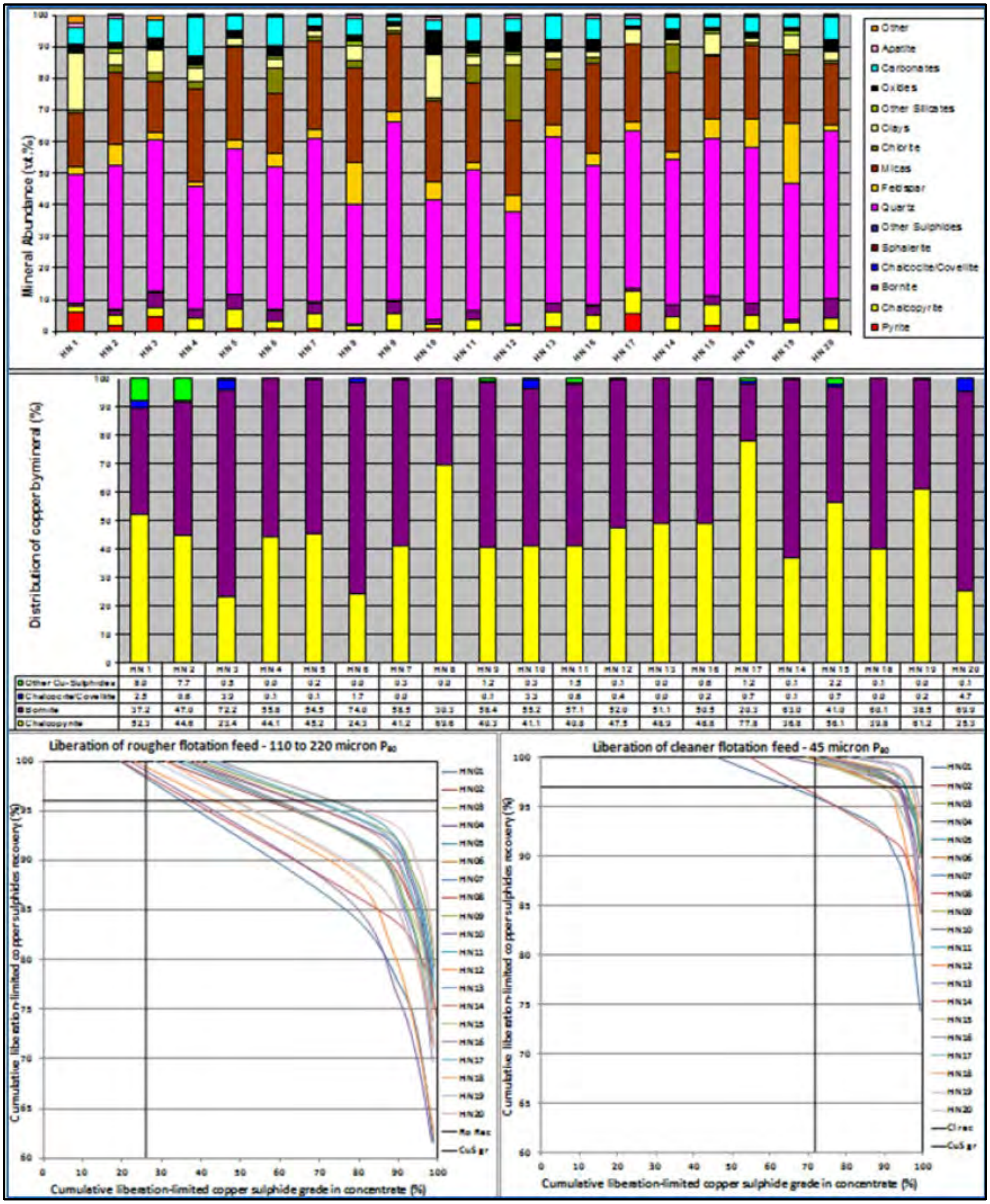
Geometallurgical Ore Type	Metallurgical Domain	BDT38 TPOH
HN-10	CP–PY	5,267
HN-11	BN–CP	5,303
HN-12	LG–PY	4,829
HN-13	LG	4,721
HN-14	HI–AS	5,117

- Visual logging of all core with respect to estimated sulphide mineral totals
- Mineralogical assessment of ore sections from all deposits by Terra Mineralogical Services (TMS), including analysis of gold association, fluorine deportment in ore and concentrate, copper mineral associations in tailing, and leach residues (49 reports and memoranda from 2002–2005)
- The production by TMS of a spatial 'metallurgical index' block model of metallurgical degree of difficulty, primarily for the Southwest and Central zones (Oyut), but also with some coverage of Hugo North Extension
- Diagnostic leach work on oxide and secondary copper zones to distinguish between chalcocite, chalcopyrite, and covellite
- QEMScan on Southwest (Oyut) and Hugo North/Hugo North Extension composites (flotation feed and rougher concentrates). Full QEMScan analysis on all 20 flotation feed composites from Hugo North/Hugo North Extension zone testwork programs (Blue Coast/SGS)
- X-ray diffraction (XRD) and QEMScan on composites of flotation tailings produced for non-acid forming/potentially acid-forming (NAF/PAF) characterization
- Mineralogy that can be inferred from the 48-element ICP assays on 24,000 intervals over all deposits
- Liberation analysis by conventional particle counts on Heruga.

Hugo North/Hugo North Extension

A graphical summary of QEMScan results for the 20 Hugo North/Hugo North Extension composites is provided in Figure 13-3.

Figure 13-3: QEMScan Results, Hugo North/Hugo North Extension



Note: Figure sourced from the 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

The first graph in Figure 13-3 displays mineral abundance by weight in the feed, summing to 100%. Sulphides are at the bottom in the stacked chart, with pyrite in red. Pyrite is only present at significant levels in three of 20 composites, and, when present, is usually accompanied by higher-than-average levels of copper sulphides, which leads to easier separation. Little dilution of concentrate by pyrite has been observed in previous flotation work, as expected from this mineralogy.

Copper sulphides plus pyrite rarely form more than 10% of the total weight, with chalcopyrite, bornite, and chalcocite/covellite present at 3.9%, 2.7%, and 0.04%, respectively by weight.

Quartz is the dominant rock-forming mineral (46% by weight on average), followed by sericite mica (24%), chlorite (3%), and feldspar (5%). Clays account for 1%–18% of the mineral components in the composites, but average less than 5% overall. The broad footprint of the cave is likely to minimize daily variation in clay content to very manageable levels in the grinding and flotation circuits.

Oxides, primarily of iron (magnetite, hematite, and goethite), average only 2.8%, and carbonates average 5.4%. Magnetite levels are too low for economic recovery and the carbonates provide useful buffering capacity to minimize acid mine drainage from tailings. Apatite is present at 0.6 wt% in the ore and is moderately variable. It can locally form a significant source of fluorine in feed and, by entrainment in froth, a source of fluorine in concentrate. However, targeted testing has indicated less fluorine in concentrate is attributable to apatite than from sericite and fluorite.

The second graph in Figure 13-3 shows the relative contributions of the copper minerals to the total copper content of the feed. Bornite accounts for 52.3% of the copper, followed by 45.5% from chalcopyrite, only 1.1% from chalcocite/covellite and 1.2% from other copper sulphides (including the sulphosalts tennantite and tetrahedrite). Tennantite is also the predominant arsenic source for Hugo North/Hugo North Extension and it is difficult to depress in flotation.

The high bornite content leads to a theoretical concentrate grade of 46% Cu. The metallurgical correlations derived from flotation testwork do not achieve this theoretical value due to recovery of liberated pyrite, entrained free gangue minerals and by incomplete liberation of both minerals from the copper sulphides. The assumed regrind target and cleaner/recleaner performance results in 30% Cu concentrate grades, which is a 35% reduction in grade below the theoretical limit established by quantitative mineralogy.

Incomplete liberation also results in incomplete copper sulphide recovery, as indicated by the lowest pair of graphs in Figure 13-3. The left graph shows the rougher feed cumulative liberation yield (CLY) profile and the right graph shows the CLY for the cleaner feed (after regrind). These graphs are best understood by providing an example at the theoretical limit. If all copper sulphides were 100% liberated then there would be no lines because the data would simplify to a single point at 100% grade (of copper sulphides, not copper) and 100% recovery in the top right corner. A highly liberated real material has lines that approach this ideal 100/100 point. A poorly-liberated material generates lines that are closer to the centre of the graph area. As expected, the rougher CLY curves are characteristic of a poorly liberated material while the cleaner feed is well liberated but well short of perfectly liberated.

Hugo North/Hugo North Extension composites HN1 and HN8 are soft and fine, but poorly liberated, while HN18 and HN19 are hard and coarse, but are also poorly liberated. The average Hugo North/Hugo North Extension rougher flotation grade-recovery operating point is included for reference as the intersection of the horizontal and vertical black lines (96% recovery and 26% copper sulphides, which corresponds to 12% Cu). This reference point is comfortably to the left of all 20 CLY curves, demonstrating the real-world dilution of the rougher concentrate that occurs with 30 minutes of continuous froth removal. Dilution is not problematic, as rougher flotation is all about recovery and not so much about grade.

The lower right-hand graph in Figure 13-3 estimates the liberation status for the same test samples after regrinding to a P_{80} of 45 µm, the cleaner feed size distribution. The degree of liberation after regrinding is much higher than in roughing with all but two samples closely approaching the 100/100 point. The copper head assays for both poorly-behaving composites are below 1%, meaning minimal copper production is at risk of this type of poor performance.

The operating point for cleaning/recleaning is at 97% copper recovery and 72% copper sulphides (33% Cu). This point is well to the left of the main cluster of CLY lines, which average 95% copper sulphide grade (44% Cu). Both grade and recovery are targeted in cleaner flotation and the selected operating point suggests that recovery is being maximised while recovering concentrate at the lowest acceptable concentrate grade. This is a typical approach in copper flotation with targets being driven by maximising recovery while achieving acceptable impurity levels for the smelter(s).

Heruga

Each of the composite samples used in this test program were subjected to standard analytical techniques to determine the quantity of each element of interest. This data is summarized in Table 13-4. The copper content in the feed ranged between 0.25–1.40% copper across the suite of composites. Negligible amounts of copper oxide were present, with the exception of composite AT003. Other metals of potential economic significance include gold and molybdenum. Gold was present in appreciable amounts, with an average feed content of 1.2 g/t Au. Molybdenum is only present in four composites, and the measured molybdenum content ranged from 0.01–0.04%.

A modal analysis was conducted on each of the nine composites targeting a nominal primary grind size of 150 µm K80. A summary of the mineral composition and primary grind sizes for each composite are displayed in Table 13-5. To facilitate the analysis of data the nine composites have been divided into two groups. The first group refers to the AT, TS and ZU composites while the second group consists of the four Met Composites. The copper sulphide mineral content in the first group of composites ranged from 0.7–4.0% and averaged 1.7%. The second group of composites had a much smaller variance, with an average copper sulphide mineral content of 1.5%. In a majority of samples, pyrite was the dominant sulphide mineral, accounting for over 50% of the sulphides by weight.

As chalcopyrite is the dominant copper sulphide the maximum theoretical grade of concentrate will be in the region of 35% Cu. In reality, chalcopyrite concentrates are usually limited to about 25% Cu to maximise copper recovery. At Heruga, pyrite is also a potential recovery target as it is likely to carry the gold values. A typical flotation approach would be to recover both copper minerals and pyrite (plus any free gold) in the rougher floats and then reject pyrite in the cleaners. This approach results in a pyrite rich cleaner tailing that can be treated to recover the gold.

13.4.2 Flotation

Hugo North/Hugo North Extension

The samples selected from the northern area of Hugo North are shown in Table 13-6.

Table 13-4: Chemical Composition of Heruga Composites

Composite	Cu (%)	Fe (%)	Mo (%)	S (%)	Ag (g/t)	Au (g/t)	Cu(Ox) (%)
AT 001	0.53	7.55	<0.001	3.2	3	1.6	0.06
AT 002	0.58	6.05	<0.001	1.9	3	2.2	0.03
AT 003	0.57	4.48	<0.001	0.4	2	0.5	0.33
TS 001	0.25	0.25	<0.001	1.9	2	0.2	0.01
ZU 001	1.4	7.45	<0.001	1.5	7	2.2	0.16
Met 001	0.76	8.75	0.041	2.2	3	0.4	<0.01
Met 002	0.56	2.38	0.016	2.5	4	2.5	<0.01
Met 003	0.47	4.47	0.005	0.7	2	1.1	<0.01
Met 004	0.47	2.17	0.042	2.1	2	0.2	<0.01

Table 13-5: Mineral Content of Heruga Composites

Composite	Cp (%)	Bn (%)	Ch (%)	Md (%)	Py (%)	Gn (%)	Primary Grind (µm K_{80})
AT 001	1.5	< 0.1	< 0.1	< 0.01	8.5	90	140
AT 002	1.7	< 0.1	< 0.1	< 0.01	4.6	94	148
AT 003	0.7	0.6	< 0.1	< 0.01	0.7	98	120
TS 001	0.7	< 0.1	< 0.1	< 0.01	2.6	97	159
ZU 001	3.7	0.1	0.2	< 0.01	0.9	95	167
Met 001	2.1	< 0.1	< 0.1	0.07	5.5	92	133
Met 002	1.4	< 0.1	< 0.1	0.02	4.4	94	166
Met 003	1.2	0.1	< 0.1	0.01	1.2	98	157
Met 004	1.3	< 0.1	< 0.1	0.05	4.9	94	141

Note: Cp = chalcopyrite, Bn = bornite, Ch = chalcocite and covellite, Md = molybdenite, Py = pyrite, Gn = gangue.

The confirmatory work generated flotation results for Hugo North/Hugo North Extension composites, which displayed an acceptably wide range of copper head grades, gangue mineralogy and alteration types, and for which comminution characteristics had been defined in SPI/MBI/Ci terms.

Spatial variability composites for flotation were selected in proximity to the comminution samples. Selection criteria for compositing were primarily spatial, with compact location groupings that could be assigned a similar height-of-draw in block cave mining. However, the selection process managed to deliver a wide range of head grades for head grade–recovery relationship development and also managed to classify in-part by alteration type.

Flotation feed sizing in the block model outputs is estimated using the MinnovEX model on the parameters of the nearby comminution sample in each instance.

The economic optimum flotation feed sizes are summarized in Table 13-7. The size-by-size Aminpro grind-recovery optimisation approach is described in Section 13.4.5.

The predictions confirm the continued use of the 2005 Integrated Development Plan metallurgical predictions for Hugo North/Hugo North Extension.

Heruga

Rougher kinetic and open circuit batch cleaner tests were conducted for Heruga. In the rougher tests, over 85% of the copper in the majority of the composites in the first sample group was recovered into a rougher concentrate containing 10% of the feed mass. On average, over 85% of the total copper in the Met composites was recovered into a rougher concentrate with a slightly higher mass pull of 15%. The gold was well recovered into the rougher concentrate for all the samples with an average recovery of 80%. In open circuit batch cleaning, the first set of composites recovered from 30–80% of the copper and generated concentrate assaying approximately 28% by weight copper. The Met composites recoveries exceeded 86% and concentrate assayed at about 30% by weight copper.

Additional testwork is required to maximise both copper and gold recoveries into saleable concentrates.

13.4.3 Cleaner Flotation Feed P_{80} and Regrind Considerations

In the absence of penalty element liberation problems, the coarsest regrind sizing that achieves 90% liberation of copper sulphides in cleaner feed is generally considered a good estimate of the optimal regrind level in plant operation. Hugo North/Hugo North Extension ore has showed uniformly lower fluorine levels in concentrate from locked-cycle testwork. In testwork, one-third of the Hugo North/Hugo North Extension concentrates would exceed the 300 ppm fluorine penalty level.

Table 13-6: Hugo North Extension Flotation Composite Selection

Designator	Cu Grade (%)	Au Grade (g/t)	Alteration
HN1	0.99	0.07	Intermediate argillic (IA)
HN2	1.85	0.43	Mainly sericitic (SER)
HN3	4.18	0.38	Mix of IA, chloritic (CHL) and SER
HN4	2.34	0.38	IA
HN5	3.16	0.75	Mainly SER
HN6	2.69	1.18	Mix of IA, CHL and SER
HN7	3.15	1.26	SER
HN8	0.81	0.15	SER
HN9	4.04	1.82	SER
HN10	1.30	0.24	Mainly IA
HN11	2.68	1.05	Mainly CHL
HN12	0.79	0.11	Mix of SER and CHL
HN13	3.15	1.11	Mix of IA, CHL and SER
HN14	3.04	0.95	Mainly SER
HN15	3.09	0.50	Mainly SER
HN16	2.49	0.57	Mainly SER
HN17	2.57	0.37	SER
HN18	3.25	1.25	SER
HN19	1.43	0.37	SER
HN20	3.79	0.44	Mainly IA

Table 13-7: Optimum Hugo North/Hugo North Extension Primary Grind Sizes

Deposit/Composite	2005 Integrated Development Plan Optimum Primary Grind Size (µm)	Aminpro 2007 Optimum Primary Grind Size (µm)
Hugo North	140	116

Penalty costs between the 300 ppm penalty threshold and the 1,000 ppm rejection level are manageable, so no further processes are considered for reducing the penalty level at this time.

High fluorine levels are generally managed in copper projects by adopting a finer regrind to increase gangue liberation.

13.4.4 Rougher and Cleaner Testwork

The Aminpro work also used Southwest (Oyut), Hugo North/Hugo North Extension kinetic flotation work by PRA to develop flotation simulation models in roughing and in cleaning that could be calibrated against the kinetic work and used to simulate the effects of ore type, copper head grade, primary grind level, rougher pH, regrind level, and cleaner pH.

In general, the following trends were observed:

- With sufficient collector adjustment, copper recovery is insensitive to pH within broad ranges (pH 7–11)
- Gold recovery is adversely affected by lime addition (both pH and Ca++ concentration above pH 9) and is not as responsive to additional collector. This has influenced a slower ramp-up of Central zone (Oyut) open pit development in the 2016 Oyu Tolgoi Feasibility Study until high-gold Hugo North/Hugo North Extension ore has been processed (2022–2024). Gravity gold recovery is a possible contingency to recover slow-floating gold, while unit cell operation on regrind cyclone underflow is a possible means of preventing as much gold from becoming slow-floating by reducing over grinding
- Additional collector and retention time is required at high copper head grades (feed forward strategy required to link collector addition to copper metal units in flotation feed)
- Better copper grade-recovery response and pyrite rejection are typically achieved with dithiophosphinate collector (3418A) than with any single xanthate (isopropyl, isobutyl, or amyl). However, xanthate storage and mixing facilities have been provided for potential synergistic addition with secondary gold collectors. Testwork completed in 2012 by Blue Coast indicated a slight advantage in copper and gold recovery with potassium amyl xanthate. The results were not conclusive,

however, against the comparative 3418A tests conducted at higher rougher concentrate grades

- Additional cleaner collector is required at finer regrinds and higher pH values
- There is a benefit from staged addition of collector

Rougher flotation kinetics might be slower at low pulp potential (eH). In recent confirmatory testwork, rougher flotation response was delayed until the flotation pulp potential (absolute) was above 0 mV. This trend was exacerbated by even modest lime additions, because increasing pH reduces eH. It is possible that this observation is a reflection of batch testwork and not representative of a continuous flow system. The cyclone overflow eH in almost all concentrators (except those treating ores with extremely high pyrite content, or an active pyrite or pyrrhotite content) is routinely in the range of 0–50 mV, with no specific chemical interventions or additional aeration in the grinding circuit. Even the most-pyritic Oyu Tolgoi ores have less than 15% pyrite content, which is not chemically active. If low eH is encountered, then additional aeration may be warranted. There is space to retrofit conditioners or aeration devices of a few minutes' capacity on the ball mill floor below the cyclones. In this event, it might also be necessary to retrofit an additional pumping stage, for which the grinding basement has sufficient space.

13.4.5 Flotation Capacity Modeling

The selection of flotation design criteria for mechanical cells in the concentrator conversion has taken account of the following information:

- The laboratory bench kinetic testwork at Ammtec in roughing and cleaning, while achieving the respective stage recoveries required by the mass balance.
- The review of flotation kinetics by Aminpro and the results of the Minemaster model for Hugo North/Hugo North Extension. Column cell and mechanical requirements were confirmed at both 30 µm and 40 µm grinds by Aminpro simulations based on the results from PRA kinetic flotation test programs carried out in Vancouver.

Aminpro evaluated the kinetic tests carried out at PRA to determine rate constants (k) and maximum recoveries (Rmax). These values formed the basis of the detailed design of the Phase 1 flotation circuit design. The rougher work was carried out on Southwest (Oyut), Central (Oyut), Hugo North, and Hugo North Extension composites. Similar results are available at +32 µm, –32+25 µm, –25+20 µm, and –20 µm in cleaning for Hugo North Extension mill feed material. The mineral contents are developed from indicator assays (Au, Ag, F, Cu, Mo, and Fe, As, S) and balanced to 100%.

After the addition of the extra rougher bank for the conversion, rougher retention times and froth carrying capacities will approximate those used in Phase 1. Currently the mechanical cleaners are handling a higher-than-expected flow due to low column stage recovery (20% versus 60% design). The mechanical cleaners, which are not being expanded, will have slightly shorter retention time and increased froth loading compared to Phase 1. The high recirculation of column cleaner tails observed in Phase 1 is not projected to persist when treating the high-grade Hugo North ore with 10 column cells, in place of four in Phase 1.

The initial selection of column cell capacities for the expansion was factored from the Phase 1 design and the Minemaster modelling. It is projected that when treating Hugo North/Hugo North Extension ore, the column stage recoveries will be above the Phase 1 design of 40% due to coarser regrind (45 µm versus 35 µm) and lower upgrade ratios. The column cell expansion was determined by maintaining froth-carrying capacity rather than retention time. The six additional columns will be identical to the existing four.

13.4.6 Thickening and Filtration

The small scale of the recent testwork has generated insufficient volumes of concentrate and tailings for conducting thickening and filtration testwork. To allow for a conservative design, the Phase 1 concentrate thickener unit capacities have been assumed, despite the coarser regrind targets. The same is true in the final tailings area, where the dewatering duty for blended Southwest (Oyut), Central (Oyut), and Hugo North/Hugo North Extension tailings is similar to Phase 1.

Industrial experience indicates that filter cake formation rates will increase by 14% due to the envisaged coarser Phase 2 regrind (45 µm vs. 35 µm). A location for a fifth pressure filter has been reserved in the layout as a contingency against a further 20% increase in peak filtration duty.

It is recommended that further Hugo North/Hugo North Extension tailings thickening and concentrate pressure filtration testwork at 0.1 m^2 scale be conducted before detailed design. This work should only proceed after underground development has progressed, as this will allow relatively easy access for sample acquisition by core drilling.

13.5 Metallurgical Predictions

13.5.1 Throughput

The throughput algorithms developed in comminution modelling described in Section 13.3 include:

- Flotation feed size:

  P_{80}, µm = $\left(\frac{10\times1.25\times MB}{83000\div TPOH}\right)^2$

- Maximum P_{80} guideline = 220 µm
- Throughput:

  Instantaneous, t/h = 29,320 $\times Ci^{0.19} \times SPI^{-0.36} \times BM^{-0.24}$

- Maximum throughput = 5.2 kt/h (hydraulic limitation)

The volumetric capacity limit in base data template 31 (BDT31) that was used in the 2014 Oyu Tolgoi Feasibility Study was 5.5 kt/h (121 kt/d, 44.3 Mt/a). After a review of the volumetric capacity in the 2016 Oyu Tolgoi Feasibility Study, this was reduced to 5.0 kt/h (110 kt/d, 40 Mt/a). The Phase 1 configured plant has now achieved 5.5 kt/d and for BDT38 (December 2020) the conservative limit of 5.2 kt/d was adopted.

For the preparation of the 2016 Oyu Tolgoi Feasibility Study production schedule for the Oyu Tolgoi operation, the plant throughput volumetric limit was changed from 5.5 kt/h to 5.0 kt/h.

For Heruga, throughput is not modeled, but instead limited to 33.25 Mt/a.

13.5.2 Recoveries

The recovery calculations for copper, gold, and silver are taken from BDT38. The letters a, b, c, d, e, f, g, h are constants, which vary by ore type. CuF is the feed copper assay in %; AuF is feed gold assay in g/t; AgF is feed silver assay in g/t; SF is feed sulfur assay in %; CuRec is copper recovery in %; and AuRec is gold recovery in %.

Copper Recovery

The equation for predicting copper recovery is presented at the top of Table 13-8 and the parameters for each of the Hugo North (including Hugo North Extension) ore types and Heruga are listed. The copper feed grade forms part of the equation.

Table 13-8: Copper Recovery Calculations for Hugo North/Hugo North Extension and Heruga Ores

$$CuRec = a \times \left(\frac{b \times Cu\%}{1 + b \times Cu\%}\right) \times \left(1 - exp^{-b \times Cu\%}\right)$$

		Recovery Constants	
Ore	**Met Domain**	**a**	**b**
10	CP-PY	96	20
11	BN-CP	95	15
12	LG-PY	96	20
13	LG	96	20
14	HI-AS	96	20
16	Heruga	98	12.2

The five new Met Domains for Hugo North ores were developed by OTLLC for BDT38.

Gold Recovery

The equations predicting gold recovery are shown in Table 13-9 and Table 13-10. Heruga has a simpler equation than Hugo North/Hugo North Extension.

Silver Recovery

The equations predicting silver recovery are shown in Table 13-11 and Table 13-122. Heruga has a simpler equation than Hugo North/Hugo North Extension.

Molybdenum Recovery

In all instances, molybdenum recovery is assumed as a fixed 60% into a concentrate grading 50% Mo.

13.5.3 Predicting Copper Assays in Concentrate

New equations for predicting copper grades in concentrate were developed for each of the Hugo North and Hugo North Extension ore types in BDT38. The equation and its parameters are shown in Table 13-13.

For Heruga, concentrate grade is assumed to be 25% Cu.

Table 13-9: Gold Recovery Calculations for Hugo North/Hugo North Extension

$$AuRec = (c + (d * CuRec\%)) * \frac{e * AuF}{1 + e * AuF}$$

Ore	Met Domain	c	d	e
10	CP-PY	0	0.89	90
11	BN-CP	0	0.89	85
12	LG-PY	0	0.79	260
13	LG	0	0.86	70
14	HI-AS	0	0.87	120

Table 13-10: Gold Recovery Calculations for Heruga

$$AuRec = (c + (d * CuRec\%))$$

Ore	Met Domain	c	d
16	Heruga	9.8	0.80

Table 13-11: Silver Recovery Calculations for Hugo North/Hugo North Extension

$$AgRec = (i + (j * CuRec\%)) * \frac{k * AgF}{1 + k * AgF}$$

Ore	Met Domain	i	j	k
10	CP-PY	0	0.92	6
11	BN-CP	0	0.98	4
12	LG-PY	0	0.76	25
13	LG	0	0.79	2
14	HI-AS	0	1.00	2

Table 13-12: Silver Recovery Calculations for Heruga

$$AgRec = (i + (j * CuRec\%))$$

Ore	Met Domain	i	j
16	Heruga	13.0	0.80

13.6 Predicting Concentrate Mass Pull

The prediction of mass pull is via the following equation for all ore types:

- $mass\ pull = \frac{Cu_{feed} * \frac{Cu_{rec}}{100}}{ConGr_{Cu}}$

Where Cu_{rec} is predicted using the equation in Table 13-8 and $ConGr_{Cu}$ is predicted using the equation in Table 13-13.

13.7 Deleterious Elements

13.7.1 Overview

Arsenic and fluorine are the only penalty elements that have been identified in the Oyut, Hugo North/Hugo North Extension deposits. Enargite is the primary arsenic carrier in these deposits, although tennantite is locally important.

As long as concentrator feed is managed such that rejection levels are avoided, the modest impact of fluorine and arsenic penalties will average less than US$5/t of concentrate. To handle production peaks while maintaining a base load for contract, a certain amount of the Oyu Tolgoi concentrate production has been considered for sale to traders for subsequent blending. This could be an avenue for disposal of high-penalty element concentrates.

For arsenic in copper concentrate, the production model assigns a rate of US$2/t/1000 ppm above a 3000 ppm threshold up to the rejection level of 5000 ppm. For fluorine, the production model assigns a rate of US$2/t/100 ppm above a 300 ppm threshold up to the rejection level of 1,000 ppm. The penalties are in line with terms from custom smelters.

However, it has been reported that no fluorine penalties have been applied under the contract terms in operation since sales commenced in late 2013, so some conservatism is inherent in the NSR estimates.

13.7.2 Arsenic

High flotation pH is the primary mineral processing control on arsenic recovery, but it is only partially effective because of the difficulty in depressing enargite and the related copper losses. In addition, high pH has an adverse impact on gold recovery and is therefore not expected to be used often.

Table 13-13: Hugo North/Hugo North Extension Ore Types

$$ConCu = \left(n * CuF + o * \frac{CuF}{SF} + p\right)$$

Ore	Met Domain	n	o	p
10	CP-PY	0.1	20.1	14.9
11	BN-CP	1.7	13.8	16.7
12	LG-PY	5.2	20.7	6.5
13	LG	8.6	17.6	5.9
14	HI-AS	0.0	21.0	11.8

Note: CuF is copper in feed and SF is sulphur in feed.

Apart from high-arsenic ore, an arsenic recovery of 78% is expected as shown in Table 13-14. "As ppm" and "Cu%" are feed grades and ConCu% is concentrate grade calculated according to the equation in Table 13-8.

13.7.3 Fluorine

Fluorine distribution in concentrates is more variable, being locally present as coarser-grained fluorite or finely intergrown topaz in some high-fluorine areas, but with a background level distributed as 0.6–2% fluorine in sericite, which itself represents 15–30% of the weight of the deposits. Regrind level and the degree of entrained gangue removal are the primary control mechanisms for fluorine.

Previous analyses of Hugo North/Hugo North Extension and Southwest zone (Oyut) ore data from locked-cycle test results are shown in Figure 13-4, where the blue line describes the formula used for predicting fluorine in concentrate for all ore types in the 2010 Integrated Development Plan, the Integrated Development and Operating Plan.

The testwork results support the fluorine content of concentrates from the Central zone (Oyut) and Hugo North/Hugo North Extension deposits.

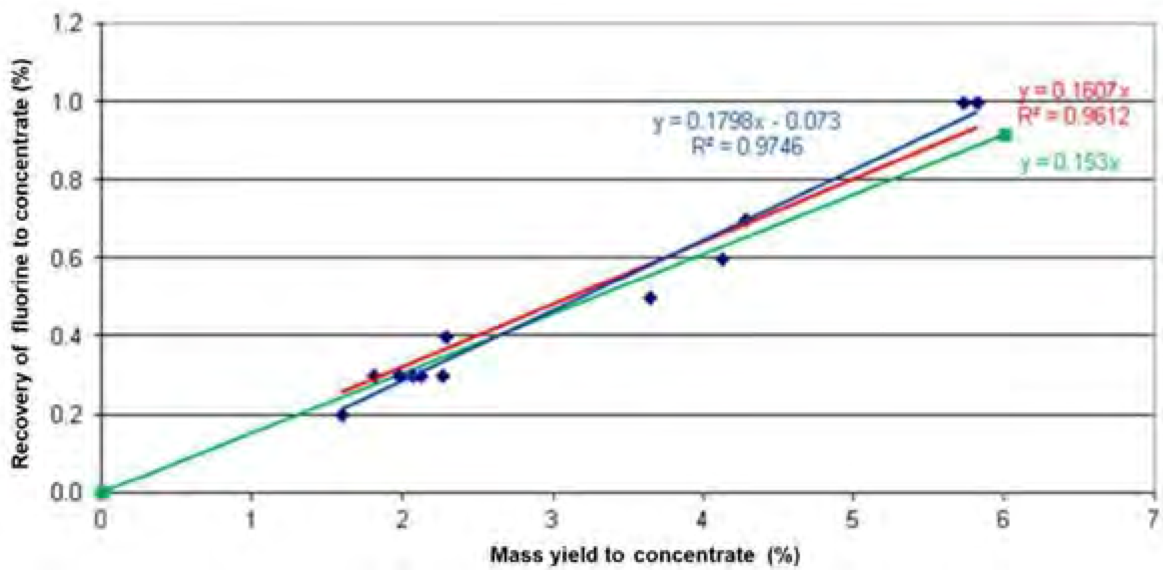
Fluorine predictions for all ore types are as shown in Table 13-15. The fluorine grade in final concentrate from Southwest zone (Oyut) ore has been almost twice what would have been projected from the relationship above, based on batch test and locked-cycle results.

Table 13-14: As Recovery Calculations for Entrée Ores (BDT38)

$$ConAs = \frac{m \times ConCu\% \times As\ ppm}{Cu\%}$$

Ore	Met Domain	AsRec:CuRec Ratio m
10	CP-PY	0.780
11	BN-CP	0.780
12	LG-PY	0.780
13	LG	0.780
14	HI-AS	0.900
16	Heruga	0.780

Figure 13-4: Fluorine Recovery and Mass Yield to Concentrate, Hugo North/Hugo North Extension and Southwest Zone (Oyut) Locked Cycle Correlation vs Central Zone (Oyut) Batch Test



Note: Figure sourced from the 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Table 13-15: Fluorine Prediction Formula

Fluorine in Concentrate (ppm)
0.3 x fluorine in feed (ppm) for all ores

It is suspected that the especially good fluorine rejection in the laboratory work is partly a function of a generally finer P_{80} grind than currently targeted in plant operation (P_{80} of 25 µm vs. 35 µm), and partly because the bead mill used in batch mode in Ammtec laboratory work had a very steep size distribution, with most of the top 20 weight percent very close in size to the P_{80}.

It was decided to increase the fluorine factor from 0.15 to 0.3 for all ore types to account for the plant response. This has not presented a problem with rejection limit in the production schedules.

13.7.4 Concentrate Production, Payable Penalty, and Minor Elements

Copper assays vary with higher-grade Hugo North/Hugo North Extension production and increased bornite content early in the block cave. The peak grades from underground bornite are moderated by simultaneous treatment of large amounts of Central zone ore in 2022–2026. High copper content, especially with a high Cu:S ratio, is attractive to most smelters as it provides high copper yield while not taxing acid recovery and handling systems. The peak anticipated grades of 30%–35% Cu are projected from 2022 through 2030. The averages in the 2016 Feasibility Study after concentrator conversion are expected to be competitive with other imports to the Chinese market at 28% Cu.

The minimum annual production grades of 23–24% Cu in the last few years are less attractive, but are on a par with product from the Mongolian Government-owned Erdenet mine, and represent small volumes far in the future.

Gold grade is much more variable. Silver represents a much lower percentage of value and is elevated in the final years by virtue of a higher Ag:Cu ratio in feed. The significant variability in precious metals content may require shifts in concentrate allocations to smelters. Some smelters are better set up for precious metals recovery than others, thus making better margins relative to the amount of gold paid for.

Arsenic and fluorine are penalty elements, but the terms have relatively little economic impact. At high levels in concentrate, smelters are unable to deal acceptably with arsenic and fluorine and, rather than a penalty, their presence becomes a basis for rejecting the concentrate. The Chinese State inspection agency also monitors quality and enforces national limits. Consequently, the primary concern is staying well clear of the rejection limits, and retaining the ability to respond to a potential decrease in the rejection limit if environmental standards become more stringent.

For each element, the annual mean level and the maximum level expected in a 5 kt shipment is estimated. Due to the differing sources of variation and measures available to control it, maximum fluorine is assessed at 1.2 times the annual average level, while maximum arsenic is assessed at 1.3 times the annual average. The fluorine variation allowed is based on an analysis of variation in Southwest zone (Oyut) production to date.

Average concentrate production is usually in a possible penalty position with regard to fluorine, if typical terms were applied. However, OTLLC has reported that current shipments are not attracting a penalty, and peak shipment levels still retain a minimum 10%–20% margin below the rejection level (1,000 ppm; Peters and Sylvester, 2016).

Average concentrate production will occasionally attract arsenic penalties when Central zone (Oyut) ores forms a significant fraction of feed. Arsenic maintains a minimum 30% margin to the rejection level.

Both fluorine and arsenic are modelled in the mine plan and neither element is expected to present significant long-term marketing difficulties. However, the primary control over fluorine rejection is in the hands of the concentrator, while the primary control over arsenic is by long-term planning and short-term grade control at the open pit mine. In Phase 1 and Phase 2, sufficient blending capacity exists in the concentrate slurry storage tanks (5–10 kt) and in the load-out shed (25 kt) to mitigate most process upsets affecting fluorine in a 5 kt smelter shipment. Such upsets would include loss of regrind efficiency or capacity or loss of control over column cleaner operation. Longer-term excursions in arsenic content in feed could be managed by maintaining a larger-than-usual inventory of higher arsenic as-bagged product at the site and scheduling its release over a longer time.

Depression of arsenic by elevated pH in cleaning is not particularly effective and would reduce gold recovery from Southwest zone (Oyut) and Hugo North/Hugo North Extension ores.

In addition to conventional payable and penalty elements, smelters are also interested in non-payable elements from which they may derive by-product credits (rhenium, mercury, selenium). There are also components that may be penalized in certain cases depending on other sources of smelter feed and their levels (bismuth, thallium). Other critical, non-penalty elements not tracked by the Oyu Tolgoi production model are also of importance in assessing a smelter's productive capacity (sulphur via the acid plant) or its operating costs and slag chemistry (Al, Ca, Mg, SiO_2, Fe). Such elements can be assayed directly in production year composites, or their overall variation inferred from other indicator assays or mineralogy.

Finally, the particle size and the moisture of the concentrate are required to assess the dusting and bulk handling characteristics in the feed preparation and gas handling areas. None of the parameters would appear to give smelters cause for concern. The ranges are necessarily wide to reflect the assay results from a variety of ore types treated over an extended mine life. They also vary due to the uncertainty in their recoveries to concentrate.

Final concentrate locked-cycle test assays were generated under conditions that follow those applied in production Phase 1. Minor elements that were non-payable and non-penalty in nature were taken directly from the ranges observed in those tests. The major payable metal (Cu, Au) and penalty element (As, F) assay trends are best determined by applying the metallurgical prediction formulae for recoveries and final concentrate copper grade to the head grades predicted by the open pit and underground mining plans, block models, and dilution and mixing models.

Product specification will generally become more attractive and volumes will increase as the tonnage of high-grade Hugo North/Hugo North Extension ore increases rapidly from 2020 onwards.

The high levels of arsenic in early Central zone (Oyut) ore will need to be managed by blending with the low-arsenic Hugo North/Hugo North Extension ore. The arsenic content in final concentrate is a fairly direct function of As:Cu ratio in feed, and this parameter is one of the constraints in the mine production schedule.

As Hugo North/Hugo North Extension Lift 1 ore production ramps down after 2036, arsenic levels are projected to increase significantly, but the metallurgical models predict a peak level of only 3,500 ppm; substantially lower than the current rejection limit of 5,000 ppm. The open pit mine plan has used a lower internal limit of 3,000 ppm from near-term production as a monthly average to avoid approaching rejection levels on a shipment-by-shipment basis. Contracts have been drafted so that payables and penalty elements are assessed on the weighted average of all lot assays in a 5 kt shipment.

Fluorine is projected to be above the usual penalty level but below the rejection limit throughout the mine life. Penalties are not always applied, but the 1,000 ppm rejection limit is legally enforceable. Unlike arsenic, control of fluorine is primarily within the scope of processing rather than pit grade control. The spread between peak shipment assays and annual average levels is based on variation observed in the first year of operation.

Major constituent non-payable, non-penalty components such as iron, sulphur, silica, and alumina are important for smelter metal and mass balances and are predictable from the mineralogy of ore and concentrate. The balance of less-significant concentrate components (minor elements) that are non-payable and non-penalty elements each form less than 1% of the total weight. Typical values and expected ranges are reported in Table 13-16 for the blend of Oyut and Hugo North/Hugo North Extension materials.

Ranges have been predicted from the full elemental assays for concentrate from each ore type, based on achieving a 100% mineral and/or metal balance in final concentrate with the predicted mineralogy and the average minor element assays.

Unlike the payable and penalty grades, major and minor non-penalty/non-payable components are stated as 'typical' values and are not expected to be a source of contract dispute, although moisture ranges should be respected, even with bagged product, to minimize freight costs either to seller's account (in Mongolia) or buyer's account (in China).

Allowances have been made for the greater variation to be expected in a 5 kt shipment (representing one day's production at the Phase 2 peak) than in a monthly or annual average.

13.7.5 Heruga

Bismuth and fluorine were present at penalty levels for testwork concentrates generated for the Heruga mineralization.

Table 13-16: Non-Payable, Non-Penalty Concentrate Analysis Derived from Blended Oyut and Hugo North/Hugo North Extension Ores

Element/Component	Unit	Combined Long-Term Typical Range (5 kt lots)
Al	ppm	4,000–15,000
Ba	ppm	20–100
Be	ppm	<0.1
Bi	ppm	<10
Ca	ppm	500–3,000
Cd	ppm	5–80
Cl	ppm	20–150
Co	ppm	50–200
Cr	ppm	15–100
Fe	%	22–36
Ge	ppm	0.5–3.0
Hg	ppm	0.2–5.0
K	ppm	1,500–3,500
Li	ppm	<5
Mg	ppm	500–4,000
Mn	ppm	50–400
Mo	ppm	500–4,000
Na	ppm	300–1,500
Ni	ppm	50–150
P	ppm	<100
Pb	ppm	100–1,000
Pd	ppm	0.05–0.30
Pt	ppm	0.02–0.15
Re	ppm	0.02–0.40
S	%	26–36
Sb	ppm	5–400
Se	ppm	150–500
SiO_2	%	3–10
Sn	ppm	1–8
Sr	ppm	15–300
Te	ppm	4–60
Ti	ppm	500–1,600
Tl	ppm	<0.5
V	ppm	20–100
Y	ppm	2–10

Element/Component	Unit	Combined Long-Term Typical Range (5 kt lots)
Zn	ppm	200–3,000
Zr	ppm	200–600
Moisture	%	7–9
D80	µm	25–50

14.0 MINERAL RESOURCE ESTIMATES

14.1 Introduction

Mineral Resources for Hugo North Extension are estimated from a block model for the Hugo North deposit produced in 2014 by a team of geologists from OTLLC, Rio Tinto and AMEC, a Wood predecessor company. The Mineral Resource database for the Hugo North resource model was closed on February 14, 2014 and includes 51 drill holes totalling 74,587 m drilled into the deposit from Entrée JV ground. No holes have been drilled at Hugo North since the database was closed in 2014.

The Mineral Resource estimate for Heruga is based on a resource model produced in 2009 by geologists from Ivanhoe, now Turquoise Hill, under the supervision of an external consultant. The Mineral Resource database for the Heruga resource model was closed on December 31, 2008. The drill hole database used in the construction of the Heruga resource model consists of a total of 54 holes and 72,317 m of core drilling. Forty-two holes and 62,732 m in the Heruga dataset were drilled on Entrée JV ground. Three holes were drilled in 2011 and 2012, and are not included in the dataset for the current Heruga Mineral Resource estimate.

14.2 Geological Models

OTLLC produced three-dimensional (3D) geological models of the major structures and lithological units based on the structural and geological information outlined in the geological discussion in this Report.

The geological shapes for the deposits are listed in Table 14-1 and Table 14-2 for the Hugo North and Heruga deposits. Copper and gold grade shells were modeled at various cut-off grades (Table 14-3) for use in grade estimation.

These shapes were then edited on plan and section views to be consistent with the structural, lithological and alteration models and the drill assay data.

Checks on the structural, lithological, and grade shell models indicated that the shapes honoured the drill hole data and interpreted geology.

The lithological shapes and faults, together with copper and gold grade shells and deposit zones, constrain the grade analysis and interpolation. Typically, the faults form the first order of hard boundaries constraining the lithological interpretation.

Table 14-1: Surfaces and Lithology Solids

Model Component	Comment
Surfaces – General	
Topography	Project-wide
Base of Quaternary cover	Project-wide
Base of Cretaceous clays and gravels	Project-wide
Solids/Surfaces – Lithology	
Quartz monzodiorite (Qmd) solid	Hugo North, Hugo North Extension, Oyut, Heruga
Late Quartz Monzodiorite solid	Heruga
Augite basalt (Va) D1 solid	Hugo North
Ignimbrite (Ign) DA2 solid	Hugo North
Hanging Wall Sequence DA3, solid	Hugo North
Base of ash flow tuff (DA2a - Ign)	Project-wide
Base of unmineralized volcanic and sedimentary units; DA2b or DA3 or DA4	Project-wide. Used as a hanging wall limit to grade interpolation
Biotite-granodiorite (BiGd) dykes	Project-wide, most important in Hugo deposits, unmineralized unit
Biotite-granodiorite (BiGd) dykes solid	Hugo North, unmineralized unit
Rhyolite (Rhy) dykes	Project-wide, most important in Oyut zones, unmineralized unit
Rhyolite (Rhy) dykes, solid	Hugo North, unmineralized unit
Hornblende–biotite granodiorite, solid	Hugo North, unmineralized unit
Hornblende–biotite andesites, dacites (And) dykes; HbBiAnd, Dac	Oyut zones, Heruga

Table 14-2: Faults

Faults	Comment
East Bat Fault	Hugo area: used to define Hugo North eastern limit
West Bat Fault	Hugo area: used to define Hugo North, Central and West zones western limits
Contact Fault	Hugo North: defines post-volcanic sequence, sub-parallel to lithological contacts
7100 Fault	Hugo North, northwest-trending fault
Lower and Intermediate Faults	Hugo North, north- trending faults sub-parallel to lithological contacts
Bogd Fault	Hugo North, east–west fault in Hugo North Extension
Khar Suult Fault	Hugo North, east–west fault in Southern area
Kharaa and Eroo Faults	Hugo North, northeast-trending fault in Northern area
Bumbat and Dugant Faults	Hugo North, east–west fault in Hugo North Extension
Burged, Noyon, Gobi, Javhlant Faults	Hugo North, northwest-trending series of faults
160 Fault	Hugo North, north trending fault
110 Fault	Hugo area: forms boundary between Hugo South and Hugo North deposits
North Boundary Fault	Hugo North area: used to define northwestern limit
Bor Tolgoi Fault	Heruga area
West Bor Tolgoi Fault	Heruga area
Central Bor Tolgoi Fault	Heruga area
South Bor Tolgoi Fault	Heruga area
Heruga North Fault	Heruga area

Table 14-3: Grade Shells

Deposit/Zone	Grade Shell Lower Cut-off		
	Au (g/t)	Cu (%)	Mo (ppm)
Hugo North Extension	0.3 1.0	0.6 2.0 qtz veining 15% by vol.	—
Heruga	0.3 0.7	0.3	100

The solids and surfaces were used to code the drill hole data. Sets of plans and cross-sections that displayed colour-coded drill holes were plotted and inspected to ensure the proper assignment of domains to drill holes.

14.3 Grade Capping/Outlier Restrictions

14.3.1 Hugo North and Hugo North Extension

Extreme (outlier) copper and gold grades were evaluated using histograms, probability plots, and cumulative distribution function plots. Outlier restriction and top-cutting or grade capping was applied during grade estimation for the Hugo North resource model. The outlier restriction approach was used to control the effects of high-grade samples, particularly in the background domains where unrestricted high-grade composites could result in over-projection or smearing of high grades. Composites with grades greater than thresholds set at the 99th percentile of the composite grade distribution were restricted to a maximum range of influence of 50 m. Thresholds for top-cuts and outlier restriction are shown in Table 14-4 and Table 14-5.

14.3.2 Heruga

As well as top-cutting of extreme grades, some outlier restriction was also applied for the Heruga deposit, particularly in the background domains. Top-cutting was generally applied at values close to or above the 99th percentile for gold and molybdenum. No cap was considered warranted for copper. The grade caps on outlier grades employed at Heruga are shown in Table 14-6.

Table 14-4: Grade Caps Applied to Cu, Au, and Ag Grade Domains, Hugo North/ Hugo North Extension

Grade Domain	Cu (%)	Au (g/t)	Ag (g/t)
101	1.0	1.2	2.5
102	—	0.4	8
103	1.5	2.0	—
104	—	n/a	—
105	—	2.0	10.5
201 + 202 + 203 + 204	5.5	2.5	17
205	n/a	—	n/a
301 + 303	9.5	3.5	—
302	3.5	—	n/a
304	n/a	—	n/a
305	n/a	6.0	2.5

Note: n/a indicates no data. Domain codes are explained in Table 14-7.

Table 14-5: Outlier Restrictions applied to Cu, Au, and Ag Grade Domains, Hugo North/Hugo North Extension

Grade Domain	Cu (%)	Au (g/t)	Ag (g/t)
102	2.5	—	—
103	—	—	10.5
104	—	—	1.5
105	3.0	—	—
301+303	—	—	21
101, 201 + 202 + 203 + 204, 205, 302, 304, 305	—	—	—

Table 14-6: Grade Caps and Outlier Restrictions, Heruga

Domain	Metal	Domain	Cap	Distance	Outlier Cap
Background	Au	1,000–4,000	3 g/t	50 m	1 g/t
Background	Au	5,000	3 g/t	50 m	0.3 g/t
Background	Mo	All	1,000 ppm	100 m	500 ppm
0.3 g/t Au shell	Au	2,000	3 g/t	—	—
0.3 g/t Au shell	Au	4,000	5 g/t	—	—
0.7 g/t Au shell	Au	2,000	10 g/t	—	—
100 ppm Mo shell	Mo	All	3,000 ppm	—	—

14.4 Composites

The drill hole assays were composited into downhole composites of a length that was considered appropriate when considering estimation block size, required lithological resolution, and proposed mining method. The compositing for Heruga honoured the domain zones by breaking composites at domain boundaries. The compositing for Hugo North/Hugo North Extension ignored domain boundaries. The domains used in compositing were derived from a combination of the grade shells and lithological domains. Composite lengths of 5 m were used for both Heruga and Hugo North/Hugo North Extension.

Residual composites of less than the fixed length (5 m) with a length of less than 1.5 m (Hugo North, Hugo North Extension) or 2 m (Heruga) were excluded from the dataset used in interpolation.

At Hugo North/Hugo North Extension, the composites included any post-mineralization dyke intervals that were deemed too small to be part of a dyke geology model. Any unsampled intervals included in the composites dataset for Hugo North/Hugo North Extension were set to:

- Cu 0.001%
- Au 0.01 g/t.

For the Heruga deposit, the composites included any post-mineralization dyke material intervals that were deemed too small to be part of a dyke geology model. Any unsampled intervals included in the composites dataset for Heruga were set to:

- Cu 0.001%
- Au 0.01 g/t
- Mo 10 ppm.

14.5 Density Estimation

Bulk density data were assigned to a unique assay database files for the Heruga and Hugo North models. The Hugo North density data set included 25,622 density determinations and densities were estimated using estimation domains corresponding to the main lithology types and simple kriging with the local mean value assigned from the median density for lithology.

The Heruga density dataset consisted of 2,898 density determinations and the density model was estimated using inverse distance to the third power weighting.

14.6 Exploratory Data Analysis

14.6.1 Hugo North and Hugo North Extension

The lithological, structural, and mineralized domains for Hugo North/Hugo North Extension were reviewed to determine appropriate estimation or grade interpolation parameters. Several different procedures were applied to the data to discover whether statistically distinct domains could be defined using the available geological objects.

The data analyses were conducted on composited assay data, typically using 5 m downhole composites. Descriptive statistics, histograms and cumulative probability plots, box plots, contact plots, and scatter plots were completed for copper and gold in each deposit area.

Results obtained were used to guide the construction of the block model and the development of estimation plans.

Copper grades in the mineralized units (Va, Ign, and Qmd) show single lognormal to near-normal distributions inside each domain (0.6% and 2% Cu Shells). Coefficients of variation values are low at 0.3 to 0.6. There are small variations in grade as a result of lithological differences within the copper domains: generally, Qmd and Va have the highest values, followed by Ign.

The cumulative distribution function patterns of copper data for all domains show evidence of three populations:

- A higher-grade population (above a copper threshold value of 2.0–2.5% Cu)
- A lower-grade zone (threshold value of 0.4–0.5% Cu)
- A background lowest-grade domain.

The pattern supports the construction of the quartz-vein shell (2% Cu is approximately coincident) and the 0.6% Cu shell.

Gold grade distributions at Hugo North/Hugo North Extension show typical positively skewed trends. The distributions are slightly more skewed than those for copper, but the level of skewness can still be described as only mild to moderate within each domain. The Qmd shows higher average gold values than the Va unit, which in turn is higher than the Ign. Coefficients of variation (CV) values for the host lithologies are moderate, varying from 0.6 to 0.9.

The cumulative distribution function pattern of gold data of all domains and the background domain shows evidence for three populations:

- A higher-grade population (above a gold threshold value of 1 g/t Au)
- A lower-grade zone (threshold value of 0.2–0.3 g/t Au)
- A background lowest grade domain.

The pattern supports the construction of the 1 g/t Au and 0.3 g/t Au grade shells.

At Hugo North/Hugo North Extension, the gold : copper relationships that were identified in 2005 are poorer. Generally, two trends may be present. The more common is a low-gold trend that outlines a gold : copper ratio of about 1:10 in the mineralized volcanic units. The Qmd unit also displays the 1:10 gold : copper ratio trend, but also shows a more gold-enriched gold : copper ratio at about 1:2.

14.6.2 Heruga

Copper grades within the 0.3% Cu shell generally displayed single distributions with some evidence for a lower-grade population resulting from the presence of unmineralized post-mineralization dykes that had not been captured by wireframes. CVs were relatively low at 0.5 to 0.6. The cumulative distribution function plot for the entire population supported the construction of a grade shell in the 0.3%–0.4% Cu range.

Gold grades were observed to display a moderate positive skew and multiple populations with evidence of lower grade populations in the range of 0.2–0.3 g/t Au.

Molybdenum grades within the 100 ppm Mo shell display a low-to-moderate positive skew and a single population distribution.

14.7 Estimation Domains

Soft, firm, and hard (SFH) estimation boundaries were implemented to account for domain boundary uncertainty and control mixing to reproduce the input grade sample distribution in the block model. Soft boundaries allowed full sharing of composites between domains during grade estimation; firm boundaries allowed sharing of composites from within a certain distance of the boundary; and hard boundaries allowed no composite sharing between domains.

Contact plots and visual inspection of grade distributions were also used in cases where results were unclear or were contrary to geological interpretations.

14.7.1 Hugo North and Hugo North Extension

Different boundary designations of soft, firm, or hard can be used for the different lithologies, depending on the grade shell. The various copper and gold grade shells used to constrain the selection of composites and blocks during the interpolation of block grades at Hugo North and Hugo North Extension are illustrated in Figure 14-1.

14.7.2 Heruga

Data analysis showed no discernible difference between the two main host lithologies, augite basalt and quartz monzodiorite, at Heruga. Therefore, for estimation purposes, the two lithologies were grouped into a single lithology domain. The post-mineralization lithologies (Lqmd, BiGd, HbBiAnd) were assigned zero grade. The cells in the block model within each structural domain were coded according to whether they were mineralized or unmineralized, and which grade shell they fell within.

14.8 Variography

14.8.1 Hugo North and Hugo North Extension

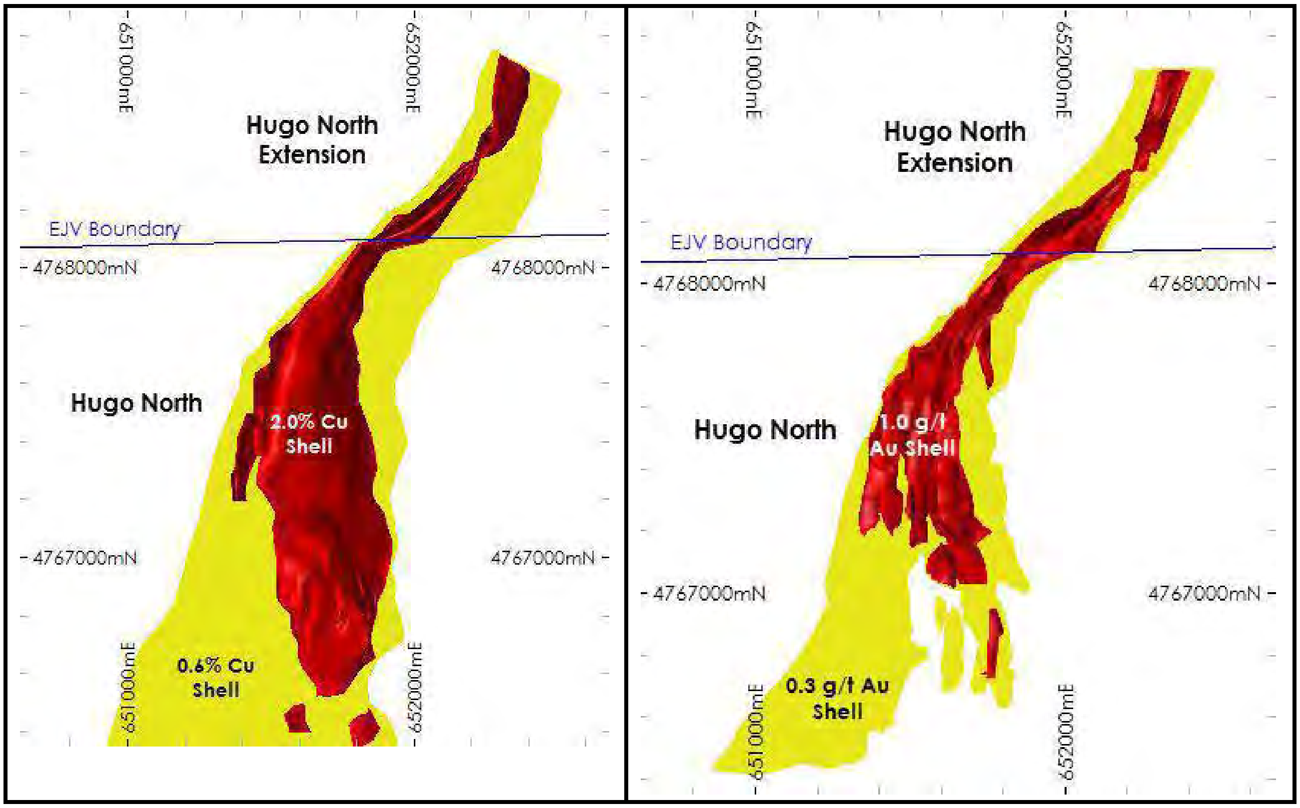
Data in some shells were subdivided into north and south sectors for the variographic analysis to take into account the flexure in direction of the deposit that occurs near the 4,767,600 mN coordinate.

The mineralization controls observed were considered to be related to the intrusive history and structural geology (faults). The patterns of anisotropy demonstrated by the various correlograms tended to be consistent with geological interpretations, particularly to any bounding structural features (faults and lithological contacts) and quartz + sulphide vein orientation data.

The nugget variance tended to be low to moderate in all the domains assessed. Copper variograms generally had nugget variances of between 15%–20% (relative) of the total variance, except in BiGd, where the nugget is 38% of the total variance. The nugget variance for gold variograms varied from 5%–25%.

Both copper and gold displayed short ranges for the first variogram structure and moderate to long ranges for the second variogram structure (where modelled).

Figure 14-1: Copper and Gold Grade Shells, Hugo North and Hugo North Extension



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017; the EJV boundary as labelled in the figure is the boundary between the Oyu Tolgoi ML and the Shivee Tolgoi ML.

14.8.2 Heruga

Although data are limited, an attempt was made to model directional variograms for gold, copper, and molybdenum. Copper and gold showed relatively low nuggets of 25%–35% (relative) of the total variance, whereas molybdenum was moderate-to-high at 40% of the sill.

All three metals showed relatively short first variogram structures and long second variogram structures of 250–300 m.

14.9 Estimation/Interpolation Methods

14.9.1 Model Setup

The block models were coded by lithological and grade shell wireframes in preparation for grade interpolation.

The Hugo North/Hugo North Extension block model was coded with an estimation domain incorporating lithology and grade shell. Blocks in the Heruga model were coded for lithology domains. Non-mineralized units and blocks above topography were flagged using a lithology code and were excluded during the interpolation process. Sub-celling was used to retain resolution at domain boundaries. The Hugo North Mineral Resource block model consists of 15 x 15 x 15 m parent blocks with sub-blocks with a minimum dimension of 5 x 5 x 5 m.

The Heruga Mineral Resource block model comprises 20 x 20 x 15 m parent blocks with sub-blocks with a minimum dimension of 5 x 5 x 5 m. The actual sub-block sizes in the block models vary as necessary to fit the specified boundaries of the wireframes used to tag the block model. The resource models were subsequently regularized to parent block dimensions for mine planning purposes.

14.9.2 Hugo North and Hugo North Extension

Interpolation was limited to the mineralized lithological units (Va, Ign, Qmd, and xBiGd). Only composites belonging to those units were used. Grades and metal values within blocks belonging to all other units (post-mineralization dykes and sediments) were set to zero.

Modelling consisted of grade interpolation by ordinary kriging (OK), except for bulk density, which was interpolated using simple kriging. Restricted and unrestricted grades were interpolated to allow calculation of the metal removed by outlier restriction. Grades were also interpolated using nearest-neighbour (NN) methods for validation purposes. Blocks and composites were matched on estimation domain.

The search ellipsoids were oriented preferentially to the general orientation of each estimation domain. The search strategy employed concentric expanding search ellipsoids.

The first pass used a relatively short search ellipse relative to the long axis of the correlogram ellipsoid. For the second pass, the search ellipse was increased by 50% (up to the full range of the correlogram) to allow interpolation of grade into those blocks not estimated by the first pass. A final, third, pass was performed using a larger search ellipsoid.

To ensure that at least three drill holes were used to estimate blocks in Pass 1, the number of composites from a single drill hole that could be used was restricted to three. Similarly, Pass 2 required a minimum of two drill holes to generate an estimate. The number of composites allowed from a single hole was restricted to three.

These parameters were based on the geological interpretation, data analyses, and variogram analyses. The number of composites used in estimating grade into a model block followed a strategy that matched composite values and model blocks sharing the same feed code or domain. The minimum and maximum numbers of composites were adjusted to incorporate an appropriate amount of grade smoothing.

Estimation of sub-cells at the boundary of grade or lithology domains was based on assigning the parent cell grade to the sub-cells; thus, all like-flagged sub-cells within the larger parent cell contain the same grade.

Grade variables were regularized to the tonnage-weighted (volume x density) mean of the sub-cell source grade values enclosed in the parent blocks before they were provided for use in detailed engineering and tabulation of Mineral Resources.

14.9.3 Heruga

The selected block size was also considered to be a suitable block size for mining studies using the block cave approach, the assumed mining method for the Heruga deposit. The parent blocks were divided into sub-cells when flagging the model with dyke wireframes. The block model was coded according to zone, lithological domain, and grade shell. Post-mineralization dykes and the late quartz monzodiorite were assumed to represent zero-grade waste cutting the mineralized lithologies.

Only the mineralized lithologies were estimated, i.e., Qmd and Va. All other units in the model were set to zero grade. Modelling consisted of grade interpolation by OK. As part of the model validation, grades were also interpolated using NN, inverse distance weighting to the third power (ID3), and OK of uncapped composites. Density was interpolated by ID3.

The search ellipsoids were oriented preferentially to the general trend of the grade shells. A staged search strategy was applied, with the first pass at 200 m and a second at 400 m.

A minimum two-hole rule was applied to both passes. Any blocks not interpolated by the first two passes were populated in a third pass that removed the two-hole constraint. Outlier restriction was applied as a second cap whereby grades over a particular threshold were only used in blocks within a specified distance from a drill hole (50–100 m). Outside of this distance the lower capped value was used.

The sub-cells in the final model were regularized to parent cell size after estimation was complete.

14.10 Block Model Validation

14.10.1 Hugo North and Hugo North Extension

Detailed visual validation of the Hugo North/Hugo North Extension block model was performed in plan and section, comparing resource block grades to original drill hole data. The checks showed good agreement between drill hole composite values and model cell values. The addition of the outlier restriction values succeeded in minimizing grade smearing.

Block model estimates were checked for global bias by comparing the average metal grades (with no cut-off) from the model (OK) with means from NN estimates. Results showed a good relationship (Table 14-7).

Models were also checked for trends and local bias in the grade estimates using swath plots. This was undertaken by plotting the mean values from the NN estimate versus the OK results for benches in 30 m swathes and for northings and eastings in 40 m swathes.

The OK estimate is expected to be smoother than the NN estimate, thus the NN estimate should fluctuate around the kriged estimate on the plots. The two trends behaved as predicted and showed no significant local bias of copper or gold in the estimates.

14.10.2 Heruga

A detailed visual validation of the Heruga resource model found that flagging of the drill data file and the block model was performed correctly. The block model estimates were checked for global bias by comparing the average metal grades from the model with means from unrestricted NN estimates. No bias was identified.

Table 14-7: Hugo North/Hugo North Extension Global Mean Grade Values by Domain (NN vs. OK)

Domain/Zone	NN Estimate	OK Estimates	% Difference
Cu (%) – Hugo North/Hugo North Extension			
All Zones	0.896	0.901	–1.0
Qtz-vein Domain	2.712	2.697	–0.5
0.6% Cu Domain	0.938	0.915	0.8
Cu background (outside 0.6%)	0.289	0.289	0.0
Au (g/t) – Hugo North/Hugo North Extension			
All Zones	0.255	0.252	–2.6
1.0 g/t Au Zone	1.291	1.243	–2.1
0.3 g/t Au Zone	0.504	0.530	–3.7
Au background	0.127	0.117	–7.8

The distribution of the grades in the model was compared to the distribution of the original drill hole data, the composites used to build the model, and the declustered NN model. In all cases, although smoothed due to the kriging interpolation method, the model was found to reflect the underlying data used to build it. The degree of smoothing occurring within the model was considered reasonable for the type of deposit and the likely block cave mining method.

The resource model was also checked for trends and local bias using 50 m swath plots that compared the restricted OK estimates to NN estimates. The trends behaved as predicted and showed no significant bias in the estimates.

14.11 Classification of Mineral Resources

14.11.1 Hugo North and Hugo North Extension

At Hugo North/Hugo North Extension, block confidence classification is based on three operations: preliminary block classification using a script based on distance to a drill hole and number of drill holes used to estimate a block (*HN_Prelim_Classification_120912 v2.bcf*), generation of probability model for the three confidence categories, and manual reclassification using polygons generated in sectional view.

Probability Models

A series of probability models were generated using the preliminary classification code of 1 for Measured, 2 for Indicated, and 3 for Inferred. Using a threshold value of 50%, the probability shells were compared to the preliminary classification block code. Boundary polygons reflecting the three categories were then manually digitized to eliminate the inclusion of isolated blocks and incorporate geological and grade continuity.

The probability shells were used as a guide for confidence. The polygons were then connected to create a three-dimensional solid. Blocks were then recoded as Indicated, or Inferred based on these solids. No Measured Mineral Resources are currently reported for Hugo North Extension.

Indicated

The drill hole spacing over much of the Hugo North/Hugo North Extension area is approximately 125 m x 75 m. The minimum nominal drill hole spacing of 75 m (horizontal) between drill holes and 150 m between drill lines for Indicated Mineral Resources was determined by a drill hole spacing study that was conducted in 2004. The following conditions need to be met to classify blocks as Indicated Mineral Resources:

- A three-hole rule was used for OK-estimated copper blocks not classified as Measured and with three or more composites from three different holes, all within 50 m distance from ID2 Pass 1. The distance used is the closest anisotropic distance.
- A three-hole rule was used for OK-estimated copper blocks with three or more composites from three different holes, all within 150 m and at least one composite within 105 m of the block centroid, all distances from ID2 Pass 2. The distance used is the closest anisotropic distance.
- A two-hole rule was used for OK-estimated copper blocks with two or more composites from two different holes, all within 150 m with at least one hole within 75 m of the block centroid, all distances from ID2 Pass 2. The distance used is the closest anisotropic distance.
- Blocks were constrained by the Indicated classification solid generated using sectional interpretation and block probabilities.

Inferred

All blocks in the Hugo North/Hugo North Extension model with an OK-estimated copper grade that did not meet the classification criteria for Measured or Indicated Mineral Resources were assigned to Inferred Mineral Resources if the block centroid was within 150 m of a composite. The distance used is the closest Cartesian distance captured from Pass 3 of the ID2 estimation described above.

Blocks were constrained by the inferred classification solid generated using sectional interpretation and block probabilities.

14.11.2 Heruga

There are no Measured or Indicated Mineral Resources at Heruga. Interpolated blocks were classified as Inferred Mineral Resources if they fell within 150 m of a drill hole composite. All mineralization at Heruga is currently classified as Inferred Mineral Resources.

14.12 Reasonable Prospects for Eventual Economic Extraction

14.12.1 Hugo North and Hugo North Extension

Mineral Resources for the Hugo North Extension are reported above a cut-off grade of 0.41% CuEq. The parameters for calculation of copper equivalent for Hugo North are the differentials of metallurgical recovery and metal price between copper, molybdenum, gold and silver taken from BDT38, which is currently used for long range planning and Mineral Reserve estimation at Oyu Tolgoi.

Metal prices used for copper equivalent (CuEq) and cut-off grade calculation are $3.08/lb Au, $1,292/oz Au and $19.00/oz Ag.

BDT38 metallurgical recovery values are taken from a combination of metallurgical testwork and actual plant performance. The recovery relationships for copper, gold and silver relate to head grade, liberation, sulfide mineralogy and association. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 93% for copper, 80% for gold and 81% for silver.

Copper equivalent grade for Hugo North is calculated:

- CuEq = Cu + ((Au * 35.7175) + (Ag * 0.5773)) / 67.9023

Given the BDT38 assumptions for metallurgical recovery and metal prices, 0.41% CuEq cut-off grade would generate $22.80/t which is enough to cover the forecast mining, process and general and administrative (G&A) operating costs and primary and secondary development costs for Hugo North and Hugo North Extension.

The Hugo North and Hugo North Extension Mineral Resources are reported inside a conceptual block cave mining shape constructed by OTLLC in 2012. The 2012 Hugo North conceptual mining shape was constructed using a 0.50% CuEq cut-off grade that would produce $21.45/t assuming a copper price of $3.00/lb and gold price of $970/oz, mining, process and G&A costs of $12.45/t and primary and secondary development costs of $8.00/t.

14.12.2 Heruga

Mineral Resources for the Heruga deposit are reported above a cut-off grade of 0.41% CuEq. The parameters for calculation of copper equivalent for Heruga are similar to those used for Hugo North and Hugo North Extension with the addition of additional revenue from sale of molybdenum. Parameters for Heruga are estimated using the differentials of metallurgical recovery and metal price between copper, gold, silver molybdenum taken from BDT38 that is used for long-range planning and Mineral Reserve estimation at Oyu Tolgoi.

Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb Cu, $1,292/oz Au, $19.00/oz Ag and $10.00/lb Mo.

BDT38 metallurgical recovery values are taken from a combination of metallurgical testwork and actual plant performance. The recovery relationships for copper, gold, silver and molybdenum relate to head grade, liberation, sulfide mineralogy and association. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 82% for copper, 73% for gold, 78% for silver and 60% for molybdenum.

Copper equivalent grade (CuEq) for Heruga is calculated:

- CuEq = Cu + ((Au * 37.0952) + (Ag * 0.5810) + (Mo * 0.0161)) / 67.9023

Given the BDT38 assumptions for metallurgical recovery and metal prices, 0.41% CuEq cut-off grade would generate $22.80/t which is enough to cover mining, process and G&A operating costs and primary and secondary development costs.

The Mineral Resource outline (Figure 14-2 and Figure 14-3) has steeply-dipping vertical western and eastern boundaries along the north north-east striking, vertical West Fault and parallel structures and the base of the resource is interpreted to be relatively flat along approximately -500 m elevation. The compact nature of the mineralized outline is expected to yield a high proportion of extraction and mining recovery and low dilution for block cave mining.

14.13 Mineral Resource Statement

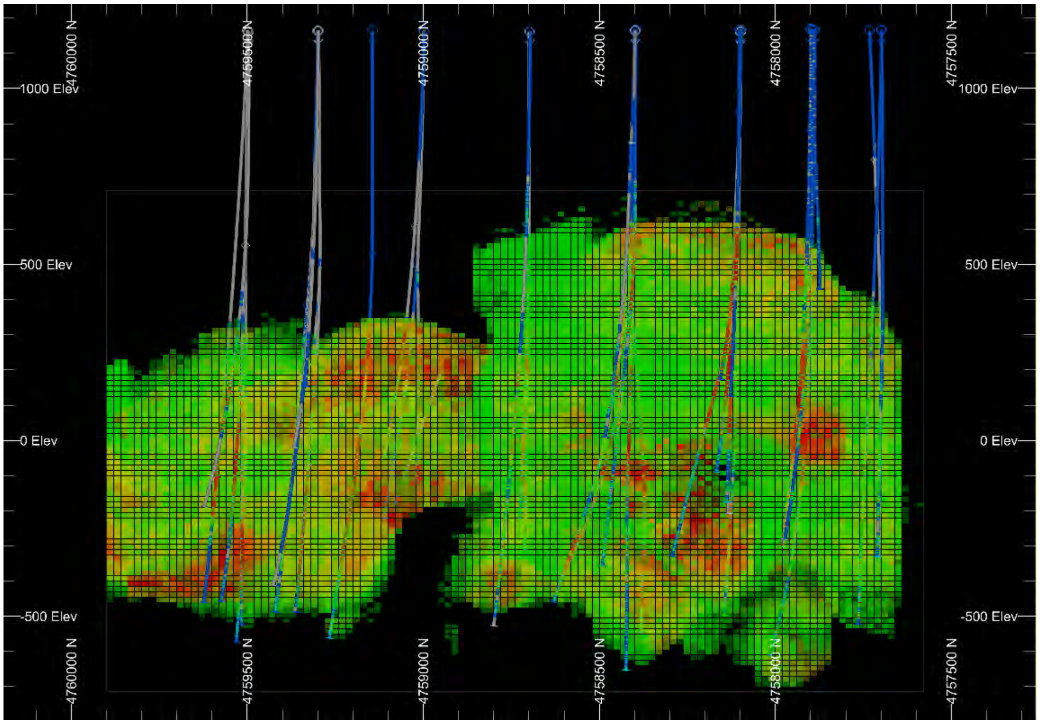
Mineral Resource estimates have the following effective dates:

- Hugo North Extension: 31 March, 2021
- Heruga: 31 March, 2021.

The estimated tonnages and grades in the Mineral Resource estimates for Hugo North Extension Lift 1 are reported inclusive of those Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

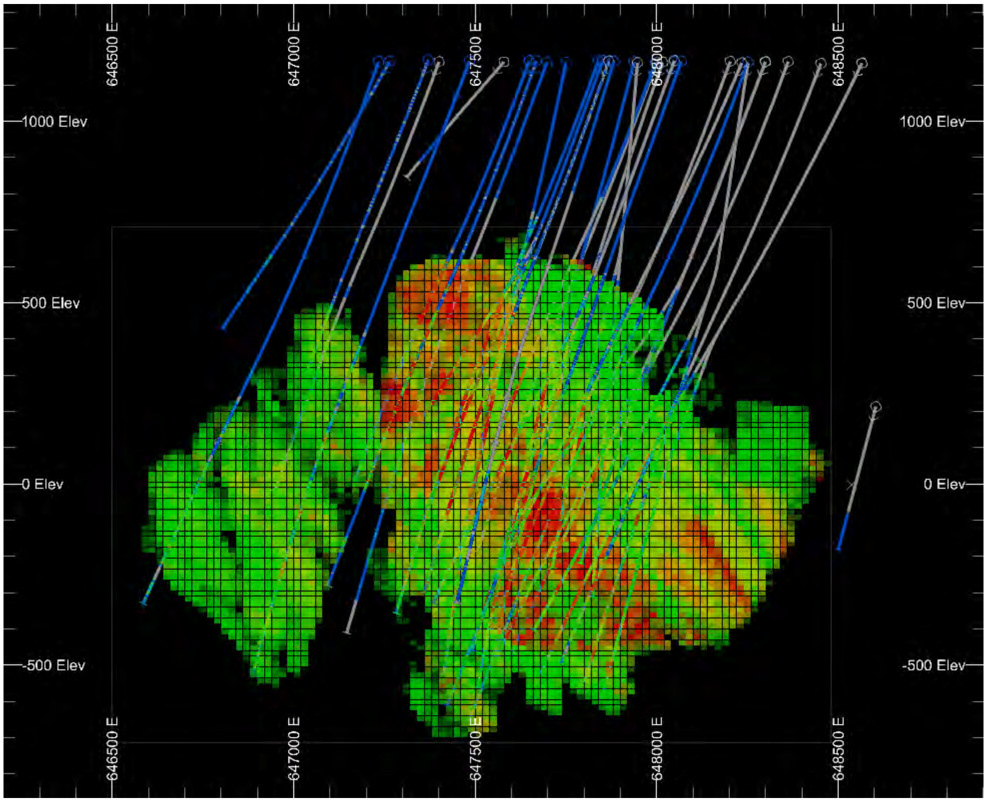
Mineral Resources are reported in Table 14-8 for Hugo North Extension and in Table 14-9 for Heruga, using the 2014 CIM Definition Standards. Mineral Resources are reported on a 100% basis within the Entrée/Oyu Tolgoi JV property.

Figure 14-2: Isometric View of Heruga Mineral Resource Looking East



Note: Figure prepared by Wood 2021.

Figure 14-3: Isometric View of Heruga Resource Looking North



Note: Figure prepared by Wood, 2021.

Table 14-8: Mineral Resource Statement, Hugo North Extension (effective date 31 March, 2021)

Classification	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	CuEq (%)
Indicated Mineral Resources	120	1.70	0.58	4.3	2.04
Inferred Mineral Resources	167	1.02	0.36	2.8	1.23

Classification	Tonnes (Mt)	Contained Cu (Mlb)	Contained Au (koz)	Contained Ag (koz)
Indicated Mineral Resources	120	4,500	2,200	16,000
Inferred Mineral Resources	167	3,800	1,900	15,000

Notes to accompany Hugo North Extension Mineral Resource table:

1 Mineral Resources have an effective date of 31 March, 2021. Mr. Christopher Wright, P. Geo, a Wood Canada Ltd. employee, is the Qualified Person responsible for the Mineral Resource estimate.

2 Mineral Resources are reported inclusive of the the Mineral Resources converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

3 Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb copper, $1,292/oz gold and $19.00/oz silver. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 93% for copper, 80% for gold and 81% for silver.

4 Mineral Resources are constrained within a conceptual mining shape constructed at a nominal 0.50% copper equivalent (CuEq) grade and above a CuEq grade of 0.41% CuEq. The CuEq formula is CuEq = Cu + ((Au * 35.7175) + (Ag * 0.5773)) / 67.9023 taking into account differentials between metallurgical performance and price for copper, gold and silver.

5 A CuEq break-even cut-off grade of 0.41% CuEq for Hugo North Extension mineralization and covers mining, processing and G&A operating cost and the cost of primary and secondary block cave mine development.

6 Mineral Resources are stated as in situ with no consideration for planned or unplanned external mining dilution.

7 The contained copper, gold, and silver estimates in the Mineral Resource table have not been adjusted for metallurgical recoveries.

8 Mineral Resources are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.

9 Numbers have been rounded as required by reporting guidelines, and may result in apparent summation differences

Table 14-9: Mineral Resource Statement, Heruga, (effective date 31 March, 2021)

Classification	Tonnes (Mt)	Cu (%)	Au (g/t)	Ag (g/t)	Mo (ppm)	CuEq (%)
Inferred Mineral Resources	1,400	0.41	0.40	1.5	120	0.68

Classification	Tonnes (Mt)	Contained Cu (Mlb)	Contained Au (koz)	Contained Ag (koz)	Contained Mo (Mlb)
Inferred Mineral Resources	1,400	13,000	18,000	66,000	370

Notes to accompany Heruga Mineral Resource table

1 Mineral Resources have an effective date of 31 March, 2021. Mr. Christopher Wright, P. Geo, a Wood Canada Ltd. employee, is the Qualified Person responsible for the Mineral Resource estimate.
2 Metal prices used for copper equivalent and cut-off grade calculation are $3.08/lb copper, $1,292/oz gold, $19.00/oz silver and $10/lb molybdenum. Metallurgical recoveries used for copper equivalent and cut-off grade calculation are 82% for copper, 73% for gold, 78% for silver and 60% for molybdenum.
3 Mineral Resources at Heruga has an overall geometry and depth of the deposit that make it amenable to underground mass mining methods. Mineral Resources are stated above a copper equivalent (CuEq) grade. The CuEq formula is CuEq = Cu + ((Au * 37.0952) + (Ag * 0.5810) + (Mo * 0.0161)) / 67.9023 taking into account differentials between metallurgical performance and price for copper, gold, silver and molybdenum.
4 A CuEq break-even cut-off grade of 0.41% CuEq is used for the Heruga mineralization and covers mining, processing and G&A operating cost and the cost of primary and secondary block cave mine development.
5 Mineral Resources are stated as in situ with no consideration for planned or unplanned external mining dilution.
6 The contained copper, gold, and silver estimates in the Mineral Resource table have not been adjusted for metallurgical recoveries.
7 Mineral Resources are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.
8 Numbers have been rounded as required by reporting guidelines, and may result in apparent summation differences

14.14 Factors That May Affect the Mineral Resource Estimate

Areas of uncertainty that could materially affect the Mineral Resource estimates include the following:

- Interpretations of fault geometries
- Effect of alteration as a control on mineralization
- Lithological interpretations on a local scale, including dyke modelling and discrimination of different Qmd phases

- Geotechnical assumptions related to the proposed block cave design and material behaviour
- Metal recovery assumptions
- Additional mining recovery and dilution considerations that may be introduced by a block cave mining method
- Assumptions as to operating costs used when assessing reasonable prospects of eventual economic extraction
- Changes to drill spacing assumptions and/or the number of drill hole composites used to support confidence classification categories.
- Commodity pricing
- Changes to permitting/social/regulatory regime assumptions.

14.15 Comments on Section 14

Changes to the Mineral Resource estimate for Hugo North Extension have resulted from changes to forecasts for metal prices, operating costs and metallurgical performance.

The Heruga Mineral Resource estimate is of lower net value per tonne than other estimated Mineral Resources at Oyu Tolgoi, and would likely be developed at the end of the current life of mine in approximately 30 years at current processing rates.

15.0 MINERAL RESERVE ESTIMATES

15.1 Introduction

The Mineral Reserve for the Entrée/Oyu Tolgoi JV property is contained within the Hugo North Extension Lift 1 block cave mining plan. The mine design work on Hugo North Lift 1, including the Hugo North Extension, was prepared by OTLLC and was used as the basis for the 2020 Feasibility Study.

The Mineral Reserve estimate is based on what is considered minable when considering factors such as the footprint cut-off grade, the draw column shut-off grade, maximum height of draw, consideration of planned dilution and internal barren rock.

15.2 Mineral Reserves Estimation

The Hugo North/Hugo North Extension underground deposit is to be mined by a variant of the block cave method, panel caving. The mine planning work conducted by OTLLC was completed using industry-standard mining software and techniques, and smelter terms as set forth in the 2020 Feasibility Study.

Key assumptions used by OTLLC in estimation included:

- Metal prices used for calculating the Hugo North Underground NSR are $3.08/lb Cu, $1,292/oz Au, and $19.00/oz Ag, based on long-term metal price forecasts as at the date the Mineral Reserve estimation process began
- The NSR was calculated with assumptions for smelter refining and treatment charges, deductions and payment terms, concentrate transport, metallurgical recoveries and royalties
- A column height shut-off of $17.84/t NSR were used to maintain grade and productive capacity and determine the point at which each underground draw point is closed
- All Mineral Resource within the block cave shell were converted to Mineral Reserves. This includes low-grade Indicated Mineral Resources and Inferred Mineral Resource that were assigned zero grade and were treated as dilution
- Mineral Reserves are reported on a 100% basis. Entrée has a 20% interest in the mineralization extracted from the Entrée/Oyu Tolgoi JV property at depths greater than 560 m, and OTLLC has an 80% interest

- The underground Mineral Resource block models used for reporting the Mineral Reserves are the models reported in the Mineral Resource section of the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The Mineral Reserve for the 2020 Feasibility Study only considers conversion of Mineral Resources from the Indicated category and engineering that has been carried out to a feasibility level or better to state the underground Mineral Reserve. There are currently no Measured Mineral Resources in the Hugo North Extension area. Copper and gold grades for the Inferred Mineral Resources within the block cave shell were set to zero and such material was assumed to be dilution. The block cave shell was defined by a $17.84/t NSR. It is anticipated that further mine planning will examine lower shut-offs. The Mineral Reserve for Hugo North Extension Lift 1 is reported within the boundaries of the Entrée/Oyu Tolgoi JV Project, more specifically in the area of the Entrée/Oyu Tolgoi JV property.

Wood completed a check of the Mineral Reserve block model provided in the 2020 Feasibility Study against the estimates reported in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020), and considers the estimate to be in general agreement with the Mineral Reserves provided in those reports. Wood reviewed the metal price assumptions and concluded that the Mineral Reserves remain valid at these prices.

15.3 Mineral Reserves Statement

Mineral Reserves are reported in Table 15-1 for the Hugo North Extension Lift 1 deposit, using the 2014 CIM Definition Standards. Mineral Reserves were estimated by OTLLC personnel during 2020, reviewed by OTLLC as part of the 2020 Oyu Tolgoi Feasibility Study, and summarized in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The QP has reviewed the estimate, and notes that there has been no depletion or additional drilling and/or engineering to that would affect the Mineral Reserve estimate for Hugo North Extension Lift 1, and therefore the effective date of the Mineral Reserve estimate is the date of finalization of the QP review, which is 15 May, 2021.

Table 15-1: Mineral Reserves Statement, Hugo North Extension Lift 1

Classification	Tonnage (Mt)	Cu Grade (%)	Au Grade (g/t)	Ag Grade (g/t)	NSR ($/t)
Proven	—	—	—	—	—
Probable	40	1.54	0.53	3.63	97.52
Total Entrée/Oyu Tolgoi Joint Venture	**40**	**1.54**	**0.53**	**3.63**	**97.52**

Classification	Tonnage (Mt)	Contained Cu (Mlb)	Contained Au (Moz)	Contained Ag (Moz)
Proven	—	—	—	—
Probable	40	1,340	676	4,613
Total Entrée/Oyu Tolgoi Joint Venture	**40**	**1,340**	**676**	**4,613**

Notes to accompany Mineral Reserves table:

1 Mineral Reserves were estimated by OTLLC personnel. Mr., Piers Wendlandt, P.E., a Wood employee, is the Qualified Person who reviewed and accepts responsibility for the Mineral Reserve estimate. The estimate has an effective date of 15 May, 2021.

2 For the underground block cave, all Mineral Resources within the cave outline were converted to Probable Mineral Reserves. No Proven Mineral Reserves have been estimated. The estimation includes low-grade Indicated Mineral Resource and Inferred Mineral Resource assigned zero grade that is treated as dilution

3 A column height shut-off NSR of $17.84/t was used to define the footprint and column heights. The NSR calculation assumed metal prices of $3.08/lb Cu, $1,292/oz Au, and $19.00/oz Ag. The NSR was calculated with assumptions for smelter refining and treatment charges, deductions and payment terms, concentrate transport, metallurgical recoveries, and royalties using OTLLC's Base Data Template 38. Metallurgical assumptions in the NSR include recoveries of 90.6% for Cu, 82.3% for Au, and 87.3% for Ag.

4 Mineral Reserves are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.

5 Numbers have been rounded as required by reporting guidelines, and may result in apparent summation differences.

15.4 Factors that May Affect the Mineral Reserves

There are, among others, certain key factors that could materially affect the interpretation of the Mineral Reserve estimate. These may include:

- Commodity market conditions and pricing
- Unknowns with respect to the overall interpretation of the Hugo North/Hugo North Extension geology, including faulting and lithology
- Assumptions related to the design and geotechnical behaviour of the cave mining system, including, but not limited to, the flow of material (ore and dilution) relative

to the upward progression and lateral advance of the cave and assumptions of the long-term performance of the mine infrastructure (both support and production)

- Assumptions related to the metal recovery in the mill and downstream processing; including, but not limited to, metal recovery, mill throughput, and contaminant elements (particularly arsenic and fluorine).

15.5 Comments on Section 15

The QP did not independently re-estimate the Mineral Reserves, but verified the OTLLC estimate by reviewing the mineable shell with respect to portions of the overall block model. This review provided a factored indirect assessment of the available Mineral Reserves that provides sufficient confirmation of the Mineral Reserve estimate without re-creating the entire mine plan from first principles.

The Mineral Reserves within the Hugo North Extension Lift 1 do not reach production until approximately six years after Hugo North Lift 1 Panel 0 within the Oyu Tolgoi ML is initiated. This delay may mitigate some of the risk associated with the mining method by providing sufficient time for OTLLC to make any changes in the event that unanticipated mining difficulties arise.

16.0 MINING METHODS

16.1 Introduction

The proposed mine plan for the Mineral Reserves within Hugo North/Hugo North Extension Lift 1 is a block caving variant, panel caving. Block cave techniques are usually applicable under conditions that include (Miller-Tait et al., 1995):

- Massive deposit (supports high production rates over a long mine life)
- Thick to very thick deposit geometry (sufficient height of draw up to ~500 m per lift)
- Mineralization occurring in flat or steep alignment (supports mine development by allowing relatively flat production horizon below the extracted material)
- Uniform grade distribution (cave mining methods are not selective by nature)
- Intermediate to deep (generally are deep enough to render open pit methods cost prohibitive)
- Weak to very weak mineralized rock mass (mineralized material must be weak enough to fail under the effect of gravity)
- Medium to very weak hanging wall and footwall.

The actual mining method will be panel caving, in which the overall cave is developed in a laterally-expanding manner of advancing the cave front within each of the defined panels (Laubscher, 2011). The weak, massive nature of the Hugo North and Hugo North Extension deposits and the location between 700–1,400 m below surface make them well suited, both geotechnically and economically, to large-scale cave mining methods. Caving methods require large, early capital investment but are generally highly productive with relatively low operating costs. The long operating life of the mine is supportive of the initial capital investment and results in a very low total cost on a production basis.

Hugo North/Hugo North Extension Lift 1, which has high copper and gold grades, will be mined as three panels. A panel is a defined contiguous portion of the overall cave footprint that is treated as a more-or-less independent and sequenced mining/production area. The Hugo North Extension area is located at the northern extension of Panel 1.

16.2 Proposed Production

The mine lateral development advance was re-started in July 2016, after an approximately three-year shutdown. Tunnelling was initially started in 2008 from the early exploration and development drifts near the bottom of Shaft 1 on the Oyu Tolgoi ML. Development and construction activities will continue through the start of initial underground production from the Oyu Tolgoi ML, initially scheduled for May 2020. This date was defined as the point of commissioning the initial 30,000 t/d production ore handling system plus key supporting infrastructure, as well as completing sufficient footprint development and construction to prepare for undercutting and commencement of drawbell firing.

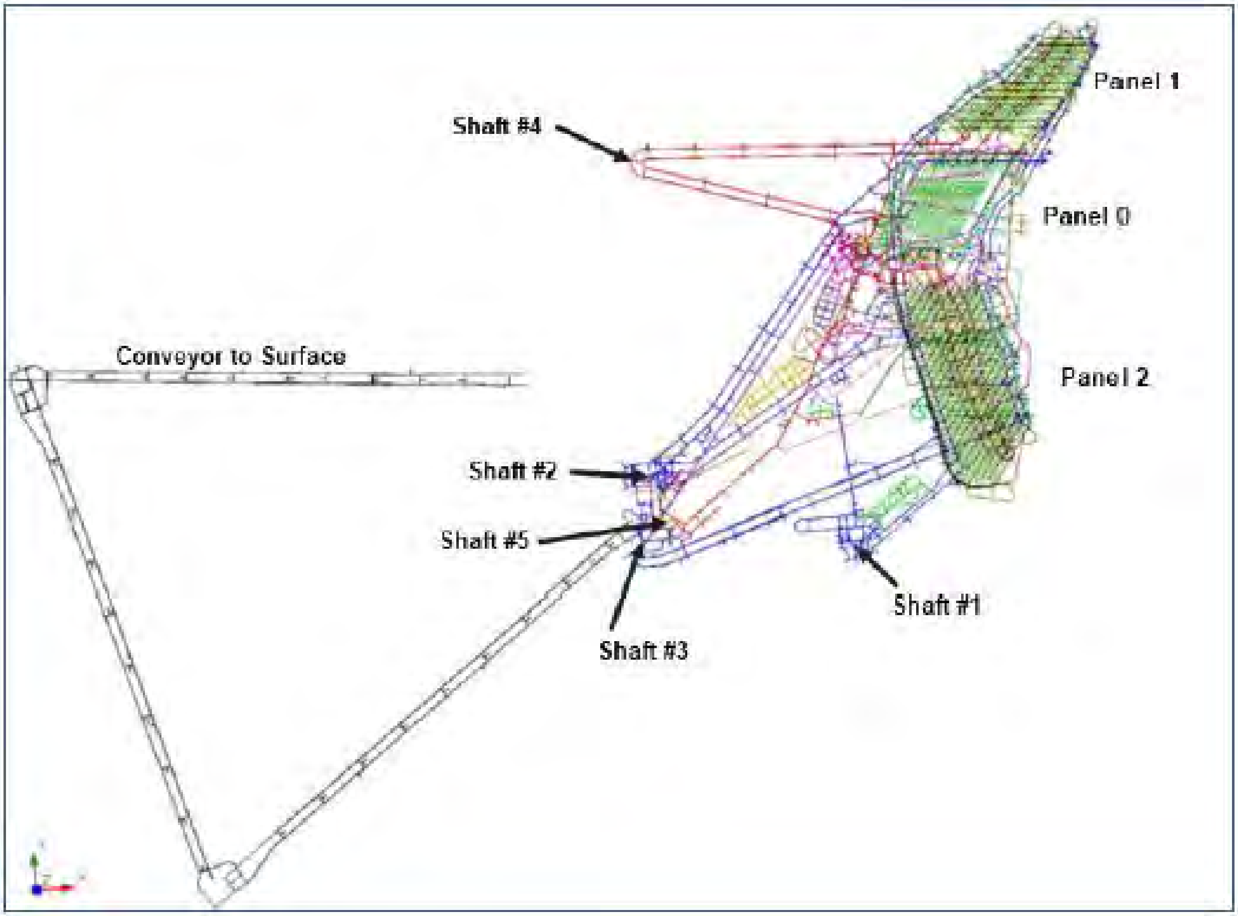
In May 2020, Turquoise Hill announced an updated block cave mine design for Panel 0 (Turquoise Hill, 2020a). As a result of the updated design, the 2016 Feasibility Study milestone of sustainable production was delayed by 25 months, to a target date of February 2023 (range between October 2022 and June 2023) (Turquoise Hill, 2020b).

Production will ramp up to an average of 95,000 t/d of ore to the mill during the planned peak production period for the combined Hugo North/Hugo North Extension Lift 1 from 2028 through 2036. Overall production from the combined Hugo North/Hugo North Extension Lift 1 is planned to ramp down from 2036 to completion in 2042 (Thomas et al., 2020). During the production life of the Hugo North Extension portion of Lift 1, the pre-production period is planned to begin in 2021 with the first draw-bell in 2026, and production is to be completed in 2038 (OTLLC, 2020).

The primary life-of-mine material handling system (conveyor to surface) will transport ore to the surface by means of a series of conveyors. The nominal production rate of the underground mine, at full production, is designed to be 95,000 t/d to meet the capacity of the mill. An overview of Lift 1 and associated infrastructure is shown in Figure 16-1.

Table 16-1 shows the approximate dimensions of Lift 1. Table 16-2 outlines the Lift 1 development general quantities for the combined Hugo North and Hugo North Extension areas. Table 16-3 provides a breakdown of the projections for the portion of Lift 1 within the Hugo North Extension area.

Figure 16-1: Hugo North (including Hugo North Extension) Lift 1 Mine Design



Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

Table 16-1: Hugo North/Hugo North Extension Lift 1 Approximate Cave Dimensions

Cave	Extraction Level		Length (m)	Width (m)	Height (m)
	Above Sea Level (m)	Below Surface (m)			
Lift 1	-100	1,270	2,000	280	600

Table 16-2: Hugo North/Hugo North Extension Lift 1 Development

Lateral Development and Mass Excavation (Equivalent Meters)		Vertical Development (Centreline Metres)	
Area	**Metres**	**Area**	**Metres**
Completed development (as-built)	64,168	Completed development (as-built)	5,047
Apex and undercut level	38,100	Shaft development	2,195
Extraction level	49,788	Raises 2.0–6.0 m diameter	5,817
Haulage level	14,442		
Intake drives	13,569		
Exhaust drives	14,325		
Conveyor drifts	2,530		
Conveyor to surface	5,495		
Underground ramps	2,215		
Crusher/transfer/shops etc.	4,862		
Transfer 20/Shaft #2 skip loading/bine top & bin 11	1,822		
Total lateral development	**211,316**	**Total vertical development**	**13,059**

Note: Data from 2020 Feasibility Study, courtesy OTLLC, 2021.

Table 16-3: Development within Hugo North Extension Lift 1

Lateral Development		Vertical Development and Mass Excavation		
Area	**Metres**	**Area**	**Unit**	**Value**
Completed development (as-built)	—	Raises 2.0–6.0 m diameter	m	781
General access and facilities	—	—	—	—
Apex and undercut level	5,033	—	—	—
Extraction level	6,366	—	—	—
Haulage level	1,365	—	—	—
Intake drives	1,657	—	—	—
Exhaust drives	1,969	—	—	—
Conveyor (inclines)	—	—	—	—
Total lateral development	**16,390**	—	—	—

Note: Data from 2016 Lookout Hill Technical Report (Peters and Sylvester, 2016), and the 2016 Oyu Tolgoi Feasibility Study.

To support overall mining of Hugo North Lift 1, five shafts, approximately 211 km of lateral development, 6.8 km of vertical raising (raise bore and drop-raise) and 137,000 m^3 of mass excavations will be undertaken. The Lift 1 levels are approximately 1,300 m below surface. The orebody has average dimensions of 2,000 m long by 280 m wide. A total of 1,428 draw points (OTLLC, 2020) are planned to be development within the mining footprint accessed from 45 extraction drifts.

For Hugo North Extension Lift 1, approximately 15.4 km of lateral development and approximately 781 m of vertical raising will be required (these figures are included in Table 16-3). To reach the Hugo North Lift 1 exhaust gallery from Shaft 4, approximately 1,020 m of lateral development will be required.

The majority of the mine infrastructure required to support the successful extraction of the Mineral Reserves within the Entrée/Oyu Tolgoi JV property will be located within the Oyu Tolgoi ML; however, the mining method is consistent across both Hugo North Lift 1 and Hugo North Extension Lift 1.

16.3 Geotechnical

For Hugo North/Hugo North Extension Lift 1, the 2020 Feasibility Study indicated that three caveability assessments were undertaken using the Laubscher Modified Rock Mass Rating (MRMR) classification system, the Mathews extended stability chart, and Flac 3D numerical modelling. Those analyses show:

- Hugo North is considered as highly suitable for cave mining methods
- Risks associated with caveability and propagation are considered to be low.

Factors that are indicated in the 2020 Feasibility Study to support this are: high stress conditions, a highly fractured rock mass and a large caving footprint.

Additionally, the 2020 Feasibility Study work surface subsidence analysis does not raise any concern for surface infrastructure in place or planned with the exception of Shaft #1, which may be impacted after year 10 of cave mining based on current schedule. Figure 16-2 illustrates the projected surface disturbance associated with Lift 1 under the conditions considered in 2020 Feasibility Study.

The abutment stresses, associated with the block cave, are predicted to be high and the 2020 Feasibility Study has placed focus on optimizing the mine design and ground support systems to manage excavation stability (OTLLC, 2020).

Modeling of the stability of the 2016 Feasibility Study design of Panel 0 using the latest geotechnical information and a more detailed understanding of the lower fault splay identified several critical stability risks and required modifications of the mine design. To address the stability risks, a comprehensive set of redesign options for the Lift 1 footprint were considered.

The new footprint design incorporates leaving 120 m wide pillars (measured on the undercut level) separating Panel 0 from Panel 1 and from Panel 2. The expanded pillar width was designed to provide more stability for the ore-handling system and the rim drives, while also increasing optionality of sequencing Panel 1 and Panel 2. The footprint redesign also includes a revised undercutting sequence for each of the panels and an overall increase in extraction drive and drawpoint spacing to 31 x 18 m.

16.3.1 Subsidence

The predicted fracture limits, determined as the point of having a notable impact on key infrastructure such as hoisting shafts at the end of the Hugo North/Hugo North Extension Lift 1 mining life, are shown by the blue outline in Figure 16-2.

It is planned that a perimeter fence will be erected 100 m outside of the predicted crack line to limit unintentional access to the area.

Results of studies (OTLLC, 2016a) indicate that the subsidence angles are predicted to be nearly vertical at the northern and southern limits of the footprint. On the eastern and western sides, however, the subsidence angle is predicted to be on the order of 55°. As shown in the 2016 Oyu Tolgoi Feasibility Study, the mine shafts and permanent infrastructure are all planned to be located outside of, or under, the predicted facture limits and "subsidence cone".

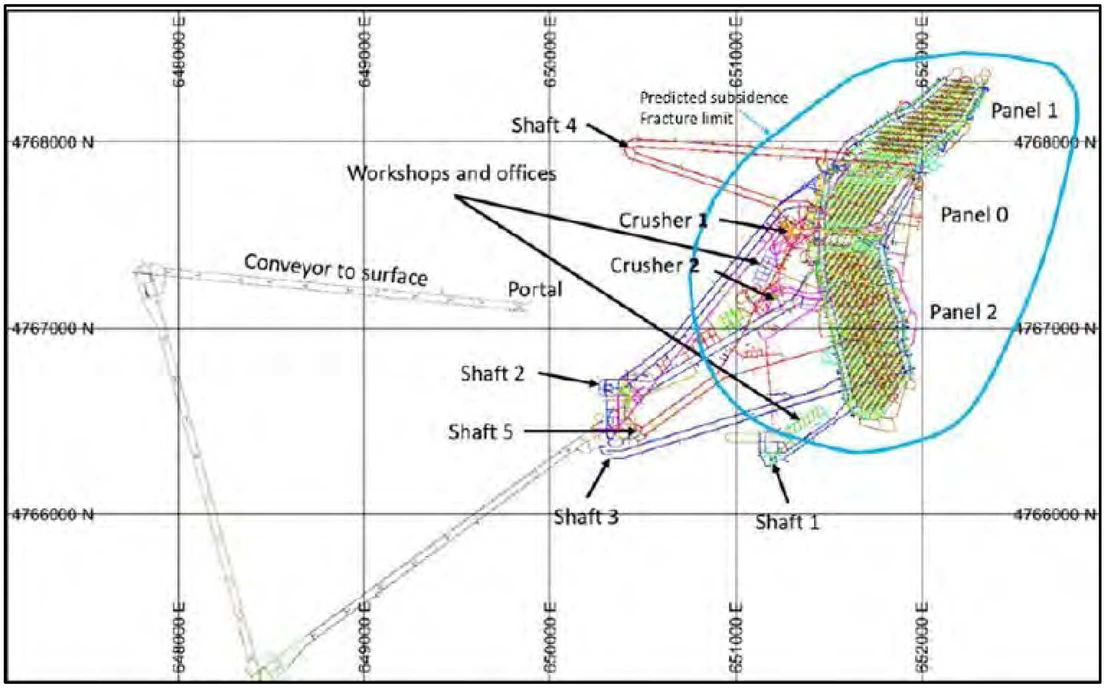
Located at the south end of the subsidence zone, Shaft 1 is closest to the fracture limits. While Shaft 1 is initially in use as a hoisting shaft for personnel, materials and rock hoisting, the potential risks to the function of this shaft are mitigated by the shift to Shaft 2 as the permanent hoisting shaft following its completion, in late 2019. At that time, Shaft 1 was converted to a primary intake ventilation shaft. Using Shaft 1 for ventilation only provides contingency against an unexpectedly larger cave subsidence damage area because a bald concrete-lined shaft can withstand higher ground movement than a hoisting shaft that is reliant on close tolerances between fixed shaft fittings and the high-speed skips and cages.

16.3.2 Rock Mechanics

Critical site characterization data associated with the planned cave initiation and the first four years of production ramp-up have been obtained by drilling in that area. This drilling confirms the expectation that the Hugo North orebody is highly faulted and sheared (OTLLC, 2020). As documented in that study, the in-situ stress measurements estimated at the mine extraction levels are high. The indicated principal stresses are:

- σ_1 = 58 MPa (sub-horizontal with a dip direction of 055°)
- σ_2 = 33 MPa (sub-horizontal with a dip direction of 145°)
- σ_3 = 27 MPa (sub vertical).

Figure 16-2: Cave Subsidence Prediction



Note: Figure from Thomas et al., (2020). Blue line indicates projected extent of subsidence.

The study analysis of this geotechnical domain data confirmed that a lithology basis for domain assignment remains valid and that the Laubscher rock mass rating (RMR) values for the different lithologies vary between 43 and 53. Table 16-4 summarizes the in-situ stress regime as reported in the study.

Within the orebody units, the rock mass strengths were divided by a range of mining stress levels that were predicted from cave-scale modelling. These included (OTLLC, 2020): isolated drift under in-situ stresses (60 MPa), average abutment stresses (80 MPa) and high abutment stresses (100 MPa). The study results indicated that closure strains of up to 5.0% are possible from the high abutment stress loading on the extraction and undercut levels.

Table 16-4: In Situ Stress Regime

	Depth Range (m)	σ1 (MPa)	σ2 (MPa)	σ3 (MPa)
Linear	0–1,330	0.049z	0.028z	0.022z
Domain 1	0–600	0.047z	0.031z	0.024z
Domain 2	600–800	0.071z – 13.95	0.012z + 11.08	0.027z – 1.59
Domain 3	>800	0.031z + 17.50	0.026z – 0.33	0.015z + 7.66

Note: z = depth below surface.

Three caveability assessments were undertaken using the Laubscher Modified Rock Mass Rating (MRMR) rock mass classification system, the Mathews extended stability chart, and Flac 3D numerical modelling. OTLLC (2016a) concluded that the risks associated with caveability and propagation are low; high stress conditions, a highly-fractured rock mass, and a large caving footprint are key factors that will require management attention, and that surface subsidence analysis does not raise any concern for surface infrastructure that is in place or planned.

The fragmentation analysis indicated fine fragmentation within geotechnical domains such that secondary breaking requirements are not expected to pose a risk to production schedule ramp-up or full production rates.

16.3.3 Ground Control and Support Regimes

Multiple ground support regimes are proposed as a function of the anticipated ground conditions and induced stress regimes that may be encountered during the development and operation of the Hugo North/Hugo North Extension Lift 1 cave.

Two main support categories are specified for heading profiles, relating to 'Good' ground (Type 1) and 'Poor' ground (Type 2 – squeezing and Type 3 – strain burst) as defined by the local rock mass rating. For on-footprint development the ratio or Type 1: Type 2: Type 3 is 10:85:5. For off-footprint development, 90% of the ground is classified as Good and 10% as Poor. By comparison, the Hugo North Extension portion of Lift 1 is anticipated to have a higher proportion of 'Good' ground conditions relative to Hugo North Lift 1 as a whole. The costing of the underground used a 60% Good ground and 40% Poor ground assumption as a more conservative estimate of ground control costs (OTLLC, 2020).

Additional ground support is included in the designs of major excavations (crusher chambers, bins, etc.) to minimize deformations, as predicted by modeling, and avoid the necessity of later rehabilitation; work that is an extremely difficult undertaking due to other construction and/or production activities.

The ground support recommendations proposed are based on the anticipated average ground conditions and stress regime; hence, these are minimum support requirements and additional ground support may be required where conditions demand.

16.3.4 Cave Monitoring

The proposed cave monitoring system includes a micro-seismic system, time domain reflectometers (TDR), extensometers, and open drill holes. Cave flow monitoring systems will comprise markers and trackers, installed primarily down surface drill holes. These systems are safeguards against potential hazards and increase the understanding of cave flow for adjusting draw strategy to optimise recovery (OTLLC, 2020).

16.4 Mining Layout

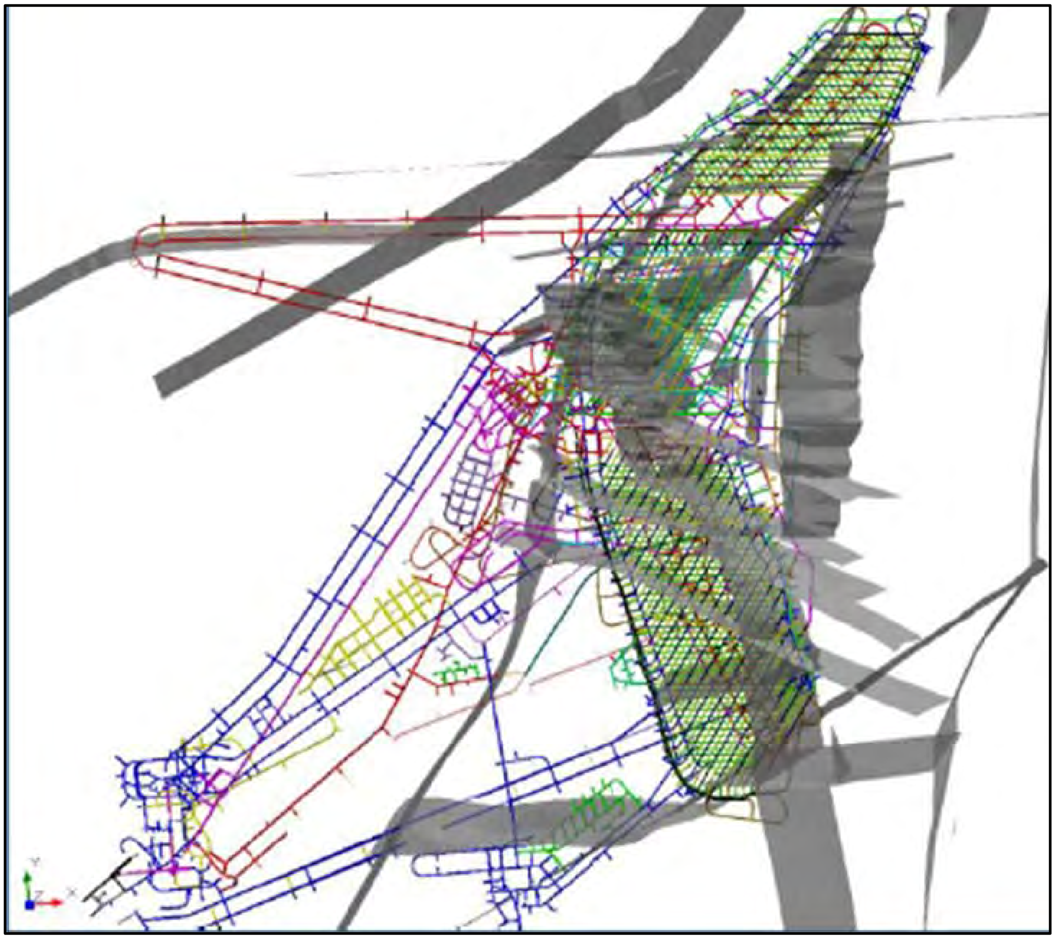
The 2020 Feasibility Study indicates that the overall footprint of the Hugo North/Hugo North Extension Lift 1 is divided into three panels (Panels 0, 1 and 2). This approach is to manage the risk of drift and pillar damage associated with high abutment stresses and the high fractured rock mass (orebody). The Hugo North Extension area is located at the northern end of Panel 1. The current mining plan for Panel 1 initiates the cave at the southern end and progresses the cave front towards the northeast along the panel axis. The footprint layout is shown in Figure 16-3. Figure 16-4 shows the boundary between Panel 0 and Panel 1.

The overall approach to the Hugo North Lift 1 design was influence by the following geotechnical characteristics (OTLLC, 2020):

- Principal stresses
- Structure
- Undercut stability.

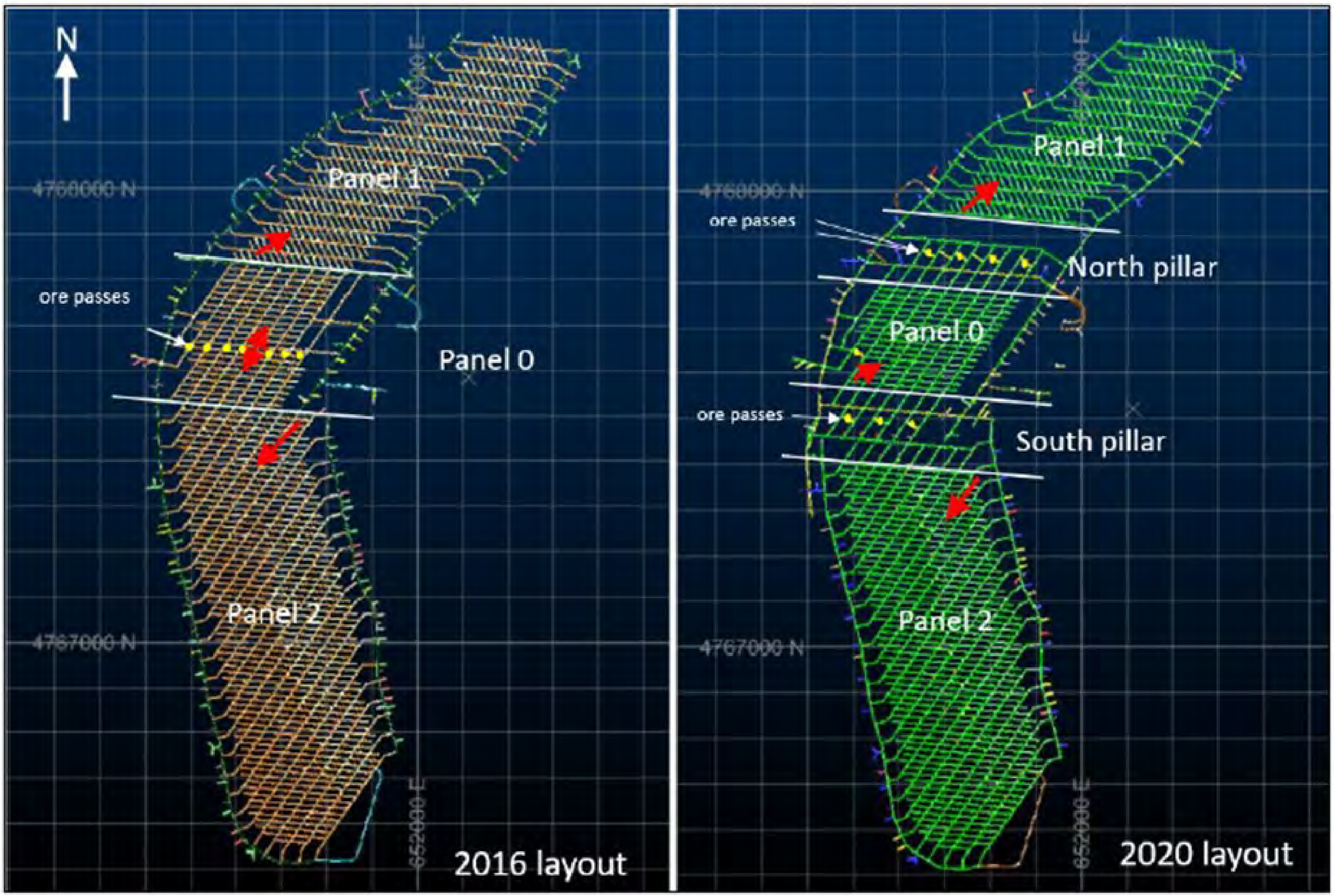
The study shows that undercut pillars adjacent to the advancing cave front are expected to be subjected to vertical stresses with a magnitude of 45 MPa. The $\sigma 1$ principal stress enters the undercut face in a horizontal direction from the bearing 055° (normal to the cave front) and angles down through the undercut pillars at stresses up to 110 MPa.

Figure 16-3: Hugo North/Hugo North Extension Lift 1 Footprint Layout, showing Basic Structural Geology and Panel Configuration



Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

Figure 16-4: Schematic Illustration of Panel 0, Panel 1, and Panel 2 Boundary from 2016 and 2020 Designs



Note: Figure from 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The stresses reduce back to in-situ level two to three pillars (approximately 30–45 m) behind the undercut face. The associated high pillar stresses, as modeled, are predicted to result in high closure strains (up to 5.0%) immediately at the undercut front and lower strains (2.0–5.0%) behind the undercut face.

Figure 16-5 illustrates the various levels, in plan view, associated with the overall Hugo North Lift 1, including the Hugo North Extension. These levels include those that have a direct function associated with the mining activities and those that are of an indirect service and material handling function on which the extraction of the Mineral Reserve is dependent. Figure 16-6 is a general cross-section through the footprint.

A summarized description of the various levels is given in the following sub-sections. This layout is expected to be consistent for the entire Hugo North Lift 1 mining footprint including the Hugo North Extension Lift 1 area.

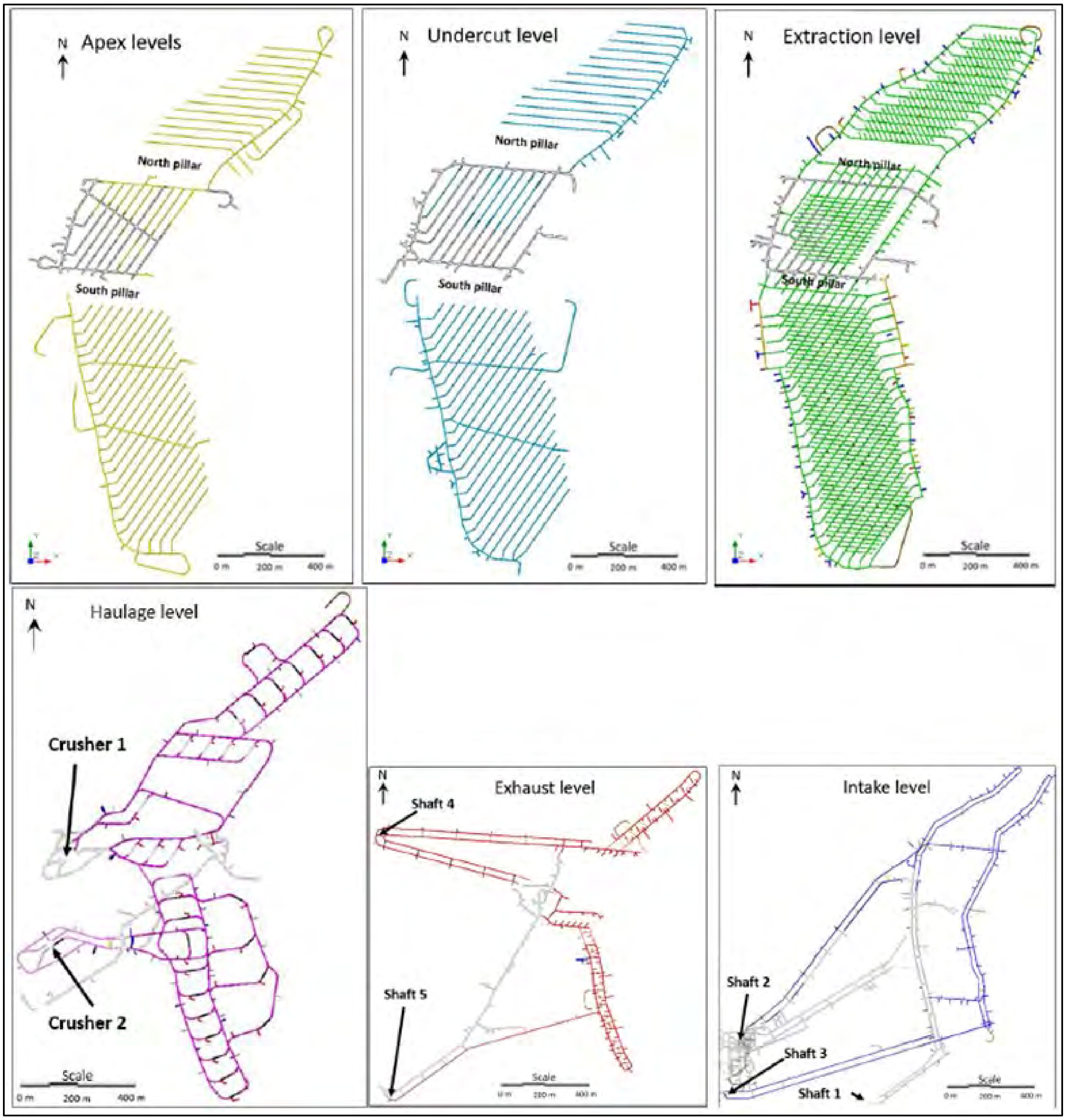
16.4.1 Undercut and Apex Level

The apex and undercut levels provide access drifts for production drills, blasting and mucking for the purpose of undercutting the ore deposit on the associated lift. Production blasting holes are drilled from the undercut level drifts upwards in a fan pattern, blasting then promotes the initiation of gravity induced caving as the blasted/broken ore is removed. The apex drifts allow for inspection of the undercut drill hole deviation prior to each blast.

Figure 16-7 and Figure 16-8 provide illustrations of the undercut blasting area and the associated cave front. A 10 m lead-lag will be provided between the adjacent undercut drifts; the purpose for this is to manage stress build-up near the undercut faces. This lead-lag results in an undercut face oriented at 70° relative to the undercut and extraction drifts. To prevent excessive stress buildup and to manage time-dependent ground deterioration on the undercut, the caving plan study (OTLLC, 2020) determined a minimum undercut retreat rate, along the undercut drift, of 7.0 m/month.

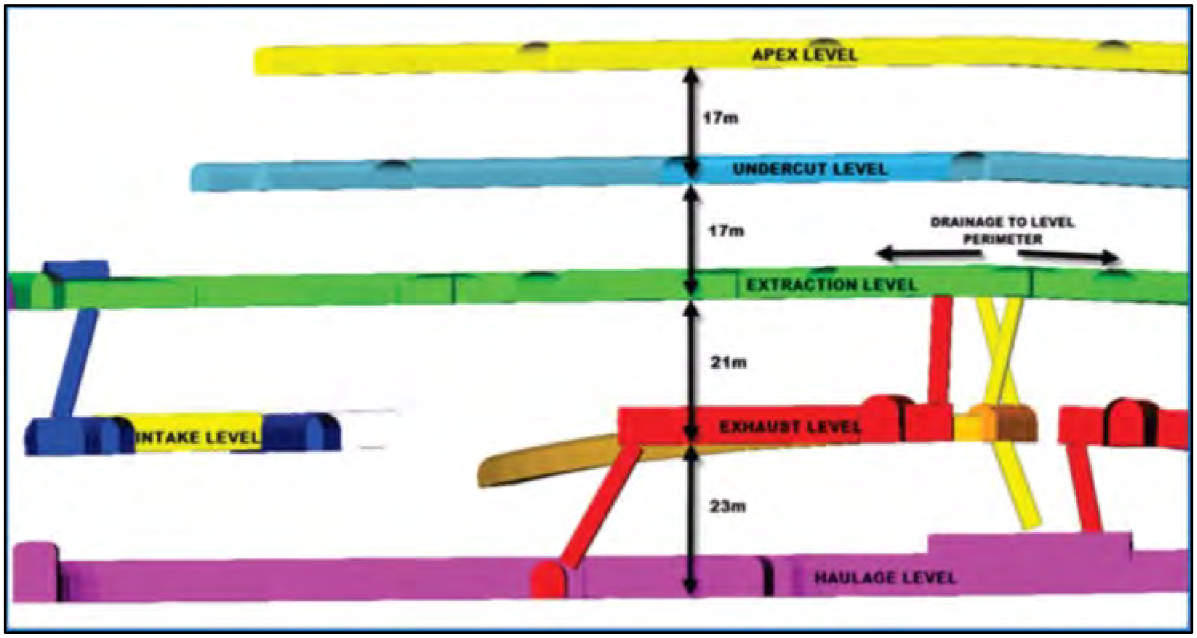
The undercut drifts are planned to be spaced on 31 m intervals, situated 17 m above and half-way between the extraction drifts. At 4.5 m wide x 4.5 m high, these drifts are predicted to be supportable and adequate for the intended function and required duration. The planned “wide-w” undercut makes use of apex inspection drifts, located 17 m above the undercut level on 31 m centres. The apex drifts are situated 34 m above the extraction drifts at the top of the major apex pillars. The drifts provide inspection and management of the undercutting activities (OTLLC, 2020).

Figure 16-5: Summary of Mine Design Elements – Hugo North Lift 1



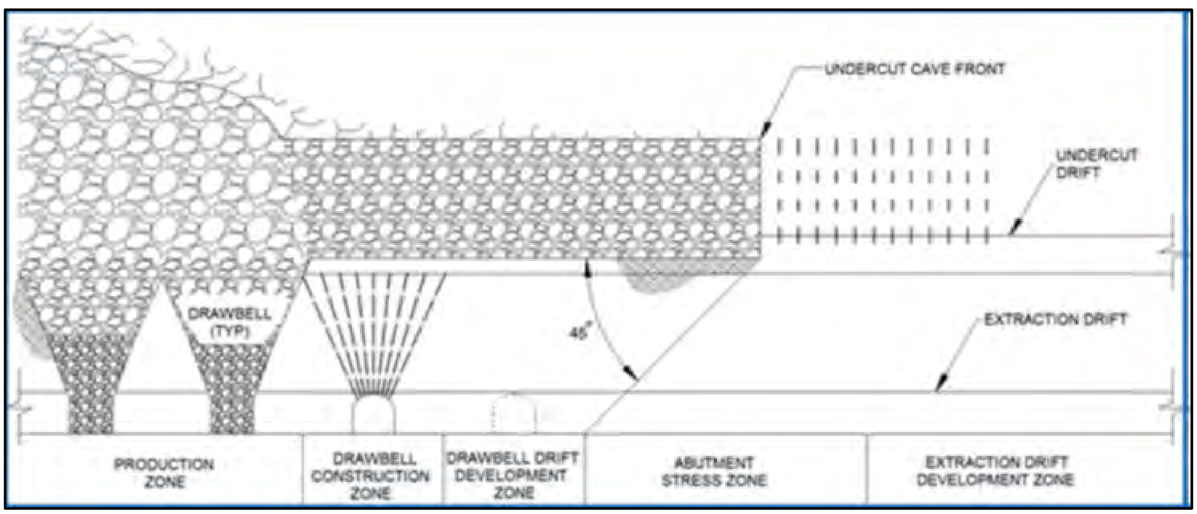
Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

Figure 16-6: Schematic Cross-Section through Production Levels



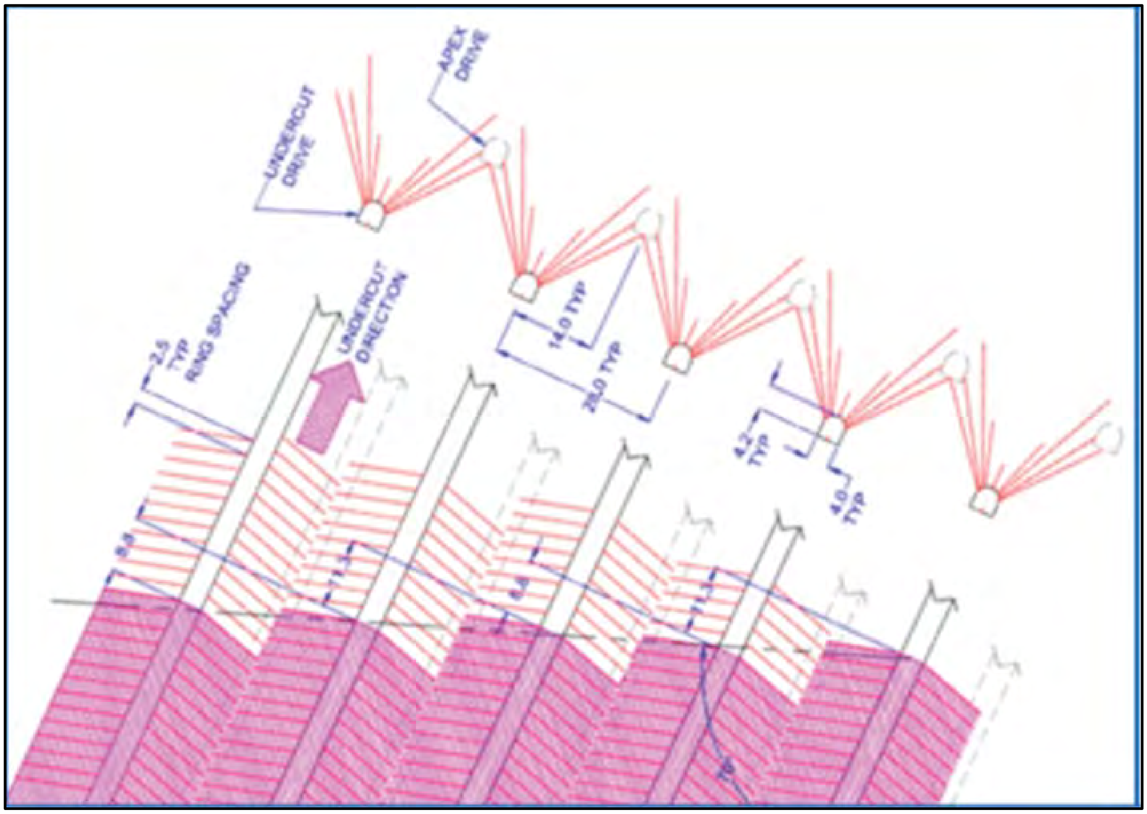
Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

Figure 16-7: Schematic Cave Section Along Extraction Drift



Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

Figure 16-8: Schematic of Undercut and Cave Front



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Based on the 2020 Feasibility Study an advance undercut sequence technique permits the extraction level drift to be developed ahead of the undercut face. A "safety-zone" parallel to the length of the undercut face will be established on the extraction level underneath the advancing undercut face. The safety-zone will be 108 m long, starting 54 m (60°) in front of the undercut and ends 54 m (60°) behind the undercut face. Full draw-bell excavation (see Figure 16-8) will begin at least 60° behind the undercut face (undercut cave front).

16.4.2 Extraction Level and Drawbells

The extraction level design (OTLLC, 2020) is intended for the efficient development of draw-bells and load-haul-dump (LHD) operation to draw ore from the associated draw points. The extraction level is divided into three mining panels: Panel 0, Panel 1, Panel 2, separated by 150 m pillars.

The extraction drifts are planned to have a cross-section of 4.5 x 4.5 m high, spaced 31 m apart, on centre. The draw point drifts are planned to have a cross-section of 4.5 x 4.5 m high. Both are considered to be supportable and adequate in the 2020 Feasibility Study. In the study, these are designed to an El Teniente-style (straight-through) draw-bell layout on an 18 m spacing.

The draw points are oriented at a 60° angle from the extraction drift to optimize the pillar size between the draw-bells and to accommodate LHD access. The extraction drifts are planned to drain from the centre towards the fringe (perimeter) drifts to manage the flow of water away from the internal exhaust raised and ore passes.

Within the Hugo North/Hugo North Extension Lift 1 cave, the overall draw-bell spacing layout is 31 x 18 m, based on the geotechnical and cave flow models (OTLLC, 2020). This layout also considered the significant factors of pillar stability and overall ore recovery. The draw-bell layout parameters for the study are shown in Table 16-5. Within the draw-bells, the draw-cone centroid spacing of 10 m is used to promote interactive draw from the cave.

16.4.3 Haulage Level

The purpose of the haulage level is to collect development and production ore material from the extraction and undercut levels, and transport it, using road trains, to crushers for size reduction. Based on the plans in the 2020 Feasibility Study, the haulage level is located 44 m below the extraction level. It is designed to support one-way traffic, around a loop, from the crusher to the truck loading chutes and return to the crusher. In general, it is located under the centre of the footprint serving ore passes from successive pairs of extraction drifts.

Typically, the haulage drifts are driven at 5.5 x 6.0 m to provide a fully-arched back profile with corners widened to 6.0 m to maintain adequate haulage clearance.

16.4.4 Intake Ventilation Level

The ventilation system is designed to provide fresh air to the mining footprint levels, main travel ways, mine working areas, and to underground fixed facilities. Shaft #1, Shaft #2, and Shaft #3 distribute air into dedicated intake drives as well as travel-ways connected to the shafts. Based on the 2020 Feasibility Study, these intake drives will each have a cross-section of 6.0 m wide x 7.0 m high.

Table 16-5: Extraction Level Layout Parameters and Schematic Layout

Extraction Level	2016 Feasibility Study	Panel 0	Panel 1 and Panel 2
Extraction drive spacing	28 m	31 m	31 m
Drawpoint spacing	15 m	18 m	18 m
Extraction drive development width x height	4.5 x 4.5 m	No change	No change
Extraction drive minimum operating width x height	4.2 x 3.9 m	No change	No change
Number of extraction drives	53	9	36
Number of drawpoints	2,231	222	1,232
Drawbell blasthole diameter	89 mm	No change	No change
Drill metres per drawbell	1,528	No change	No change

Fresh air for the mining footprint level will be supplied through two sets of two intake tunnels parallel to the extraction perimeter drives, 5.0 m wide x 5.5 m wide. A series of 3.0 m raises will connect the intake drifts to the fringe (perimeter) drifts on the extraction level allowing fresh air to enter to extraction level from the east and west side of the mining footprint.

16.4.5 Exhaust Ventilation Level

The exhaust ventilation level allows passage of vitiated air out of the mine through Shaft #4, Shaft #5, and the conveyor to the surface. Fresh air entering the extraction drifts, from the perimeter/fringes removes dust and diesel engine exhaust from the LHD working in the extraction drift and exhausts down a 2.0 m diameter central ventilation raise adjacent to the ore pass in each extraction drift. Two parallel exhaust drifts in the exhaust level will run the length of the deposit along the centre of the deposit axis. The exhaust gallery drifts are planned to be 5.8 x 6.5 m in the 2020 Feasibility Study.

Each of the truck-loading chambers on the haulage level will connect to the exhaust level through an exhaust raise, which will collect dust and diesel engine exhaust from the truck-loading chutes and haulage drifts.

The exhaust galleries will connect to the mine main exhaust drifts to carry all of the vitiated air from the mine to the exhaust shafts.

16.5 Service Functions and Mine Support

The following sub-section descriptions address the mine service functions that are necessary for the overall operation of the underground, but will not be necessarily located within the Entrée/Oyu Tolgoi JV property area.

16.5.1 Crushing and Conveying Levels

Road trains will haul from the loading chutes to the primary crushers on the west side of the mining footprint. The crushed material will then be transferred by a series of conveyors directly to the surface or to the Shaft #2 hoisting system. Dedicated shop facilities for the road trains will be constructed west of Crusher 1 in a location to provide optimal access and to minimize truck downtime (OTLLC, 2020).

Shaft #2 serves as the initial material handling route to surface until the conveyor-to-surface is commissioned. The Shaft #2 muck hoisting system will consist of two, balanced, 60 t skips with a system capacity of 30,000 dry t/d.

When completed, the conveyor-to-surface will consist of one transfer conveyor to carry crushed material from Transfer 5 to a series of three 2,200 m conveyors up to the surface capable of carrying the planned production rate of 33 Mt/a (Turquoise Hill, 2020). This is intended to be the primary material handling system for the LOM. At that time, the Shaft 2 system will serve as a backup materials handling system.

16.5.2 Passes and Ventilation Raises

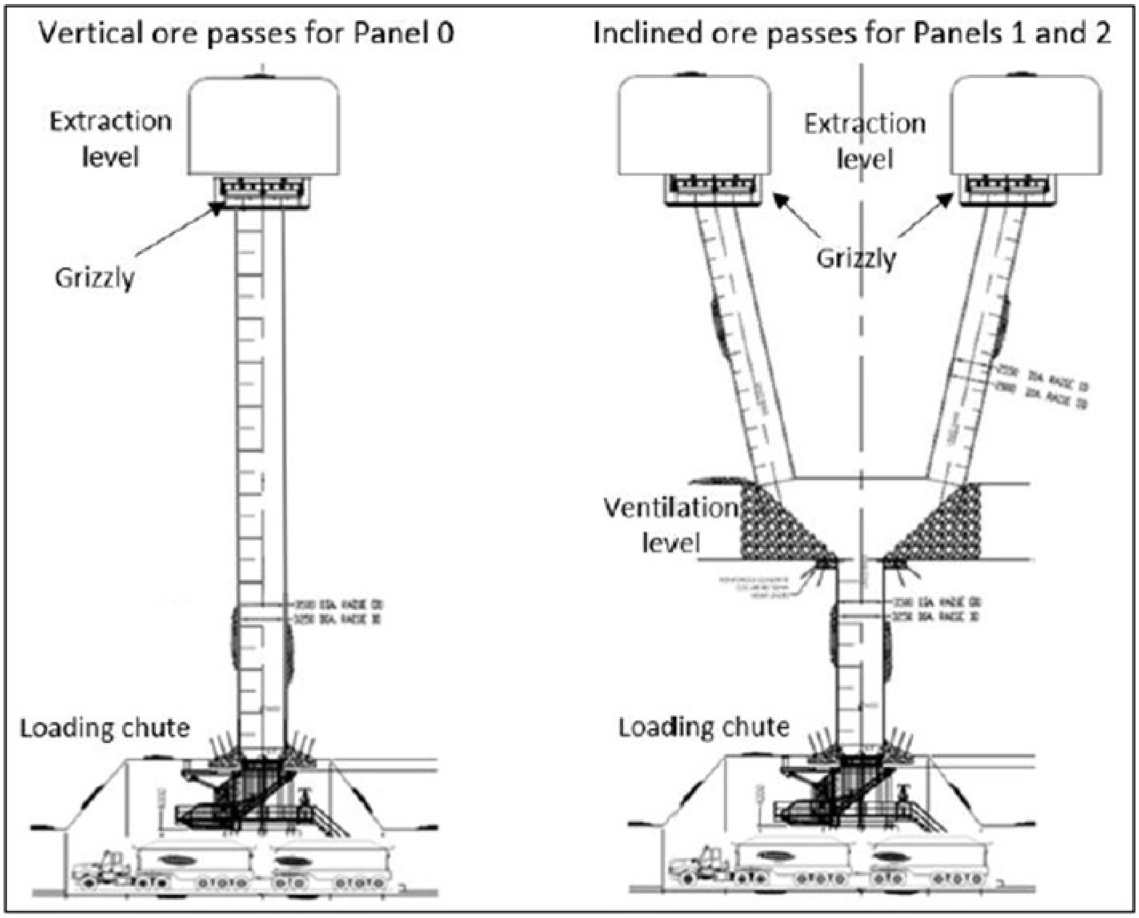
Overall vertical development will include shaft development, ore/waste passes and ventilation raises. With the exception of the shafts, vertical development is planned to use several methods, including raise bore, boxhole and drop-raise.

Two types of ore/waste passes will be constructed to handle the production and development muck from the extraction and undercut levels (OTLLC, 2020). These include:

- Central passes
- Perimeter passes.

An illustration of the ore pass designs for Panels 0, 1 and 2 is provided in Figure 16-9.

Figure 16-9: Ore Pass Designs for Panels 0, 1 and 2



Note: Figure from Thomas et al., (2020).

Central ore passes will handle most of the muck transfer. The ore passes will be raise-bored from the extraction level at a 3.0 m excavated diameter, 38 m long and vertical, from the exhaust level to the haulage level. After being excavated, the ore passes will be lined with 20 mm to 50 mm rolled-steel plate (thickness varied by throughput).

Panel 1 and Panel 2 ore passes are designed as "Y" ore passes where each system is configured in a "Y" shape where 2, 2.8 m diameter x 15 m long upper ore pass legs each supporting tonnage from one extraction drive, feed ore through a small storage bin into one 3.5 m diameter 13 m long lower ore pass leg.

Most of the ventilation raises will be raisebored at 3.0 m diameter, and will range from 20–100 m long. An exception is the central exhaust raises, which will be relatively short

(16 m) and will be excavated at 2.4 m diameter. All ventilation raises are anticipated to require support with remotely-applied, fibre-reinforced shotcrete (OTLLC, 2020).

16.5.3 Underground Material Handling System

Within the mine footprint area, LHD muckers will deliver run-of-mine ore from extraction drawpoints to the grizzly on the associated extraction drift. The run-of-mine ore will be tipped into the respective ore pass connecting, through a bin, to the chute type truck loader on the haulage level. Each of the in-line truck-loading stations will be equipped with a hydraulically operated loading chute to load the road train trailers. The truck loading stations will be located at the perimeter and central passes to load the 160 t capacity (2 × 80 t trailers) side dump Powertrans road trains. The road trains will then deliver to one of two crusher tips (OTLLC, 2020).

The two crushers are each designed at a capacity of 4.0 kt/h to satisfy the 95.0 kt/d production target. Crushed material will discharge into a 640 t surge bin. Both of the crusher stations will be equipped with a hydraulic rock breaker to clear oversized material and an overhead bridge crane for service. The crusher stations will be operated remotely from a central control facility on the surface (OTLLC, 2020).

Primary material flow directed to the conveyor-to-surface system will feed a short transfer conveyor and then onto a series of three incline conveyors to the surface (refer to Section 16.4.1).

Material directed to Shaft #2, via the short horizontal conveyor, feeds into one of two 5.0 kt storage bins for ultimate loading into skips to be hoisted to the surface.

16.5.4 Mine Access

The mine access development includes the conveyor and service declines and the shafts that provide for both ventilation and hoisting.

Shaft 2 serves as the primary main access for personnel and materials and production hoisting. It is also the primary intake ventilation shaft. It is sunk to a depth of 1,284 m, concrete-lined, and finished at 10.0 m diameter. A fixed-guide system supports the hoisting systems with a service cage with a capacity of 39 t, which accommodates up to 150 persons on a single deck, in addition to the muck hoisting system (OTLLC, 2020).

The primary access for Shaft 2 will be along two access drifts that connect the Shaft 2 1265 service level station to the main fixed facilities (main workshops and offices) and the extraction level. The two access drifts will permit a one-way traffic pattern in this area (OTLLC, 2020).

Shaft 1 provided the initial pre-production and service access. It is sunk to a depth of 1,385 m, and finished at 6.7 m diameter. It is concrete-lined, and was equipped with fixed-guides for skip and cage hoisting. The associated steel headframe supported two winders. One operates a double-deck, 6 t capacity cage with a personnel capacity of 32 persons per deck. The other operates two, balanced, 9.5 t skips with the capacity to hoist 3,500 t/d of muck. Mine intake air heaters connect to a sub-collar plenum to provide tempering of intake air when necessary. Upon the completion of Shaft 2, Shaft 1 was transitioned from the primary access to ventilation intake.

Ultimately, five shafts will be required to provide access and ventilation support for the Hugo North Lift 1 (including Hugo North Extension). Shaft 5 was completed in early 2019, while construction has recently restarted on ventilation Shaft 3 and Shaft 4. These shafts are listed in Table 16-6.

16.5.5 Surface Facilities

The underground mine requires a number of surface facilities to support the underground operations. At Hugo North/Hugo North Extension Lift 1 these include:

- Shaft 1 area
- Production Shaft “farm”
- Shaft 4 area
- Conveyor-to-surface portal area.

The Shaft 4 area was initially planned to be located on the Shivee Tolgoi ML but has subsequently been relocated to the south as a result of the Panel 0 pillar changes.

Although not directly associated with the underground mine, the Oyu Tolgoi Project site plan indicates a concrete batch plant situated to the east of the Hugo North Extension and immediately north of the Oyu Tolgoi/Shivee Tolgoi ML boundary (refer to Section 18).

Table 16-6: Shaft Station Depths

Shaft	Diameter (m)	Depth| (m)	Function
Shaft 1	6.7	1,385	Early development and intake
Shaft 2	10.0	1,284	Skipping, primary cage access, intake
Shaft 3	10.0	1,148	Intake
Shaft 4	11.0	1,149	Exhaust
Shaft 5	6.7	1,178	Exhaust

Note: Data from 2016 Oyu Tolgoi Feasibility Study.

The current facilities at the collar of Shaft 1 were constructed as/when required, and have subsequently been expanded to suit on-going requirements. These facilities include offices, a dryhouse, warehouse, lamp room, shop, generators, boiler plant and miscellaneous ancillary facilities. Most of these will remain in service until the completion of mine construction.

The production shaft farm will include the collars of Shafts 2, 3 and 5. Additionally, the area will contain a 220 kV substation, shaft take-away conveyors and overland conveyor to the concentrator coarse stockpile. The permanent mine office and dry-house will be located near the collar of Shaft 2 (OTLLC, 2020).

The Shaft 4 surface collar area will be equipped with main exhaust fans and an electrical substation.

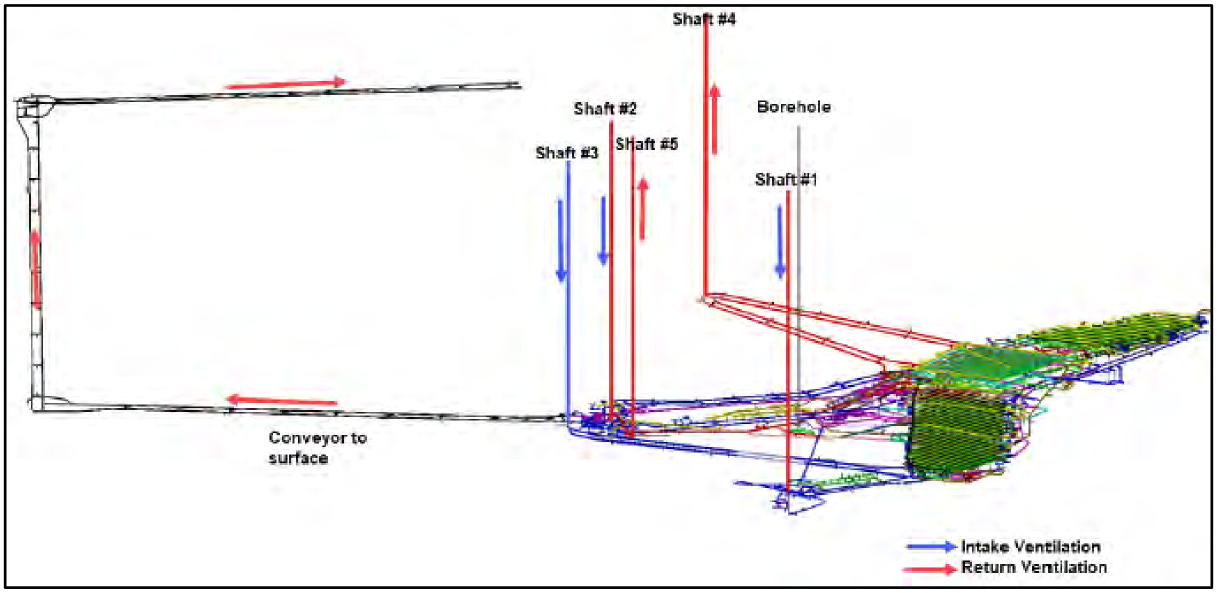
At the portal, the underground conveyor-to-surface system will connect to a surface take-away conveyor and, then, onto the overland conveyor.

16.5.6 Mine Ventilation

At full production, fresh air will enter the mine through three multi-purpose shafts (numbers 1, 2 and 3) and exit through two dedicated exhaust shafts (numbers 4 and 5) as well as the conveyor-to-surface portal. The ventilation system is primarily an exhausting (pull) design with the main fans on the surface at the exhaust shafts. The system components are outlined in Figure 16-10, as sourced from OTLLC (OTLLC, 2020).

Mine air heaters will be installed on all three intake shafts. The heaters will need to operate any time there is a possibility of the intake air temperature being cold enough to induce freezing. The design temperature for the heated/tempered air entering the shaft collar is +2°C.

Figure 16-10: Hugo North and Hugo North Extension Lift 1 Shafts and Ventilation Raises



Note: Figure from 2020 Feasibility Study, courtesy OTLLC, 2021.

The air heating system will use hot water from a central heating plant delivered to glycol heat exchangers to transfer heat from each mine air heater glycol loop, which in turn heats intake air from ambient to design minimum intake temperature, within the design specification (OTLLC, 2020).

16.6 Equipment Fleet

The underground mobile equipment fleet is classified into seven broad categories:

- Mucking (LHDs)
- Haulage (road trains and articulated haul trucks)
- Drilling (jumbos, production drills and bolting equipment)
- Raise bore and boxhole
- Utilities and underground support (flatbeds, boom trucks, fuel and lube trucks, explosive carriers, shotcrete transmixers and sprayers, etc.)
- Surface support
- Light vehicles (personnel transports, jeeps, tractors, etc.).

Major fixed equipment will include:

- Material handling (crushing and conveying)
- Fans and ventilation equipment
- Pumping and water handling equipment
- Power distribution equipment
- Data and communications equipment
- Maintenance equipment (fixed shop furnishing).

16.7 Development and Production

16.7.1 Development

Development and construction of the block cave infrastructure begins several years ahead of general production. The development mining of the apex, undercut, extraction, haulage, ventilation drifts and other in-footprint infrastructure produces ore for delivery to the mill. Additionally, development ore removed as swell from the undercut is delivered to the mill ahead of completing the associated draw-bells.

It is also necessary to ramp the individual lifts and panels of the mine from the development and initial production phases through to the full production.

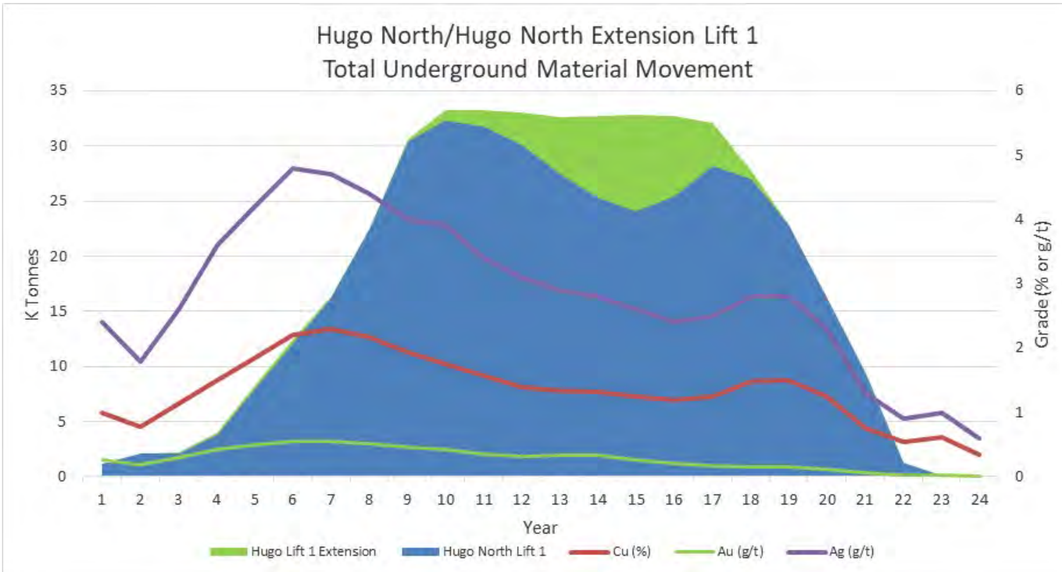
For Hugo North Extension Lift 1, development into the extension begins in 2021, approximately five years before the first draw-bell is taken in 2026. There is a further ramp-up of about five years between the first draw-bell and the peak production period (Thomas et al., 2020).

All material mined during development activities is contained in the Mineral Reserves estimated for Hugo North Extension Lift 1, and is included in the production profiles in the following sub-sections.

16.7.2 Production

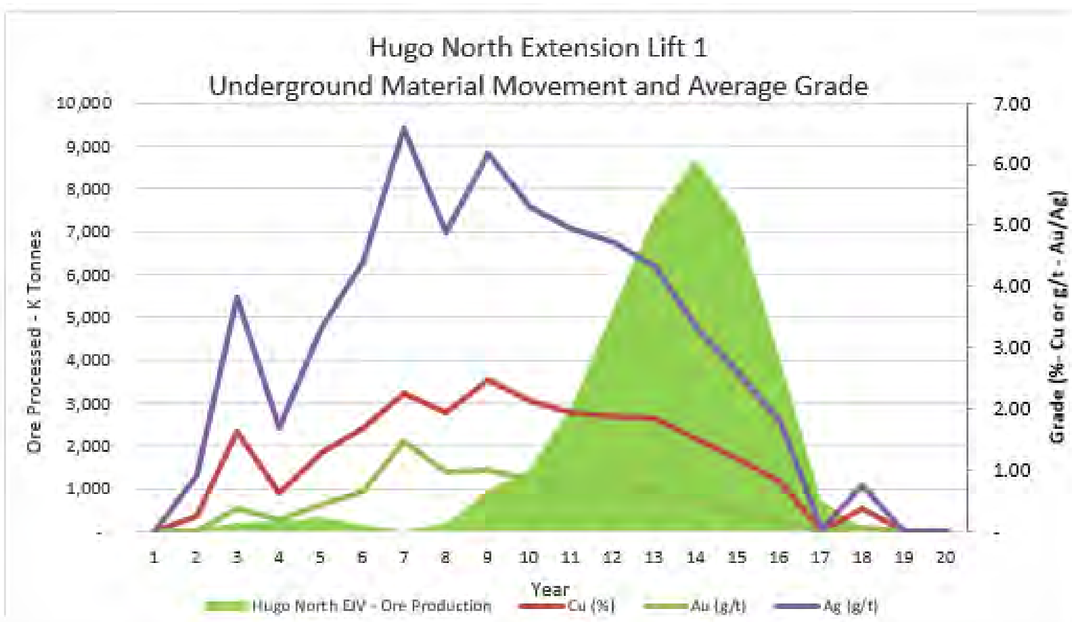
Ore production from the Hugo North/Hugo North Extension Lift 1 is planned to fill the capacity of the mill, hence during the underground mining phase ore production from the surface mine will be limited. The underground production split of ore between Hugo North Lift 1 (OTLLC) and Hugo North Extension Lift 1 (Entrée/Oyu Tolgoi JV property) is shown in Figure 16-11 and for the Hugo North Extension Lift 1 (Entrée/Oyu Tolgoi JV property) alone in Figure 16-12.

Figure 16-11: Hugo North/Hugo North Extension Lift 1 Total Underground Material Movement



Note: Figure prepared by Wood, 2021. Hugo Lift 1 Extension = Hugo North Extension. Year 2 = calendar year 2022.

Figure 16-12: Hugo North Extension Lift 1 – Underground Material Movement and Average Grade

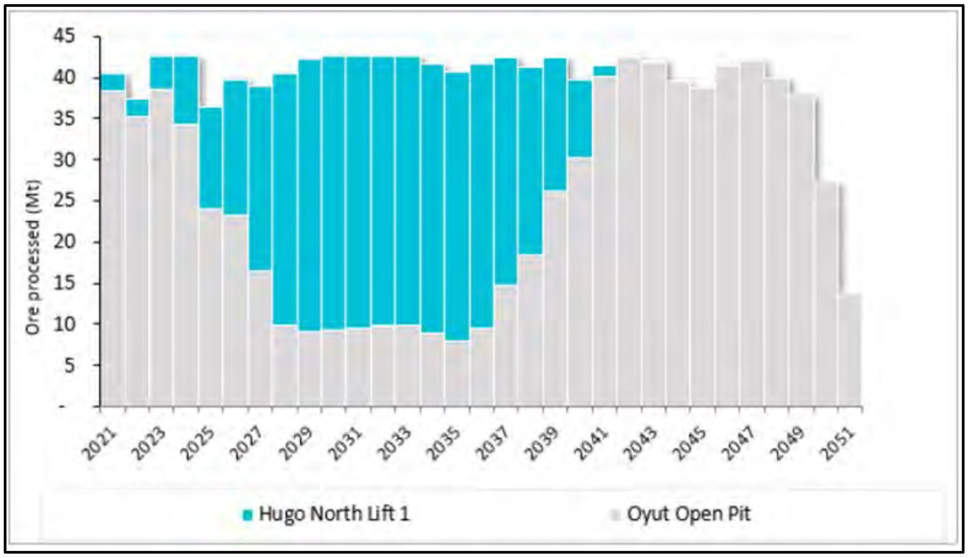


Note: Figure prepared by Wood, 2021. Hugo North EJV refers to Hugo North Extension Lift 1 within the Entrée/Oyu Tolgoi JV property. Year 2 = calendar year 2022.

16.7.3 Processing Schedule

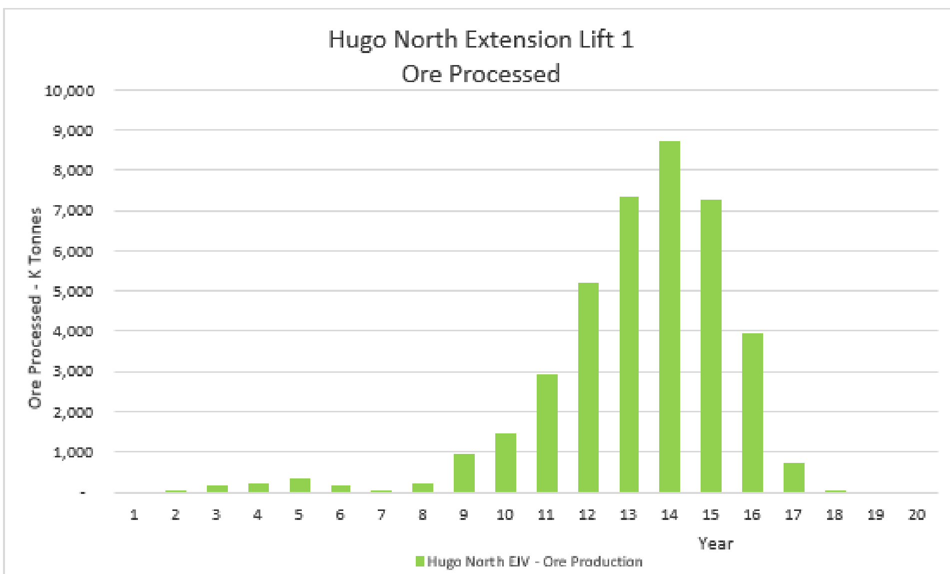
The overall processing schedule was balanced to meet the available mill hours. The processing schedule, by source, is shown in Figure 16-13. Figure 16-14 shows the schedule for Hugo North Extension Lift 1 alone. Recovered copper, gold and silver from production is shown in Figure 16-15, Figure 16-16, and Figure 16-17 respectively. The forecast production schedule for Hugo North Extension is included in Table 16-7. In these figures, Year 2 corresponds to 2022.

Figure 16-13: Overall Oyu Tolgoi Reserve Case Processing Schedule



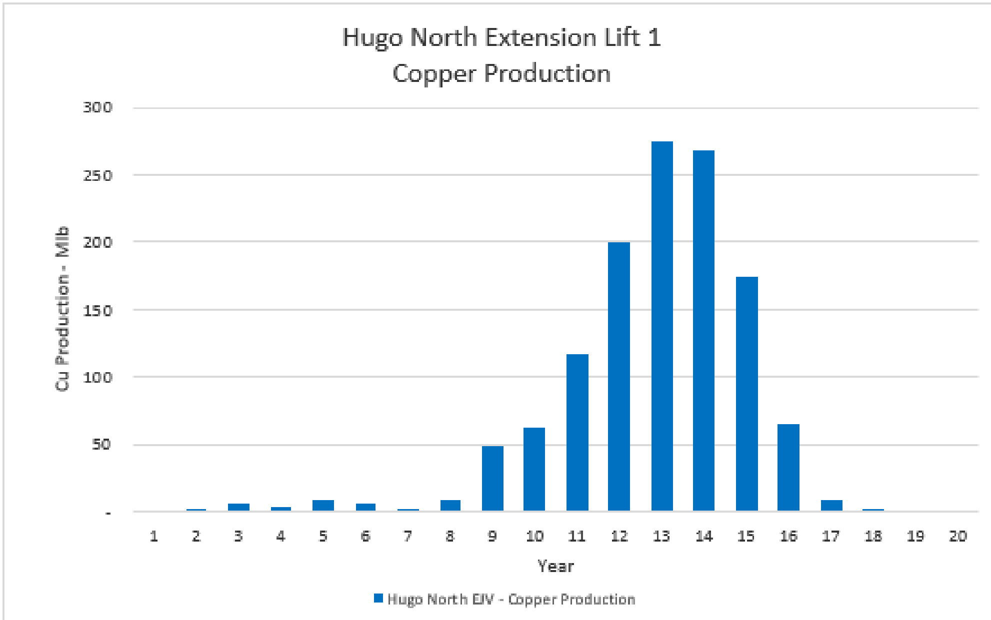
Note: Figure from 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

Figure 16-14: Hugo North Extension Lift 1 Proposed Mining and Processing Schedule



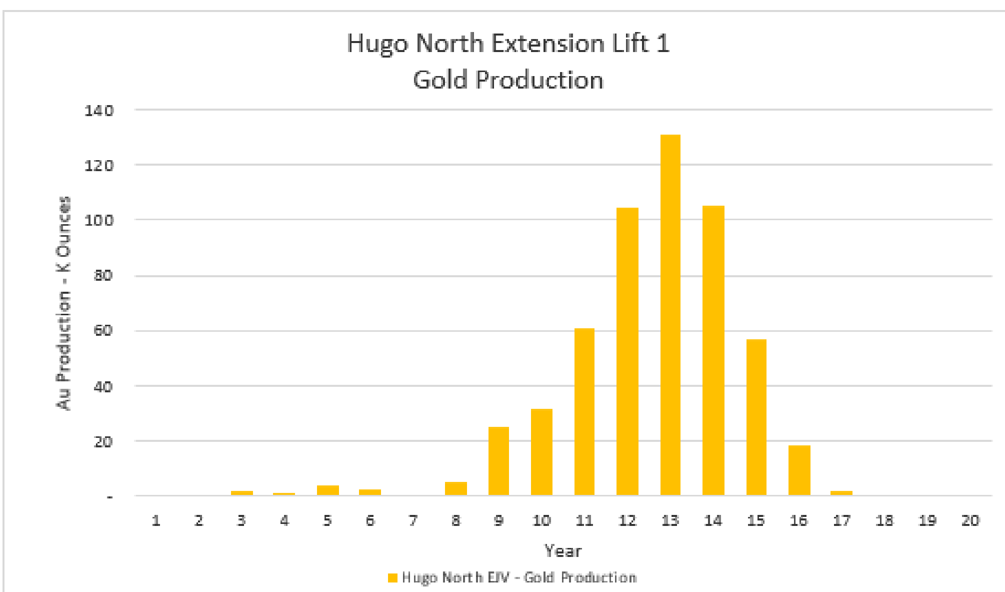
Note: Figure prepared by Wood, 2021. Hugo North EJV refers to Hugo North Extension Lift 1 within the Entrée/Oyu Tolgoi JV property. Year 2 = calendar year 2022.

Figure 16-15: Hugo North Extension Lift 1 Proposed Copper Production Schedule



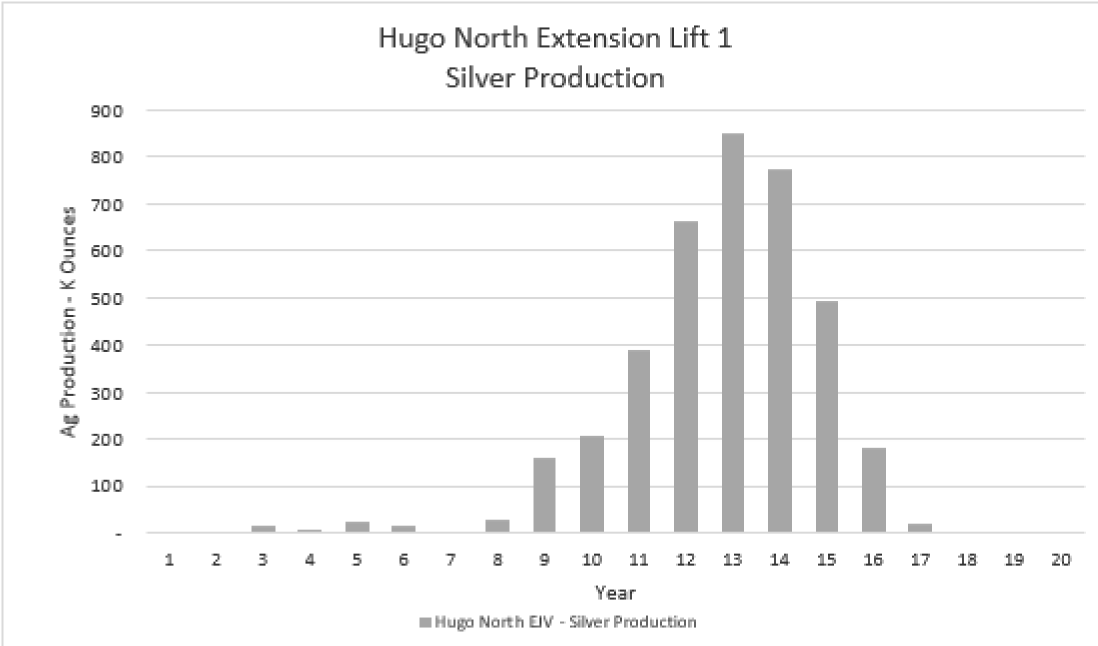
Note: Figure prepared by Wood, 2021. Hugo North EJV refers to Hugo North Extension Lift 1 within the Entrée/Oyu Tolgoi JV property. Year 2 = calendar year 2022.

Figure 16-16: Hugo North Extension Lift 1 Proposed Gold Production Schedule



Note: Figure prepared by Wood, 2021. Hugo North EJV refers to Hugo North Extension Lift 1 within the Entrée/Oyu Tolgoi JV property. Year 2 = calendar year 2022.

Figure 16-17: Hugo North Extension Lift 1 Proposed Silver Production Schedule



Note: Figure prepared by Wood, 2021. Hugo North EJV refers to Hugo North Extension Lift 1 within the Entrée/Oyu Tolgoi JV property. Year 2 = calendar year 2022.

Table 16-7: Forecast Production Schedule

	Unit	Total	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
Production	kt	39,761	0	48	178	234	349	169	5	203	951	1,442
NSR	$/t	97.5	0	9	97	35	80	110	168	134	165	140
Cu	%	1.54	0	0.24	1.62	0.61	1.27	1.69	2.27	1.95	2.47	2.12
Au	g/t	0.53	0	0.01	0.37	0.17	0.42	0.65	1.48	0.97	1	0.84
Ag	g/t	3.63	0	0.9	3.83	1.69	3.32	4.41	6.59	4.88	6.16	5.3
Con T	Kt	1,718	0	0.93	7.23	7.48	13.76	6.48	0.19	10.39	47.87	64.43
Con Cu	%	32.98	0	9.69	37.1	16.97	29.71	41.1	51.81	35.53	45.6	44.16
Con Au	g/t	9.94	0	0.05	7.12	3.76	8.23	13.25	28.85	15.52	16.33	15.25
Con Ag	g/t	69.45	0	18.41	61.44	28.85	53.47	76.3	111.31	79.76	105.05	100.56
Con As	ppm	505.62	0	4,557.79	899.97	1,624.44	1,249.57	762.45	590.92	539.08	452.75	505.37
Con Fl	ppm	584.1	0	472.52	623.97	506.04	603.8	518.15	465.96	627.78	520.12	516.7
Cu	Mlb	1,249	0	0.22	5.93	2.8	9.02	5.86	0.22	8.2	48.15	62.61
Au	Koz	549	0	0	1.66	0.9	3.62	2.75	0.17	5.19	25.1	31.57
Ag	Koz	3,836	0	0.56	14.29	6.94	23.63	15.89	0.69	26.63	161.68	208.24

	Unit	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18
Production	kt	2,922	5,202	7,342	8,722	7,261	3,948	735	52
NSR	$/t	129	124	118	93	71	47	30	18
Cu	%	1.95	1.88	1.83	1.51	1.18	0.81	0.56	0.37
Au	g/t	0.79	0.77	0.68	0.46	0.3	0.18	0.1	0.06
Ag	g/t	4.94	4.73	4.31	3.34	2.6	1.82	1.24	0.76
Con T	Kt	129.99	242.94	352.26	382.42	286.73	140.86	22.61	1.37
Con Cu	%	40.74	37.33	35.34	31.74	27.53	20.85	16.47	12.18
Con Au	g/t	14.49	13.41	11.54	8.61	6.11	4.02	2.32	1.38
Con Ag	g/t	93.72	85.02	75.16	62.8	53.48	40.33	29.83	20.29
Con As	ppm	519.13	475.54	429.05	519.33	497.42	511.45	667.48	838.33
Con Fl	ppm	523.12	554.46	593.14	611.46	613.61	588.45	585.6	510.77
Cu	Mlb	116.78	199.85	274.5	267.53	174.34	64.68	8.22	0.37
Au	Koz	60.64	104.79	130.8	105.49	56.71	18.18	1.67	0.06
Ag	Koz	391.68	664.15	851.38	772.13	492.89	182.53	21.68	0.89

Note: Based on 2020 Feasibility Study. Year 2 = 2022.

17.0 RECOVERY METHODS

17.1 Introduction

Entrée's share of products will, unless Entrée otherwise agrees, be processed at the OTLLC facilities by paying milling and smelting charges. The OTLLC facilities are not intended to be profit centres and therefore, minerals from the Entrée/Oyu Tolgoi JV property will be processed at cost. OTLLC will also make the OTLLC facilities available to Entrée at the same terms if spare processing capacity exists to process other suitable mill feed.

Oyu Tolgoi, including the Entrée/Oyu Tolgoi JV property, is being developed in phases:

- Phase 1: all work required to bring OTLLC's Oyut open pit into full commercial production through commissioning and ramp-up of Lines 1 and 2, by the addition of essential services and infrastructure. The Phase 1 concentrator was commissioned in early 2013. The nameplate processing capacity of 96 kt/d was achieved in August 2013. Operating data acquired since that time have been used in Phase 2 design, which addresses the delivery of Hugo North/Hugo North Extension underground plant feed via Lift 1 in conjunction with open pit mining
- Phase 2: all additional work required to process Hugo North (including Hugo North Extension) Lift 1 production plus open pit plant feed to match Phase 1 semi-autogenous grind (SAG) mill capacity, including:
  - The addition of a fifth ball mill to achieve a finer primary grind P_{80} of 150 to 160 µm for a blend of Hugo North/Hugo North Extension and Oyut open pit feeds, compared to 180 µm for the Southwest zone (Oyut).
  - Additional roughing and column flotation capacity to process the higher level of concentrate production when processing the higher-grade Hugo North/Hugo North Extension plant feed
  - Additional concentrate dewatering and bagging capacity.

The intent of Phase 2 is to treat all the high-value Hugo North/Hugo North Extension ore delivered by the mine, supplemented by OTLLC's open pit ore to fill the mill to its capacity limit. The open pit ore has different optimal processing conditions to the Hugo North/Hugo North Extension ore, and the concentrator operation will target capturing maximum value from the higher NSR of the underground ore. These conditions approximate those for Southwest zone (Oyut) ore but will not be optimal for Central zone (Oyut) ore. The higher grades of the Hugo North/Hugo North Extension ore will generate higher concentrate tonnages, which will beneficially dilute impurities, particularly arsenic from the Central zone (Oyut) ore.

The existing concentrator substation to the south will be expanded to supply the additional electrical loads. The Phase 1 bagging plant will be expanded by the addition of four more bagging modules. This expansion was anticipated in the Phase 1 design, and room was provided for the new equipment.

17.2 Process Flow Sheet

The proposed flowsheet for Phase 1 is included as Figure 17-1. Figure 17-2 shows the concentrator overall block diagram on completion of Phase 2.

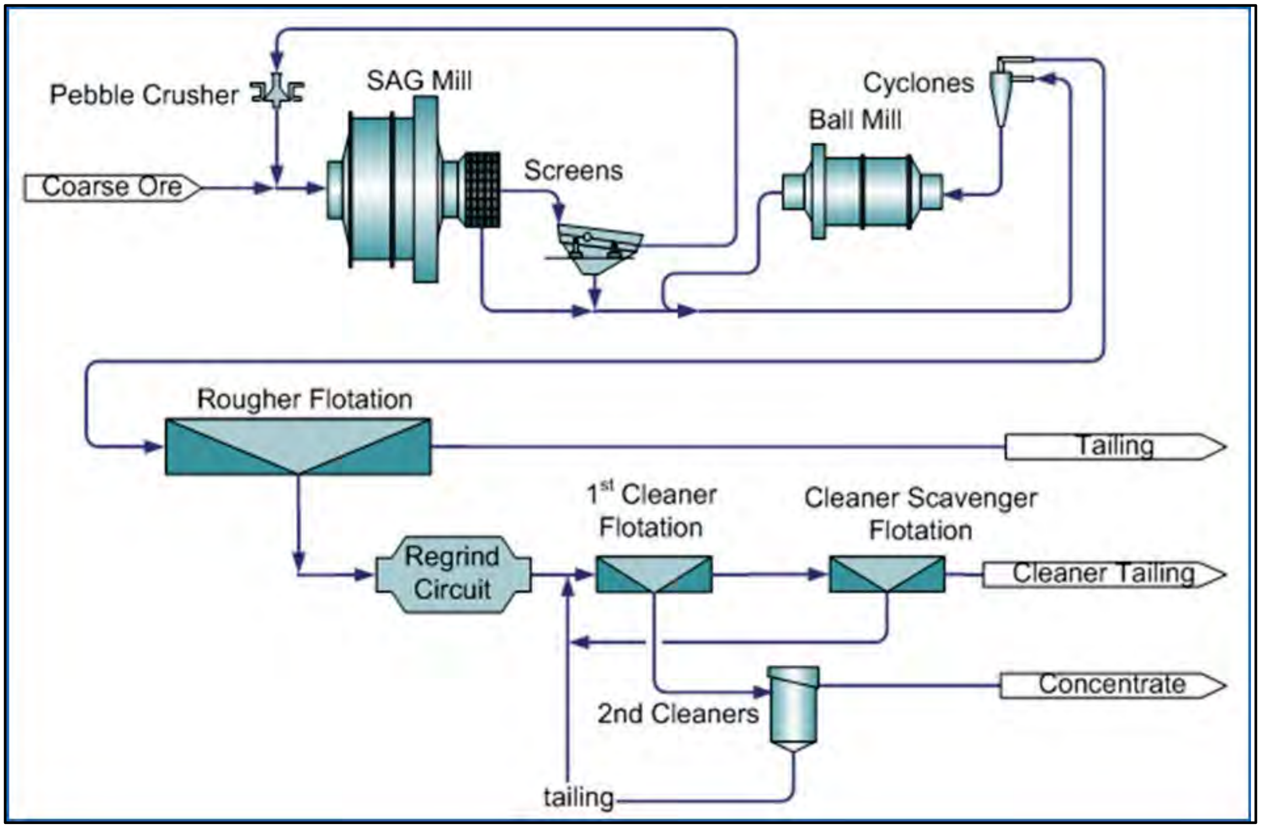
17.3 Plant Design

Phase 1, currently in production, uses two grinding lines (Lines 1 and 2), each consisting of a SAG mill, two parallel ball mills, and associated downstream equipment to nominally treat 100 kt/d of ore from the Oyut open pit. During Phase 2, softer ore from the Central zone of the Oyut open pit will be processed and combined with Hugo North/Hugo North Extension underground ore.

The Phase 2 concentrator development program will optimize the concentrator circuit to maximise recovery from the higher-grade Hugo North/Hugo North Extension ore while allowing it to handle a higher tonnage throughput. Components of Lines 1 and 2 that require upgrading to accommodate the gradual introduction of ore from underground include the ball mill, rougher flotation circuit, flotation columns, concentrate filtration, thickening, and bagging areas, and bagged storage facilities.

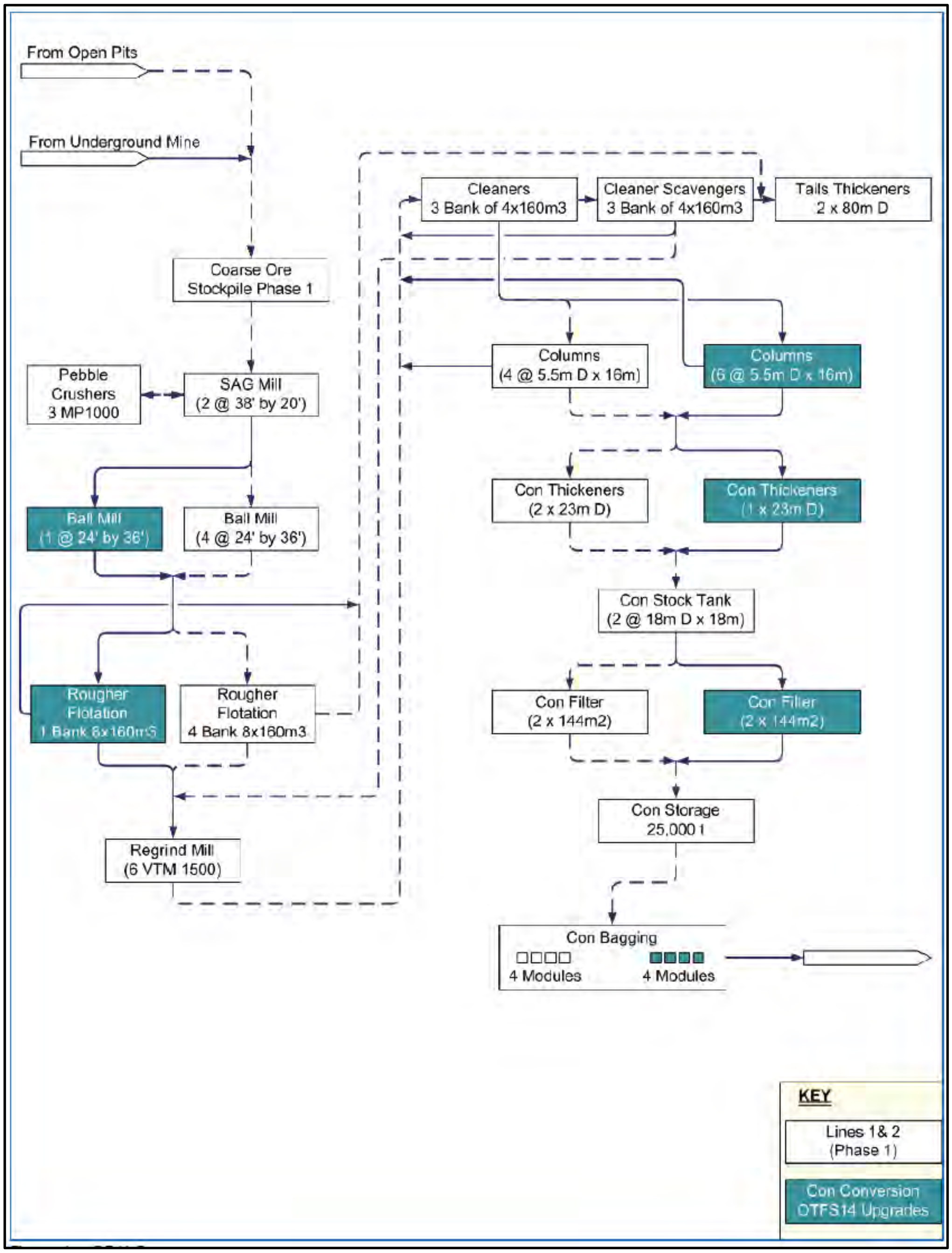
The planned volumetric limit of the existing concentrator has been set at 5,200 t/h, to reflect the above constraints and the demonstrated achievable throughputs. These constraints limit the planned annual throughput to 41.9 Mt/a, based on 92% utilization. The same 5,200 t/h volumetric limit will be applied to the concentrator after completion of the Phase 2 modifications. However, the planned utilization has been increased to 93.5%, resulting in a maximum processing throughput of 42.6 Mt/a (124,800 t/d).

Figure 17-1: Basic Oyu Tolgoi Concentrator Flowsheet – Phase 1



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Figure 17-2: Oyu Tolgoi Project Concentrator Overall Block Diagram on Completion of Phase 2



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

The plant description includes the modifications to be made to process Lines 1 and 2 to allow it to achieve the higher milling rates and manage the higher head grades when the feed becomes dominated by Hugo North ore.

The primary crushing and overland conveying systems that deliver crushed ore to the coarse ore stockpile will not need to be modified for Phase 2. The underground operations will provide for the delivery of ore to the existing coarse ore storage stockpile via an additional parallel conveyor, which was allowed for in the Phase 1 design.

The process plant employs a conventional semi-autogenous mill/ball mill grinding circuit with pebble crushing (SABC) followed by copper flotation.

In each of Lines 1 and 2, coarse ore is slurried and ground to approximately 80% passing 2 mm in 38 ft diameter SAG mills. Screening of the discharge separates out +15 mm particles, which are conveyed to pebble crushing and then returned to the SAG mills. Approximately 10 to 15% of the feed circulates from the SAG mill screens to the pebble crushers, depending on ore type and grate condition. Screen undersize from each SAG mill is pumped to pressurised distributors which split the flow between the discharge hoppers of pairs of secondary ball mills.

Ball mill discharge combines with the SAG product slurry and is pumped to dedicated packs of cyclones. Cyclone underflow from each pack returns to its respective ball mill, while the overflow, with a P_{80} of 140 to 180 µm, gravitates to the rougher flotation feed distributor. The slurry is distributed to four lines of self-aspirated rougher flotation cells and combined rougher concentrate is then reground in vertical tower mills to 80% passing 35 µm before delivery to the first stage cleaners. The concentrate from the first stage cleaners is pumped to four sparged column cells operating in parallel, which produce the final grade concentrate.

Tailings from the cleaner and rougher flotation cells are combined, thickened, and pumped to the tailings storage facility (TSF), where they settle to their terminal density, allowing the recycle of process water to the concentrator. The cleaner concentrate is thickened, filtered, bagged, and transported to the Chinese border where it is transferred to a holding yard, awaiting transport to smelters. Currently, all tailings are pumped to TSF Cell 1. The tailings pumping system will be upgraded to feed Cells 1 and 2 when Cell 2 is required to be commissioned.

17.4 Energy, Water, and Process Materials Requirements

17.4.1 Reagents and Media

Phase 2 will share facilities with the Phase 1 Lines 1–2 reagent supply systems. The modifications to the reagent system are described below. In general, the aim is to have 45 days of reagent inventory on hand at or near the plant site.

- Lime: No additional lime storage capacity, beyond the four 1000 t silos installed in Phase 1 is required. An additional metering station will be required at the new rougher bank and the column cells
- Primary collector: The primary collector will be Aerophine 3418A (sodium di-isobutyl dithiophosphinate). Consumption will peak at nearly 1,700 kg per day during Phase 2, approximately 65% more than the Phase 1 usage. The Phase 1 system has sufficient dilution capacity to supply the conversion. An additional metering station will be required at the new rougher bank
- Secondary collector: The on-site inventory for Phase 1 is 40 t, which has not been increased for the conversion to Phase 2. An additional metering station will be required at the new rougher bank. No secondary collectors are currently added in Phase 2
- Frother: Frother distribution in Phase 1 provides for the use of two frothers, methyl isobutyl carbinol (MIBC) added neat, and a secondary frother (polyglycol ether or similar) added as a low concentration solution in water. Primary frother consumption in Phase 2 will be roughly equal to Phase 1 design at 15 g/t, peaking at nearly 1,800 kg per day. This is due to a reduction in estimated consumption, as corroborated by May to December 2013 consumption reports. No additional frother tankage will be required. Delivery will be in 18 m^3 isotainers off-loaded by forklift and placed on a racking system, from which the contents will be pumped to the plant storage. Additional metering stations for each type will be required at the new rougher bank
- Tailings flocculant: The major flocculant will be a non-ionic type such as Magnafloc 338. Tailings flocculant use will increase to 2400 kg per day, proportionate to tonnage. No new flocculant preparation equipment will be installed. The proposed reagent inventory is considered adequate for Phase 2. Recent testing of

an alternate flocculant has led to higher underflow densities at significantly reduced consumption

- Concentrate flocculant: The flocculant used for concentrate thickening is an anionic variety, such as Magnafloc 5250. Concentrate flocculant demand will increase to 110 kg per day, but the Phase 1 capacity is sufficiently under-utilised such that expansion will not be necessary. An additional flocculant metering pump and dilution system will be installed. Reagent inventory will be increased to five bulk bags
- Water treatment chemicals: The existing anti-scalant and corrosion inhibitor supply systems will be adequate for both the process and raw water systems. The reagent inventory is also adequate for Phase 2
- Grinding media: No additional inventory is required for SAG milling. For ball milling, the new Ball Mill 5 will use the existing 1.6 kt ball storage system for 75 mm balls and the ball conveying system will be modified to deliver to it. An additional inventory of 192 t of 75 mm media in quarter-height isotainers is provided. Using Phase 1 regrind media consumption estimates, the regrind mills will consume about 22 t/d of 16 mm media, reducing on-site inventory to eight days of operation. However, actual operating data for 2013 indicates a large decrease in consumption, from the 2013 design of 60–130 g/t for Southwest zone (Oyut) ore. Long-term consumptions in regrind milling are budgeted in terms of g/kWh for the various ore types. Underground ore has a lower abrasivity than the more siliceous open pit ore, with corresponding lower specific media consumption anticipated.

17.4.2 Raw Water

Raw water is delivered by pipeline from the lagoon to the raw water tank, from where it is pumped through cartridge filters to the grinding and air compressor cooling systems, as well as the potable water system. Spent cooling water will supply a second gland seal water tank interconnected with the Phase 1 gland seal water tank. Excess spent cooling water will flow by gravity to the tailings collection box and make its way to the process water tank via the tailings thickener overflow; any shortfall in gland seal water requirement will be made up directly from the cooling water supply.

The concentrator conversion equipment will be serviced by the existing water system with minimal modification. The gland seal water storage capacity will be expanded, and appropriate connections added to the existing network.

17.4.3 Process Water

The bulk of the process water is added to the SAG mill feed chutes and the cyclone feed pump boxes at low pressure. The ball mills are secondary addition points. The rest of the process water is circulated around the concentrator at higher pressure for sprays, utility hoses, and other miscellaneous uses. A booster pump is provided for high-pressure washing of the mill liners. The increased tonnage in Phase 2 will require additional process water but no system modifications.

17.4.4 Water Balance

The concentrator raw water demand varies seasonally due to evaporation, ice formation on the TSF, and the release of water during spring thaw. Annual average raw water demand is 0.45 m^3/t ore processed. The total site raw water demand has been estimated to range from a low of 678 L/s in June to as high as 932 L/s in the February–March period, with an average of 732 L/s. The design groundwater pumping capacity is 900 L/s. Using drawdown of the lagoons will slightly reduce the lagoon recharge rate. The current projection is that the peak instantaneous raw water demand could exceed 900 L/s at the Phase 2 volumetric limit of 121 kt/d (after tailings system upgrades) and approach the limit at the average feed rate of 117.43 kt/d in the peak Phase 2 year (2021). This compares with the long-term average Gunii Hooloi groundwater extraction of 870 L/s approved by the Ministry of Environment, Green Development and Tourism (MEGDT), based on average usage over 40 years. The largest water loss, 564 L/s, is the entrained water in the settled tailings. The Phase 1 design specified a final tailings settled density of 73.5%. That value has not been realised to date and 70% solids has been used in the water balance model.

17.4.5 Concentrator Power

With the addition of the concentrator conversion loads, the peak operating load demand from the existing 220 kV concentrator substation will increase by an estimated 20 MW (from 116–136 MW), and the nominal operating (diversified) load will increase by an estimated 19 MW (from 106–125 MW). The operating power demand includes the diversity, demand, and percent duty factors specific to the type of equipment and process.

Total demand for Phase 2 during normal operating conditions is estimated at 150 MW peak operating load and 144 MW nominal operating (diversified) load. This includes the peripheral 35 kV ring loads to the concentrator account. This nominal operating load results in an estimated annual power consumption of 1,093,800 MWh for the combined concentrator, an incremental increase of 161,400 MWh for the concentrator conversion.

The existing concentrator 35 kV line will distribute power through cable feeders to the following additional equipment:

- One 16 MVA, 35 kV–10.5 kV Ball Mill 5 oil-filled transformer
- One 16 MVA, 35 kV–6.3 kV oil-filled transformer from a new 35 kV GIS switchgear section to be added.

The modifications will provide power for all the new conversion equipment, in addition to the power demands of the relocated air compressors and the new column cells.

18.0 PROJECT INFRASTRUCTURE

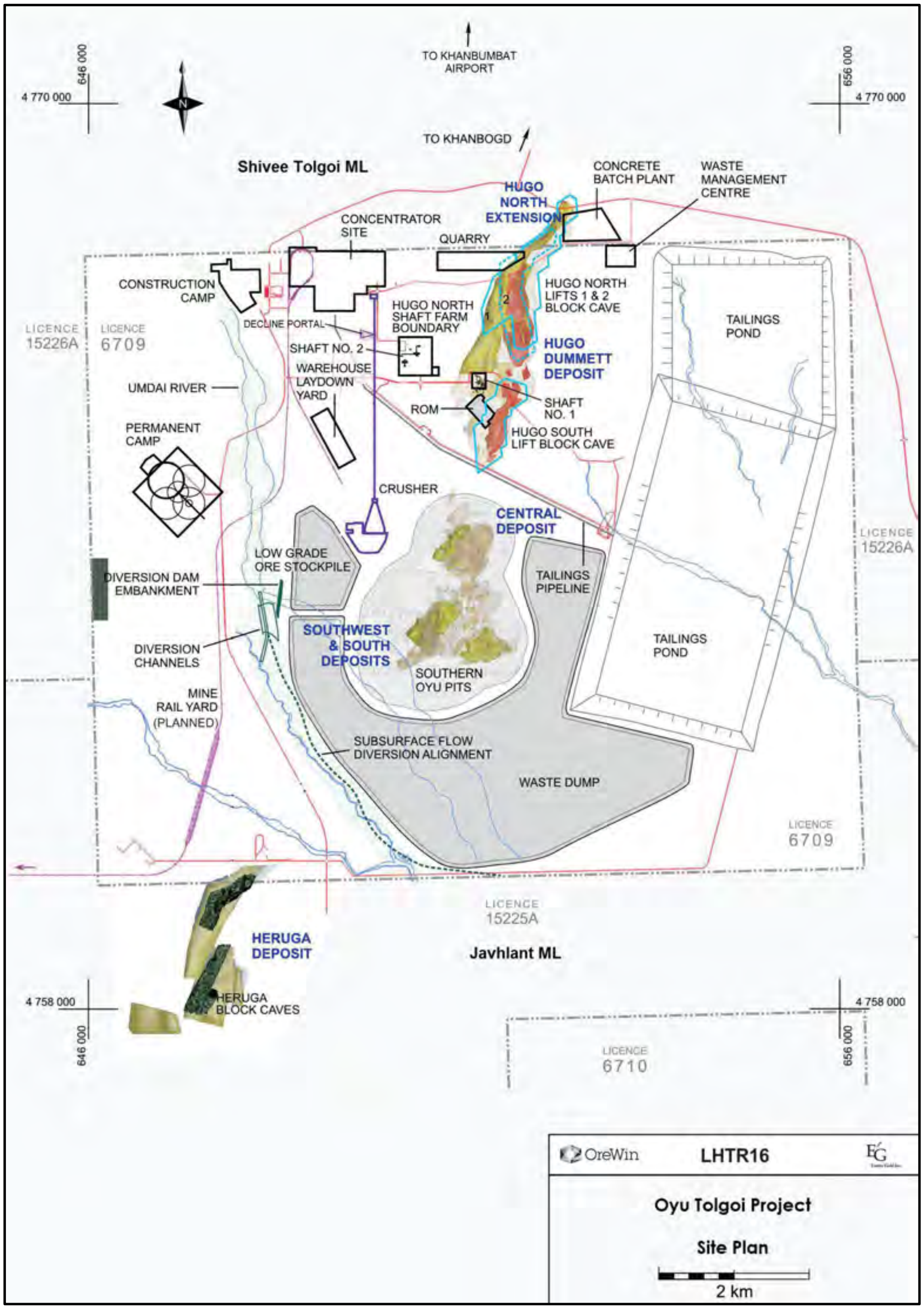
18.1 Introduction

Infrastructure required for Phase 1 of the Oyu Tolgoi project has been completed, and includes:

- Access roads
- Airport
- Accommodation
- Open pit and quarries
- Tailings and waste rock storage facilities
- Process plant
- Batch plants
- Administration, warehousing, emergency, and maintenance facilities
- Power and water supply and related distribution infrastructure
- Water management infrastructure
- Waste management
- Heating
- Fuel storage.

A site plan showing the key infrastructure and locations of the plant and mines is shown in Figure 18-1. All existing and planned infrastructure is currently within the Oyu Tolgoi licence area.

Figure 18-1: Actual and Proposed Oyu Tolgoi Project Site Plan



Note: Figure from Peters and Sylvester (2016).

Additional infrastructure that will be required to support Phase 2, or modifications to the Phase 1 infrastructure, includes:

- Construction of conveyor decline and shafts
- Construction of permanent underground facilities including crushing and materials handling, workshops, services, and related infrastructure
- Concentrator conversion
- Modifications to the electrical shaft farm substation, and upgrades to some of the distribution systems
- Expanded logistical and accommodations infrastructure
- Underground maintenance and fuel storage facilities
- Expanded water supply and distribution infrastructure
- Expanded TSF capacity.

18.2 Road and Logistics

Additional information on Project accessibility is included in Section 5.

18.2.1 Road

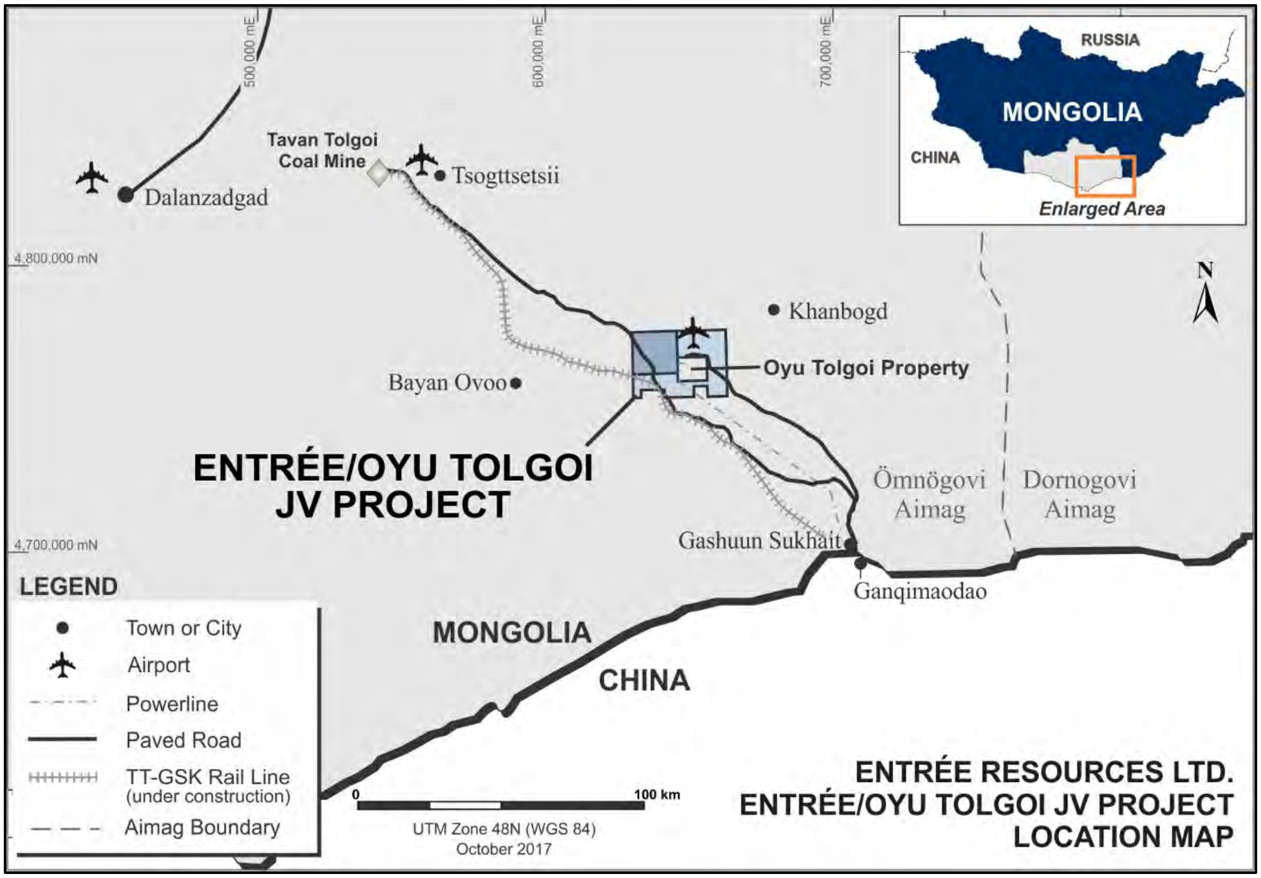
Internal roads for the Oyu Tolgoi project are unpaved and maintained for suitable and safe access across the mine.

Concentrate and supplies are currently transported along a 105 km sealed road that has been constructed to the Mongolian–Chinese border crossing at Gashuun Sukhait (Figure 18-2).

18.2.2 Air

OTLLC has constructed an airport for the mine, and the site is serviced by charter and scheduled flights to and from Ulaanbaatar. The airport is capable of servicing commercial aircraft sized up to the Boeing 737-800 series.

Figure 18-2: Road and Planned Rail Routes



Note: Figure courtesy Entrée, 2017.

18.2.3 Rail

There is currently no access from the Project site to the rail line within Mongolia, except along a 330 km long desert trail northeast to Sainshand. The route of a planned standard gauge, 220 km long, railway from Tavan Tolgoi to the Chinese border passes through the southwest corners of the Shivee Tolgoi and Javhlant MLs.

A rail corridor has been allowed for to connect the Oyu Tolgoi project and the Tavan Tolgoi rail and enters the project area from the southwest corner through the Javhlant ML, and heads north to a rail yard and then on to the warehouse and concentrate storage building. An allowance has been made in the project site layout for a rail link to the operation and rail link has been included in the alternate production cases analysis to the site for the transport of:

- Concentrate (outbound to various Chinese smelters)
- Coal for the power plant (inbound from Mongolian coal mines)
- Diesel fuel (inbound from Russia)
- Other inbound equipment and consumables.

18.3 Stockpiles

Stockpiles are discussed in Section 20.

18.4 Waste Storage Facilities

Waste rock storage facilities are discussed in Section 20.

18.5 Tailings Storage Facilities

The tailings storage facilities are discussed in Section 20.

18.6 Built Infrastructure

The administration and support infrastructure includes the administration building, North gatehouse, medical centre, fire station, operations warehouse, central mine dry batch plants and core management facility.

Accommodation is currently provided to the Oyo Tolgoi project through onsite and satellite camps. Messing facilities are included in the camps. A recreation centre is located in the main camp area. Some personnel live in Khanbogd, located approximately 35 km to the northeast.

The current maintenance facilities support the plant and infrastructure, open pit construction and light vehicle fleets. The current fuel storage facilities will support the open pit and current plant and infrastructure configuration.

Information and communications technology provides control, monitoring, and communications systems. These facilities are provided within the plant, mine and infrastructure facilities.

Waste rock storage facilities and tailings storage facilities, together with the water supply and management assumptions and plans are provided in Section 20.

18.7 Power and Electrical

18.7.1 Power Supply

OTLLC currently sources power for the Oyu Tolgoi mine from China's Inner Mongolian Western grid, via overhead power line, pursuant to back-to-back power purchase agreements with Mongolia's National Power Transmission Grid JSC, the relevant Mongolian power authority, and Inner Mongolia Power International Cooperation Co., Ltd (IMPIC), the Chinese power generation company.

OTLLC is obliged under the Oyu Tolgoi Investment Agreement to secure a long-term domestic power source for the Oyu Tolgoi mine. On December 31, 2018, OTLLC and the Government of Mongolia entered into a Power Source Framework Agreement (PFSA) which contemplated the construction of a coal-fired power plant at Tavan Tolgoi, which would be majority-owned by OTLLC and situated close to the Tavan Tolgoi coal mining district located approximately 150 km from the Oyu Tolgoi mine.

In April 2020, the Minister of Energy notified OTLLC of the Government's decision to develop and fund a State-Owned Power Plant (SOPP) to be located at the Tavan Tolgoi coal fields instead of an OTLLC led plant, which would supply power to the Oyu Tolgoi mine and potentially other regional mines.

In June 2020, the Government of Mongolia and OTLLC amended the PSFA to reflect joint prioritization and progression of SOPP in accordance with and subject to agreed milestones. The agreed milestones in the amended PFSA include signing a power purchase agreement by March 31, 2021, commencement of construction by no later than July 1, 2021 and commissioning of SOPP within four years thereafter, and, negotiating an extension to the existing power import agreement by March 1, 2021.

If the milestones are not met as provided for in the amendment, then OTLLC will be entitled to select from and implement the alternative power solutions specified in the PSFA (as amended), including an OTLLC-led coal-fired power plant and a primary renewables solution, and the Government of Mongolia would be obliged to support such decision.

The first two PSFA amendment milestones (execution of the extension of the existing power import agreement and execution of the SOPP power purchase agreement) were not met by the original dates of March 1, 2021 and March 31, 2021, respectively. The Ministry of Energy has proposed to OTLLC that the milestones under the PSFA amendment be extended. OTLLC is engaging to agree to a standstill period following the lapsing of the milestones and to discuss the issue of domestic power supply at the sub-working group level. During the standstill period, OTLLC would not exercise its rights to select and proceed with an alternative power solution but would not waive its right to do so in the future.

OTLLC continues to collaborate with the Government of Mongolia to ensure a secure, stable and reliable long-term power solution is implemented with an immediate focus on extending the IMPIC supply arrangements.

18.7.2 On-site Distribution

Power is distributed through 220 kV/35 kV transformers which provide power to 35 kV substations to supply the concentrator ring loads, including primary crushing, conveying, and tailings pumping, some infrastructure loads, and the borefield loads. Both medium and low-level voltages are used for power distribution. Medium voltages are 35 kV, 10.5 kV, 6.3 kV, 3.3 kV, and 1.0 kV, all 3-phase and 50 Hz. Low voltages are 690 V and 400 V, both 3-phase, and 220 V, single-phase at 50 Hz.

18.7.3 Emergency and Standby Power Supply On-site Distribution

The diesel power station at Oyu Tolgoi site provides emergency and standby power. It comprises two 20 MW capacity generators connected to the 35 kV grid.

To improve reliability, OTLLC has stated that these generators will be replaced with self-contained, air-cooled diesel generators capable of load cycling to match the power demand.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

19.1.1 Supply and Demand Forecasts

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

Copper supply-demand fundamentals are expected to remain solid, with the market in a slight deficit during 2019–20 and a moderate surplus from 2021. Demand in the next five years, is expected to increase, supported by growth in ex-China Asia, a modest expansion in China, and a recovery in developed markets (USA and Europe). Despite the strong gains observed in the last decade, there remains scope for further growth in emerging markets driven by continued urbanization, industrial and infrastructure upgrade, and rising household incomes in the medium-to-long term.

Supply is expected to remain constrained until 2021, when new production from committed projects are expected to enter the market, resulting in a temporary oversupply. Later in the decade, however, a supply gap is expected to open as output from existing operations declines due to falling grades and resource depletion. The pace at which new projects (particularly greenfield projects) can be brought online is slow because of remoteness, high altitudes, lower grades, high capital intensity, social and environmental requirements, and other risks associated with the development of large-scale copper projects.

Consistent with strong demand fundamentals, refined copper consumption is expected to increase. China is expected to continue to dominate this market, but with its share of refined consumption declining from a peak of 50% in 2019 to 46% by 2030.

Total copper smelting production capacity is expected to increase, with China forecast to see most of the growth in the next five years. Historically, raw material constraints have resulted in low utilization rates at smelters and have exacerbated competition for concentrate in China, which relies largely on imported feed. This trend is expected to continue.

Chinese smelting capacity is expected to continue to expand through 2030, with several identified greenfield and brownfield projects, and China is expected to add more smelting capacity than the rest of the world put together. As the smelter capacity growth outpaces mine supply growth and competition for concentrate intensifies, it is likely the Chinese smelting industry will see some consolidation.

19.1.2 Sales and Marketing

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The Oyu Tolgoi Copper Concentrate Sales and Marketing group (CCSM) is responsible for all aspects of concentrate marketing and sales, including, updating product specifications, negotiating sales and logistics contracts, and analysing supply-and-demand trends in the Chinese and global markets. CCSM is supported by Rio Tinto's Copper Concentrate Sales and Marketing team.

19.1.3 Product Specification

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The 2021–2040 concentrate specifications of Oyu Tolgoi concentrate are listed in Table 19-1 and Table 19-2. The specifications are regularly updated to match the planned production schedule. CCSM communicates and discusses any specification changes with Oyu Tolgoi customers.

During the initial years of production, concerns were raised by customers regarding grade variability and the high gold content of the concentrate. These concerns are expected to continue in the short-term and are being addressed through smart scheduling and targeted placement, combined with active management of the product quality. Grade variability is expected to reduce significantly as production from Hugo North builds up, enabling higher-grade feed from the underground mine to be blended with ore from the open pit.

As underground production increases, the concentrate copper grade will increase to above 30%, making it more attractive to customers for blending with lower grade concentrates sourced from elsewhere. Gold content is also projected to decrease as underground production increases, making the concentrate more attractive to Chinese smelters.

Table 19-1: Specifications for Major Components of Oyu Tolgoi concentrate (2021–2040)

Element	Unit	Average	Minimum	Maximum
Cu	%	28.3	22.3	35.7
Au	g/dmt	8.3	2.4	41.0
Ag	g/dmt	51.5	35.2	67.9
As	ppm	2,244	951	4,700
F	ppm	673	549	800
Cd/Pb/Hg	ppm	Under review	Under review	Under review
Moisture	%	8.0	6.0	10

Note: Arsenic levels are managed to an internal limit of 4,700 ppm by either blending or internally recycling concentrate to meet the 5,000 ppm Chinese import limit. Lead (Pb), cadmium (Cd) and mercury (Hg) specifications are currently under review (Thomas et al., 2020).

Table 19-2: Specifications for Major Components of Oyu Tolgoi Concentrate (5-year averages)

Major Elements	Unit	2021–2025	2026–2030	2031–2035	2036–2040
Cu	%	27.1	34.0	28.4	26.5
Au	g/dmt	12.9	8.8	5.9	3.4
Ag	g/dmt	51.6	63.9	50.8	42.0
As	ppm	2,501	1,635	1,717	2,105
F	ppm	664	677	645	687
Cd/Pb/Hg	ppm	Under review	Under review	Under review	Under review

Note: Lead (Pb), cadmium (Cd) and mercury (Hg) specifications are currently under review (Thomas et al., 2020)

Impurity limits in concentrate smelted in China are issued jointly by the Ministry of Commerce and the Ministry of Environmental Protection. The mandatory standard, implemented in 2007, specifies the upper limits for impurities found in imported copper concentrate, as shown in Table 19-3. Copper concentrate with impurities content above these limits cannot be imported into China.

As indicated in Table 19-2, the arsenic and fluorine levels in the Oyu Tolgoi concentrate generally fall within Chinese national impurities limits shown in Table 19-3 (sourced from Chinese Standard GB 20424-2006). If there are any changes to these impurity limits, Oyu Tolgoi will take any necessary steps to ensure that the material produced complies with the requirements imposed by Chinese regulators. A detailed assessment and mitigation plan is underway to ensure this is achieved.

Table 19-3: Concentrate Impurity Limits Imposed by Chinese National Regulators

Element	Upper Limit (ppm)
As	5,000
Pb	60,000
F	1,000
Cd	500
Hg	100

19.2 Commodity Price Projections

Commodity pricing and smelter terms used in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020) were based on the 2020 Feasibility Study (Table 19-4), and are used in the Mineral Resource and Mineral Reserve estimates.

Commodity pricing and smelter terms used for the economic analysis are as outlined in Table 19-5.

19.3 Contracts

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The current marketing plan places more than 60% of concentrates on term contracts and the balance on spot contracts tendered to smelters or traders. The spot component allows for management of the variations in annual production, market dynamics, support potential trials with new customers, or to support of other marketing activities. The plan also provides some flexibility on volume shipped.

The term of the current contracts ranges from one to five years, which helps to reduce contract renewal risk from contracts expiring at the same time.

OTLLC currently has 13 long-term contracts and several spot agreements. The arrangements differ between entities with respect to commercial terms and length of contract. Smelter customers are based in various provinces throughout China, while trader customers allow Oyu Tolgoi concentrate broad and far-reaching uptake across China's many smelters.

Table 19-4: Commodity Pricing and Smelter Terms (Mineral Resources and Mineral Reserves)

Parameter	Unit	Long-Term Assumptions
Copper price	US$/lb	3.08
Gold price	US$/oz	1,292
Silver price	US$/oz	19.00
Treatment charges	US$/dmt conc.	84.00
Copper refining charge	US$/lb	0.085
Gold refining charge	US$/oz	4.50

Table 19-5: Commodity Pricing and Smelter Terms (economic analysis)

Parameter	Unit	Long-Term Assumptions
Copper price	US$/lb	3.25
Gold price	US$/oz	1,591
Silver price	US$/oz	21.08
Treatment charges	US$/dmt conc.	91.12
Copper refining charge	US$/lb	0.90
Gold refining charge	US$/oz	4.50
Silver refining charge	US$/oz	0.45

Rail capacity in China is expected to be constrained for the next 5–10 years, leading to delivery delays and increased Chinese transport costs as concentrate volume grows. To secure downstream logistics capacity, OTLLC is pursuing an agreement with Shenhua Logistics to provide rail services to eastern China. Shenhua owns the largest private rail network in China, including the line to the border crossing at Gashuun Sukhait–Ganqimaodao.

CCSM are responsible for the logistics strategy in China. Transportation from the mine to the bonded warehouse in China is the responsibility of the Oyu Tolgoi Operations.

Sales to customers are currently completed on a "deliver at place" basis at the Huafung bonded warehouse. Customers are responsible for transportation within China, with compensation for transport costs provided through a freight differential price adjustment. Where it makes sense, customers are being transitioned to a direct delivery model, where OTLLC pays for domestic transport in China and the freight differential is eliminated.

19.4 Marketing Strategy

OTLLC has developed a marketing strategy for the Oyu Tolgoi project, including their portion of the mineralization within the Entrée/Oyu Tolgoi JV property.

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

It is envisaged that the CCSM team will continue to oversee and execute all sales and marketing activities for OTLLC. A strategy has been developed by CCSM for marketing concentrate from Oyu Tolgoi that includes the following considerations:

- Customer attractiveness (financial situation, growth plans etc)
- Delivery point and terms
- Freight costs (e.g. mine to customer versus port to customer)
- Precious metals recovery and payment
- Length of contract
- Percentage of off-take to smelters versus traders
- Percentage on contract versus spot
- Percentage sales to any one smelter
- Number of customers for a given scale of operation
- Management of concentrate quality and volume during commissioning and ramp-up
- Alternate offshore logistics and costs.

In addition to the points listed above, the marketing strategy considers the contractual obligations of OTLLC under the Investment Agreement and the Concentrate and Power Supply Agreement (dated 3 November 2012) concerning smelting capacity developed within Mongolia or Inner Mongolia. In the case of a smelter being built in Mongolia, contractual obligations require OTLLC to provide concentrate for domestic smelting as a priority if requested by the Government of Mongolia and the terms should be mutually agreed. In the case of a smelter being built in Bayannoer, a city in western Inner Mongolia, contractual obligations will apply for supply of up to 25% of Oyu Tolgoi production at international terms no worse than those achieved elsewhere in the Chinese market. To date, no formal announcements have been made with regards to additional smelting capacity being built in Mongolia or in Bayannoer.

CCSM has established a customer database and conducts full marketing risk assessments each year, including contingency plans for customer default. Risk assessments are based on a number of factors, including contract value; OTLLC's exposure to a single contract; customer reliability, competence, performance, reputation and loyalty; the customer's potential for increased future sales; their commitment to safe production and product use; the cost of transport to the smelter; and the customer's technical ability to maximize the value of by-products.

The current marketing plan places more than 60% of concentrates on term contracts and the balance on spot contracts tendered to smelters or traders. The spot component allows for management of the variations in annual production, market dynamics, support potential trials with new customers, or to support of other marketing activities. The plan also provides some flexibility on volume shipped.

The term of the current contracts ranges from one to five years, which helps to reduce contract renewal risk from contracts expiring at the same time.

The smelter terms used in this Report are from the 2020 Feasibility Study as reported in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020) and BDT38.

Under the terms of the JVA (Article 12), Entrée retains the right to take the product in kind. For the purposes of this study, it has been assumed that Entrée takes control of their portion of the bagged concentrate and that the sales of concentrate will use the same approximate smelter terms, transport and other marketing costs as for the OTLLC concentrate.

19.5 Comments on Section 19

The QP did not review contracts, pricing studies, or smelter terms developed by OTLLC or their third-party consultants as these were considered by OTLLC to be confidential to OTLLC. Instead, the QP relied on summary pricing and smelting information provided by OTLLC within the 2020 Feasibility Study and BDT38. Based on the review of this summary information, the OTLLC smelter terms are similar to smelter terms for which Wood is familiar, and the metal pricing is in line with Wood's assessment of industry-consensus long-term pricing estimates.

The concentrates being produced for sale at any given time will be derived from a blend consisting of a minority of Hugo North Extension (Entrée-sourced) ore and a majority of OTLLC-sourced ore. The influence of Entrée's ore on concentrate composition and its influence on concentrate marketing will be minor.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Introduction

An Environmental and Social Impact Assessment (ESIA) was completed for the for Oyu Tolgoi mine, based on an assumed 27-year mine life. Activities that did not constitute part of the project for the purposes of the ESIA include

- Project expansion to support an increase in throughput rates
- Long-term project power supply.

A cumulative impact assessment was performed to assess impacts from further developments at Oyu Tolgoi together with other existing or planned projects, trends, and developments within the South Gobi region.

An environmental management system (EMS) is currently in place for operations.

20.2 Baseline and Supporting Studies

The Oyu Tolgoi environmental and social impact assessment was a comprehensive assessment of existing biophysical and human environment conditions pre-mining, addressed potential effects of the mine on biophysical and human environment, and specifically addressed biodiversity with plans to increase biodiversity overall in the region through offsets to areas adjacent to the mine.

20.3 Environmental Considerations/Monitoring Programs

20.3.1 Environmental and Social Impact Assessment

Holders of a mining licence in Mongolia must comply with environmental protection obligations established in the Environmental Protection Law of Mongolia (1995), Law of Environmental Impact Assessment (1998, amended in 2001) and the Minerals Law (2006). These obligations include preparation of an EIA for mining proposals, submitting an annual EPP, posting an annual bond against completion of the protection plan and submitting an annual environmental report.

OTLLC has posted environmental bonds to the Mongolian Ministry of Environment, Green Development and Tourism (MEGDT) in accordance with the Minerals Law of Mongolia for restoration and environmental management work required for exploration and the limited development work undertaken at the site. OTLLC pays to the Khanbogd Soum annual fees for water and road usage, while sand and gravel use fees are paid to the Aimag government in Dalanzadgad.

OTLLC has completed a comprehensive ESIA for the Oyu Tolgoi project, including the Entrée/Oyu Tolgoi JV property. The culmination of nearly 10 years of independent work and research carried out by both international and Mongolian experts, the ESIA identifies and assesses the potential environmental and social impacts of the project, including cumulative impacts, focusing on key areas such as biodiversity, water resources, cultural heritage, and resettlement.

The ESIA also sets out measures through all project phases to avoid, minimise, mitigate, and manage potential adverse impacts to acceptable levels established by Mongolian regulatory requirements and good international industry practice, as defined by the requirements of the Equator Principles, and the standards and policies of the International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), and other financing institutions. The IFC and the EBRD have similar, but not identical, definitions for the scope of an impact assessment. Both institutions frame assessments in terms of a project's 'area of influence'. The guidance provided by both IFC and the EBRD was utilised in defining the scope of the ESIA. The Oyu Tolgoi ESIA builds upon an extensive body of studies and reports, and Detailed Environmental Impact Assessments (DEIAs) that have been prepared for project design and development purposes, and for Mongolian approvals under the following laws:

- The Environmental Protection Law
- The Law on Environmental Impact Assessment
- The Minerals Law.

These initial studies, reports and DEIAs were prepared over a six-year period between 2002 and 2008.

The original DEIAs provided baseline information for both social and environmental issues. These DEIAs covered impact assessments for different project areas, and were prepared as separate components to facilitate technical review as requested by the Government of Mongolia.

The original DEIAs were in accordance with Mongolian standards and while they incorporated World Bank and IFC guidelines, they were not intended to comprehensively address overarching IFC policies such as the IFC Policy on Social and Environmental Sustainability, or the EBRD Environmental and Social Policy.

OTLLC has implemented and audited an EMS that conforms to the requirements of ISO 14001:2004. Implementation of the EMS during the construction phases will focus on the environmental policy; significant environmental aspects and impacts and their risk prioritisation; legal and other requirements; environmental performance objectives and targets; environmental management programs; and environmental incident reporting. The EMS for operations consists of detailed plans to control the environmental and social management aspects of all project activities following the commencement of commercial production from the open pit operations in the OTLLC ground holdings in 2013.

Following submission and approval of the initial DEIAs, the Government of Mongolia requested that OTLLC prepare an updated, comprehensive ESIA whereby the discussion of impacts and mitigation measures was project-wide and based on the latest project design. The ESIA was also to address social issues, meet the Government of Mongolia (legal) requirements, and comply with current IFC good practice.

For the ESIA the baseline information from the original DEIAs was updated with recent monitoring and survey data. In addition, a social analysis was completed through the commissioning of a Socio-Economic Baseline Study and the preparation of a Social Impact Assessment (SIA) for the project.

The requested ESIA, completed in 2012, combines the DEIAs, the project SIA, and other studies and activities that have been prepared and undertaken by and for OTLLC.

Certain facilities and operations were approved subsequent to 2012 (AMC, 2020), and to August 2020 these include:

- Waste management centre: 2014
- DEIA report of Oyu Tolgoi TSF project which included environmental issues related to the Oyu Tolgoi concentrate thickener underflow: 2014
- DEIA report of Tsagaan Khad to Oyu Tolgoi Road which included environmental issues associated with an 18.6 km-long road connecting Tsagaan Khad to Gashuun Sukhait
- DEIA of 93.8 km-long paved road connecting Khanbogd–Oyu Tolgoi–Javkhlant bag (constructed in 2018): 2016

- DEIA of use of Undai River sand deposit: 2018
- DEIA on OT hazardous landfill: 2020
- DEIA on OT chemical warehouse: 2020.

For the purposes of the ESIA, the 'project' constitutes the direct activities that are to be financed and/or over which the project can exert control and influence through the project design, impact management, and mitigation measures.

This includes:

- All Oyu Tolgoi project facilities within the Oyu Tolgoi ML area and surrounding 10 km buffer zone, including the following key features:
  - Open pit mining facilities
  - Underground mining facilities
  - Accommodation camps
  - Construction-related activities and facilities, including concrete batch plant, quarry, and laydown areas
  - Power generation facilities
  - Heating plant and boilers
  - Crusher
  - Concentrator
  - Tailings storage facility
  - Water management facilities (including diversion of the Undai River)
  - Waste water management facilities for camps and mining operations
  - Waste management facilities (municipal and industrial)
  - Waste rock storage facilities
  - Access roads within the Oyu Tolgoi ML area
  - Vehicle and equipment maintenance and repair facilities
  - Fuel storage facilities
  - Electrical power distribution infrastructure
  - Administration buildings and catering facilities
- Specific infrastructure facilities and disturbances within the Entrée/Oyu Tolgoi JV property may include:
  - Concrete batch plant and quarry
  - Permanent airport facility and temporary airstrip at Khanbumbat

  - Gunii Hooloi water supply pipeline
  - Drill pads
  - Road to border with China
  - Power lines

- Contractor accommodation camps adjacent to Khanbogd
- Potential dedicated off-site worker accommodation planned for Khanbogd
- Gunii Hooloi water abstraction borefield and the water pipeline supplying the mine, as well as maintenance roads, pumping stations, construction camps, storage lagoons, and other support infrastructure
- Infrastructure improvements (and associated resource use) by Oyu Tolgoi between the mine site and the Chinese border, including the 220 kV power transmission line, the access road that will be used for concentrate export, construction camps, local water boreholes, and borrow pits
- Dedicated border crossing at Gashuun Sukhait for the exclusive use of the Oyu Tolgoi Project
  - The concentrate will be sold by Oyu Tolgoi at the Mongolia–China border crossing at Gashuun Sukhait. The point of sale marks a key boundary to the project area
  - Infrastructure components that may be transferred to third-party ownership in the future.

A number of infrastructure components of the project considered within the ESIA will be constructed by OTLLC but may be transferred at some stage to public or third-party operation and/or ownership. Transfer of these infrastructure components to public operation and ownership will limit the degree of control that OTLLC can exert over their management and operation. These infrastructure components, which may be owned and operated by the Government of Mongolia, and will or may be used by members of the public and/or other commercial operations, include:

- The permanent airport, which is planned to be handed over to the Government of Mongolia after the completion of the project construction phase
- The road from Oyu Tolgoi to the Chinese border at Gashuun Sukhait, which follows the alignment for the designated national road and is planned to be handed over to the Government of Mongolia upon completion of the project construction phase

- The dedicated border crossing facility at Gashuun Sukhait, which will be operated by the Mongolian authorities
- The 220 kV electricity transmission line from the Chinese border to Oyu Tolgoi, was transferred to the Government of Mongolia in October 2015.

20.3.2 Future Project Elements Not Directly Addressed in the Environmental and Social Impact Assessment

In addition to the project elements identified above, certain other activities and facilities are expected to be developed over time, either as part of, or in support of, the project. These do not constitute part of the project for the purposes of the ESIA.

These include:

- Project expansion to support an increase in plant feed throughput from 100,000 t/d to 160,000 t/d
- Long-term project power supply. The main power supply is currently via a dedicated 220 kV overhead power line from the Inner Mongolian electricity grid in northern China, (D'Appolonia S.p.A., 2016).

While the impacts of these project elements and their mitigation and management are not directly addressed in the ESIA, they are considered in the cumulative impact assessment of the ESIA.

20.3.3 Management Plans

The management plans developed for the Oyu Tolgoi project address the management of health, safety, environment, and social aspects associated with the project. The management plans form part of the mine's Integrated Health, Safety, Environment and Community Management System (HSECMS). The HSECMS has been audited and is certified to ISO 14001 and OHSAS 18001.

20.3.4 Water Usage

Minimizing water use throughout all the operational aspects has been a key focus of attention during mine planning and design. Ongoing attention to water conservation will be maintained during operation through the continuous review of key performance indicators for water use and implementation of additional water conservation measures.

Oyu Tolgoi averages 0.39 m^3 of water per tonne of ore processed in 2019 (AMC, 2020). The water used by Oyu Tolgoi comes from a deep and saline aquifer and has no impact on drinkable water in the region. In 2019 water used by Oyu Tolgoi was continuously recycled at an average rate of 87.2% (AMC, 2020).

20.4 Stockpiles

No stockpile facilities are envisaged within the Entrée/Oyu Tolgoi JV Project area for the planned underground mining operations.

20.5 Waste Rock Storage Facilities

No waste rock facilities are envisaged within the Entrée/Oyu Tolgoi JV Project area for the planned underground mining operations.

20.6 Tailings Storage Facility

20.6.1 Introduction

Site selection of the TSF was based on consideration of such aspects as local topography, location/elevation relative to other project facilities, required storage capacity, potential environmental impacts, water conservation, and the potential for future tailings storage facility expansion. Central or perimeter discharge, paste tailings, and conventional thickened tailings deposition methods were all evaluated. Due to the flat topography, the design required the construction of a perimeter embankment to retain the tailings within a "basin."

The existing TSF is 2 km east of the open pit, and 5 km southeast of the process plant. Conventional thickened tailings are currently deposited in Cell 1 of the planned TSF.

20.6.2 Operating Assumptions

To support the production in the first 20 years, the tailings storage facility (TSF) is planned to consist of two cells, each approximately 4 km^2 in size, with a total storage capacity of about 720 Mt, assuming an average settled dry density of 1.6 t/m^3 (Oyu Tolgoi operational observation and survey measurement over time). The facility will be constructed in two major stages, starting with Cell 1 and then continuing with Cell 2. Construction of Cell 1 started in 2011, and the operation started in 2012 after the completion of the Cell 1 starter dam. The embankments of Cell 1 have been raised annually to provide required tailings storage volumes. Embankment construction and tailings depositions will transition to Cell 2 when Cell 1 reaches its full capacity in ~2023. The general arrangement of the cells is shown in Figure 20-1.

As of June 30, 2019, about 213 Mt had been placed in Cell 1, which has a remaining capacity of approximately 176 Mt. The cell embankment had reached 50 m in height and is planned to reach its final height of about 70 m in ~2023.

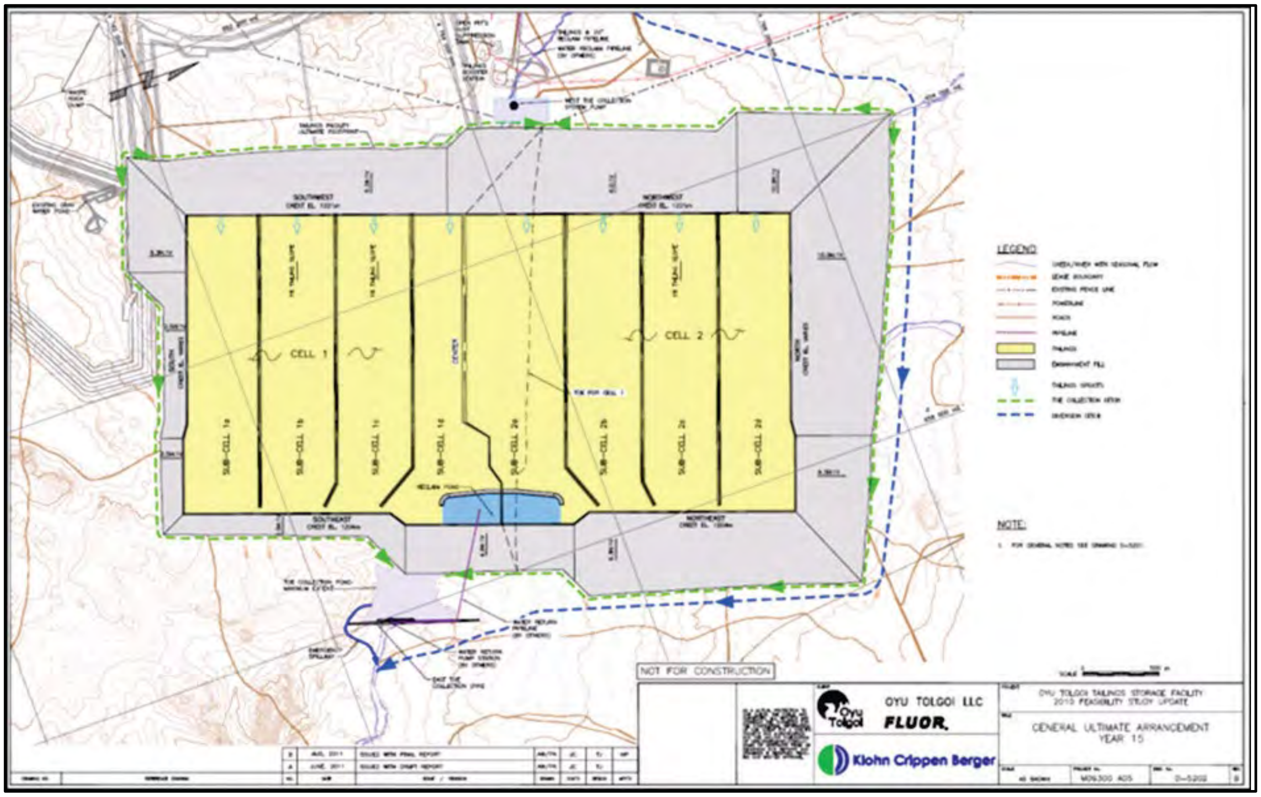
Each cell will be divided into four parallel sub-cells by berms. These berms, or 'splitter dykes', will constrain the active tailings beach to one sub-cell. Supernatant water will run down the active beach to the eastern embankment and flow from there to one of two reclaim ponds situated on the northeast corner of Cell 1 and southeast corner of Cell 2. The two reclaim ponds may be combined in future by eliminating the central north embankment of Cell 1.

The original impoundment design is based on the assumption that the tailings beach will slope from the deposition point to the reclaim pond at an average of 1%. An overall tailings beach slope of about 0.6% to 1% was recently reported. At flatter beach slopes, the eastern dike must initially be raised more quickly (while the western dike is raised more slowly). Likewise, flatter beach slopes tend to correspond to lower placed tailings density, which requires the embankments to be raised more quickly. Rates of rise since 2015 reduced, likely due to tailings consolidation.

20.6.3 Impoundment Layout

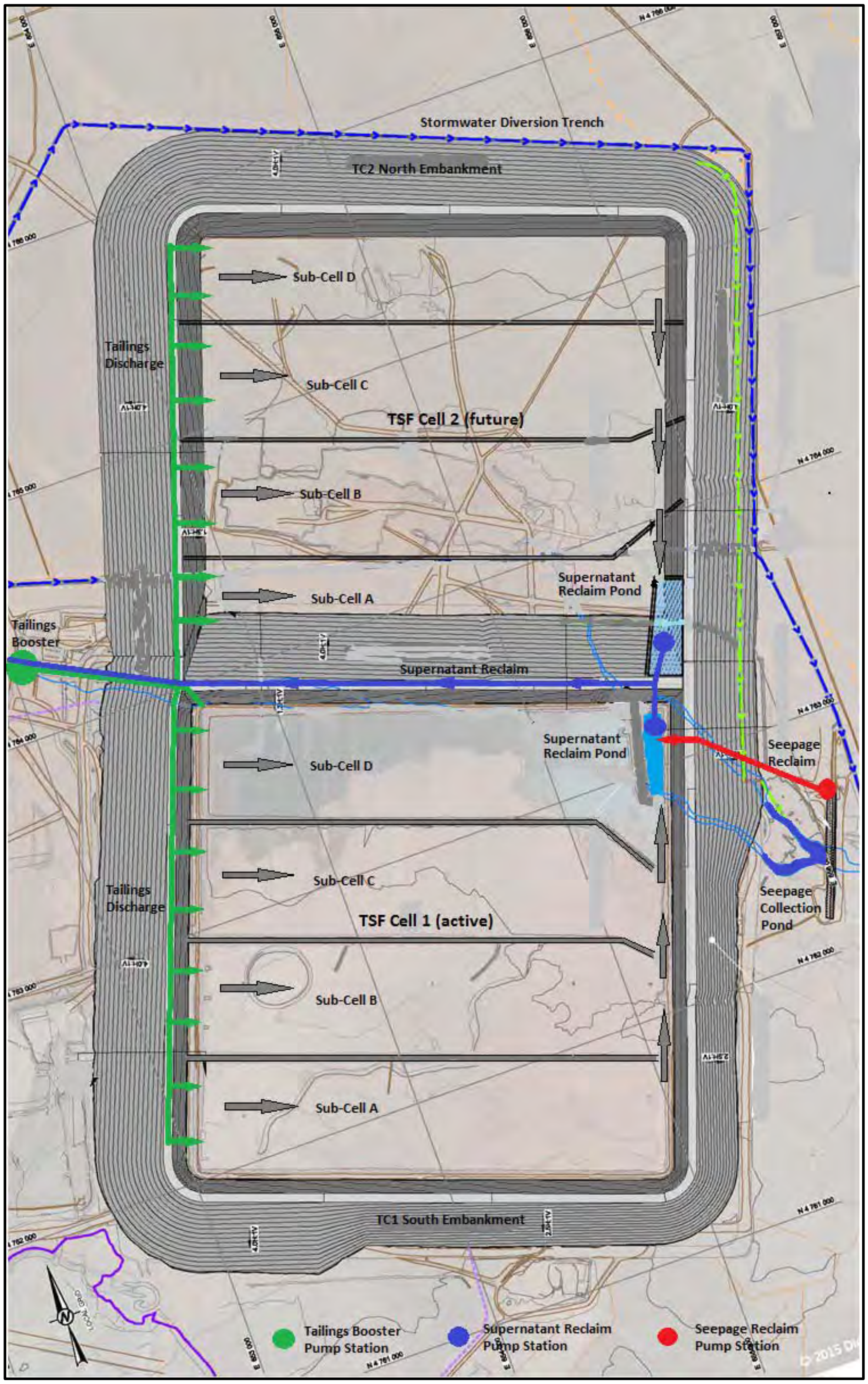
The impoundment layout for the TSF is shown in Figure 20-2 and comprises two 2 km x 2 km cells (Cell 1 and Cell 2), each subdivided into four sub-cells (A through D), with up to 70 m high embankments enclosing the four sides of the impoundment. Cell 1 is currently in operation.

Figure 20-1: General Arrangement of Cells 1 and 2



Note: Figure from the 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Figure 20-2: TSF Cell 1 and 2 Layout Plan



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

The 2020 Feasibility Study fully defines the development of two initial cells, which are sufficient for the first 20 years of mine operation and identifies conceptual locations for two additional cells that can be used over the remaining mine life. After the first 20 years of production, the plan is to construct two more cells located east of Cell 1 and Cell 2 to store additional tailings.

20.6.4 Design Considerations

Based on the Australian National Committee on Large Dams (ANCOLD) design guidelines and a "High A" consequence classification, the following notable hydrological/geotechnical design criteria have been adopted (Golder, 2019a):

- Floods: to accommodate the one-in-10,000 annual exceedance probability (AEP) 72 hour rainfall event
- Contingency freeboard to contain the one-in-50 (2%) AEP wind wave run-up
- Freeboard: additional freeboard of 0.5 m above maximum operating level
- Earthquakes: maximum credible earthquake (MCE) with peak ground acceleration of 0.31*g*, based on a M7 Richter scale earthquake at the Tavan Takhi Fault, located 18 km from the TSF. MCE corresponds to a 5,000-year-return-interval seismic event
- Slope stability:
  - Factor of safety > 1.5 in "long term drained, consolidated undrained and end of raise (loss of containment" case
  - Factor of safety > 1.3 in "end of raise undrained (no loss of containment)" case
  - Factor of safety > 1.0 to 1.2 for "post seismic" case*.

(*Note: For factors of safety ranging from 1.0 to 1.2 in the "post-seismic" case, deformation analysis is required to demonstrate dynamic stability, or no loss of structural integrity and serviceability, where freeboard is retained and filter layer remain functional).

20.6.5 Embankment

The TSF embankment is constructed of zoned, locally-sourced earth materials, which form the inner inclined clay core/filter layers, and of open pit mine waste rock, which forms the main embankment shell. The TSF embankment is raised each year using a downstream methodology to ensure that sufficient storage capacity for ongoing tailings deposition, with flood storage and freeboard, is retained at all times.

The perimeter or confining embankments are configurated as "wet" and "dry" zones. The wet zone of embankments is constructed in the area where water is present the majority of the time while the dry zone is constructed around the remaining of the TSF. The overall downstream slope along the wet zone of perimeter embankments and where the embankment is founded on the clay foundation was changed from 4 horizontal (H):1 vertical (V) to 5H: 1V (Golder, 2018a; Golder, 2019a); the overall downstream slope of the other dry zone remains as 4H: 1V.

To date the rate of tailings rise has been approximately ~5.7 m/a, which may change in relation to any change of mine production and/or tailings characteristics. Some amelioration in the rate of tailings rise is expected over time as the overall depth of tailings increases in each cell, causing ongoing consolidation of previously placed tailings.

20.6.6 Tailings Deposition

The TSF receives thickened tailings (with about 60% solids content by weight) from the tailings thickeners at the Oyu Tolgoi concentrator via dual overland HDPE pipelines, which are directed to a tailings booster pump station adjacent to the TSF. From the booster pump station, the tailings are pumped through overland conveyance pipelines to spigots installed on the west embankment of the TSF for discharge into discrete sub-cells. The tailings within each sub-cell are confined by splitter dykes and form a beach inclining toward the east where a supernatant reclaim pond is located. A floating barge pump station returns all supernatant reclaim water to the main process water pond at the concentrator for reuse.

20.6.7 Water Considerations

The TSF is designed and operated in a manner that aims to minimize water loss. To achieve this, the TSF is constrained in area, resulting in a high rate of rise. The TSF is further subdivided into sub-cells, with one active cell generally operating at any given time. This allows inactive cells to consolidate and dry and helps ensure that only one wet sub-cell is exposed to evaporation. The supernatant water reclaim pond is restricted in size to minimize evaporation from this exposed water body.

Seepage from the base of the TSF is controlled by native clay where presented, and, where not presented, by establishing a 1m layer of compacted clay with surrounding cut-off. Any seepages from the TSF are collected in a trench and conveyed to a seepage collection cut-off dam, from where they are returned by pump to the main reclaim pond within the TSF for return to the concentrator. The TSF is isolated from the surrounding environment by a perimeter seepage collection drainage channel that conveys seepage originating from the TSF to a seepage collection cut-off embankment, from where it is returned to the TSF. In addition, a run-on diversion drainage channel conveys occasional surface water originating from the upstream Budaa and Khaliv ephemeral streams and surrounding catchment areas to the downstream Budaa stream bed.

20.6.8 Monitoring Considerations

Vibrating wire piezometers were installed under the embankment of Cell 1. These enable changes in pore water pressure in the clay to be measured when the clay is being loaded during embankment construction and tailings deposition. The geotechnical strategy for ongoing development of the TSF is based on "reasonable conservatism" requiring an "observational approach" during construction, whereby ongoing monitoring provides data that support the design and helps identify opportunities for further optimization (and, if needed, a response to adverse data). Moreover, Oyu Tolgoi installed multiple inclinometers to monitor slope movement of perimeter dykes and potential deformation of foundation clay layers.

ATC Williams is currently in the process of improving the Cell 2 design and assessing alternative tailings disposal strategies to revisit needs for and conceptual designs of Cell 3 and Cell 4. ATC Williams (2020) completed the Cell 1 Embankment Raise 7 Design and suggested additional activities of investigation, monitoring and foundation dewatering which include, (1) cone penetration testing with pore pressure measurements (CPTu) along the toe of the Cell 1 northern embankments and northern portion of the eastern embankments; (2) reassessment of liquefaction potential of foundation materials based on the new CPTu data; and, (3) installation of additional pressure relief wells along the north embankment toe. It is crucial to implement these activities following the recommendations of ATC Williams.

20.7 Water Supply

20.7.1 Gunii Hooloi Aquifer

The Gunii Hooloi basin extends 35 km to 70 km north of the Oyu Tolgoi site (refer also to discussion in Section 18).

Based on the first two hydrogeological investigation programs, the Gunii Hooloi aquifer has been demonstrated and approved by the MEGDT to be capable of providing 870 L/s, based on usage over 40 years and with limitations on drawdown that ensure that the main body of the aquifer remains in confined conditions.

Updated hydrogeological modelling, completed in 2013, and based on all three hydrogeological investigation programs, demonstrates that the Gunii Hooloi aquifer is capable of providing 1,475 L/s, based on the same time and drawdown conditions. Modelling also indicates that there is limited potential for connection between the shallow streambed aquifers and the deeper Gunii Hooloi aquifer (ACM 2020).

OTLLC noted in 2016 (Peters and Sylvester, 2016), that hydrogeological analytical studies and reporting to Mongolian norms remained to be completed in order to demonstrate and gain approval from the MEGDT of updated approved water reserves for the Gunii Hooloi aquifer.

20.7.2 Raw Water Distribution and Use

Water demand for the Oyu Tolgoi facilities has been calculated at between 588 L/s and 785 L/s, with an average yearly demand of 696 L/s, to meet a production rate of 100,000 t/d. The primary source of raw water to meet these requirements is the Gunii Hooloi basin.

Most water losses are from the TSF, primarily associated with interstitial water locked in the settled tailings, but also due to evaporation. Additional water losses result from dust control. Minor water losses relate to construction activities (e.g., concrete production), infrastructure maintenance (e.g., heating system make-up), and unrecoverable water from domestic water use (Thomas et al., 2020).

Water from groups of individual bores accumulate into five centrally located collection tank pump stations, from which water is pumped into the main water line leading to the Oyu Tolgoi site. Water is pumped into a 400,000 m^3 emergency storage lagoon (two cells, 200,000 m^3 each) situated on elevated ground approximately 5 km north of the Oyu Tolgoi plant site. Water is gravity-fed to the site through two pipelines from the two cells.

A permanent water treatment and bottling plant has been constructed to treat raw water from the Gunii Hooloi borefield to drinking (potable) and domestic water standards. Raw water distribution from the borefield lagoon to the site and throughout the site is designed as a gravity flow system. Two DN900 ductile iron pipes deliver raw water from the lagoon to the concentrator water tank, then to individual buried pipes that convey water to other functional areas of the site; pipe burial depth is 2.5 m. Raw water is provided to the concentrator, the main camp area, (including the water treatment plant), the production shaft farm, the central heating plant, the warehouses, the open pit and central maintenance truck shops, and the primary crusher. Raw water will be provided to the underground mine for makeup and other services during construction and operations. Local flowmeters are provided to monitor raw water consumption in each area.

The borefield lagoon for raw water storage is about 4.5 km away from site. The lagoon can hold 400,000 m^3 of water to provide approximately one week of emergency/buffer storage in case of any interruption in the supply of water from the borefield.

20.7.3 Undai River Diversion Works

Under natural conditions, the Undai River runs southeast and south of the Oyut open pit. Subsurface flow in the river channel is constant, but surface flows are also present occasionally, though usually only after heavy rainfall. There can be large floods in the river channel. Because of its proximity to the open pit, the river has been diverted. The river diversion system consists of three components: a dam, diversion channel, and subsurface diversion.

20.7.4 Raw Water Management Plan and Water Conservation

Due to low average annual precipitation in the project area, water management and conservation are given the highest priority in all aspects of project design. Minimising water use throughout all the operational aspects has been a key focus of attention during mine planning and design. Ongoing attention to water conservation will be maintained during operation through the continuous review of key performance indicators for water use and implementation of additional water conservation measures.

The development of a borefield to access groundwater reserves within the Gunii Hooloi aquifer basin has been established as the most cost-effective option to meet the raw water demand for the Project. Water from the borefield is used for process water supply, dust suppression in the mining areas, and potable use. Another major component of the water management plan is the diversion of the Undai River to accommodate project facilities. Undai River water is not used by the mine; the diversion is to preserve this water in the environment.

OTLLC has affirmed it is committed to water conservation and has benchmarked its water conservation efforts against other mines by assessing factors such as quantified water consumption per tonne of concentrate produced. The predicted water demand estimation is 670 L/sec at the peak production rate of 105,000 kt/d with average of 628 L/sec. Water usage is 30 L/s for the underground mine and 628–670 L/s for the process plant (2020 Feasibility Study, Chapter 8). The water consumption compares favourably with other large operations in similar arid conditions.

20.8 Closure Plan

Current closure planning is based on a combination of progressive rehabilitation and mine design and operation schedule and plans. The Oyu Tolgoi Mine Closure Plan for OTLLC was completed in June 2012 and updated in 2014, and is based on the design status at that time.

OTLLC plans continuous development of environmental monitoring plans, including proposed activities and schedules, to ensure that environmental parameters meet the criteria, standards, and limits laid out in the EIA and EPP. In accordance with Mongolian Law, OTLLC has stated that it intends undertake monitoring at its own expense using approved methods and accredited facilities. The monitoring permits procedures and activities would be adjusted and/or modified as necessary to ensure optimal environmental protection.

Progressive reclamation will be performed on any areas of the mine site where it is deemed practical to do so and with consideration of the need to preserve future mine expansion options. Disturbed areas that are no longer used in the active operation will be technically and biologically rehabilitated concurrently with ongoing mining operations, as practicable. There are potential opportunities for local communities and herder groups to participate in the implementation of several progressive rehabilitation measures that could result in economic benefits and capacity development for those involved.

By the end of 2019, 1,663 ha of land had been progressively rehabilitated, and was handed back to local government out of a total of 6,036 ha of land affected by the mining operation. Physical and biological rehabilitation phases have been fully completed on 466 ha (Thomas et al., 2020).

OTLLC will also pursue opportunities for local communities and herder groups to participate in the implementation of progressive rehabilitation measures that could result in economic benefits and capacity development for those involved (Thomas et al., 2020).

Parameters that will be monitored during the closure and post-closure phases of the mine, to characterize both physical and chemical stability of the project area and the environmental impact of the project, will include:

- Surface water and groundwater quality
- Physical stability of tailings deposits
- Physical stability of the river water diversion dike, waste rock dumps, drainage ditches, and concrete shaft/raise caps
- Isolation of open pit voids and unfilled subsidence zones, including status of open water and erosion controls
- Success of indigenous revegetation, including remediation as required until proven to be self-sustaining
- Condition of groundwater monitoring wells, piezometers, survey monuments, and other instrumentation
- Seepage rates to the adjacent groundwater aquifer from all monitoring wells
- Effectiveness of dust control measures on waste rock, tailings storage facility, and other waste areas with specific attention to potential wind-blown contaminant sources.

20.9 Permitting

The Mongolian Minerals Law (2006) and Mongolian Land Law (2002) govern exploration, mining, and land use rights for the Oyu Tolgoi project. Water rights are governed by the Mongolian Water Law and the Mongolian Minerals Law. These laws allow licence holders to use the land and water in connection with exploration and mining operations, subject to the discretionary authority of Mongolian national, provincial, and regional governmental authorities as granted under Mongolian law.

OTLLC has studied and continues to study the permitting and approval requirements for the development of the Oyu Tolgoi project including the Entrée/Oyu Tolgoi JV property, and maintains a permit and licencing register.

OTLLC personnel, working with the Mongolian authorities, have developed descriptions of the permitting processes and procedures for the Oyu Tolgoi project, including the underground development of the Entrée/Oyu Tolgoi JV property.

OTLLC has stated that permits have been obtained for underground mining (OTLLC, 2016f).

The Oyu Tolgoi Property comprises five mining licences held by Oyu Tolgoi LLC and Entrée LLC, a subsidiary of Entrée Resources Ltd., formerly known as Entrée Gold Inc. The mining licences provide rights to the holders to explore, develop mining infrastructure, and conduct mining operations at Oyu Tolgoi.

Oyu Tolgoi LLC owns 100% of three licences; MV-006708 (the Manakht licence), MV-006709 (the Oyu Tolgoi licence), and MV-006710 (the Khukh Khad licence) while legal title to MV-015226 (the Shivee Tolgoi Licence) and MV-015225 (the Javkhlant Licence) is currently held by Entrée LLC (AMC, 2020). Based on Wood review of Mahoney Liotta draft advice letter dated 18 January 2021 all Entrée mining licences are in good standing.

20.9.1 Water

Self-discovered water resources are required to be made available for household purposes. However, the Investment Agreement confirms that OTLLC holds the sole rights to use these water resources for the project.

On 17 October 2014, a water use permit for 25 years was issued to OTLLC. In June 2016, OTLLC entered into a utilization agreement with a water agency of the Government of Mongolia for 25 years (until June 2040). Together with water use conclusions issued annually and the approved water reserve rate, these arrangements enable OTLLC to use the amount of water that will be required to develop the project.

The Law on Water and the Investment Agreement both provide that the term of water use permits for exploiting mineral deposits of strategic importance is be the same as the term of mining licenses; therefore, OTLLC considers that it is entitled to extensions of its water permit and water utilization agreements for subsequent 20-year periods as its mining licenses are renewed.

20.9.2 Airstrip

OTLLC has the right to construct, manage, and use an aerodrome in connection with the project, based on permits issued in accordance with Mongolian law. A permanent domestic airport, capable of servicing Boeing 737-800 series aircraft, has been constructed at Oyu Tolgoi to support the transportation of people and goods to the site from Ulaanbaatar. It also serves as the regional airport for the Khanbogd soum.

20.10 Considerations of Social and Community Impacts

20.10.1 Studies

A social analysis was completed through the commissioning of a Socio-Economic Baseline Study and the preparation of a SIA for the project.

The cumulative impact assessment examined geographical areas, communities, and regional stakeholders that could be subject to cumulative impacts from further developments at Oyu Tolgoi together with other existing or planned projects, trends, and developments within the South Gobi region. Areas evaluated included:

- Macro-economic impacts across the Mongolian economy
- Impacts on communities and infrastructure in the South Gobi region related, for example, to influx, economic changes, and pressure on infrastructure. Specifically, within Ömnögovi aimag, this includes the soums of Khanbogd, Bayan Ovoo, Manlai, and Tsogttsetsii and the aimag capital, Dalanzadgad
- Biodiversity impacts related to the fragmentation of ecosystems by roads and other infrastructure
- Impacts on water resources in terms of both shallow aquifers for herder water supplies and deep aquifers for potential industrial water supplies

20.10.2 OTLLC Corporate Policies

Corporate commitment to sound environmental and social planning for the project is based on two policies:

- Turquoise Hill's Statement of Values and Responsibilities (March 2010), which declares its support for human rights, social justice, and sound environmental management, including the United Nations Universal Declaration of Human Rights (1948);
- The Way We Work 2009, Rio Tinto's Global Code of Business Conduct that defines the way Rio Tinto manages the economic, social, and environmental challenges of its global operations.

20.10.3 Community Management Responsibilities

At OTLLC, social and community management are directly under the Chief Operating Officer (COO), who is separate from the Mine General Manager. The COO is responsible for pastureland and livelihood development, community and social performance, community assistance and partnership, and compliance and governance.

20.10.4 Community and Social Management Considerations

Community and social management plans, procedures and strategies have been developed by OTLLC for the following:

- Community health, safety and security
- Grievance and fair treatment procedure
- Pastureland and livelihood improvement strategy
- Resettlement Action Plan
- Stakeholder Engagement Plan
- Cultural Heritage Management Plan.

The surrounding community (predominantly herders) and local government are kept fully informed about mine developments and provide input and review of implementation of plans, procedures and strategies that directly affect them.

21.0 CAPITAL AND OPERATING COSTS

21.1 Introduction

The estimates included in the Turquoise Hill Technical Report (Thomas et al., 2020) that were derived from the 2020 Feasibility Study were modified from the 2020 Feasibility Study estimates by the exclusion of all costs prior to January 1, 2021. All capital costs are expressed in Q1 2020 US dollars with no allowances for currency fluctuations or interest during construction. Likewise, operating costs are expressed in real 2020 US dollars; therefore, they do not include escalation. The overall cost estimates presented in this section are from the Turquoise Hill Technical Report (Thomas et al., 2020).

21.2 Capital Cost Estimates

21.2.1 Summary

The overall capital cost and sustaining cost estimates are from the 2020 Feasibility Study for (Hugo North)/Hugo North Extension Lift 1, and are summarized in Table 21-1. The capital cost estimate represents the overall development for the Hugo North/Hugo North Extension Lift 1 underground mine, supporting shafts, the concentrator conversion project, and the infrastructure expansion project.

Wood reviewed the 2020 Feasibility Study overall capital cost and sustaining capital cost estimates for the Phase 2 expansion associated with Hugo North/Hugo North Extension Lift 1, and then proportioned the cost estimates to the Entrée/Oyu Tolgoi JV and to Entrée's 20% attributable portion based on the JVA. The proportioned estimates and an explanation of how the capital was proportioned are provided in Section 22 of this Report.

The capital cost estimate includes the costs associated with the engineering, procurement, construction management (EPCM) and Owner's project costs, and includes value-added tax (VAT) and duties. The total estimated capital cost to design, procure, construct, and commission the complete expansion, inclusive of an underground block cave mine, supporting shafts, concentrator conversion, and supporting infrastructure expansion, is US$7.358 billion which includes US$505 million in pre-restart capital.

Table 21-1: Overall Capital Cost Estimate (US$ billion)

Description	Phase 2		
	Pre-restart (US$M)	Post-restart (US$M)	Total Phase 2 (US$M)
Underground Mine (Hugo North Lift 1)	270	2,735	3,005
Site Development	0.0	0.0	0.0
Concentrator Modifications	8	159	167
Utilities & Ancillaries	0	149	149
Offsite Facilities	0	159	159
Subtotal Direct Costs	*278*	*3,202*	*3,480*
Indirect Costs	131	1,432	1,563
Owner's Costs	96	2,039	2,135
Escalation, Growth, ForEx, Contingency	0	179	179
Subtotal Indirect Costs	*228*	*3,650*	*3,877*
Total	***505***	***6,852***	***7,358***

Notes: Phase 2 Project estimate base date is 2020. Totals may not sum due to rounding.

The sustaining capital cost estimate for Hugo North/Hugo North Extension Lift 1 including closure costs is $US5.945 billion (US$9.30/t processed.

21.2.2 Basis of Estimate

The overall capital cost estimate for Hugo North/Hugo North Extension Lift 1 was developed to a feasibility study level by OTLLC using the Rio Tinto Project Services Estimating Guidelines. In consideration of the current state of design and estimate pricing basis, the accuracy of the overall estimate with contingency is expected to be within +20/-20% of the final project costs. OTLLC advised that the estimates of capital cost and schedule are central estimates, having an equal probability of overrun as underrun. This is consistent with the AACE Class 3 feasibility level definition.

The 2020 Feasibility Study estimates include contingency and were based on nominal Q1 2020 US dollars. The estimates for each major component cover:

- The direct field cost of executing the Project
- Indirect cost associated with the design, construction, and commissioning of the new facilities

- Mongolian customs duties, Mongolian VAT
- Some allowances for contingency.

The overall cost estimate presented in this sub-section is from the 2020 Feasibility Study.

21.2.3 Project Execution Plan

The Project execution plan key outputs from the 2020 Feasibility Study included:

- Project management and delivery strategies
- Contracting plan and list of major installation packages
- Level 1 Project Master Schedule.

In summary, the project execution plan management plan in the 2020 Feasibility Study entailed the following strategy:

- The Owner's team will be directly responsible for the overall program management and will establish the project governance, overall execution plan, systems and procedures to be adopted across the project to ensure the overall business drivers are delivered
- The Owner's team will manage overall project interfaces between the project and external stakeholders along with internal interfaces between the mining contractors, EPCM, and existing site operations
- An Owner's team will focus on the execution of the underground mine development, conveyor-to-surface decline development, and shaft excavation. The Owner's team will comprise Owner's team personnel from OTLLC and Rio Tinto, and service providers
- OTLLC Operations will provide common services to the Owner's team where capability exists, such as information technology (IT) infrastructure, finance, procurement, human resources, health, safety, and environmental, and training
- An internationally-recognized EPCM company will be engaged to deliver the capital portion of Owner's, excluding the underground development, conveyor-to-surface decline, and shaft sinking activities.

21.2.4 Underground Mining and Shafts

The scope in this area from the 2020 Feasibility Study covered the following:

- Surface construction: This includes the design and construction of underground mine surface support facilities such as the mine dry, overland conveyors, and supporting utilities, but not shaft-sinking or equipping of the shafts
- Shafts 2, 3, 4, and 5: the scope of work for the shafts is defined largely by issued-for-construction design, and pricing is from awarded contracts and purchase orders or firm bids. Capital costs for the shafts include the detail design and construction of all structures, utilities, materials, equipment, shaft-sinking as well as all associated indirect and management costs, and contractor and engineering support to commission the facilities
- Underground construction: This includes design and construction of all underground facilities including crushing, materials handling to the surface portal transfer station, underground workshops and offices, and supporting utilities
- Underground development: This includes the horizontal and vertical development for underground mine access and ventilation as well as the mass excavations for receiving the constructed facilities. Shaft logistics, waste rock handling, drawpoint construction, and haul road construction are also included. Mine development crew numbers will increase over time as the constructed underground ventilation system is progressively commissioned
- Capitalized operating costs: This includes capital construction and development proceeding to first ore production. As OTLLC owns the development equipment, the capitalized operating costs include maintenance as well. There will also be capitalized operating costs for mine management, technical services groups, administration, safety, and training activities, hoisting, haulage, equipment and other costs prior to first underground ore production.

21.2.5 Concentrator Conversion

Conversion of the Phase 1, 100 kt/d capacity, concentrator to efficiently process underground ore included the following in the 2020 Feasibility Study:

- One ball mill
- One rougher flotation line
- Six flotation columns
- One concentrate thickener

- Two concentrate filters
- Four concentrate bagging modules
- Associated minor equipment, engineering, and other indirect services.

21.2.6 Infrastructure Expansion

The scope in this area from the 2020 Feasibility Study covered the following:

- Central heating plant expansion: two 29 MW coal-fired boilers and two 7 MW diesel-fired backup boilers
- Operations camp expansion
- Operations warehouse expansion
- Development of a road mitigation strategy to respond to animal issues on the OT–GSK road to China
- Permanent road from Oyu Tolgoi to Khanbogd
- Expansion of three logistics centres at the Oyu Tolgoi site, Gashuun Sukhait, and Hua Fang
- Extensions of related backbone utilities, engineering, and other indirect services.

21.2.7 EPCM Services

The scope of EPCM services from the 2020 Feasibility Study included the following:

- Project management of the surface and underground facilities (excludes shaft-sinking and lateral development activities), including:
  - Engineering management
  - Project control services
  - Contract administration
  - Materials management
  - Construction management
  - No-load commissioning.

21.2.8 Owner's Costs

The scope in this area from the 2020 Feasibility Study covered the following:

- Overall program management of the complete Phase 2 works
- Government permit applications
- Customs/border management
- Construction insurances
- Interface management with the Operations group
- Overall engineering and construction management of the underground lateral and vertical development, including underground mass excavations and shaft-sinking.

21.2.9 Estimate Assumptions

The 2020 Feasibility Study noted that the following estimate assumptions were excluded from schedule contingency analysis, and states that if they could not be achieved, the Project schedule could be delayed and/or execution duration extended. On a project of this magnitude, time-dependent costs, e.g., overheads, equipment rental etc., could be considerable:

- All permissions required to initiate the project on time will be received without incurring additional cost or affecting the schedules
- Transportation access from point of manufacture to the project site, including the border crossing, will be unrestricted.

21.2.10 Currency and Commodity Rates

For consistency of estimating and conversion of native currency costs to the US dollar reporting currency, fixed rates of currency exchange and key project commodities were established in the 2020 Feasibility Study and applied across all source estimates. Currency exchange rates used between the USD, the Mongolian Tugrik (MNT), and Chinese Yuan (RMB) were varied (MNT 1,990/US$ - MNT 2,618/US$ and RMB 6.29/US$ - RMB 6.9/US$, respectively).

The commodity rate assumptions are shown in Table 21-2. The estimate does not provide for variations in the exchange rates.

21.2.11 Sustaining Capital

Sustaining capital costs were estimated in the 2020 Feasibility Study for tailings, processing, and underground mining, and infrastructure/other. Table 21-3 shows the sustaining capital cost for each area on a dollar-per-tonne processed basis, and the following sub-sections describe the basis for the cost estimates.

Tailings Storage Facility Construction

Potentially-acid forming mine waste was used for construction of the major tailings embankment structure, the downstream shell. Of the total amount of embankment material, 70%–80% consisted of mine waste placed by the mine fleet, and so was included in the open pit haulage estimate. Allowance was made for dozing mine dumped material to achieve the final contour. Other mine waste requiring controlled placement was to be delivered to a stockpile located between the pit and Cell 1 and was then to be reloaded and hauled to the TSF by a fleet of 100 t trucks.

Concentrator

Costs were included for replacement of the concentrator support mobile equipment, and mobile equipment supporting the construction of the tailings dam. Replacement was based on the operating life of each piece of equipment, which varies from 10–15 years.

Costs were included to replace the fixed processing plant equipment after it is no longer feasible to maintain its designed function. Replacement costs were based on 0.5% per annum of the initial capital value.

An allowance was included to modify the expanded process streams after commencement of their operation. Most process plants typically require some minor changes to the initial design to attain design or optimum capacity.

Table 21-2: Major Commodity Pricing Assumptions

Major Commodity	Unit	Value
Diesel fuel	L	0.87
Power	kWh	0.10
Charter flights Ulaanbaatar to Oyu Tolgoi	US$/return trip	155.00
Site support services	Camp man-day	22.00

Table 21-3: Overall Sustaining Capital Cost Estimate Summary

Description	Unit	Value
Tailings storage facility construction	$/t processed	0.75
Concentrator	$/t processed	0.13
Underground mining	$/t processed	6.93
Infrastructure	$/t processed	0.23
G&A	$/t processed	0.19
Mine closure	$/t processed	1.07
Total	**$/t processed**	**9.30**

Note: The overall sustaining capital cost estimate presented is for Hugo North/Hugo North Extension Lift 1. Totals may not sum due to rounding.

Underground Mining

All mine development, lateral or vertical, was capitalized. This includes development associated with the material handling system, off-footprint ventilation infrastructure, permanent shafts, and main shops, undercut drill and blast, associated swell mucking, and drawbell drill and blast costs, and equipment replacement.

For Hugo North/Hugo North Extension, sustaining capital costs fell under four main categories:

- Ongoing development: All mine development, lateral or vertical, is capitalized until after first ore (May 2020). All development not directly associated with the final material handling system, off-footprint ventilation infrastructure, permanent shafts, and main shops will be considered sustaining capital after that time
- Undercutting and caving: All undercut drill and blast, associated swell mucking, and drawbell drill and blast are considered sustaining capital. The only exception is the portion of this work done prior to first ore

- Ongoing construction: Construction activities included under the category of sustaining capital are projects that are considered routine and are an integral part of the mine operations. The mine schedule provides the information required to determine how many of each type of installation was required during each schedule period. The following work is included in this category:
  - Drawpoint lintels
  - Grizzlies
  - Truck-loading chutes
  - Ventilation control doors
  - Gathering sumps
  - Power stations (for portable substations)
  - Stations for portable refuge stations
  - Concrete road construction
  - Ventilation controls and bulkheads
  - Service doors
- Mobile equipment re-build and replacement: The annual cost of mobile equipment replacement is based on estimated operating hours. Mobile equipment re-build and replacement schedules are a product of the mining schedule. The following methodology was used to determine the annual cost of mobile equipment re-build and replacement:
  - Re-build life is estimated as 60% of the initial life of the equipment
  - Re-build cost is assessed at 40% of the base unit cost
  - Replacement cost is assessed at 100% of the base unit cost plus development allowance and freight
  - No replacement costs are provided for any of the mobile equipment during the final four years of mine operations, and no re-build costs are provided for any of the mobile equipment during the final two years.

Infrastructure and Other

Sustaining capital included the following:

- Replacement of information and communication (ICT) equipment at a rate of 10% per annum of initial capital value
- Refurbishment/replacement of the central heating plant boiler every 10 years

- Refurbishment of process and non-process buildings approximately every 10 years
- Expansion of the waste management centre to provide additional capacity.

21.2.12 Contingency

In general, the base estimate in the 2020 Feasibility Study was developed on the following principles:

- The Project will be implemented in accordance with the Project execution plan assuming typical site conditions known for the Project location without undue interruptions from abnormal weather, civil unrest, and the like
- Neat quantity take-offs were prepared from the available developed design, with the addition of design growth allowances to represent conditions anticipated at design completion
- Equipment and bulk material pricing rates are taken from a combination of formal quotes, budget quotes, informal quotes, and historical experience. Quoted rates were adjusted, where deemed appropriate, to include specific project terms and conditions, wastage, freight components, and the like
- Installation pricing rates are based primarily on pre-suspension awarded data or Phase1 Project experience
- Costs are escalated to the anticipated time of expenditure based on projected pricing indices
- Exchange rates are fixed.

The amount of contingency included was based on a risk analysis of the quality and maturity of the major estimate input variables plus the identified discrete risk events, with consideration to the level of allowances and provisions included in the base estimate. The capital contingency added to the 2020 Feasibility Study estimate was approximately 15.1% (P_{mean} of estimate to complete).

Major estimate input variables included scope definition, pricing rates, and implementation methodology. Discrete risk events addressed the issues that cannot be included in the development of the base estimate because of uncertainty over the likelihood of occurrence and cost impact; that is these events are possible not probable. The amount of contingency was calculated as the difference between the mean value from a Monte Carlo simulation and the base estimate value plus the outcome of the discrete risks analysis.

21.3 Operating Cost Estimates

21.3.1 Summary

Table 21-4 provides an overview of the Hugo North/Hugo North Extension Lift 1 operating cost estimate. Operating costs for the Entrée 20% attributable interest in Hugo North Extension Lift 1 are discussed in Section 22.

The operating costs were based on a mine plan that consists of both the Oyut open pit material and Hugo North/Hugo North Extension Lift 1 underground ore. The Oyut pit supplies the initial source of ore to the mill at a nominal capacity of 100 kt/d. Once production from underground commences, the open pit feed to the mill is continually displaced by the higher-grade ore from Hugo North/Hugo North Extension Lift 1. Production of ore from Hugo North Lift 1 ramps up from 2020 until 2027 when it reaches a steady-state production level.

Feed from the underground mine is planned to commence from 2020 and ramp up to near the target underground design tonnage of 95 kt/d. The mill operating rate at that time will be a nominal 110 kt/d, due to the higher processing throughput rate of the Hugo North/Hugo North Extension Lift 1 ore. The underground discussion in this section describes operating costs from the underground-only mining operation through to the completion of mining North/Hugo North Extension Lift 1.

Operating costs for the concentrator and infrastructure in the 2020 Feasibility Study represent a combined open pit and underground mining operation post-2015, assuming the Phase 2 underground operation is undertaken in conjunction with open pit mining.

The operating cost estimates include all expenses to operate and maintain the Oyu Tolgoi plant plus the sustaining capital required to keep the plant running at its design capacity. Escalation is excluded from the operating costs per Rio Tinto guidelines. No cost of financing is included. No royalties or joint venture fees are included. Power has been treated as a purchased utility from a third-party provider.

The following subsections describe the estimate basis and assumptions.

Table 21-4: Cash Operating Cost Estimate Summary

Description	Unit	Value
Underground mining	$/t processed	8.75
Processing	$/t processed	7.44
Infrastructure and other operating	$/t processed	2.32
G&A	$/t processed	1.96
Total	**$/t processed**	**20.47**

Note: Cash operating costs are for Hugo North/Hugo North Extension Lift 1. VAT and duties included. Totals may not sum due to rounding.

21.3.2 Underground Operating Costs

The underground operations work was assumed to be performed by OTLLC crews. During mine construction and ramp-up, the operations team would be supported by development contractors.

Operating costs were based on a workforce employed directly by OTLLC. Operating costs include direct production costs (mucking, hauling, crushing, conveying, and hoisting); mine support costs (equipment maintenance, ventilation, power costs, services, logistics, and pumping); and mine management (management, tech services, safety, training, and administration). This includes all activities associated with production, which includes moving ore from the cave to the surface. Operating-type costs that incurred before the start of production are captured under the same cost codes but are capitalized.

The underground mining cost assumptions are summarized by area in Table 21-5.

21.3.3 Process Operating Costs

Process operating costs over the Hugo North/Hugo North Extension Lift 1 were estimated to average US$7.44/t of processed mill feed (Table 21-6).

Power

The concentrator electrical load included all equipment and ancillaries in the concentrator buildings and the primary crushing, overland conveying, tailings pumping, water reclaim, and seepage control areas. Energy consumption was based on the Phase 1 specific rate (kWh/t), scaled for ore competence and throughput.

Table 21-5: Hugo North/Hugo North Extension Lift #1 Underground Costs

Description	Unit	Operating Cost
Freight	US$M	18.61
Underground infrastructure & mining	US$M	190.06
Indirect – camp, catering, flights	US$M	159.50
Operations	US$M	31.42
Underground mining operations	US$M	2,826.57
VAT	US$M	380.03
Contingency	US$M	230.77
Total (US$M)	**US$M**	**3,836.96**
	US$/t	**8.75**

Note: Totals may not sum due to rounding.

Table 21-6: Average Processing Costs

Description	US$/t
Power	2.86
Media	1.12
Reagents	0.62
Water	0.13
Maintenance materials	1.38
Bagging	0.23
Labour	0.46
VAT and duties	0.64
Total	**7.44**

Note: average processing costs are for Hugo North/Hugo North Extension Lift 1. Totals may not sum due to rounding.

The average Phase 2 throughput was estimated 39.7 Mt/a, and requiring 26.4 kWh/t, at the current grid power unit cost of $0.102/kWh.

Media

Media included the media for the SAG, ball, and regrind mills. Media consumption rates were based on Phase 1 consumptions, but were adjusted for ore abrasiveness. Unit consumptions for grinding media are as shown in Table 21-7.

Table 21-7: Unit Consumption of Grinding Media

Grinding Line	Unit	Value
SAG milling, 125 mm steel balls	(kg/t)	0.47
Ball milling, 75 mm steel balls	(kg/t)	0.54
Regrind, 17 mm steel balls	(kg/kWh)	0.127

Note: unit consumptions presented are for Hugo North/Hugo North Extension Lift 1.

Reagents

Reagent additions were based on operating data for Southwest (Oyut) ore and were estimated for Hugo North/Hugo North Extension ores from laboratory results. Reagent costs were based on current OTLLC pricing. The forecasts are included in Table 21-8.

Water

The current industrial water rate of 959 TMK/m^3 (\$0.47/m^3) was used with a unit concentrator consumption rate of 0.36 m^3/t dry ore processed to estimate water costs for the use of the concentrator only.

Maintenance Materials

Maintenance materials, including mill and crusher liners, wear plates, and regular maintenance spares required in the normal course of operation, were budgeted on annual basis. The annual maintenance cost also included allowances for items such as screen decks and panels, cyclone parts, pump internals, flotation cell impellors/stators, bearings, and fixed plant lubricants. The total maintenance average annual cost is $55 million per year (OTLLC, 2020).

Bagging

All copper concentrate is bagged. The estimated cost of bags is $19.48 each inclusive of VAT ($17.27 per bag and $2.27 per bag tag) (2016 Turquoise Hill Technical Report; Peters and Sylvester, 2016). An increment of $0.20/t ore processed was added to account for the higher rate of concentrate production expected from the higher-grade Hugo North/Hugo North Extension ore.

Table 21-8: Reagent Consumptions by Ore Type

Reagent	Unit	Southwest	Central	Hugo North
Lime	kg/t	0.76	1.78	0.50
Aerophine 3418A (dithiophosphinate)	g/t	10.26	8.52	14.67
Aero 3422	g/t	6.84	9.68	9.78
PAX	g/t	5.00	—	7.15
Secondary collector (MX 5149/IPETC)	g/t	10.00	10.00	10.00
Dowfroth 250	g/t	7.37	7.37	7.37
OTZ -100	g/t	14.83	14.83	14.83
Tails thickener floc	g/t	19.79	19.79	19.79
Dust control agent	g/t	0.004	0.004	-
Anti-scalant (was Antiprex D)	g/raw water m^3	0.60	0.60	0.60
Corrosion inhibitor yellow metal	g/raw water m^3	1.96	1.96	1.96
Corrosion Inhibitor mild steel	g/process water m^3	4.40	4.40	4.40

Labour

The concentrator workforce plan was based upon the review of 2015 actual labour levels and the 2016 plan estimate. A moderate level of workforce reduction, as forecast in the 2016–2017 plan, was included in the concentrator labour estimate. The labour force is expected to decline over the long term with a slight rise during the mining of Hugo North/Hugo North Extension due to an increase in concentrate production and bagging labour. Therefore, it has been assumed this increase will be offset by workforce decline and increased productivity and efficiency in the concentrator and tailings areas. Labour costs are estimated at $18 million per year.

The total labour force is estimated as shown in Table 21-9.

Miscellaneous

Miscellaneous costs included the cost for concentrator mobile equipment, filter clothes, laboratory supplies, safety supplies, controls and communications, general and administrative costs attributable to the concentrator, and external contractors and consultants. Process overhead costs were estimated at US$0.74 million per year. External services included mine/mill maintenance and processing-related professional services, consultants, and Rio Tinto group services, and services for outsourced functions such as industrial cleanup service.

Table 21-9: Concentrator and Tailings Operations Long-Term Workforce

Area	2025	2047	2051
Concentrator	207	177	175
Bagging	150	128	127
Tailings operations	46	40	39
Total Labour Force	**403**	**345**	**341**

With the exception of the assay laboratory contract, which was treated as running over the LOM, the scope of services generally covered close technical support or supervision of maintenance, operations, and technical support activities, rather than provision of the service in its entirety.

21.3.4 Infrastructure and Other Operating Costs

The infrastructure operating cost estimate of $2.32/t processed, from the 2016 Oyu Tolgoi Feasibility Study, covered the costs directly attributable to operational activities of the infrastructure department.

The main responsibilities of this department are to operate and maintain all Phase 1 and Phase 2 site infrastructure, including:

- Central heating plant (CHP)
- Raw water supply from the borefields north of the site
- Heavy mobile equipment (HME) facility
- Warehouse (buildings only)
- Water bottling plant
- Electrical utilities other than the power plant and 220 kV distribution
- Camp facility (buildings only)
- Airport
- Light vehicle facility
- Other building maintenance, including the waste management centre.

The cost estimate adopted the cost element groups used by the 2016 Oyu Tolgoi Feasibility Study team at the time. These included:

- Labour
- Fixed overheads
- Utilities
- External services
- Materials.

21.3.5 General and Administrative Operating Costs

G&A costs are not discussed in this section of the Report because the JVA does not participate in G&A costs. Instead, the Entrée/Oyu Tolgoi JV pays a separate monthly administration charge to OTLLC; this charge is described in Section 22 of the Report.

21.3.6 Closure Costs

The mine closure estimate in the 2016 Oyu Tolgoi Feasibility Study was prepared using quantities and installation hours from existing capital cost estimates and the closure plan. The hours required for demolition were assumed to be 20% of the original install and construct hours for most of the surface infrastructure.

No residual or salvage values were included. The closure expenditures are assumed to commence 10 years prior to the completion of mining and processing after which there is a 10-year post-closure monitoring program, which is in turn followed by a long-term monitoring and inspection program. The estimate contained direct costs consisting, among others, of the following:

- Costs prior to closure
- Demolition and disposal of permanent facilities
- Rehabilitation and revegetation
- Collection, treatment, and disposal of hazardous wastes
- Human resources
- Community and socioeconomic initiatives.
- Post-closure monitoring and ongoing obligations.

The estimate also included indirect costs, including the following:

- Closure support facilities
- Catering costs
- Closure EPC services
- Owner's costs.
- Contingency, currently evaluated at 25% of all direct and indirect costs.

The total projected cost of closure of the Oyu Tolgoi mine site is $1.308 billion, or approximately $1.07/t processed. The costs are summarized in Table 21-10. All costs are expressed in 2020 U.S. dollars with no allowances for escalation beyond this period.

The inputs into Table 21-10 are as quoted in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020). The total cost in the 2020 Feasibility Study has changed marginally, but the detailed breakdown was not available for this Report. The estimate currently spread across a different processed tonnage resulting in a cost increase from the previous $0.90–$1.07/t as contained in the sustaining capital section (refer to Table 21-3).

21.3.7 Escalation

Escalation was excluded from all operating cost estimates.

Table 21-10: Closure Cost Estimate

Cost Item	(US$ M)
Direct costs	
Demolition and removal of permanent facilities	368.4
Rehabilitation and revegetation	238.1
Treatment and disposal of hazardous wastes	3.6
Human resources	33.5
Community	33.1
Post-closure monitoring and other obligations	15.2
Subtotal Direct costs	781.9
Indirect costs	
Closure support facilities	72.9
Closure management (EPCM) services	57.8
Owner’s costs incl. 10% VAT	131.1
Subtotal indirect costs	261.8
Contingency (25%)	263.7
Rounding adjustment	0.7
Total closure cost	**1,308.0**
US$/tonne processed	**1.07**

Note: Totals may not sum due to rounding

22.0 ECONOMIC ANALYSIS

22.1 Cautionary Statement

The results of the economic analyses discussed in this section represent forward-looking information as defined under Canadian securities law. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes:

- Mineral Resource and Mineral Reserve estimates
- Assumed commodity prices and exchange rates
- The proposed mine production plan
- Projected mining and process recovery rates
- Assumptions as to mining dilution
- Sustaining costs and proposed operating costs
- Interpretations and assumptions as to joint venture and agreement terms
- Assumptions as to closure costs and closure requirements
- Assumptions as to environmental, permitting and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed
- Unrecognized environmental risks
- Unanticipated reclamation expenses
- Unexpected variations in quantity of mineralized material, grade or recovery rates
- Geotechnical or hydrogeological considerations during mining being different from what was assumed
- Failure of mining methods to operate as anticipated
- Failure of plant, equipment or processes to operate as anticipated
- Changes to assumptions as to the availability of electrical power, and the power rates used in the operating cost estimates and financial analysis

- Ability to maintain the social licence to operate
- Accidents, labour disputes and other risks of the mining industry
- Changes to interest rates
- Changes to tax rates.

The cash flows are based on data provided by OTLLC, including mining schedules and annual capital and operating cost estimates, as well as Entrée's interpretation of the commercial terms applicable to the Entrée/Oyu Tolgoi JV, and certain assumptions regarding taxes and royalties. The cash flows have not been reviewed or endorsed by OTLLC. There can be no assurance that OTLLC or its shareholders will not interpret certain terms or conditions, or attempt to renegotiate some or all of the material terms governing the joint venture relationship, in a manner which could have an adverse effect on Entrée's future cash flow and financial condition.

The cash flows also assume that Entrée will ultimately have the benefit of the standard royalty rate of 5% of sales value, payable by OTLLC under the Oyu Tolgoi Investment Agreement. Unless and until Entrée finalizes agreements with the Government of Mongolia or other Oyu Tolgoi stakeholders, there can be no assurance that Entrée will be entitled to all the benefits of the Oyu Tolgoi Investment Agreement, including with respect to taxes and royalties. If Entrée is not entitled to all the benefits of the Oyu Tolgoi Investment Agreement, it could have an adverse effect on Entrée's future cash flow and financial condition. For example, Entrée could be subject to the surtax royalty which came into effect in Mongolia on January 1, 2011. To become entitled to the benefits of the Oyu Tolgoi Investment Agreement, Entrée may be required to negotiate and enter into a mutually acceptable agreement with the Government of Mongolia or other Oyu Tolgoi stakeholders, with respect to Entrée's direct or indirect participating interest in the Entrée/Oyu Tolgoi JV or the application of a special royalty (not to exceed 5%) to Entrée's share of the Entrée/Oyu Tolgoi JV property mineralization or otherwise.

22.2 Summary

Entrée is refiling this Report to include updated information provided by OTLLC on the concentrate tonnes and grade expected to be produced from Lift 1 of the Hugo North/Hugo North Extension deposits. The updated concentrate information resulted in a positive impact on Entrée's attributable financial interest in Lift 1 of the Hugo North/Hugo North Extension deposits. The economic analysis for Lift 1 in this section of the Report was revised to include the updated concentrate data.

Wood completed an economic analysis for Entrée's 20% attributable portion of the Hugo North Extension Lift 1 deposit within the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analysis. The economic analysis was prepared using the following long-term metal price estimates: copper at US$3.25/lb; gold at US$1,591/oz and silver at US$21.08/oz.

The pre-tax cash flow and the after-tax net present value at a discount rate of 8% (NPV@8%) for Entrée's 20% attributable portion (referred to by Entrée as the 2021 Reserves case) is US$449 million and US$131 million respectively. A summary of the financial results for Entrée's 20% attributable portion of Hugo North Extension Lift 1 is shown in Table 22-1. Internal rate of return (IRR) and payback are not presented because with 100% financing, neither is applicable.

Mine site cash costs, total cash costs after by-product credits, and all-in sustaining costs per pound of payable copper are shown in Table 22-2 for Entrée's 20% attributable portion. Cash costs are those costs relating to the direct operating costs of the mine site including:

- On site operating costs (direct mining, processing, and tailings)
- Capital carrying costs (amortization charge)
- Administrative fees
- Refining, smelting, and transportation costs

Total cash costs after by-product credit are the cash costs less by-product credits for gold and silver. All-in sustaining costs after credits are the total cash costs plus mineral royalties, reclamation accrual costs, and sustaining capital charges.

The following subsections provide details on the economic analysis that supports the Mineral Reserves within Hugo North Extension Lift 1.

22.3 Methodology Used

The economic analysis for Entrée's 20% attributable portion of Hugo North Extension Lift 1 within the Entrée/Oyu Tolgoi JV property was carried out using a financial model developed by Wood. The financial model uses the discounted cash flow (DCF) approach. This method of valuation requires projecting yearly cash inflows, or revenues, and subtracting yearly cash outflows such as operating costs, capital costs, royalties, and taxes.

Table 22-1: Summary Production and Financial Results for Entrée's 20% Attributable Portion (base case is bolded)

	Unit	Item
LOM processed material (Entrée/Oyu Tolgoi JV Property)		
Probable Mineral Reserve feed		40 Mt grading 1.54% Cu, 0.53 g/t Au, 3.63 g/t Ag
Copper recovered	Mlb	1,249
Gold recovered	koz	549
Silver recovered	koz	3,836
Entrée's 20% attributable portion financial results		
LOM cash flow, pre-tax	US$M	449
NPV(5%), after-tax	US$M	185
NPV(8%), after-tax	**US$M**	**131**
NPV(10%), after-tax	US$M	104

Notes:

1. Long-term metal prices used in the NPV economic analyses are: copper US$3.25/lb, gold US$1,591/oz, silver US$21.08/oz.
2. The Mineral Reserves within Hugo North Extension Lift 1 are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.
3. Numbers have been rounded. Totals may not sum due to rounding.

Table 22-2: Mine Cash and All-in Sustaining Costs for Entrée's 20% Attributable Portion

Description	Unit	LOM Average
Mine site cash cost	$/lb payable copper	1.29
TC/RC and transport	$/lb payable copper	0.29
Total cash costs before credits	$/lb payable copper	1.57
Gold credits	$/lb payable copper	0.72
Silver credits	$/lb payable copper	0.06
Total cash costs after credits	$/lb payable copper	0.79
Total all-in sustaining costs after credits	**$/lb payable copper**	**1.26**

Note: TC/RC = treatment and refining charges. Totals may not sum due to rounding.

The resulting net annual pre-tax and after-tax cash flows are discounted back to the date of valuation and totalled to determine the net present value (NPV) of the project at 5%, 8%, and 10% discount rates. The 8% discount rate is used as the Project base case.

The economic analysis includes sensitivities to variations in capital costs, operating costs, copper grade, and copper price.

It should be noted that, for the sake of discounting, cash flows are assumed to occur at the end of each period. Cash flows are discounted to the beginning of 2021.

22.4 Financial Model Parameters

The financial model has been prepared on the basis of the assumptions outlined in the following sub-sections.

22.4.1 Mineral Reserve Estimates

Table 22-3 shows the total Hugo North Extension Lift 1 Mineral Reserve estimate that will be mined and processed from the Entrée/Oyu Tolgoi JV property and also shows Entrée's 20% attributable portion of that production forecast.

Figure 22-1 provides the Entrée/Oyu Tolgoi JV property annual production profile including grades for copper, gold, and silver.

22.4.2 Metallurgical Recoveries

Metallurgical recoveries calculated for Hugo North Extension Lift 1 are shown in Table 22-4.

22.4.3 Metal Prices, Smelting and Refining Terms

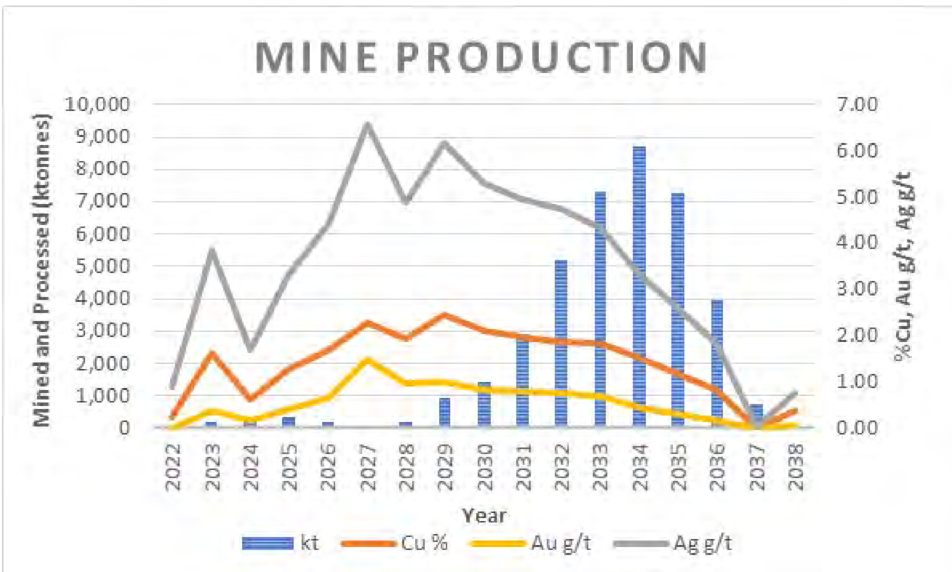
Metal prices and smelting and refining terms assumed for Hugo North Extension Lift 1 are shown in Table 22-5.

Concentrate shipping costs are assumed at US$35.2/wet*tonne. Concentrate payable terms are shown in Table 22-6. The economic analysis includes a silver refining charge of US$0.45/oz Ag, derived from the 2016 Turquoise Hill Technical Report (Peters and Sylvester, 2016). Both arsenic and fluorine are penalty elements (Table 22-7); however, neither exceeds the penalty limits, so no penalty charges apply to the concentrate.

Table 22-3: Entrée/Oyu Tolgoi JV Property Hugo North Extension Mineral Reserve Mined and Processed in Mine Plan

Unit	Total Entrée/Oyu Tolgoi JV Property	Entrée's 20% Attributable Production
kt	39,761	7,952
Cu (%)	1.54	1.54
Au (g/t)	0.53	0.53
Ag (g/t)	3.63	3.63

Figure 22-1: Mine Production (total Entrée/Oyu Tolgoi JV property)



Note: Figure prepared by Wood, 2021. Entrée has a 20% interest in ore extracted from Hugo North Extension Lift 1.

Table 22-4: Metallurgical Recoveries

Deposit	Concentrate Cu Grade (%)	Recovery (%)		
		Cu	Au	Ag
Hugo North Extension Lift 1	33.0	92.4	81.0	82.6

Table 22-5: Metal Prices, Smelting and Refining Terms

Metal	Unit	2021	2022	2023	2024	Long Term
Copper price	US$/lb	3.78	3.61	3.45	3.46	3.25
Gold price	US$/oz	1,815	1,801	1,732	1,677	1,591
Silver price	US$/oz	25.82	24.74	23.20	22.14	21.08
Treatment charges	US$/dmt conc.	0.07	0.08	0.09	0.09	0.09
Copper refining charge	US$/lb	67.37	79.24	91.12	91.12	91.12
Gold refining charge	US$/oz	4.5	4.5	4.5	4.5	4.50

Table 22-6: Concentrate Payable Terms

Terms	Item	Unit	Value
Copper terms	Cu deduction (units)	%	1
	Payable Cu	%	96.0
Silver terms	Minimum	g/t	30
	Payable Ag	%	90.0
Gold terms	Payable Au terms	g/t	%
		0	0.0
		1	90.0
		3	94.0
		5	95.0
		10	97.0
		20	97.5
		50	98.3

Table 22-7: Penalty Elements

Item	Unit	As	F
Concentrate limit	ppm	3,000	300
Payment unit (PU)	ppm	1,000	100
Penalty	$/dmt/PU	2	2
Rejection limit	ppm	5,000	1,000

22.4.4 Royalties

Entrée has anticipated that by the time the Entrée/Oyu Tolgoi JV property goes into production, Entrée will pay the same stabilized royalty rate as OTLLC, which is the 5% regular royalty. Furthermore, Entrée has assumed that the company will maintain its 20% interest in the Entrée/Oyu Tolgoi JV property as part of the stabilization agreement.

Accordingly, the financial model assumes that a 5% royalty applies, and that no other special or surtax royalties apply. The royalty is applied to the gross metal sales for copper, gold, and silver.

22.4.5 Capital Costs

Wood apportioned the overall capital and sustaining capital costs according to Entrée's interpretation of the terms of the Entrée/Oyu Tolgoi JV agreement for use in the economic assessment. This interpretation includes:

- OTLLC is responsible for 80% of all capital expenditures incurred on the Entrée/Oyu Tolgoi JV property for the benefit of the Entrée/Oyu Tolgoi JV and Entrée is responsible for the remaining 20%
- Any mill, smelter and other processing facilities and related infrastructure will be owned exclusively by OTLLC and not by Entrée. Mill feed from the Entrée/Oyu Tolgoi JV property will be transported to the concentrator and processed at cost (using industry standards for calculation of cost including an amortization of capital costs)
- Underground infrastructure on the Oyu Tolgoi mining licence is also owned exclusively by OTLLC, although the Entrée/Oyu Tolgoi JV will eventually share usage once underground development crosses onto the Entrée/Oyu Tolgoi JV property
- Entrée recognizes those capital costs incurred by OTLLC on the Oyu Tolgoi mining licence (facilities and underground infrastructure) as an amortization charge for capital costs that will be calculated in accordance with Canadian generally-accepted accounting principles determined yearly based on the estimated tonnes of concentrate produced for Entrée's account during that year relative to the estimated total life-of-mine concentrate to be produced (for processing facilities and related infrastructure), or the estimated total life-of-mine tonnes to be milled from the relevant deposit(s) (in the case of underground infrastructure). The

charge is made to Entrée's operating account when the Entrée/Oyu Tolgoi JV mine production is actually milled

- For direct capital cost expenditures on the Entrée/Oyu Tolgoi JV property, Entrée will recognize its attributable share of costs at the time of actual expenditure
- Entrée has elected to have OTLLC debt finance Entrée's share of costs for approved programs and budgets, with interest accruing at OTLLC's actual cost of capital or prime plus 2%, whichever is less, at the date of the advance. Debt repayment may be made in whole or in part from (and only from) 90% of monthly available cash flow arising from the sale of Entrée's share of products. Available cash flow means all net proceeds of sale of Entrée's share of products in a month less Entrée's share of costs of Entrée/Oyu Tolgoi JV activities for the month that are operating costs under Canadian generally-accepted accounting principles.

The total Hugo North Extension Lift 1 amortized capital cost within the Entrée/Oyu Tolgoi JV property is estimated at US$701.0 million, of which $140.2 million is Entrée's 20% attributable portion.

The total Hugo North Extension Lift 1 mine development cost within the Entrée/Oyu Tolgoi JV property is estimated at US$275.7 million, of which $55.1 million is Entrée's 20% attributable portion.

Table 22-9 and Table 22-8 provide a summary of the capital costs for Hugo North Extension Lift 1. Treatment of capital within the financial model as provided by Entrée is shown in Table 22-10.

22.4.6 Operating Costs

The operating costs for the Hugo North Extension Lift 1 deposit within the Entrée/Oyu Tolgoi JV property on a per tonne milled basis averages US$46.01 over the LOM. Entrée's 20% attributable portion of the operating costs averages US$46.01 over the LOM. Table 22-11 provides a breakdown of the operating costs for Hugo North Extension Lift 1.

Treatment of the operating costs for Hugo North Extension Lift 1 within the financial model are detailed within Table 22-12.

An annual license fee is payable against operating costs. The annual licence fee is to keep the Shivee Tolgoi and Javhlant MLs in good standing and is approximately US$944,000. The annual fees for the period October 27, 2020 to October 27, 2021 were paid in September, 2020.

Table 22-8: Amortized Capital

Amortization Charges for OTLLC Capital Costs	Unit	Entrée/Oyu Tolgoi JV	Entrée 20% Attributable
Hugo North Lift #1 underground construction	US$ M	574.5	114.9
Infrastructure & central heating plant	US$ M	58.9	11.8
Tailings storage facility & infrastructure sustaining capital	US$ M	39.0	7.8
Concentrator sustaining capital	US$ M	9.1	1.8
Concentrator expansion	US$ M	19.6	3.9
Total Facilities Capital	**US$ M**	**701.0**	**140.2**

Note: OTLLC capital costs are inclusive of indirect costs, Mongolian custom duties, VAT, and contingency. U/G = underground, CHP = central heating plant. Totals may not sum due to rounding.

Table 22-9: Mine Development and Sustaining Capital

Entrée/Oyu Tolgoi JV Property Mine Development	Unit	Entrée/Oyu Tolgoi JV	Entrée 20% Attributable
Underground mine development	US$ M	275.7	55.1

Note: Capital costs are inclusive of indirect costs, Mongolian custom duties, VAT, and contingency.

Table 22-10: Treatment of Capital

Capital Item	Calculation Treatment
Concentrator expansion	100% allocated to Oyu Tolgoi (no allocation to the Entrée/Oyu Tolgoi JV property)
Mine shaft #2, 3, 4 and 5	100% allocated to Oyu Tolgoi (no allocation to the Entrée/Oyu Tolgoi JV property)
Hugo North Lift #1 UG construction	Total capital costs on Entrée/Oyu Tolgoi JV property area x 20%
Infrastructure and CHP	100% allocated to Oyu Tolgoi (no allocation to the Entrée/Oyu Tolgoi JV property)
Miscellaneous indirect capital costs	Total miscellaneous indirect capital costs to be 100% allocated on a proportionate basis of total costs to concentrator expansion, mine shafts, Hugo North Lift #1 UG construction and Infrastructure. Example: Total misc indirect capital costs x (concentrator expansion/(concentrator expansion + mine shaft #2, 3, 4, 5 + Hugo North Lift#1 UG construction

Capital Item	Calculation Treatment
	+ infrastructure & CHP) = amount to be allocated to concentrator expansion capital cost pool
Detailed engineering	Total detailed engineering capital costs to be 100% allocated on a proportionate basis of total costs to concentrator expansion, mine shafts, Hugo North Lift #1 UG construction and Infrastructure. Example: Total detailed engineering capital costs x (concentrator expansion/(concentrator expansion + mine shaft #2, 3, 4, 5 + Hugo North Lift#1 UG construction + infrastructure & CHP) = amount to be allocated to concentrator expansion capital cost pool
Project management and construction/engineering project management and construction	Total project management and construction/engineering project management and construction capital costs to be 100% allocated on a proportionate basis of total costs to concentrator expansion, mine shafts, Hugo North Lift #1 UG construction and Infrastructure. Example: Total PMC/EPMC Capital costs x (concentrator expansion/(concentrator expansion + mine shaft #2, 3, 4, 5 + Hugo North Lift#1 UG construction + infrastructure & CHP) = amount to be allocated to concentrator expansion capital cost pool
Owner's project management	Total Owners project management capital costs to be 100% allocated on a proportionate basis of total costs to concentrator expansion, mine shafts, Hugo North Lift #1 UG construction and infrastructure. Example: Total misc indirect capital costs x (concentrator expansion/(concentrator expansion + mine shaft #2, 3, 4, 5 + Hugo North Lift#1 UG construction + infrastructure & CHP) = Amount to be allocated to concentrator expansion capital cost pool
VAT and duties	Specific VAT and duties to be allocated directly to each specific capital cost pool

Note: Misc = miscellaneous, UG = underground, CHP = central heating plant, PMC = project management and construction, EPCM = engineering, procurement and construction management, EPMC = engineering project management and construction, PM = project management, VAT = value-added tax.

Table 22-11: Operating Costs

Description	Unit	Value
Mining	$/t processed	8.75
Processing	$/t processed	7.44
Infrastructure and other operating	$/t processed	2.32
Amortized mining costs	$/t processed	15.93
Amortized process costs	$/t processed	0.72
Amortized tailings costs	$/t processed	0.98
Total refining and transportation costs	$/t processed	8.36
Total operating expenditure	***$/t processed***	**44.51**
Administration charge (2% during development; 2.5% during production) and annual license fee	$/t processed	1.50
Total	***$/t processed***	**46.01**

Note: Totals may not sum due to rounding.

Table 22-12: Treatment of Operating Costs

Operating Expenditure	Calculation Treatment
Concentrate transport	Entrée's per tonne concentrate production x concentrate transport costs per tonne
Treatment and refining charges	Entrée's per tonne concentrate production x treatment and refining charges per tonne
Penalties	Entrée's per tonne concentrate production x penalties per tonne
Mining costs – Hugo North	Total Hugo North mine operating cost x (Entrée/Oyu Tolgoi JV property Hugo North Extension Lift 1 mined tonnes/total Hugo North Lift 1 mined tonnes) x 20%
Processing costs	Total processing costs x (Entrée/Oyu Tolgoi JV property processed tonnes/total process tonnes) x 20%
General and administration (G&A)	n/a
Operations support	Total operations support costs x (Entrée/Oyu Tolgoi JV property mined tonnes / total mined tonnes) x 20%
Administration charge	2.00% x (operating costs + capital costs) allocated to Entrée during each deposit's development; 2.50% x (operating costs + capital costs) allocated to Entrée during each deposits production

In addition to direct operating expenditures, Entrée incurs an asset amortization charge for the use of OTTLC assets. The US$140.2 million amortization charge (refer to Table 22-8) is carried against operating costs and is based on the calculation treatment described in **Error! Not a valid bookmark self-reference.**.

22.4.7 Loan

Entrée advised that under the terms of the JVA, Entrée may be carried through to production, at its election, by debt financing from OTLLC with interest accruing at OTLLC's actual cost of capital or prime plus 2%, whichever is less, at the date of the advance. Debt repayment may be made in whole or in part from (and only from) 90% of monthly available cash flow arising from sale of Entrée's share of products. Such amounts will be applied first to payment of accrued interest and then to repayment of principal.

Available cash flow means all net proceeds of sale of Entrée's share of products in a month less Entrée's share of costs of operations for the month. Therefore, Entrée assumes that the company will not be obliged to contribute cash to the Entrée/Oyu Tolgoi JV property for its portion of operating and capital expenditures and will receive 10% of its share of cash flow from the Entrée/Oyu Tolgoi JV property until such time as any loans outstanding are repaid and 100% thereafter.

At year end 2020, accrued interest on the loans at prime rate plus 2% per annum was US$2,784,848. The principal amount of the loans was US$6,830,249. To date, the loans primarily comprise contributions made by OTLLC on Entrée's behalf to exploration programs and budgets and for licence fee payments.

22.4.8 Depreciation

The US$55.1 million in mine development capital is depreciated on a unit of production basis over the underground tonnes mined.

With respect to development capital costs for existing OTLLC facilities, Entrée has advised that these capital costs will have been fully depreciated prior to the processing of ore from the Entrée/Oyu Tolgoi JV property through the OTLLC facilities, and no amortization allowance for such development capital costs is payable.

Table 22-13: Treatment of Depreciation Charge

Amortization Charges	Calculation Treatment
Process plant	(Total process plant capital/total LOM concentrate produced) x Entrée/Oyu Tolgoi JV property concentrate produced x 20%
Concentrator expansion	(Total concentrator expansion capital/total LOM concentrate produced) x Entrée/Oyu Tolgoi JV property concentrate produced x 20%
Underground mine capital Lift 1 (including Shafts 1–5)	(Total underground mine capital less Entrée's portion)/total LOM mined tonnes) x Entrée/Oyu Tolgoi JV property mined tonnes x 20%
Infrastructure	(Total infrastructure less Entrée's portion)/total LOM mined tonnes) x Entrée/Oyu Tolgoi JV property mined tonnes x 20%
Tailings	(Total tailings capital/total LOM concentrate produced) x Entrée/Oyu Tolgoi JV property concentrate produced x 20%

22.4.9 Taxes

Mongolian Corporate Income Taxes (CIT) are applied to the total net income at 10% on the first 2.1 million and 25% on the remainder. Prior years income tax losses are carried forward and applied to current years taxable income balance. There is an opening tax loss balance of US$5.7 million.

22.5 Economic Analysis

Wood completed an economic analysis for Entrée's 20% attributable portion of the Hugo North Extension Lift 1 deposit within the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analyses. Underlying assumptions in the analysis include:

- All pricing within the financial analysis is based on 2020 constant dollars. No escalation is applied
- For the analysis, Entrée have advised that under the JVA, all costs of operations under each program and budget will, to the extent practicable, be allocated at the time the program and budget is adopted between the Entrée/Oyu Tolgoi JV property and the Oyu Tolgoi ML, based on the proportions in which each of them benefits most from such operations. OTLLC shall pay for 100% of costs allocated to the Oyu Tolgoi ML and all associated liabilities including for environmental

compliance. The balance of such costs shall be borne and paid by the participants in accordance with their respective participating interests (i.e. Entrée 20%; OTLLC 80%)

- Entrée is carried through to production by debt financing from OTLLC with interest accruing at prime (Royal Bank Prime of 2.5%) plus 2%, or approximately 4.5%. Debt repayment is made from 90% of monthly available cash flow arising from sale of Entrée's share of products. Entrée receives 10% of its share of cash flow from the Entrée/Oyu Tolgoi JV property until the loans outstanding balance is repaid and 100% thereafter.

For Entrée's 20% attributable portion, using a discount rate of 8%, the pre-tax net present value (NPV) is approximately US$172 million. The after-tax NPV@8% is approximately US$131 million.

Table 22-14 provides a summary of key financial outcomes for Entrée's 20% attributable portion of the Entrée/Oyu Tolgoi JV property. The internal rate of return (IRR) and payback are not presented in Table 22-14 because with 100% financing, neither is applicable.

Figure 22-2 provides a distribution of Entrée's 20% attributable portion cash flows over the LOM.

Table 22-15 and Table 22-16 provide the cash flow details on an annualized basis for Entrée's 20% attributable portion.

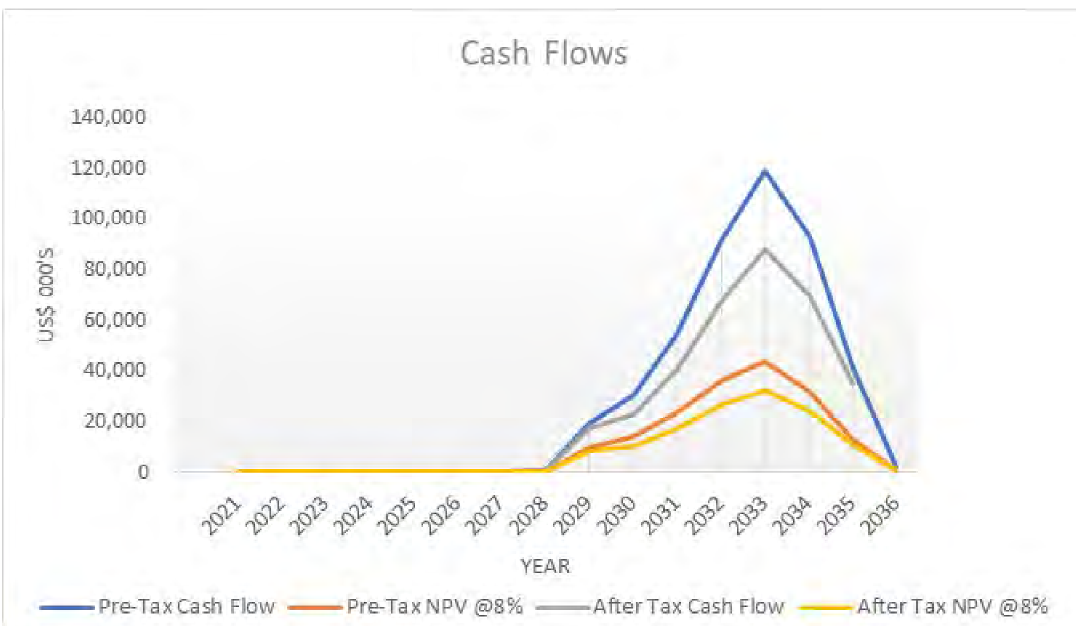
22.6 Sensitivity Analysis

A sensitivity analysis was performed for Entrée's 20% attributable portion sensitivity to variations in capital costs, operating costs, copper grade, and copper price. Entrée's 20% attributable portion is most sensitive to changes in copper price and grade and less sensitive to changes in operating and capital costs. The copper grade sensitivity mirrors the copper price and plots on the same line. Figure 22-3 to Figure 22-6 provide sensitivity spider graphs for pre-tax and after-tax cash flow and NPV for Entrée's 20% attributable portion.

Table 22-14: Summary Production and Financial Results for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1 (base case is bolded)

Cash Flow Before Tax		Units	Total
Cumulative cash flow			448,748
NPV @	5%	kUS$	244,087
NPV @	**8%**	**kUS$**	**172,205**
NPV @	10%	kUS$	137,358
Cash Flow After Tax		**Units**	**Total**
Cumulative cash flow			340,280
NPV @	5%	kUS$	185,158
NPV @	**8%**	**kUS$**	**130,684**
NPV @	10%	kUS$	104,276

Figure 22-2: LOM Cash Flow for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1



Note: Figure prepared by Wood, 2021.

Table 22-15: Cash Flow for Entrée's 20% Attributable Portion Hugo North Extension Lift 1, Year 0 to Year 9

	Unit	Value	Value	Total	Yr 0 1/1/2020	Yr 1 1/1/2021	Yr 2 1/1/2022	Yr 3 1/1/2023	Yr 4 1/1/2024	Yr 5 1/1/2025	Yr 6 1/1/2026	Yr 7 1/1/2027	Yr 8 1/1/2028	Yr 9 1/1/2029
Mine Production														
Production	(t)			39,760,956	—	—	47,735	178,072	234,020	348,824	168,861	4,718	203,034	950,649
	t/day			23,897	—	—	131	488	639	956	463	13	555	2,605
Cu	(%)			1.54	—	—	0.24	1.62	0.61	1.27	1.69	2.27	1.95	2.47
Au	(g/t)			0.53	—	—	0.01	0.37	0.17	0.42	0.65	1.48	0.97	1.00
Ag	(g/t)			3.63	—	—	0.90	3.83	1.69	3.32	4.41	6.59	4.88	6.16
Processing														
Cu Concentrate														
Tonnes Concentrate	ktdry			1,718	—	—	0.9	7.2	7.5	13.8	6.5	0.2	10.4	47.9
Cu Recovered to Cu Con	klb			1,249,292	—	—	220.5	5,930.4	2,799.9	9,016.9	5,864.3	220.5	8,201.2	48,148.9
Au Recovered to Cu Con	koz			549	—	—	0.0	1.7	0.9	3.6	2.8	0.2	5.2	25.1
Ag Recovered to Cu Con	koz			3,836	—	—	0.5	14.3	6.9	23.7	15.9	0.7	26.7	161.7
Mo Concentrate														
Tonnes Concentrate	ktdry			—	—	—	—	—	—	—	—	—	—	—
Mo Recovered to Mo Con	klb			—	—	—	—	—	—	—	—	—	—	—
Smelting														
Payable Cu in Cu Concentrate	klb			1,162,783	—	—	170.4	5,526.9	2,528.0	8,361.4	5,499.1	208.2	7,596.8	45,184.6
Payable Au in Cu Concentrate	koz			529	—	—	—	1.6	0.9	3.5	2.7	0.2	5.0	24.4
Payable Ag in Cu Concentrate	koz			3,425	—	—	—	12.9	-	21.3	14.3	0.6	24.0	145.5
Payable Mo in Mo Concentrate	klb			—	—	—	—	—	—	—	—	—	—	—
Cash Flow (000's)														
Metal Price														
Cu	US$/lb				3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Au	US$/oz				1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00
Ag	US$/oz				21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08
Mo	US$/lb				—	—	—	—	—	—	—	—	—	—

	Unit	Value	Value	Total	Yr 0 1/1/2020	Yr 1 1/1/2021	Yr 2 1/1/2022	Yr 3 1/1/2023	Yr 4 1/1/2024	Yr 5 1/1/2025	Yr 6 1/1/2026	Yr 7 1/1/2027	Yr 8 1/1/2028	Yr 9 1/1/2029
Revenue														
Cu	kUS$			755,809	—	—	111	3,593	1,643	5,435	3,574	135	4,938	29,370
Au	kUS$			168,251	—	—	—	501	270	1,100	852	56	1,601	7,757
Ag	kUS$			14,442	—	—	—	54	—	90	60	3	101	613
Mo	kUS$			—	—	—	—	—	—	—	—	—	—	—
Total Revenue	kUS$			938,502	—	—	111	4,148	1,914	6,625	4,486	194	6,640	37,740
Mineral royalties (gross sales value)	kUS$	5.0%		46,925	—	—	6	207	96	331	224	10	332	1,887
Surtax royalty	kUS$	0.0%		—	—	—	—	—	—	—	—	—	—	—
Net Revenue	kUS$			891,577	—	—	105	3,940	1,818	6,294	4,262	184	6,308	35,853
Operating Costs on Site														
Mining	kUS$		8.75	69,584	—	—	84	312	410	610	296	8	355	1,664
Processing	kUS$		7.44	59,182	—	—	71	265	348	519	251	7	302	1,415
Infrastructure and Other Operating	kUS$		2.32	18,482	—	—	22	83	109	162	78	2	94	442
Total Operating Costs on Site	kUS$		18.52	147,247	—	—	177	659	867	1,292	625	17	752	3,521
Capital Carrying Charge														
Mining	kUS$		15.93	126,671	—	—	152	567	746	1,111	538	15	647	3,029
Processing	kUS$		0.72	5,740	—	—	3	24	25	46	22	1	35	160
Tailings	kUS$		0.98	7,793	—	—	9	35	46	68	33	1	40	186
Total Capital Carrying Charge	kUS$		17.63	140,204	—	—	165	626	816	1,226	593	17	721	3,375
Administration Charge														
Administration Charge	kUS$		1.08	8,565	—	—	10	38	50	75	36	1	44	205
Annual License Fee	kUS$		0.43	3,398	—	189	189	189	189	189	189	189	189	189
Total Administration Charge	kUS$		1.50	11,963	—	189	199	227	239	264	225	190	233	394
Refining & Transportation Costs														
Cu Refining & Other Metal Costs	kUS$		2.63	20,930	—	—	3	99	46	151	99	4	137	813
Cu Con Smelting Cost	kUS$		3.94	31,306	—	—	15	132	136	251	118	4	189	872
Au Refining & Other Metal Costs	kUS$		0.06	476	—	—	—	1	1	3	2	0	5	22

	Unit	Value	Value	Total	Yr 0	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9
					1/1/2020	1/1/2021	1/1/2022	1/1/2023	1/1/2024	1/1/2025	1/1/2026	1/1/2027	1/1/2028	1/1/2029
Ag Refining & Other Metal Costs	kUS$		0.04	308	—	—	—	1	-	2	1	0	2	13
Cu Con Fluorine Penalty	kUS$		—	—	—	—	—	—	—	—	—	—	—	—
Cu Con Transportation Costs	kUS$		1.66	13,218	—	—	7	56	58	106	50	1	80	368
Cu Con Insurance Costs	kUS$		0.03	262	—	—	0	1	1	2	1	0	2	11
Roasting Cost	kUS$		—	—	—	—	—	—	—	—	—	—	—	—
Mo Con Transportation Costs	kUS$		—	—	—	—	—	—	—	—	—	—	—	—
Total Refining & Transportation Costs	kUS$		8.36	66,500	—	—	25	291	241	514	272	9	415	2,100
Net Smelter Return (NSR)	kUS$			872,003	—	—	86	3,857	1,673	6,111	4,215	185	6,225	35,640
Operating Profit (EBITDA)	kUS$			525,663	—	(189)	(460)	2,137	(345)	2,998	2,547	(49)	4,187	26,464
Total Production Costs														
Total Operating Costs	kUS$			365,914	—	189	565	1,804	2,163	3,295	1,715	233	2,121	9,389
Depreciation	kUS$			55,130	—	—	0	1	4	10	6	0	8	72
Total Production Costs	kUS$			421,044	—	189	565	1,805	2,166	3,305	1,721	233	2,129	9,462
Income from Operations														
Net Revenue	kUS$			891,577	—	-	105	3,940	1,818	6,294	4,262	184	6,308	35,853
Production Costs	kUS$			421,044	—	189	565	1,805	2,166	3,305	1,721	233	2,129	9,462
Net Income Before Taxes	kUS$			470,533	—	(189)	(460)	2,135	(348)	2,988	2,541	(49)	4,179	26,392
Federal Tax	kUS$	25%		108,468	—	—	—	—	—	—	—	—	—	2,022
Depreciation	kUS$			55,130	—	—	0	1	4	10	6	0	8	72
Reclamation Accrual	kUS$			8,509	—	—	10	38	50	75	36	1	43	203
Net Income After Taxes	kUS$			408,686	—	(189)	(470)	2,098	(395)	2,924	2,511	(50)	4,144	24,238
Capital Cost														
EJV Capital Share Shaft 4	kUS$			—	—	—	—	—	—	—	—	—	—	—
EJV HN Lift 1	kUS$			55,130	—	—	66	247	324	484	234	7	282	1,318
EJV HN Lift 2	kUS$			—	—	—	—	—	—	—	—	—	—	—
Heruga EJV	kUS$			—	—	—	—	—	—	—	—	—	—	—
Total Capital	kUS$			55,130	—	-	66	247	324	484	234	7	282	1,318

	Unit	Value	Value	Total	Yr 0	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9
					1/1/2020	1/1/2021	1/1/2022	1/1/2023	1/1/2024	1/1/2025	1/1/2026	1/1/2027	1/1/2028	1/1/2029
Cash Flow After Tax														
10% Cash flow pass through				41,168	—	—	—	210	—	292	251	-	414	2,424
Cash flow after loan payment				301,689	—	—	—	—	—	—	—	—	—	14,679
Final Loan Balance				2,576		—	—	—	—	—	—	—	—	—
Discount Factor														
Cash Flow				340,280	—	—	—	210	-	292	251	—	414	17,103
NPV @		5%		185,158	—	—	—	181	—	229	187	—	280	11,025
NPV @		8%		130,684	—	—	—	167	—	199	158	—	224	8,556
NPV @		10%		104,276	—	—	—	158	—	182	142	—	193	7,253
IRR Before Tax				0.0%	—	—	—	210	210	502	753	753	1,168	18,271
Cash Flow Before Tax														
Cash Flow				448,748	—	—	—	210	—	292	251	—	414	19,126
NPV @		5%		244,087	—	—	—	181	—	229	187	—	280	12,329
NPV @		8%		172,205	—	—	—	167	—	199	158	—	224	9,568
NPV @		10%		137,358	—	—	—	158	—	182	142	—	193	8,111

Table 22-16: Cash Flow for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1, Year 10 to Year 19

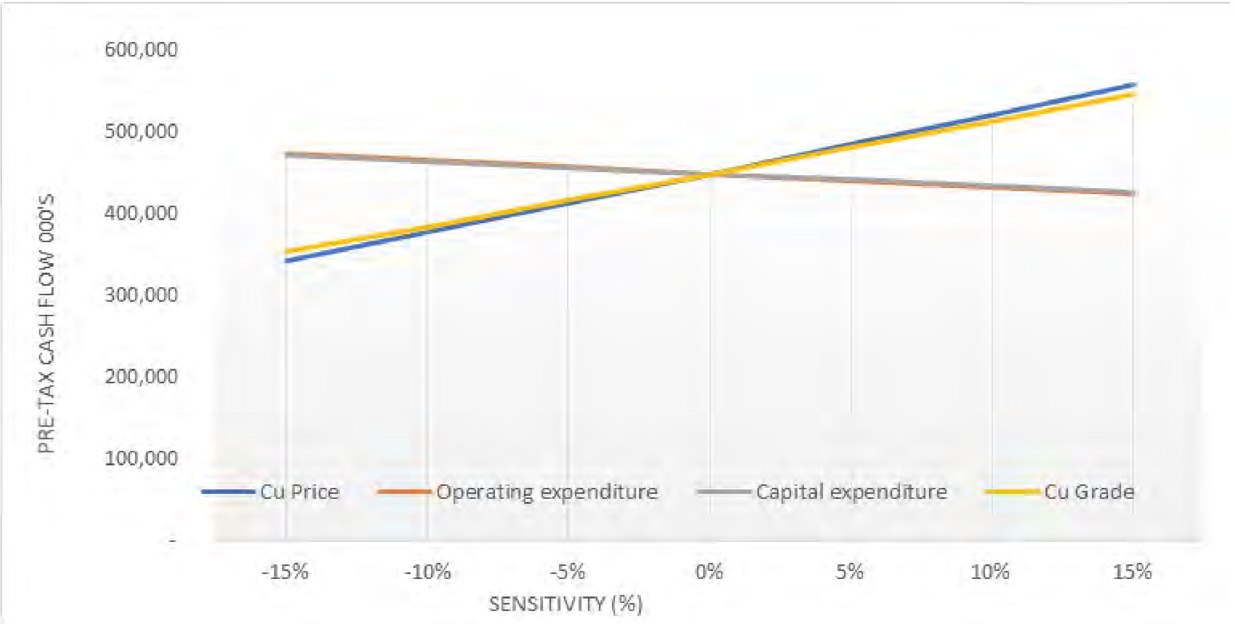
	Unit	Value	Value	Yr 10	Yr 11	Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19
				1/1/2030	1/1/2031	1/1/2032	1/1/2033	1/1/2034	1/1/2035	1/1/2036	1/1/2037	1/1/2038	1/1/2039
Mine Production													
Production (t)				1,442,132	2,921,711	5,201,779	7,341,624	8,722,314	7,260,583	3,947,892	734,899	52,111	—
t/day				3,951	8,005	14,213	20,114	23,897	19,892	10,787	2,013	143	—
Cu (%)				2.12	1.95	1.88	1.83	1.51	1.18	0.81	0.56	0.37	—
Au (g/t)				0.84	0.79	0.77	0.68	0.46	0.30	0.18	0.10	0.06	—
Ag (g/t)				5.30	4.94	4.73	4.31	3.34	2.60	1.82	1.24	0.76	—
Processing1													
Cu Concentrate													
Tonnes Concentrate	kt dry			64.4	130.0	242.9	352.3	382.4	286.7	140.9	22.6	1.4	—
Cu Recovered to Cu Con	klb			62,611.2	116,778.7	199,848.8	274,497.2	267,530.6	174,341.3	64,683.6	8,223.2	374.8	—
Au Recovered to Cu Con	koz			31.6	60.5	104.8	130.8	105.9	56.4	18.2	1.7	0.1	—
Ag Recovered to Cu Con	koz			208.3	391.7	664.1	851.3	772.2	493.0	182.7	21.7	0.9	—
Mo Concentrate													
Tonnes Concentrate	kt dry			—	—	—	—	—	—	—	—	—	—
Mo Recovered to Mo Con	klb			—	—	—	—	—	—	—	—	—	—
Smelting													
Payable Cu in Cu Concentrate	klb			58,850.4	109,334.2	186,804.0	255,992.3	248,808.9	161,007.8	59,181.6	7,402.9	325.3	—
Payable Au in Cu Concentrate	koz			30.6	58.7	101.6	126.8	100.6	53.6	17.1	1.5	0.1	—
Payable Ag in Cu Concentrate	koz			187.5	352.5	597.7	766.2	695.0	443.7	164.4	—	—	—
Payable Mo in Mo Concentrate	klb			—	—	—	—	—	—	—	—	—	—
Cash Flow (000's)													
Metal Price													
Cu	US$/lb			3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Au	US$/oz			1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00
Ag	US$/oz			21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08
Mo	US$/lb			—	—	—	—	—	—	—	—	—	—

Revenue													
Cu	kUS$			38,253	71,067	121,423	166,395	161,726	104,655	38,468	4,812	211	—
Au	kUS$			9,750	18,687	32,336	40,357	32,002	17,040	5,444	483	18	—
Ag	kUS$			790	1,486	2,520	3,230	2,930	1,871	693	—	—	—
Mo	kUS$			—	—	—	—	—	—	—	—	—	—
Total Revenue	kUS$			48,793	91,240	156,278	209,982	196,657	123,566	44,605	5,295	229	—
Mineral royalties (gross sales value)	kUS$	5.0%		2,440	4,562	7,814	10,499	9,833	6,178	2,230	265	11	—
Surtax royalty	kUS$	0.0%		—	—	—	—	—	—	—	—	—	—
Net Revenue	kUS$			46,354	86,678	148,464	199,483	186,825	117,387	42,375	5,030	218	—
Operating Costs on Site													
Mining	kUS$		8.75	2,524	5,113	9,103	12,848	15,265	12,706	6,909	1,286	91	-
—	kUS$		7.44	2,147	4,349	7,743	10,928	12,983	10,807	5,876	1,094	78	-
Infrastructure and Other Operating	kUS$		2.32	670	1,358	2,418	3,413	4,054	3,375	1,835	342	24	-
Total Operating Costs on Site	kUS$		18.52	5,341	10,820	19,264	27,188	32,301	26,888	14,620	2,722	193	-
Capital Carrying Charge													
Mining	kUS$		15.93	4,594	9,308	16,572	23,389	27,788	23,131	12,577	2,341	166	—
Processing	kUS$		0.72	215	434	812	1,177	1,278	958	471	76	5	—
Tailings	kUS$		0.98	283	573	1,020	1,439	1,710	1,423	774	144	10	—
Total Capital Carrying Charge	kUS$		17.63	5,092	10,315	18,403	26,005	30,775	25,512	13,822	2,561	181	—
Administration Charge													
Administration Charge	kUS$		1.08	311	630	1,122	1,584	1,879	1,562	848	158	11	—
Annual License Fee	kUS$		0.43	189	189	189	189	189	189	189	189	189	—
Total Administration Charge	kUS$		1.50	500	818	1,311	1,773	2,068	1,750	1,037	346	200	—
Refining & Transportation Costs													
Cu Refining & Other Metal Costs	kUS$		2.63	1,059	1,968	3,362	4,608	4,479	2,898	1,065	133	6	—
Cu Con Smelting Cost	kUS$		3.94	1,174	2,369	4,427	6,420	6,969	5,225	2,567	412	25	—
Au Refining & Other Metal Costs	kUS$		0.06	28	53	91	114	91	48	15	1	0	—
Ag Refining & Other Metal Costs	kUS$		0.04	17	32	54	69	63	40	15	—	—	—
Cu Con Flourine Penalty	kUS$		—	—	—	—	—	—	—	—	—	—	—

Cu Con Transportation Costs	kUS$		1.66	496	1,000	1,869	2,710	2,942	2,206	1,084	174	11	—
Cu Con Insurance Costs	kUS$		0.03	14	26	44	59	55	34	12	1	0	—
Roasting Cost	kUS$		-	—	—	—	—	—	—	—	—	—	—
Mo Con Transportation Costs	kUS$		-	—	—	—	—	—	—	—	—	—	—
Total Refining & Transportation Costs	kUS$		8.36	2,788	5,448	9,848	13,980	14,598	10,452	4,758	722	42	—
Net Smelter Return (NSR)	kUS$			46,006	85,793	146,430	196,002	182,060	113,114	39,847	4,573	187	—
Operating Profit (EBITDA)	kUS$			32,633	59,277	99,638	130,536	107,082	52,785	8,138	(1,321)	(398)	—
Total Production Costs													
Total Operating Costs	kUS$			13,720	27,401	48,826	68,946	79,742	64,602	34,237	6,351	615	—
Depreciation	kUS$			186	704	2,382	6,026	12,250	16,291	13,422	3,450	317	—
Total Production Costs	kUS$			13,906	28,105	51,208	74,972	91,993	80,893	47,659	9,801	932	—
Income from Operations													
Net Revenue	kUS$			46,354	86,678	148,464	199,483	186,825	117,387	42,375	5,030	218	—
Production Costs	kUS$			13,906	28,105	51,208	74,972	91,993	80,893	47,659	9,801	932	—
Net Income Before Taxes	kUS$			32,447	58,573	97,256	124,511	94,832	36,494	(5,284)	(4,771)	(715)	—
Federal Tax	kUS$	25%		7,797	14,328	23,999	30,813	23,393	6,116	—	—	—	—
Depreciation	kUS$			186	704	2,382	6,026	12,250	16,291	13,422	3,450	317	—
Reclamation Accrual	kUS$			309	625	1,113	1,571	1,867	1,554	845	157	11	—
Net Income After Taxes	kUS$			24,528	44,324	74,526	98,153	81,823	45,115	7,293	(1,478)	(409)	—
Capital Cost													
EJV Capital Share Shaft 4	kUS$			—	—	—	—	—	—	—	—	—	—
EJV HN Lift 1	kUS$			2,000	4,051	7,213	10,179	12,094	10,067	5,474	1,019	72	—
EJV HN Lift 2	kUS$			—	—	—	—	—	—	—	—	—	—
Heruga EJV	kUS$			—	—	—	—	—	—	—	—	—	—
Total Capital	kUS$			2,000	4,051	7,213	10,179	12,094	10,067	5,474	1,019	72	—
Cash Flow After Tax													
10% Cash flow pass through				2,453	4,432	7,453	9,815	8,182	4,512	729	—	—	—
Cash flow after loan payment				20,076	35,840	59,861	78,158	61,547	30,537	991	—	—	—
Final Loan Balance				—	—	—	—	—	—	—	2,576	—	—

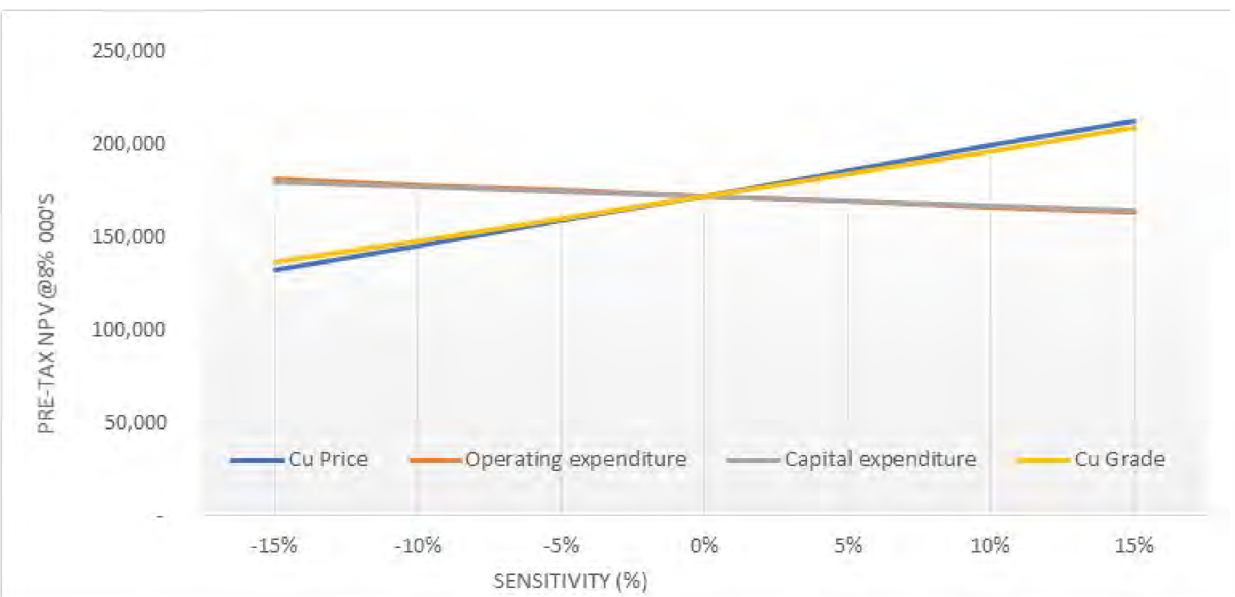
Discount Factor													
Cash Flow				22,528	40,273	67,314	87,973	69,729	35,048	1,721	(2,576)	—	—
NPV @		5%		13,831	23,547	37,483	46,654	35,218	16,859	788	(1,124)	—	—
NPV @		8%		10,435	17,272	26,731	32,348	23,740	11,049	502	(696)	—	—
NPV @		10%		8,686	14,115	21,448	25,483	18,362	8,390	374	(510)	—	—
IRR Before Tax													
Cash Flow Before Tax													
Cash Flow				30,325	54,601	91,313	118,786	93,122	41,164	1,721	(2,576)	—	—
NPV @		5%		18,617	31,924	50,846	62,995	47,033	19,801	788	(1,124)	—	—
NPV @		8%		14,046	23,417	36,261	43,677	31,704	12,977	502	(696)	—	—
NPV @		10%		11,692	19,137	29,095	34,408	24,522	9,854	374	(510)	—	—

Figure 22-3: Pre-Tax Cash Flow Sensitivity Analysis for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1



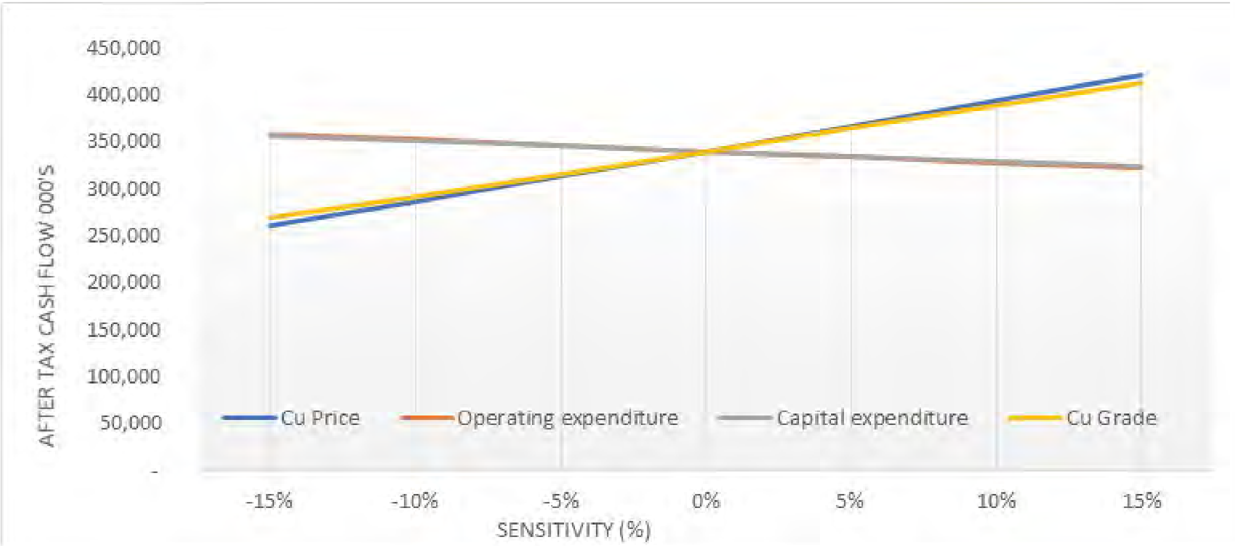
Note: Figure prepared by Wood, 2021.

Figure 22-4: Pre-Tax NPV@8% Sensitivity Analysis for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1



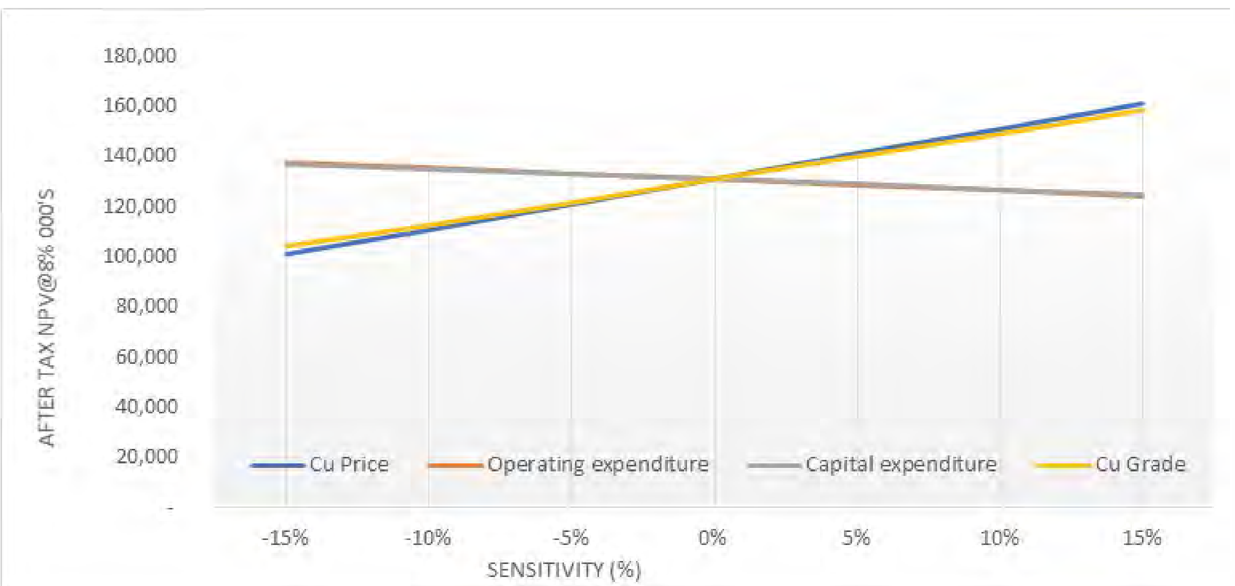
Note: Figure prepared by Wood, 2021.

Figure 22-5: After-Tax Cash Flow Sensitivity Analysis for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1



Note: Figure prepared by Wood, 2021.

Figure 22-6: After-Tax NPV@8% Sensitivity Analysis for Entrée's 20% Attributable Portion, Hugo North Extension Lift 1



Note: Figure prepared by Wood, 2021.

22.7 Comment on Section 22

Entrée's 20% attributable portion of the Hugo North Extension Lift 1 demonstrates a positive after-tax NPV@8% of US$131 million at the study copper price of US$3.25/lb. Significant positive cash flows are recognized starting in 2029.

23.0 ADJACENT PROPERTIES

The Entrée/Oyu Tolgoi JV Project surrounds the operating Oyut open pit mine and the developing Hugo North underground mine within OTLLC's Oyu Tolgoi ML. The Oyu Tolgoi ML contains the majority of the infrastructure that supports the current and planned operations. Other deposits within the Oyu Tolgoi licence area include Hugo South, and the northern tip of the Heruga deposit.

Turquoise Hill has filed a number of technical reports on the Oyu Tolgoi ML and Oyu Tolgoi mining operation, which are included in the list of previously-filed technical reports listed in Section 2.7 of this Report.

Information that follows in this sub-section on the OTLLC operations is sourced and summarized from the following document:

- Thomas, M., Carlson, R., Dudley, J., and Kolkert, R., 2020: Oyu Tolgoi 2020 Technical Report, Turquoise Hill Resources Ltd., Ömnögovi Aimag, Mongolia: report prepared by AMC Consultants for Turquoise Hill Resources Ltd., effective date 30 June, 2020.

The QPs have not been able to verify the information on the adjoining Oyu Tolgoi ML that is not part of the Entrée/Oyu Tolgoi JV Project, and caution that the information presented is not necessarily indicative of the mineralization within the Entrée/Oyu Tolgoi JV Project, and is not necessarily indicative of the development approach that may be taken for the deposits within the Entrée/Oyu Tolgoi JV Project.

OTLLC is 66% owned by Turquoise Hill and 34% owned by Erdenes Oyu Tolgoi LLC. Rio Tinto owns 50.8% of Turquoise Hill and Erdenes Oyu Tolgoi LLC is owned by the Government of Mongolia. Rio Tinto is appointed by OTLLC to provide strategic and operational management to Oyu Tolgoi.

OTLLC holds its rights to the Oyu Tolgoi mining operation through the Oyu Tolgoi ML MV-006709, which comprises approximately 8,496 ha. The Oyu Tolgoi ML includes the right to explore, develop mining infrastructure and facilities, and conduct mining operations.

Within the Oyu Tolgoi ML, Mineral Resources have been estimated for Hugo North, Hugo South, the northern portion of the Heruga, and the Oyut deposits, and Mineral Reserves have been reported for the Oyut deposit and Lift 1 of the Hugo North deposit.

Currently, the predominant source of mill feed is the Oyut open pit, which has been in operation since 2013. The open pit mine is a conventional Owner-operated truck-and-shovel operation, and the mine plan assumes that 16 pit phases will be mined. Phases 1 to 4a (excluding 4b) have been mined out; phases 3b, 4b, 5a, 5b, 6b, 7, 8, 9, 10, 11, 12, 13 remain to be mined.

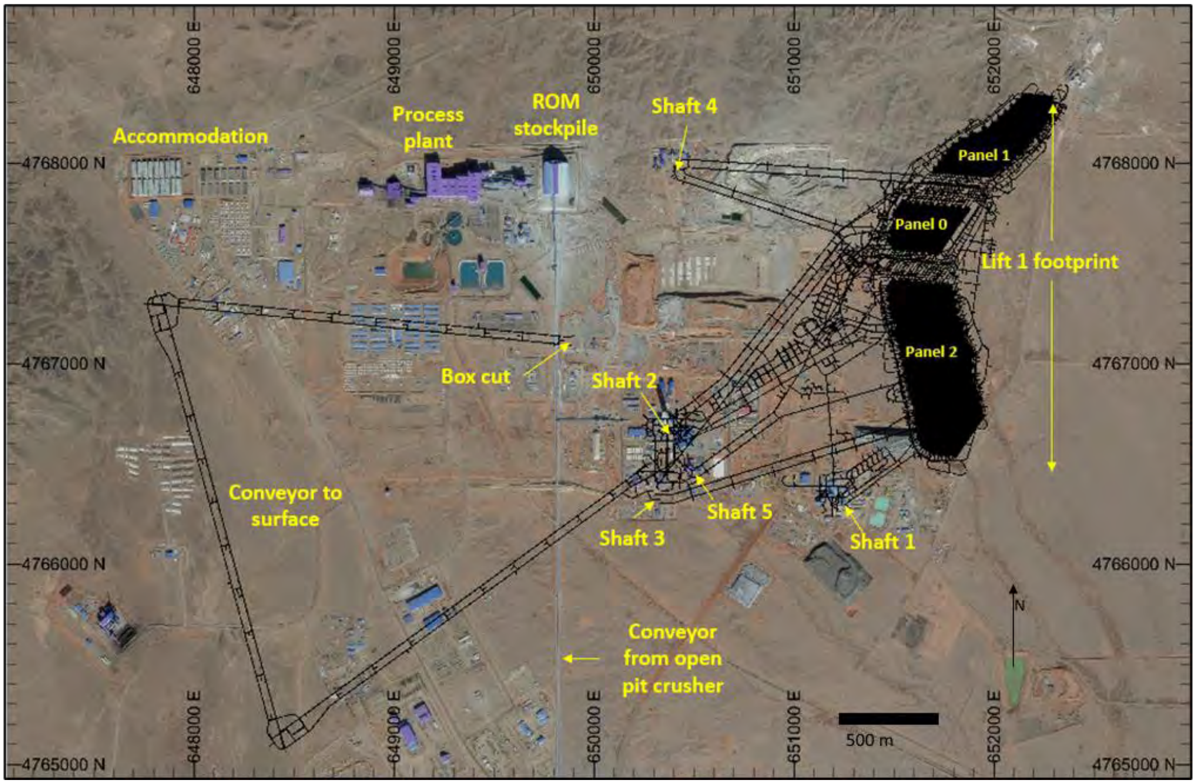
OTLLC conducts drilling, loading, hauling, and associated production support roles. Equipment maintenance is conducted under service agreements. A blasting contractor provides blasting products and down-the-hole services. Waste rock facilities consist of the East/clay facility and the South facility. Stockpiles include the segregated oxide material, high grade, medium grade, low grade, and mineralised waste piles.

In parallel with open pit mining, underground infrastructure and mine development is ongoing for the Hugo North Lift 1 underground block cave. Stockpiling will allow the higher-grade ore from Hugo North Lift 1 to gradually displace lower-value open pit ore with the higher-grade material from Hugo North Lift 1 as that material becomes available.

The Hugo North Lift 1 deposit is planned to be mined by underground panel caving methods. Shaft 1, a multi-purpose shaft, was completed in 2008. Shaft 2, also a multipurpose shaft, was completed in 2019, and is now the main access for personnel and materials and for rock hoisting. Shaft 5, an exhaust ventilation shaft, was completed in 2019. Construction of ventilation shafts Shaft 3 and 4 were commenced in but are currently on care-and-maintenance due to the Covid-19 pandemic. The declines for the conveyor to surface are being driven down from the surface. An infrastructure layout plan showing the locations of the planned infrastructure in relation to the proposed panel mining for the Hugo North area is provided as Figure 23-1.

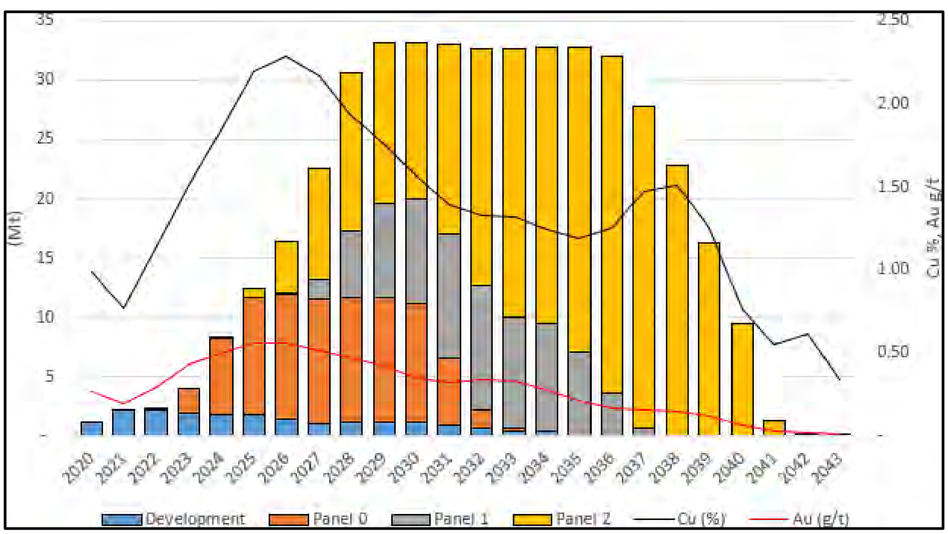
Production operations are planned to commence in Panel 0 and progress into Panel 2 and later into Panel 1 (Figure 23-2). Development of Panel 0 is well advanced with development ongoing on the extraction, undercut, and apex levels. Maximum production rates from Panel 0 are projected to be 30 kt/d, from Panel 1 the projection is 35 kt/d, and from Panel 2 is 95 kt/d. Subject to any delays arising from the Covid-19 pandemic, sustainable cave propagation (sustainable production, which is estimated to occur after firing approximately 60 drawpoints) is expected to occur in February 2023, followed by a six-year production build up to a maximum underground production rate of 33 Mt/a (95 kt/d).

Figure 23-1: Hugo North Surface Infrastructure Layout Plan



Note: Figure from Thomas et al., 2020.

Figure 23-2: Production Plan, Hugo North, Lift 1



Note: Figure from Thomas et al., 2020.

Oyu Tolgoi employs a conventional SAG mill/ball mill/grinding circuit (SABC) followed by flotation. The Phase 1 concentrator commenced ore commissioning in January 2013 with production of first copper–gold concentrate from the Oyut open pit on 31 January 2013. Commercial production was achieved in September 2013. Mill throughput reached the nominal 96 kt/d design capacity, with milled throughput exceeding design in April, 2014.

Throughput has progressively increased since 2013 as the result of operating experience and minor plant modifications. Flotation recovery has been variable with changing ore types and feed grades, and has been demonstrated to decrease at very high throughput rates. At high throughput in the Phase 1 circuit the grind coarsens and the rougher circuit residence times are reduced. To date, all ore processed through the concentrator has originated from the Oyut open pit.

The Oyu Tolgoi concentrator uses conventional crushing, grinding, and froth flotation technology. The Phase 1 concentrator had an initial nameplate capacity of 32 Mt/a. Annual throughput has progressively increased as a result of operating experience and minor plant modifications such that annualised production rates exceeding 40 Mt/a have been achieved. Modifications to the concentrator (Phase 2) to process the combined production from the Hugo North and Oyut deposits have been designed to allow higher throughput rates and feed grades while minimising negative effects on flotation recovery. Phase 2 includes installation of an additional ball mill, additional rougher and cleaner flotation equipment, and additional concentrate thickening, filtering, and handling facilities.

Infrastructure facilities required for the open pit portion of the Oyu Tolgoi mine and process plant have been completed, and include a water borefield, water treatment plant, airport, accommodation, and administration, training, mine equipment maintenance, gatehouse, medical centre, fire station, heating plant, fuel storage, and warehouse facilities. Key infrastructure buildings and services that will be expanded or added in support of the underground mining operation are: a power distribution system, some internal access roads, concentrate logistics facilities, camp accommodation, water distribution, information and communication (ICT), surface warehouse for underground, central heating and the waste and recycling facilities.

Shipment of Oyu Tolgoi concentrates commenced in July 2013. The logistics process remains stable with sales transacted at a third-party warehouse facility at Huafang in China, approximately 7 km from the China–Mongolia border. Here the customers pay for the copper concentrate by means of a letter of credit and take responsibility for delivery of the concentrate by truck or train to their respective smelters. Efforts are continuing to explore markets outside China and to use different modes of transport, including direct delivery to customers or delivery to other bonded warehouses within China.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Preliminary Economic Assessment

24.1.1 Introduction

The 2021 PEA that follows is an alternative development option done at the conceptual level based on Mineral Resources, which assesses the Hugo North Extension Lift 2 deposit.

The 2021 PEA mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the 2021 PEA based on these Mineral Resources will be realized.

The information presented in Sections 1 to 14 of the Report also pertain to the 2021 PEA, as do Section 23, and Sections 25 to 27, and therefore are not repeated here. Information relating to Sections 15 to 22 content for the 2021 PEA is provided in the following sub-sections. Years presented in the 2021 PEA are for illustrative purposes only.

24.1.2 Mineral Reserve Estimates

This section is not relevant to the 2021 PEA, as the 2021 PEA mine plan is based on Mineral Resources only.

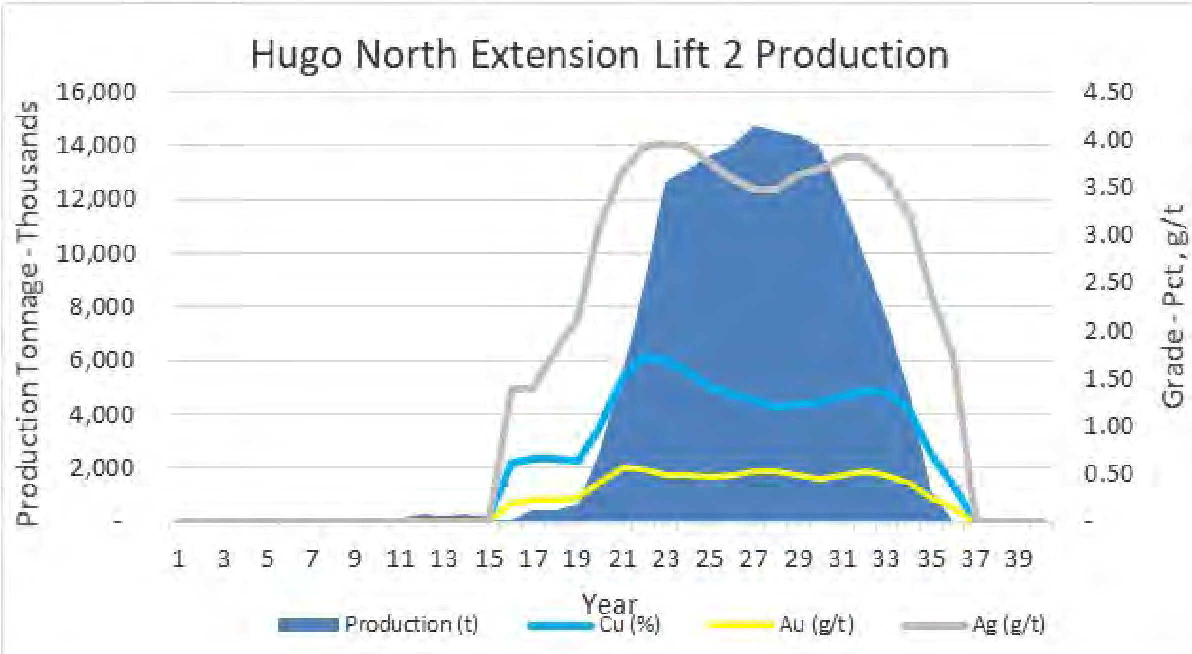
24.1.3 Mining Methods

Underground Mine Schedule

Underground Production Schedule

Mineral resources from Lift 2 form the basis of the 2021 PEA mine plan, which include 78 Mt (Indicated) and 88 Mt (Inferred). The average expected run-of-mine feed grade of 1.35% Cu, 0.49 g/t Au, and 3.6 g/t Ag (1.64% CuEq) includes dilution and mine losses. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The production forecast for the 2021 PEA is provided in Figure 24-1.

Figure 24-1: 2021 PEA Production Forecast for the Subset of Mineral Resources within the 2021 PEA Mine Plan



Note: Figure prepared by Wood, 2021. Year 1 = 2021 in this figure.

Underground Mine Processing Schedule

Underground Mining Method – Block/Panel Caving

All underground mining within the Entrée/Oyu Tolgoi JV property is anticipated to be by underground, block/panel caving. This provides a low-cost method that is amenable to the massive, weak rock mass associated with the mineralization and surrounding country rock and is suitable to sustain the throughput rate to the mill.

Generalized Caving System

As proposed for the Hugo North Extension Lift 2 mine, a generalized description of the cave mining method begins with the cave.

The cave itself is not an open cavity/chamber; rather, it is the region where broken rock accumulates between breaking/falling from the cave back and being drawn from a production drawpoint. Production draw rates are managed to control the gap between the top of the broken mineralized material within the cave and the exposed cave back.

This management is necessary to control the stresses applied by the broken mineralized material to the production/extraction levels and to prevent uncontrolled free-fall of mineralized material/rock as it breaks from the cave back.

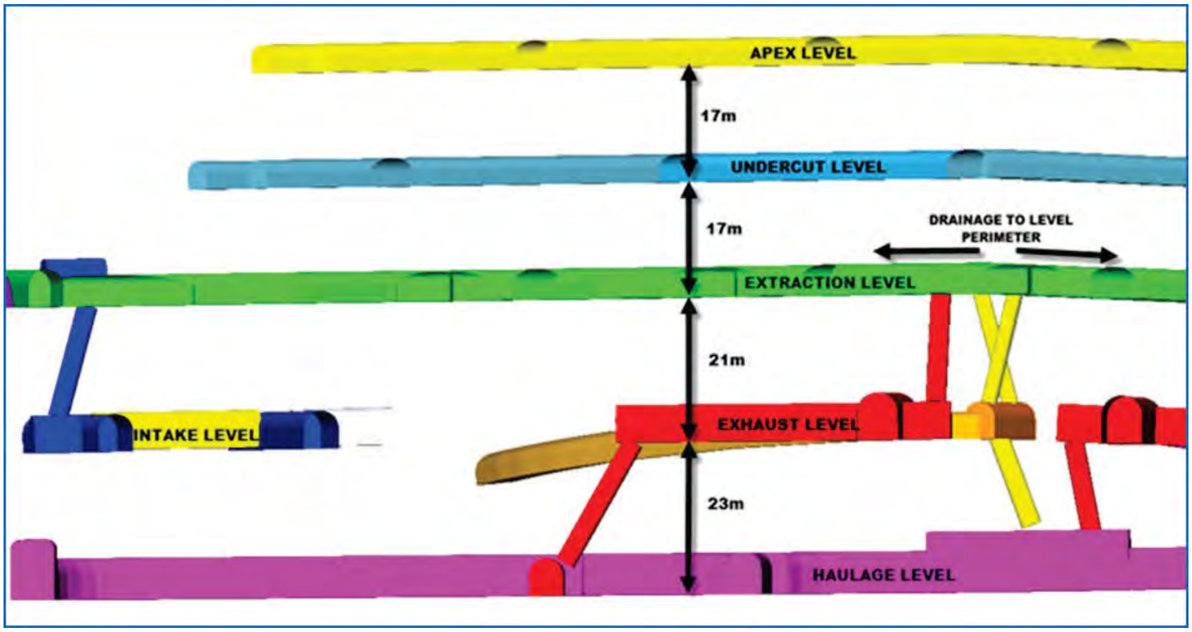
The cave is initiated by undercutting the rock mass until sufficient supporting rock has been removed and the "chamber" is no longer stable. With continued undercutting, the cave is progressed along the desired axis at a controlled rate. The undercut level is, generally, the upper of several levels common to panel/block caving methods (Figure 24-2). In the case of the Hugo North Extension Lift 2 mine, an additional level above the undercut level (the apex level), is planned to provide access for inspection of the cave and to monitor blasthole drilling.

Below the undercut level is the extraction level. This consists of numerous parallel drifts that cut across the width of the deposit and provide access to the drawpoints, from which mineralized material is extracted/drawn from the cave above (Figure 24-3). Pairs of drawpoints are connected from one extraction drift to the next by a short drift. Each of the drawpoint pairs is connected to the cave (undercut level) by a drawbell that focuses the downward flow of the mineralized material (under the effect of gravity) from the cave to the extraction level. Articulated LHD-type loaders are used to load the mineralized material from the drawpoint, haul it to an ore-pass and dump it into the ore-pass through a size-restricting grizzly.

The ore-passes serve two basic functions, first to provide an access to transfer extracted mineralized material from the extraction level to the haulage level, second to provide a degree of surge storage. The haulage level provides access drifts for the primary haulage trucks to collect ore from the ore passes, through truck loading chutes, and transport it to the primary size reducing crushers. At the primary size reducing crushers, the mineralized material is crushed to a size range suitable for handling and transport on a main belt conveyor or through a skip hoisting system.

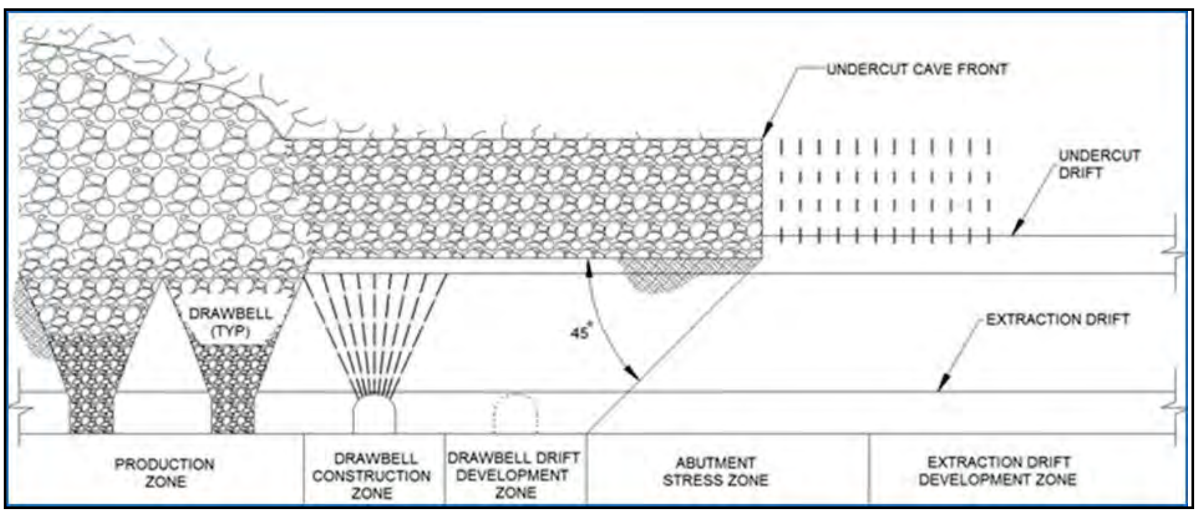
For the proposed Hugo North Extension Lift 2 mine, the primary mill feed-handling system to the surface will be a system of multiple, series-aligned, conveyor belts. Figure 24-4 shows the arrangement planned at Hugo North Extension Lift 1. These systems will be loaded from bins below the associated and respective crushers and will carry the mineralized material to the surface where it will be transferred to the main overland conveyor to the mill feed storage barn.

Figure 24-2: Generalized Cross-Section Through Typical Cave Mine Mining Horizon



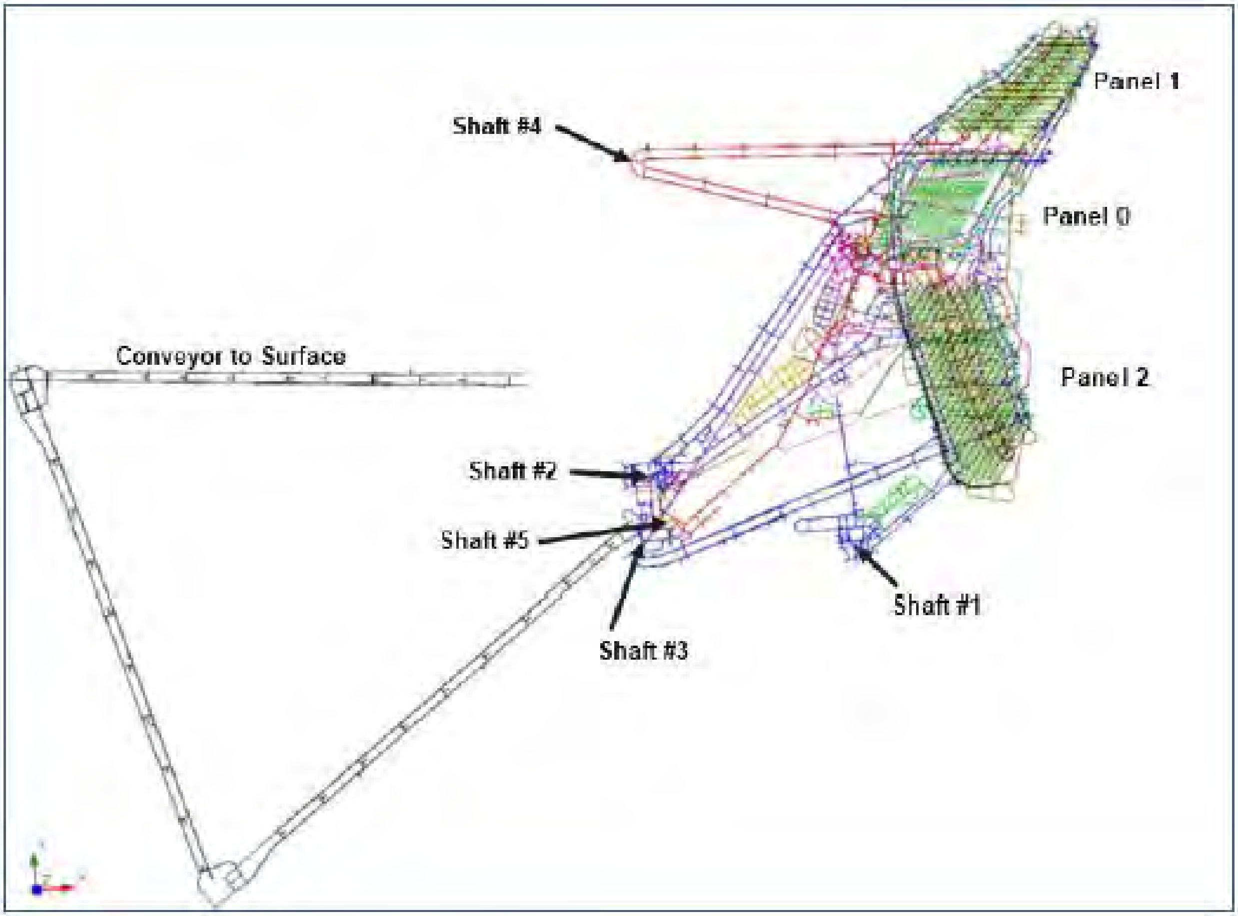
Note: Figure from 2020 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2021.

Figure 24-3: Generalized Cave Section Showing the Cave, Undercuts, and Draw-bells



Note: Figure from 2020 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2021.

Figure 24-4: Arrangement of General Underground Support Infrastructure for Mining Areas



Note: Figure from 2020 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2021.

Underground Mine Support Infrastructure

Ventilation intake and exhaust will be carried in several dedicated airways (shafts and drifts) to move air from the surface, through the mine workings and return to the surface. The fresh air will be drawn into the mine through intake shafts and carried to the mine working areas through several intake drifts.

From a main intake gallery, the air will be distributed to the various work areas either directly from in ventilation drift or through a ventilation raise.

Vitiated/exhaust air will be drawn away from the work areas toward a main exhaust gallery through exhaust raises or directly out of the respective work areas. The exhaust air will then be drawn towards the exhaust shafts through several exhaust drifts. The exhaust shafts will provide access back to the surface where the air will be ejected through the mine main fans.

Equipment maintenance shops will be provided underground to accommodate the routine maintenance needs of mobile and fixed-plant equipment. These shops will include provision for equipment such as: haul trucks, LHDs, rock drills, service equipment, light vehicles, crushers and conveyors, etc. Warehouse space, appropriate to the respective shop, will be planned for each of the maintenance facilities.

Office and support space will be provided underground to accommodate the needs of operations and support personnel assigned to work underground. This space will include offices for operations and engineering staff, lunchrooms, toilet facilities, training rooms, safety/mine rescue facilities and equipment, etc.

Dedicated refuge facilities, either fixed or mobile, will be provided to ensure personnel a habitable environment in the event of a mine fire, inundation, or other emergency where the main mine atmosphere may not be conducive to life support.

The existing Hugo North Extension Lift 1 infrastructure will be used to support the Lift 2 mine. It is anticipated that access to the Hugo Extension Lift 2 area will be by a decline system from Lift 1, and extension to Shaft 4, and internal ventilation shafts or raises to provide ventilation. Mineralized material would be crushed, and conveyed to surface by a two-leg extension to the Lift 1 incline conveyor system (Thomas et al., 2020).

Mine Surface Support Infrastructure

Surface located infrastructure for the mine ventilation system will include intake air heating systems and the main (exhaust) fans. The winter air temperatures at the mine site are often below freezing, so to prevent possible damage to the intake shaft and/or fittings the intake air will be seasonally heated to +2°C, using a glycol-based heat exchanger. The source of heat to the glycol system will be the site heating water reticulation system. The system main fans, located at the top of the exhaust shafts, will provide the main impetus for the movement of air through the mine.

The main offices for the underground mines will typically be located near the personnel access into the mine. The office building will generally provide for office space of mine personnel assigned to work on the surface. Additionally, the facility will support the miner change facility (dry-house), training rooms, safety and mine rescue. Shaft collar areas will be provided to accommodate the staging of personnel, material and equipment that is to be transported to/from the underground. Where mineralized material/waste skipping will be used, the skip dumps and associated infrastructure is also included with this support infrastructure.

Underground Mining Areas

The subset of the Mineral Resource estimate in the 2021 PEA mine plan consists solely of the Hugo North Extension Lift 2, within the Entrée/Oyu Tolgoi JV property. The current level of knowledge regarding these areas suggests that cave mining is appropriate for the deposit, and the general mining method and system will be as described in the previous sub-sections.

The spatial relationship of the Hugo North/Huge North Extension Lift 2 to the greater Oyu Tolgoi mining complex is shown in Figure 24-5 where the deposit area in the 2021 PEA mine plan is within the zone marked as "Shivee Tolgoi ML Joint Venture Property" on the right of the figure.

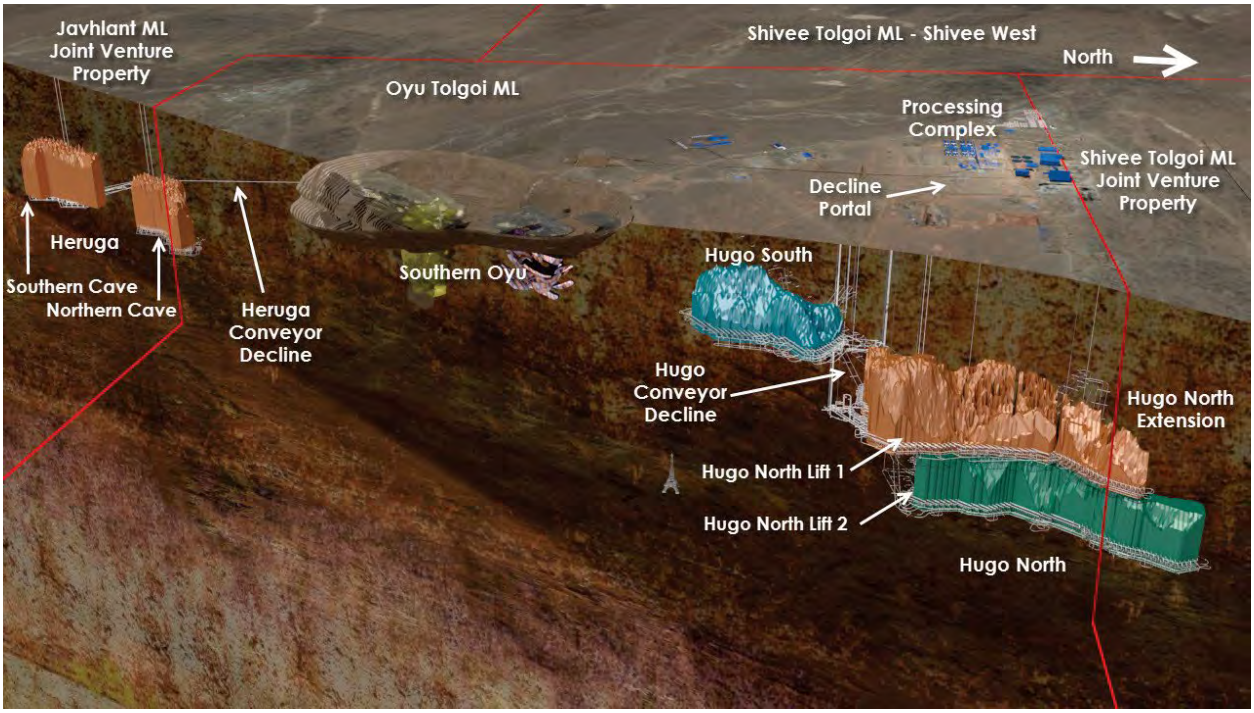
Hugo North Extension Lift 2

The Hugo North Extension mine planning and optimization indicated that the ideal elevation for the second lift (Lift 2) is approximately 400 m below Lift 1 (~1,700 m below surface). The effect of the northeasterly plunge of the mineralization is evident in the total tonnage considered in the mine plan. The mine plan assumes that draw-points will be in use for production between 2038 and 2055 in the Hugo North Extension Lift 2 area.

Initial mill feed delivery from the Hugo North Extension Lift 2 is assumed to begin in 2027 when development commences in the Hugo North Extension Lift 2 area. Production from Hugo North Extension Lift 2 is anticipated to begin in 2038 with the completion of the first drawpoints, and stabilizes in 2043. The peak production from Hugo North Extension Lift 2 is expected to be approximately 40,500 t/d in 2047, and the average life-of-mine production rate (2031–2056) is planned at about 17,500 t/d.

The existing Hugo North Extension Lift 1 infrastructure will be used to support the Lift 2 mine. It is anticipated that access to the Hugo Extension Lift 2 area will be by a decline system from Lift 1, and extension to Shaft 4, and internal ventilation shafts or raises to provide ventilation. Mineralized material would be crushed, and conveyed to surface by a two-leg extension to the Lift 1 incline conveyor system.

Figure 24-5: Schematic of Deposit Areas



Note: Figure from 2020 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2021.

Equipment Fleet

The Hugo North Extension Lift 2 mine in the 2021 PEA case is anticipated to use a similar equipment fleet based on the requirements of the common block cave technique. The underground mobile equipment fleet is classified into seven broad categories:

- Mucking (articulated LHD type loaders)
- Haulage (tractor-trailer road trains and articulated haul trucks)
- Drilling (multi-boom jumbos, production drills and bolting equipment)
- Raise bore and boxhole (pilot hole and reaming)
- Utilities and underground support (flatbed, boom trucks, fuel and lube carriers, explosive carriers and loaders, shotcrete transmixers and sprayers, telehandlers, etc.)
- Surface support
- Light vehicles (personnel transports, "jeeps", tractors, etc.)

Major fixed equipment will include:

- Material handling (crushing and conveying)
- Fans and ventilation equipment
- Pumping and water handling equipment
- Power distribution equipment
- Data and communications equipment
- Maintenance equipment (fix shop furnishings).

24.1.4 Recovery Methods

The 2021 PEA assumes that no changes will be required to the process plant from those contemplated in Phase 2, and that the same mill throughput will be maintained. Plant processes and reagent use will also stay the same. Therefore, information relating to the process plant remains the same for the 2021 PEA LOM, as discussed in Section 17 for the Phase 2 process capacity. Those data are reproduced here for completeness of the 2021 PEA presentation.

Introduction

Entrée's share of products will, unless Entrée otherwise agrees, be processed at the OTLLC facilities by paying milling and smelting charges. The OTLLC facilities are not intended to be profit centres and therefore, minerals from the Entrée/Oyu Tolgoi JV property will be processed at cost. OTLLC will also make the OTLLC facilities available to Entrée at the same terms if spare processing capacity exists to process other suitable mill feed.

Oyu Tolgoi, including the Entrée/Oyu Tolgoi JV property, is being developed in phases:

- Phase 1: all work required to bring OTLLC's Oyut open pit into full commercial production through commissioning and ramp-up of Lines 1 and 2, by the addition of essential services and infrastructure. The Phase 1 concentrator was commissioned in early 2013. The nameplate processing capacity of 96 kt/d was achieved in August 2013. Operating data acquired since that time have been used in Phase 2 design, which addresses the delivery of Hugo North/Hugo North Extension underground plant feed via Lift 1 in conjunction with open pit mining

- Phase 2: all additional work required to process Hugo North (including Hugo North Extension) Lift 1 production plus open pit plant feed to match Phase 1 semi-autogenous grind (SAG) mill capacity, including:
  - The addition of a fifth ball mill to achieve a finer primary grind P_{80} of 150 to 160 µm for a blend of Hugo North/Hugo North Extension and Oyut open pit feeds, compared to 180 µm for the Southwest zone (Oyut).
  - Additional roughing and column flotation capacity to process the higher level of concentrate production when processing the higher-grade Hugo North/Hugo North Extension plant feed.
  - Additional concentrate dewatering and bagging capacity.

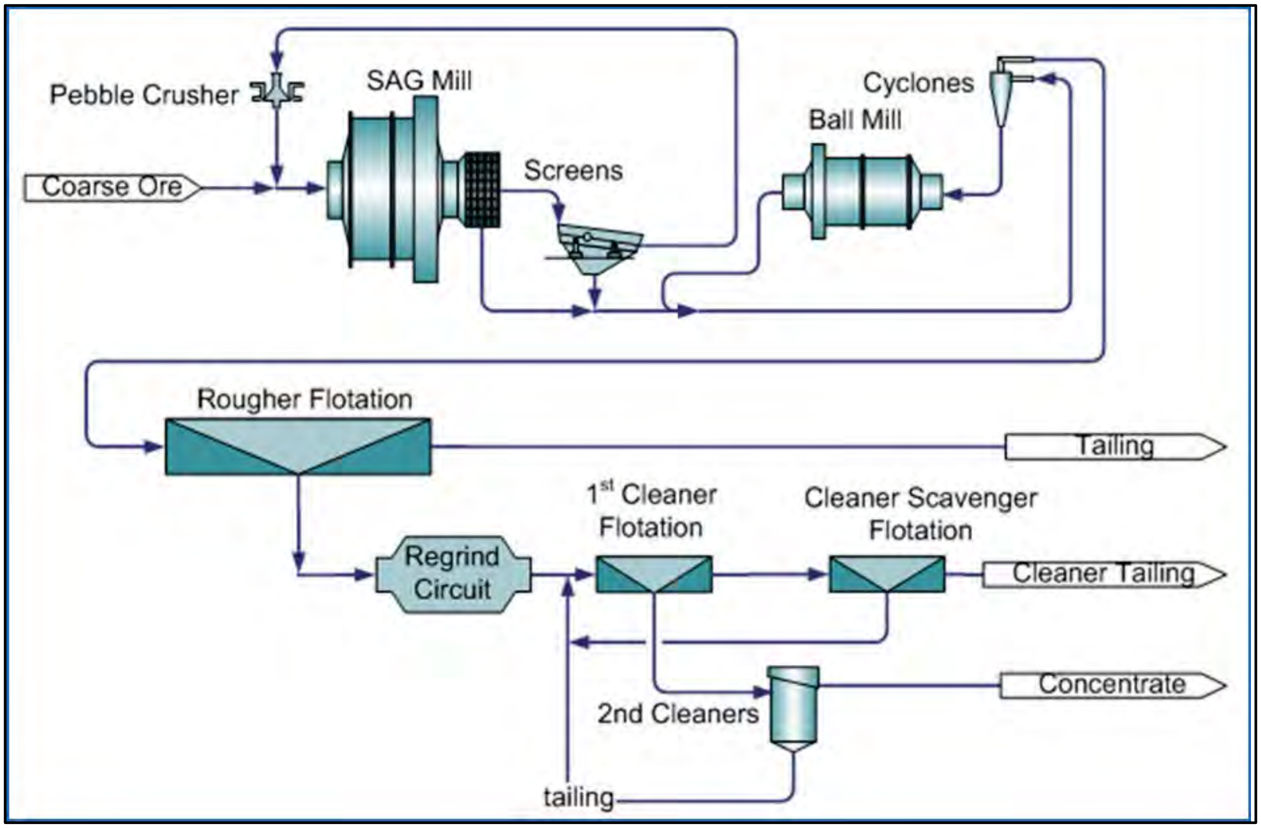
The intent of Phase 2 is to treat all of the high-value Hugo North/Hugo North Extension ore delivered by the mine, supplemented by OTLLC's open pit ore to fill the mill to its capacity limit. The open pit feeds have different optimal processing conditions than does the Hugo North/Hugo North Extension ore, and the concentrator operation will target capturing maximum value from the higher NSR of the underground ore. These conditions approximate those for Southwest zone (Oyut) ore but will not be optimal for Central zone (Oyut) ore. The higher grades of the Hugo North/Hugo North Extension ore will generate high tonnages of concentrates, which will beneficially dilute impurities, particularly arsenic from the Central zone (Oyut) ore.

The existing concentrator substation to the south will be expanded to supply the additional electrical loads. The Phase 1 bagging plant will be expanded by the addition of four more bagging modules. This expansion was anticipated in the Phase 1 design, and room was provided for the new equipment.

Process Flow Sheet

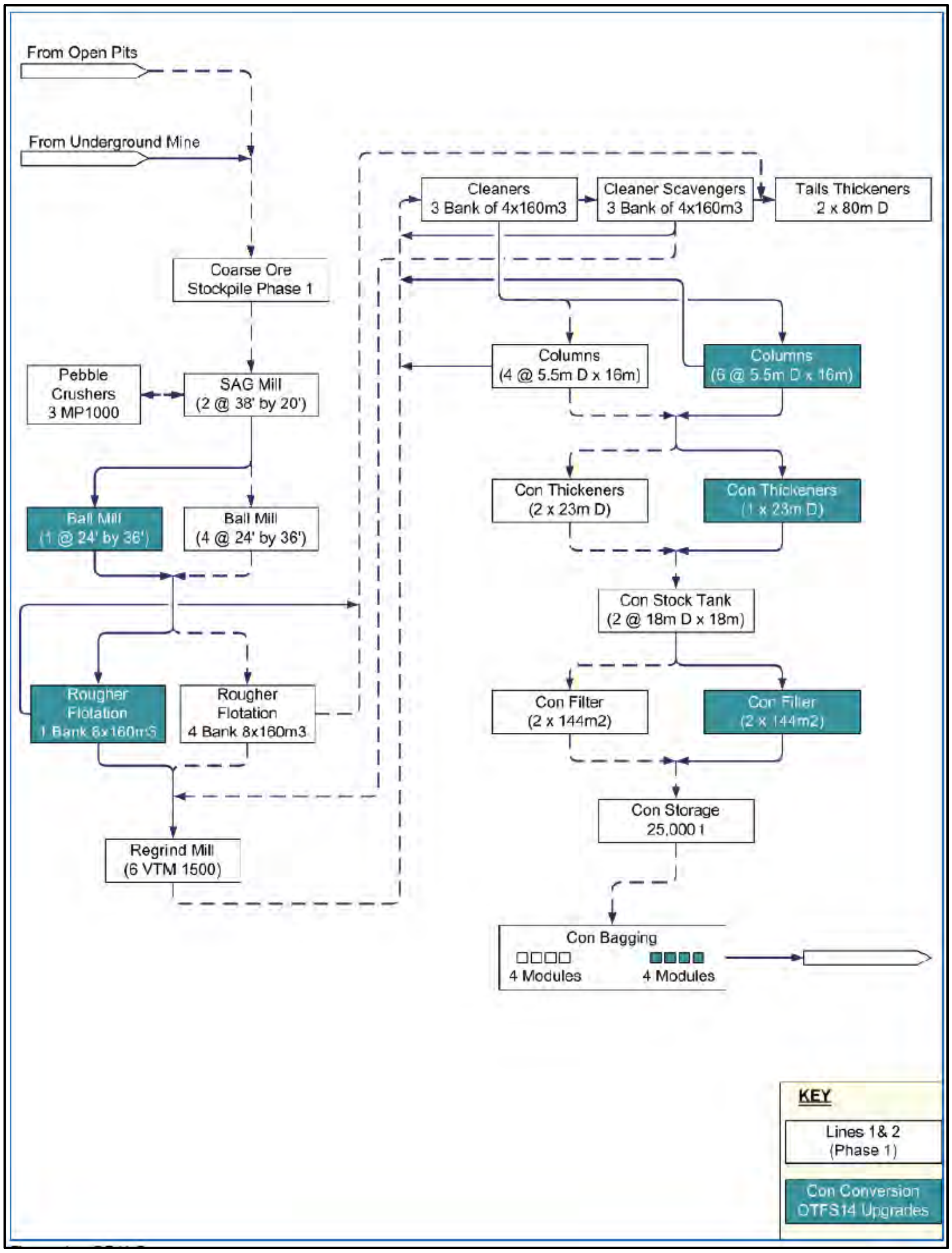
The proposed flowsheet for Phase 1 is included as Figure 24-6. Figure 24-7 shows the concentrator overall block diagram on completion of Phase 2.

Figure 24-6: Basic Oyu Tolgoi Concentrator Flowsheet – Phase 1



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Figure 24-7: Oyu Tolgoi Project Concentrator Overall Block Diagram on Completion of Phase 2



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

Plant Design

Phase 1, currently in production, uses two grinding lines (Lines 1 and 2), each consisting of a SAG mill, two parallel ball mills, and associated downstream equipment to treat up to 100 kt/d of ore from the Oyut open pit. During Phase 2, softer ore from the Central zone of the Oyut open pit will be processed and combined with Hugo North/Hugo North Extension underground ore.

The Phase 2 concentrator development program will optimize the concentrator circuit to enable it to maximise recovery from the higher-grade Hugo North/Hugo North Extension ore and to allow it to handle higher tonnage throughput. Components of Lines 1 and 2 that require upgrading to accommodate the gradual introduction of ore from underground include the ball mill, rougher flotation circuit, flotation columns, concentrate filtration, thickening, and bagging areas, and bagged storage facilities.

The plant description includes the modifications to be made to process Lines 1 and 2 to accept higher milling rates and head grades during the first three years after initial ore delivery from Hugo North/Hugo North Extension Lift 1.

The primary crushing and overland conveying systems that deliver crushed ore to the coarse ore stockpile will not need to be modified for Phase 2. The underground operations will provide for the delivery of ore to the existing coarse ore storage gantry via an additional parallel conveyor, which was allowed for in the Phase 1 design.

The process plant employs a conventional semi-autogenous grind (SAG) mill/ball mill/grinding circuit (SABC) followed by flotation.

In each of Lines 1 and 2, coarse ore is slurried and ground to approximately 80% passing 2 mm in 38 ft diameter SAG mills. Screening of the discharge separates out +15 mm particles, which are transferred to pebble crushing by conveying systems for size reduction and then returned to the SAG mills. Ten to 15% of the feed circulates from the SAG mill screens to the pebble crushers, depending on ore type and grate condition. SAG mill screen undersize from each mill flows into dedicated concrete pump hoppers and is pumped to through pressurised distributors which split the flow between the discharge hoppers of pairs of secondary ball mills.

Transferred SAG mill product slurry, combined with ball mill discharge slurry, is pumped to dedicated packs of cyclones. Cyclone underflow from each pack returns to its respective ball mill, while the overflow, with an 80% passing size of 140–180 µm, is distributed by gravity to the rougher flotation feed distributor. The slurry is distributed to four lines of self-aspirated rougher flotation cells and combined rougher concentrate is then reground in vertical tower mills to 80% passing 35 µm before delivery to the first stage cleaners. The concentrate from the first stage cleaners is pumped to four sparged column cells operating in parallel, which produce the final grade concentrate.

Tailings from the cleaner and rougher flotation cells are combined, thickened, and pumped to the tailings storage facility (TSF), where they settle to their terminal density, allowing the recycle of process water to the concentrator. The cleaner concentrate is thickened, filtered, bagged, and transported to the Chinese border where it is transferred to a holding yard, awaiting transport to smelters. Currently, all tailings are pumped to TSF Cell 1. The tailings pumping system will be upgraded to feed Cells 1 and 2 when Cell 2 is required to be commissioned.

Energy, Water, and Process Materials Requirements

Reagents and Media

Phase 2 will share facilities with the Phase 1 Lines 1–2 reagent supply systems. The modifications to the reagent system are described below. In general, the aim is to have 45 days of reagent inventory on hand at or near the plant site.

- Lime: No additional lime storage capacity, beyond the four 1000 t silos installed in Phase 1 is required. An additional metering station will be required at the new rougher bank and the column cells.
- Primary collector: The primary collector will be Aerophine 3418A (sodium di-isobutyl dithiophosphinate). Consumption will peak at nearly 1700 kg per day during Phase 2, approximately 65% more than the Phase 1 usage. The Phase 1 system has ample dilution capacity to supply the conversion. An additional metering station will be required at the new rougher bank.
- Secondary collector: The proposed on-site inventory for Phase 1 is 40 t, which has not been increased for the conversion to Phase 2. An additional metering station will be required at the new rougher bank. No secondary collectors are currently added in Phase 1.
- Frother: Frother distribution in Phase 1 provides for the use of two frothers, methyl isobutyl carbinol (MIBC) added neat, and a secondary frother (polyglycol ether or similar) added as a low concentration solution in water. Primary frother consumption in Phase 2 will be roughly equal to Phase 1 design at 15 g/t, peaking

at nearly 1,800 kg per day due to a reduction in estimated consumption, as corroborated by May to December 2013 consumption reports. No additional frother tankage will be required. Delivery will be in 18 m^3 isotainers off-loaded by forklift and placed on a racking system, from which the contents will be pumped to the plant storage. Additional metering stations for each type will be required at the new rougher bank

- Tailings flocculant: The major flocculant will be a non-ionic type such as Magnafloc 338. Tailings flocculant use will increase to 2400 kg per day, proportionate to tonnage. No new flocculant preparation equipment will be installed. The proposed reagent inventory is considered adequate for Phase 2. Recent testing of an alternate flocculant has led to higher underflow densities at significantly reduced consumption
- Concentrate flocculant: The flocculant used for concentrate thickening is an anionic variety, such as Magnafloc 5250. Concentrate flocculant demand will increase to 110 kg per day, but the Phase 1 capacity is sufficiently under-utilised that expansion will not be necessary. An additional flocculant metering pump and dilution system will be installed. Reagent inventory will be increased to five bulk bags
- Water treatment chemicals: The existing anti-scalant and corrosion inhibitor supply systems will be adequate for both the process and raw water systems. The reagent inventory is also adequate for Phase 2
- Grinding media: No additional inventory is required for SAG milling. For ball milling, the new Ball Mill 5 will use the existing 1.6 kt ball storage system for 75 mm balls and the ball conveying system will be modified to deliver to it. An additional inventory of 192 t of 75 mm media in quarter-height isotainers is provided. Using Phase 1 regrind media consumption estimates, the regrind mills will consume about 22 t/d of 16 mm media, reducing on-site inventory to eight days of operation. However, actual operating data for 2013 indicates a large decrease in consumption, from the design 2013 plan of 130 to 60 g/t for Southwest zone (Oyut) ore. Long-term consumptions in regrind milling are budgeted in terms of g/kWh for the various ore types. Underground ore has a lower abrasivity than the more siliceous open pit ore, with corresponding lower specific media consumption anticipated.

Raw Water

Raw water is delivered by pipeline from the lagoon to the raw water tank, from where it is pumped through cartridge filters to the grinding and air compressor cooling systems. Spent cooling water will supply a second gland seal water tank interconnected with the Phase 1 gland seal water tank. Excess spent cooling water will flow by gravity to the tailings collection box and make its way to the process water tank via the tailings thickener overflow; any shortfall in gland seal water requirement will be made up directly from the cooling water supply.

The concentrator conversion equipment will be serviced by the existing water system with minimal modification. The gland seal water storage capacity will be expanded, and appropriate connections added to the existing network.

Process Water

The bulk of the process water is added to the SAG mill feed chutes and the cyclone feed pump boxes in high volumes at low pressure. The ball mills are secondary addition points. The rest of the process water is circulated around the mill at higher pressure for sprays, utility hoses, and other miscellaneous uses. A booster pump is provided for high-pressure washing of the mill liners. The increased tonnage in Phase 2 will require additional process water but no system modifications.

Water Balance

The concentrator raw water demand varies seasonally due to evaporation, ice formation on the TSF, and the release of water during spring thaw. Annual average raw water demand is 0.45 m^3/t ore processed. The total site raw water demand has been estimated to range from a low of 678 L/s in June to as high as 932 L/s in the February–March period, with an average of 732 L/s. The design groundwater pumping capacity is 900 L/s. Using drawdown of the lagoons will slightly reduce the lagoon recharge rate, but the current projection is that the peak instantaneous raw water demand could exceed 900 L/s at the Phase 2 volumetric limit of 121 kt/d (after tailings system upgrades), and approach it at the average of 117.43 kt/d in the peak Phase 2 year (2021). This compares with the long-term average Gunii Hooloi groundwater extraction of 870 L/s approved by the Ministry of Environment, Green Development and Tourism (MEGDT), based on average usage over 40 years. The largest water loss, 564 L/s, is the entrained water in the settled tailings.

The Phase 1 design specified a final tailings settled density of 73.5%. That value has not been realised to date and a value of 70% has been used in the water balance model.

Concentrator Power

With the addition of the concentrator conversion loads, the peak operating load demand from the existing 220 kV concentrator substation will increase by an estimated 20 MW (from 116 to 136 MW), and the nominal operating (diversified) load will increase by an estimated 19 MW (from 106 to 125 MW). The operating power demand includes the diversity, demand, and percent duty factors specific to the type of equipment and process.

Total demand for Phase 1 and the concentrator conversion combined during normal operating conditions is estimated at 150 MW peak operating load and 144 MW nominal operating (diversified) load. This includes the peripheral 35 kV ring loads to the concentrator account. This nominal operating load results in an estimated annual power consumption of 1,093,800 MWh for the combined concentrator, an incremental increase of 161,400 MWh for the concentrator conversion.

The existing concentrator 35 kV line will distribute power through cable feeders to the following:

- One 16 MVA, 35 kV–10.5 kV Ball Mill 5 oil-filled transformer, and
- One 16 MVA, 35 kV–6.3 kV oil-filled transformer from a new 35 kV GIS switchgear section to be added.

The modifications will provide power for all of the new conversion equipment, in addition to the power demands of the relocated air compressors and the new column cells.

24.1.5 Project Infrastructure

As noted in Section 18.1, the majority of the primary infrastructure and facilities required for the Oyu Tolgoi project were completed during Phase 1. Section 18.1 also summarizes what infrastructure and facilities would be required to support Phase 2.

Key additional infrastructure assumptions that would be needed to support the 2021 PEA mine plan in addition to that contemplated in Phase 2 include:

- Construction of permanent underground facilities including crushing and materials handling, workshops, services, and related infrastructure
- Modifications to the electrical shaft farm substation, and upgrades to some of the distribution systems
- Expanded logistical and accommodations infrastructure
- Underground maintenance and fuel storage facilities
- Expanded water supply and distribution infrastructure
- Expanded TSF capacity.

The 2021 PEA assumes that the infrastructure in place for Hugo North Extension Lift 1 will be available for Hugo North Extension Lift 2, and that a similar design will be employed for the underground mining operation.

24.1.6 Market Studies and Contracts

The marketing study and commodity price assumptions remain the same as those discussed in Section 19. Those data are reproduced in this sub-section for completeness of the 2021 PEA presentation.

Supply and Demand Forecasts

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

Copper supply-demand fundamentals are expected to remain solid, with the market in a slight deficit during 2019–20 and a moderate surplus from 2021. Demand in the next five years, is expected to increase, supported by growth in ex-China Asia, a modest expansion in China, and a recovery in developed markets (USA and Europe). Despite the strong gains observed in the last decade, there remains scope for further growth in emerging markets driven by continued urbanization, industrial and infrastructure upgrade, and rising household incomes in the medium-to-long term.

Supply is expected to remain constrained until 2021, when new production from committed projects are expected to enter the market, resulting in a temporary oversupply. Later in the decade, however, a supply gap is expected to open as output from existing operations declines due to falling grades and resource depletion. The pace at which new projects (particularly greenfield projects) can be brought online is slow because of remoteness, high altitudes, lower grades, high capital intensity, social and environmental requirements, and other risks associated with the development of large-scale copper projects.

Consistent with strong demand fundamentals, refined copper consumption is expected to increase. China is expected to continue to dominate this market, but with its share of refined consumption declining from a peak of 50% in 2019 to 46% by 2030.

Total copper smelting production capacity is expected to increase, with China forecast to see most of the growth in the next five years. Historically, raw material constraints have resulted in low utilization rates at smelters and have exacerbated competition for concentrate in China, which relies largely on imported feed. This trend is expected to continue.

Chinese smelting capacity is expected to continue to expand through 2030, with several identified greenfield and brownfield projects, and China is expected to add more smelting capacity than the rest of the world put together. As the smelter capacity growth outpaces mine supply growth and competition for concentrate intensifies, it is likely the Chinese smelting industry will see some consolidation.

Sales and Marketing

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The Oyu Tolgoi Copper Concentrate Sales and Marketing group (CCSM) is responsible for all aspects of concentrate marketing and sales, including, updating product specifications, negotiating sales and logistics contracts, and analysing supply-and-demand trends in the Chinese and global markets. CCSM is supported by Rio Tinto's Copper Concentrate Sales and Marketing team.

Product Specification

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The 2021–2040 concentrate specifications of Oyu Tolgoi concentrate are listed in Table 24-1 and Table 24-2. The specifications are regularly updated to match the planned production schedule. CCSM communicates and discusses any specification changes with Oyu Tolgoi customers.

Table 24-1: Specifications for Major Components of Oyu Tolgoi concentrate (2021–2040)

Element	Unit	Average	Minimum	Maximum
Cu	%	28.3	22.3	35.7
Au	g/dmt	8.3	2.4	41.0
Ag	g/dmt	51.5	35.2	67.9
As	ppm	2,244	951	4,700
F	ppm	673	549	800
Cd/Pb/Hg	ppm	Under review	Under review	Under review
Moisture	%	8.0	6.0	10

Notes: Arsenic levels are managed to an internal limit of 4,700 ppm by either blending or internally recycling concentrate to meet the 5,000 ppm Chinese import limit. Lead (Pb), cadmium (Cd) and mercury (Hg) specifications were under review at the time of the 2020 Feasibility Study.

Table 24-2: Specifications for Major Components of Oyu Tolgoi Concentrate (5-year averages)

Major Elements	Unit	2021–2025	2026–2030	2031–2035	2036–2040
Cu	%	27.1	34.0	28.4	26.5
Au	g/dmt	12.9	8.8	5.9	3.4
Ag	g/dmt	51.6	63.9	50.8	42.0
As	ppm	2,501	1,635	1,717	2,105
F	ppm	664	677	645	687
Cd/Pb/Hg	ppm	Under review	Under review	Under review	Under review

Note: Lead (Pb), cadmium (Cd) and mercury (Hg) specifications are currently under review

During the initial years of production, concerns were raised by customers regarding grade variability and the high gold content of the concentrate. These concerns are expected to continue in the short-term and are being addressed through smart scheduling and targeted placement, combined with active management of the product quality. Grade variability is expected to reduce significantly as production from Hugo North builds up, enabling higher-grade feed from the underground mine to be blended with ore from the open pit.

As underground production increases, the concentrate copper grade will increase to above 30%, making it more attractive to customers for blending with lower grade concentrates sourced from elsewhere. Gold content is also projected to decrease as underground production increases, making the concentrate more attractive to Chinese smelters.

Impurity limits in concentrate smelted in China are issued jointly by the Ministry of Commerce and the Ministry of Environmental Protection. The mandatory standard, implemented in 2007, specifies the upper limits for impurities found in imported copper concentrate, as shown in Table 24-3. Copper concentrate with impurities content above these limits cannot be imported into China.

As indicated in Table 24-1, the arsenic and fluorine levels in the Oyu Tolgoi concentrate generally fall within Chinese national impurities limits shown in Table 24-3 (sourced from Chinese Standard GB 20424-2006). If there are any changes to these impurity limits, Oyu Tolgoi will take any necessary steps to ensure that the material produced complies with the requirements imposed by Chinese regulators. A detailed assessment and mitigation plan is underway to ensure this is achieved.

Commodity Price Projections

The commodity pricing used for the subset of the Mineral Resource estimate that is used in the 2021 PEA is based on pricing from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020), which uses BDT 38 and the 2020 Feasibility Study as a basis, and which in turn is based on reviews of long-term consensus estimates reported in public reports.

Table 24-4 provides an overview of metal pricing and smelter terms used for the Mineral Resource and Mineral Reserve estimates. The basis for the smelter terms is discussed in Section 19.3.

The economic analysis commodity pricing is based on pricing from the CIBC analyst consensus average published on 30th April 2021.

Table 24-5 provides an overview of metal pricing and smelter terms used for the economic analysis. The basis for the smelter terms is discussed in Section 19.3. The economic analysis includes a silver refining charge of US$0.45/oz Ag, derived from the 2016 Turquoise Hill Technical Report (Peters and Sylvester, 2016).

Table 24-3: Concentrate Impurity Limits Imposed by Chinese National Regulators

Element	Upper Limit (ppm)
As	5,000
Pb	60,000
F	1,000
Cd	500
Hg	100

Table 24-4: Commodity Pricing and Smelter Terms (subset of Mineral Resource estimate within the 2021 PEA Mine Plan)

Parameter	Unit	Long-Term Assumptions
Copper price	US$/lb	3.08
Gold price	US$/oz	1,292
Silver price	US$/oz	19.00
Treatment charges	US$/dmt conc.	84.00
Copper refining charge	US$/lb	0.085
Gold refining charge	US$/oz	4.50

Table 24-5: Commodity Pricing and Smelter Terms (economic analysis)

Parameter	Unit	Long-Term Assumptions
Copper price	US$/lb	3.25
Gold price	US$/oz	1,591
Silver price	US$/oz	21.08
Treatment charges	US$/dmt conc.	91.12
Copper refining charge	US$/lb	0.09
Gold refining charge	US$/oz	4.50
Silver refining charge	US$/oz	0.45

Contracts

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

The current marketing plan places more than 60% of concentrates on term contracts and the balance on spot contracts tendered to smelters or traders. The spot component allows for management of the variations in annual production, market dynamics, support potential trials with new customers, or to support of other marketing activities. The plan also provides some flexibility on volume shipped.

The term of the current contracts ranges from one to five years, which helps to reduce contract renewal risk from contracts expiring at the same time.

OTLLC currently has 13 long-term contracts and several spot agreements. The arrangements differ between entities with respect to commercial terms and length of contract. Smelter customers are based in various provinces throughout China, while trader customers allow Oyu Tolgoi concentrate broad and far-reaching uptake across China’s many smelters.

Rail capacity in China is expected to be constrained for the next 5–10 years, leading to delivery delays and increased Chinese transport costs as concentrate volume grows. To secure downstream logistics capacity, OTLLC is pursuing an agreement with Shenhua Logistics to provide rail services to eastern China. Shenhua owns the largest private rail network in China, including the line to Gashuun Sukhait–Ganqimaodao.

CCSM are responsible for the logistics strategy in China. Transportation from the mine to the bonded warehouse in China is the responsibility of the Oyu Tolgoi Operations.

Sales to customers are currently completed on a “deliver at place” basis at the Huafung bonded warehouse. Customers are responsible for transportation within China, with compensation for transport costs provided through a freight differential price adjustment. Where it makes sense, customers are being transitioned to a direct delivery model, where OTLLC pays for domestic transport in China and the freight differential is eliminated.

The smelter terms used in this Report are from the 2016 Oyu Tolgoi Feasibility Study as reported in the 2016 Turquoise Hill Technical Report (Peters and Sylvester, 2016) and BDT31.

Under the terms of the JVA (Article 12), Entrée retains the right to take the product in kind. For the purposes of this study, it has been assumed that Entrée takes control of their portion of the bagged concentrate and that the sales of concentrate will use the same approximate smelter terms, transport and other marketing costs as for the OTLLC concentrate.

Marketing Strategy

OTLLC has developed a marketing strategy for the Oyu Tolgoi project, including their portion of the mineralization within the Entrée/Oyu Tolgoi JV property.

Information in this subsection is reproduced from the 2020 Turquoise Hill Technical Report (Thomas et al., 2020).

It is envisaged that the CCSM team will continue to oversee and execute all sales and marketing activities for OTLLC. A strategy has been developed by CCSM for marketing concentrate from Oyu Tolgoi that includes the following considerations:

- Customer attractiveness (financial situation, growth plans etc)
- Delivery point and terms
- Freight costs (e.g. mine to customer versus port to customer)
- Precious metals recovery and payment
- Length of contract
- Percentage of off-take to smelters versus traders
- Percentage on contract versus spot
- Percentage sales to any one smelter
- Number of customers for a given scale of operation
- Management of concentrate quality and volume during commissioning and ramp-up
- Alternate offshore logistics and costs.

In addition to the points listed above, the marketing strategy considers the contractual obligations of OTLLC under the Investment Agreement and the Concentrate and Power Supply Agreement (dated 3 November 2012) concerning smelting capacity developed within Mongolia or Inner Mongolia. In the case of a smelter being built in Mongolia, contractual obligations require OTLLC to provide concentrate for domestic smelting as a priority if requested by the Government of Mongolia and the terms should be mutually agreed. In the case of a smelter being built in Bayannoer, a city in western Inner Mongolia, contractual obligations will apply for supply of up to 25% of Oyu Tolgoi production at international terms no worse than those achieved elsewhere in the Chinese market. To date, no formal announcements have been made with regards to additional smelting capacity being built in Mongolia or in Bayannoer.

CCSM has established a customer database and conducts full marketing risk assessments each year, including contingency plans for customer default. Risk assessments are based on a number of factors, including contract value; OTLLC's exposure to a single contract; customer reliability, competence, performance, reputation and loyalty; the customer's potential for increased future sales; their commitment to safe production and product use; the cost of transport to the smelter; and the customer's technical ability to maximize the value of by-products.

The current marketing plan places more than 60% of concentrates on term contracts and the balance on spot contracts tendered to smelters or traders. The spot component allows for management of the variations in annual production, market dynamics, support potential trials with new customers, or to support of other marketing activities. The plan also provides some flexibility on volume shipped.

The term of the current contracts ranges from one to five years, which helps to reduce contract renewal risk from contracts expiring at the same time.

The smelter terms used in this Report are from the 2020 Feasibility Study as reported in the 2020 Turquoise Hill Technical Report (Thomas et al., 2020) and BDT38.

Under the terms of the JVA (Article 12), Entrée retains the right to take the product in kind. For the purposes of this study, it has been assumed that Entrée takes control of their portion of the bagged concentrate and that the sales of concentrate will use the same approximate smelter terms, transport and other marketing costs as for the OTLLC concentrate.

Comments on Section 24.1.6

The QP did not review contracts, pricing studies, or smelter terms developed by OTLLC or their third-party consultants as these were considered by OTLLC to be confidential to OTLLC. Instead, the QP relied on summary pricing and smelting information provided by OTLLC within the 2020 Feasibility Study and BDT38. Based on the review of this summary information, the OTLLC smelter terms are similar to smelter terms for which Wood is familiar, and the metal pricing is in line with Wood's assessment of industry-consensus long-term pricing estimates.

The economic analysis for the 2021 PEA is based on consensus pricing derived from CIBC. The QP reviewed the pricing, and the metal pricing is in line with Wood's assessment of industry-consensus long-term pricing estimates.

The concentrates being produced for sale at any given time will be derived from a blend consisting of a minority of Hugo North Extension (Entrée-sourced) ore and a majority of OTLLC-sourced ore. The influence of Entrée's ore on concentrate composition and its influence on concentrate marketing will be minor.

24.1.7 Environmental Studies, Permitting, and Social or Community Impact

Information relating to environmental studies, permitting, and social or community impact remain the same for the 2021 PEA as were discussed in Section 20. Those data are reproduced here for completeness. Changes have been considered for the TSF as part of the 2021 PEA LOM.

Introduction

An Environmental and Social Impact Assessment (ESIA) was completed for the for Oyu Tolgoi mine, based on an assumed 27-year mine life. Activities that did not constitute part of the project for the purposes of the ESIA include

- Project expansion to support an increase in throughput rates
- Long-term project power supply.

A cumulative impact assessment was performed to assess impacts from further developments at Oyu Tolgoi together with other existing or planned projects, trends, and developments within the South Gobi region.

An environmental management system (EMS) is currently in place for operations.

Baseline and Supporting Studies

The Oyu Tolgoi environmental and social impact assessment was a comprehensive assessment of existing biophysical and human environment conditions pre-mining, addressed potential effects of the mine on biophysical and human environment, and specifically addressed biodiversity with plans to increase biodiversity overall in the region through offsets to areas adjacent to the mine.

Environmental Considerations/Monitoring Programs

Environmental and Social Impact Assessment

Holders of a mining licence in Mongolia must comply with environmental protection obligations established in the Environmental Protection Law of Mongolia (1995), Law of Environmental Impact Assessment (1998, amended in 2001) and the Minerals Law (2006). These obligations include preparation of an EIA for mining proposals, submitting an annual EPP, posting an annual bond against completion of the protection plan and submitting an annual environmental report.

OTLLC has posted environmental bonds to the Mongolian Ministry of Environment, Green Development and Tourism (MEGDT) in accordance with the Minerals Law of Mongolia for restoration and environmental management work required for exploration and the limited development work undertaken at the site. OTLLC pays to the Khanbogd Soum annual fees for water and road usage, while sand and gravel use fees are paid to the Aimag government in Dalanzadgad.

OTLLC has completed a comprehensive ESIA for the Oyu Tolgoi project, including the Entrée/Oyu Tolgoi JV property. The culmination of nearly 10 years of independent work and research carried out by both international and Mongolian experts, the ESIA identifies and assesses the potential environmental and social impacts of the project, including cumulative impacts, focusing on key areas such as biodiversity, water resources, cultural heritage, and resettlement.

The ESIA also sets out measures through all project phases to avoid, minimise, mitigate, and manage potential adverse impacts to acceptable levels established by Mongolian regulatory requirements and good international industry practice, as defined by the requirements of the Equator Principles, and the standards and policies of the International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD), and other financing institutions. The IFC and the EBRD have similar, but not identical, definitions for the scope of an impact assessment. Both institutions frame assessments in terms of a project's 'area of influence'. The guidance provided by both IFC and the EBRD was utilised in defining the scope of the ESIA. The Oyu Tolgoi ESIA builds upon an extensive body of studies and reports, and Detailed

Environmental Impact Assessments (DEIAs) that have been prepared for project design and development purposes, and for Mongolian approvals under the following laws:

- The Environmental Protection Law
- The Law on Environmental Impact Assessment
- The Minerals Law.

These initial studies, reports and DEIAs were prepared over a six-year period between 2002 and 2008.

The original DEIAs provided baseline information for both social and environmental issues. These DEIAs covered impact assessments for different project areas, and were prepared as separate components to facilitate technical review as requested by the Government of Mongolia.

The original DEIAs were in accordance with Mongolian standards and while they incorporated World Bank and IFC guidelines, they were not intended to comprehensively address overarching IFC policies such as the IFC Policy on Social and Environmental Sustainability, or the EBRD Environmental and Social Policy.

OTLLC has implemented and audited an EMS that conforms to the requirements of ISO 14001:2004. Implementation of the EMS during the construction phases will focus on the environmental policy; significant environmental aspects and impacts and their risk prioritisation; legal and other requirements; environmental performance objectives and targets; environmental management programs; and environmental incident reporting. The EMS for operations consists of detailed plans to control the environmental and social management aspects of all project activities following the commencement of commercial production from the open pit operations in the OTLLC ground holdings in 2013.

Following submission and approval of the initial DEIAs, the Government of Mongolia requested that OTLLC prepare an updated, comprehensive ESIA whereby the discussion of impacts and mitigation measures was project-wide and based on the latest project design. The ESIA was also to address social issues, meet the Government of Mongolia (legal) requirements, and comply with current IFC good practice.

For the ESIA the baseline information from the original DEIAs was updated with recent monitoring and survey data. In addition, a social analysis was completed through the commissioning of a Socio-Economic Baseline Study and the preparation of a Social Impact Assessment (SIA) for the project.

The requested ESIA, completed in 2012, combines the DEIAs, the project SIA, and other studies and activities that have been prepared and undertaken by and for OTLLC.

Certain facilities and operations were approved subsequent to 2012 (AMC, 2020), and to August 2020 these include:

- Waste management centre: 2014
- DEIA report of Oyu Tolgoi TSF project which included environmental issues related to the Oyu Tolgoi concentrate thickener underflow: 2014
- DEIA report of Tsagaan Khad to Oyu Tolgoi Road which included environmental issues associated with an 18.6 km-long road connecting Tsagaan Khad to Gashuun Sukhait
- DEIA of 93.8 km-long paved road connecting Khanbogd–Oyu Tolgoi–Javkhlant bag (constructed in 2018): 2016
- DEIA of use of Undai River sand deposit: 2018
- DEIA on OT hazardous landfill: 2020
- DEIA on OT chemical warehouse: 2020

For the purposes of the ESIA, the 'project' constitutes the direct activities that are to be financed and/or over which the project can exert control and influence through the project design, impact management, and mitigation measures.

This includes:

- All Oyu Tolgoi project facilities within the Oyu Tolgoi ML area and surrounding 10 km buffer zone, including the following key features:
  - Open pit mining facilities
  - Underground mining facilities
  - Accommodation camps
  - Construction-related activities and facilities, including concrete batch plant, quarry, and laydown areas
  - Power generation facilities
  - Heating plant and boilers
  - Crusher

- Concentrator
- Tailings storage facility
- Water management facilities (including diversion of the Undai River)
- Waste water management facilities for camps and mining operations
- Waste management facilities (municipal and industrial)
- Waste rock storage facilities
- Access roads within the Oyu Tolgoi ML area
- Vehicle and equipment maintenance and repair facilities
- Fuel storage facilities
- Electrical power distribution infrastructure
- Administration buildings and catering facilities

- Specific infrastructure facilities and disturbances within the Entrée/Oyu Tolgoi JV property may include:
  - Concrete batch plant and quarry
  - Permanent airport facility and temporary airstrip at Khanbumbat
  - Gunii Hooloi water supply pipeline
  - Drill pads
  - Road to border with China
  - Power lines
- Contractor accommodation camps adjacent to Khanbogd
- Potential dedicated off-site worker accommodation planned for Khanbogd
- Gunii Hooloi water abstraction borefield and the water pipeline supplying the mine, as well as maintenance roads, pumping stations, construction camps, storage lagoons, and other support infrastructure
- Infrastructure improvements (and associated resource use) by Oyu Tolgoi between the mine site and the Chinese border, including the 220 kV power transmission line, the access road that will be used for concentrate export, construction camps, local water boreholes, and borrow pits
- Dedicated border crossing at Gashuun Sukhait for the exclusive use of the Oyu Tolgoi Project

- The concentrate will be sold by Oyu Tolgoi at the Mongolia–China border crossing at Gashuun Sukhait. The point of sale marks a key boundary to the project area
- Infrastructure components that may be transferred to third-party ownership in the future.

A number of infrastructure components of the project considered within the ESIA will be constructed by OTLLC but may be transferred at some stage to public or third-party operation and/or ownership. Transfer of these infrastructure components to public operation and ownership will limit the degree of control that OTLLC can exert over their management and operation. These infrastructure components, which may be owned and operated by the Government of Mongolia, and will or may be used by members of the public and/or other commercial operations, include:

- The permanent airport, which is planned to be handed over to the Government of Mongolia after the completion of the project construction phase
- The road from Oyu Tolgoi to the Chinese border at Gashuun Sukhait, which follows the alignment for the designated national road and is planned to be handed over to the Government of Mongolia upon completion of the project construction phase
- The dedicated border crossing facility at Gashuun Sukhait, which will be operated by the Mongolian authorities
- The 220 kV electricity transmission line from the Chinese border to Oyu Tolgoi, was transferred to the Government of Mongolia in October 2015.

Future Project Elements Not Directly Addressed in the Environmental and Social Impact Assessment

In addition to the project elements identified above, certain other activities and facilities are expected to be developed over time, either as part of, or in support of, the project. These do not constitute part of the project for the purposes of the ESIA.

These include:

- Project expansion to support an increase in plant feed throughput from 100,000 t/d to 160,000 t/d

- Long-term project power supply. The main power supply is currently via a dedicated 220 kV overhead power line from the Inner Mongolian electricity grid in northern China, (D'Appolonia S.p.A., 2016).

While the impacts of these project elements and their mitigation and management are not directly addressed in the ESIA, they are considered in the cumulative impact assessment of the ESIA.

Management Plans

The management plans developed for the Oyu Tolgoi project address the management of health, safety, environment, and social aspects associated with the project. The management plans form part of the mine's Integrated Health, Safety, Environment and Community Management System (HSECMS). The HSECMS has been audited and is certified to ISO 14001 and OHSAS 18001.

Water Usage

Minimizing water use throughout all the operational aspects has been a key focus of attention during mine planning and design. Ongoing attention to water conservation will be maintained during operation through the continuous review of key performance indicators for water use and implementation of additional water conservation measures.

Oyu Tolgoi averages 0.39 m^3 of water per tonne of ore processed in 2019 (AMC, 2020). The water used by Oyu Tolgoi comes from a deep and saline aquifer and has no impact on drinkable water in the region. In 2019 water used by Oyu Tolgoi was continuously recycled at an average rate of 87.2% (AMC, 2020).

Stockpiles

No stockpile facilities are envisaged within the Entrée/Oyu Tolgoi JV Project area for the planned underground mining operations.

Waste Rock Storage Facilities

No waste rock facilities are envisaged within the Entrée/Oyu Tolgoi JV Project area for the planned underground mining operations.

Tailings Storage Facility

Introduction

Site selection was based on consideration of such aspects as local topography, location relative to other project facilities, required storage capacity, potential environmental impacts, water conservation, and the potential for future TSF expansion. Central or perimeter discharge, paste tailings, and conventional thickened tailings deposition methods were all evaluated. Due to the flat topography, the design required the construction of a perimeter embankment to retain the tailings within a "basin."

The existing TSF is 2 km east of the open pit, 5 km southeast of the process plant, and is located within the OTLLC property, outside the licences where Entrée has a participating interest. Conventional thickened tailings are currently deposited in Cell 1.

Operating Assumptions

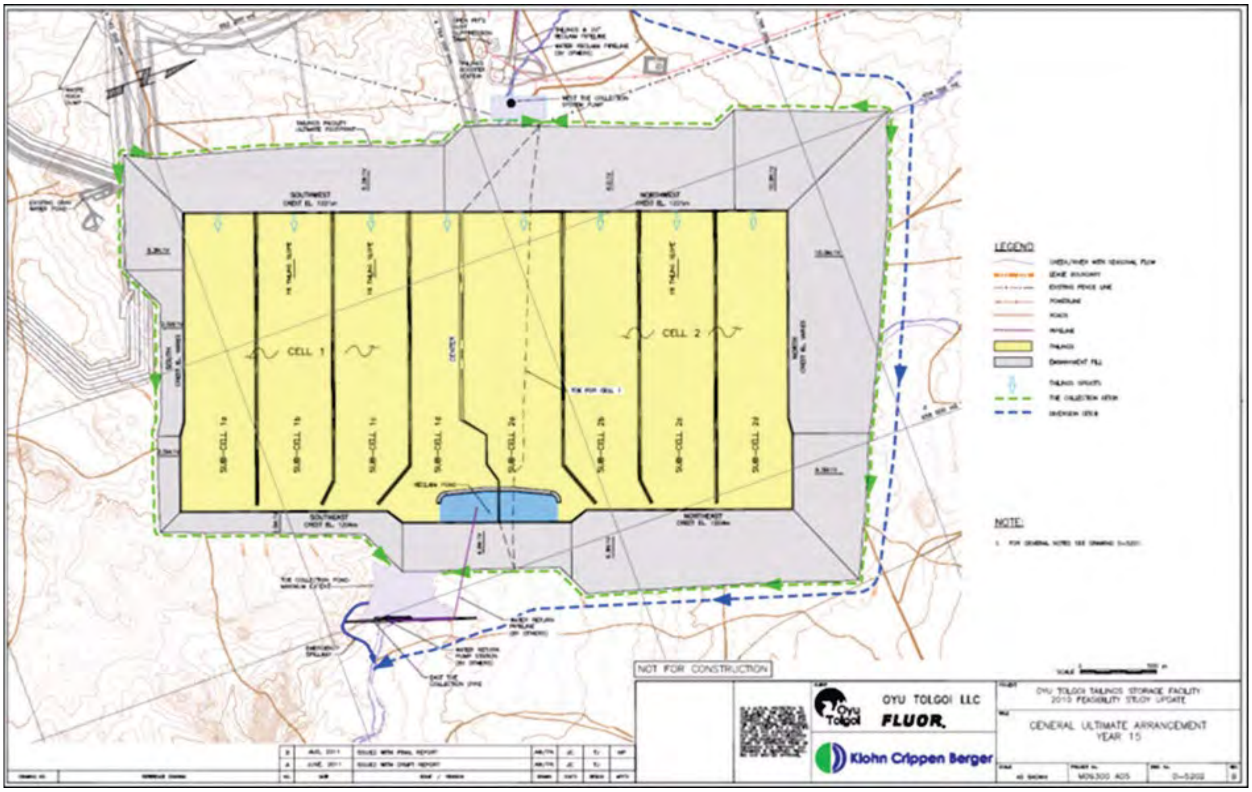
For the first 20 years of production, the TSF will consist of two cells, each approximately 4 km^2 in size, to store a total of 720 Mt of tailings. The facility will be constructed in two stages, starting with Cell 1 (TC1) and then continuing with Cell 2 (TC2). The general arrangement of the cells is shown in Figure 24-8.

Each cell will be divided into four parallel sub-cells by berms. Berms, or 'splitter dikes', will constrain the active tailings beach to one sub-cell. Supernatant water will run down the active beach to the eastern embankment and flow from there to one of two reclaim ponds situated on the northeast corner of TC1 and southeast corner of TC2. The two reclaim ponds may be combined in future by eliminating the central north embankment of TC1.

As of June 30, 2019, about 213 Mt has been placed in Cell 1, which has a remaining capacity of approximately 176 Mt. The cell embankment has reached 50m in height and is planned to reach its final height of about 70 m in ~2023.

The original impoundment design is based on the assumption that the tailings beach will slope from the deposition point to the reclaim pond at an average of 1%. An overall tailings beach slope of about 0.6% to 1.0% was recently reported. At flatter beach slopes, the eastern dike must initially be raised more quickly (while the western dike is raised more slowly).

Figure 24-8: General Arrangement of Cells 1 and 2



Note: Figure from the 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

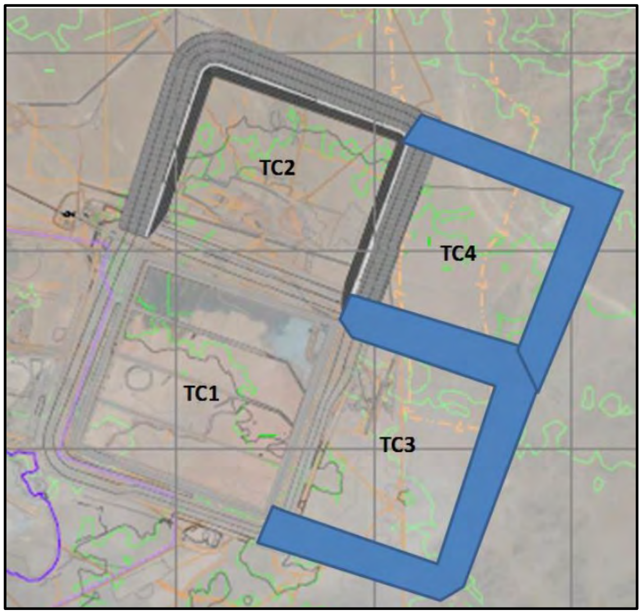
Likewise, flatter beach slopes tend to correspond to lower placed tailings density, which requires the embankments to be raised more quickly. Rates of rise since 2015 reduced considerably, likely due to tailings consolidation.

Besides the two cells discussed above, four more new TSF cells are currently being considered, namely Cell 3 (TC3), Cell 4 (TC4), Cell 5 (TC5) and Cell 6 (TC6).

Figure 24-9 and Figure 24-10 show conceptual design layouts of TC3/TC4 and TC5/TC6 respectively. Total design storage capacities of TC3 and TC4 are approximately 709 Mt; the total design storage capacity of TC5 and TC6 are more than 700 Mt, assuming a settled tailings dry density of 1.6 t/m^3.

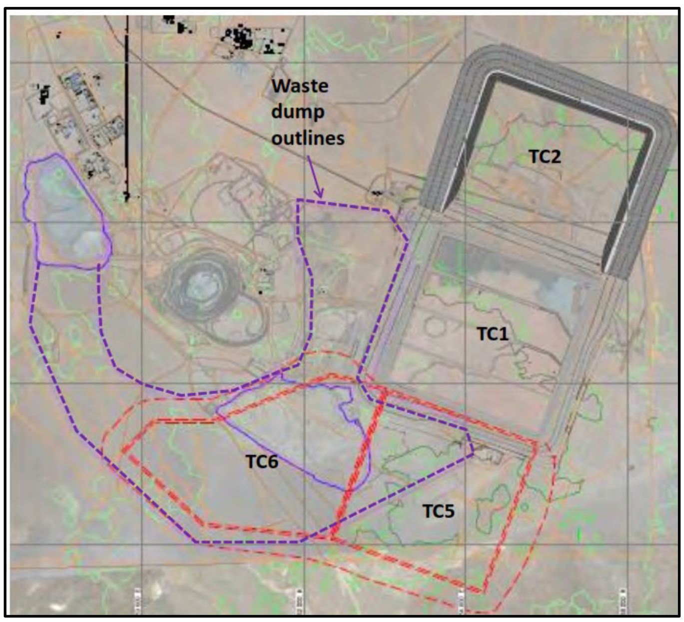
There is enough space to construct new cells in addition to these six tailings cells that will have the capacity to contain the life of mine tailings under the 2021 PEA case.

Figure 24-9: Conceptual Design Layout of Cells 3 and 4



Note: Figure from Golder (2015b). Figure north is to the top of the plan. Grid squares are 2 km x 2 km.

Figure 24-10: Conceptual Design Layout of Cells 5 and 6



Note: Figure from Golder (2015b). Figure north is to the top of the plan. Grid squares are 2 km x 2 km.

However, the cost of constructing additional cells may increase as the haul distances for mine waste and other embankment materials increase. Moreover, opportunities for additional tailings storage by raising the embankments beyond the current design maximum height of 70 m and alternate tailings disposal options such as in-pit tailings disposal have been discussed, which could potentially lead to lower cost of tailings disposal in the future if proven feasible.

Impoundment Layout

The impoundment layout for TC1 and TC2 is shown in Figure 24-11, with up to 70 m high embankments enclosing the four sides of the impoundment. TC1 is in operation and is being raised annually. Detailed level design of TC2 is currently ongoing

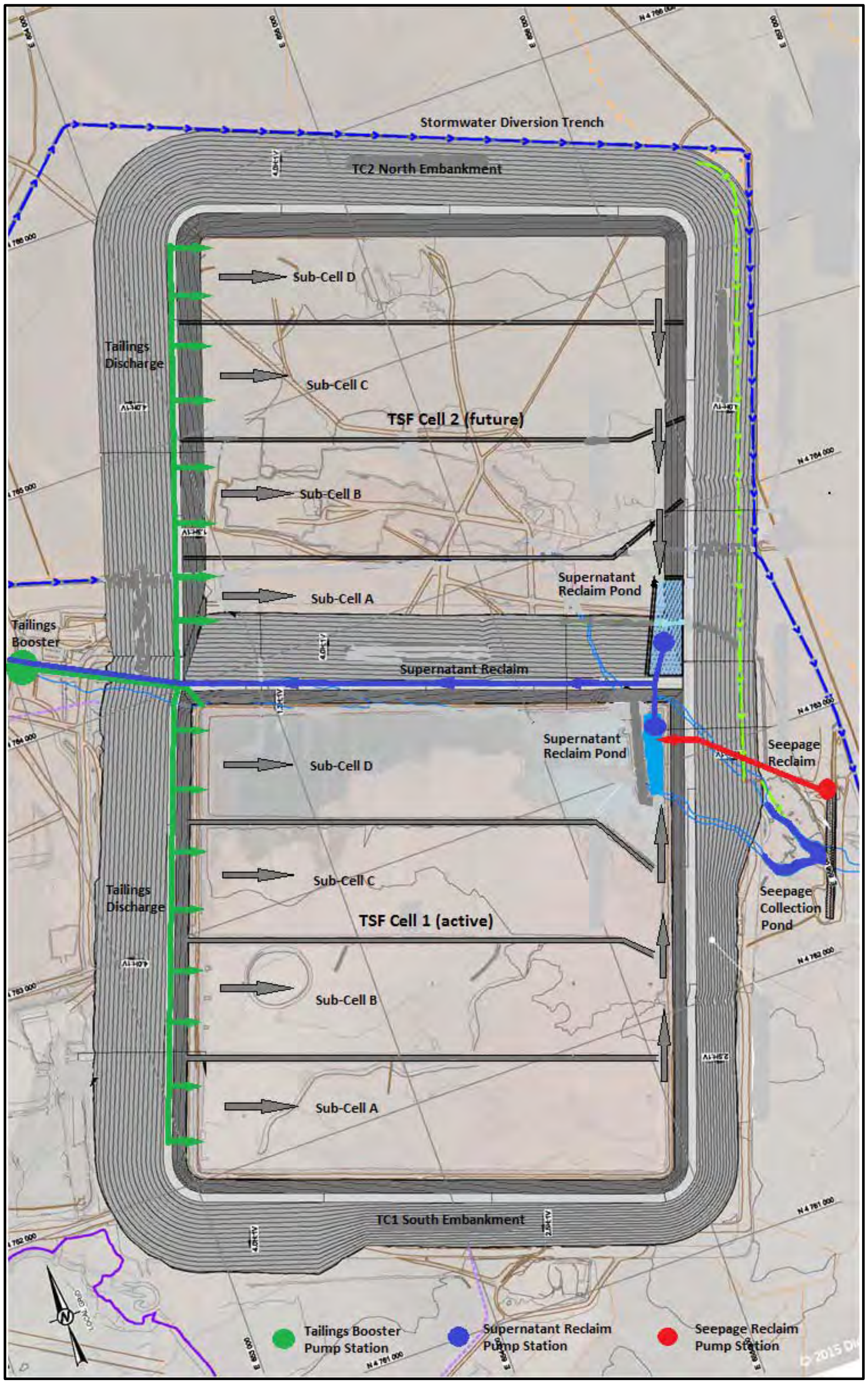
Figure 24-9 and Figure 24-10 presented layouts of four new cells (TC3 through TC6) that are currently considered. Construction of additional cells adjoining the currently planned TC1 through TC6 is likely, although greater hauling distances of embankment materials and construction costs could be involved.

Design Considerations

Based on the Australian National Committee on Large Dams (ANCOLD) design guidelines and a "High A" consequence classification, the following notable hydrological/geotechnical design criteria have been adopted (Golder, 2019a):

- Floods: to accommodate the one-in-10,000 annual exceedance probability (AEP) 72 hour rainfall event
- Contingency freeboard to contain the one-in-50 (2%) AEP wind wave run-up
- Freeboard: additional freeboard of 0.5 m above maximum operating level
- Earthquakes: MCE with peak ground acceleration of 0.31 *g*, based on a M7 Richter scale earthquake at the Tavan Takhi Fault, located 18 km from the TSF. MCE corresponds to a 5,000-year-return-interval seismic event

Figure 24-11: TSF Cell 1 and 2 Layout Plan



Note: Figure from 2016 Oyu Tolgoi Feasibility Study, courtesy OTLLC, 2017.

- Slope stability
  - Factor of safety > 1.5 in "long term drained, consolidated undrained and end of raise (loss of containment" case
  - Factor of safety > 1.3 in "end of raise undrained (no loss of containment)" case
  - Factor of safety > 1.0 to 1.2 for "post seismic" case*

* Note: For FoS 1.0 to 1.2 in "post-seismic" case, deformation analysis is required to demonstrate dynamic stability, or no loss of structural integrity and serviceability, where freeboard is retained and filter layer remain functional.

Future designs of additional cells to support the 2021 PEA case may follow the same considerations as outlined above, although some criteria could be updated and revised slightly, such as rainfall and earthquake data.

Embankment

The TSF embankment is constructed of zoned, locally-sourced earth materials, which form the inner inclined clay core/filter layers, and of open pit mine waste rock, which forms the main embankment shell. The TSF embankment is raised each year using a downstream methodology to ensure that sufficient storage capacity for ongoing tailings deposition, with flood storage and freeboard, is retained at all times.

To date the rate of tailings rise at TC1 has been about 5.7 m/a, which will change in relation to any change in mine production and/or tailings densities. Some amelioration in the rate of tailings rise is expected over time as the overall depth of tailings increases in each cell, causing ongoing consolidation of previously-placed tailings.

Future cells to support the 2021 PEA case are assumed to use similar embankment configurations as the current TSF design.

Tailings Deposition

The TSF receives thickened tailings (with about 60% solids content by weight) from the tailings thickeners at the Oyu Tolgoi concentrator via dual overland HDPE pipelines, which are directed to a tailings booster pump station adjacent to the TSF. From the booster pump station, the tailings are pumped through overland conveyance pipelines to spigots installed on the west embankment of the TSF for discharge into discrete sub-cells. The tailings within each subcell are confined by splitter dikes and form a beach inclining toward the east where a supernatant reclaim pond is located. A floating barge pump station returns supernatant reclaim water to the main process water pond at the concentrator for reuse.

The same concepts for tailings deposition and reclaim water return will continue to be used for future cells.

Water Considerations

The TSF is designed and operated in a manner that aims to minimize water loss. To achieve this, the TSF is constrained in area, resulting in a high rate of rise. The TSF is further subdivided into sub-cells, with one active cell generally operating at any given time. This allows inactive cells to consolidate and dry and helps ensure that only one wet sub-cell is exposed to evaporation. The supernatant water reclaim pond is restricted in size to minimize evaporation from this exposed water body.

Seepages from the base of the TSF are controlled by native clay where presented and, where not presented, by establishing a 1 m layer of compacted clay with surrounding cut-off. Any seepages from the TSF are collected in a trench and conveyed to a seepage collection cut-off dam, from where they are returned by pump to the main reclaim pond within the TSF for return to the concentrator. The TSF is isolated from the surrounding environment by a perimeter seepage collection drainage channel that conveys seepage originating from the TSF to a seepage collection cut-off embankment, from where it is returned to the TSF. In addition, a run-on diversion drainage channel conveys occasional surface water originating from the upstream Budaa and Khaliv ephemeral streams and surrounding catchment areas to the downstream Budaa stream bed.

The above water considerations may also be applied to future tailings storage designs supporting the 2021 PEA.

Monitoring Considerations

Vibrating wire piezometers were installed under the embankment of Cell 1. These enable changes in pore water pressure in the clay to be measured when the clay is being loaded during embankment construction and tailings deposition.

OTLLC also installed multiple inclinometers in the TSF to monitor slope movement of perimeter embankments and potential deformation of foundation clay layers. The geotechnical strategy for ongoing development of the TSF is based on "reasonable conservatism" requiring an "observational approach" during construction, whereby ongoing monitoring provides data that support the design and helps identify opportunities for further optimisation (and, if needed, a response to adverse data).

The existing monitoring instruments, along with new monitoring instruments that would be installed in future cells, will continue to be used to guide TSF operation and design optimisation throughout the LOM.

Water Supply

Gunii Hooloi Aquifer

The Gunii Hooloi basin extends 35 km to 70 km north of the Oyu Tolgoi site (refer also to discussion in Section 18).

Based on the first two hydrogeological investigation programs, the Gunii Hooloi aquifer has been demonstrated and approved by the MEGDT to be capable of providing 870 L/s, based on usage over 40 years and with limitations on drawdown that ensure that the main body of the aquifer remains in confined conditions.

Updated hydrogeological modelling, completed in 2013, and based on all three hydrogeological investigation programs, demonstrates that the Gunii Hooloi aquifer is capable of providing 1,475 L/s, based on the same time and drawdown conditions. Modelling also indicates that there is limited potential for connection between the shallow streambed aquifers and the deeper Gunii Hooloi aquifer (ACM 2020).

OTLLC noted in 2016 (Peters and Sylvester, 2016), that hydrogeological analytical studies and reporting to Mongolian norms remained to be completed in order to demonstrate and gain approval from the MEGDT of updated approved water reserves for the Gunii Hooloi aquifer.

Raw Water Distribution and Use

Water demand for the Oyu Tolgoi facilities has been calculated at between 588 L/s and 785 L/s, with an average yearly demand of 696 L/s, to meet a production rate of 100,000 t/d. The primary source of raw water to meet these requirements is the Gunii Hooloi basin.

Most water losses are from the TSF, primarily associated with interstitial water locked in the settled tailings, but also due to evaporation. Additional water losses result from dust control. Minor water losses relate to construction activities (e.g. concrete production), infrastructure maintenance (e.g. heating system make-up), and unrecoverable water from domestic water use (AMC, 2020).

Water from groups of individual bores accumulate into five centrally located collection tank pump stations, from which water is pumped into the main water line leading to the Oyu Tolgoi site. Water is pumped into a 400,000 m^3 emergency storage lagoon (two cells, 200,000 m^3 each) situated on elevated ground approximately 5 km north of the Oyu Tolgoi plant site. Water is gravity-fed to the site through two pipelines from the two cells.

A permanent water treatment and bottling plant has been constructed to treat raw water from the Gunii Hooloi borefield to drinking (potable) and domestic water standards. Raw water distribution from the borefield lagoon to the site and throughout the site is designed as a gravity flow system. Two DN900 ductile iron pipes deliver raw water from the lagoon to the concentrator water tank, then to individual buried pipes that convey water to other functional areas of the site; pipe burial depth is 2.5 m. Raw water is provided to the concentrator, the main camp area, (including the water treatment plant), the production shaft farm, the central heating plant, the warehouses, the open pit and central maintenance truck shops, and the primary crusher. Raw water will be provided to the underground mine for makeup and other services during construction and operations. Local flowmeters are provided to monitor raw water consumption in each area.

The borefield lagoon for raw water storage is about 4.5 km away from site. The lagoon can hold 400,000 m^3 of water to provide approximately one week of emergency/buffer storage in case of any interruption in the supply of water from the borefield.

Undai River Diversion Works

Under natural conditions, the Undai River runs southeast and south of the Oyut open pit. Subsurface flow in the river channel is constant, but surface flows are also present occasionally, though usually only after heavy rainfall. There can be large floods in the river channel. Because of its proximity to the open pit, the river has been diverted. The river diversion system consists of three components: a dam, diversion channel, and subsurface diversion.

Raw Water Management Plan and Water Conservation

Due to low average annual precipitation in the project area, water management and conservation are given the highest priority in all aspects of project design. Minimising water use throughout all the operational aspects has been a key focus of attention during mine planning and design. Ongoing attention to water conservation will be maintained during operation through the continuous review of key performance indicators for water use and implementation of additional water conservation measures.

The development of a borefield to access groundwater reserves within the Gunii Hooloi aquifer basin has been established as the most cost-effective option to meet the raw water demand for the Project. Water from the borefield is used for process water supply, dust suppression in the mining areas, and potable use. Another major component of the water management plan is the diversion of the Undai River to accommodate project facilities. Undai River water is not used by the mine; the diversion is to preserve this water in the environment.

OTLLC has affirmed it is committed to water conservation and has benchmarked its water conservation efforts against other mines by assessing factors such as quantified water consumption per tonne of concentrate produced. The predicted water demand estimation is 670 L/sec at the peak production rate of 105,000 kt/d with average of 628 L/sec. Water usage is 30 L/s for the underground mine and 628-670 L/s for the processing plant (Oyu Tolgoi Feasibility Study 2020, Chapter 8). The water consumption compares favourably with other large operations in similar arid conditions.

Closure Plan

Current closure planning is based on a combination of progressive rehabilitation and closure planning. The Oyu Tolgoi Mine Closure Plan for OTLLC was completed in June 2012 and updated in 2014, and is based on the design status at that time.

OTLLC plans continuous development of environmental monitoring plans, including proposed activities and schedules, to ensure that environmental parameters meet the criteria, standards, and limits laid out in the EIA and EPP. In accordance with Mongolian Law, OTLLC has stated that it intends to undertake monitoring at its own expense using approved methods and accredited facilities. The monitoring permits procedures and activities would be adjusted and/or modified as necessary to ensure optimal environmental protection.

Progressive reclamation will be performed on any areas of the mine site where it is deemed practical to do so and with consideration of the need to preserve future mine expansion options. Disturbed areas that are no longer used in the active operation will be technically and biologically rehabilitated concurrently with ongoing mining operations, as practicable. There are potential opportunities for local communities and herder groups to participate in the implementation of several progressive rehabilitation measures that could result in economic benefits and capacity development for those involved.

By the end of 2019, 1,663 ha of land had been progressively rehabilitated which were handed back to local government out of a total of 6,036 ha of land affected by the mining operation. Physical and biological rehabilitation phases have been fully completed on 466 ha (AMC, 2020).

The company will also pursue opportunities for local communities and herder groups to participate in the implementation of progressive rehabilitation measures that could result in economic benefits and capacity development for those involved (AMC, 2020).

Parameters that will be monitored during the closure and post-closure phases of the mine, to characterize both physical and chemical stability of the project area and the environmental impact of the project, will include:

- Surface water and groundwater quality
- Physical stability of tailings deposits
- Physical stability of the river water diversion dike, waste rock dumps, drainage ditches, and concrete shaft/raise caps
- Isolation of open pit voids and unfilled subsidence zones, including status of open water and erosion controls
- Success of indigenous revegetation, including remediation as required until proven to be self-sustaining
- Condition of groundwater monitoring wells, piezometers, survey monuments, and other instrumentation
- Seepage rates to the adjacent groundwater aquifer from all monitoring wells
- Effectiveness of dust control measures on waste rock, tailings storage facility, and other waste areas with specific attention to potential wind-blown contaminant sources.

Permitting

The Mongolian Minerals Law (2006) and Mongolian Land Law (2002) govern exploration, mining, and land use rights for the Oyu Tolgoi project. Water rights are governed by the Mongolian Water Law and the Mongolian Minerals Law. These laws allow licence holders to use the land and water in connection with exploration and mining operations, subject to the discretionary authority of Mongolian national, provincial, and regional governmental authorities as granted under Mongolian law.

OTLLC has studied and continues to study the permitting and approval requirements for the development of the Oyu Tolgoi project including the Entrée/Oyu Tolgoi JV property, and maintains a permit and licencing register.

OTLLC personnel, working with the Mongolian authorities, have developed descriptions of the permitting processes and procedures for the Oyu Tolgoi project, including the underground development of the Entrée/Oyu Tolgoi JV property.

OTLLC has stated that permits have been obtained for underground mining (OTLLC, 2016f).

The Oyu Tolgoi Property comprises five mining licences held by Oyu Tolgoi LLC and Entrée LLC, a subsidiary of Entrée Resources Ltd., formerly known as Entrée Gold Inc. The mining licences provide rights to the holders to explore, develop mining infrastructure, and conduct mining operations at Oyu Tolgoi.

Oyu Tolgoi LLC owns 100% of three licences; MV-006708 (the Manakht licence), MV-006709 (the Oyu Tolgoi licence), and MV-006710 (the Khukh Khad licence) while legal title to MV-015226 (the Shivee Tolgoi Licence) and MV-015225 (the Javkhlant Licence) is currently held by Entrée LLC (AMC, 2020). Based on Wood review of Mahoney Liotta draft advice letter dated 18 January 2021 all Entrée mining licences are in good standing.

Water

Self-discovered water resources are required to be made available for household purposes. However, the Investment Agreement confirms that OTLLC holds the sole rights to use these water resources for the project.

On 17 October 2014, a water use permit for 25 years was issued to OTLLC. In June 2016, OTLLC entered into a utilization agreement with a water agency of the Government of Mongolia for 25 years (until June 2040). Together with water use conclusions issued annually and the approved water reserve rate, these arrangements enable OTLLC to use the amount of water that will be required to develop and operate the project.

The Law on Water and the Investment Agreement both provide that the term of water use permits for exploiting mineral deposits of strategic importance is be the same as the term of mining licenses; therefore, OTLLC considers that it is entitled to extensions of its water permit and water utilization agreements for subsequent 20-year periods as its mining licenses are renewed.

Airstrip

OTLLC has the right to construct, manage, and use an aerodrome in connection with the project, based on permits issued in accordance with Mongolian law. A permanent domestic airport, capable of servicing Boeing 737-800 series aircraft, has been constructed at Oyu Tolgoi to support the transportation of people and goods to the site from Ulaanbaatar. It also serves as the regional airport for the Khanbogd soum.

Considerations of Social and Community Impacts

Studies

A social analysis was completed through the commissioning of a Socio-Economic Baseline Study and the preparation of a SIA for the project.

The cumulative impact assessment examined geographical areas, communities, and regional stakeholders that could be subject to cumulative impacts from further developments at Oyu Tolgoi together with other existing or planned projects, trends, and developments within the South Gobi region. Areas evaluated included:

- Macro-economic impacts across the Mongolian economy
- Impacts on communities and infrastructure in the South Gobi region related, for example, to influx, economic changes, and pressure on infrastructure. Specifically, within Ömnögovi aimag, this includes the soums of Khanbogd, Bayan Ovoo, Manlai, and Tsogttsetsii and the aimag capital, Dalanzadgad
- Biodiversity impacts related to the fragmentation of ecosystems by roads and other infrastructure
- Impacts on water resources in terms of both shallow aquifers for herder water supplies and deep aquifers for potential industrial water supplies

OTLLC Corporate Policies

Corporate commitment to sound environmental and social planning for the project is based on two policies:

- Turquoise Hill's Statement of Values and Responsibilities (March 2010), which declares its support for human rights, social justice, and sound environmental management, including the United Nations Universal Declaration of Human Rights (1948);
- The Way We Work 2009, Rio Tinto's Global Code of Business Conduct that defines the way Rio Tinto manages the economic, social, and environmental challenges of its global operations.

Community Management Responsibilities

At OTLLC, social and community management are directly under the Chief Operating Officer (COO), who is separate from the Mine General Manager. The COO is responsible for pastureland and livelihood development, community and social performance, community assistance and partnership, and compliance and governance.

Community and Social Management Considerations

Community and social management plans, procedures and strategies have been developed by OTLLC for the following:

- Community health, safety and security
- Grievance and fair treatment procedure
- Pastureland and livelihood improvement strategy
- Resettlement Action Plan
- Stakeholder Engagement Plan
- Cultural Heritage Management Plan.

The surrounding community (predominantly herders) and local government are kept fully informed about mine developments and provide input and review of implementation of plans, procedures and strategies that directly affect them.

24.1.8 Capital and Operating Costs

This subsection presents the overall capital cost and operating cost estimates for Hugo North/Hugo North Extension Lift 2 The Entrée/Oyu Tolgoi JV property and Entrée's 20% attributable portion of these overall estimates is discussed in Section 24.1.8.

Capital Cost Estimates

Capital cost and sustaining cost estimates were prepared as separate and independent estimates. The information basis for the capital cost estimate was provided by OTLLC as an Excel spreadsheet that documented the capital cost estimate as a single line item by year and a sustaining capital cost estimate, also as an annualized single line item. No detailed allocations of these costs were provided by OTLLC.

The capital cost estimate to develop Hugo North/Hugo North Extension Lift 2 is US$1.816 billion. The sustaining capital cost estimate was provided as US$5.018 billion.

Operating Cost Estimates

Operating costs are based on extrapolations from existing operations data and include estimates for mining, processing, and infrastructure for Hugo North/Hugo North Extension Lift 2.

Mine operating costs refer to the mucking of ore from the block cave mine, and associated materials handling, through crushing and conveying to the surface after the commencement of production (first ore). Operating costs include direct production costs (mucking, hauling, crushing, conveying and hoisting); mine support costs (equipment maintenance, ventilation, power, services, logistics and pumping); mine management (management, technical services, safety, training and administration), and VAT/duties.

As reported in Table 24-6, the mining operating cost of $9.21/t processed used in the 2021 PEA is derived from production costs estimated for Hugo North/Hugo North Extension Lift 1.

Process operating costs average $7.47/t processed and account for power, media, reagents, water, maintenance, bagging, labor, and VAT/duties. Note that tailings cash costs are included in the concentrator operating costs with the additional construction included in sustaining capital.

Table 24-6: Cash Operating Costs

Description	Unit	Value
Mining	$/t processed	9.21
Processing	$/t processed	7.47
Infrastructure	$/t processed	2.32
Total	**$/t processed**	**19.00**

Note: Operating costs are for Lift 2. VAT and duties included. Totals may not sum due to rounding.

Infrastructure costs average $2.32/t processed and account for the costs directly attributable to operational activities of the infrastructure department.

G&A costs are not covered in this sub-section because the JVA does not participate in G&A costs. Instead, the Entrée/Oyu Tolgoi JV pays a separate monthly administration charge to OTLLC which is described in Section 24.1.8.

Closure Costs

LOM planned closure costs are estimated at US$1.293 billion, which is accrued at $1.07/t processed through 2032. Thereafter, incremental closure costs are estimated at $25 million for developing Hugo North/Hugo North Extension Lift 2; and are accrued at $0.03/t processed for the remainder of the mine life.

Escalation

Escalation is excluded from all operating cost estimates.

24.1.9 Economic Analysis

Cautionary Statement

The results of the economic analyses discussed in this section represent forward- looking information as defined under Canadian securities law. The results depend on inputs that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes:

- Mineral Resource estimates
- Assumed commodity prices and exchange rates
- The proposed mine production plan

- Projected mining and process recovery rates
- Assumptions as to mining dilution
- Sustaining costs and proposed operating costs
- Interpretations and assumptions as to joint venture and agreement terms
- Assumptions as to closure costs and closure requirements
- Assumptions as to environmental, permitting and social risks.

Additional risks to the forward-looking information include:

- Changes to costs of production from what is assumed
- Unrecognized environmental risks
- Unanticipated reclamation expenses
- Unexpected variations in quantity of mineralized material, grade or recovery rates
- Geotechnical or hydrogeological considerations during mining being different from what was assumed
- Failure of mining methods to operate as anticipated
- Failure of plant, equipment or processes to operate as anticipated
- Changes to assumptions as to the availability of electrical power, and the power rates used in the operating cost estimates and financial analysis
- Ability to maintain the social licence to operate
- Accidents, labour disputes and other risks of the mining industry
- Changes to interest rates
- Changes to tax rates.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA based on these Mineral Resources will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The cash flows in the PEA are based on data provided by OTLLC, including mining schedules and annual capital and operating cost estimates, as well as Entrée's interpretation of the commercial terms applicable to the Entrée/Oyu Tolgoi JV, and certain assumptions regarding taxes and royalties. The cash flows have not been reviewed or endorsed by OTLLC. There can be no assurance that OTLLC or its shareholders will not interpret certain terms or conditions, or attempt to renegotiate some or all of the material terms governing the joint venture relationship, in a manner which could have an adverse effect on Entrée's future cash flow and financial condition.

The cash flows also assume that Entrée will ultimately have the benefit of the standard royalty rate of 5% of sales value, payable by OTLLC under the Oyu Tolgoi Investment Agreement. Unless and until Entrée finalizes agreements with the Government of Mongolia or other Oyu Tolgoi stakeholders, there can be no assurance that Entrée will be entitled to all the benefits of the Oyu Tolgoi Investment Agreement, including with respect to taxes and royalties. If Entrée is not entitled to all the benefits of the Oyu Tolgoi Investment Agreement, it could have an adverse effect on Entrée's future cash flow and financial condition. For example, Entrée could be subject to the surtax royalty which came into effect in Mongolia on January 1, 2011. To become entitled to the benefits of the Oyu Tolgoi Investment Agreement, Entrée may be required to negotiate and enter into a mutually acceptable agreement with the Government of Mongolia or other Oyu Tolgoi stakeholders, with respect to Entrée's direct or indirect participating interest in the Entrée/Oyu Tolgoi JV or the application of a special royalty (not to exceed 5%) to Entrée's share of the Entrée/Oyu Tolgoi JV property mineralization or otherwise.

Summary

Wood completed an economic analysis for Entrée's 20% attributable portion of the Hugo North Extension Lift 2 deposit area within the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analysis.

The economic analysis was prepared using the following long-term metal price estimates: copper at US$3.25/lb; gold at US$1,591/oz and silver at US$21.08/oz. The pre-tax cash flow and the after-tax NPV@8% for Entrée's 20% attributable portion in the 2021 PEA is US$1,982 million and US$306 million respectively.

A summary of the production and financial results for Entrée's 20% attributable portion is shown in Table 24-7. Mine site cash costs, cash costs after by-product credits, and all-in sustaining costs per pound of payable copper for Entrée's 20% attributable portion are shown in Table 24-8. IRR and payback are not presented because with 100% financing, neither is applicable.

Table 24-7: 2021 PEA Summary Production and Financial Results for Entrée's 20% Attributable Portion (base case is bolded)

	Units	Value
LOM processed material (Entrée/Oyu Tolgoi JV Property)		
Copper recovered	Mlb	4,564
Gold recovered	koz	2,025
Silver recovered	koz	15,067
Entrée's 20% attributable portion financial results		
LOM cash flow, pre-tax	US$M	1,982
NPV(5%), after-tax	US$M	541
NPV(8%), after-tax	**US$M**	**306**
NPV(10%), after-tax	US$M	213

Notes:

1. Long-term metal prices used in the NPV economic analyses are: copper US$3.25/lb, gold US$1,591/oz, silver US$21.08/oz.
2. The Mineral Resources are reported on a 100% basis. OTLLC has a participating interest of 80%, and Entrée has a participating interest of 20%. Notwithstanding the foregoing, in respect of products extracted from the Entrée/Oyu Tolgoi JV property pursuant to mining carried out at depths from surface to 560 m below surface, the participating interest of OTLLC is 70% and the participating interest of Entrée is 30%.
3. Numbers have been rounded. Totals may not sum due to rounding.

Table 24-8: 2021 PEA Mine Cash and All-in Sustaining Costs for Entrée's 20% Attributable Portion

Description	Unit	LOM Average 2021 PEA
Mine site cash cost	US$/lb payable copper	0.82
TC/RC & transport	US$/lb payable copper	0.28
Total cash costs before credits	US$/lb payable copper	1.10
Gold credits	US$/lb payable copper	0.73
Silver credits	US$/lb payable copper	0.07
Total cash costs after credits	US$/lb payable copper	0.30
Total All-in Sustaining Costs After Credits	**US$/lb payable copper**	**0.92**

Note: Totals may not sum due to rounding.

The following subsections provide details on the 2021 PEA performed on the subset of Mineral Resources within the PEA mine plan for the Hugo North Extension Lift 2 deposit area within the Entrée/Oyu Tolgoi JV property.

The economic analysis for Entrée's 20% attributable portion of the Entrée/Oyu Tolgoi JV property was carried out using a financial model developed by Wood. The financial model uses the DCF approach. This method of valuation requires projecting yearly cash inflows, or revenues, and subtracting yearly cash outflows such as operating costs, capital costs, royalties, and taxes. The resulting net annual pre-tax and after-tax cash flows are discounted back to the date of valuation and totalled to determine the NPV of the project at 5%, 8%, and 10% discount rates.

This economic analysis includes sensitivities to variations in capital costs, operating costs, copper grade, and copper price.

It should be noted that, for the sake of discounting, cash flows are assumed to occur at the end of each period. Cash flows are discounted to the beginning of 2027, the beginning of Hugo North Extension Lift 2 development.

Financial Model Parameters

The financial model has been prepared based on the assumptions outlined in the following sub-sections.

Mineral Resource

Figure 24-1 showed the subset of the Mineral Resource within the 2021 PEA mine plan that is proposed to be mined and processed for the Entrée/Oyu Tolgoi JV property and Table 24-8 shows Entrée's 20% attributable share of the production.

Figure 24-12 shows the annual production profile for the subset of the Mineral Resource within the 2021 PEA mine plan, including grades for copper, gold, and silver.

Metallurgical Recoveries

Metallurgical recoveries projected by deposit are shown in Table 24-9.

Metal Prices, Smelting and Refining Terms

Assumptions for metal prices and smelting and refining terms are shown in Table 24-10. The economic analysis includes a silver refining charge of US$0.45/oz Ag, derived from the 2016 Turquoise Hill Technical Report (Peters and Sylvester, 2016).

Figure 24-12: Proposed Mine Production, Hugo North Extension Lift 2

Note: Figure prepared by Wood, 2021. Entrée has a 20% interest in the mill feed material extracted.

Table 24-9: Average LOM Metallurgical Recovery Projections

Deposit	Concentrate Cu Grade (%)	Recovery (%)		
		Cu	Au	Ag
Hugo North Extension - Lift 2	34.1	92.3	77.6	77.8

Table 24-10: Metal Prices, Smelting and Refining Terms

Metal	Unit	Long-Term
Copper price	US$/lb	3.25
Gold price	US$/oz	1,591
Silver price	US$/oz	21.08
Treatment charges	US$/dmt conc.	91.12
Copper refining charge	US$/lb	0.090
Gold refining charge	US$/oz	4.50

Concentrate shipping costs are assumed at US$35.2/wet*tonne. Concentrate payable term assumptions are shown in Table 24-11.

Both arsenic and fluorine are penalty elements; however, neither exceeds the penalty limits, so no penalty charges apply to the concentrate (Table 24-12).

Royalties

Entrée have assumed that by the time the Entrée/Oyu Tolgoi JV property goes into production, Entrée will pay the same stabilized royalty rate as OTLLC, which is the 5% royalty. Furthermore, Entrée has anticipated that they will maintain their 20% interest in the Entrée/Oyu Tolgoi JV property as part of the stabilization agreement.

Accordingly, the financial model assumes that a 5% royalty applies, and that no other special or surtax royalties apply. The royalty is applied to the gross metal sales for copper, gold, and silver.

Capital Costs

Wood apportioned the overall capital and sustaining capital costs according to Entrée's interpretation of the terms of the Entrée/Oyu Tolgoi JV agreement for use in the economic assessment. This interpretation includes:

- OTLLC is responsible for 80% of all capital expenditures incurred on the Entrée/Oyu Tolgoi JV property for the benefit of the Entrée/Oyu Tolgoi JV and Entrée is responsible for the remaining 20%
- Any mill, smelter and other processing facilities and related infrastructure will be owned exclusively by OTLLC and not by Entrée. Mill feed from the Entrée/Oyu Tolgoi JV property will be transported to the concentrator and processed at cost (using industry standards for calculation of cost including an amortization of capital costs)
- Underground infrastructure on the Oyu Tolgoi mining licence is also owned exclusively by OTLLC, although the Entrée/Oyu Tolgoi JV will eventually share usage once underground development crosses onto the Entrée/Oyu Tolgoi JV property

Table 24-11: Concentrate Payable Terms

Item	Unit	Value
Copper terms		
Cu deduction (units)	%	1
Payable Cu	%	96.0
Silver terms		
Minimum	g/t	30
Payable Ag	%	90.0
Gold terms		
Payable Au terms	g/t	%
	0	0.0
	1	90.0
	3	94.0
	5	95.0
	10	97.0
	20	97.5
	50	98.3%

Table 24-12: Penalty Elements

Item	Unit	As	F
Concentrate limit	ppm	3,000	300
Payment unit (PU)	ppm	1,000	100
Penalty	$/dmt/PU	2	2
Rejection limit	ppm	5,000	1,000

- Entrée recognizes those capital costs incurred by OTLLC on the Oyu Tolgoi mining licence (facilities and underground infrastructure) as an amortization charge for capital costs that will be calculated in accordance with Canadian generally-accepted accounting principles determined yearly based on the estimated tonnes of concentrate produced for Entrée's account during that year relative to the estimated total life-of-mine concentrate to be produced (for processing facilities and related infrastructure), or the estimated total life-of mine tonnes to be milled from the relevant deposit(s) (in the case of underground infrastructure). The charge is made to Entrée's operating account when the Entrée/Oyu Tolgoi JV mine production is actually milled

- For direct capital cost expenditures on the Entrée/Oyu Tolgoi JV property, Entrée will recognize its attributable share of costs at the time of actual expenditure.

Entrée has elected to have OTLLC debt finance Entrée's share of costs for approved programs and budgets, with interest accruing at OTLLC's actual cost of capital or prime plus 2%, whichever is less, at the date of the advance. Debt repayment may be made in whole or in part from (and only from) 90% of monthly available cash flow arising from the sale of Entrée's share of products. Available cash flow means all net proceeds of sale of Entrée's share of products in a month less Entrée's share of costs of Entrée/Oyu Tolgoi JV activities for the month that are operating costs under Canadian generally-accepted accounting principles.

The total Hugo North Extension Lift 2 amortized capital cost within the Entrée/Oyu Tolgoi JV property is estimated at US$201.2 million, of which $40.2 million is Entrée's 20% attributable portion.

The total Hugo North Extension Lift 2 mine development and sustaining capital cost within the Entrée/Oyu Tolgoi JV property is estimated at US$1,598.6 million, of which $319.7 million is Entrée's 20% attributable portion.

Table 24-13 provides a summary of the 2021 PEA amortized capital cost projections for the Entrée/Oyu Tolgoi JV property and for Entrée's 20% attributable portion. Table 24-14 provides an overview of the mine development and sustaining capital.

Operating Costs

The Entrée/Oyu Tolgoi property operating costs used in the 2021 PEA average $28.25/t processed and are inclusive of the amortized capital, refining and smelting charges, and a 2% administrative fee. Entrée's 20% attributable portion operating costs on a per tonne milled basis averages US$28.25 over the LOM (Table 24-15).

An annual license fee is payable against operating costs. The annual licence fee is to keep the Shivee Tolgoi and Javhlant MLs in good standing and is approximately US$944,000. The annual fees for the period October 27, 2020 to October 27, 2021 were paid.

Table 24-13: 2021 PEA Amortized Capital

Amortization Charges for OTLLC Capital Costs	Unit	Entrée/Oyu Tolgoi JV	Entrée 20% Attributable
Tailings storage facility & infrastructure sustaining capital	US$ M	169.0	33.8
Concentrator sustaining capital	US$ M	32.3	6.5
Total Facilities Capital	**US$ M**	**201.2**	**40.2**

Notes: 1. Capital costs are inclusive of indirect costs, Mongolian custom duties, VAT, and contingency. Totals may not sum due to rounding.

Table 24-14: Mine Development and Sustaining Capital

Entrée/Oyu Tolgoi JV Property Mine Development & Sustaining Capital	Unit	Entrée/Oyu Tolgoi JV	Entrée 20% Attributable
Underground Development Capital	US$ M	1,173.7	234.7
Underground Sustaining Capital	US$ M	424.9	85.0
Total Development & Sustaining Capital	**US$ M**	**1,598.6**	**319.7**

Notes: 1. Capital costs are inclusive of indirect costs, Mongolian custom duties, VAT, and contingency. Totals may not sum due to rounding.

Table 24-15: 2021 PEA Operating Costs

Description	Unit	2021 PEA
Mining	$/t processed	9.21
Processing	$/t processed	7.47
Infrastructure and other operating	$/t processed	2.32
Amortized mining costs	$/t processed	0.00
Amortized process costs	$/t processed	0.19
Amortized tailings costs	$/t processed	1.02
Total refining & transportation costs	$/t processed	7.17
Total operating expenditure	$/t processed	27.40
Administration charge (2% during development; 2.5% during production)	$/t processed	0.85
Total	**$/t processed**	**28.25**

Note: Totals may not sum due to rounding.

Loan

Entrée advised that under the terms of the JVA, Entrée may be carried through to production, at its election, by debt financing from OTLLC with interest accruing at OTLLC's actual cost of capital or prime plus 2%, whichever is less, at the date of the advance. Debt repayment may be made in whole or in part from (and only from) 90% of monthly available cash flow arising from sale of Entrée's share of products. Such amounts will be applied first to payment of accrued interest and then to repayment of principal. Available cash flow means all net proceeds of sale of Entrée's share of products in a month less Entrée's share of costs of operations for the month.

Therefore, Entrée assumes that the company will not be obliged to contribute cash to the Entrée/Oyu Tolgoi JV property for its portion of operating and capital expenditures and will receive 10% of its share of cash flow from the Entrée/Oyu Tolgoi JV property until such time as any loans outstanding are repaid, and 100% thereafter.

It is assumed that at the start of the PEA, Entrée will have settled any outstanding loan balances from proceeds from Hugo North Extension Lift 1 development.

Depreciation

US$319.7 million in mine development and sustaining capital (refer to Table 24-14) is depreciated on a unit of production basis over the underground tonnes mined.

With respect to development capital costs for existing OTLLC facilities, Entrée has advised that these capital costs will have been fully depreciated prior to the processing of Entrée/Oyu Tolgoi JV property mill feed material through the OTLLC facilities, and no amortization allowance for such development capital costs is payable.

Taxes

Mongolian Corporate Income Taxes (CIT) are applied to the total Net Income at 10% on first US$2.1 million and 25% on the remainder. Prior years income tax losses are carried forward and applied to current years taxable income balance.

Economic Analysis

Wood completed an economic analysis for Entrée's 20% attributable portion of the 2021 PEA on the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analyses. Underlying assumptions in the analysis include:

- All pricing within the financial analysis is based on 2020 constant dollars. No escalation is applied
- For the analysis, Entrée have advised that under the JVA, all costs of Operations under each program and budget will, to the extent practicable, be allocated at the time the program and budget is adopted between the Entrée/Oyu Tolgoi JV property and the Oyu Tolgoi ML, based on the proportions in which each of them benefits most from such Operations. OTLLC shall pay for 100% of costs allocated to the Oyu Tolgoi ML and all associated liabilities including for environmental compliance. The balance of such costs shall be borne and paid by the participants in accordance with their respective participating interests (i.e. Entrée 20%; OTLLC 80%)
- Entrée is carried through to production by debt financing from OTLLC with interest accruing at prime (Royal Bank Prime of 2.5%) plus 2%, or approximately 4.5%. Debt repayment is made from 90% of monthly available cash flow arising from sale of Entrée's share of products. Entrée receives 10% of its share of cash flow from the Entrée/Oyu Tolgoi JV property until the loans outstanding balance is repaid and 100% thereafter.

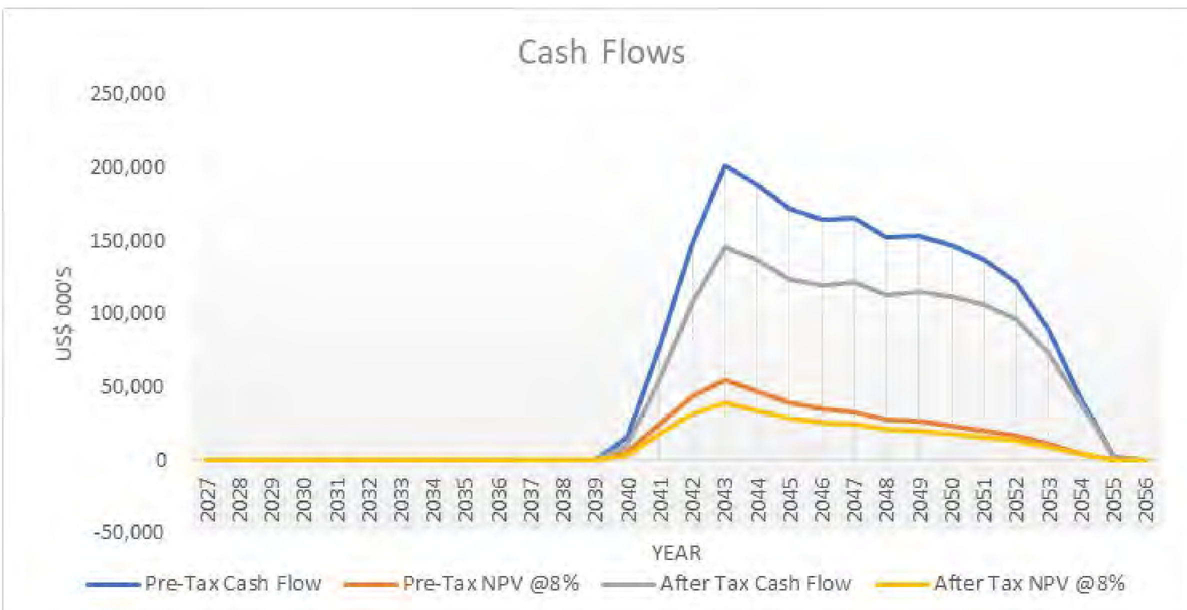
Using a discount rate of 8%, the pre-tax NPV for Entrée's 20% attributable portion is estimated at US$413 million. The after-tax NPV@8% is US$306 million. Table 24-16 provides a summary of key 2021 PEA financial outcomes for Entrée's 20% attributable portion of the Entrée/Oyu Tolgoi JV property. IRR and payback for the 2021 PEA are not presented in Table 24-16, because with 100% financing, neither is applicable.

Figure 24-13 provides a distribution of Entrée's 20% attributable portion cash flows over the 2021 PEA LOM. Table 24-17 to Table 24-20 provide a summary of the 2021 PEA cash flow on an annualized basis for Entrée's 20% attributable portion.

Table 24-16: Summary 2021 PEA Financial Results for Entrée's 20% Attributable Portion, Hugo North Extension Lift 2, (base case is bolded)

Cash Flow Before Tax		Units	Total
Cumulative Cash Flow		kUS$	1,982,208
NPV @	5%	kUS$	727,526
NPV @	**8%**	**kUS$**	**413,460**
NPV @	10%	kUS$	287,619
Cash Flow After Tax		**Units**	**Total**
Cumulative Cash Flow		kUS$	1,484,003
NPV @	5%	kUS$	540,840
NPV @	**8%**	**kUS$**	**306,246**
NPV @	10%	kUS$	212,569

Figure 24-13: 2021 PEA Cash Flow for Entrée's 20% Attributable Portion, Hugo North Extension Lift 2



Note: Figure prepared by Wood, 2021.

Table 24-17: Annualized Cashflow, Entrée's 20% Attributable Portion, Hugo North Extension Lift 2, Year 0 to Year 10

	Units	Units	Value	Total	Yr 0 1/1/2020	Yr 1 1/1/2021	Yr 2 1/1/2022	Yr 3 1/1/2023	Yr 4 1/1/2024	Yr 5 1/1/2025	Yr 6 1/1/2026	Yr 7 1/1/2027	Yr 8 1/1/2028	Yr 9 1/1/2029	Yr 10 1/1/2030
Mine Production															
Production	t			165,645,842	—	—	—	—	—	—	—	—	—	—	—
t/day	t/day			40,372	—	—	—	—	—	—	—	—	—	—	—
Cu	%			1.35	—	—	—	—	—	—	—	—	—	—	—
Au	g/t			0.49	—	—	—	—	—	—	—	—	—	—	—
Ag	g/t			3.64	—	—	—	—	—	—	—	—	—	—	—
Processing															
Cu Concentrate															
Tonnes Concentrate	kt dry			6,064	—	—	—	—	—	—	—	—	—	—	—
Cu Recovered to Cu Con	klb			4,563,803	—	—	—	—	—	—	—	—	—	—	—
Au Recovered to Cu Con	koz			2,025	—	—	—	—	—	—	—	—	—	—	—
Ag Recovered to Cu Con	koz			15,067	—	—	—	—	—	—	—	—	—	—	—
Mo Concentrate															
Tonnes Concentrate	kt dry			—	—	—	—	—	—	—	—	—	—	—	—
Mo Recovered to Mo Con	klb			—	—	—	—	—	—	—	—	—	—	—	—
Smelting															
Payable Cu in Cu Concentrate	klb			4,254,136	—	—	—	—	—	—	—	—	—	—	—
Payable Au in Cu Concentrate	koz			1,951	—	—	—	—	—	—	—	—	—	—	—
Payable Ag in Cu Concentrate	koz			13,560	—	—	—	—	—	—	—	—	—	—	—
Payable Mo in Mo Concentrate	klb			—	—	—	—	—	—	—	—	—	—	—	—
Cash Flow (000's)															
Metal Price															
Cu	US$/lb				3.25	3.78	3.61	3.45	3.46	3.25	3.25	3.25	3.25	3.25	3.25
Au	US$/oz				1,591.00	1,815.00	1,801.00	1,732.00	1,677.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00
Ag	US$/oz				21.08	25.82	24.74	23.20	22.14	21.08	21.08	21.08	21.08	21.08	21.08
Mo	US$/lb				-	-	-	-	-	-	-	-	-	-	-
Revenue															
Cu	kUS$			2,765,188	—	—	—	—	—	—	—	—	—	—	—
Au	kUS$			620,658	—	—	—	—	—	—	—	—	—	—	—
Ag	kUS$			57,169	—	—	—	—	—	—	—	—	—	—	—
Mo	kUS$			—	—	—	—	—	—	—	—	—	—	—	—
Total Revenue	kUS$			3,443,015	—	—	—	—	—	—	—	—	—	—	—
Mineral royalties (gross sales value)	kUS$	5.0%		172,151	—	—	—	—	—	—	—	—	—	—	—
Surtax royalty	kUS$	0.0%		—	—	—	—	—	—	—	—	—	—	—	—
Net Revenue	kUS$			3,270,865	—	—	—	—	—	—	—	—	—	—	—

	Units	Units	Value	Total	Yr 0 1/1/2020	Yr 1 1/1/2021	Yr 2 1/1/2022	Yr 3 1/1/2023	Yr 4 1/1/2024	Yr 5 1/1/2025	Yr 6 1/1/2026	Yr 7 1/1/2027	Yr 8 1/1/2028	Yr 9 1/1/2029	Yr 10 1/1/2030
Operating Costs on Site															
Mining	kUS$		9.21	305,222	—	—	—	—	—	—	—	—	—	—	—
Processing	kUS$		7.47	247,547	—	—	—	—	—	—	—	—	—	—	—
Infrastructure and Other Operating	kUS$		2.32	76,996	—	—	—	—	—	—	—	—	—	—	—
Total Operating Costs on Site	kUS$		19.01	629,765	—	—	—	—	—	—	—	—	—	—	—
Capital Carrying Charge															
Mining	kUS$		-	-	—	—	—	—	—	—	—	—	—	—	—
Processing	kUS$		0.19	6,453	—	—	—	—	—	—	—	—	—	—	—
Tailings	kUS$		1.02	33,792	—	—	—	—	—	—	—	—	—	—	—
Total Capital Carrying Charge	kUS$		1.21	40,244	—	—	—	—	—	—	—	—	—	—	—
Administration Charge															
Administration Charge	kUS$		0.75	24,743	—	—	—	—	—	—	—	—	—	—	—
Annual License Fee	kUS$		0.10	3,398	—	—	—	—	—	—	—	—	—	—	—
Total Administration Charge	kUS$		0.85	28,141	—	—	—	—	—	—	—	—	—	—	—
Refining & Transportation Costs															
Cu Refining & Other Metal Costs	kUS$		2.31	76,574	—	—	—	—	—	—	—	—	—	—	—
Cu Con Smelting Cost	kUS$		3.34	110,519	—	—	—	—	—	—	—	—	—	—	—
Au Refining & Other Metal Costs	kUS$		0.05	1,755	—	—	—	—	—	—	—	—	—	—	—
Ag Refining & Other Metal Costs	kUS$		0.04	1,220	—	—	—	—	—	—	—	—	—	—	—
Cu Con Fluorine Penalty	kUS$		—	—	—	—	—	—	—	—	—	—	—	—	—
Cu Con Transportation Costs	kUS$		1.41	46,660	—	—	—	—	—	—	—	—	—	—	—
Cu Con Insurance Costs	kUS$		0.03	962	—	—	—	—	—	—	—	—	—	—	—
Roasting Cost	kUS$		—	—	—	—	—	—	—	—	—	—	—	—	—
Mo Con Transportation Costs	kUS$		—	—	—	—	—	—	—	—	—	—	—	—	—
Total Refining & Transportation Costs	kUS$		7.17	237,691	—	—	—	—	—	—	—	—	—	—	—
Net Smelter Return (NSR)	kUS$			3,205,324	—	—	—	—	—	—	—	—	—	—	—
Operating Profit (EBITDA)	kUS$			2,335,023	—	—	—	—	—	—	—	—	—	—	—
Total Production Costs															
Total Operating Costs	kUS$			935,842	—	—	—	—	—	—	—	—	—	—	—
Depreciation	kUS$			319,714	—	—	—	—	—	—	—	—	—	—	—
Total Production Costs	kUS$			1,255,556	—	—	—	—	—	—	—	—	—	—	—
Income from Operations															
Net Revenue	kUS$			3,270,865	—	—	—	—	—	—	—	—	—	—	—
Production Costs	kUS$			1,255,556	—	—	—	—	—	—	—	—	—	—	—
Net Income Before Taxes	kUS$			2,015,309	—	—	—	—	—	—	—	—	—	—	—
Federal Tax	kUS$	25%		498,206	—	—	—	—	—	—	—	—	—	—	—
Depreciation	kUS$			319,714	—	—	—	—	—	—	—	—	—	—	—
Reclamation Accrual	kUS$		1.07	35,448	—	—	—	—	—	—	—	—	—	—	—

	Units	Units	Value	Total	Yr 0 1/1/2020	Yr 1 1/1/2021	Yr 2 1/1/2022	Yr 3 1/1/2023	Yr 4 1/1/2024	Yr 5 1/1/2025	Yr 6 1/1/2026	Yr 7 1/1/2027	Yr 8 1/1/2028	Yr 9 1/1/2029	Yr 10 1/1/2030
Net Income After Taxes	kUS$			1,801,369	—	—	—	—	—	—	—	—	—	—	—
Capital Cost															
EJV Capital Share Shaft 4	kUS$			-	—	—	—	—	—	—	—	—	—	—	—
EJV HN Lift 1	kUS$			-	—	—	—	—	—	—	—	—	—	—	—
EJV HN Lift 2	kUS$			319,714	—	—	—	—	—	—	—	—	—	—	—
Heruga EJV	kUS$			—	—	—	—	—	—	—	—	—	—	—	—
Total Capital	kUS$			319,714	—	—	—	—	—	—	—	—	—	—	—
Cash Flow After Tax															
10% Cash flow pass through	kUS$			180,653	—	—	—	—	—	—	—	—	—	—	—
Cash flow after loan payment	kUS$			1,303,546	—	—	—	—	—	—	—	—	—	—	—
Final Loan Balance	kUS$			196	—	—	—	—	—	—	—	—	—	—	—
Project Start	years				—	—	—	—	—	—	—	—	—	—	—
Cash Flow	kUS$			1,484,003	—	—	—	—	—	—	—	—	—	—	—
NPV @ 5%	kUS$	5%		540,840	—	—	—	—	—	—	—	—	—	—	—
NPV @ 8%	kUS$	8%		306,246	—	—	—	—	—	—	—	—	—	—	—
NPV @ 10%	kUS$	10%		212,569	—	—	—	—	—	—	—	—	—	—	—
IRR Before Tax	kUS$			0.0%											
Cash Flow Before Tax															
Cash Flow	kUS$			1,982,208	—	—	—	—	—	—	—	—	—	—	—
NPV @ 5%	kUS$	5%		727,526	—	—	—	—	—	—	—	—	—	—	—
NPV @ 8%	kUS$	8%		413,460	—	—	—	—	—	—	—	—	—	—	—
NPV @ 10%	kUS$	10%		287,619	—	—	—	—	—	—	—	—	—	—	—

Table 24-18: Annualized Cashflow, Entrée's 20% Attributable Portion, Hugo North Extension Lift 2, Year 11 to Year 20

	Units	Yr 11 1/1/2031	Yr 12 1/1/2032	Yr 13 1/1/2033	Yr 14 1/1/2034	Yr 15 1/1/2035	Yr 16 1/1/2036	Yr 17 1/1/2037	Yr 18 1/1/2038	Yr 19 1/1/2039	Yr 20 1/1/2040
Mine Production											
Production	t	144,713	328,730	250,790	285,753	114,842	101,096	422,778	412,649	646,820	2,538,668
t/day	t/day	396	898	687	783	315	276	1,158	1,131	1,772	6,936
Cu	%	—	—	—	—	0.04	0.62	0.67	0.65	0.65	0.99
Au	g/t	0.00	0.00	0.00	0.00	0.02	0.20	0.23	0.23	0.26	0.41
Ag	g/t	0.00	0.00	0.00	0.00	0.01	1.39	1.39	1.80	2.12	3.07
Processing											
Cu Concentrate											
Tonnes Concentrate	ktdry	—	—	—	0.2	1.4	1.2	5.3	9.4	18.4	77.6
Cu Recovered to Cu Con	klb	—	—	—	—	12.0	1,189.3	5,385.2	5,099.7	8,029.3	50,213.8
Au Recovered to Cu Con	koz	—	—	—	—	0.0	0.5	2.5	2.4	4.1	26.1
Ag Recovered to Cu Con	koz	—	—	—	—	0.0	3.7	15.5	19.5	33.3	188.1
Mo Concentrate											
Tonnes Concentrate	ktdry	—	—	—	—	—	—	—	—	—	—
Mo Recovered to Mo Con	klb	—	—	—	—	—	—	—	—	—	—
Smelting											
Payable Cu in Cu Concentrate	klb	—	—	—	(3.6)	(18.9)	1,117.0	5,060.1	4,698.2	7,320.2	46,575.6
Payable Au in Cu Concentrate	koz	—	—	—	—	—	0.5	2.4	2.3	3.9	25.3
Payable Ag in Cu Concentrate	koz	—	—	—	—	—	3.3	13.9	17.6	30.0	169.3
Payable Mo in Mo Concentrate	klb	—	—	—	—	—	—	—	—	—	—
Cash Flow (000's)											
Metal Price											
Cu	US$/lb	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Au	US$/oz	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00
Ag	US$/oz	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08
Mo	US$/lb	—	—	—	—	—	—	—	—	—	—
Revenue											
Cu	kUS$	—	—	—	(2)	(12)	726	3,289	3,054	4,758	30,274
Au	kUS$	—	—	—	—	—	154	772	722	1,246	8,061
Ag	kUS$	—	—	—	—	—	14	59	74	127	714
Mo	kUS$	—	—	—	—	—	—	—	—	—	—
Total Revenue	kUS$	—	—	—	(2)	(12)	894	4,120	3,850	6,131	39,049
Mineral royalties(gross sales value)	kUS$	—	—	—	(0)	(1)	45	206	192	307	1,952
Surtax royalty	kUS$	—	—	—	—	—	—	—	—	—	—
Net Revenue	kUS$	—	—	—	(2)	(12)	849	3,914	3,657	5,824	37,096

	Units	Yr 11 1/1/2031	Yr 12 1/1/2032	Yr 13 1/1/2033	Yr 14 1/1/2034	Yr 15 1/1/2035	Yr 16 1/1/2036	Yr 17 1/1/2037	Yr 18 1/1/2038	Yr 19 1/1/2039	Yr 20 1/1/2040
Operating Costs on Site											
Mining	kUS$	267	606	462	527	212	186	779	760	1,192	4,678
Processing	kUS$	216	491	375	427	172	151	632	617	967	3,794
Infrastructure and Other Operating	kUS$	67	153	117	133	53	47	197	192	301	1,180
Total Operating Costs on Site	kUS$	550	1,250	953	1,086	437	384	1,607	1,569	2,459	9,652
Capital Carrying Charge											
Mining	kUS$	—	—	—	—	—	—	—	—	—	—
Processing	kUS$	—	—	—	0	2	1	6	10	20	83
Tailings	kUS$	30	67	51	58	23	21	86	84	132	518
Total Capital Carrying Charge	kUS$	30	67	51	58	25	22	92	94	152	601
Administration Charge											
Administration Charge	kUS$	21	49	37	42	17	15	63	61	96	379
Annual License Fee	kUS$	—	—	—	—	—	—	—	—	189	189
Total Administration Charge	kUS$	21	49	37	42	17	15	63	61	285	568
Refining & Transportation Costs											
Cu Refining & Other Metal Costs	kUS$	—	—	—	(0)	(0)	20	91	85	132	838
Cu Con Smelting Cost	kUS$	—	—	—	3	26	22	96	171	336	1,415
Au Refining & Other Metal Costs	kUS$	—	—	—	—	—	0	2	2	4	23
Ag Refining & Other Metal Costs	kUS$	—	—	—	—	—	0	1	2	3	15
Cu Con Fluorine Penalty	kUS$	—	—	—	—	—	—	—	—	—	—
Cu Con Transportation Costs	kUS$	—	—	—	1	11	9	40	72	142	597
Cu Con Insurance Costs	kUS$	—	—	—	(0)	(0)	0	1	1	2	11
Roasting Cost	kUS$	—	—	—	—	—	—	—	—	—	—
Mo Con Transportation Costs	kUS$	—	—	—	—	—	—	—	—	—	—
Total Refining & Transportation Costs	kUS$	—	—	—	4	37	52	232	333	617	2,900
Net Smelter Return(NSR)	kUS$	—	—	—	(7)	(49)	842	3,888	3,517	5,513	36,149
Operating Profit (EBITDA)	kUS$	(601)	(1,366)	(1,042)	(1,194)	(527)	376	1,920	1,600	2,311	23,377
Total Production Costs											
Total Operating Costs	kUS$	601	1,366	1,042	1,192	515	473	1,994	2,057	3,513	13,719
Depreciation	kUS$	0	2	2	3	2	1	8	10	21	157
Total Production Costs	kUS$	601	1,367	1,044	1,195	517	475	2,002	2,067	3,534	13,876
Income from Operations											
Net Revenue	kUS$	—	—	—	(2)	(12)	849	3,914	3,657	5,824	37,096
Production Costs	kUS$	601	1,367	1,044	1,195	517	475	2,002	2,067	3,534	13,876
Net Income Before Taxes	kUS$	(601)	(1,367)	(1,044)	(1,197)	(529)	375	1,912	1,590	2,290	23,220
Federal Tax	kUS$	—	—	—	—	—	—	—	—	—	4,950
Depreciation	kUS$	0	2	2	3	2	1	8	10	21	157
Reclamation Accrual	kUS$	31	70	54	61	25	22	90	88	138	543

	Units	Yr 11 1/1/2031	Yr 12 1/1/2032	Yr 13 1/1/2033	Yr 14 1/1/2034	Yr 15 1/1/2035	Yr 16 1/1/2036	Yr 17 1/1/2037	Yr 18 1/1/2038	Yr 19 1/1/2039	Yr 20 1/1/2040
Net Income After Taxes	kUS$	(632)	(1,436)	(1,096)	(1,255)	(552)	355	1,829	1,511	2,172	17,883
Capital Cost											
EJV Capital Share Shaft4	kUS$	—	—	—	—	—	—	—	—	—	—
EJV HN Lift1	kUS$	—	—	—	—	—	—	—	—	—	—
EJV HN Lift2	kUS$	279	634	484	552	222	195	816	796	1,248	4,900
Heruga EJV	kUS$	—	—	—	—	—	—	—	—	—	—
Total Capital	kUS$	279	634	484	552	222	195	816	796	1,248	4,900
Cash Flow After Tax											
10% Cashflow pass through	kUS$	—	—	—	—	—	35	183	151	217	1,788
Cashflow after loan payment	kUS$	—	—	—	—	—	—	—	—	—	8,631
Final Loan Balance	kUS$	—	—	—	—	—	—	—	—	—	-
Project Start	years	5	6	7	8	9	10	11	12	13	14
Cash Flow	kUS$	—	—	—	—	—	35	183	151	217	10,420
NPV @ 5%	kUS$	—	—	—	—	—	22	107	84	115	5,263
NPV @ 8%	kUS$	—	—	—	—	—	16	78	60	80	3,547
NPV @ 10%	kUS$	—	—	—	—	—	14	64	48	63	2,744
IRR Before Tax											
Cash Flow Before Tax											
Cash Flow	kUS$	—	—	—	—	—	35	183	151	217	15,370
NPV @ 5%	kUS$	—	—	—	—	—	22	107	84	115	7,763
NPV @ 8%	kUS$	—	—	—	—	—	16	78	60	80	5,233
NPV @ 10%	kUS$	—	—	—	—	—	14	64	48	63	4,047

Table 24-19: Annualized Cashflow, Entrée's 20% Attributable Portion, Hugo North Extension Lift 2 Year 21 to Year 30

	Units	Yr 21 1/1/2041	Yr 22 1/1/2042	Yr 23 1/1/2043	Yr 24 1/1/2044	Yr 25 1/1/2045	Yr 26 1/1/2046	Yr 27 1/1/2047	Yr 28 1/1/2048	Yr 29 1/1/2049	Yr 30 1/1/2050
Mine Production											
Production	t	5,380,776	8,838,001	12,616,892	13,118,357	13,634,302	13,960,178	14,735,726	14,576,534	14,378,151	13,913,622
t/day	t/day	14,742	24,214	34,567	35,843	37,354	38,247	40,372	39,827	39,392	38,120
Cu	%	1.49	1.73	1.69	1.57	1.42	1.34	1.27	1.20	1.24	1.26
Au	g/t	0.58	0.55	0.50	0.48	0.47	0.49	0.53	0.53	0.50	0.45
Ag	g/t	3.66	3.93	3.96	3.94	3.76	3.60	3.48	3.47	3.64	3.69
Processing											
Cu Concentrate											
Tonnes Concentrate	kt dry	205.0	361.0	521.8	535.1	529.4	514.3	522.4	499.8	500.1	489.0
Cu Recovered to Cu Con	klb	163,965.4	313,670.1	436,738.1	420,089.5	395,078.5	379,133.1	379,354.3	354,460.5	360,395.9	356,489.5
Au Recovered to Cu Con	koz	78.8	123.2	160.2	161.9	162.8	171.5	194.6	192.1	177.1	155.3
Ag Recovered to Cu Con	koz	509.7	921.0	1,327.9	1,358.6	1,325.5	1,283.4	1,283.5	1,240.0	1,272.4	1,243.2
Mo Concentrate											
Tonnes Concentrate	kt dry	—	—	—	—	—	—	—	—	—	—
Mo Recovered to Mo Con	klb	—	—	—	—	—	—	—	—	—	—
Smelting											
Payable Cu in Cu Concentrate	klb	153,112.8	293,568.4	408,344.1	392,075.5	368,178.6	353,185.3	353,227.3	329,799.3	335,493.1	331,976.1
Payable Au in Cu Concentrate	koz	76.4	119.5	152.1	153.8	154.7	166.3	188.8	186.3	171.8	147.5
Payable Ag in Cu Concentrate	koz	458.8	828.9	1,195.2	1,222.8	1,192.9	1,155.0	1,155.1	1,116.0	1,145.2	1,118.9
Payable Mo in Mo Concentrate	klb	—	—	—	—	—	—	—	—	—	—
Cash Flow (000's)											
Metal Price											
Cu	US$/lb	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Au	US$/oz	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00
Ag	US$/oz	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08	21.08
Mo	US$/lb	—	—	—	—	—	—	—	—	—	—
Revenue											
Cu	kUS$	99,523	190,819	265,424	254,849	239,316	229,570	229,598	214,370	218,070	215,784
Au	kUS$	24,323	38,024	48,412	48,949	49,214	52,926	60,064	59,280	54,658	46,943
Ag	kUS$	1,934	3,495	5,039	5,155	5,029	4,870	4,870	4,705	4,828	4,717
Mo	kUS$	—	—	—	—	—	—	—	—	—	—
Total Revenue	kUS$	125,781	232,338	318,874	308,953	293,560	287,366	294,532	278,354	277,557	267,444
Mineral royalties (gross sales value)	kUS$	6,289	11,617	15,944	15,448	14,678	14,368	14,727	13,918	13,878	13,372
Surtax royalty	kUS$	—	—	—	—	—	—	—	—	—	—
Net Revenue	kUS$	119,492	220,721	302,931	293,505	278,882	272,997	279,805	264,437	263,679	254,072
Operating Costs on Site											
Mining	kUS$	9,915	16,285	23,248	24,172	25,123	25,723	27,152	26,859	26,493	25,637
Processing	kUS$	8,041	13,208	18,855	19,605	20,376	20,863	22,022	21,784	21,487	20,793
Infrastructure and Other Operating	kUS$	2,501	4,108	5,865	6,098	6,338	6,489	6,849	6,775	6,683	6,467
Total Operating Costs on Site	kUS$	20,457	33,601	47,968	49,874	51,836	53,075	56,023	55,418	54,664	52,898

	Units	Yr 21 1/1/2041	Yr 22 1/1/2042	Yr 23 1/1/2043	Yr 24 1/1/2044	Yr 25 1/1/2045	Yr 26 1/1/2046	Yr 27 1/1/2047	Yr 28 1/1/2048	Yr 29 1/1/2049	Yr 30 1/1/2050
Capital Carrying Charge											
Mining	kUS$	—	—	—	—	—	—	—	—	—	—
Processing	kUS$	218	384	555	569	563	547	556	532	532	520
Tailings	kUS$	1,098	1,803	2,574	2,676	2,781	2,848	3,006	2,974	2,933	2,838
Total Capital Carrying Charge	kUS$	1,316	2,187	3,129	3,245	3,345	3,395	3,562	3,505	3,465	3,359
Administration Charge											
Administration Charge	kUS$	804	1,321	1,886	1,961	2,037	2,085	2,201	2,176	2,147	2,078
Annual License Fee	kUS$	189	189	189	189	189	189	189	189	189	189
Total Administration Charge	kUS$	993	1,510	2,075	2,150	2,226	2,274	2,389	2,365	2,336	2,267
Refining & Transportation Costs											
Cu Refining & Other Metal Costs	kUS$	2,756	5,284	7,350	7,057	6,627	6,357	6,358	5,936	6,039	5,976
Cu Con Smelting Cost	kUS$	3,736	6,578	9,509	9,751	9,647	9,373	9,520	9,109	9,114	8,912
Au Refining & Other Metal Costs	kUS$	69	108	137	138	139	150	170	168	155	133
Ag Refining & Other Metal Costs	kUS$	41	75	108	110	107	104	104	100	103	101
Cu Con Fluorine Penalty	kUS$	—	—	—	—	—	—	—	—	—	—
Cu Con Transportation Costs	kUS$	1,577	2,777	4,014	4,117	4,073	3,957	4,019	3,846	3,848	3,763
Cu Con Insurance Costs	kUS$	35	65	89	86	82	80	82	78	77	75
Roasting Cost	kUS$	—	—	—	—	—	—	—	—	—	—
Mo Con Transportation Costs	kUS$	—	—	—	—	—	—	—	—	—	—
Total Refining & Transportation Costs	kUS$	8,214	14,887	21,207	21,260	20,676	20,021	20,253	19,237	19,336	18,959
Net Smelter Return (NSR)	kUS$	117,567	217,450	297,667	287,693	272,884	267,344	274,279	259,117	258,221	248,486
Operating Profit (EBITDA)	kUS$	88,512	168,536	228,552	216,976	200,799	194,232	197,577	183,911	183,878	176,590
Total Production Costs											
Total Operating Costs	kUS$	30,980	52,185	74,379	76,529	78,083	78,765	82,228	80,526	79,801	77,482
Depreciation	kUS$	681	2,091	5,087	7,777	11,061	14,847	20,186	25,218	31,155	37,749
Total Production Costs	kUS$	31,661	54,277	79,466	84,306	89,144	93,613	102,414	105,744	110,956	115,230
Income from Operations											
Net Revenue	kUS$	119,492	220,721	302,931	293,505	278,882	272,997	279,805	264,437	263,679	254,072
Production Costs	kUS$	31,661	54,277	79,466	84,306	89,144	93,613	102,414	105,744	110,956	115,230
Net Income Before Taxes	kUS$	87,831	166,444	223,464	209,199	189,738	179,385	177,391	158,693	152,723	138,842
Federal Tax	kUS$	21,643	41,296	55,551	51,985	47,119	44,531	44,033	39,358	37,866	34,395
Depreciation	kUS$	681	2,091	5,087	7,777	11,061	14,847	20,186	25,218	31,155	37,749
Reclamation Accrual	kUS$	1,151	1,891	2,700	2,807	2,918	2,987	3,153	3,119	3,077	2,978
Net Income After Taxes	kUS$	65,718	125,348	170,301	162,184	150,762	146,713	150,391	141,433	142,935	139,217
Capital Cost											
EJV Capital Share Shaft 4	kUS$	—	—	—	—	—	—	—	—	—	—
EJV HN Lift 1	kUS$	—	—	—	—	—	—	—	—	—	—
EJV HN Lift 2	kUS$	10,385	17,058	24,352	25,320	26,316	26,945	28,442	28,134	27,751	26,855
Heruga EJV	kUS$	—	—	—	—	—	—	—	—	—	—
Total Capital	kUS$	10,385	17,058	24,352	25,320	26,316	26,945	28,442	28,134	27,751	26,855
Cash Flow After Tax											
10% Cash flow pass through	kUS$	6,572	12,535	17,030	16,218	15,076	14,671	15,039	14,143	14,294	13,922
Cash flow after loan payment	kUS$	48,761	95,755	128,919	120,646	109,370	105,097	106,910	99,156	100,890	98,441

	Units	Yr 21 1/1/2041	Yr 22 1/1/2042	Yr 23 1/1/2043	Yr 24 1/1/2044	Yr 25 1/1/2045	Yr 26 1/1/2046	Yr 27 1/1/2047	Yr 28 1/1/2048	Yr 29 1/1/2049	Yr 30 1/1/2050
Final Loan Balance	kUS$	—	—	—	—	—	—	—	—	—	—
Project Start	years	15	16	17	18	19	20	21	22	23	24
Cash Flow	kUS$	55,332	108,290	145,949	136,864	124,446	119,769	121,949	113,299	115,184	112,363
NPV @ 5%	kUS$	26,616	49,609	63,677	56,870	49,248	45,140	43,773	38,731	37,501	34,840
NPV @ 8%	kUS$	17,443	31,609	39,445	34,250	28,836	25,696	24,226	20,840	19,618	17,720
NPV @ 10%	kUS$	13,246	23,567	28,875	24,616	20,348	17,803	16,479	13,918	12,864	11,408
IRR Before Tax	kUS$	66,339	174,629	320,577	457,441	581,888	701,656	823,606	936,905	1,052,088	1,164,451
Cash Flow Before Tax											
Cash Flow	kUS$	76,975	149,586	201,500	188,849	171,566	164,300	165,982	152,657	153,050	146,758
NPV @ 5%	kUS$	37,026	68,527	87,914	78,471	67,894	61,923	59,578	52,186	49,829	45,505
NPV @ 8%	kUS$	24,266	43,663	54,459	47,259	39,754	35,250	32,973	28,080	26,067	23,144
NPV @ 10%	kUS$	18,427	32,554	39,866	33,966	28,052	24,422	22,429	18,753	17,092	14,900

Table 24-20: Annualized Cashflow, Entrée's 20% Attributable Portion, Hugo North Extension Lift 2, Year 31 to Year 37

	Units	Yr 31 1/1/2051	Yr 32 1/1/2052	Yr 33 1/1/2053	Yr 34 1/1/2054	Yr 35 1/1/2055	Yr 36 1/1/2056	Yr 37 1/1/2057
Mine Production								
Production	t	11,948,967	9,864,597	7,532,072	4,713,748	1,185,943	1,137	—
t/day	t/day	32,737	26,952	20,636	12,914	3,249	3	—
Cu	%	1.32	1.37	1.36	1.18	0.71	0.39	—
Au	g/t	0.49	0.52	0.49	0.41	0.24	0.16	—
Ag	g/t	3.82	3.81	3.59	3.20	2.41	1.74	—
Processing								
Cu Concentrate								
Tonnes Concentrate	kt dry	433.1	367.3	280.8	160.9	30.9	0.0	—
Cu Recovered to Cu Con	klb	320,076.1	275,318.9	209,221.3	112,972.0	16,901.4	8.6	—
Au Recovered to Cu Con	koz	142.8	125.8	90.3	46.7	6.7	0.0	—
Ag Recovered to Cu Con	koz	1,105.9	898.7	635.1	342.1	59.3	0.0	—
Mo Concentrate								
Tonnes Concentrate	kt dry	—	—	—	—	—	—	—
Mo Recovered to Mo Con	klb	—	—	—	—	—	—	—
Smelting								
Payable Cu in Cu Concentrate	klb	298,192.9	256,606.4	194,966.9	105,078.0	15,575.0	7.8	—
Payable Au in Cu Concentrate	koz	138.5	122.1	87.6	44.4	6.3	0.0	—
Payable Ag in Cu Concentrate	koz	995.3	808.8	571.6	307.9	53.3	0.0	—
Payable Mo in Mo Concentrate	klb	—	—	—	—	—	—	—
Cash Flow (000's)								
Metal Price								
Cu	US$/lb	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Au	US$/oz	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00	1,591.00
Ag	US$/oz	21.08	21.08	21.08	21.08	21.08	21.08	21.08
Mo	US$/lb	—	—	—	—	—	—	—
Revenue								
Cu	kUS$	193,825	166,794	126,728	68,301	10,124	5	—
Au	kUS$	44,068	38,838	27,874	14,115	2,016	1	—
Ag	kUS$	4,196	3,410	2,410	1,298	225	0	—
Mo	kUS$	—	—	—	—	—	-	—
Total Revenue	kUS$	242,090	209,042	157,012	83,714	12,365	6	—
Mineral royalties (gross sales value)	kUS$	12,104	10,452	7,851	4,186	618	0	—
Surtax royalty	kUS$	—	—	—	—	—	—	—
Net Revenue	kUS$	229,985	198,590	149,161	79,528	11,747	6	—

	Units	Yr 31 1/1/2051	Yr 32 1/1/2052	Yr 33 1/1/2053	Yr 34 1/1/2054	Yr 35 1/1/2055	Yr 36 1/1/2056	Yr 37 1/1/2057
Operating Costs on Site								
Mining	kUS$	22,017	18,177	13,879	8,686	2,185	2	-
Processing	kUS$	17,857	14,742	11,256	7,044	1,772	2	-
Infrastructure and Other Operating	kUS$	5,554	4,585	3,501	2,191	551	1	-
Total Operating Costs on Site	kUS$	45,428	37,504	28,636	17,921	4,509	4	-
Capital Carrying Charge								
Mining	kUS$	—	—	—	—	—	—	—
Processing	kUS$	461	391	299	171	33	0	—
Tailings	kUS$	2,438	2,012	1,537	962	242	0	—
Total Capital Carrying Charge	kUS$	2,898	2,403	1,835	1,133	275	0	—
Administration Charge								
Administration Charge	kUS$	1,785	1,474	1,125	704	177	0	—
Annual License Fee	kUS$	189	189	189	189	189	189	—
Total Administration Charge	kUS$	1,974	1,662	1,314	893	366	189	—
Refining & Transportation Costs								
Cu Refining & Other Metal Costs	kUS$	5,367	4,619	3,509	1,891	280	0	—
Cu Con Smelting Cost	kUS$	7,893	6,694	5,117	2,933	564	0	—
Au Refining & Other Metal Costs	kUS$	125	110	79	40	6	0	—
Ag Refining & Other Metal Costs	kUS$	90	73	51	28	5	0	—
Cu Con Fluorine Penalty	kUS$	—	—	—	—	—	—	—
Cu Con Transportation Costs	kUS$	3,332	2,826	2,160	1,238	238	0	—
Cu Con Insurance Costs	kUS$	68	58	44	23	3	0	—
Roasting Cost	kUS$	—	—	—	—	—	—	—
Mo Con Transportation Costs	kUS$	—	—	—	—	—	—	—
Total Refining & Transportation Costs	kUS$	16,875	14,380	10,960	6,153	1,096	1	—
Net Smelter Return (NSR)	kUS$	225,215	194,661	146,051	77,561	11,269	6	—
Operating Profit (EBITDA)	kUS$	162,810	142,640	106,416	53,429	5,501	(188)	—
Total Production Costs								
Total Operating Costs	kUS$	67,175	55,950	42,746	26,100	6,246	194	—
Depreciation	kUS$	40,237	41,280	39,671	32,095	10,362	12	—
Total Production Costs	kUS$	107,412	97,230	82,416	58,194	16,607	206	—
Income from Operations								
Net Revenue	kUS$	229,985	198,590	149,161	79,528	11,747	6	—
Production Costs	kUS$	107,412	97,230	82,416	58,194	16,607	206	—
Net Income Before Taxes	kUS$	122,573	101,360	66,745	21,334	(4,860)	(200)	—
Federal Tax	kUS$	30,328	25,025	16,371	3,753	—	—	—
Depreciation	kUS$	40,237	41,280	39,671	32,095	10,362	12	—
Reclamation Accrual	kUS$	2,557	2,111	1,612	1,009	254	0	—

	Units	Yr 31 1/1/2051	Yr 32 1/1/2052	Yr 33 1/1/2053	Yr 34 1/1/2054	Yr 35 1/1/2055	Yr 36 1/1/2056	Yr 37 1/1/2057
Net Income After Taxes	kUS$	129,925	115,504	88,432	48,667	5,247	(188)	—
Capital Cost								
EJV Capital Share Shaft 4	kUS$	—	—	—	—	—	—	—
EJV HN Lift 1	kUS$	—	—	—	—	—	—	—
EJV HN Lift 2	kUS$	23,063	19,040	14,538	9,098	2,289	2	—
Heruga EJV	kUS$	—	—	—	—	—	—	—
Total Capital	kUS$	23,063	19,040	14,538	9,098	2,289	2	—
Cash Flow After Tax								
10% Cash flow pass through	kUS$	12,992	11,550	8,843	4,867	525	—	—
Cash flow after loan payment	kUS$	93,869	84,914	65,052	34,702	2,434	—	—
Final Loan Balance	kUS$	—	—	—	—	—	196	—
Project Start	years	25	26	27	28	29	30	31
Cash Flow	kUS$	106,862	96,464	73,895	39,569	2,958	(196)	—
NPV @ 5%	kUS$	31,557	27,130	19,793	10,094	719	(45)	—
NPV @ 8%	kUS$	15,604	13,042	9,251	4,587	318	(19)	—
NPV @ 10%	kUS$	9,863	8,094	5,637	2,744	186	(11)	—
IRR Before Tax								
Cash Flow Before Tax								
Cash Flow	kUS$	137,190	121,489	90,266	43,322	2,958	(196)	—
NPV @ 5%	kUS$	40,513	34,168	24,178	11,051	719	(45)	—
NPV @ 8%	kUS$	20,032	16,426	11,300	5,022	318	(19)	—
NPV @ 10%	kUS$	12,662	10,194	6,885	3,004	186	(11)	—

Sensitivity Analysis

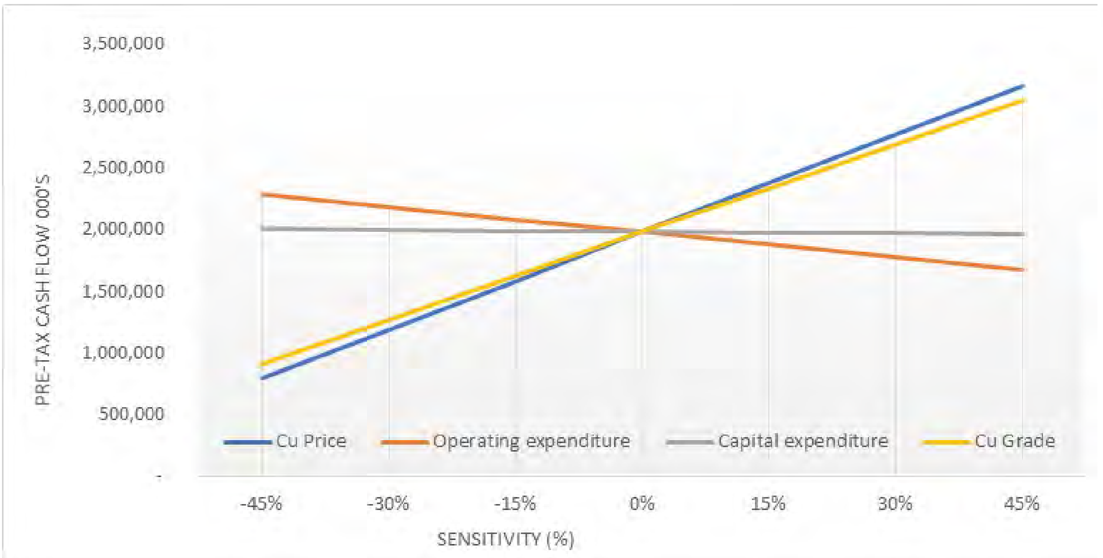
Entrée's 20% attributable portion of the 2021 PEA is most sensitive to changes in copper price and grade and less sensitive to changes in operating and capital costs. The copper grade sensitivity generally mirrors the copper price. Figure 24-14 to Figure 24-17 provide sensitivity spider graphs for the 2021 PEA pre-tax and after-tax cash flow and NPV for Entrée's 20% attributable portion.

To test the project sensitivity to timing, the project pre- and after-tax cash flows were discounted to the start of 2021 (Figure 24-18).

Comments on Section 24.1.8

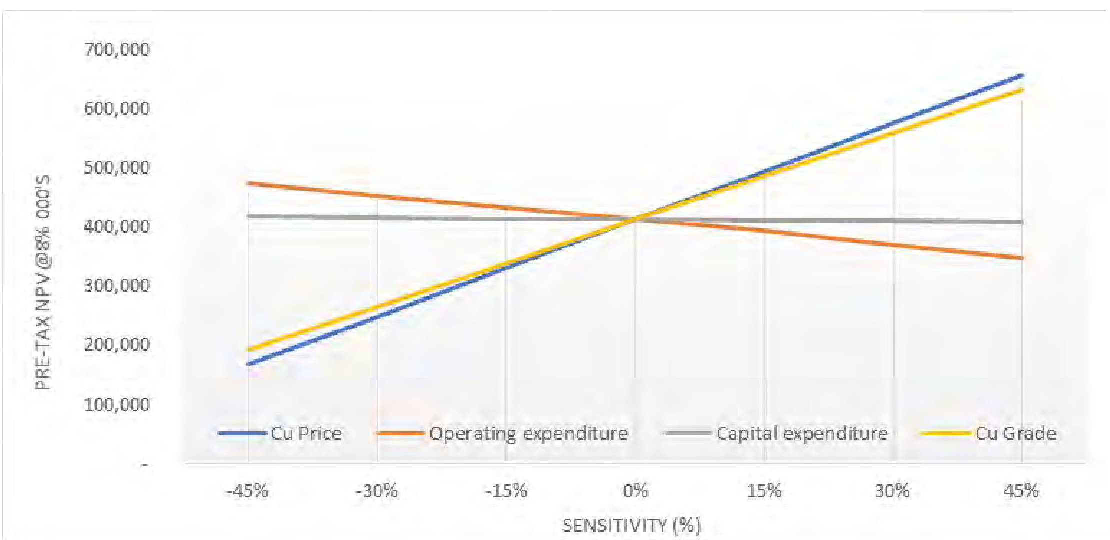
Entrée's 20% attributable portion of the Hugo North Extension Lift 2 demonstrates a positive after-tax NPV@8% of US$306.2 million at the study copper price of US$3.25/lb. Discounting the after-tax NPV@8% to 2021 results in a reduced value of US$193.0 million. Significant positive cash flows for the 2021 PEA are recognized in 2040.

Figure 24-14: 2021 PEA Pre-Tax Cash Flow Sensitivity Analysis, Hugo North Extension Lift 2



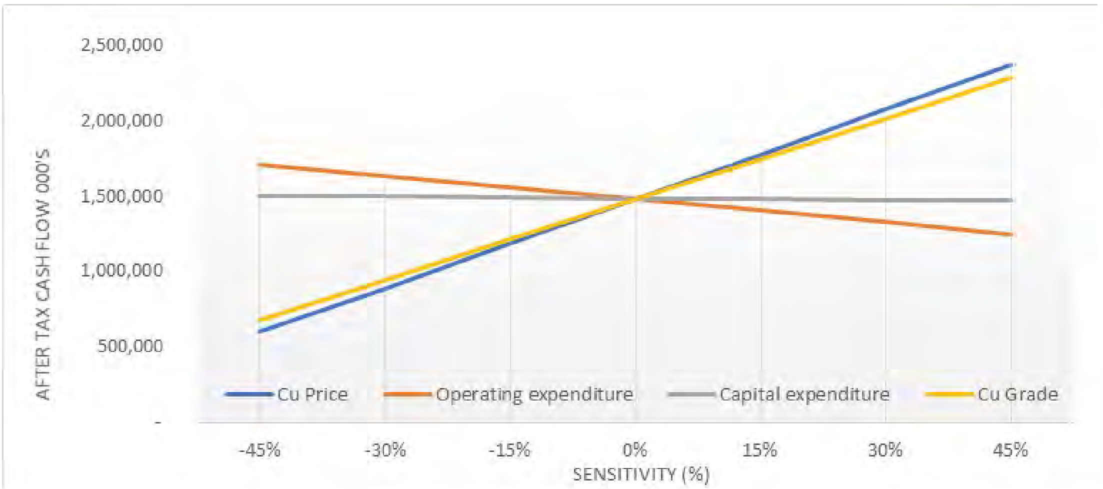
Note: Figure prepared by Wood, 2021.

Figure 24-15: 2021 PEA Pre-Tax NPV@8% Sensitivity Analysis, Hugo North Extension Lift 2



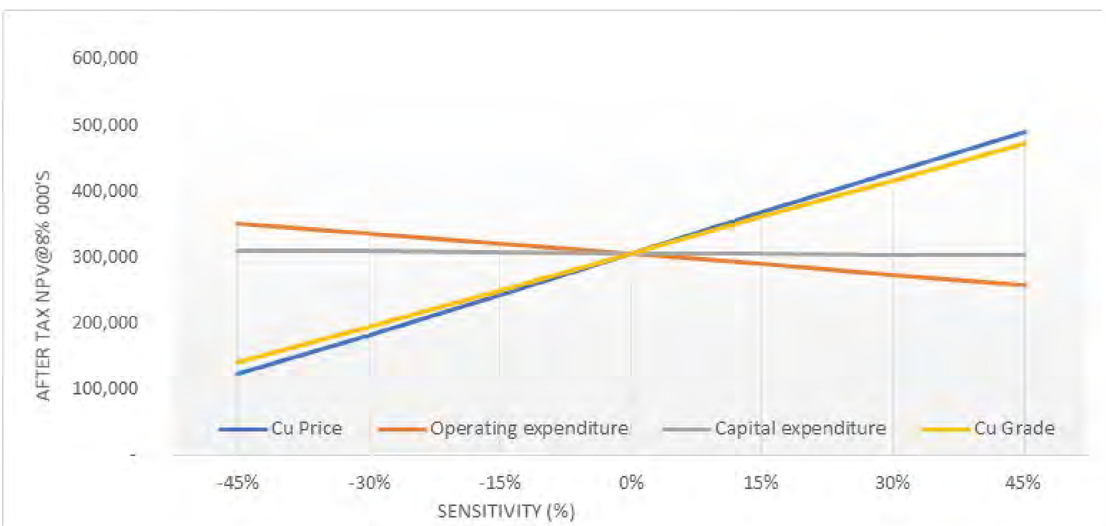
Note: Figure prepared by Wood, 2021.

Figure 24-16: 2021 PEA After-Tax Cash Flow Sensitivity Analysis, Hugo North Extension Lift 2



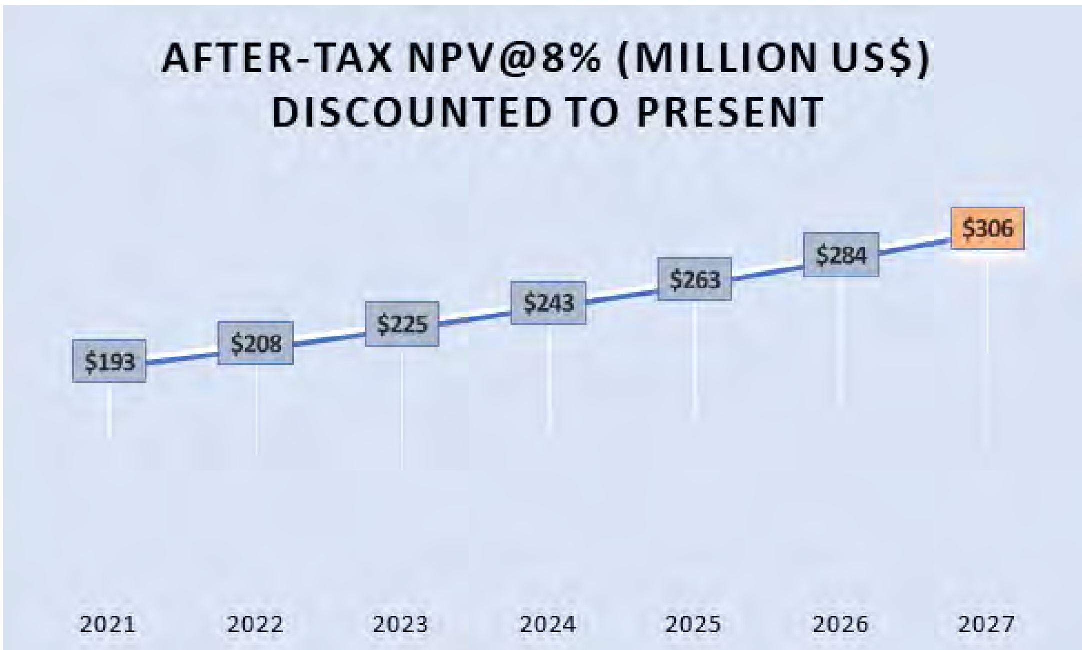
Note: Figure prepared by Wood, 2021.

Figure 24-17: 2021 PEA After-Tax NPV@8% Sensitivity Analysis, Hugo North Extension Lift 2



Note: Figure prepared by Wood, 2021.

Figure 24-18: Sensitivity to Timing for 2021 PEA After-Tax NPV@8% Results for Entrée's 20% Attributable Portion, Hugo North Extension Lift 2, Assuming Discounting Prior to Lift 2 Construction (start of construction (Base Case) highlighted in red)



Note: Figure prepared by Wood, 2021.

25.0 INTERPRETATION AND CONCLUSIONS

25.1 Introduction

The QPs note the following interpretations and conclusions in their respective areas of expertise, based on the review of data available for this Report.

25.2 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

The Entrée/Oyu Tolgoi JV property hosts the Hugo North Extension deposit and most of the Heruga deposit, and several exploration targets. OTLLC is the manager of the Entrée/Oyu Tolgoi JV. Through various agreements, Rio Tinto has assumed management of the building and operation of Oyu Tolgoi, including the Hugo North Extension deposit. Rio Tinto will also manage any development of the portion of the Heruga deposit on the Entrée/Oyu Tolgoi JV property. Exploration operations on behalf of OTLLC, including exploration on the Entrée/Oyu Tolgoi JV property, are conducted under Rio Tinto's supervision.

While the Shivee West property is currently 100% owned by Entrée, since 2015 it has been subject to a License Fees Agreement between Entrée and OTLLC, and may ultimately be included in the Entrée/Oyu Tolgoi JV property. OTLLC also has a first right of refusal with respect to any proposed disposition by Entrée of an interest in the Shivee West property.

Information obtained from experts retained by Entrée supports that the support that the mineral tenure held is valid, and is sufficient to support declaration of Mineral Resources and Mineral Reserves.

OTLLC must submit (on behalf of OTLLC and Entrée) an updated reserve report and feasibility study, prepared by authorised consultants, to the Mongolian Minerals Council (MMC) every five years. The MMC must accept the report for the MLs to remain current. The most recent study was submitted in July 2020.

The Oyu Tolgoi Investment Agreement specifies that the Government of Mongolia will own 34% of the shares of OTLLC (and indirectly by extension, 34% of OTLLC's interest in the Entrée/Oyu Tolgoi JV property) through its subsidiary Erdenes Oyu Tolgoi LLC. A shareholders' agreement was concurrently executed to establish the Government's 34% ownership interest in OTLLC and to govern the relationship among the parties. Although the contract area defined in the Oyu Tolgoi Investment Agreement includes the Javhlant and Shivee Tolgoi MLs, Entrée is not a party to the Oyu Tolgoi Investment Agreement, and does not have any direct rights or benefits under the Oyu Tolgoi Investment Agreement.

Under Resolution No 57 dated July 16, 2009 of the State Great Khural, the Oyu Tolgoi series of deposits were declared to be Strategic Deposits. The Ministry of Mining has advised Entrée that it considers the deposits on the Entrée/Oyu Tolgoi JV property to be part of the series of Oyu Tolgoi deposits.

The Minerals Law provides that the applicable regular royalty rate for gold sold to the Bank of Mongolia or commercial banks authorized by the Bank of Mongolia is 2.5% and no surtax royalty is charged. The applicable regular royalty rate for copper, silver, molybdenum and exported gold is 5%. If the State is an equity participant in the exploitation of a Strategic Deposit, the licence holder is permitted to negotiate with the Government of Mongolia to exchange the Government's equity interest in the licence holder for an additional royalty payable to the Government (a special royalty), the percentage or amount of which would vary depending on the particulars of the Strategic Deposit, but which cannot exceed 5%. The special royalty would be paid in addition to the regular royalty and, if applicable, a surtax royalty.

25.3 Geology and Mineralization

The Oyu Tolgoi deposits, including the deposits within the Entrée/Oyu Tolgoi JV property host copper–gold porphyry and related high-sulphidation copper–gold deposit styles. Mineralization identified within the Shivee West property consists of low-sulphidation epithermal mineralization styles. There is also potential for porphyry copper–gold mineralization within the Shivee West property.

Knowledge of the deposit settings, lithologies, mineralization style and setting, and structural and alteration controls on mineralization is sufficient to support Mineral Resource and Mineral Reserve estimation at Hugo North Extension and Mineral Resource estimation at Heruga.

The Hugo North Extension deposit is potentially open to the north at depth, and the Heruga deposit is potentially open to the south. The Shivee Tolgoi and Javhlant MLs retain exploration potential.

25.4 Exploration, Drilling and Analytical Data Collection in Support of Mineral Resource Estimation

The nature, extent, and results of the sample preparation, security, and analytical procedures, and the quality control procedures employed, and quality assurance actions taken by OTLLC and Entrée provide adequate confidence in the drill hole data collection and processing.

The Hugo North Extension and Heruga drill holes are drilled at a wide range of azimuths and dips depending on the orientation of the mineralization, but an east to west orientation is dominant throughout the Project area. Drilling is normally oriented perpendicular to the strike of the mineralization. Depending on the dip of the drill hole and the dip of the mineralization, drill intercept widths are typically greater than true widths.

Sample security procedures were in line with industry norms at the time the samples were collected. Current sample storage procedures and storage areas are consistent with industry-accepted practices.

The data verification completed by OTLLC and its predecessor companies, and the independent data verification completed by others, including the current QP, are sufficient to conclude the drill hole database is reasonably free of errors and suitable to support Mineral Resource estimation.

25.5 Metallurgical Testwork

Detailed metallurgical testwork has been completed on the Oyut and Hugo North/Hugo North Extension deposits. The first phase of the development of the Oyu Tolgoi mine process facilities was completed with concentrator commissioning in 2013. Testwork results and operations data have been used to develop and update the throughput models and metallurgical predictions, as well as to guide designs for the second development phase. Arsenic and fluorine are the only penalty elements that have been identified for the Oyut and Hugo North/Hugo North Extension deposits.

The available testwork results show that the processing characteristics of the Hugo North Extension mineralization within the Entrée property are consistent with the overall Hugo North/Hugo North Extension mineralisation.

Limited metallurgical testwork has been conducted to date at Heruga. Bismuth and fluorine were present at penalty levels for testwork concentrates generated for the Heruga mineralization.

25.6 Mineral Resource Estimates

Mineral Resource estimation was performed by OTLLC staff. Mineral Resources have had reasonable prospects of eventual economic extraction considerations applied.

Mineral Resources have an effective date of 31 March, 2021, are stated on a 100% basis and are reported inclusive of the Mineral Resources that were converted to Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

Areas of uncertainty that could materially affect the Mineral Resource estimates include the following: commodity pricing; interpretations of fault geometries; effect of alteration as a control on mineralization; lithological interpretations on a local scale, including dyke modelling and discrimination of different quartz monzodiorite phases; geotechnical assumptions related to the proposed block cave design and material behaviour; metal recovery assumptions; additional dilution considerations that may be introduced by a block cave mining method; assumptions as to operating costs used when assessing reasonable prospects of eventual economic extraction; and changes to drill spacing assumptions and/or the number of drill hole composites used to support confidence classification categories.

25.7 Mineral Reserve Estimates

Mineral Reserve estimation was performed by OTLLC staff. Mineral Reserves have an effective date of 15 May, 2021, and are presented on a 100% basis.

Factors that may affect the Mineral Reserve estimates include commodity market conditions and pricing; unknowns with respect to the overall interpretation of the Hugo North/Hugo North Extension geology, including faulting and lithology; assumptions related to the design and geotechnical behaviour of the cave mining system, including, but not limited to, the flow of material (ore and dilution) relative to the upward progression and lateral advance of the cave and assumptions of the long-term performance of the mine infrastructure (both support and production); and assumptions related to the metal recovery in the mill and downstream processing, including, but not limited to, metal recovery, mill throughput, contaminant elements (particularly arsenic and fluorine).

25.8 Mine Plan

The proposed mine plan for the Hugo North/Hugo North Extension Lift 1 Mineral Reserves is a block caving variant, panel caving. Risks associated with caveability and propagation are considered to be low.

Underground infrastructure will include apex and undercut levels, extraction drifts and drawbells, haulage levels, intake and exhaust ventilation systems. Overall vertical development will include shaft development, ore/waste passes and ventilation raises.

Underground mobile equipment will include mucking, haulage, drilling, raise bore and boxhole equipment, utilities, surface and underground support vehicles, and light vehicles. Fixed equipment will consist of material handling, ventilation, power, maintenance, and water-related equipment.

In May 2020, Turquoise Hill announced an updated block cave mine design for Panel 0. As a result of the updated design, the 2016 Feasibility Study milestone of sustainable production was delayed by 25 months, to a target date of February 2023 (range between October 2022 and June 2023). Production will ramp up to an average of 95,000 t/d of ore to the mill during the planned peak production period for the combined Hugo North/Hugo North Extension Lift 1 from 2028 through 2036. Overall production from the combined Hugo North/Hugo North Extension Lift 1 is planned to ramp down from 2036 to completion in 2042 (Thomas et al., 2020). During the production life of the Hugo North Extension portion of Lift 1, the pre-production period is planned to begin in 2021 with the first draw-bell in 2026, and production is to be completed in 2038.

25.9 Recovery Plan

The process plant employs conventional SABC comminution followed by flotation.

The Phase 2 concentrator development program will optimize the concentrator circuit to enable it to maximise recovery from the higher-grade Hugo North/Hugo North Extension ore and to allow it to process higher tonnage throughput. Components that require upgrading to accommodate the gradual introduction of ore from underground include ball milling, rougher flotation, cleaner flotation columns, concentrate filtration, thickening, and bagging areas, and bagged concentrate storage facilities.

The planned volumetric limit of the existing concentrator has been set at 5,200 t/h, to reflect the above constraints and the demonstrated achievable throughputs. These constraints limit the planned annual throughput to 41.9 Mt/a, based on 92% utilization. The same 5,200 t/h volumetric limit will be applied to the concentrator after completion of the Phase 2 modifications. However, the planned utilization has been increased to 93.5%, resulting in a maximum processing throughput of 42.6 Mt/a (124,800 t/d).

Entrée's share of products will, unless Entrée otherwise agrees, be processed at the OTLLC facilities by paying milling and smelting charges. The OTLLC facilities are not intended to be profit centres and therefore, minerals from the Entrée/Oyu Tolgoi JV Project will be processed at cost. OTLLC will also make the OTLLC facilities available to Entrée at the same terms if spare processing capacity exists to process other suitable mill feed.

25.10 Infrastructure

Infrastructure required for Phase 1 of the Oyu Tolgoi project has been completed. All infrastructure with the exception of a concrete batch plant, is currently within the Oyu Tolgoi licence area.

Additional infrastructure that will be required to support Phase 2, or modifications to the Phase 1 infrastructure, includes: construction of conveyor decline and shafts, construction of permanent underground facilities including crushing and materials handling, workshops, services, and related infrastructure, concentrator conversion, modifications to the electrical shaft farm substation, and upgrades to some of the distribution systems, expanded logistical and accommodations infrastructure, underground maintenance and fuel storage facilities, expanded water supply and distribution infrastructure, and expanded TSF capacity.

25.11 Environmental, Permitting and Social Considerations

25.11.1 Environmental

An ESIA was completed. A cumulative impact assessment was performed to assess impacts from further developments at Oyu Tolgoi together with other existing or planned projects, trends, and developments within the South Gobi region.

An EMS is currently in place for operations.

25.11.2 Tailings Storage Facility

For the first 20 years of production, the TSF will consist of two cells, each approximately 4 km^2 in size, to store a total of 720 Mt of tailings. Cell 1 of the facility is operational, storing conventional thickened tailings. Two more cell, referred to as Cell 3 and 4, are currently planned to store additional 709 Mt tailings after the first 20 years of production.

25.11.3 Water Considerations

Water demand for the Oyu Tolgoi facilities has been calculated at between 588 L/s and 785 L/s, with an average yearly demand of 696 L/s, to meet a production rate of 100,000 t/d. The primary source of raw water to meet these requirements is the Gunii Hooloi basin. Updated hydrogeological modelling, completed in 2013, and based on all three hydrogeological investigation programs, demonstrates that the Gunii Hooloi aquifer is capable of providing 1,475 L/s, based on the same time and drawdown conditions.

25.11.4 Closure

Current closure planning is based on a combination of progressive rehabilitation and closure planning. The Oyu Tolgoi Mine Closure Plan for OTLLC was completed in June 2012 and updated in 2014, and is based on the design status at that time.

25.11.5 Permitting

OTLLC has studied and continues to study the permitting and approval requirements for the development of the Oyu Tolgoi project including the Entrée/Oyu Tolgoi JV Project, and maintains a permit and licencing register. OTLLC personnel, working with the Mongolian authorities, have developed descriptions of the permitting processes and procedures for the Oyu Tolgoi project, including the underground development of the Entrée/Oyu Tolgoi JV Project.

OTLLC has stated that permits have been obtained for underground mining.

25.11.6 Social

A social analysis was completed through the commissioning of a Socio-Economic Baseline Study and the preparation of a SIA for the project.

OTLLC has developed community and social management plans, procedures and strategies. The surrounding community (predominantly herders) and local government are kept fully informed about mine developments and provide input and review of implementation of plans, procedures and strategies that directly affect them.

25.12 Markets and Contracts

Wood did not review contracts, pricing studies, or smelter terms developed by OTLLC or their third-party consultants as these were considered by OTLLC to be confidential to OTLLC. Instead, Wood relied on summary pricing and smelting information provided by OTLLC within the 2020 Oyu Tolgoi Feasibility Study and BDT38. Based on the review of this summary information, the OTLLC smelter terms are similar to smelter terms for which Wood is familiar.

Mineralization mined from Entrée property will always be processed in the minority in the concentrator. As such, concentrates from Entrée mineralization will not be marketed as a separate product but as a minority component in concentrates derived from all Oyu Tolgoi ore sources.

The metal pricing is in line with Wood's assessment of industry-consensus long-term pricing estimates.

The concentrates being produced for sale at any given time will be derived from a blend consisting of a minority of Hugo North Extension (Entrée-sourced) ore and a majority of OTLLC-sourced ore. The influence of Entrée's ore on concentrate composition and its influence on concentrate marketing will be minor.

25.13 Capital Cost Estimates

The capital cost estimate represents the overall development for the Hugo North/Hugo North Extension Lift 1 underground mine, supporting shafts, the concentrator conversion project, and the infrastructure expansion project.

The total estimated capital cost to design, procure, construct, and commission the complete expansion, inclusive of an underground block cave mine, supporting shafts, concentrator conversion, and supporting infrastructure expansion, is US$7.358 billion which includes US$505 million in pre-restart capital.

The sustaining capital cost estimate for Hugo North/Hugo North Extension Lift 1 including closure costs is US$5.945 billion (US$9.30/t processed).

25.14 Operating Cost Estimates

The operating costs were based on a mine plan that consists of both the Oyut open pit material and Hugo North/Hugo North Extension Lift 1 underground ore.

Once production from underground commences, the open pit feed to the mill is continually displaced by the higher-grade ore from Hugo North/Hugo North Extension Lift 1. Production of ore from Hugo North Lift 1 ramps up from 2020 until 2027 when it reaches a steady-state production level.

Operating costs total US$20.47/t processed.

25.15 Economic Analysis

The total Hugo North Extension Lift 1 amortized capital cost within the Entrée/Oyu Tolgoi JV property is estimated at US$701.0 million, of which $140.2 million is Entrée's 20% attributable portion.

The total Hugo North Extension Lift 1 mine development cost within the Entrée/Oyu Tolgoi JV property is estimated at US$275.7 million, of which $55.1 million is Entrée's 20% attributable portion.

The operating costs for the Hugo North Extension Lift 1 deposit within the Entrée/Oyu Tolgoi JV property on a per tonne milled basis averages US$46.01 over the LOM. Entrée's 20% attributable portion of the operating costs averages US$46.01 over the LOM.

Based on the above inputs, Wood completed an economic analysis for Entrée's 20% attributable portion of the Entrée/Oyu Tolgoi JV property using both pre-tax and after-tax discounted cash flow analyses. The economic analysis was prepared using the following long-term metal price estimates: copper at US$3.25/lb; gold at US$1,591/oz and silver at US$21.08/oz.

The pre-tax cash flow and the after-tax net present value at a discount rate of 8% (NPV@8%) for Entrée's 20% attributable portion (referred to by Entrée as the 2021 Reserves case) is US$449 million and US$131 million respectively.

Internal rate of return (IRR) and payback are not presented, because, with 100% financing, neither is applicable.

Entrée's 20% attributable portion was evaluated for sensitivity to variations in capital costs, operating costs, copper grade, and copper price. Entrée's 20% attributable portion is most sensitive to changes in copper price and grade and less sensitive to changes in operating and capital costs.

25.16 2021 PEA

The 2021 PEA is an alternative development option done at the conceptual level based on Mineral Resources, which assesses the Hugo North/Hugo North Extension Lift 2.

The mine plan is partly based on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA based on these Mineral Resources will be realized.

Under the assumptions in this Report, the 2021 PEA mine plan shows positive project economics over the life-of-mine. Using a discount rate of 8%, the pre-tax project NPV for Entrée's 20% attributable portion is US$413 million. The after-tax NPV@8% is US$306 million for Entrée's 20% attributable portion. The mine plan is achievable under the set of assumptions and parameters presented.

Entrée's 20% attributable portion is most sensitive to changes in copper price and grade and less sensitive to changes in operating and capital costs.

25.17 Risks

Due to its nature and location, the Entrée/Oyu Tolgoi JV Project is subject to many legal, commercial, and political risks associated with the agreements with OTLLC, the sovereign government of Mongolia, and other entities. Some of the key technical risks are summarized below.

25.17.1 Hugo North/Hugo North Extension Underground Development

The Hugo North Extension Lift 1 mine design in the 2020 Feasibility Study is subject to future refinements and updates. Hugo North (including Hugo North Extension) Lift 1 surface and underground drilling programs are ongoing to support the evaluation by OTLLC of different design and sequencing options for Panels 1 and 2 as part of OTLLC's planned Pre-Feasibility and Feasibility level work. There is a risk that the production build-up in Panel 1 could be slowed if geotechnical conditions in the initial undercutting area of Panel 1 are less favourable than currently anticipated. The drilling will allow OTLLC to better understand the nature and extent of any risk and develop mitigation strategies if necessary.

Neither the 2020 Feasibility Study nor this Report reflect the impacts of the COVID-19 pandemic, which are ongoing and continue to be assessed by OTLLC. In particular, progress on Shafts 3 and 4 has been delayed and the overall impact of these delays is under review by OTLLC. COVID-19 related delays to sinking activities in Shafts 3 and 4 could impact the timing to extend the footprint development into Panel 1 because of limited ventilation until these shafts are commissioned.

On December 18, 2020, Turquoise Hill announced that a Definitive Estimate that refines the analysis in the 2020 Feasibility Study and broadly confirms the economics and assumptions presented therein has been completed and delivered to OTLLC by Rio Tinto. Entrée has not received a copy of the Definitive Estimate and it was not reviewed or relied upon by Wood in the preparation of the Report. According to Turquoise Hill, the Definitive Estimate assumes COVID-19 related restrictions in 2021 that are no more stringent than those experienced in September 2020. Should COVID-19 constraints continue beyond 2021, should the COVID-19 situation escalate in 2021 leading to additional restrictions, or should COVID-19 related restrictions or other non-technical criteria result in a delay in commencement of undercutting in Panel 0, which is currently scheduled for mid-2021, the development costs and schedule in the 2020 Feasibility Study upon which this Report are based could be negatively impacted.

25.17.2 Mine Plan

Geotechnical assumptions related to the design and geotechnical behaviour of the cave mining system, including, but not limited to, the flow of material (ore and dilution) relative to the upward progression and lateral advance of the cave and assumptions of the long-term performance of the mine infrastructure (both support and production) are based on assumptions from Hugo North/Hugo North Extension Lift 1. These may not be directly applicable to the Hugo North Extension Lift 1 area.

The Mineral Reserves within the Hugo North Extension Lift 1 do not reach production until approximately six years after Hugo North Lift 1 Panel 0 within the Oyu Tolgoi ML is initiated. This delay may mitigate some of the risk associated with the mining method by providing sufficient time for OTLLC to make any changes in the event that unanticipated mining difficulties arise.

25.17.3 Tailings Storage Facility Design

The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry standards to guide design and management of TSFs. Members of International

Council on Mining and Metals (ICMM), including Rio Tinto (and therefore OTLLC), are required to be in compliance with the GISTM within the next several years. The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently-published global tailings standard (GISTM, 2020). This may result in changes of the design criteria and potentially impact the TSF capital and operating cost estimates.

25.18 Opportunities

A number of prospects have been identified in the Entrée/Oyu Tolgoi JV Project through reconnaissance evaluation, geochemical sampling and geophysical surveys. Some targets have preliminary drill testing. The Entrée/Oyu Tolgoi JV Project retains exploration potential for porphyry and epithermal-style mineralization. Entrée retains a 30% interest in any new mineralization identified between surface and 560 m depth.

25.19 Conclusions

Under the assumptions presented in this Report, Entrée's 20% attributable portion of the 2021 Reserves case for the Hugo North Extension Lift 1 return positive economics.

Under the 2021 PEA assumptions presented in this Report, Entrée's 20% attributable portion of the Mineral Resource subset within the 2021 PEA mine plan for the Hugo North Extension Lift 2 that is within the Entrée/Oyu Tolgoi JV property returns positive economics.

26.0 RECOMMENDATIONS

26.1 Introduction

The QPs were not given access to information on the portions of the Project that Entrée does not have an ownership interest in, with the exception of:

- Information on, and site visits to the process plant, TSF, and underground access development
- Access to OTLLC operations site personnel to discuss information relevant to Entrée's JV interest in the property.

The QPs are not in a position to make meaningful recommendations for further work other than for exploration and underground drilling, both of which are based on information provided by OTLLC.

26.2 Work Programs

An exploration work program is recommended for the Entrée/Oyu Tolgoi JV property in the area of the Castle Rock, Bumbat Ulaan and Southeast IP targets, and is termed the Phase 1 work program.

Drilling should be considered for Hugo North Extension, and is termed the Phase 2 work program. The Phase 2 work program is independent of the Phase 1 work program, and, if appropriate, the two phases could be conducted concurrently.

26.3 Phase 1 Work Program

Recent geological mapping, rock and soil sampling and/or geophysics by OTLLC have outlined significant-sized targets on the Entrée/Oyu Tolgoi JV property at the West Mag, Castle Rock, Bumbat Ulaan and Southeast IP targets, which are indicative of potential near-surface porphyry-style mineralization.

Six wide-spaced core holes drilled to depths averaging about 500 m drilled at each of the Castle Rock, Bumbat Ulaan and Southeast IP targets, for a total program of 18 core holes (9,000 m), are recommended. The exact locations and depths of the holes should be determined through a detailed review of the existing exploration results, social-cultural and access considerations.

Assuming an all-in drilling cost of US$275/m, the proposed work program is estimated at US$2.48 million.

All drilling, surveying, logging, sampling, assaying, and QA/QC protocols should be similar to those already used on the Entre/Oyu Tolgoi JV property.

26.4 Phase 2 Work Program

Wood recommends an infill drill campaign be conducted within the Hugo North Extension deposit with the objective of improving confidence category of material classified as Probable Reserves and Indicated Mineral Resources and potentially converting the Inferred Mineral Resources to higher confidence categories.

Based on information provided by OTLLC, the budget for ongoing surface and underground drilling of the Hugo North Extension portion of Lift 1 and Lift 2 is expected to range from $2–5 million over five years.

As the Phase 2 drill data are collected, selected core should be subject to confirmatory comminution and flotation testwork to support the metallurgical assumptions for the Hugo North/Hugo North Extension mineralization. This program is expected to require a budget of US$100,000.

All drilling, surveying, logging, sampling, assaying, and QA/QC protocols should be similar to those already used on the Entre/Oyu Tolgoi JV property.

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