NI 43-101 Mineral Resource Estimate Technical Report

Minera Valle Central Operation
Rancagua, Region VI, Chile

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Prepared for:

Amerigo Resources Ltd.

Prepared by:

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Date and Signature Page

This Technical Report on the Minera Valle Central operation is submitted to Amerigo Resources Ltd. and is effective February 01, 2022.

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Dr. Todd Harvey	1.5, 1.7, 13, and 17
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Amerigo	Amerigo Resources Ltd.
ARD	Acid Rock Drainage
ARO	asset retirement obligation
cfm	cubic feet per minute
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
CMET	Complex Mafic El Teniente
Codelco	Corporación Nacional del Cobre
CQNS	Cauquenes Tailings
CSA	Canadian Securities Administrators
Cu	copper
CuT	total Cu grade
DET	Codelco-Chile El Teniente Division
EAA	Atomic Absorption Equipment
g/t	grams per tonne
GRE	Global Resource Engineering Ltd
ha	hectare
HDPE	high density polyethylene
ID2	Inverse Distance squared
kg	kilogram
km	kilometre
kV	kilovolt
kW	kilowatt
LIMS	Laboratory Information Management System
LME	London Metal Exchange
m/s^2	metres per second squared
masl	metres above sea level
mm	millimetres
MMSA	Mining and Metallurgical Society of America
Mo	molybdenum
MVA	million volt-amps
MVC	Minera Valle Central, S.A.
MW	megawatt
NI	National Instrument
NN	Nearest Neighbor
OK	Ordinary Kriging

PPE	property, plant, and equipment
psi	pounds per square inch
QP	qualified person
RC	reverse circulation
SI	International System of Units
SME	Society for Mining, Metallurgy & Exploration
TEN	Fresh Teniente Tailings
tpd	tonnes per day
US CPI	United Stated Consumer Price Index
USD	U.S. dollars
UTM	Universal Transverse Mercator

1.0 SUMMARY

Global Resource Engineering, LLC (GRE) was retained by Amerigo Resources Ltd. to prepare a National Instrument (NI) 43-101 compliant Mineral Resource Estimate for the Cauquenes and Colihues tailings impoundments and Technical Report for the Minera Valle Central operations, Rancagua, Region VI, Chile. Minera Valle Central, S.A. ("MVC") is a wholly owned subsidiary of Amerigo Resources Ltd. ("Amerigo" or the "Company"), a company listed on the Toronto Stock Exchange. This report has been prepared in accordance with the Canadian Securities Administrators (CSA) NI 43-101, and the Resources have been classified in accordance with standards as defined by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) "CIM Definition Standards – For Mineral Resources and Mineral Reserves," prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council on December 17, 2010, as amended May 10, 2014 and the generally accepted CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (November 29, 2019)".

This Technical Report is preliminary in nature and includes 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.

The Qualified Persons (QPs) responsible for the preparation of this Technical Report are:

- Dr. Hamid Samari
- Dr. Todd Harvey
- Terre A. Lane
- Larry Breckenridge

1.1 Property Description and Location

The MVC operation is located in Region VI (Libertador Bernardo O'Higgins Region) of central Chile. The site is 8 kilometres (km) east of the city of Rancagua and 90 km south of Santiago. Personnel and supplies are transported by road between the site and Rancagua or Santiago. The MVC plant is located at an elevation of 650 metres above sea level with a Mediterranean-type climate characterized by long, warm, dry summers (8 months) and mild, rainy winters (4 months).

MVC has been in operation since 1992 and produces copper (Cu) and molybdenum (Mo) concentrates by reprocessing tailings produced by the El Teniente mine, which is owned and operated by Corporación Nacional del Cobre (Codelco). MVC has the rights from Codelco to process the Fresh Tailings (TEN) generated at the El Teniente mine. The Fresh Tailings are transported to MVC via a 36-km long launder. MVC also has the rights from Codelco to remove and process tailings from the historic Colihues and Cauquenes(CQNS) tailings facilities located south of the MVC plant. MVC currently mines the Cauquenes tailings with hydraulic monitors.

The MVC processing facility has a capacity of 185,000 tonnes per day (tpd) and consists of grinding and flotation plants to recover copper and molybdenum concentrates. Once the tailings have been reprocessed by MVC, they are returned to the El Teniente tailings launder and transported to the Carén tailings impoundment located approximately 50 km to the west of the MVC site. In 2021, MVC processed

66 million tonnes of tailings and produced 63.4 million pounds of copper and 1.3 million pounds of molybdenum.

MVC operates in material compliance with applicable environmental laws and regulations, and there are no known material environmental concerns at MVC. MVC has an approved mine closure plan under Chilean Law 20.551 and has provided a financial guarantee in accordance with the approved schedule.

1.2 History

The El Teniente mine commenced copper production in 1905, and the mill concentrator tailings have been deposited in four separate impoundments: Barahona (1919 to 1936), Cauquenes (1936 to 1977), Colihues (1977 to 1986) and Carén (1986 to the present). MVC commenced operation in 1992, and Amerigo acquired MVC in 2003.

1.3 Geology Setting and Mineralization

El Teniente is a porphyry copper-molybdenum deposit located in the Andes of central Chile. Most of the high-grade copper ore at El Teniente is hosted by vertically extensive hydrothermal breccia pipes hosted in a mafic intrusive complex. The deposit is zoned from a barren core through a narrow zone of bornite-rich mineralization outwards into the main chalcopyrite dominant mineralized breccias. Several phases of breccia emplacement with associated copper and molybdenum mineralization occurred over a period of two million years. El Teniente has been in production since 1905, and, in 2021, the mine produced 459,817 metric tons of fine copper. In 2023, El Teniente plans to complete their New Mine Level project at a cost of US$ 5.1 billion. With this initiative, the world's largest underground mine is expected to be able to extend its useful life by more than 50 years. For the year end 2020, El Teniente's total ore reserves (Proven and Probable in accordance with Law 20.235 of the Chilean Republic) are 1,293 million tonnes of ore at a grade of 0.83 % copper containing 10.7 million tonnes of copper.

Codelco's historical records of El Teniente's mill tailings represent a detailed account of the tonnage and grade of material stored in the Cauquenes and Colihues impoundments. From 1936 to 1977, approximately 364 million tonnes of tailings at a 0.31% Cu grade were deposited in the Cauquenes tailings impoundment. From 1977 to 1986 approximately 216 million tonnes of tailings at a 0.26% Cu grade were deposited in the Colihues tailings impoundment. A limited amount of drilling has been conducted on both impoundments, and mineral resource estimates have been completed on Cauquenes and Colihues.

1.4 Drilling, Sampling and Analysis

A total of 83 holes have been drilled on the Cauquenes tailings in ten separate campaigns. The most recent drilling by MVC in 2021 consisted of ten hydraulic probe drill holes, twenty five reverse circulation (RC) drill holes, five hollow stem auger drill holes, and forty three sonic drill holes on Cauquenes to obtain confirmatory samples for grade, mineralogy, and metallurgy tests. The drilling was performed in 6-inch diameter casings, and the holes were vertical.

MVC personnel supervised the sample preparation according to company standards. The samples were handled, prepared, and tested in MVC's laboratory. The samples were assayed for total copper, soluble copper, molybdenum, and iron. Measures were taken to ensure the security of the samples, and the samples did not leave MVC premises. The samples were bagged and labeled according to MVC standards.

Comparisons of duplicate samples were used to ensure full quality control. Five percent of the samples were randomly selected for duplicate analysis. No abnormal data was reported.

1.5 Mineral Processing and Metallurgical Testing

MVC is a large concentrator in Chile that produces copper and molybdenum sulfide concentrates from previously treated tailings. Currently, feed to the plant is derived from two sources: fresh rougher tailings from the Codelco's El Teniente concentrator and hydraulically recovered tails from the Cauquenes tailings impoundment. The mineralogy of the feeds varies, and the most recent mineralogy indicates that the main copper and molybdenum-bearing minerals are sulfide in nature. In the fresh tailings the majority of the copper (47%) occurs as chalcopyrite, with significant secondary copper sulfide forms: chalcocite, bornite, and covellite (40%). In the historic tailings, approximately 75% of the copper occurs as secondary copper minerals and about 17% of the copper occurs in the form of chalcopyrite. The portion of poor floating copper minerals (copper in iron oxides and sulfates) ranged from 7 to 13% for the historic and fresh tailings, respectively. In both tailings streams, the molybdenum occurs as molybdenite.

The flowsheet has evolved over the life of the project (29 years) and has recently been streamlined to improve operational performance. Much of the recent laboratory test work has been focused on the particle size impacts on copper and molybdenum flotation response.

MVC has made significant improvements to the plant performance based on analysis and supporting test work. These improvements have led to increased copper production (9%), and a more consistent operation. Over the last several years the following upgrades have been undertaken (dates are approximate ranges):

- Modernization and standardization of the primary cyclones – mid-2020 to end 2020
- Increased the overall regrind capacity by reassigning an existing mill from the Cauquenes and Cascade concentrate circuit – Aug 2020.
- Increased El Teniente tonnage from 125,000 tonnes per day (tpd) to approximately 150,000 tonnes per day. The flotation feed increased from approximately 42,000 tpd to 60,000 and then to 75,000 tpd – Jan 2021.
- Improved rougher froth handling through a change in frother blend and the upgrade of pumping systems and descaling of the associated pipes and launders – 2020.
- Improved water recovery from the tailings thickener by changing the underflow and overflow pumps and utilizing a new low viscosity flocculent – Sept 2020
- Additional rougher flotation capacity through the reassignment of a rougher bank to TEN from a cleaner scavenger role – April 2021
- Grinding improvements through the assignment of a CQNS ball mill to TEN with an additional mill assignment pending. Also, due to better cyclone performance, the ball mill feed density was improved along with an increased ball loading – late 2021
- Added a cleaner column to the molybdenum circuit - Jan 2022.

The MVC plant is treating a low-grade porphyry tailings stream from fresh and historic tailings. It is basically a scavenging system where value is optimized by maximizing throughput and reducing costs (limiting grinding).

1.6 Mineral Resource Estimate

MVC has an operating record of economic extraction of copper and molybdenum from fresh and Colihues tailings and the Cauquenes deposit.

The Cauquenes tailings deposit has an inferred and indicated mineral resource estimate of 220.7 million tonnes at a grade of 0.256% Cu and 0.0205% Mo containing 1,048 million pounds of copper and 100 million pounds of molybdenum. Table 1-1 shows the summary of the mineral Resources for the Cauquenes Deposit. The total mineral resource of 220.7 million tonnes is available, of which 185.23 million tonnes is included in the mine plan at a grade of 0.255% Cu and 0.0202% Mo, with 877 million pounds of copper and 82 million pounds of molybdenum.

The historic tailings were deposited in Cauquenes by El Teniente between 1936 and 1977. The mineralogy of the feeds varies and the most recent mineralogy indicates that the main copper and molybdenum-bearing minerals are sulfide in nature. In the fresh tailings the majority of the copper (47%) occurs as chalcopyrite, with significant secondary copper sulfide forms: chalcocite, bornite, and covellite (40%). In the historic tailings, approximately 75% of the copper occurs as secondary copper minerals and about 17% of the copper occurs in the form of chalcopyrite. The portion of poor floating copper minerals (copper in iron oxides and sulfates) ranged from 7 to 13% for the historic and fresh tailings, respectively. In both tailings streams, the molybdenum occurs as molybdenite.

Table 1-1: Mineral Resource for the Cauquenes Deposit

Resource Category	Mass (M t)	*Average Value*				*Material Content*		
		K Ratio	CuT (%)	Floatable Cu (%)	Mo (%)	CuT (M lbs)	Floatable Cu (M lbs)	Mo (M lbs)
Indicated	207.09	0.205	0.255	0.213	0.0203	1,163.55	973.66	92.58
Inferred	13.61	0.137	0.278	0.248	0.0238	83.41	74.52	7.15
Total	**220.70**	**0.201**	**0.256**	**0.215**	**0.0205**	**1,246.96**	**1,048.17**	**99.73**

Differences may occur in totals due to rounding.

Based on the historical records, the Colihues tailings has an inferred mineral resource of 144 million tonnes at 0.261% Cu.

1.7 Recovery Methods

MVC initially utilizes two separate circuits to produce copper and molybdenum concentrates from fresh and historic tailings: fresh rougher tailings from Codelco's El Teniente concentrator and hydraulically recovered tails from the Cauquenes tailings impoundment. Primary classification, or desliming, is performed on the tailings streams to separate the fine and coarse fractions. The fines go for scavenging flotation in a cascade system, while the coarse fraction is subjected to grinding before conventional froth flotation. The ground coarse fraction is transported to a conventional rougher/cleaner flotation circuit to produce a combined bulk copper-molybdenum concentrate. The bulk concentrate is reground and cleaned to upgrade the copper and molybdenum grades. The cleaned bulk concentrate is subjected to selective flotation for molybdenum recovery. The molybdenum circuit tailings become the final copper concentrate. Final tailings from both the fresh and Cauquenes circuits report to thickening before final discharge to the El Teniente tailings channel and report to the Caren impoundment. Overflow thickener water is recirculated to the plant as process water.

1.8 Environmental Studies and Permits

MVC operates within the specifications and guidelines established by the Ministry of Mining, Sernageomin (National Mining and Geology Service), other local environmental authorities and relevant international conventions. MVC is not aware of any significant environmental, social or permitting issues that would prevent exploitation of the Cauquenes deposit.

The Cauquenes Expansion Project Environmental Impact Assessment study was filed with the Chilean authorities in 2013, requesting an increase in historic tailings processing rate via an expansion to the MVC plant. Environmental approval was received in 2014 and MVC is in receipt of the necessary sectorial permits.

1.9 Contracts and Royalties

MVC has the right to process tailings from both the Cauquenes and Colihues deposits and the Fresh Tailings from El Teniente up to 2037. Royalties to El Teniente are based on the quantity of copper and molybdenum produced by MVC and the respective LME metal prices.

MVC's copper concentrate is currently delivered to El Teniente under a tolling or "maquila" contract and MVC's molybdenum concentrate is currently processed under smelting contracts with Molibdenos y Metales S.A. (Molymet) and Glencore Chile SpA (Glencore). Copper concentrates at a grade of approximately 27% Cu are currently trucked to the Las Ventanas smelter located north of Valparaiso approximately 240 km from MVC. The MVC copper concentrate is high quality with minor silver credits and no penalty elements. Molybdenum concentrates at a grade of approximately 40% Mo are currently trucked to Molymet's smelter located approximately 70 km north of MVC and to Glencore, who ships the concentrate overseas. The MVC molybdenum concentrate is high quality with no penalty elements.

Power is MVC's largest single operating cost. Effective January 1, 2020, MVC and Pehuenche entered into a modification of MVC's Power Supply Contract to, among other things, extend the term of the contract from December 31, 2032 to December 31, 2037, reduce the fixed power rate starting on January 1, 2020, and gradually reduce the 2020 fixed rate further during the years 2021 to 2023. The fixed rate is subject to additional pass-through charges and to semi-annual price readjustments starting on July 1, 2020 based on the United States Consumer Price Index (US CPI) of the preceding three months. MVC's average cost of power is $0.0919/kWh for 2021.

1.10 Interpretation and Conclusions

In the Opinion of the QP:

- MVC has valid contracts with El Teniente to process Fresh Tailings, the Colihues deposit and the Cauquenes deposit and all royalty obligations to El Teniente have been sufficiently identified. The contracts extend MVC's mine life to 2037.

- MVC has been in operation since 1992 and operates within the specifications and guidelines established by the Ministry of Mining, other local environmental authorities and relevant international conventions.
- MVC project operates under an approved Environmental Impact Management permit updated to match the current production rate.
- Total water supplies are expected to be sufficient for current and planned operational needs. The mine has a large storage capacity and flexible water sources and is capable of responding to abnormal climate conditions.
- MVC has adopted measures to conserve water within their facility but have no control over extended periods of drought that may adversely impact the ability to maintain targeted production rates.
- The MVC Project has obtained sectorial permits from the various agencies that have authority over environmental resources, construction, operation and closure of the Project.
- Exploration work conducted on the MVC Project is appropriate to the style of mineralization. Results support the interpretations of tonnes and grade from historical records. A limited amount of drilling has been conducted on the Cauquenes deposits and mineral resource estimates have been completed.
- Sampling methods are acceptable, meet industry-standard practice, and are adequate for mineral resource estimation and mine planning purposes.
- The quality of the copper and molybdenum analytical data is reliable and sample preparation and analysis were generally performed in accordance with exploration best practices and industry standards.
- Data verification programs undertaken on the data collected from the Project adequately support the geological interpretations and the database quality, and therefore support the use of the data in mineral resource estimation.
- The geological understanding of the deposits is sufficient to support estimation of indicated and inferred mineral resources. Codelco's historical records of El Teniente's mill tailings represent a detailed account of the tonnage and grade of material deposited in the Cauquenes and Colihues deposits. These records have been verified by independent checks on tonnage and grade of the historical tailings deposits.
- Mineral resources have been estimated to industry best practices and conform to the requirements of CIM (2014).
- The metallurgical testwork completed on the MVC Project has been appropriate to establish the optimal processing routes. Metallurgical tests on Fresh, Colihues and Cauquenes tailings were performed on samples that were representative of the mineralization. Metal recovery factors have been estimated for copper and molybdenum that appear appropriate to the mineralization styles and the planned extraction facilities.
- The major components of the flowsheet and process plant design of the MVC plant expansion are based on current technologies supported by operating data and laboratory testwork.

In the opinion of the QP, the Project that is outlined in this Technical Report has met its objectives. Mineral resources have been estimated for the Project. The data supporting the indicated and inferred mineral resource estimates were appropriately collected, evaluated and estimated, and the Project objective of identifying tailings mineralization that could potentially support future processing operations has been achieved.

1.11 Recommendations

MVC has a twenty-nine year operating history of processing El Teniente's tailings and the contract with El Teniente is expected to provide a stable supply of tailings material until 2037. Sources of mill feed include Fresh Tailings, the Colihues deposit and the Cauquenes deposit. Extraction of material from the Cauquenes deposit commenced in 2015.

GRE recommends using a probabilistic water balance to better quantify the risks posed to the MVC water supply over time and with climate change.

The recommendation of the QP is to continue with the production of copper and molybdenum concentrates at MVC.

2.0 INTRODUCTION

2.1 Terms of Reference

Global Resource Engineering, LLC (GRE) was retained by Amerigo Resources Ltd. to prepare a National Instrument (NI) 43-101 compliant Mineral Resource Estimate update for the Cauquenes and Colihues tailings impoundments and Technical Report for the Minera Valle Central operations, Rancagua, Region VI, Chile. Minera Valle Central, S.A. ("MVC") is a wholly owned subsidiary of Amerigo Resources Ltd. ("Amerigo" or the "Company"), a company listed on the Toronto Stock Exchange. This report has been prepared in accordance with the Canadian Securities Administrators (CSA) NI 43-101, and the Resources have been classified in accordance with standards as defined by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) "CIM Definition Standards – For Mineral Resources and Mineral Reserves," prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council on December 17, 2010, as amended May 10, 2014 and the generally accepted CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (November 29, 2019)".

2.2 Sources of Information

Amerigo has previously published five NI 43-101 Technical Reports on the MVC operations:

Henderson, R., 2019: Minera Valle Central Operation, Rancagua, Region VI, Chile, 43-101 Technical Report, December 31, 2018 (Henderson, 2019)

Henderson R., 2017: Minera Valle Central Operation, Rancagua, Region VI, Chile. 43-101 Technical Report, December 31, 2016 (Henderson, 2017)

Henderson R., 2014: Minera Valle Central Operation, Rancagua, Region VI, Chile. 43-101 Technical Report, December 31, 2013 (Henderson, 2014)

Moss R. and Poblete R., 2006: Technical Review of Operations at Minera Valle Central, Rancagua Region VI: unpublished technical report prepared for Amerigo Resources Ltd, March 11, 2006 (Moss, et al., 2006)

Maycock A., 2003: Technical Review of Operations at Minera Valle Central, Rancagua Region VI: unpublished technical report prepared for Amerigo Resources Ltd, May 2003 (Maycock, 2003)

The information contained in current report Sections 4 through 13 was largely presented in, and in some cases, is excerpted directly from, the reports listed above. The GRE QPs have reviewed this material in detail and find the information contained herein to be factual and appropriate with respect to guidance provided by NI 43-101 and associated Form NI 43-101F1.

Additional information was requested from and provided by Amerigo. In preparing Sections 9 through 13 of this report, the Authors have relied in part on historical information including exploration reports, technical papers, sample descriptions, assay results, computer data, maps and drill logs generated by previous operators and associated third party consultants. Historical documents and data sources used during the preparation of this report are cited in the text, as appropriate, and are summarized in current report Section 27.

2.3 Qualified Persons and Personal Inspection

The independent Qualified Persons (QPs) as defined by NI 43-101 responsible for the preparation of this Technical Report are:

- Hamid Samari, PhD, QP, Mining and Metallurgical Society of America (MMSA) #01519QP
- Dr. Todd Harvey, PhD, Society for Mining, Metallurgy & Exploration (SME) Registered Member 04144120
- Terre Lane, MMSA 01407QP, SME Registered Member 4053005
- Larry Breckenridge, M.S. and P.E. license number Colorado 38048.

Practices consistent with CIM (2014) were applied to the generation of this Resource Estimate.

Dr. Samari, Dr. Harvey, Mr. Breckenridge, and Ms. Lane are collectively referred to as the "Authors" of this Technical Report. GRE's QP Ms. Lane conducted an on-site inspection of the project on February 07 and February 08, 2022. While on-site, Ms. Lane conducted a general inspection of the Amerigo tailing deposits, including visual inspection of the present working, pit slopes, mineralization and processing plant. Other QP's have not visited this site for this technical report.

In addition to their own work, the Authors have made use of information from other sources and have listed these sources in this document under "References."

Table 2-1 lists the primary "Qualified Persons" (as defined in the National Instrument 43-101) that compiled different sections of the report.

Table 2-1: List of Contributing Authors

Section	Section Name	Qualified Person
1	Summary 1.0, 1.1, 1.6,1.9,1.10,1.11	Terre Lane
1	Summary 1.2, 1.3,1.4	Hamid Samari
1	Summary 1.5,1.7	Todd Harvey
1	Summary 1.8	Larry Breckenridge
2	Introduction	Terre Lane
3	Reliance on Other Experts	Terre Lane
4	Property Description and Location	Terre Lane
5	Accessibility, Climate, Local Resources, Infrastructure, and Physiography	Terre Lane
6	History	Hamid Samari
7	Geological Setting and Mineralization	Hamid Samari
8	Deposit Types	Hamid Samari
9	Exploration	Hamid Samari
10	Drilling	Hamid Samari
11	Sample Preparation, Analyses and Security	Hamid Samari
12	Data Verification	Hamid Samari
13	Mineral Processing and Metallurgical Testing	Todd Harvey
14	Mineral Resource Estimates	Terre Lane
15	Mineral Reserve Estimates	Terre Lane
16	Mining Methods	Terre Lane
17	Recovery Methods	Todd Harvey

Section	Section Name	Qualified Person
18	Project Infrastructure	Terre Lane
19	Market Studies and Contracts	Terre Lane
20	Environmental Studies, Permitting and Social or Community Impact	Larry Breckenridge
21	Capital and Operating Costs	Terre Lane
22	Economic Analysis	Terre Lane
23	Adjacent Properties	Terre Lane
24	Other Relevant Data and Information	Terre Lane
25	Interpretation and Conclusions	Terre Lane
26	Recommendations	Terre Lane
27	References	Terre Lane

2.4 Units

All currency amounts are stated in U.S. dollars (US$, USD). Quantities are generally stated in metric units, as per standard Canadian and international practice, including metric tonnes (tonnes, t) and kilograms (kg) for weight, kilometres (km) or metres for distance, hectares (ha) for area, percentage (%) for copper and molybdenum grades. Imperial units have occasionally been converted (where noted) to the International System of Units (SI units) for consistency.

2.5 Cautionary Statement Regarding Forward-Looking Statements

This Technical Report contains certain forward-looking information and statements as defined in applicable securities laws (collectively referred to as "forward-looking statements"). These statements relate to future events or future performance. All statements other than statements of historical fact are forward-looking statements. The use of any of the words “anticipate,” “plan,” “continue,” “estimate,” “expect,” “may,” “will,” “project,” “predict,” “potential,” “should,” “believe,” and similar expressions is intended to identify forward-looking statements. These statements involve known and unknown risks, uncertainties, and other factors that may cause actual results or events to differ materially from those anticipated in such forward-looking statements. These statements speak only as of the date of this Technical Report. These forward-looking statements include but are not limited to, statements concerning:

- forecast production and operating costs
- strategies and objectives
- estimates of the availability and quantity of tailings, and the quality of mine plan estimates
- prices and price volatility for copper and other commodities and of materials used in our operations
- the demand for and supply of copper and other commodities and materials that are produced, sold, and used
- sensitivity of financial results and share price to changes in commodity prices
- the Company’s financial resources
- interest and other expenses
- domestic and foreign laws affecting operations

- the Company's tax position and the tax rates applicable to them
- the production capacity of facility operations, planned production levels, and future production
- potential impact of production and transportation disruptions
- the Company's planned capital expenditures and estimates of asset retirement obligations and other costs related to environmental protection
- the Company's future capital and production costs, including the costs and potential impact of complying with existing and proposed environmental laws and regulations in the operation and closure of operations
- the Company's financial and operating objectives
- the Company's environmental, health, and safety initiatives
- the outcome of legal proceedings and other disputes in which the Company may be involved
- the outcome of negotiations concerning treatment charges and royalties
- the Company's dividend policy
- general business and economic conditions.

Inherent in forward-looking statements are risks and uncertainties beyond the Company's ability to predict or control, including risks that may affect operating or capital plans; risks generally encountered in the permitting and development of mineral projects such as unusual or unexpected geological formations, unanticipated metallurgical difficulties, delays associated with permit appeals, ground control problems, adverse weather conditions, process upsets and equipment malfunctions; risks associated with labour disturbances and availability of skilled labour and management; fluctuations in the market prices of principal commodities, which are cyclical and subject to substantial price fluctuations; risks created through competition for mining projects and properties; risks associated with lack of access to markets; risks associated with availability of tailings and mine plan estimates; risks posed by fluctuations in exchange rates and interest rates, as well as general economic conditions; risks associated with environmental compliance and changes in environmental legislation and regulation; risks associated with dependence on third parties for the provision of critical services; risks associated with non- performance by contractual counterparties; title risks; social and political risks associated with operations in foreign countries; risks of changes in laws affecting facility operations or their interpretation, including foreign exchange controls; and risks associated with tax reassessments and legal proceedings.

Actual results and developments are likely to differ, and may differ materially, from those expressed or implied by the forward-looking statements contained in this Technical Report. Such statements are based on a number of assumptions which may prove to be incorrect, including, but not limited to, assumptions about:

- general business and economic conditions
- interest rates
- changes in commodity and power prices
- acts of foreign governments and the outcome of legal proceedings

- the supply and demand for, deliveries of, and the level and volatility of prices of copper and other commodities and products used in facility operations
- the timing of the receipt of permits and other regulatory and governmental approvals
- costs of production and production and productivity levels, as well as those of competitors
- changes in credit market conditions and conditions in financial markets generally
- the availability of funding on reasonable terms
- the ability to procure equipment and operating supplies in sufficient quantities and on a timely basis
- the availability of qualified employees and contractors for operations
- the ability to attract and retain skilled staff
- the satisfactory negotiation of collective agreements with unionized employees
- the impact of changes in foreign exchange rates and capital repatriation on costs and results
- engineering and construction timetables and capital costs for expansion projects
- costs of closure of various operations
- market competition
- the accuracy of mine plan estimates (including, with respect to size, grade and recoverability) and the geological, operational, and price assumptions on which these are based
- tax benefits and tax rates
- the outcome of copper concentrate treatment and refining charge negotiations
- the resolution of environmental and other proceedings or disputes
- the future supply of reasonably priced power
- the ability to obtain, comply with, and renew permits in a timely manner
- ongoing relations with employees and entities with which the Company does business.

The reader is cautioned that the foregoing list of important factors and assumptions is not exhaustive. Other events or circumstances could cause actual results to differ materially from those estimated or projected and expressed in, or implied by, forward-looking statements. The reader should also carefully consider the matters discussed under *"Risk Factors"* in Amerigo's Annual Information Form, which is filed each year under Amerigo's profile on the SEDAR website, www.sedar.com. Except as required by law, the Company undertakes no obligation to update publicly or otherwise revise any forward-looking statements or the foregoing list of factors, whether as a result of new information or future events or otherwise.

3.0 RELIANCE ON OTHER EXPERTS

The Authors are not experts in legal matters, such as the assessment of the legal validity of mining claims, private lands, mineral rights, and property agreements. The Authors did not conduct any investigations of the environmental, permitting, or social-economic issues associated with the MVC, and the Authors are not experts with respect to these issues. The Authors relied on Amerigo for statements regarding mining claims, mineral rights, property agreements, environmental matters, and permitting. These are included in Sections 4.0 and 5.0 of this report. The Authors have not independently conducted any title or other searches but have relied on Amerigo for information on the status of claims, property title, royalties, agreements, permit status, and other pertinent conditions.

The Authors have reviewed, and incorporated reports and studies as described within this Report, and have adjusted information that required amending.

The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to GRE at the time of preparation of this report
- Assumptions, conditions, and qualifications as set forth in this report
- Data, reports, and opinions supplied by Amerigo and other third-party sources.

4.0 PROPERTY LOCATION AND DESCRIPTION

4.1 Property Location

Minera Valle Central (MVC), owned by the Canadian company Amerigo Resources Ltd., is located in Region VI (Libertador Bernardo O'Higgins Region) of central Chile at latitude 34° 14' south and longitude 70° 41' west (Universal Transverse Mercator [UTM] 621000N, 345000E). The site is 8 km east of the city of Rancagua and 90 km south of Santiago (Figure 4-1). The Cauquenes tailing deposit is a natural kidney-shaped basin that covers an area of 742 hectares and the Colihues tailing deposit covers an area of 650 hectares.

Figure 4-1: Location of the Minera Valle Central Operations

4.2 Property Overview

MVC has been in production since 1992 and produces copper and molybdenum concentrates by reprocessing tailings produced by the El Teniente mine, which is owned and operated by Codelco. MVC has the rights from Codelco to process the Fresh Tailings generated at the El Teniente mine. The Fresh Tailings are transported to MVC via a 36-km long cement launder. MVC also has the rights from Codelco to remove and process tailings from the Colihues and Cauquenes tailings impoundments located south of the MVC plant (Photo 4-1). MVC currently mines the Cauquenes tailings with hydraulic monitors.

Photo 4-1: Aerial Photograph of the MVC Site

The MVC processing plant has a capacity of 185,000 tonnes per day (tpd) and consists of grinding and flotation to recover copper and molybdenum concentrates. Once the tailings have been reprocessed by MVC, they are returned to the El Teniente tailings launder and transported to the Carén tailings facility located approximately 50 km to the west of the MVC site. Photo 4-2, Photo 4-3, and Photo 4-4 present photographs of the MVC plant layout.

Photo 4-2: Photograph of the MVC Grinding and Flotation Plants

Photo 4-3: Photograph of the MVC Cascade Flotation Plants

Photo 4-4: Photograph of the MVC Thickeners, Moly Plant and Offices

In 2021, MVC processed 66 million tonnes of tailings and produced 63.4 million pounds of copper and 1.3 million pounds of molybdenum.

4.3 Royalties

Royalties to El Teniente are based on the quantity of copper and molybdenum produced from MVC and the London Metal Exchange (LME) metal price. Details of the royalties are presented in Section 19.0 of this report.

4.4 Permits

MVC has been in operation since 1992 and operates within the specifications and guidelines established by the Ministry of Mining, Sernageomin (National Mining and Geology Service), other local environmental authorities, and relevant international conventions. MVC is not aware of any significant environmental, social, or permitting issues that would prevent exploitation of the Cauquenes tailings. Environmental permitting is discussed in detail in Section 20.

The Cauquenes Project Environmental Impact Assessment study was filed with the Chilean authorities on January 7, 2013, requesting an increase in historic tailings processing rate via an expansion to the MVC plant. The EIA was approved in 2014, and MVC is in receipt of the necessary sectoral permits that were required to construct the plant expansion from various agencies that have authority over environmental resources, construction, operation, and closure of the Project.

MVC operates in material compliance with applicable environmental laws and regulations. There are no known material environmental concerns at MVC.

The Codelco Chile El Teniente Division (DET) Agreement (see Section 19.0) provides that MVC will transfer its property, plant, and equipment (PPE) to El Teniente on December 31, 2037, at no cost and free of all encumbrances unless Division El Teniente (DET) decides not to take ownership of the PPE and provides MVC with a three-year notice to this effect. The DET Agreement also contains three early exit options, which may only be exercised by DET to terminate the DET Agreement at specific future dates in the event of changes that were unforeseen as of the date of the DET Agreement. If early exit options 1 or 3 were to be exercised, DET would then acquire all MVC's PPE. In all of these cases, MVC would not have an asset retirement obligation ("ARO") in respect of its own plant. MVC would only have an ARO if DET were to exercise early exit option 2 or decided not to take ownership of PPE in 2037. The Company has concluded there is a remote possibility of DET exercising option 2 or deciding not to take ownership of MVC's PPE on December 31, 2037 at the end of the term of the DET Agreement; therefore, the ARO weighted for probability is immaterial. The Agreement also requires MVC and DET to jointly assess the revision of DET's own closure plan for Cauquenes and compare it to the current El Teniente plan. In the case of any variation in the interests of El Teniente due to MVC's activities in the Cauquenes impoundment, the parties will jointly evaluate the form of implementation and financing of or compensation for such variation.

Notwithstanding the above, MVC as an operating mining company is required to have a mine closure plan under Chilean Law 20.551. The closure plan estimates a closure cost of approximately $12.5 million in 2038. MVC has posted a financial guarantee in accordance with the approved closure schedule.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The MVC site is accessed by driving approximately one hour (90 km) on the Pan American Highway south from Santiago to Rancagua and a further 15 minutes (8 km) east to the MVC offices. Approximately 7 km of the road from the highway is paved, and the remaining 1 km is a well-maintained, all-weather, dirt road to the MVC offices.

There are good road connections from Rancagua to Santiago (90 km) and the ports of San Antonio (159 km) and Valparaiso (207 km). Personnel and supplies are transported by road between the site and Rancagua or Santiago. Copper concentrates are transported to the Codelco Las Ventanas smelter via road, and the molybdenum concentrates are transported to the Molymet smelter at Nos, located approximately 70 km north of MVC, and Glencore, located approximately 100 km north of MVC. Most of the MVC employees live in Rancagua, which is the nearest large town, with a population of approximately 214,000. Figure 5-1 shows the MVC Plant Site accessibility from the Rancagua.

Figure 5-1: MVC Plant Site Accessibility

5.2 Climate

The MVC plant is located in an area that has a Mediterranean-type climate with clearly defined seasons characterized by long, warm, dry summers (8 months) and mild, rainy winters (4 months). Road access and operations are not normally affected by adverse weather conditions.

In Rancagua (approximately 9 km to the west), the average annual precipitation is approximately 310 millimetres (mm). The rainy months are May to August. The average monthly temperatures range from 4°C in the winter to 29°C in the summer.

Table 5-1and Table 5-2 show the temperatures and precipitation for Rancagua.

Table 5-1: MVC Seasonal Temperatures in Degrees Celsius

Season	Maximum	Minimum
Winter	15.4	5.0
Spring	21.8	9.0
Summer	28.1	13.6
Autumn	21.9	9.4

Source: https://weatherspark.com/y/26519/Average-Weather-in-Rancagua-Chile-Year-Round

Table 5-2: MVC Precipitation in mm

Season	Average
Winter	170
Spring	48
Summer	15
Autumn	76

Source: https://weatherspark.com/y/26519/Average-Weather-in-Rancagua-Chile-Year-Round

5.3 Local Resources and Infrastructure

Rancagua is the capital of Chile's Region VI, Region del Libertador General Bernardo O'Higgins. The region's main activities are agriculture, wine making, and mining. The region has a population of approximately 700,000.

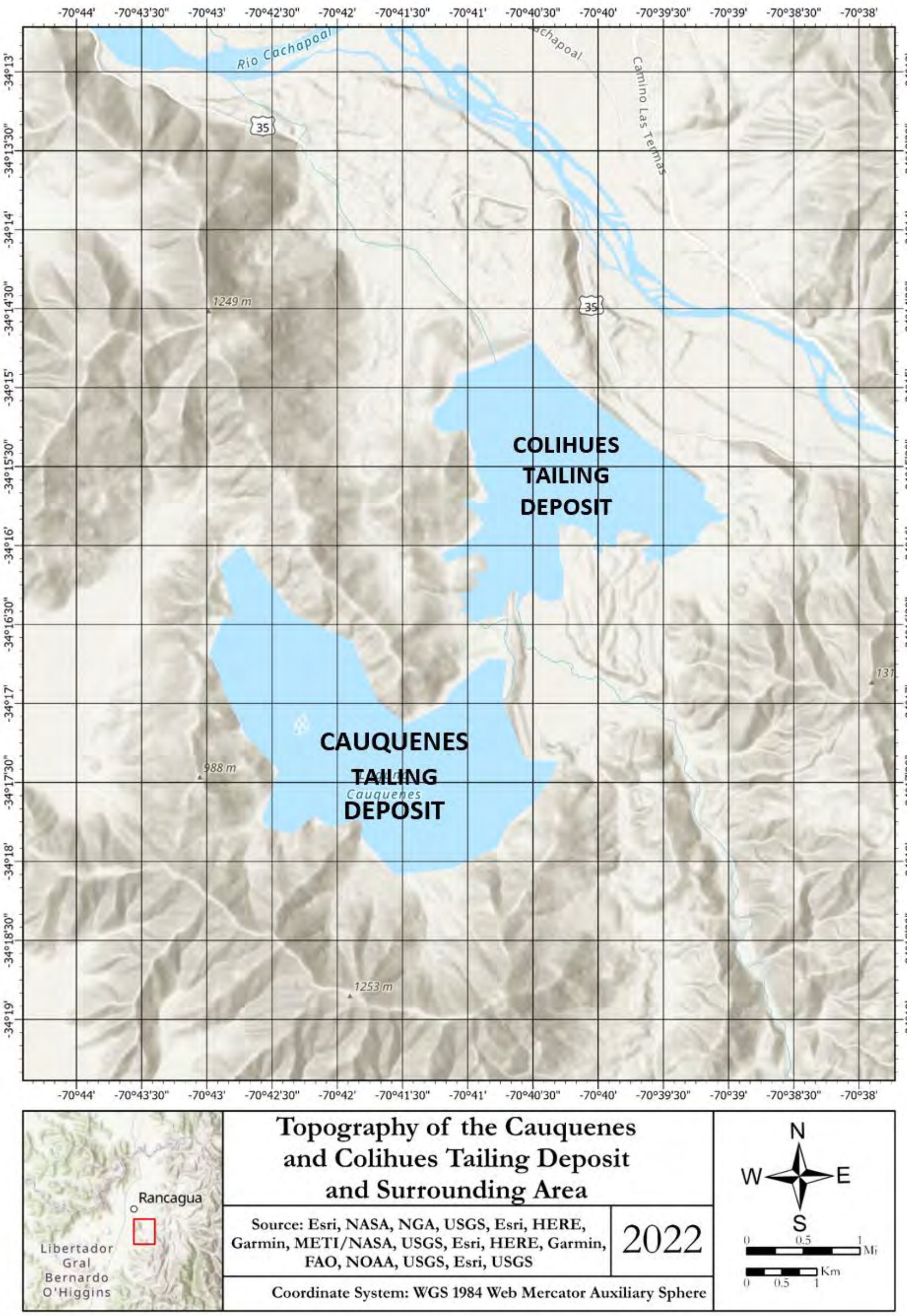
Rancagua has many service companies oriented to the mining industry, and most supplies and services are available there. More specialized items and services can be quickly obtained from Santiago. Chile has a long history of mining; therefore, consumables, equipment, and services are readily available. Community services, hospitals, etc. are available in Rancagua.

5.4 Physiography

The site is on the south side of the Rio Claro de Cauquenes river valley, and the physiography consists of rolling hills and foothills of the Andes Mountains. The process plant is at an elevation of 650 metres above sea level (masl), and the offices are at 590 masl. The top of the Colihues tailings deposit is at 670 masl, and the top of the Cauquenes tailings impoundment is at 722 masl.

The MVC property is located in a high-risk seismic zone, with an earthquake rating similar to the city of Santiago. The U.S. Geological Survey map reports a peak ground acceleration value of 3.2 to 4 metres per second squared (m/s^2) with 10% probability of exceedance in 50 years. The Modified Mercalli Scale rating for the region is VIII – Destructive. On February 27, 2010, the Pichilemu earthquake occurred, with a magnitude of 6.9 on the Richter scale. The El Teniente tailings launder was damaged, and MVC's operations were suspended for approximately one week until power and tailings flow were restored to MVC's plant. No damage occurred at MVC. Figure 5-2 shows the topography of the Cauquenes and Colihues Tailing Deposit and Surrounding Area.

Figure 5-2: Topography of the Cauquenes and Colihues Tailing Deposit and Surrounding Area



6.0 HISTORY

6.1 Chronological Summary

The El Teniente mine commenced copper production in 1905, and the mill concentrator tailings have been deposited in four separate impoundments: Barahona (1919 to 1936), Cauquenes (1936 to 1977), Colihues (1977 to 1986), and Carén (1986 to present). MVC commenced operation in 1992, and Amerigo acquired MVC in 2003. The following is a summary timeline of the project's history:

- 1905: Braden Copper Company commenced production at El Teniente. Braden was later acquired by Kennecott Copper Corporation, and, in 1971, El Teniente became a state owned mine, operated by Codelco upon its creation in 1976.
- 1936 to 1977: Approximately 364 million tonnes of El Teniente tailings were deposited in the Cauquenes tailings impoundment.
- 1977 to 1986: Approximately 216 million tonnes of El Teniente tailings were deposited in the Colihues tailings impoundment.
- 1986: El Teniente commenced tailings deposition into the Carén tailings impoundment.
- 1989: Codelco issued a tender to bidders for the rights to operate a tailings retreatment plant for the tailings from El Teniente. MVC was the successful bidder.
- October 1992: MVC commenced operation with a simple cascade frothing and flotation cleaning circuit at a cost of US$8 million to recover copper from the fine fraction of the tailings.
- 1996: MVC added four ball mills and a new treatment plant to enhance the recovery of the metal contained in the coarse fraction of the tailings. An investment of US$21 million was required to add sections for fine grinding and conventional flotation of the copper.
- 2002: MVC negotiated the right to treat up to 10,000 tpd of higher grade tailings from Colihues, the historic tailings impoundment located near MVC's plant.
- 2003: On July 3, 2003, Amerigo acquired MVC.
- 2004: MVC announced an agreement in principle to increase the maximum rate of extraction of Colihues feed material from 10,000 tpd to 45,000 tpd.
- 2005: The plant expansion was completed, including four additional ball mills and a molybdenum recovery plant. Production of molybdenum commenced. In 2004 and 2005, MVC incurred US$37 million in capital expenditures.
- 2006 to 2009: MVC invested US$80 million over this four year period into capital plant such as water reclaim thickeners, self-generating power, Colihues extraction, and mill refurbishments.
- 2010: MVC reached an agreement with El Teniente to study the potential for processing the Cauquenes deposit and started engineering studies and construction of a pilot plant.
- 2015: MVC invested US$57 million into the infrastructure and equipment to extract material from Cauquenes into the existing plant facilities.
- 2018: MVC reported record annual production of 65 million pounds of copper.

6.2 El Teniente's Tailings Production History

Codelco's historical records of El Teniente's mill tailings represent a detailed account of the tonnage and grade of material stored in the Barahona, Cauquenes, and Colihues impoundments (Codelco, 2008). From 1919 until 1936, El Teniente's tailings were deposited in the Barahona tailings impoundment located near the mine site. Mine records show approximately 35 million tonnes of tailings at a grade of 0.32% Cu were deposited into Barahona. From 1936 to 1977, approximately 364 million tonnes of tailings at a grade of 0.31% Cu were deposited in the Cauquenes tailings impoundment. From 1977 to 1986, approximately 216 million tonnes of tailings at a grade of 0.26% Cu were deposited in the Colihues tailings impoundment.

Recovery of molybdenum commenced in the late 1950s when Noke's reagents were introduced to the Sewell concentrator; in 1960, El Teniente constructed a new plant to selectively recover molybdenum.

Table 6-1 and Table 6-2 summarize the El Teniente mine records of annual tonnage and copper grade of tailings delivered to the Cauquenes and Colihues tailings impoundments, respectively.

Table 6-1: El Teniente Tailings Delivered to Cauquenes (1936 to 1977)

Year	Annual Tailings (tonnes)	Copper Grade %	Accumulated Tonnes (tonnes)	Accumulated Grade Cu %	Contained Cu (tonnes)	Accumulated Contained Cu (tonnes)
1936	3,520,562	0.234	3,520,562	0.234	8,238	8,238
1937	6,570,479	0.358	10,091,041	0.315	23,522	31,760
1938	5,812,469	0.312	15,903,510	0.314	18,135	49,895
1939	5,804,596	0.338	21,708,106	0.320	19,620	69,515
1940	5,110,592	0.337	26,818,698	0.323	17,223	86,738
1941	6,130,421	0.310	32,949,119	0.321	19,004	105,742
1942	6,777,404	0.357	39,726,523	0.327	24,195	129,937
1943	7,758,091	0.406	47,484,614	0.340	31,498	161,435
1944	6,887,988	0.366	54,372,602	0.343	25,210	186,645
1945	6,762,549	0.382	61,135,151	0.348	25,833	212,478
1946	4,348,121	0.362	65,483,272	0.349	15,740	228,218
1947	5,982,818	0.442	71,466,090	0.356	26,444	254,662
1948	6,910,680	0.389	78,376,770	0.359	26,883	281,545
1949	6,159,374	0.298	84,536,144	0.355	18,355	299,900
1950	6,921,559	0.324	91,457,703	0.352	22,426	322,326
1951	8,260,912	0.307	99,718,615	0.349	25,361	347,687
1952	8,088,069	0.316	107,806,684	0.346	25,558	373,245
1953	6,683,235	0.343	114,489,919	0.346	22,923	396,168
1954	5,186,604	0.343	119,676,523	0.346	17,790	413,958
1955	7,151,162	0.310	126,827,685	0.344	22,169	436,127
1956	8,566,066	0.311	135,393,751	0.342	26,640	462,768
1957	8,557,570	0.325	143,951,321	0.341	27,812	490,580
1958	8,729,544	0.282	152,680,865	0.337	24,617	515,197
1959	8,797,678	0.273	161,478,543	0.334	24,018	539,215
1960	9,049,863	0.300	170,528,406	0.332	27,150	566,364
1961	8,593,098	0.300	179,121,504	0.331	25,779	592,143
1962	8,593,098	0.300	187,714,602	0.329	25,779	617,923

Year	Annual Tailings (tonnes)	Copper Grade %	Accumulated Tonnes (tonnes)	Accumulated Grade Cu %	Contained Cu (tonnes)	Accumulated Contained Cu (tonnes)
1963	8,593,098	0.300	196,307,700	0.328	25,779	643,702
1964	8,593,099	0.300	204,900,799	0.327	25,779	669,481
1965	9,515,358	0.292	214,416,157	0.325	27,785	697,266
1966	7,798,192	0.278	222,214,349	0.324	21,679	718,945
1967	10,168,657	0.289	232,383,006	0.322	29,387	748,333
1968	9,855,699	0.300	242,238,705	0.321	29,567	777,900
1969	10,770,993	0.304	253,009,698	0.320	32,744	810,644
1970	11,421,679	0.309	264,431,377	0.320	35,293	845,937
1971	14,235,041	0.344	278,666,418	0.321	48,969	894,905
1972	14,807,915	0.279	293,474,333	0.319	41,314	936,219
1973	14,280,630	0.289	307,754,963	0.318	41,271	977,490
1974	10,051,583	0.281	317,806,546	0.316	28,245	1,005,735
1975	18,039,211	0.273	335,845,757	0.314	49,247	1,054,982
1976	19,313,790	0.246	355,159,547	0.310	47,512	1,102,494
1977	9,087,793	0.246	364,247,340	0.309	22,356	1,124,850

Table 6-2: El Teniente Tailings Delivered to Colihues (1977 to 1986)

Year	Annual Tailings (tonnes)	Copper Grade %	Accumulated Tonnes (tonnes)	Accumulated Grade Cu %	Contained Cu (tonnes)	Accumulated Contained Cu (tonnes)
1977	9,767,003	0.246	9,767,003	0.246	24,027	24,027
1978	19,538,624	0.229	29,305,627	0.235	44,743	68,770
1979	20,441,864	0.257	49,747,491	0.244	52,536	121,306
1980	20,320,355	0.275	70,067,846	0.253	55,881	177,187
1981	18,943,890	0.271	89,011,736	0.257	51,338	228,525
1982	22,453,713	0.297	111,465,449	0.265	66,688	295,212
1983	23,381,476	0.271	134,846,925	0.266	63,364	358,576
1984	23,764,923	0.251	158,611,848	0.264	59,650	418,226
1985	26,493,078	0.247	185,104,926	0.261	65,438	483,664
1986	31,383,984	0.27	216,488,910	0.263	84,737	568,401

6.3 MVC's Production History

The MVC plant currently processes Fresh Tailings from the El Teniente concentrator and Cauquenes tailings from the historical tailings deposit. Since Amerigo's purchase of MVC in 2003, annual copper production has steadily increased from 12,000 tonnes to over 29,000 tonnes of copper. MVC's plant throughput has increased mainly due to the increasing tonnages mined from the higher grade historical tailings.MVC produced 1.3 million pounds of molybdenum in 2021.

In 2003, MVC commenced production from the Colihues deposit, and, in 2015, suspended operations from Colihues. The total tonnage of material extracted from the Colihues deposit, up to the end of December 2016 was 72,742,245 tonnes. The total quantity of copper produced from Colihues, up to the end of December 2016 was approximately 55,975 tonnes.

In 2015, MVC commenced production from the Cauquenes deposit. The total tonnage of material extracted from the Cauquenes deposit, up to the end of December 2021, was 123,692,310 tonnes. The total quantity of copper produced from Cauquenes, up to the end of December 2021, was approximately 98,739 tonnes.

Table 6-3 through Table 6-6 present the production history of MVC from 2003 up to the end of 2021.

Table 6-3: MVC Production History (2003 to 2021)

Year	Tonnes Processed (tonnes)	Copper Grade (% Cu)	Copper Recovery (%)	Copper Produces (tonnes)	Molybdenum Produced (Mlbs)
2003	33,671,886	0.110	32.3	11,988	0.00
2004	43,844,672	0.113	28.5	14,117	0.00
2005	45,836,836	0.118	25.0	13,552	0.63
2006	39,088,829	0.114	25.2	11,189	0.67
2007	38,529,330	0.130	30.1	15,065	0.6 4
2008	45,523,128	0.133	25.9	15,707	0.77
2009	50,389,155	0.136	25.8	17,674	0.59
2010	52,755,676	0.150	26.8	21,137	0.78
2011	54,176,727	0.149	24.6	19,810	0.79
2012	56,108,797	0.157	26.6	23,455	1.06
2013	55,740,934	0.160	22.5	20,046	0.81
2014	57,811,530	0.139	22.0	17,649	0.58
2015	51,782,348	0.150	20.2	15,682	0.10
2016	62,671,103	0.154	25.3	24,419	0.47
2017	66,376,936	0.162	25.8	27,710	1.55
2018	65,682,995	0.162	27.7	29,463	1.89
2019	62,994,127	0.157	26.6	26,310	1.40
2020	59,151,215	0.162	25.7	24,591	1.41
2021	66,091,728	0.174	25.2	28,743	1.31

*Excludes copper produced from toll processing Minera Maricunga concentrates.

Table 6-4: MVC Fresh Tailings Production History (2003 to 2021)

Year	Tonnes Processed (tonnes)	Copper Grade (% Cu)	Copper Recovery (%)	Copper Produces (tonnes)
2003	33,254,528	0.108	32.0	11,480
2004	42,942,903	0.110	27.8	13,103
2005	44,653,199	0.114	24.0	12,222
2006	38,599,167	0.112	25.0	10,763
2007	37,762,909	0.127	30.1	14,492
2008	42,687,834	0.125	26.5	14,081
2009	45,274,144	0.118	25.5	13,606
2010	42,938,486	0.116	24.7	12,355
2011	45,261,856	0.121	20.0	10,929
2012	44,997,096	0.126	22.3	12,631
2013	44,484,008	0.132	20.0	11,744
2014	44,951,132	0.114	21.4	10,962

Year	Tonnes Processed (tonnes)	Copper Grade (% Cu)	Copper Recovery (%)	Copper Produces (tonnes)
2015	44,472,506	0.116	21.0	10,793
2016	42,031,933	0.116	19.6	9,566
2017	43,718,332	0.118	19.2	9,881
2018	43,403,906	0.118	18.9	9,649
2019	42,309,069	0.111	18.6	8,735
2020	43,662,625	0.134	19.9	11,643
2021	48,018,661	0.147	20.7	14,641

Table 6-5: MVC Colihues Tailings Production History (2003 to 2021)

Year*	Tonnes Processed	Copper Grade (% Cu(	Copper Recovery (%)	Copper Produced (tonnes)
2003	417,359	0.305	40.0	509
2004	901,769	0.281	40.0	1,104
2005	1,183,638	0.282	39.9	1,330
2006	489,661	0.276	31.5	426
2007	766,421	0.249	30.0	573
2008	2,835,295	0.262	21.9	1,625
2009	5,115,012	0.294	27.1	4,069
2010	9,817,191	0.295	30.3	8,782
2011	8,914,872	0.290	34.3	8,881
2012	11,111,702	0.283	34.4	10,823
2013	11,256,926	0.270	27.3	8,302
2014	12,860,398	0.227	22.9	6,687
2015	7,072,004	0.226	18.5	2,955

*Nil production for the period 2016 - 2021

Table 6-6: MVC Cauquenes Tailings Production History (2015 to 2021)

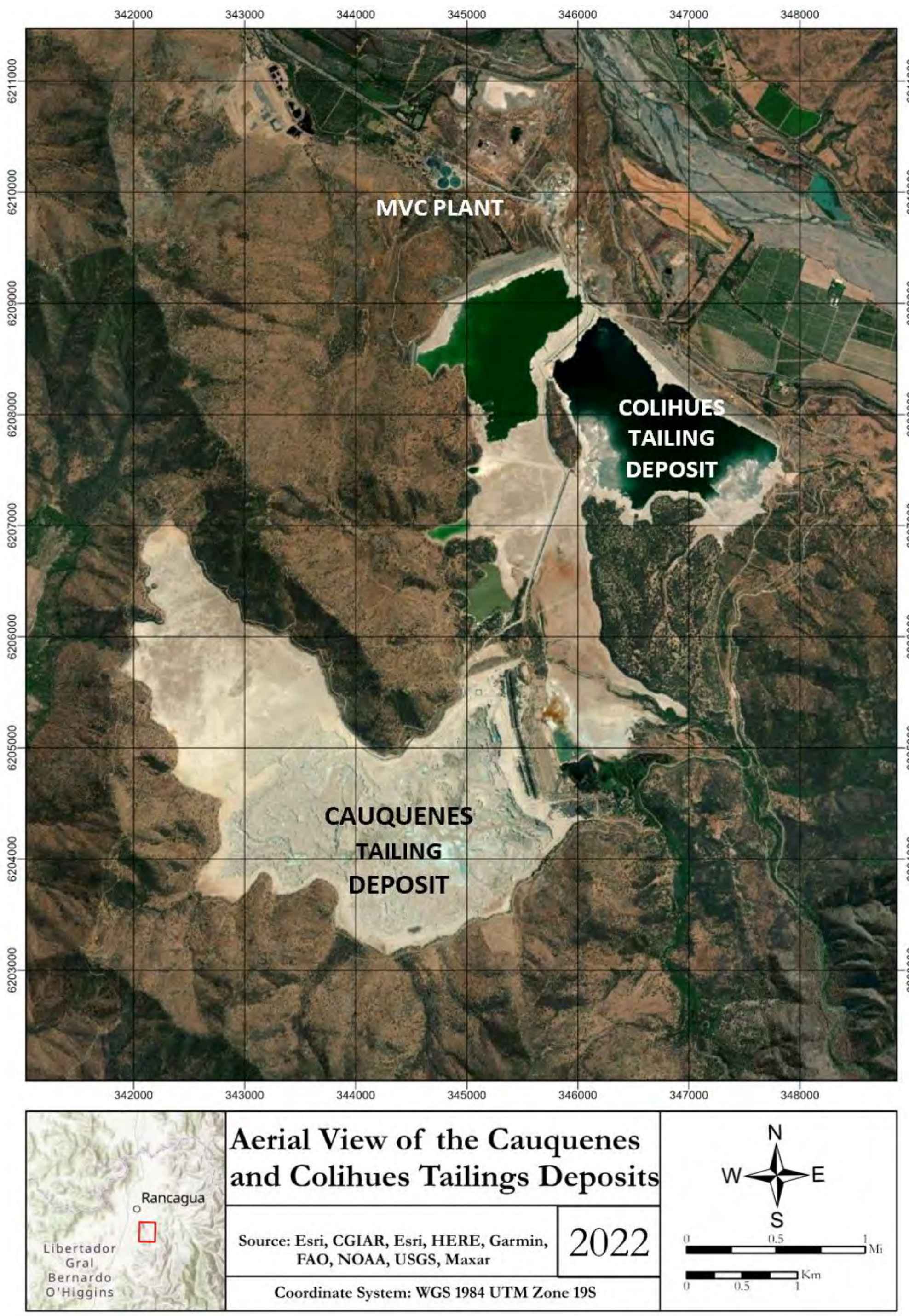
Year	Tonnes Processed (tonnes)	Copper Grade (% Cu)	Copper Recovery (%)	Copper Produces (tonnes)
2015	4,557,676	0.220	19.3	1,934
2016	20,639,169	0.232	31.1	14,853
2017	22,658,605	0.249	31.6	17,829
2018	22,279,089	0.249	35.7	19,814
2019	20,714,226	0.254	33.7	17,684
2020	15,622,663	0.251	33.7	13,243
2021	17,220,882	0.237	32.7	14,102

7.0 GEOLOGIC SETTING AND MINERALIZATION

7.1 Source of Tailings

The historic Cauquenes and Colihues tailings impoundments (Figure 7-1) are man-made deposits that were generated as sites for the containment of tailings produced during the processing of copper-molybdenum ore at Codelco's El Teniente mine.

Figure 7-1: Aerial View of the Cauquenes and Colihues Tailings Deposits



Cauquenes tailings were deposited over the period 1936 to 1977, and the Colihues tailings were deposited over the period 1977 to 1986.

El Teniente is located in the Andes of central Chile and is a porphyry copper-molybdenum deposit. Most of the high grade copper ore at El Teniente is hosted by vertically extensive hydrothermal breccia pipes hosted in a mafic intrusive complex. The deposit is zoned from a barren core through a narrow zone of bornite-rich mineralization outwards into the main chalcopyrite dominant mineralized breccias. Several phases of breccia emplacement with associated copper and molybdenum mineralization occurred over a period of two million years. Focused intrusive activity with attendant mineralization at the intersection of major structures over such an extended period of time resulted in the formation of the El Teniente deposit. (Skewes, et al., 2005).

7.2 Lithology and Mineralogy

Over the period 1910 to 1979, approximately 75% of the El Teniente mine production was from the Complex Mafic El Teniente (CMET) zone, and the remaining volume was mined from intrusive felsic zones (Sewell Tonalite) and magmatic-hydrothermal breccias, principally breccias of tourmaline and sericite.

Copper production was primarily via flotation of high grade secondary copper mineralization, consisting of chalcocite and covellite, with some pockets of remnant oxide copper (chlorides, carbonates, and silicates) with atacamite, malachite, and chrysocolla; occasionally cuprite and native copper. The contribution of chalcopyrite over this period was relatively low and gradually increased as the depth of the mine increased. Table 7-1 shows the dates of extraction, the ore grade, and the predominant ore minerals associated with the respective underground mine sectors.

Table 7-1: El Teniente Mine Mineralogy

Tailings Impoundment	Mine	Level	Sector	Period		tms	$CuT	Fine	Copper Ore
				Start	Finish				
Barahona	Bornite	Fortuna 4		1906	1919	185,627	2.18	4,054	Calcosina > covelina >> ox. Cu
	Bornite	Fortuna 4 ½		1906	1919	25,429	2.18	555	
	Fortuna	Fortuna 4		1906	1919	22,079	2.18	492	
	Regimento		Antiguo	1906	1919	11,785	2.77	327	(cc-cv > Cu) >> (cp-bo)
	Fortuna	Fortuna 3 ¼		1906	1920	1,666,747	2.14	36,161	Calcosina>covelina>>ox. Cu
	Fortuna	Fortuna 3 ⅜		1906	1921	1,650,827	2.09	34,463	
	Teniente	Teniente 1		1906	1921	3,387	2.41	82	
	Fortuna	Fortuna 3		1906	1922	4,888,808	2.18	106,546	
	Centinela	Teniente 3		1906	1923	291,392	25.49	7,246	
	Teniente	Teniente H	Sur	1906	1925	4,238,787	2.37	100,337	
	Teniente	Teniente H	Norte	1924	1926	3,519,776	2.34	820,512	
	Teniente	Teniente G		1906	1927	6,640,034	2.24	148,511	
	Teniente	Teniente D	Sur	1906	1930	965,391	3.15	30,426	
	Teniente	Teniente E		1906	1931	223,905	2.51	5,615	
	Fortuna	Fortuna 3 ½		1906	1932	547,889	2.11	11,544	
	Bornite	Fortuna 4 ½	Lixiviación	1933	1933	22,283	2.14	477	(calcosina > covelina >>
	Fortuna	Fortuna 3 ½	Lixiviación	1928	1933	390,927	2.18	8,527	

Tailings Impoundment	Mine	Level	Sector	Period		tms	$CuT	Fine	Copper Ore
				Start	Finish				
	Fortuna	Fortuna 4	Lixiviación	1933	1933	3,945	2.14	84	ox. Cu) >> (calcopirita > bornite)
	Teniente	Teniente F	47 As	1906	1935	10,551,136	2.18	229,970	
	Teniente	Teniente F	Norte	1926	1935	7,001,262	2.39	167,647	
	Fortuna	Fortuna 3	Lixiviación	1927	1940	505,178	2.17	10,938	
Cauquenes - Colhues	Teniente	Teniente D	Norte	1926	1940	20,609,099	2.43	501,555	
	Teniente		Pique 1	1939	1940	22,042	1.04	230	
	Teniente	Teniente D	0,59 s	1940	1941	38,113	2.21	841	
	Teniente	Teniente D	0,59 s	1928	1941	22,309,931	1.95	435,922	
	Teniente	Sub Level Grizzly	B	1943	1943	912	1.97	18	
	Teniente	Sub Level Grizzly	Grizzly	1943	1944	6,966	1.66	116	
	Teniente	Teniente Sub Level 1		1939	1944	106,917	1.68	1,834	
	Teniente	Teniente B	Norte	1942	1945	32,201	2.25	726	Calcosina-calcopirita > bornita
	Teniente	Teniente	Level Hundimiento	1940	1946	4,339,244	1.59	68,915	
	Teniente	Teniente	Level Hundimiento	1949	1949	4,002	1.59	64	
	Teniente	Teniente B	Norte Norte	1943	1949	20,270,780	2.16	437,409	
	Teniente	Teniente A		1906	1954	506,119	2.14	10,855	
	Teniente	Teniente C	Sub Level 3	1954	1954	15	0.98	0	
	Teniente	Teniente B	Sur	1934	1955	21,407,412	1.73	371,023	
	Teniente	Teniente C		1906	1957	485,173	2.11	10,222	
	Norte	Teniente Sub B	Teniente 3	1906	1958	14,549,696	2.13	309,854	
	Teniente	Teniente B	Norte	1906	1958	37,315,653	2.32	865,301	
	Teniente	Teniente C	Sub Level 1	1954	1959	1,890,541	1.49	28,206	
	Teniente	Teniente Sub A		1937	1968	676,780	1.93	13,034	
	Norte	Teniente Sub B	Norte Norte	1965	1969	15,930,108	1.66	264,929	
	Norte	Teniente Sub C		1948	1969	974,447	1.73	16,841	
	Norte	Teniente 3		1925	1969	3651,617	1.40	4,906	Calcopirita > bornite > calcosina
	Norte	Teniente Sub 4		1962	1969	251,490	1.11	2,780	
	Norte	Teniente 5		1926	1969	555,127	1.00	5,534	Calcopirita

Tailings Impoundment	Mine	Level	Sector	Period		tms	$CuT	Fine	Copper Ore
				Start	Finish				
	Norte	Teniente 4	Central	1972	1973	150,377	1.73	2,600	Calcopirita >> (bornite)
	Norte	Teniente Sub B	Sur	1959	1979	21,243,787	1.89	402,411	Calcosina-calcopirita

8.0 DEPOSIT TYPES

The historic Colihues and Cauquenes tailings impoundments are man-made deposits that were generated as sites for the containment of tailings produced during the processing of copper-molybdenum ore at the El Teniente Mine.

Please refer to Sections 6 and 7 for details regarding production history and records of tonnage and grades of copper and molybdenum deposited in Cauquenes and Colihues.

9.0 EXPLORATION

Please refer to Section 10 "Drilling" for details regarding sampling programs carried out on the Cauquenes and Colihues deposits.

10.0 DRILLING

Only in the Cauquenes tailing deposit, drilling campaigns have been carried out. No drilling campaigns are carried out in Colihues Tailings Deposit.

10.1 Cauquenes Drilling

To date, 2,365 meters of drilling have been carried out. Eighty-three drilling holes have been completed in the Cauquenes impoundment, as shown in Table 10-1 and Figure 10-1. Seventy-three drill holes are located inside the basin, seven drill holes are located in the buffer zone (S52, S57, S58, S59, S60, S63 and S64), which is close to the walls, and three drill holes are located on the wall (S53, S54 and S55). The drill holes in the buffer zone and walls were completed in 2021.

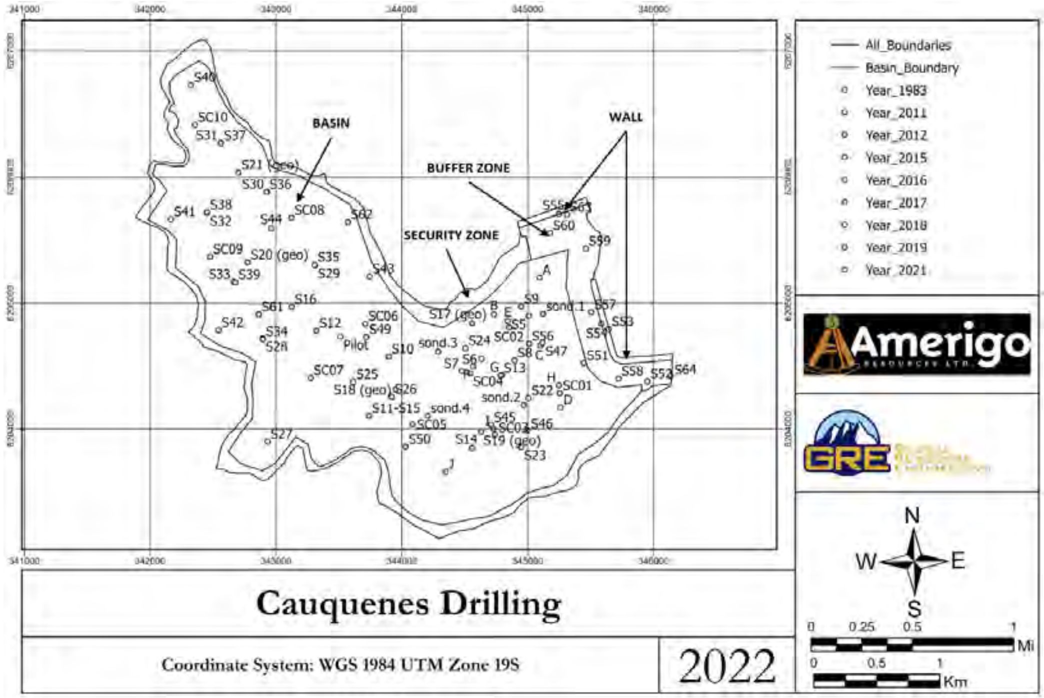
From 2018 onwards, the type of drilling carried out by MVC is by the sonic technique, 3-inch diameter tubes are used, and samples are recovered every one meter of drilling. The orientation of these perforations is approximately 90° with respect to the horizontal. Sonic Drilling employs the use of high-frequency mechanical vibration to penetrate the ground, in order to build wells and/or extract earth samples (core).

Sonic Drilling Rig (UNISONIC) is a sonic drilling rig mounted on a Unimog U90T truck. The UNISONIC is designed to drill up to 50 metres in most terrains, recovering a unit of small volume, and is very friendly to the environment as it is mounted on 4 tires with characteristics of an ATV and allows for transportation on public roads with low tonnage without the need for a support vehicle (Autonomous).

Table 10-1: MVC Probe Development

By	Year	No. of Holes	Length (m)	Drilling Technique
CIMM	1983	10	425	Hydraulic Probe
MVC	2011	4	120	Reverse Circulation
MVC	2012	6	180	Reverse Circulation
MVC	2015	4	80	Reverse Circulation
MVC	2016	4	95	Reverse Circulation
MVC	2017	7	200	Reverse Circulation
MVC	2017	5	125	Hollow Stem Auger
MVC	2018	13	311	Sonic
MVC	2019	17	438	Sonic
MVC	2021	13	391	Sonic
Total		**83**	**2,365**	

Figure 10-1: Cauquenes Drilling



The specific drilling campaigns are described below.

10.1.1 CIMM 1983 Campaign

In 1983, CIMM completed a ten hole drilling campaign on Cauquenes tailings. The 3-inch and 24-inch holes were drilled to a depth of 45 to 50 metres. Figure 10-2 presents the location of the holes, and Table 10-2 presents the assay results for copper and molybdenum.

Figure 10-2: CIMM 1983 Drill Hole Locations

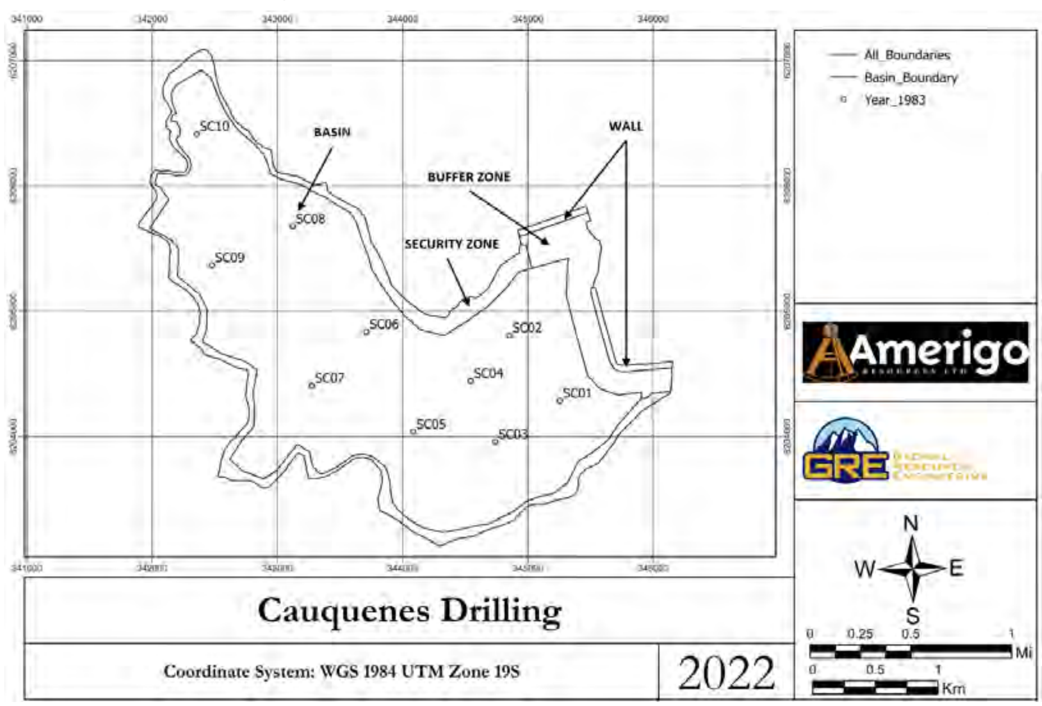


Table 10-2: CIMM 1983 Drill Results

Depth (m)	Drill Hole									
	SC-01	SC-02	SC-03	SC-04	SC-05	SC-06	SC-07	SC-08	SC-09	SC-10
% Copper Total										
0 to 5	0.242	0.250	0.220	0.268	0.311	0.255	0.273	0.271	0.231	0.223
5 to 10	0.303	0.250	0.270	0.258	0.291	0.306	0.263	0.251	0.261	0.303
10 to 15	0.281	0.230	0.273	0.208	0.306	0.277	0.294	0.310	0.330	0.280
15 to 20	0.321	0.271	0.243	0.250	0.227	0.178	0.137	0.310	0.330	0.300
20 to 25	0.283	0.210	0.208	0.257	0.206	0.193	0.207	0.238	0.241	0.366
25 to 30	0.253	0.210	0.257	0.247	0.324	0.243	0.256	0.248	0.312	0.267
30 to 35	0.279	0.250	0.288	0.242	0.267	0.260	0.239	0.200	0.305	0.200
35 to 40	0.428	0.271	0.480	0.252	0.465	0.260	0.269	0.200		
40 to 45	0.380	0.236		0.240		0.245		0.218		
> 45		0.255						0.308		
% Copper Soluble										
0 to 5	0.138	0.102	0.053	0.135	0.098	0.134	0.108	0.074	0.071	0.059
5 to 10	0.053	0.112	0.108	0.135	0.062	0.186	0.137	0.062	0.125	0.086
10 to 15	0.076	0.052	0.078	0.089	0.063	0.063	0.048	0.160	0.153	0.102
15 to 20	0.100	0.095	0.078	0.101	0.056	0.042	0.033	0.140	0.055	0.113
20 to 25	0.113	0.055	0.053	0.112	0.063	0.064	0.066	0.072	0.053	0.189
25 to 30	0.059	0.066	0.058	0.102	0.059	0.088	0.087	0.111	0.061	0.072
30 to 35	0.040	0.100	0.048	0.109	0.036	0.129	0.055	0.067	0.049	0.056
35 to 40	0.036	0.100	0.035	0.086	0.030	0.069	0.063	0.057		
40 to 45	0.027	0.065		0.074		0.086		0.043		
> 45		0.088						0.037		
% Molybdenum Total										
0 to 5	0.0068	0.0098	0.0101	0.0090	0.0081	0.0080	0.0085	0.0114	0.0070	0.0094
5 to 10	0.0165	0.0091	0.0090	0.0090	0.0095	0.0095	0.0085	0.0094	0.0070	0.0091
10 to 15	0.0129	0.0213	0.0060	0.0188	0.0160	0.0094	0.0110	0.0099	0.0097	0.0095
15 to 20	0.0279	0.0263	0.0271	0.0254	0.0231	0.0122	0.0110	0.0160	0.0140	0.0114
20 to 25	0.0248	0.0219	0.0230	0.0238	0.0246	0.0195	0.0206	0.0244	0.0137	0.0219
25 to 30	0.0218	0.0198	0.0230	0.0248	0.0305	0.0282	0.0294	0.0229	0.0274	0.0239
30 to 35	0.0261	0.0292	0.0286	0.0253	0.0290	0.0250	0.0233	0.0190	0.0305	0.0195
35 to 40	0.0311	0.0282	0.0256	0.0224	0.0329	0.0250	0.0224	0.0126		
40 to 45	0.0230	0.0230		0.0180		0.0125		0.0241		
> 45		0.0120								

10.1.2 MVC 2011 Campaign

In 2011, MVC completed four drill holes using reverse circulation (RC) drill in the Cauquenes tailings. The drilling was performed in 6-inch diameter casings, with a DTH drill and a 14 bar screw compressor rated at 760 cubic feet per minute (cfm). The holes were vertical, down to a depth of 30 metres. Figure 10-3 presents the location of the holes, and Table 10-3 presents the assay results for copper and molybdenum.

Figure 10-3: MVC 2011 Drill Hole Locations

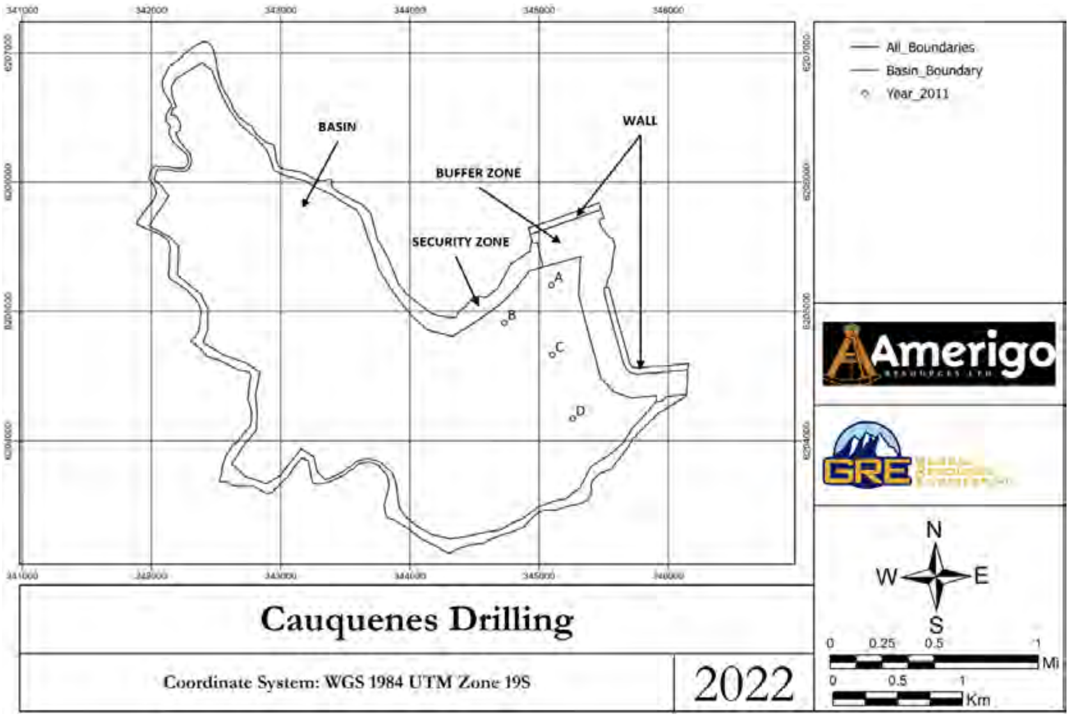


Table 10-3: MVC 2011 Drill Results

Depth (m)	Drill Hole			
	MVC A	MVC B	MVC C	MVC D
% Copper Total				
0 to 5	0.100	0.145	0.137	0.128
5 to 10	0.306	0.238	0.263	0.248
10 to 15	0.281	0.217	0.231	0.280
15 to 20	0.283	0.210	0.225	0.278
20 to 25	0.246	0.182	0.279	0.257
25 to 30	0.303	0.178	0.236	0.239
% Molybdenum Total				
0 to 5	0.018	0.0148	0.0262	0.0115
5 to 10	0.0141	0.0154	0.0197	0.0118
10 to 15	0.0142	0.0304	0.0227	0.0129
15 to 20	0.0278	0.0278	0.0254	0.0195
20 to 25	0.0276	0.0261	0.0281	0.0318
25 to 30	0.0258	0.0233	0.0437	0.0181

10.1.3 MVC 2012 Campaign

In 2012, MVC completed six drill holes using a RC drill in the Cauquenes tailings to obtain confirmatory samples for grade, mineralogy, and metallurgy tests. The drilling was performed in 6-inch diameter casings, with a DTH drill and a 14 bar screw compressor rated at 760 cfm. The holes were vertical, down to a depth of 30 metres.

Out of six holes, four holes drilled were located immediately adjacent to four (4) holes corresponding to the CIMM drilling campaign in 1983. The objective was to validate the results obtained previously.

Figure 10-4 presents the locations of the holes, the numerical values next to the dots represent the depth of the holes in meters. Table 10-4 presents the assay analyses for the six holes.

Figure 10-4: MVC 2012 Drill Hole Locations

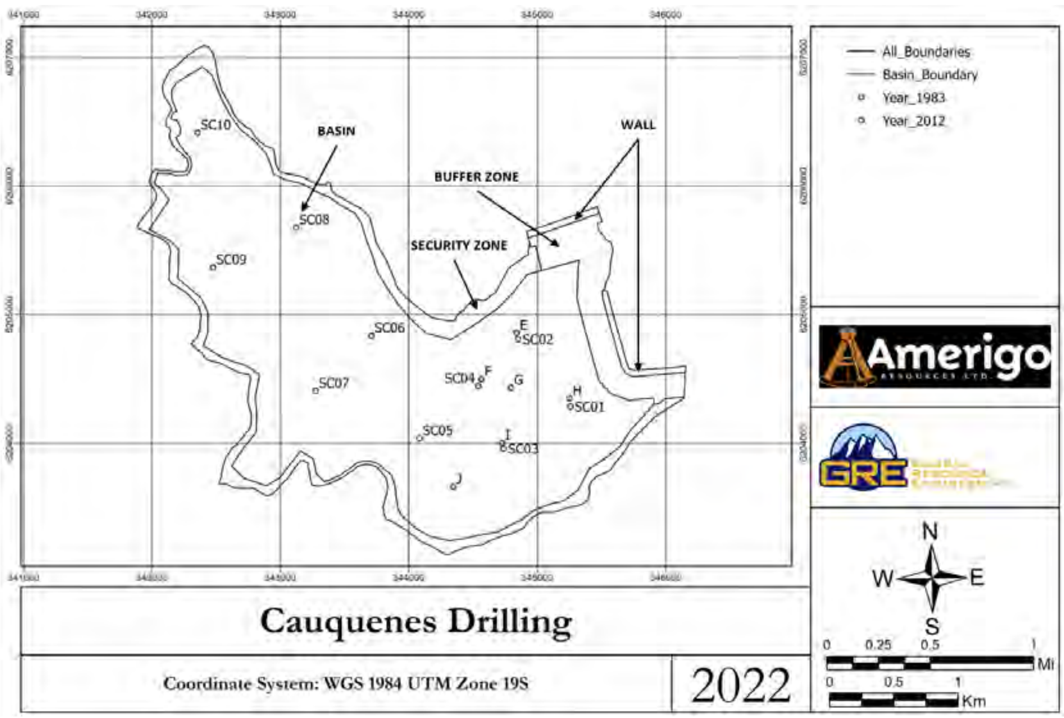


Table 10-4: MVC 2012 Drill Hole Assays

Depth (m)	Drill Hole					
	MVC E	MVC F	MVC G	MVC H	MVC I	MVC J
% Copper Total						
0 to 5	0.181	0.172	0.195	0.114	0.210	0.203
5 to 10	0.254	0.298	0.230	0.211	0.272	0.359
10 to 15	0.254	0.279	0.248	0.234	0.281	0.250
15 to 20	0.246	0.258	0.255	0.276	0.234	0.306
20 to 25	0.233	0.248	0.242	0.291	0.270	0.308
25 to 30	0.246	0.243	0.235	0.270	0.300	0.375
% Molybdenum Total						
0 to 5	0.0087	0.0113	0.0082	0.0098	0.0088	0.0104
5 to 10	0.0143	0.0130	0.0131	0.0153	0.0113	0.0142
10 to 15	0.0234	0.0200	0.0195	0.0214	0.0148	0.0194
15 to 20	0.0244	0.0241	0.0250	0.0255	0.0243	0.0198
20 to 25	0.0235	0.0264	0.0252	0.0249	0.0244	0.0266
25 to 30	0.0233	0.0246	0.0239	0.0245	0.0245	0.0267

10.1.4 MVC 2015 Campaign

In 2015, MVC completed four drill holes using a RC drill in the Cauquenes tailings. The drilling was performed in 6-inch diameter casings, with a DTH drill and a 14 bar screw compressor rated at 760 cfm. The holes were vertical, down to a depth of 20 metres. Figure 10-5 presents the location of the holes, and Table 10-5 presents the assay results for copper and molybdenum.

Figure 10-5: MVC 2015 Drill Hole Locations

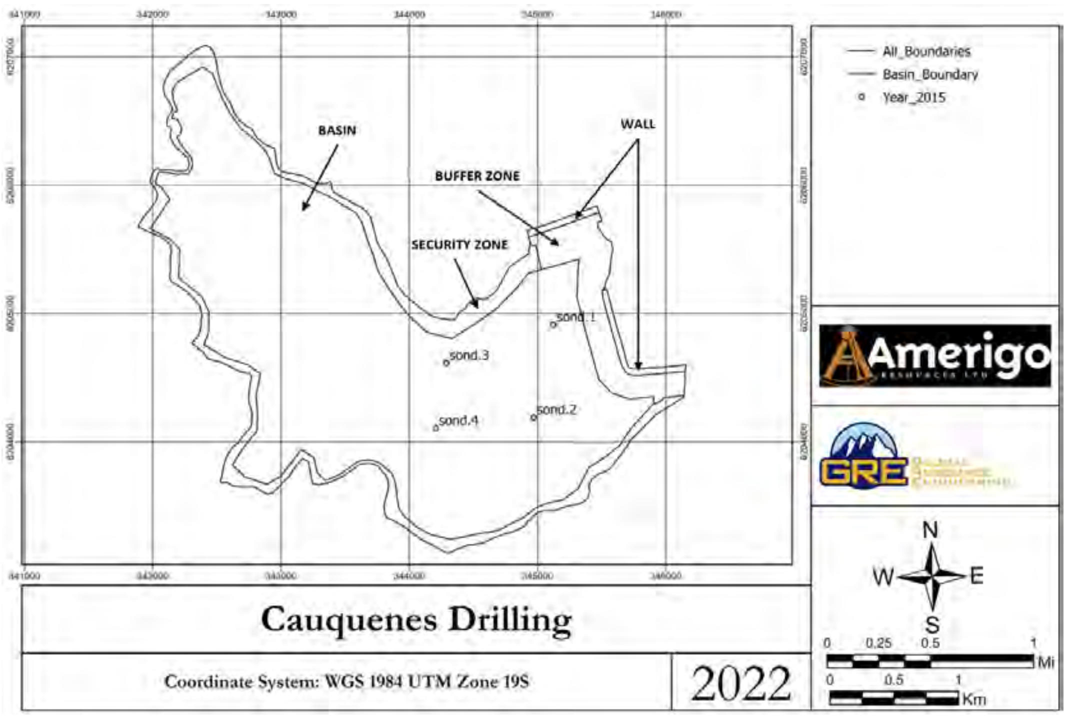


Table 10-5: MVC 2015 Drill Results

Depth (m)	Drill Hole			
	MVC Sond.1	MVC Sond.2	MVC Sond.3	MVC Sond.4
% Copper Total				
0 to 5	0.143	0.235	0.235	0.142
5 to 10	0.247	0.296	0.251	0.273
10 to 15	0.242	0.281	0.257	0.264
15 to 20	0.249	0.260	0.228	0.221

10.1.5 MVC 2016 Campaign

In 2016, MVC completed four drill holes using a RC drill in the Cauquenes tailings. The drilling was performed in 6-inch diameter casings, with a DTH drill and a 14 bar screw compressor rated at 760 cfm. The holes were vertical, down to a depth of 20 to 25 metres. Figure 10-6 presents the location of the holes, and Table 10-6 presents the assay results for copper and molybdenum.

Figure 10-6: MVC 2016 Drill Hole Locations

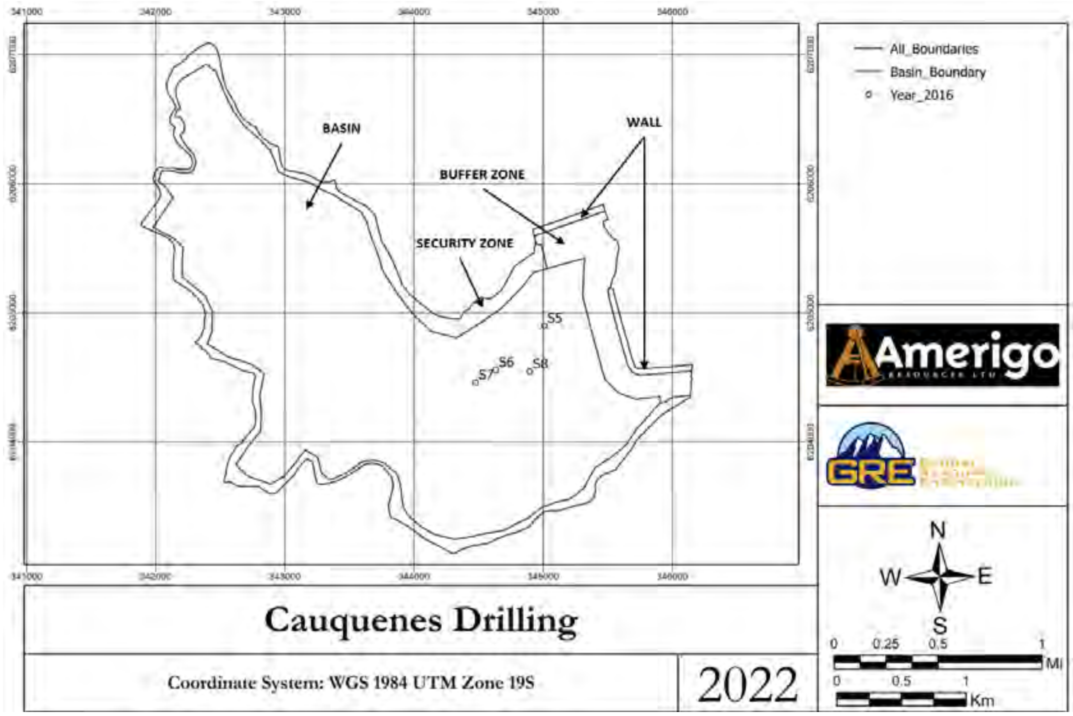


Table 10-6: MVC 2016 Drill Results

Depth (m)	Drill Hole			
	MVC S5	MVC S6	MVC S7	MVC S8
% Copper Total				
0 to 5	0.189	0.231	0.178	0.228
5 to 10	0.263	0.214	0.212	0.219
10 to 15	0.231	0.203	0.209	0.208
15 to 20	0.230	0.212	0.216	0.226
20 to 25	0.221	0.240		0.228
% Molybdenum Total				
0 to 5	0.016	0.020	0.021	0.012
5 to 10	0.025	0.023	0.020	0.012
10 to 15	0.022	0.022	0.021	0.019
15 to 20	0.023	0.022	0.018	0.022
20 to 25	0.019	0.028		0.022

10.1.6 MVC 2017 Campaign

In 2017, MVC completed Seven drill holes using a RC drill in the Cauquenes tailings and five holes using hollow stem auger drill. The holes were vertical, down to a depth ranging from 15 metres to 40 metres. Figure 10-7 presents the location of the holes, and Table 10-7 presents the assay results for copper and molybdenum.

Figure 10-7: MVC 2017 Drill Hole Locations

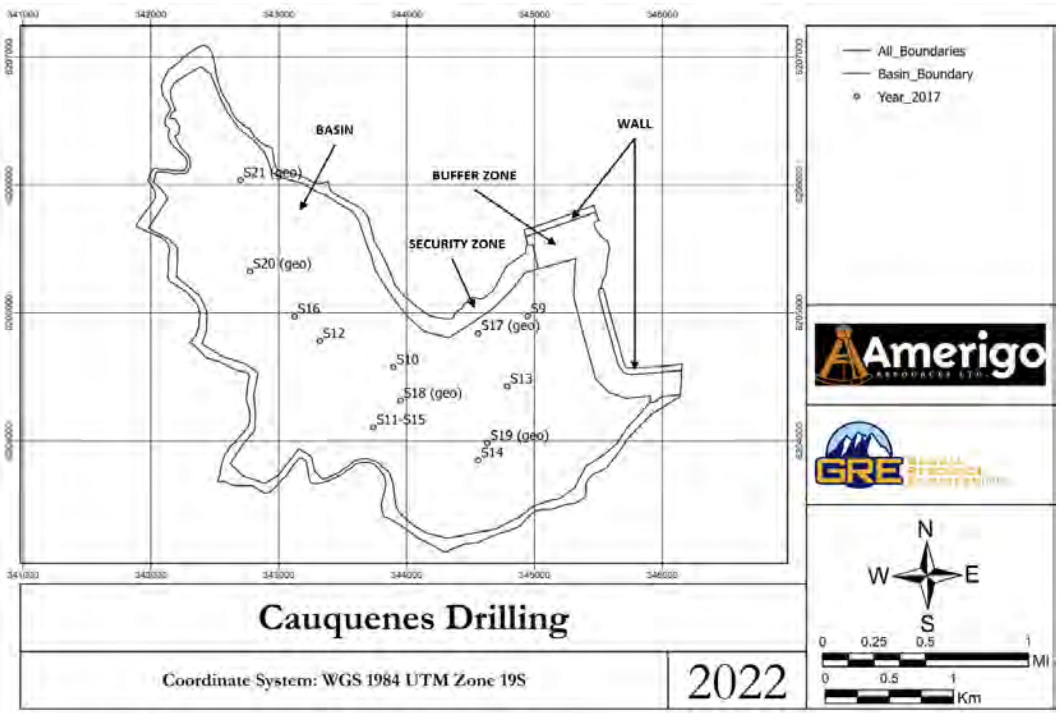


Table 10-7: MVC 2017 Drill Hole Assays

Depth (m)	Drill Hole - Reverse Circulation							Drill Hole - Hollow Stem Auger				
	MVC S9	MVC S10	MVC S11-S15	MVC S12	MVC S13	MVC S14	MVC S16	MVC S17 (geo)	MVC S18 (geo)	MVC S19 (geo)	MVC S20 (geo)	MVC S21 (geo)
% Copper Total												
0 to 5	0.27	0.30	0.27	0.20	0.23	0.24	0.21	0.26	0.20	0.22	0.18	0.23
5 to 10	0.26	0.27	0.28	0.26	0.30	0.26	0.26	0.21	0.28	0.23	0.27	0.28
10 to 15	0.25	0.23	0.22	0.28	0.27	0.23	0.28	0.22	0.22	0.21	0.31	0.26
15 to 20	0.26	0.22	0.20		0.26	0.39	0.30	0.23	0.20	0.25	0.28	0.31
20 to 25	0.30	0.20	0.17		0.30	0.40	0.29	0.25	0.18	0.31	0.30	0.32
25 to 30			0.23		0.41		0.25					
30 to 35			0.24		0.35							
35 to 40			0.28		0.23							
% Molybdenum Total												
0 to 5	0.027	0.011	0.009	0.013	0.031	0.027	0.010	0.029	0.009	0.021	0.007	0.005
5 to 10	0.028	0.009	0.009	0.015	0.035	0.027	0.008	0.029	0.012	0.024	0.006	0.003
10 to 15	0.029	0.012	0.014	0.015	0.027	0.025	0.009	0.026	0.015	0.022	0.010	0.004
15 to 20	0.026	0.012	0.014		0.024	0.045	0.012	0.030	0.029	0.024	0.012	0.010
20 to 25	0.024	0.028	0.019		0.026	0.023	0.012	0.029	0.026	0.024	0.011	0.019
25 to 30			0.022		0.032		0.019					
30 to 35			0.023		0.019							
35 to 40			0.028		0.017							

10.1.7 MVC 2018 Campaign

In 2018, MVC completed thirteen drill holes using Sonic drilling with a 3-inch barrel in the Cauquenes tailings. The holes were vertical, down to a depth ranging from 20 metres to 40 metres. Figure 10-8 presents the location of the holes, and Table 10-8 presents the assay results for copper and molybdenum.

Figure 10-8: MVC 2018 Drill Hole Locations

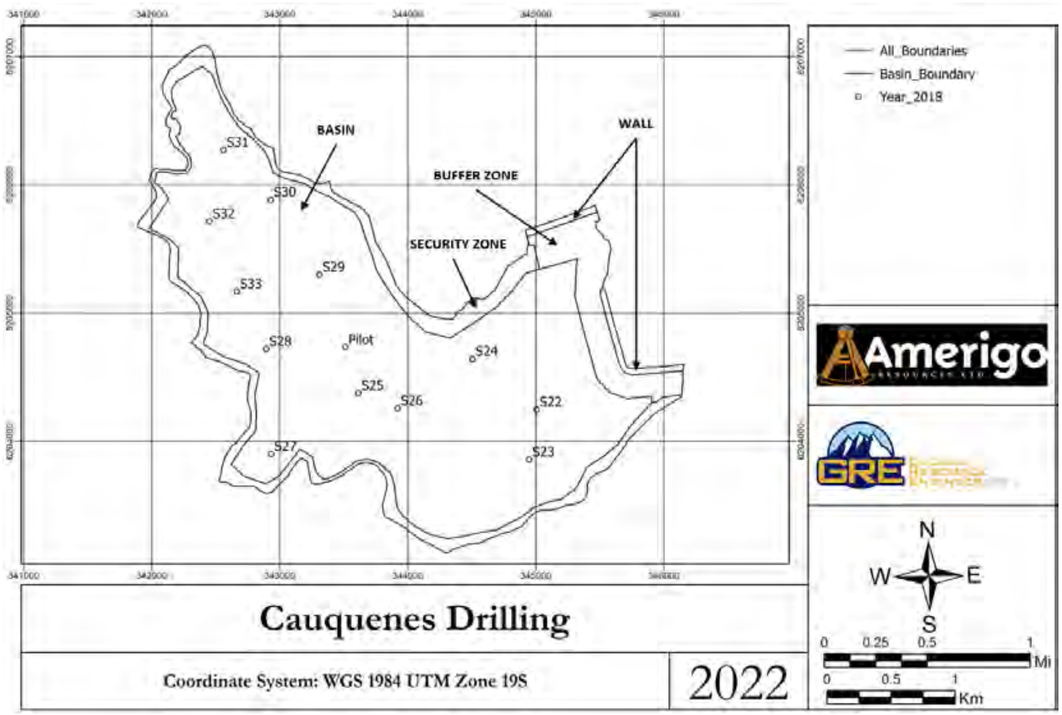


Table 10-8: MVC 2018 Drill Hole Assays

Depth (m)	Drill Hole												
	MVC Pilot	MVC S22	MVC S23	MVC S24	MVC S25	MVC S26	MVC S27	MVC S28	MVC S29	MVC S30	MVC S31	MVC S32	MVC S33
% Copper Total													
0 to 5	0.25	0.18	0.23	0.23	0.20	0.22	0.15	0.21	0.16	0.20	0.22	0.13	0.15
5 to 10	0.28	0.21	0.37	0.24	0.17	0.18	0.34	0.28	0.23	0.27	0.28	0.32	0.29
10 to 15	0.23	0.24	0.58	0.27	0.20	0.21	0.30	0.22	0.27	0.29	0.22	0.28	0.35
15 to 20	0.15	0.25	0.59	0.24	0.26	0.25	0.18	0.19	0.18	0.31	0.34	0.30	0.26
20 to 25	0.21	0.28			0.22	0.25	0.34						
25 to 30	0.23				0.21	0.31	0.41						
30 to 35					0.34								
% Molybdenum Total													
0 to 5	0.009	0.020	0.028	0.026	0.011	0.017	0.009	0.009	0.007	0.013	0.012	0.010	0.008
5 to 10	0.011	0.024	0.035	0.027	0.012	0.022	0.013	0.006	0.005	0.009	0.006	0.009	0.007
10 to 15	0.009	0.026	0.033	0.023	0.028	0.027	0.014	0.011	0.010	0.011	0.011	0.012	0.015
15 to 20	0.014	0.015	0.022	0.018	0.028	0.028	0.015	0.015	0.011	0.016	0.012	0.015	0.015
20 to 25	0.024	0.017			0.030	0.032	0.032						
25 to 30	0.027				0.022	0.029	0.029						
30 to 35					0.023								

10.1.8 MVC 2019 Campaign

In 2019, MVC completed seventeen drill holes using Sonic drilling with a 3-inch barrel in the Cauquenes tailings. The holes were vertical, down to a depth ranging from 5 metres to 50 metres. Figure 10-9 presents the location of the holes, and Table 10-9 and Table 10-10 present the assay results for copper and molybdenum.

Figure 10-9: MVC 2019 Drill Hole Locations

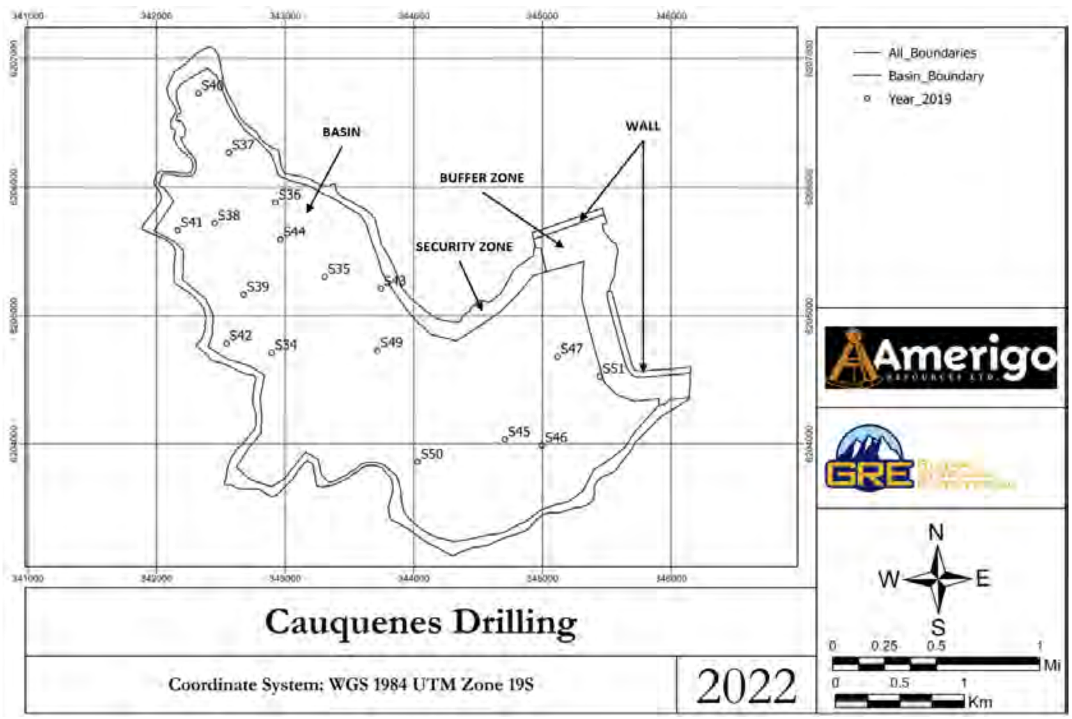


Table 10-9: MVC 2019 Drill Hole Assays (MVC S34 to MVC S41)

Depth (m)	Drill Hole							
	MVC S34	MVC S35	MVC S36	MVC S37	MVC S38	MVC S39	MVC S40	MVC S41
% Copper Total								
0 to 5	0.23	0.22	0.10	0.22	0.22	0.21	0.26	0.09
5 to 10	0.24	0.19	0.27	0.19		0.22	0.34	0.31
10 to 15	0.22	0.20	0.24	0.20		0.21	0.29	0.28
15 to 20	0.26	0.19	0.18			0.22	0.20	0.36
20 to 25			0.29				0.20	0.21
25 to 30								0.20
30 to 35								0.25
% Molybdenum Total								
0 to 5	0.026	0.032	0.010	0.032	0.032	0.024	0.004	0.010
5 to 10	0.028	0.033	0.012	0.033		0.028	0.005	0.008
10 to 15	0.031	0.026	0.011	0.026		0.024	0.006	0.010
15 to 20	0.025	0.019	0.019			0.028	0.013	0.015
20 to 25			0.029				0.023	0.018

Depth (m)	Drill Hole							
	MVC S34	MVC S35	MVC S36	MVC S37	MVC S38	MVC S39	MVC S40	MVC S41
25 to 30								0.028
30 to 35								0.030

Table 10-10: MVC 2019 Drill Hole Assays (MVC S42 to MVC S51)

Depth (m)	Drill Hole								
	MVC S42	MVC S43	MVC S44	MVC S45	MVC S46	MVC S47	MVC S49	MVC S50	MVC S51
% Copper Total									
0 to 5	0.10	0.19	0.16	0.30	0.51	0.19	0.27	0.23	0.23
5 to 10	0.27	0.26	0.25	0.36	0.31	0.23	0.20	0.20	0.20
10 to 15	0.23	0.27	0.32			0.24	0.19	0.22	0.35
15 to 20	0.18	0.16	0.27			0.23	0.21	0.33	0.26
20 to 25	0.29	0.18	0.19			0.23	0.24	0.42	
25 to 30		0.22	0.21				0.23		
30 to 35			0.21				0.22		
35 to 40			0.23						
40 to 45			0.24						
> 45			0.19						
% Molybdenum Total									
0 to 5	0.010	0.015	0.008	0.033	0.039	0.028	0.019	0.016	0.016
5 to 10	0.012	0.010	0.008	0.023	0.023	0.029	0.018	0.029	0.029
10 to 15	0.011	0.015	0.011			0.029	0.031	0.027	0.015
15 to 20	0.019	0.013	0.012			0.025	0.035	0.051	0.015
20 to 25	0.029	0.028	0.019			0.022	0.033	0.043	
25 to 30		0.027	0.026				0.033		
30 to 35			0.026				0.023		
35 to 40			0.025						
40 to 45			0.019						
> 45			0.016						

10.1.9 MVC 2021 Campaign

In 2021, MVC completed thirteen drill holes using Sonic drilling with a 3-inch barrel in the Cauquenes tailings. The holes were vertical, down to a depth ranging from 15 metres to 51 metres. Figure 10-10 presents the location of the holes, and Table 10-11 presents the assay results for copper and molybdenum.

Figure 10-10: MVC 2021 Drill Hole Locations

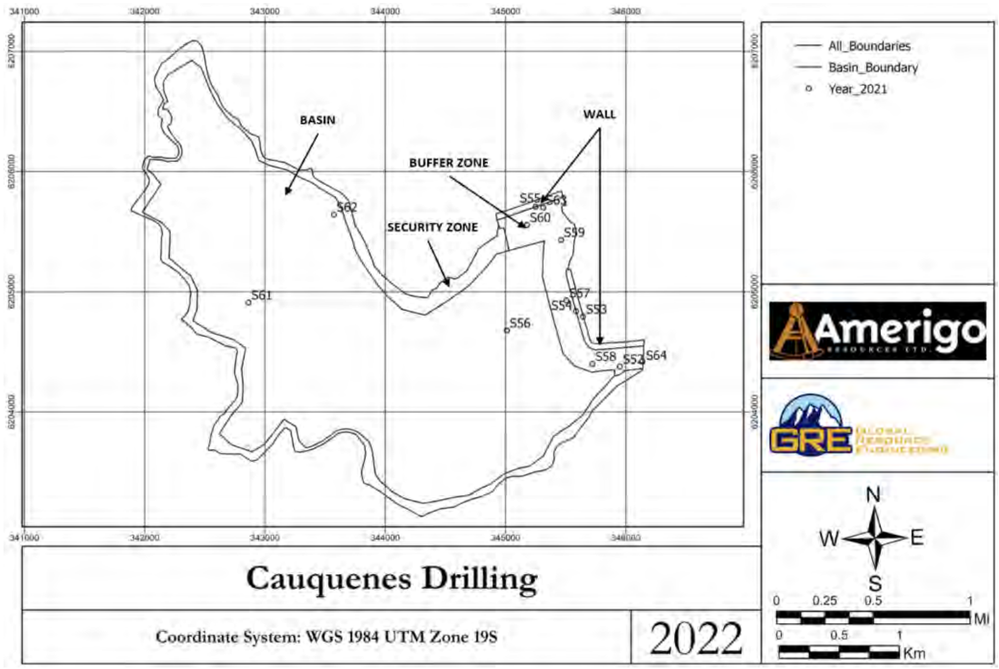


Table 10-11: MVC 2021 Drill Hole Assays

Depth (m)	Drill Hole												
	MVC S52	MVC S56	MVC S57	MVC S58	MVC S59	MVC S60	MVC S61	MVC S62	MVC S63	MVC S64	MVC S53	MVC S54	MVC S55
% Copper Total													
0 to 5	0.21	0.21	0.18	0.21	0.17	0.18	0.15	0.22	0.16	0.18	0.02		0.33
5 to 10	0.27	0.24	0.39	0.19	0.27	0.32	0.28	0.27	0.26	0.27	0.02		0.31
10 to 15	0.48	0.24	0.25	0.28	0.28	0.23	0.41	0.30	0.25	0.30	0.38	0.29	0.28
15 to 20	0.33	0.20	0.30	0.29	0.30	0.31	0.21	0.23	0.24		0.55	0.25	0.26
20 to 25			0.31	0.33	0.30	0.30	0.23	0.20	0.26		0.61	0.23	0.28
25 to 30			0.33	0.37		0.28	0.27		0.36		0.52	0.23	0.50
30 to 35			0.34	0.57		0.27	0.25				0.56	0.58	
35 to 40			0.39	0.72			0.23					0.47	
40 to 45			0.37				0.24					0.49	
> 45			0.45									0.32	
% Molybdenum Total													
0 to 5	0.011	0.025	0.011	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.009		0.015
5 to 10	0.013	0.025	0.011	0.013	0.014	0.013	0.010	0.011	0.016	0.010	0.008		0.025
10 to 15	0.028	0.021	0.022	0.026	0.025	0.026	0.012	0.011	0.026	0.018	0.029	0.027	0.027
15 to 20	0.026	0.014	0.025	0.023	0.027	0.022	0.013	0.014	0.025		0.028	0.030	0.025
20 to 25			0.024	0.024	0.024	0.023	0.023	0.021	0.023		0.019	0.023	0.032
25 to 30			0.024	0.029		0.026	0.028		0.028		0.021	0.025	0.035
30 to 35			0.033	0.031		0.025	0.040				0.038	0.023	
35 to 40			0.035	0.025			0.024					0.026	
40 to 45			0.028				0.019					0.032	
> 45			0.028									0.028	

11.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

The MVC drilling campaigns (2018 to 2021) sample preparation was completed to Standard Operations to be followed during sampling operations. Composites were created every 5 metres for a total of 83 samples submitted for analysis. Quality assurance in sample preparation for chemical analysis was followed to ensure that the information generated met industry standard precision and accuracy requirements. Procedures and equipment used for drying, pulverizing, screening, mixing, separation, and splitting of the samples were done strictly as defined in the protocol.

MVC personnel supervised the sample preparation according to company standards. The samples were handled, prepared, and tested in MVC's laboratory. MVC's laboratory is not certified by any standards association.

Measures were taken to ensure the security of the samples and that the samples did not leave MVC premises. The samples were bagged and labeled according to MVC standards.

The samples were assayed by MVC for total copper, soluble copper, total molybdenum, and total iron. Analysis was based on atomic spectrometry and electrothermal atomization. The procedures for preparation, analysis, and quality control samples followed the methods described and accredited to ISO -17025 NCh of 2005. Analysis was based on methods described by "Minerals and Non-Metallic Industrial Products," Leonardo Balabanoff, Inés Game, Editorial Universidad de Concepción 1984 Part IV and "Minerals of Copper and Molybdenum. Instrumental Analysis," Skoog Leary, Mac Graw Hill Editorial fourth edition, Naucalpan, Mexico 1994, Chapter 10.

Samples were studied in a light reflected polarizing microscope universal Olympus model B - Max41, with standard techniques for recognizing sulfur species. The objective was to study the mineral composition of the primary components (number, size, and distribution) and to determine the degree of liberation.

11.1 Standard operating practices

11.1.1 Sample Recovery

The recovery of the drilling samples is 85 - 90%; a field control of the recovery percentage is carried out for each meter of drilling obtained. Extraction of samples is divided into following steps:

- The bars must be withdrawn consecutively, one by one, until the barrel reaches the surface.
- Subsequently, the head must be positioned at an angle of approximately 30° to leave the barrel in the proper position and withdraw the sample.
- The assistant must locate the plastic sleeve that will contain the sample according to the length and width that the operator indicates.
- It begins with the withdrawal of the sample from inside the barrel, where the operator induces a slight vibration that causes the sample to detach, at the same time that the assistant must keep the bottom of the sleeve firm to prevent the sample from mixing while it is being withdrawn.
- Once the removal of the sample from inside the barrel is finished, the assistant will proceed to identify the sample according to its length and/or depth.

Each sample was arranged in an orderly and consecutive manner in a plastic sleeve labeled from metres and to metres.

The samples represent sections each one-metre deep with disaggregated material of generally gray colors, but depending on the location and section of the drilling, it can present shades of yellow to greenish colors. The granulometric size of the material varies between silt and sand. Drilling sections that have sterile material are also identified, which are validated by chemical analysis of grades lower than the sections identified as tailings. Two domains are defined, the first as tailings material with economic interest and the second as sterile material clays or other mineral without economic potential; the chosen support size is 5 metres.

11.1.2 Sample Reduction and Preparation Techniques

The reduction and homogenization of the 8 kg composite in a dry state is carried out following the rolling and quartering sequence according to the sampling standard. The sample must be reduced by means of the Jones cutter, to obtain homogenized samples that represent the reality of the terrain. The sample reduction sequence is described below:

- The 8 kg sample is passed through the cutter and two trays, and approximately 4 kg of the total sample are obtained, 4 kg enter the metallurgical analysis bag, and the sequence is continued with the rest.
- The sample is cut again, leaving 2 kg per tray, one tray remains in the remaining control bag, and the next one is continued cutting.
- The remaining 2 kg are cut, obtaining 1 kg more to complete the metallurgical analysis bag and the rest follows the sequence.
- With the final kilogram, samples of 600 grams are obtained for granulometric analysis, 50 grams for mineralogical analysis, 5 grams for chemical analysis, and the remainder completes the excess core bag.

11.1.3 Quality of Assay Data and Laboratory Tests

The chemical analysis is carried out at MVC, where the samples must be previously weighed in a calibrated analytical balance with certified standard masses, whose verification is daily. For reading in Atomic Absorption Equipment (EAA), calibration is performed with material from certified secondary standards.

Determination of soluble copper grade by means of EAA: The weighed sample is attacked with 1 M citric acid for half an hour with constant agitation, then it is read with EAA.

Molybdenum law determination by EAA: The attack of the sample is with 3 acids and disintegration with 1 acid.

Iron law determination by EAA: The weighed sample is attacked with 2 acids and disintegrated with 1 acid, then reading is performed with equipment with EAA.

Quality Control: The certified reference material acquired corresponds to OREAS 501b, which is analyzed once a day for copper and molybdenum, in addition to being analyzed each time an operational sample or metallurgical test is performed, which is registered in the Laboratory Information Management System (LIMS).

For the laboratory tests, tests are carried out to simulate the metallurgical behavior of each product used according to the protocol; this is supervised by MVC personnel.

11.1.4 Verification of Sampling and Tests

The excess core bags made during the assembly of the composite are preserved in a natural state. These are stored to validate grades and/or granulometry in case it is required or there is a deviation with the grade calculated by granulometry and grade analyzed.

11.1.5 Data and Sample Backup Files

The samples are stored in the shade in transparent high-density polyethylene bags with a caliber close to or greater than 300 and with a size according to the volume sampled. These bags protect the drilling sections from humidity or sun, which can change the in-situ conditions of the drilling section. The bags are labeled according to the section and drilling to which they belong. For each drilling obtained, a digital record is kept in the internal MVC system by sections. The weights of the remaining samples are also recorded, and the corresponding section and drilling are recorded for later storage. Each grade chemical analysis and granulometric analysis is digitally entered and stored in an internal MVC system.

11.2 QP's Opinion on the Adequacy

Exploration work conducted on the MVC Project is appropriate to the style of mineralization. Results support the interpretations of tonnes and grade from historical records. Sampling methods are acceptable, meet industry-standard practice, and are adequate for mineral resource estimation and mine planning purposes. The quality of the copper and molybdenum analytical data is reliable and sample preparation and analysis were generally performed in accordance with exploration best practices and industry standards. Data verification programs undertaken on the data collected from the Project adequately support the geological interpretations and the database quality, and therefore support the use of the data in mineral resource estimation.

12.0 DATA VERIFICATION

The QPs are aware of the data verification requirements in Section 3.2 of NI 43-101. The following text describes the activities performed and methods employed to personally verify the data that forms the foundation of the report.

GRE's QP Ms. Lane conducted an on-site inspection of MVC on February 07 and February 08, 2022. While on-site, Ms. Lane conducted a general inspection of the Amerigo tailing deposits, including visual inspection of the present working, pit slopes, mineralization and process plant. At the time of site visits, the samples for the drilling had been completed, and Ms. Lane verified the sampling practices in the Cauquenes tailings. Ms. Lane also checked all the ground features with the provided maps of the tailings and ground features.

GRE utilized the separate block models for mine planning for the Cauquenes tailings deposit. Mining and processing methods, costs and infrastructure needs were verified during the site visit and experience of the QPs, (Ms. Lane and Dr. Harvey). The topography used in the pit designs was provided as a detailed survey and was reviewed in comparison to local topography available on the Internet such as Google Earth and ESRI's ArcGIS Online World Imagery. Ms. Lane of GRE viewed and measured the slope of existing pit walls during the site visit and determined appropriate pit slopes. The pit slopes are further supported by being a trailing deposit having shallow depths.

Based on the review of the project database and all existing project documents, and the QP's observations at the project during the site visit, Ms. Lane considers the ground feature maps and assay data contained in the project database to be reasonably accurate and suitable for use in estimating mineral resources.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction and References

MVC is a large concentrator in Chile that produces copper and molybdenum sulfide concentrates from previously treated tailings. Feed to the plant is derived from two sources: fresh plant tailings from the Codelco's El Teniente concentrator and hydraulically recovered tails from the Cauquenes tailings impoundment. The historical tailings were deposited in Cauquenes by El Teniente between 1936 and 1977. The mineralogy of the feeds varies, and the most recent mineralogy indicates that the main copper and molybdenum-bearing minerals are sulfide in nature. In the fresh tailings, the majority of the copper (47%) occurs as chalcopyrite, with significant secondary copper sulfide forms: chalcocite, bornite, and covellite (40%). In the historical tailings, approximately 75% of the copper occurs as secondary copper minerals and about 17% occurs in the form of chalcopyrite. The portion of poor floating copper minerals (copper in iron oxides and sulfates) ranged from 7 to 13% for the historical and fresh tailings, respectively. In both tailings streams, the molybdenum occurs as molybdenite.

The most recent data indicates approximately 25% of the copper and 14% of the molybdenum are recovered from the two tailing streams. The recovery of metals is generally low due to the size distribution of the tailings feed. The two feed tailings streams are initially subjected to cyclone separation, where fine particles are rejected to a scavenger-type cascade flotation circuit and coarse particles subjected to grinding followed by rougher and cleaner flotation. The goal is to maximize coarse particle recovery to the grinding circuit and to reject fine material containing ultra-fines that interfere with the flotation performance. The current plant configuration treats approximately 185,000 tonnes per day of tailings with fresh tailings making up 73% of the feed. Approximately 65% of the total copper fed to the concentrator is derived from the fresh tailings. The fresh to historical tailings ratio is variable and can be adjusted to maximize recovered copper.

The flowsheet has evolved over the life of the project (29 years) and has recently been streamlined to improve operational performance. Much of the recent laboratory test work has been focused on the particle size impacts on copper and molybdenum flotation response. Additionally, thickening water recovery and grinding optimization investigations have been undertaken.

The following relevant reports and data have been referenced in the development of this report:

- 2019 NI 43-101 Report titled "Minera Valle Central Operation Rancagua, Region VI, Chile 43-101 Technical Report"
- November 2019 Metrix Plant Technologies titled "MVC Plant Survey Results Summary Memo"
- Plant Data Spreadsheet 2019 to 2021 titled "A Informes Operativos Diarios, Mensuales, Anuales"
- Plant Data Spreadsheet 2019 to 2021 titled "D Consumo Reactivos"
- February 2020 911Metallurgy Corp (911Met) titled "Amerigo Mill Audit"
- July 2020 Patterson and Cooke (P&C) titled "MVC Thickener and Tailings Transport Audit"
- September 2020 Base Metallurgical Laboratories Report titled "Metallurgical Optimization Study Minera Valle Central – BL0571"

- September 2020 Alex G Doll Consulting Ltd. (AGD) titled "Minera Valle Central Grinding Circuit Evaluation"
- May 2021 Base Metallurgical Laboratories Report titled "Metallurgical Optimization Study Minera Valle Central – BL0707"
- May 2021 911Metallurgy Corp (911Met), "Summary Report"
- July 2021 Orway Mineral Consultants Canada Ltd (OMC) titled "Regrind Mill Sizing"
- October 2021 Base Metallurgical Laboratories Report titled "Dewatering Testing of Minera Valle Central Process Tailings – BL0844"

13.2 Executive Summary And Recommendations

The metallurgical discussions in the previous 43-101 Technical Report (Henderson, 2019) have been largely superseded by recent test work and plant investigations. The previous report had indicated that there was a potential to increase total copper recovery through the flotation of the primary cyclone overflow material (fine particles). Investigations by 911Met and supporting test work conducted by Base Metallurgical Laboratories (Base Metallurgical Laboratories, 2021) showed that ultra-fine liberated copper minerals cannot be efficiently separated from the gangue, and a salable concentrate cannot be produced from this material. Additionally, comingling this material with the coarse cyclone product negatively impacts the overall flotation circuit performance. For the El Teniente tailings, the cyclone overflow rejects approximately 72% of the mass to the fines along with approximately 65% of the copper, and the historical tailings cyclone overflow contains approximately 45% of the mass and 41% of the copper.

The recent test work and plant investigations indicate that the majority of the plant performance improvements are linked to:

- Improved primary cyclone efficiency (reduced coarse losses to the overflow)
- Simplification of the cycloning system
- Improved liberation of the coarse material and, by improving/balancing of the grinding energy and applying it where most metallurgically beneficial.
- Increased rougher flotation retention time
- Increase copper concentrate regrinding power
- Increased throughput of fresh El Teniente tailings
- Improved water recovery from the final tailings
- Copper and molybdenum flotation reagent modification
- Molybdenum cleaning improvements
- Reduction of flotation circulating loads
- Implementation of daily operating routines, best practices and data monitoring.

Many of the potential improvement areas have already been addressed after suitable test work and analysis were conducted. 911Met assessed the MVC concentrator performance and organized the required supporting test work and/or associated experts. The MVC plant staff have shown a high degree of collaboration, initiative, and a willingness to implement flowsheet and operation changes, resulting in a quickly improved metallurgical performance. The following text highlights the test work and analysis performed.

Metrix conducted a plant survey in September 2019 (Metrix Plant Technologies Ltd, 2019) and noted that the copper losses to the cyclone fines fraction were substantial. They also noted that the circulating load of copper was substantial (170%). 911Met reviewed this report, and it provided an initial guide for further investigations. 911Met first visited the plant in early 2020 (911Metallurgy Corp, 2020) and identified several key areas for improvement, including cyclone separation, primary grinding operations, froth pumping, and final tailings water recovery. Other areas highlighted included combined cleaner flotation of the two rougher tailing streams (TEN and CQNS), and general metallurgical monitoring programs.

As a result of this work, several additional experts were contacted to assess the water recovery and the grinding circuit performance. In 2020, the final tailings thickening system was examined by Patterson and Cooke (P&C), and analysis of the grinding circuit was conducted by Alex G Doll Consulting (AGD). Additional supporting laboratory testing was commissioned through Base Metallurgical Laboratories.

The P&C report (Patterson and Cooke, 2020) provided directions for improved thickener management, including more consistent dilution water addition, the addition of variable speed underflow pumps, and increased bed depth. The implementation of several of the recommendations in the MVC plant resulted in an improvement in water recovery of between 10 and 15%.

The BML BL0571 report (Base Metallurgical Laboratories, 2020) indicated that the liberated values of the copper sulfides present in the tailings were low, just over 20% for both feed samples. Fully liberated copper sulfides were almost exclusively confined to the very fine fraction (less than 9 µm). The test work showed that grinding the Cauquenes (CQNS) a little less, to a coarser 130 µm instead of 110um while grinding El Teniente (TEN) finer, to 110 µm instead of 200um, would optimize their flotation performance. AGD utilized the newly provided liberation targets with the aim of improving the grinding power distribution (Alex G. Doll Consulting Ltd., 2020). The analysis showed that reconfiguring the grinding circuit to apply more of the already installed grinding energy to the El Teniente tailings and less to the Cauquenes would improve overall copper mineral liberation and increase copper recovery.

Additionally, the fine fraction (-106 µm) of the two tailing streams showed poor flotation response and resulted in unsalable grade concentrates. Further, blending the fine fraction with the coarse fraction had a negative overall impact on flotation performance, particularly in the cleaner circuit.

As a result of this work, MVC rebalanced the grinding power by reassigning a CQNS ball mill to TEN grinding duties. The final goal was to achieve an 80% passing size (P_{80}) of 130 µm (instead of 110 µm) for CQNS and 180 µm (instead of 200 µm) for TEN. Further, the ball mill feed density was increased to 70% solids as a result of replacing the cyclones (see below) and increasing the cyclone feed dilution water. 911Metallurgy reports that grinding TEN further to 110 µm will require MVC to expand the grinding circuit substantially and require additional energy along with the associated substantial capital cost. It is estimated that these modifications have the potential to improve the recovery of copper by 6% and molybdenum by 10%. GRE recommends that MVC continue to optimize the grinding power distribution to achieve the target grinds for each feed material and evaluate the cost-benefit of increased grinding capacity.

MVC upgraded their dated primary cycloning system and standardized the size of its cyclones. The resulting improvement in cyclone efficiency reduced losses of copper-rich coarse particles to the cyclone overflow and allowed for the elimination of the double cyclone system that was in existence which greatly simplified the circuit. This resulted in more copper being sent to grinding and recovered by the flotation circuit. The improvement in cyclone efficiency was also instrumental in allowing MVC to expand the throughput of TEN by upwards of 20%. The resulting year-over-year increase in copper production for 2020 to 2021 was 9.2%.

Significant work has been undertaken to optimize the initial fine fraction separation. Cyclones inherently have some bypass, and there may be alternative separation methods that could be employed to improve the separation efficiency in combination with cyclones or otherwise. GRE recommends MVC continue to examine methods to improve the initial size separation. The use of screens in place of cyclones was previously examined by MVC, and the capital cost was prohibitive.

To fully capitalize on the available El Teniente tailings, further flotation capacity may be necessary. Test work evaluated the rougher flotation retention time and indicated that additional rougher retention time would improve recovery. An existing rougher circuit was repurposed (Bank 1000), resulting in an approximate 2% increase in copper recovery. This increased flotation retention time was quickly occupied by the increased tonnage provided by El Teniente, resulting in a higher metal production and the same recovery as before the expansion.

One of the test work programs by BML (Base Metallurgical Laboratories, 2021) focused on the potential to improve the fine fraction flotation response as this was previously presented as a viable method to increase overall plant production (Henderson, 2019). The test work indicated that the fines fraction remains unviable. Alternate reagent schemes were also employed in an attempt to improve the flotation response of the fine fraction with no benefit. BML also examined the impact of improved regrinding of the concentrates before the cleaning stage. The data showed a clear relationship between particle size (regrind) and metallurgical performance. Improved concentrates were produced as the concentrate size was reduced. Reducing the copper rougher concentrate size to about 40 µm P_{80} resulted in concentrates of about 26% copper for TEN and 37% copper for CQNS, an improvement over current plant results. The data reported that regrinding to obtain a finer final concentrate may result in up to 6% higher copper concentrate grade or a 1.5% higher recovery.

Regrinding of the molybdenum concentrate at the laboratory scale was effective. The best results employed a regrind on the first cleaner concentrate versus the more traditional rougher concentrate. Comparable tests with and without regrinding indicated that concentrate grades were similar, but molybdenum recovery was improved. A new reagent scheme using MolyFlo and nitrogen flotation showed promise in limited laboratory testing. An initial set of laboratory conditions produced vastly superior molybdenum performance; achieving 79% molybdenum recovery to a final molybdenum concentrate grading 55% molybdenum. The average molybdenum recovery (within the molybdenum circuit) in 2021 was approximately 70% at a final concentrate of approximately 42%.

MVC is currently staging a plant trial of the MolyFlo system, a project that is supported by the laboratory test work's results. Once complete, a techno-economic study should be conducted including the potential addition of a molybdenum regrind circuit to complement the newly installed column flotation cell.

Although final copper and molybdenum recoveries are accurate, the internal metallurgical balance around the various flotation systems is challenging because of the complexity, comingling of concentrate and tails streams, and the circulating loads. This was greatly improved by the development of a comprehensive MetSim model (Section 17.9). The original assay turnaround at MVC was time-consuming, but the addition of a high-quality handheld XRF has reduced turnaround time and improved flotation circuit monitoring and operator confidence.

In summary, MVC has made significant improvements to the plant performance based on analysis and supporting test work. These improvements have led to increased copper production (9%) and a more consistent operation. Over the last several years, the following upgrades have been undertaken (dates are approximate ranges):

- Modernization and standardization of the primary cyclones – mid-2020 to end 2020
- Increased the overall regrind capacity by reassigning an existing mill from the CQNS and Cascade concentrate circuit – August 2020.
- Increased El Teniente tonnage from 125,000 tonnes per day (tpd) to approximately 150,000 tpd. The flotation feed increased from approximately 42,000 tpd to 60,000 and then to 75,000 tpd – January 2021.
- Improved rougher froth handling through a change in frother blend and the upgrade of pumping systems and descaling the froth handling system – 2020.
- Reduction of copper circulating loads to a near open circuit cleaning - Summer 2020
- Improved water recovery from the tailings thickener by changing the underflow and overflow pumps and utilizing a new low viscosity flocculent – September 2020
- Additional rougher flotation capacity through the reassignment of a rougher bank to TEN from a cleaner scavenger role – April 2021
- Grinding improvements through the assignment of a CQNS ball mill to TEN with an additional mill assignment pending. Also, the ball mill feed density was improved along with an increased ball loading – late 2021
- Added a cleaner column to the molybdenum circuit - January 2022.

The MVC plant is treating a low-grade porphyry tailings stream from fresh and historic tailings. It is basically a scavenging system where value is optimized by maximizing throughput and reducing costs (limiting grinding).

13.3 MVC Plant Performance

13.3.1 El Teniente Fresh Tailings

MVC has been processing El Teniente's Fresh Tailings since 1992; Amerigo purchased MVC in 2003. The current processing plant at MVC employs primary cyclone classification to separate coarse and fine fractions. The fine fraction is processed in an unconventional scavenger cascade flotation system to produce a concentrate that is pumped to the rougher flotation circuit. The coarse fraction is ground in conventional ball mills followed by conventional rougher and cleaner flotation circuits. The two tailing streams are treated separately in the rougher flotation stage but combined in the cleaning stage. The overall final copper concentrate contains 26.3% Cu and 0.756% Mo (MVC, 2021). The weighted average feed grade of Fresh Tailings was 0.147% Cu and 108 ppm Mo, and the estimated recovery was 20.8% and 8.4% for copper and molybdenum, respectively.

As a note, MVC commenced molybdenum production in 2005, and the plant was shut down between 2015 and late 2016 due to low metal prices. Molybdenum represents approximately 9% of the revenue at current market prices.

13.3.2 Cauquenes

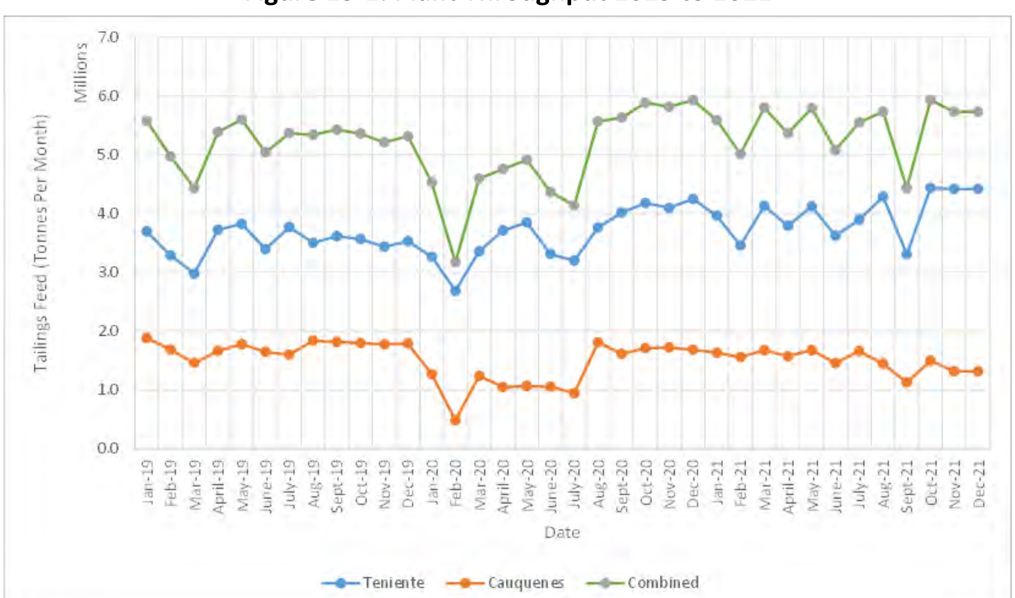
Substantial metallurgical test work has been conducted on the Cauquenes deposit. The early work using drill hole samples focused on grinding, flotation, and direct leaching (Henderson, 2019). In 2016, large-tonnage production plant trials were undertaken. Scoping test work conducted by Codelco in 2008 reported that rougher copper recovery for the Cauquenes coarse tails fraction ground to 70% passing 75 µm would be approximately 70%. Copper recovery for the fine fraction was estimated to be 20%. This data did not include cleaning test data and will therefore grossly overestimate actual plant performance. Global molybdenum recovery was estimated to be 15 to 20%, and concentrate copper grades were expected to be 28% Cu.

For the full year of 2016, Cauquenes material was processed in the plant at an average rate of 60,000 tonnes per day (Henderson, 2019). In 2021, MVC processed an average of 45,000 tonnes per day of Cauquenes at a feed grade of 0.237% Cu and 219 ppm Mo. The estimated copper and molybdenum recovery for Cauquenes was 32.8% and 8.4%, respectively.

13.3.3 Plant Data

Figure 13-1 shows the monthly feed tonnage for the two tailings streams and shows the estimated copper recovery for each tailings stream (MVC, 2021). The large dip in production is a result of a drought, where both fresh tailings and historic tailing production were curtailed. The majority of the other dips in production are the result of scheduled maintenance.

Figure 13-1: Plant Throughput 2019 to 2021



Tonnage improvements can be seen in Figure 13-2, and the El Teniente circuit shows recovery improvements of approximately 2% across the period under investigation. The copper recovery from Cauquenes does not show improvement. Much of the potential recovery gains achieved through the plant upgrades and operational modifications have been masked by the continued increase in throughput as shown in Figure 13-1. Figure 13-3 shows the total copper production from 2019 to 2021. (MVC, 2021).

Figure 13-2: Estimated Copper Recovery 2019 to 2021

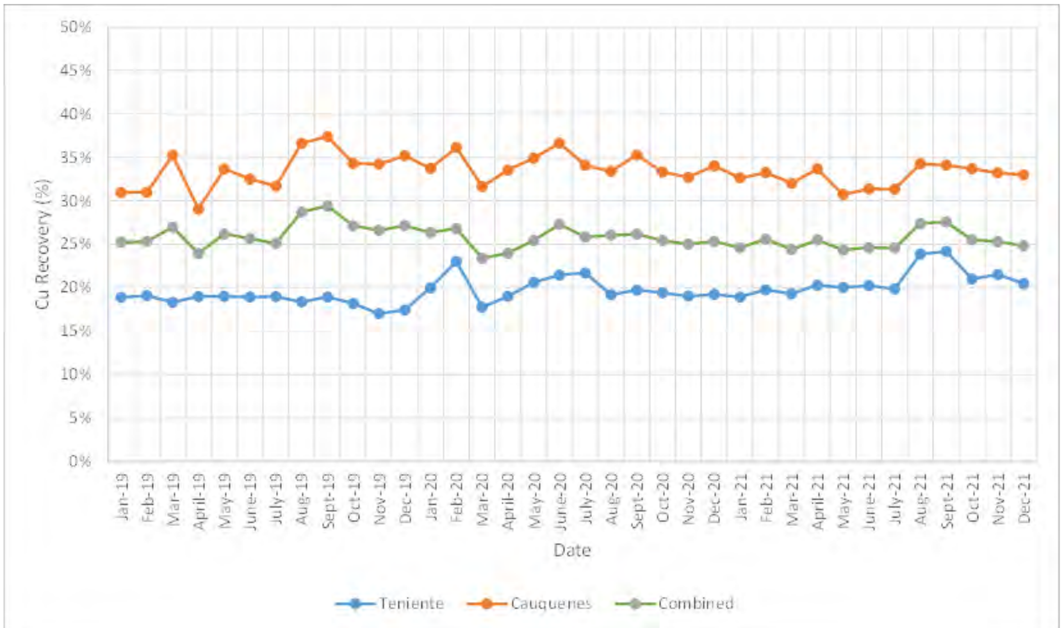
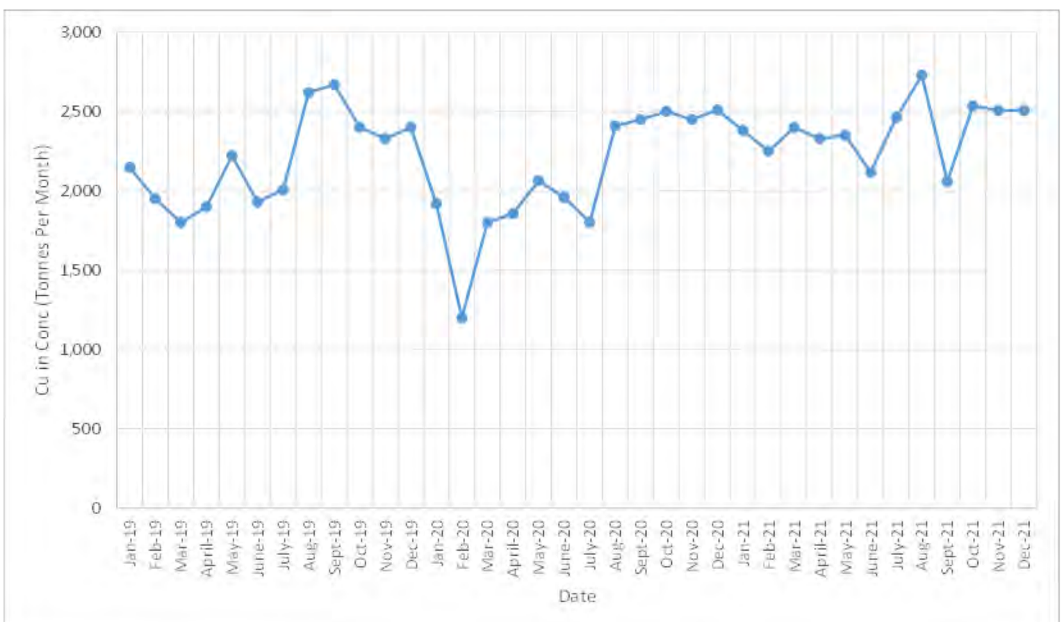


Figure 13-3: Copper in Concentrate 2019 to 2021

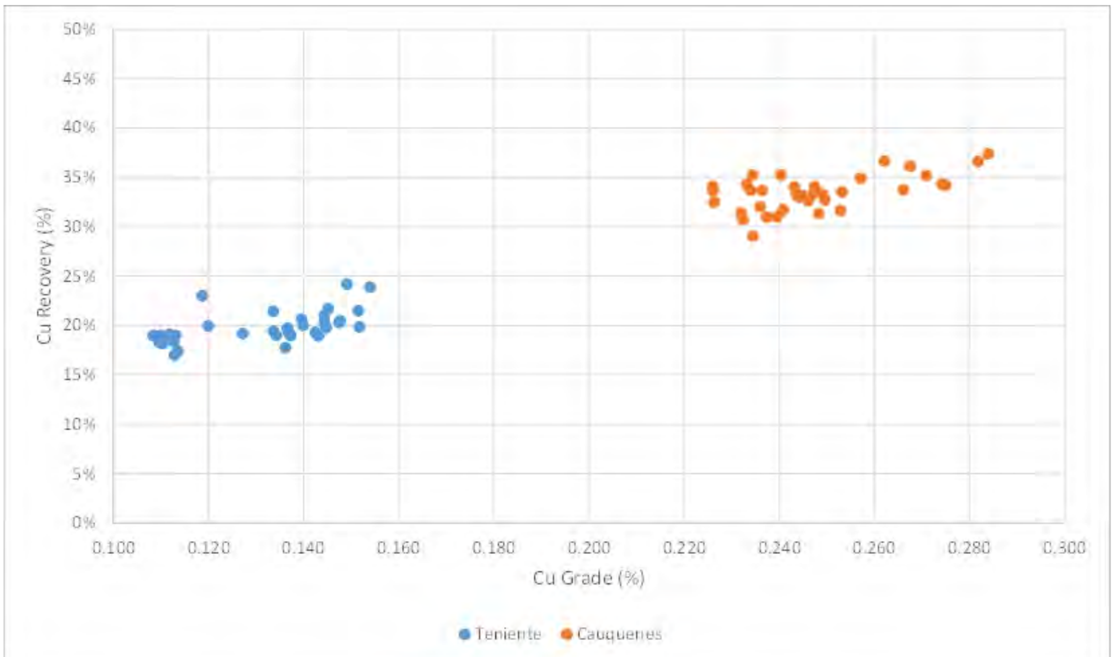


GRE conducted regression analysis on the grade and throughput data provided. For both El Teniente and Cauquenes, grade and throughput were statistically significant variables (P-Value less than 0.05). Typically, we expect that as grade increases recovery increases, and as tonnage increases recovery decreases. In the

El Teniente, the grade model was consistent, but the data suggests that increased throughput led to increased recovery (a positive coefficient). This analysis does not define the whole process impact as the R-squared of the multiple regression was only 17% (highlighted). This means that only 17% of the variability in the process is accounted for by grade and throughput. Other factors warrant further investigation to better define the circuit influences such as feed particle size, cyclone performance, grind, etc.

Figure 13-4 shows the scatter plot of grade versus recovery for the two tailing streams. The grade recovery relationship is visible as indicated by the statistical analysis. Unfortunately, feed grade is a variable that MVC does not have any control over.

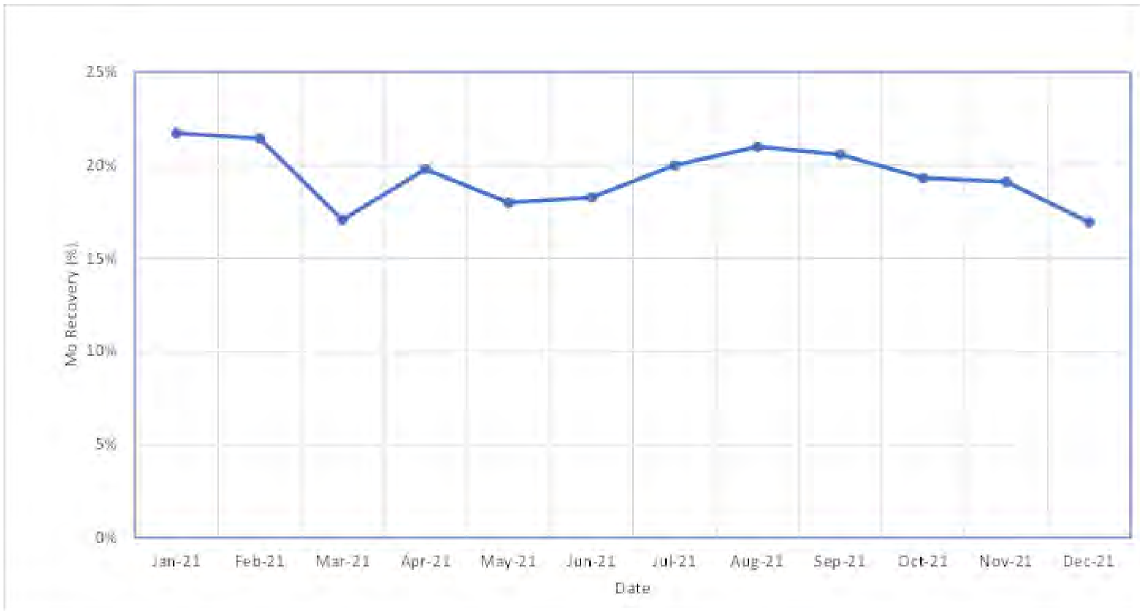
Figure 13-4: Grade versus Recovery – Monthly Average 2019 – 2021



Additional analysis is required on a wider data set to better define the process relationships that exist in the plant. The use of statistics avoids the “confirmation bias” that many metallurgists have when examining plant data providing an unbiased analysis of the data.

The global molybdenum recovery for 2021 is shown in Figure 13-5.

Figure 13-5: Total Mo Recovery to Bulk Concentrate



13.4 Supporting Test Work and Analysis

13.4.1 Patterson and Cooke Audit – July 2020

Patterson and Cooke (P&C) were retained by MVC to examine the final tailings transport and thickening capacity to improve overall water recovery. Maximizing water recovery from the tailings is critical to the operation of the MVC plant. Dilution water is required to properly operate the upstream sizing cyclones and to allow for dilution of flotation feeds. Water that leaves the MVC plant in the thickener underflow cannot be recovered for MVC use.

P&C also focused on MVC's tailings transport. The final tails are transported by a series of channels ("Canaleta") to the final plant thickeners. The capacity of these channels is fixed, and the volume of tailings has increased with increased production. The goal was to examine the hydraulic transport system and determine the capacity, the safe operating limits, and the potential for size segregation.

P&C reviewed the plant's design and technical documents, undertook tests to characterize the tailings, and conducted a statistical analysis of the plant performance using data from 2019 operations.

At the time of the study, the MVC plant was treating approximately 185,000 tpd of mixed tailings; 140,000 tpd fresh tailings from El Teniente and 45,000 tpd of historical tailings from Cauquenes. The total tailings produced from the plant was approximately 180,000 tpd. These tailings are transported through two steel channels to a distribution box that gravity feeds three High-Rate thickeners with a diameter of 100 metres. Flocculant is fed to the feed well of the thickeners. The thickener underflow is pumped to a collection box and then discharged back into the main El Teniente channel for transport to the Carén tailings impoundment.

13.4.1.1 Laboratory Tests

Tests were conducted on two tailings samples: M1 current tailings and M2 future tailings condition (with a greater portion of Cauquenes). The M1 and M2 samples had the same particle size distribution: approximately 80% passing 100 µm. The M2 sample was marginally finer. All data presented is from the P&C report (Patterson and Cooke, 2020).

A series of sedimentation tests were conducted testing 11 different flocculants as shown in Figure 13-6 and Figure 13-7.

Figure 13-6: Flocculent Tests – Sample M1

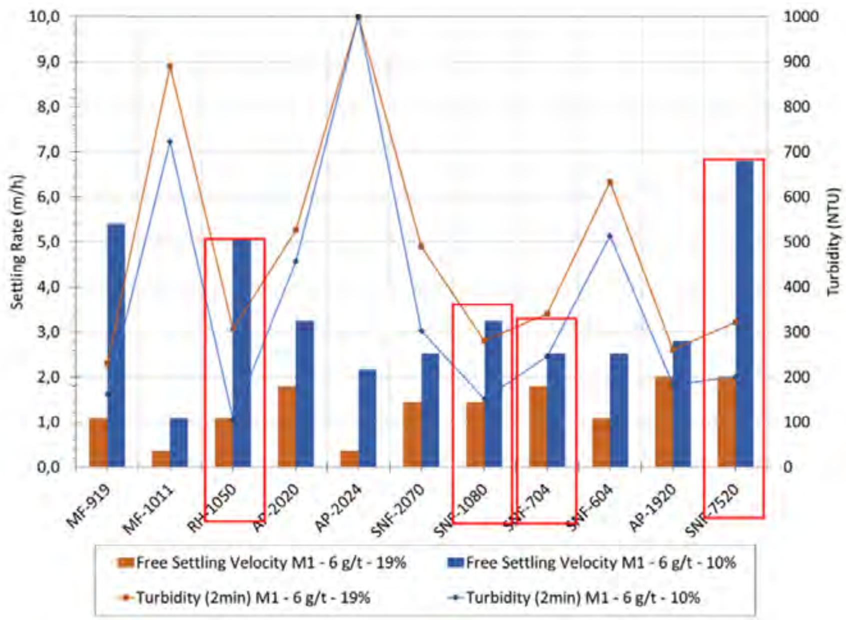
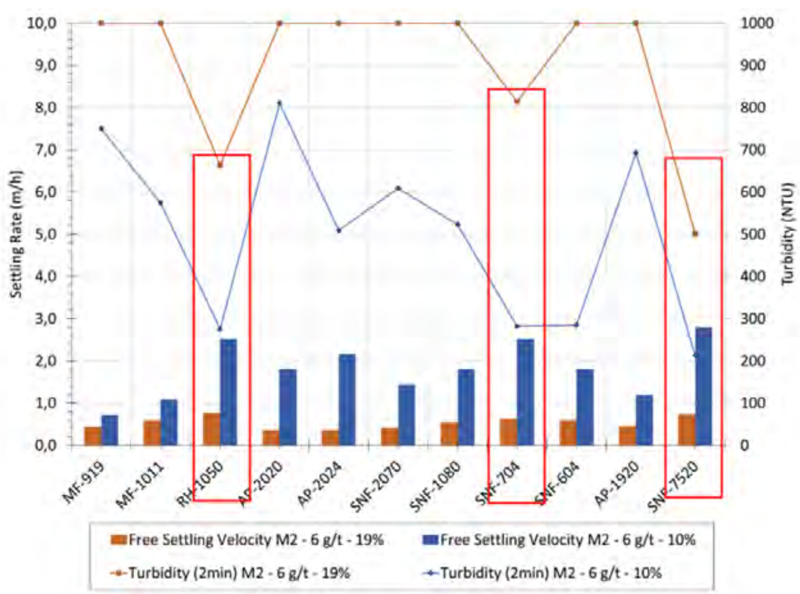
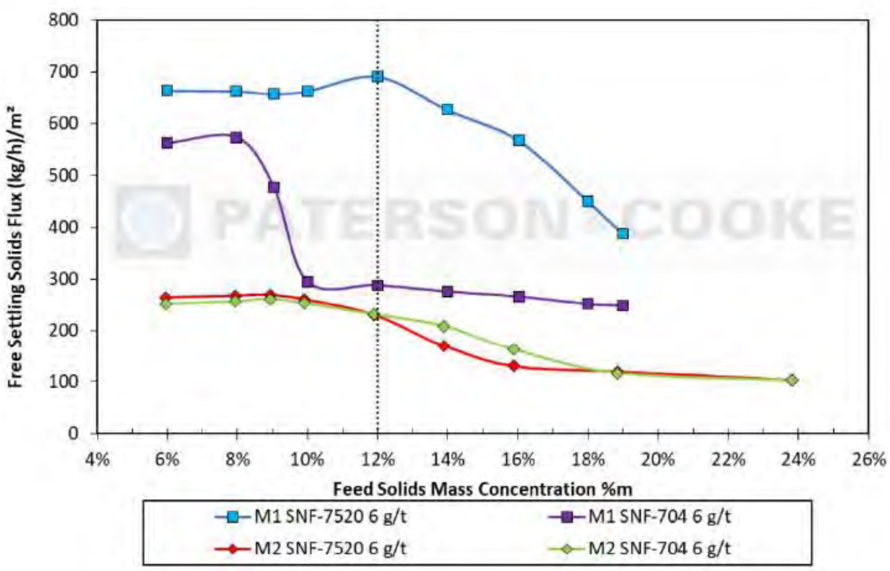


Figure 13-7: Flocculant Tests – Sample M2



Flocculants SNF-7520 (flocculant currently employed at MVC) and SNF-704 (flocculant of interest to MVC) were used for further settling tests. Settling flux testing was performed to determine optimum dilution. These results are presented in Figure 13-8.

Figure 13-8: Feed Dilution Tests for M1 and M2 using SNF-7520 and SNF-704



For both M1 and M2 samples, the optimum mass percentage in the feed stream was between 8 and 12%, except for M1 and the SNF-704 reagent, where the optimal solids concentration was 8%. To simulate the thickeners at MVC, a dynamic settling test was conducted with a 12% pulp dilution. MVC's pulp dilution operating range at the time ranged from 12% to 19%.

The dynamic sedimentation tests included the following: optimum flocculant dosage, solid treatment rate testing, 24-hour consolidation, Rheology (unsheared), and Rheological reduction. Dynamic sedimentation test conditions and results are presented in Table 13-1 and Table 13-2.

Table 13-1: Results of Dynamic Sedimentation Testing

Parameter	M1 (SNF-7520)		M1 (SNF-704)		M2 (SNF-7520)		M2 (SNF-704)	
Density in Feed (%S)	12.0	15.0	12.0	15.0	12.0	15.0	12.0	15.0
Flocculant Dosage (g/t)	6.0		8.0		10.0		10.0	
Solids feed rate (t/hr/m^2)	0.392							
Density (%S) with 200mm bed	56.0	57.0	56.2	57.0	51.9	52.2	52.6	53.5
Turbidity (NTU)	89	91	118	166	86	108	179	167

Table 13-2: Consolidation Testing and Rheology (Unsheared) – 24 Hour Consolidation

Parameter	M1 (SNF-7520)	M1 (SNF-704)	M2 (SNF-7520)	M2 (SNF-704)	M23 (SNF-7520)
Solids feed rate (t/hr/m^2)	0.392				0.428
Shear (%s) at 24 hr	78.3	77	72.2	75.9	77.3
Target density (%S)	58				
Residence Time at 58 %S (min)	34.1	30.4	93.1	41.7	49.7
Yield stress Unsheared (Pa)	27.6	35.7	71.4	8.5	41

Samples M1 and M2 both achieved the objective of 58% solids compaction at between 30 and 90 minutes. However, sample M2 required more time to achieve the 58 % solids target.

The sample rheology (yield stress) without shear was very similar for both flocculants tested for sample M1. However, for sample M2, the yield stress was lower, with flocculant SNF-704 compared to SNF-7520. For both samples, there are no meaningful rheological differences in the sheared flocculated state between the flocculants tested.

Clay analysis (<2 µm particles) did not show the presence of smectite in either sample. The absence of expansive clays indicates that the sedimentation and thickening process should not be adversely impacted. However, there was a high concentration of muscovite in M1 (87.7%) and M2 (81.5%), which have been shown to decrease sedimentation rates, decrease discharge solids density, and increase yield stress values.

13.4.1.2 Plant Audit Results

P&C investigated several aspects of the MVC plant, including the tailings channel transport characteristics and historical thickener performance, and also modeled the final tailings thickener performance with revised operating parameters.

The tailings channel transport system was reviewed to evaluate the slurry transport characteristics and also the potential for size segregation. P&C determined that Channel #1 (the oldest) is suitable for the current flows but would be operating in an unsafe manner according to P&C criteria for future expansion. The Channel #2 (the newest) capacity does not present any issues. P&C recommends adding 15 cm of side wall to Channel #1 to meet the future demands. Further tonnage expansion may require a third channel.

The main objective of the P&C audit was to evaluate the final tailings thickener performance to allow the plant to achieve the target underflow density of 58% on a consistent basis. P&C made a variety of recommendations but the two most important ones were to improve the thickener dilution water system and to add variable speed drives to the underflow pumps.

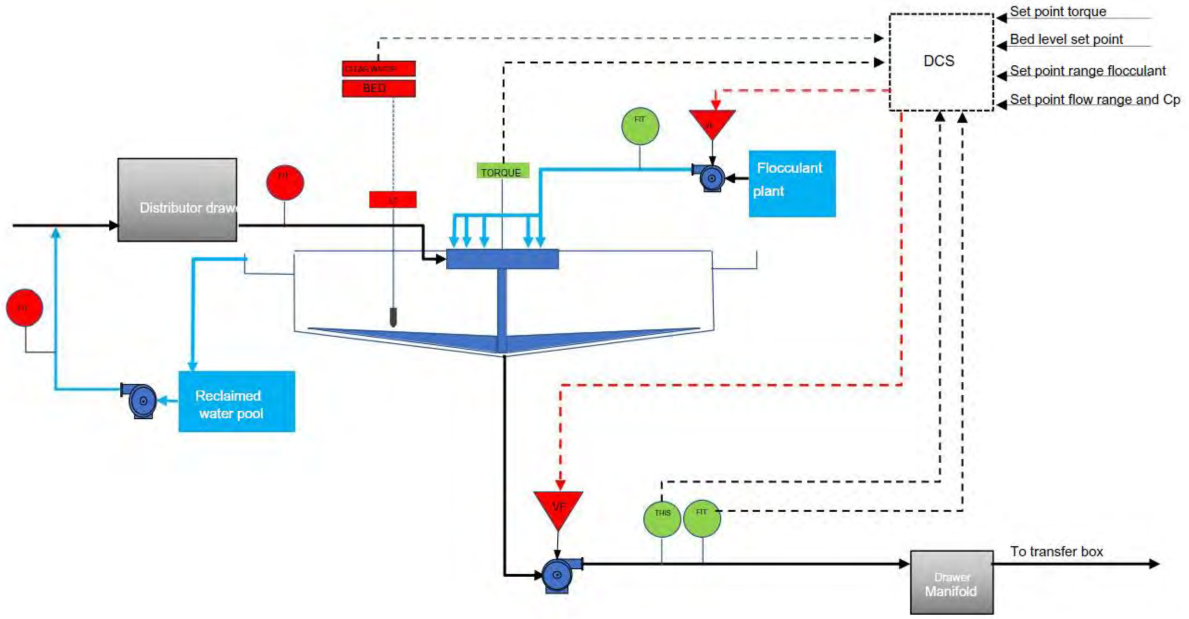
Maintaining a more consistent dilution to the thickener center well resulted in improved thickener performance. P&C's modeling and test work showed that the thickeners should be able to achieve the target underflow density. The current flocculent and dosage used by MVC was suitable for this improvement. P&C recommended the addition of variable speed underflow pumps, which MVC subsequently installed. The addition of these variable speed pumps allowed the formation of a suitable compaction zone, which improved the underflow density and provided more stable operating performance. The net performance improvement resulted in a 10 to 15% increase in recovered water.

P&C made further recommendations related to improving the thickener process control, including bed level measurement, underflow density, and torque, as shown in Figure 13-9. The areas in red are the recommended additions. The controls system should utilize logic loops examining the bed level, torque, and underflow density to adjust the flocculant dosage and underflow pump speeds.

P&C made several other recommendations related to balancing the thickener loads (currently performed manually), adding additional torque delivery, eliminating size segregation in the feed launders, and reducing discharge pipe velocities. The upgrades already implemented by MVC have shown good results

(10 to 15% additional water recovery), and further performance improvements are likely possible and necessary for expanded tonnages.

Figure 13-9: Final Tailings Thickener Control System



13.4.2 Base Metallurgical Laboratories Test Work – September 2020

The BL571 (Base Metallurgical Laboratories, 2020) test program focused on the recovery of copper and molybdenum by flotation for samples from TEN and CQNS. The samples provided for this program were taken in March 2020. Two raw feed streams, a copper concentrate, a molybdenum concentrate, and final tailings were used for the test work. An overall balance was produced based on these samples. The balance is shown in Table 13-3.

Table 13-3: Metallurgical Balance for the Mineralogical Survey

Product	Mass (%)	Assay (%)				Distribution (%)			
		Cu	Fe	S	Mo	Cu	Fe	S	Mo
Feed (CQNS)	48.0	0.278	3.36	0.95	0.0254	62	41	36	73
Feed (TEN)	52.0	0.156	3.92	1.60	0.0085	38	52	65	27
Combined Feed	100.0	0.214	3.89	1.28	0.0166	100	100	100	100
Cu Con	0.19	26.0	20.8	29.6	1.10	22.6	1.00	4.32	12.4
Mo Con	0.004	2.66	1.78	34.2	46.8	0.04	0.002	0.10	10.2
Tail	99.81	0.166	3.86	1.22	0.0129	77.3	99.0	95.6	77.5

13.4.2.1 Mineralogical Assessment of Plant Streams

Mineralogical analysis was conducted on sized samples. The sized samples were divided into four size ranges for analysis using QEMSCAN. The TEN feed sample had 1.5% by weight sulfides, most of which was pyrite at 1.16% of the feed mass. Just under half the copper in this feed stream was in the form of chalcopyrite, about 40% of the balance secondary copper sulfide forms: chalcocite, bornite, and covellite. These minerals should all be recoverable by flotation.

There was approximately 13% of the copper in this stream occurring as native copper, copper in iron oxides, or copper sulfate. These forms of copper may not respond well to conventional flotation. Metallic copper can respond to flotation but may be better recovered by gravity. Attempts at obtaining a suitable gravity upgrade were not effective.

The CQNS feed stream had higher grades of both copper and molybdenum. The sulfide content of the tailings was high at 2%. The copper mineralogy was also different. Approximately 75% of the copper in the feed was present as secondary copper minerals and about 17% of the copper was in the form of chalcopyrite. It is not known whether the higher levels of secondary mineralization observed in the CQNS occurred due to in situ oxidation. The higher oxidation levels found in CQNS likely inhibit the flotation response. There was also approximately 7% of the copper in the CQNS feed present in iron oxides that would not respond well to sulfide flotation conditions. This feed stream had very little native copper present.

The non-sulfide gangue minerals present were similar for each feed. There are elevated levels of micas, chlorites, and kaolinite that may affect the viscosity of the pulp. A summary of the mineral content and copper mineral distribution is presented in Table 13-4 and Table 13-5.

Table 13-4: Mineralogical Results

Class	Mineral	TEN Feed Mass (%)	CQNS Feed Mass (%)
Sulfides	Chalcopyrite	0.21	0.13
	Bornite	0.02	0.01
	Chalcocite	0.06	0.22
	Covellite	0.01	0.05
	Galena	0.03	0.03
	Sphalerite	0.01	0.02
	Molybdenite	0.02	0.04
	Pyrite	1.16	1.52
Silicates, Oxides, Carbonates, and Other	Iron Oxides	2.44	1.28
	Quartz	23.2	29.6
	Muscovite/Illite	19.8	28.5
	Plagioclase Feldspar	18.4	10.1
	K-Feldspars	5.48	1.73
	Chlorite	12.3	13.7
	Biotite/Phlogopite	7.06	7.34
	Kaolinite	1.03	2.61
	Tourmaline	0.44	0.92
	Epidote	1.6	0.21
	Rutile/Anatase	0.78	0.92
	Amphibole (Hornblende	0.19	0.06
	Apatite	0.37	0.2
	Calcite	0.63	0.05
	Ca-Sulphates	4.37	0.03
	Others	0.42	0.69
Total		100	100

Table 13-5: QEMSCAN Copper Distribution

Mineral	Copper Distribution (%)	
	TEN	CQNS
Chalcopyrite	47.4	16.7
Bornite	6.5	2.5
Chalcocite	28.5	61.9
Covellite	4.4	11.6
Enargite	0.5	0.1
Tetrahedrite	0.0	0.0
Cu-Sulphate	1.0	0.0
Native Cu	8.9	0.4
Cu in Iron Oxides	2.7	6.8
Total	100	100

13.4.2.2 Fragmentation Characteristics of the Feed Streams

The fragmentation was measured for the TEN and CQNS samples. The TEN feed was much coarser, with a P_{80} of 183 µm. The CQNS feed P_{80} was 132 µm. The liberation values of the copper sulfides were low, just over 20% for both feed samples. Liberated copper sulfides were almost exclusively contained to the very fine C5 size fraction (less than 9 µm) as shown in Table 13-6. The liberation values for copper sulfides were low, just over 20 percent for both feed samples. Liberated copper sulfides were almost exclusively contained to the very fine C5 size fraction (less than 9 µm).

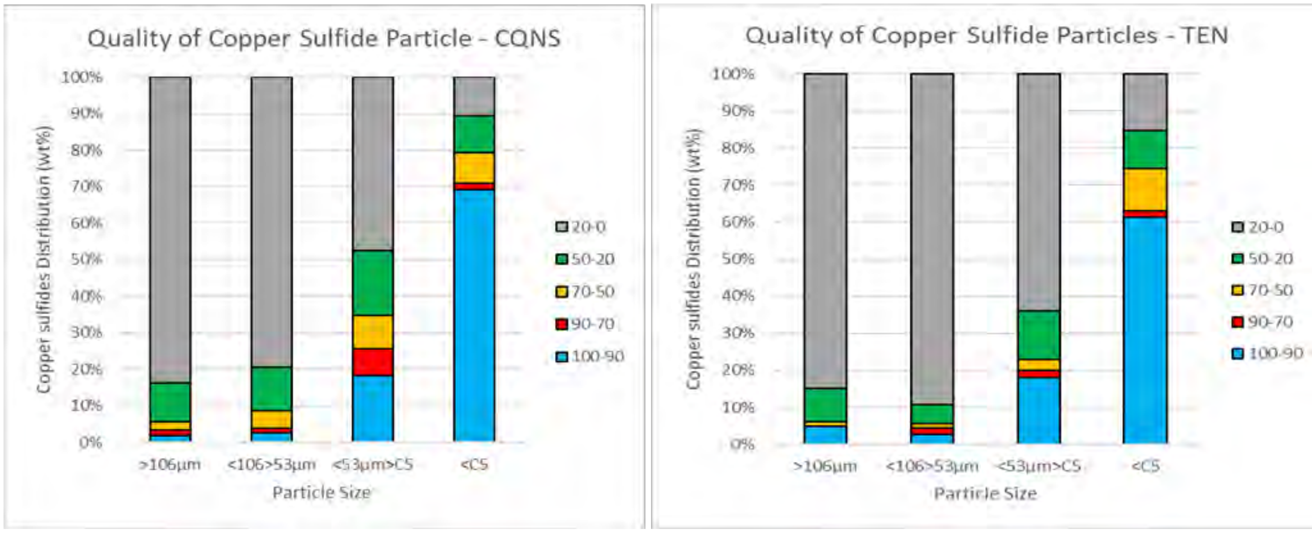
Table 13-6: Feed Liberation Characteristics

Mineral Status	TEN Liberation 2 Dimensions (%)					CQNS Liberation 2 Dimensions (%)				
	Cs	Md	Os	Py	Gn	Cs	Md	Os	Py	Gn
Liberated	23.8	32.4	69.4	76.0	98.8	21.1	51.9	69.2	71.9	98.7
Binary - Cs	-	0.7	0.6	0.7	0.7	-	0.6	1.2	5.1	0.9
Binary - Md	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	0.1	0.1
Binary - Os	0.1	<0.1	-	0.4	<0.1	0.1	<0.1	-	0.2	<0.1
Binary - Py	0.8	1.4	4.5	-	0.4	4.4	1.2	2.9	-	0.2
Binary - Gn	73.7	59.4	20.9	21.3	-	70.9	43.9	24.1	18.3	-
Multiphase	1.7	6.1	4.7	1.6	0.0	3.4	2.4	2.6	4.4	0.1
Total	100	100	100	100	100	100	100	100	100	100

Note: Cs-Copper Sulfides including Chalcopyrite, Bornite, Chalcocite/Covellite, Enargite/Tennantite, and Tetrahedrite, Md-Molybdenite, Os-Other Sulfides including Sphalerite and Galena, Py-Pyrite/Arsenopyrite, Gn-Gangue.

Most of the remaining copper sulfide minerals occurred as binary particles with non-sulfide gangue. There were very minor occurrences of copper sulfide interlocking with pyrite. The distribution of the unliberated copper sulfides for TEN and CQNS was contained in the coarse size fractions as shown in Figure 13-10.

Figure 13-10: Size Distribution of Copper Sulfides



In both feed streams, the copper mineralization for sizes less than 53 µm was mostly binary particles with very little copper (0 to 20% Cu). This class of particle has a very low probability for recovery to the concentrate without grinding to increase liberation and the grade of the resulting liberated copper mineral.

For both composites, approximately 45% of the copper was contained in greater than 106 µm size range. An additional 9 to 12% of the copper was contained in the less than <106 µm and >53 µm size range. The 106 µm particle size range represents about a third of the feed mass and should be the target for grinding power.

Molybdenum particle locking characteristics were very similar to copper sulfides, except more fully liberated molybdenite was observed. Similar to copper, the majority of the liberated molybdenite was found in the finest C5 (9 µm) size fraction.

Targeting the coarse fraction for molybdenite is recommended. However, molybdenite requires higher levels of liberation than copper sulfides for acceptable recovery. Therefore, the molybdenite recovery will lag the copper sulfide for a given grind size.

13.4.2.3 Concentrate Quality

The copper and molybdenite concentrates were subjected to the same mineralogical assessment as the feed. A summary of the data is displayed in Table 13-7. The concentrate is a product of near equal blends of TEN and CQNS feed streams.

The concentrate contained 43.8% by-weight copper sulfides. The primary impurity in the concentrate was pyrite (31.9%). The remainder were non-sulfide gangue minerals. The pyrite in the concentrate was well distributed across all size ranges. The non-sulfide gangue deportment to the copper concentrate was nearly equally divided: 53% as liberated particles and the remainder as interlocked particles. About 30% of the liberated gangue was recovered as fine particles, likely by froth entrainment.

Table 13-7: Copper and Molybdenum Concentrate Mineral Content

Copper Concentrate

Class	Mineral	Mass (%)
Sulfides	Chalcopyrite	20
	Bornite	2.8
	Chalcocite	18.7
	Covellite	2.3
	Enargite/Tennantite	0.4
	Cu-Metal	0.2
	Galena	0.1
	Sphalerite	0.1
	Molybdenite	1.9
	Pyrite	31.9
Silicates, Oxides, Carbonates, and Other	Iron Oxides	1.5
	Quartz	4.2
	Muscovite/Illite	7.9
	Plagioclase Feldspar	2
	K-Feldspars	0.7
	Chlorite	2.6
	Biotite/Phlogopite	0.8
	Kaolinite	0.5
	Tourmaline	0.2
	Others	1.3
Total		100

Molybdenum Concentrate

Class	Mineral	Mass (%)
Sulfides	Chalcopyrite	2.52
	Bornite	0.2
	Chalcocite	1.3
	Covellite	0.8
	Enargite/Tennantite	0.1
	Cu-Metal	<0.1
	Galena	0.1
	Sphalerite	<0.1
	Molybdenite	77.8
	Pyrite	1.4
Silicates, Oxides, Carbonates, and Other	Iron Oxides	0.3
	Quartz	5.2
	Muscovite/Illite	2.7
	Plagioclase Feldspar	1.1
	K-Feldspars	1.3
	Chlorite	1.1
	Biotite/Phlogopite	0.2
	Kaolinite	0.5
	Tourmaline	0.2
	Others	2.9
Total		100

Based on BML experience, the copper sulfide liberation levels are far below typical copper concentrates. However, the presence of high-grade secondary copper minerals results in copper concentrate grades near industry averages. The results indicated that additional regrinding of the cleaner concentrates may improve the concentrate grade.

The molybdenum concentrate contained 78% by weight molybdenite (46.7% Mo). This was also far below normal industrial levels based on BML experience. The main diluents were quartz, muscovite/illite, copper sulfides, and pyrite. The molybdenite in the concentrate was approximately 85% liberated when assessed in two dimensions. Desirable commercial concentrates typically have liberation levels over 92% and impurity levels of less than 10%. The impurities in the sample are present as interlocked particles. Regrinding will be needed to improve the quality of the concentrate at MVC.

13.4.2.4 Efficiency of Process

The overall efficiency of the process was estimated by examining the mineralogy of the exit streams. This is accomplished by calculating the liberation of the feed using the material balance of the circuit and the liberation data of the exit streams. This can be compared to the measured feed liberation to determine the net change. Table 13-8 presents the effect of grinding on mineral liberation.

Table 13-8: Effect of Grinding on Mineral Liberation

Mineral Status	Measured Feed (159 µm P80)				After Grinding (136 µm P80)			
	Cs	Md	Py	Gn	Cs	Md	Py	Gn
Liberated	22.0	47.0	73.7	98.8	34.4	45.9	80.7	99.0
Binary - Cs	-	0.6	3.1	0.7	-	3.5	2.4	0.7
Binary - Md	0.0	-	0.0	0.0	0.1	-	0.0	0.0
Binary - Py	3.1	1.3	-	0.4	4.0	0.6	-	0.3
Binary - Gn	71.9	47.8	19.6	-	59.4	44.8	15.2	-
Multiphase	2.8	3.3	3.2	0.0	2.0	5.2	1.4	0.0
Total	100	100	100	100	100	100	100	100

Notes: 1) Cs – Copper Sulfides, Md – Molybdenite, Py – Pyrite, Gn - Non-Sulfide Gangue including Iron Oxides.
2) Values shown are mineral liberation percent of total mineral in the feed as two-dimensional values.
3) Measured feed is calculated from the feed measurements on the CQNS and TEN feed measurements.
4) The after-grinding values are calculated by using the material balance and liberation analyses on the process exit streams.

The applied grinding changed the feed sizing from 159 µm P_{80} to 136 µm P_{80}. This change in grind size increased copper sulfide liberation from 22.0 to 34.4%. There was no measurable change in molybdenite liberation. In general, this level of liberation is insufficient to achieve high levels of rougher flotation recovery. Finer primary grinding is required to improve rougher recovery.

Table 13-9 presents overall mineral recovery by liberation status. The data indicated that the plant recovers 45% of liberated copper and only 7% of the copper sulfides interlocked with non-sulfide gangue (quartz, etc.). The losses of liberated copper sulfide are confined to the very finest size fraction.

Table 13-9: Mineral Recovery by Class to Process Streams

Mineral Status	Mineral Liberation-2 Dimensions			
	Copper Sulfides	Molybdenite	Pyrite	Gangue
Copper Concentrate				
Liberated	45.1	20.4	3.7	<0.1
Binary – Cs	-	27.7	39.9	2.2
Binary – Md	62.2	-	95.2	1.0
Binary – Py	64.3	75.5	-	0.6
Binary – Gn	6.8	2.5	0.8	-
Multiphase	20.8	9.7	14.5	6.9
Moly Concentrate				
Liberated	<0.1	18.7	<0.1	<0.1
Binary – Cs	-	16.5	<0.1	<0.1
Binary - Md	13.1	-	4.8	0.6
Binary - Py	<0.1	24.5	-	<0.1
Binary - Gn	<0.1	1.4	<0.1	-
Multiphase	0.3	4.4	0.1	0.2
Tailings				
Liberated	54.9	60.9	96.3	100.0
Binary - Cs	-	55.8	60.1	97.8
Binary - Md	24.7	-	<0.1	98.5
Binary - Py	35.6	<0.1	-	99.4
Binary - Gn	93.2	96.1	99.2	-

	Mineral Liberation-2 Dimensions			
Mineral Status	Copper Sulfides	Molybdenite	Pyrite	Gangue
Multiphase	78.9	85.9	85.5	92.9

Liberated molybdenite recovery was poor, recovering only 19% of the liberated particles to the molybdenite concentrate. Interlocked forms of molybdenite were also poorly recovered.

As a result of the liberation recovery analysis, a detailed investigation of the losses to tailings was performed. Figure 13-11 presents the distribution of losses by size and mineral class from copper sulfides and molybdenite. Figure 13-12 presents the quality of the particles by the same size classes.

Figure 13-11: Tailings Liberation Characteristics

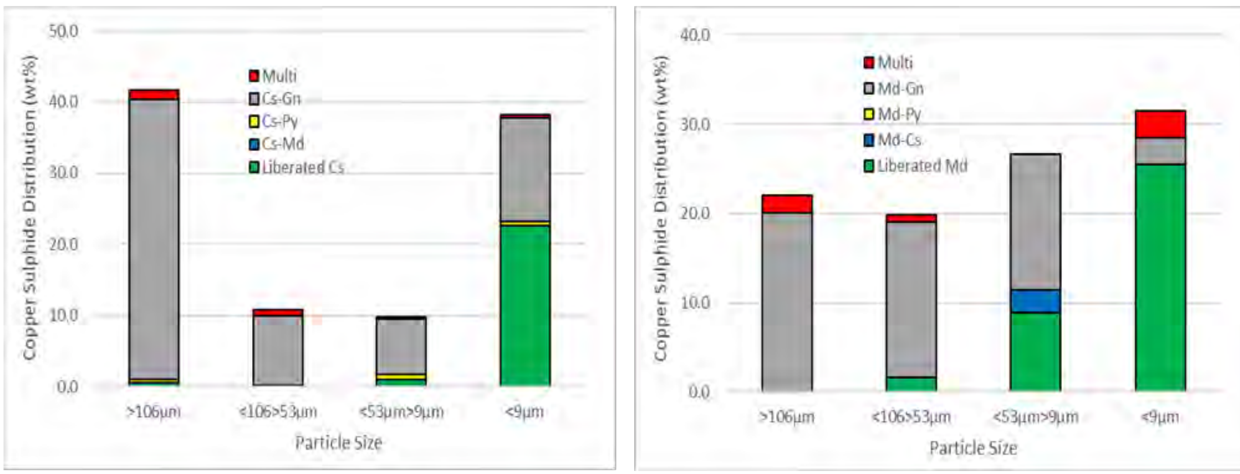
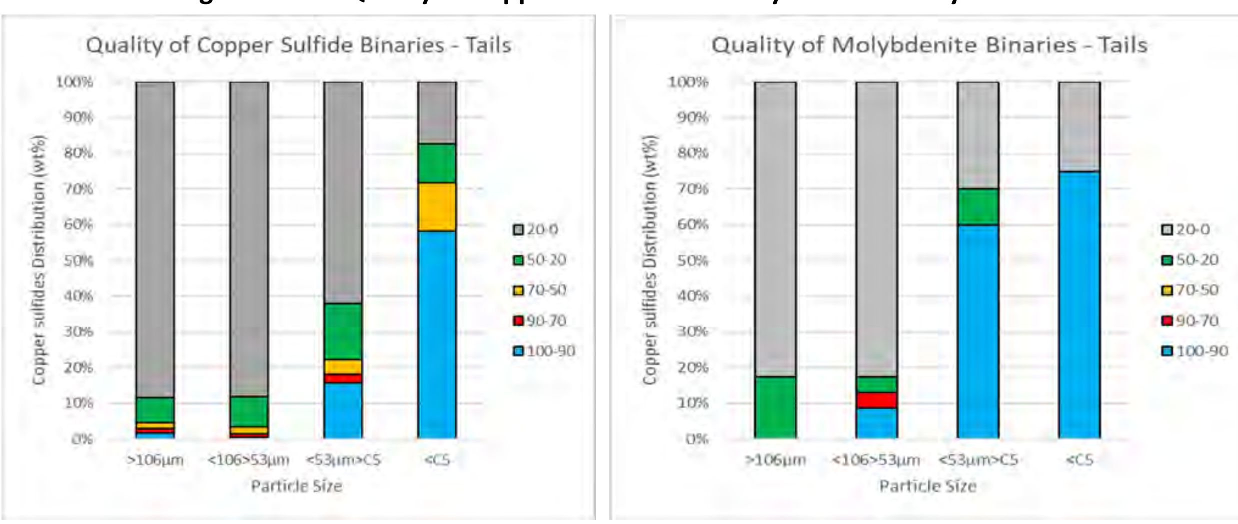


Figure 13-12: Quality of Copper Sulfides and Molybdenite Binary Particles



Copper sulfide losses were bimodal: coarse particles interlocked with non-sulfide gangue or as fine liberated particles. The coarse locked particles have insufficient copper sulfide content to allow recovery to the concentrate. As indicated previously, a finer grind is required to change the particle grade to allow recovery.

For molybdenite, the losses are shifted more to the fine particle size range. This is a common phenomenon, the recovery of very fine molybdenite is challenging. The use of specific collectors should be investigated to improve the flotation performance of this class of particles.

13.4.2.5 Metallurgical Testing of Process Streams

As shown in Table 13-4, both copper and molybdenum recoveries were low; copper was 23% recovered into a copper concentrate, at a concentrate grade of 26% copper. Molybdenum had a 10% recovery to a molybdenum concentrate, assaying 47% molybdenum. About 12% of the feed molybdenum was reporting to the copper concentrate.

The two feed samples were sized by a 106 µm sieve to obtain two fraction sizings: +106µ m, representing the cyclone underflow, and -106 µm, representing the overflow material. The majority of the test work was conducted on the coarser fraction size. Several tests were conducted on a blended composite of 75% coarser material and 25% of the fines. A bulk copper/moly concentrate sample designated Bulk Con 2 was also provided to evaluate copper and molybdenum separation.

After the samples were screened, chemical analysis was conducted on the +106 and -106 size fractions as well as on the Bulk Concentrate. A metallurgical balance was calculated for each of the feed samples, showing the distribution of elements of interest in each size fraction. The metallurgical balance for each feed, along with individual assays are shown in Table 13-10.

Table 13-10: Assay of Screened Samples

		Assay (%)				Distribution (%)			
	Mass (%)	Cu	S	Fe	Mo (g/t)	Cu	S	Fe	Mo
TEN +106	39	0.17	2.66	1.3	95	49	30	23	54
TEN - 106	61	0.11	4.00	2.7	51	51	70	77	46
TEN Feed	100	0.13	3.48	2.2	68	100	100	100	100
CQNS +106	31	0.34	2.57	0.9	225	48	24	30	30
CQNS -106	69	0.16	3.66	0.9	234	52	76	70	70
CQNS Feed	100	0.22	3.33	0.9	231	100	100	100	100
Bulk Con 2	100	31.0	24.2	33.1	11638	100	100	100	100

About 39% of the TEN sample reported to the coarser fraction size, which contained almost half the copper and just over half the molybdenum. The fines contained about 75% of the sulfur and iron, indicating that the majority of the pyrite from the feed was present in the finer size fraction.

Similarly, for the CQNS, about 30% of the feed mass was in the coarser size fraction which contained just under half of the copper. In this composite, however, only 30% of the feed molybdenum reported to the coarser size fraction, but at a much higher molybdenum grade. Again, almost 70% of the pyrite appeared to be in the fines. The Bulk Con 2 sample measured approximately 31% copper and 1.2% molybdenum.

A series of rougher tests were conducted on the coarser size fraction of the two tailing samples similar to the feed to the plant rougher circuit. These tests were used to measure baseline performance and determine the effect of primary grind sizing on the coarser fraction of each feed sample. The results are presented in Figure 13-13 to Figure 13-16.

Figure 13-13: Effect of Primary Grind Size on TEN +106 Size Fraction - Copper

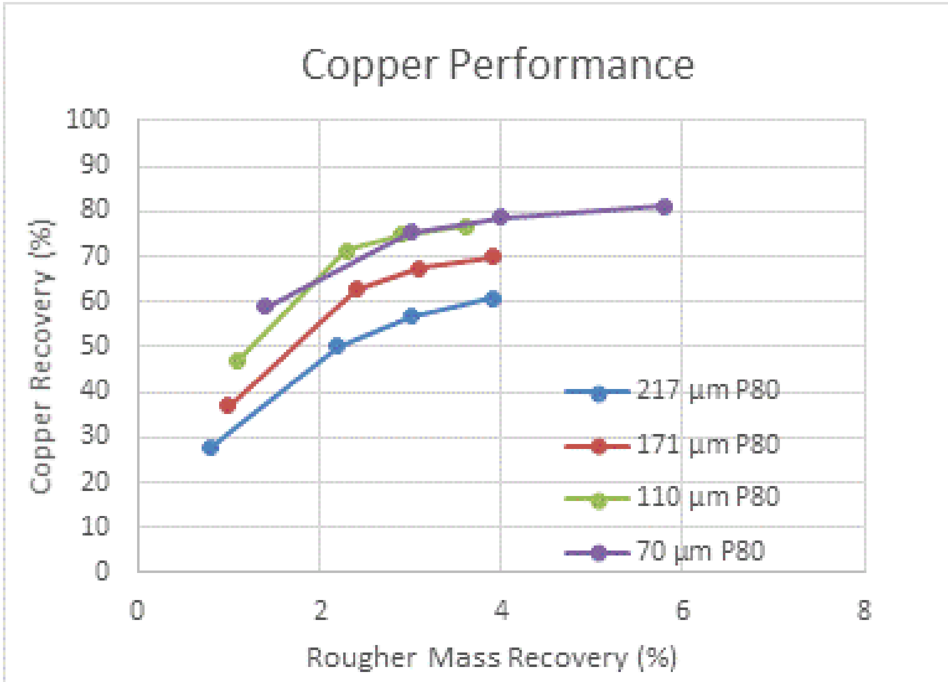


Figure 13-14: Effect of Primary Grind Size on TEN +106 Size Fraction – Molybdenum

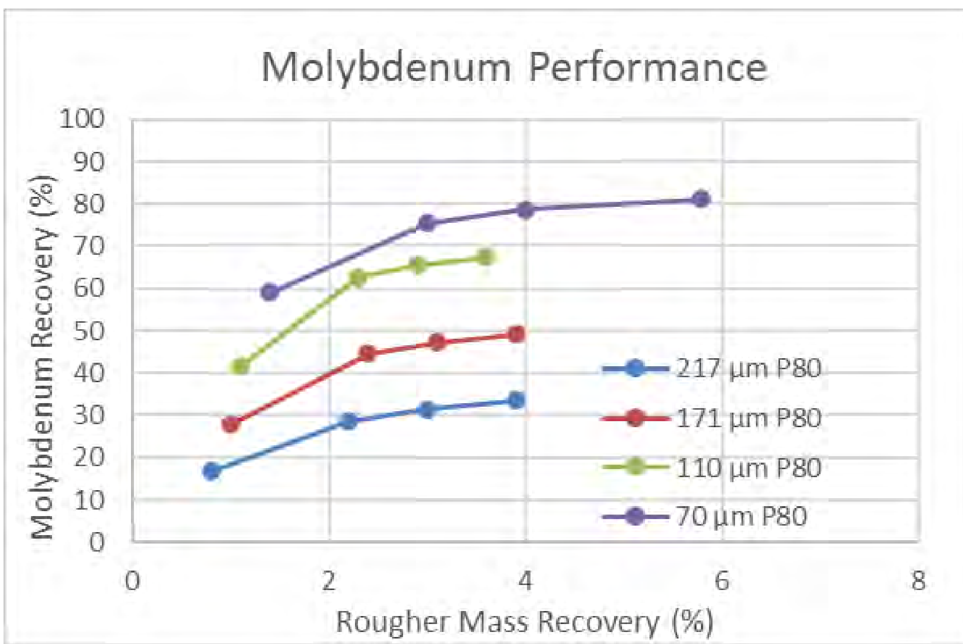


Figure 13-15: Effect of Primary Grind Size on CQNS Performance – Copper

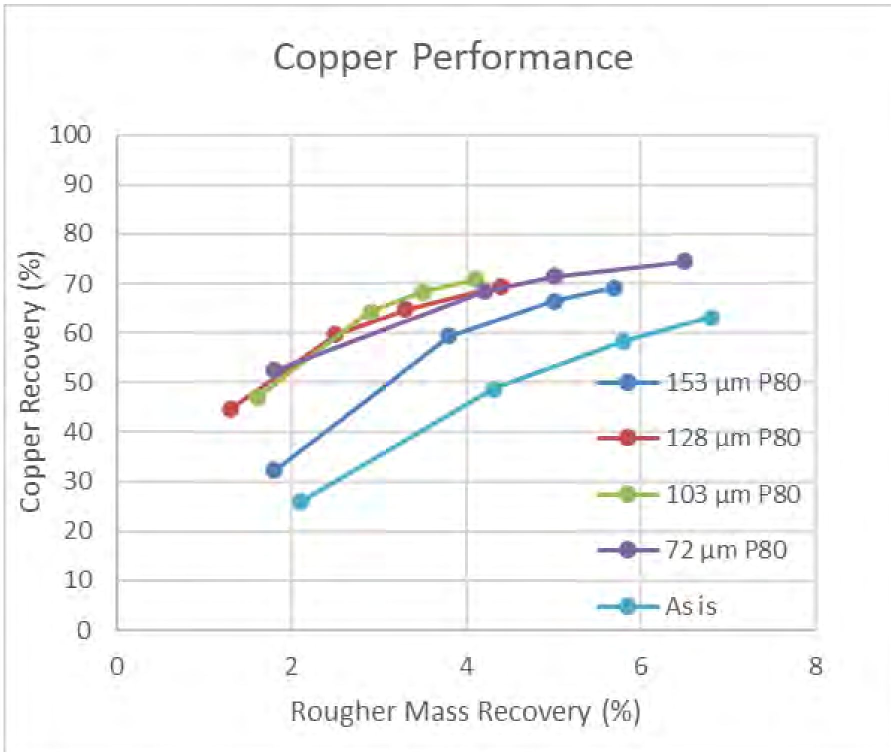
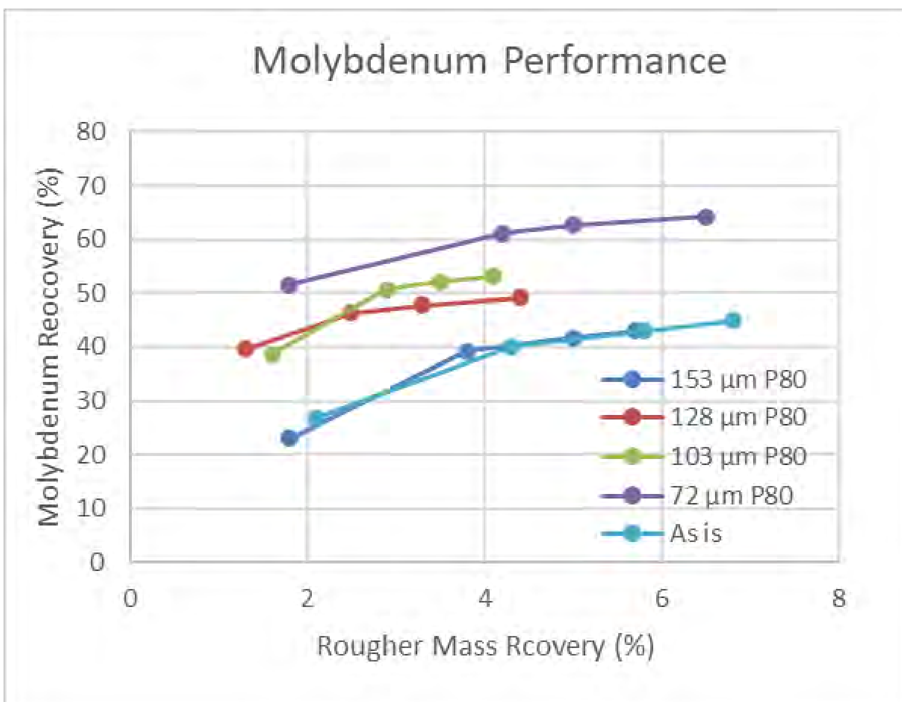


Figure 13-16: Effect of Primary Grind Size on CQNS Performance – Molybdenum



The primary grind size over the range of 72 and 217 µm P80 was investigated for both samples. Tests were conducted at a pulp pH of 8, modified using lime. The reagents used included Aero 3477, which is a strong dithiophosphate, and MolyFlo, a hydrocarbon-based molybdenum collector. As indicated by the mineralogical analysis on the feed material, liberation for copper in the sample is poor, and further grinding and liberating the copper particles would be necessary to obtain an adequate recovery. The rougher tests confirmed this.

For the TEN sample, primary grind size had a significant impact on both copper and molybdenum flotation. By decreasing grind size to 110 µm P_{80}, the copper rougher mass-recovery profile shifted significantly, and copper recovery to the rougher concentrate increased to 77%. Further grinding to 72 µm P_{80} did not improve rougher recovery significantly.

Finer primary grinding on the TEN sample also had a significant impact on molybdenum recovery to the rougher concentrate. At 110 µm P_{80} primary grind sizing, molybdenum recovery increased to 67%.

The CQNS had a different response to grinding. By decreasing the primary grind size to 128 µm P_{80}, a significant improvement in copper recovery to the rougher concentrates was obtained. However, grinding finer had no significant benefit to copper performance. A single test conducted on the sample without primary grinding had a very poor response, indicating that some grinding was necessary to selectively recover copper and molybdenum from the feed.

A series of rougher tests were conducted on the -106 µm samples (fines). These tests examined baseline conditions, as well as pH 10.5 and the use of sodium hydrosulfide (NaHS) as a sulfidizing agent to reverse the effects of oxidation. Results are displayed in Figure 13-17 through Figure 13-20.

Overall, results were very poor for the TEN fines fraction. At baseline conditions, using 3477 and at pH 8, both copper and molybdenum had 42% recovery into a rougher concentrate, at an 11% mass pull. No discernible benefit was observed with increased pH or change in the collector.

Figure 13-17: Effect of pH and NaHS on TEN Fines – Copper

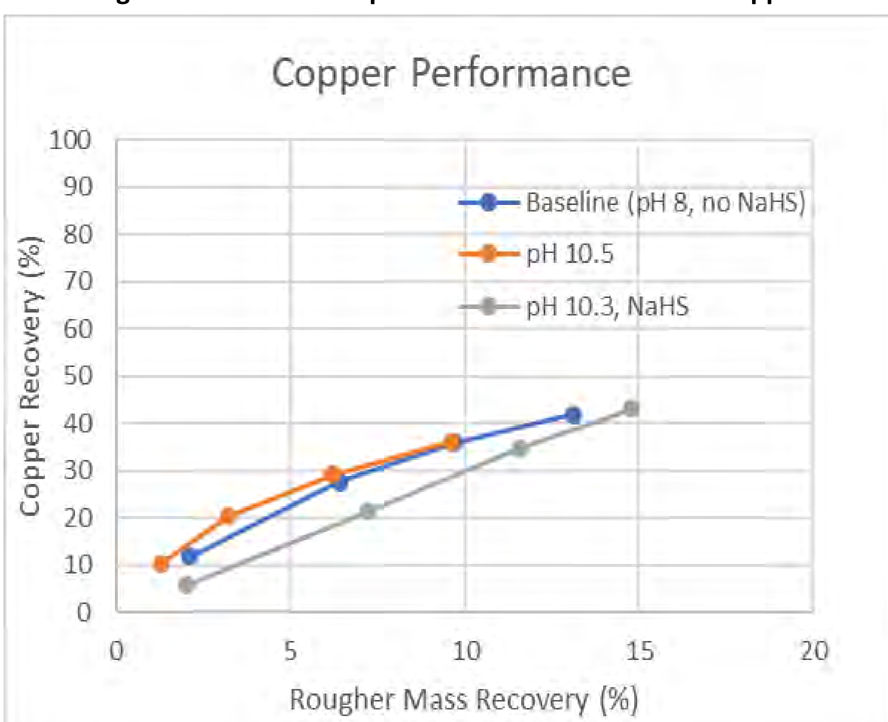


Figure 13-18: Effect of pH and NaHS on TEN Fines - Molybdenum

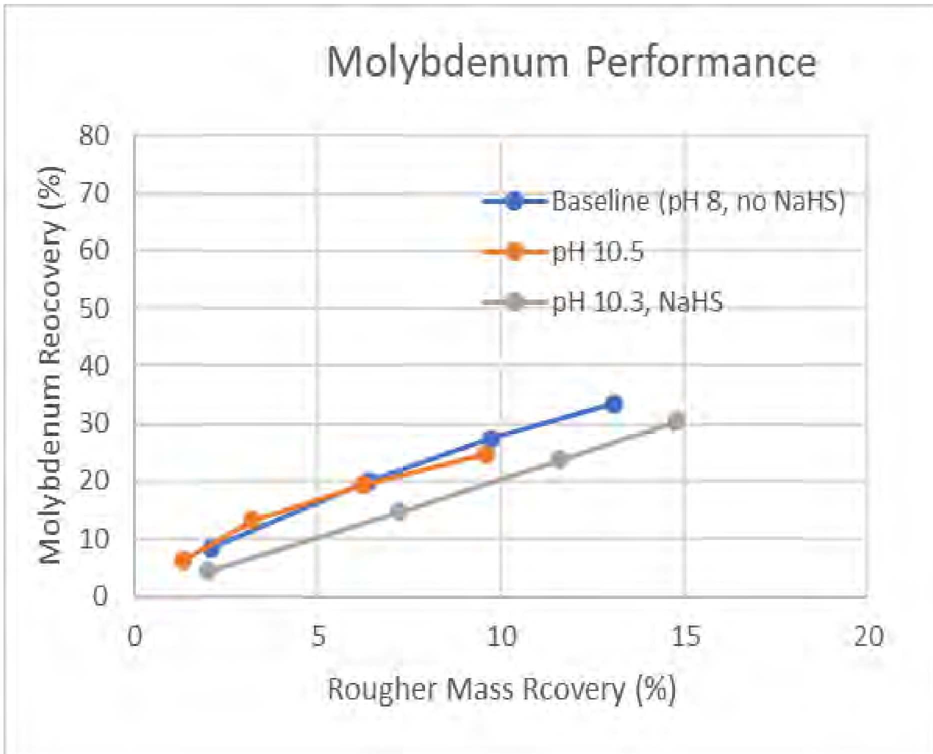


Figure 13-19: Effect of pH and NaHS on CQNS Fines - Copper

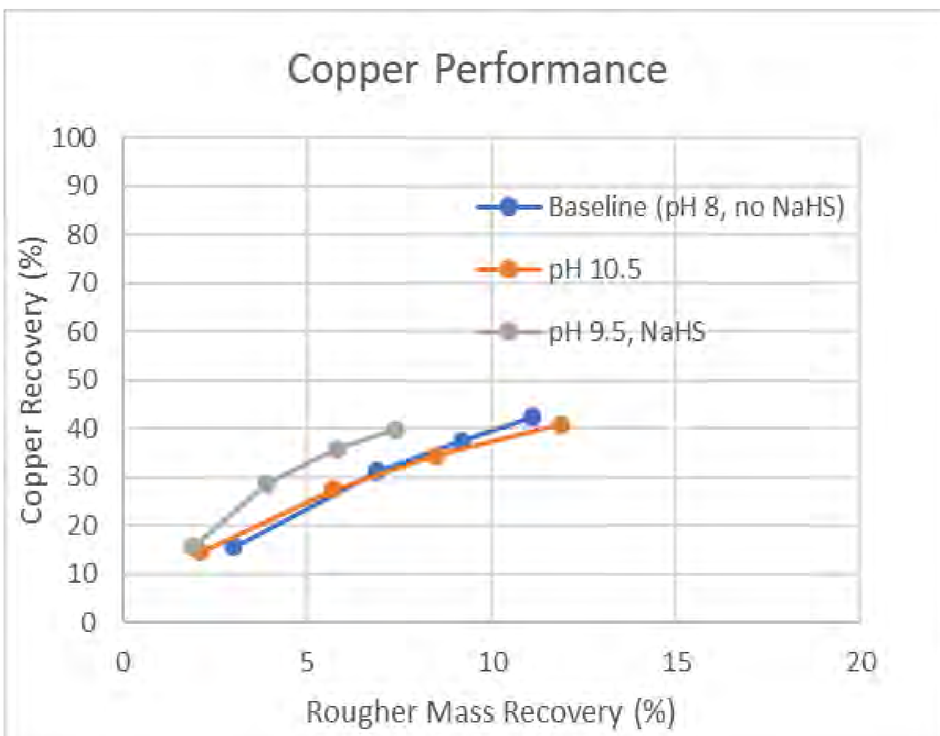
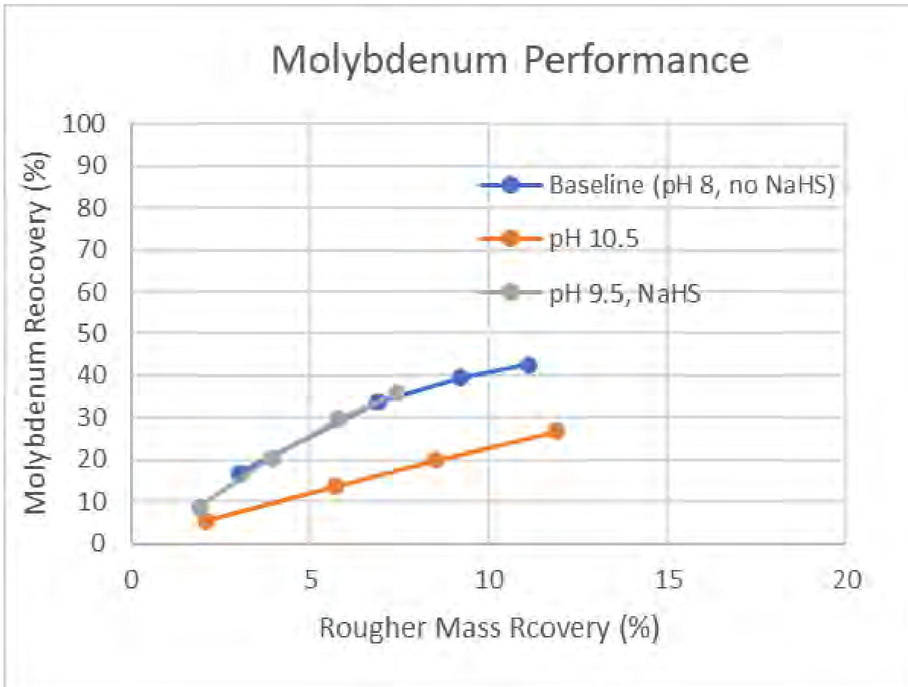


Figure 13-20: Effect of pH and NaHS on CQNS Fines – Molybdenum



For CQNS, slightly better initial copper rougher kinetics were obtained at pH 9.5 with NaHS, however, final copper rougher recovery did not improve. Copper recovery was 32% into a concentrate containing about 14% of the feed mass. The data indicate that recovery is very linear with mass pull and that high recoveries will warrant very high mass concentrates of low grade.

A limited number of cleaner tests were conducted on the TEN +106 µm and CQNS +106 µm samples, ground to 110 µm P_{80}, and 128 µm P_{80}, respectively. These grind sizes were selected as optimal from the rougher test series. The parameters investigated include regrind size as well as reagent type.

The best copper recovery for the TEN sample was 58% into a final concentrate, assaying 26% Cu (Figure 13-21). Molybdenum had 47% recovery, assaying 1.2% (Figure 13-22). These results support the mineralogical findings: improving the liberation levels of the coarse fraction will result in improved metallurgical performance.

The copper cleaner performance of the CQNS sample was very good, with 57% recovery from the feed into the concentrate, assaying 34% copper (Figure 13-23). For this sample, molybdenum recovery was lower than that of TEN at 40% recovery, but at a higher final grade of 1.8% molybdenum (Figure 13-24).

The range of regrind sizes was limited. Additional testing was curtailed to conserve sample mass for locked cycle testing. Finer regrinding slightly improved both copper and molybdenum performance for both samples. Regrind target sizes of 22 to 24 µm P_{80} produced the best results with concentrate grades above 25% copper.

Figure 13-21: Copper Cleaner Performance – TEN

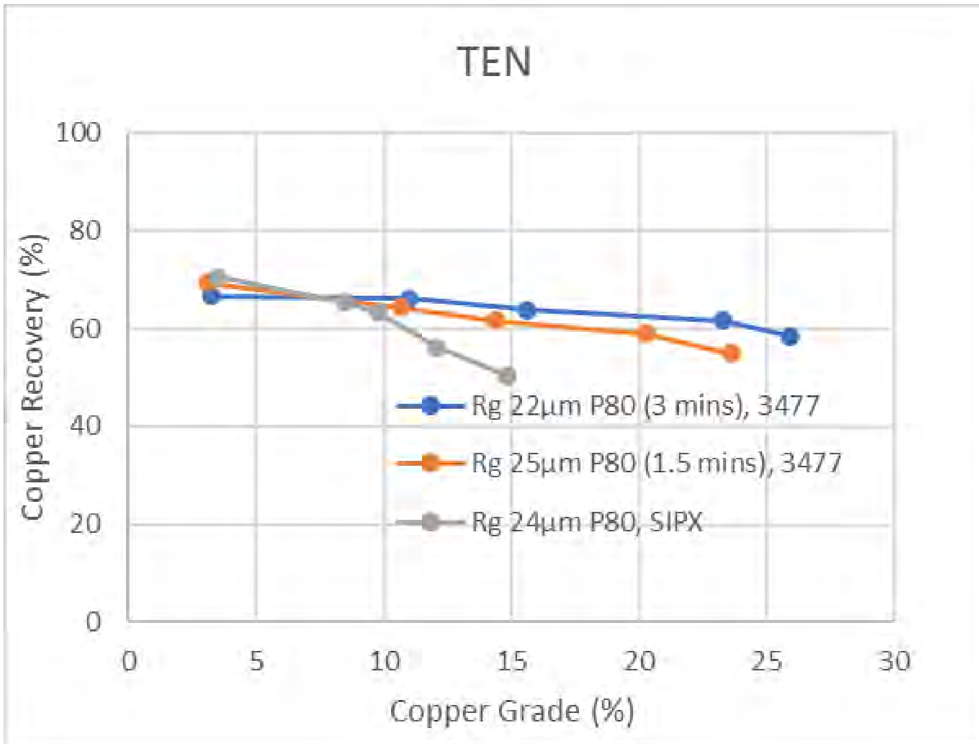


Figure 13-22: Copper Cleaner Performance – CQNS

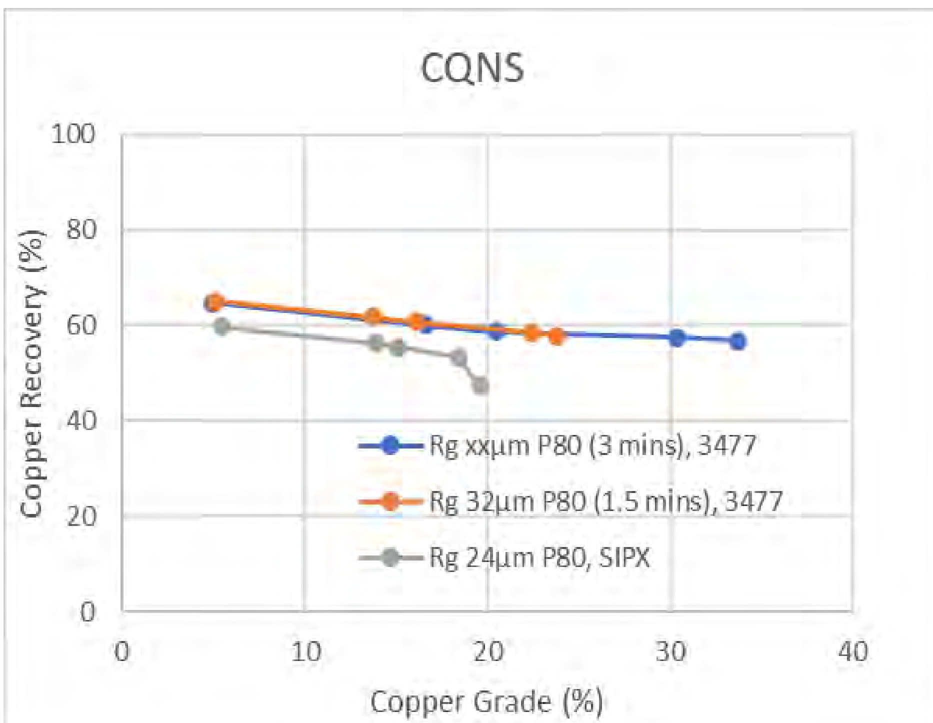


Figure 13-23: Molybdenum Cleaner Performance - TEN

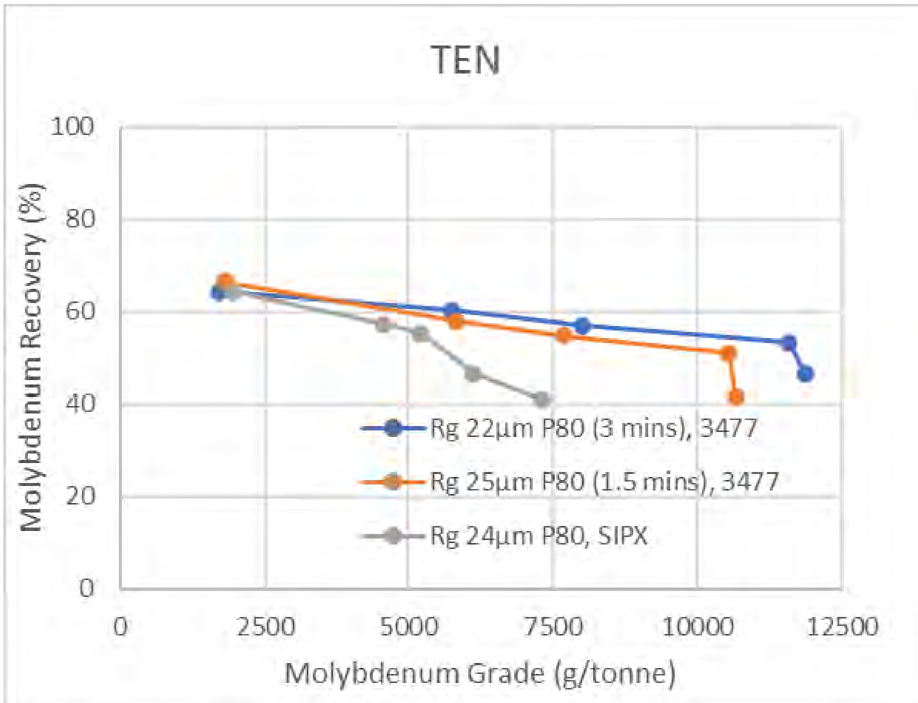
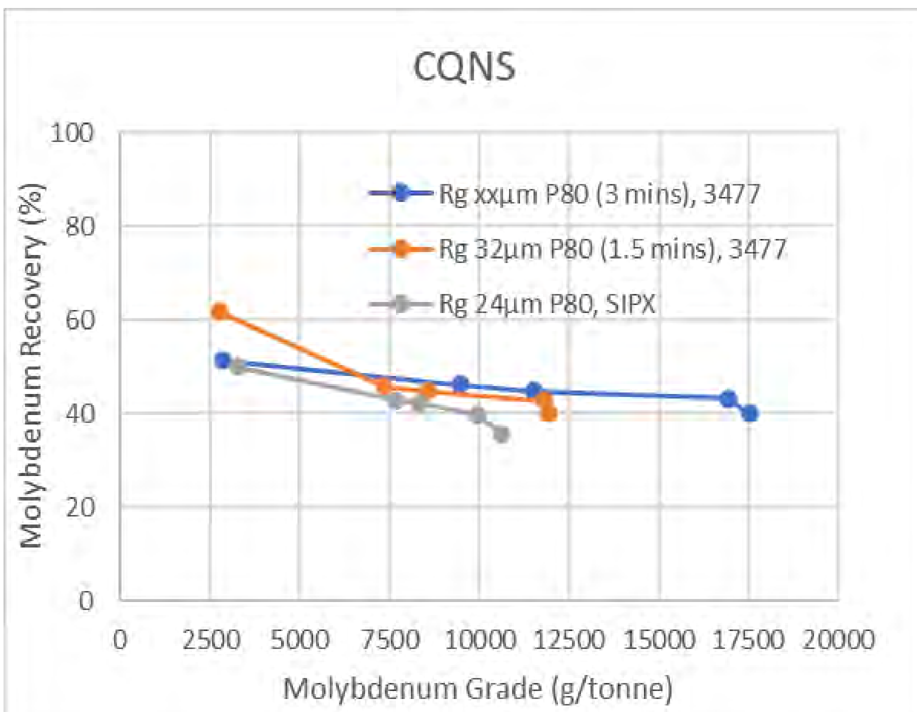
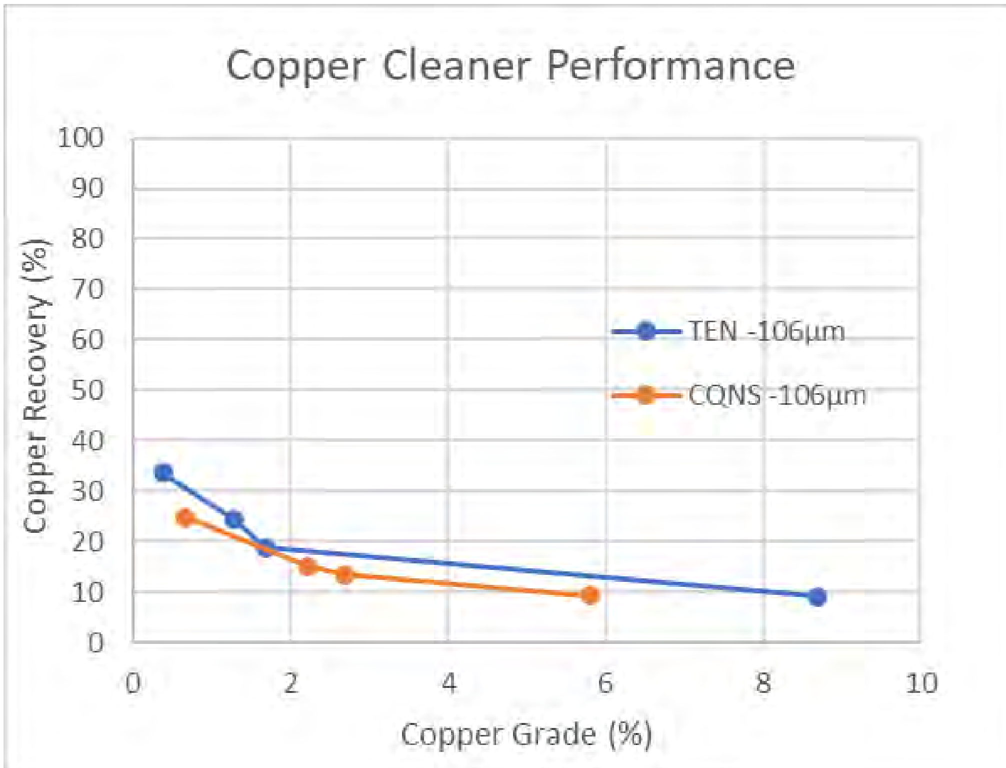


Figure 13-24: Molybdenum Cleaner Performance – CQNS



Similar to the rougher tests, the cleaner performance of the undersize feed sample was very poor for both samples. Copper and molybdenum recovery from the TEN -106 µm samples were 9.1 and 4.0%, respectively, at a final concentrate grade of only 8.7% copper and 1881 ppm molybdenum (Figure 13-25).

Figure 13-25: Copper Cleaner Performance



For the CQNS -106 µm sample, results were also poor, with copper and molybdenum recoveries of 9% and 11%, respectively, at a final concentrate grade of 5.8% copper and 9579 ppm molybdenum (Figure 13-26).

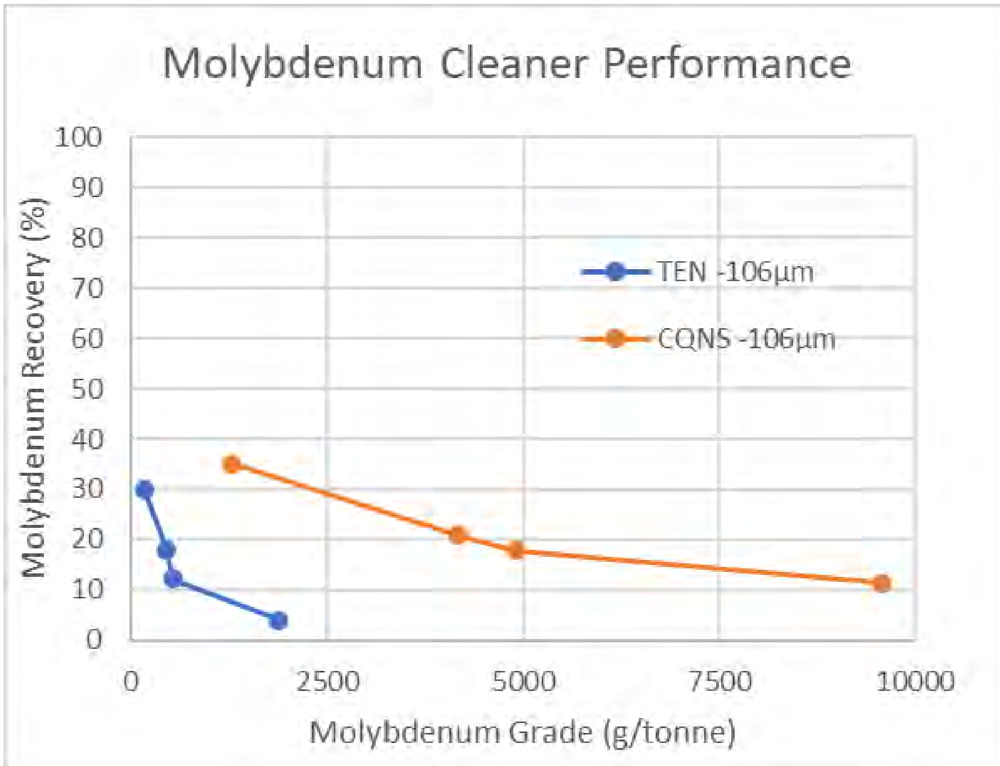
The results of this limited testing campaign on the fines stream demonstrated very poor performance. It also confirmed the supposition that this stream should not be blended with the coarse cleaner stream. The very low recoveries and very poor concentrate grade would be detrimental if combined. There does not appear to be any economic benefit in continuing to operate the fines flotation circuit.

To estimate the effect of grinding on the plant coarse fraction a blended sample consisting of 75% +106 µm and 25% -106 µm material was constructed to simulate the cyclone bypass similar to the plant. TEN and CQNS blend test results are presented in Figure 13-27 to Figure 13-28 and Figure 13-29 to Figure 13-30, respectively.

For both samples, 25% addition of the undersize samples decreases both copper and molybdenum batch cleaner test performance at the conditions tested.

The combined samples from each composite were subject to a single locked cycle test. These tests evaluated closed circuit conditions. To help improve the concentrate grade and performance over the batch test, the tests were conducted at higher pH levels and finer regrind sizings. The objective was to define the base case performance of increased coarse grinding and more selective chemical conditions.

Figure 13-26: Molybdenum Cleaner Performance



Copper from the TEN sample was 56% recovered into a concentrate, assaying 22% copper. Molybdenum was 46% recovered into this concentrate, assaying 1.0% molybdenum. Copper from the CQNS sample was 52% recovered into the final concentrate, assaying 33% copper. Molybdenum was 36% recovered into a concentrate grading 1.8% molybdenum.

Applying the recoveries obtained in these tests to the coarse fractions and 25% mass recovery of the fines, the overall plant performance would be about 32% copper recovery to an average copper concentrate grade of about 28% copper. This assumes that no concentrate is produced from the fines fraction.

Figure 13-27: TEN Copper Blend Performance

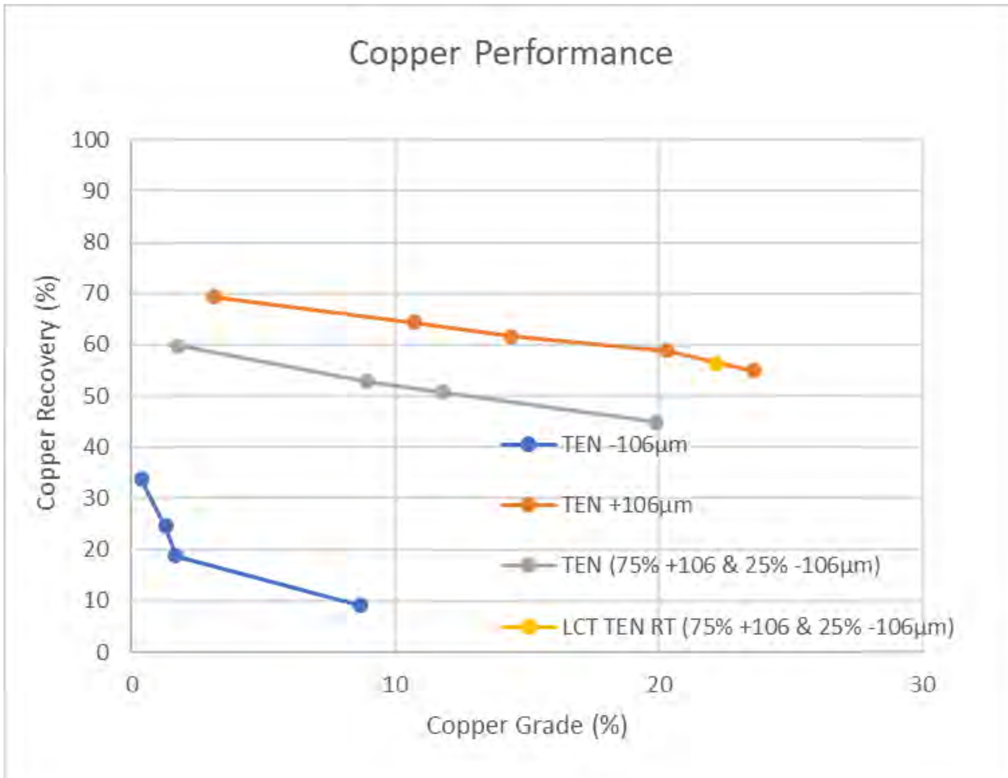


Figure 13-28: TEN Molybdenum Blend Performance

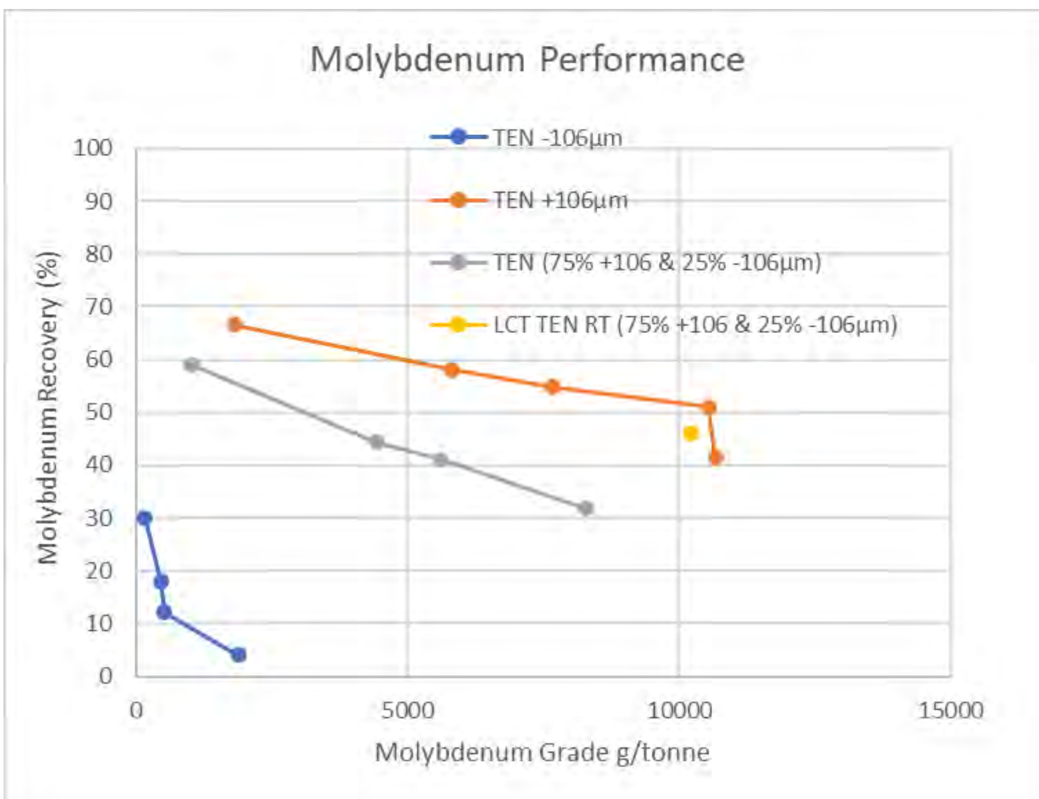


Figure 13-29: CQNS Copper Blend Performance

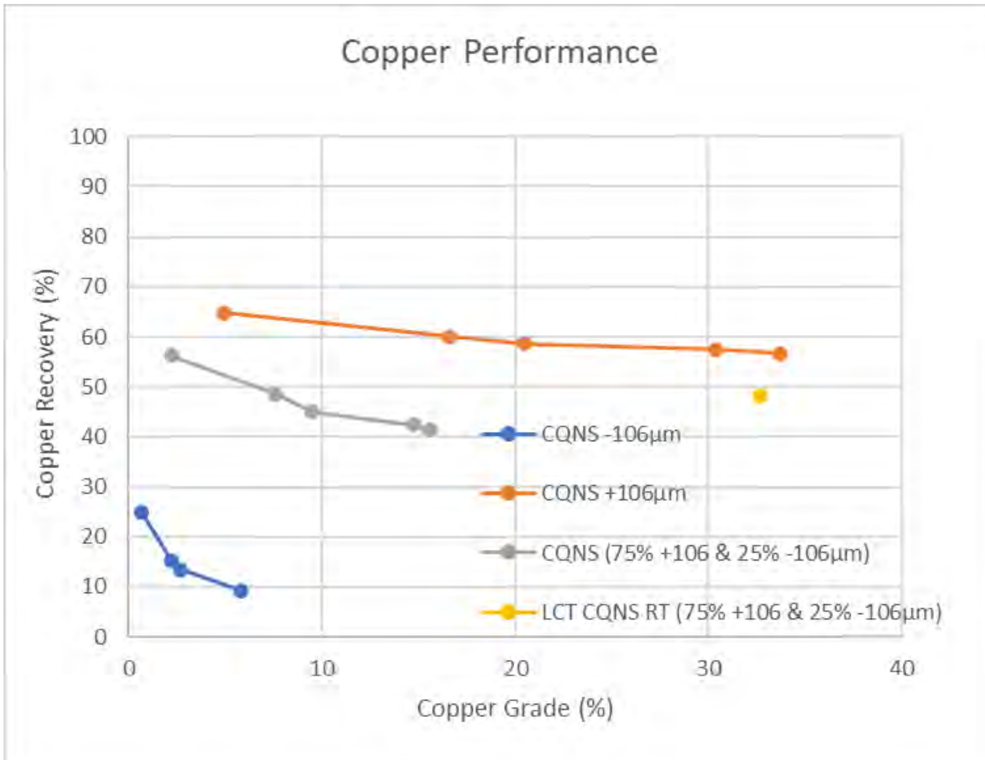
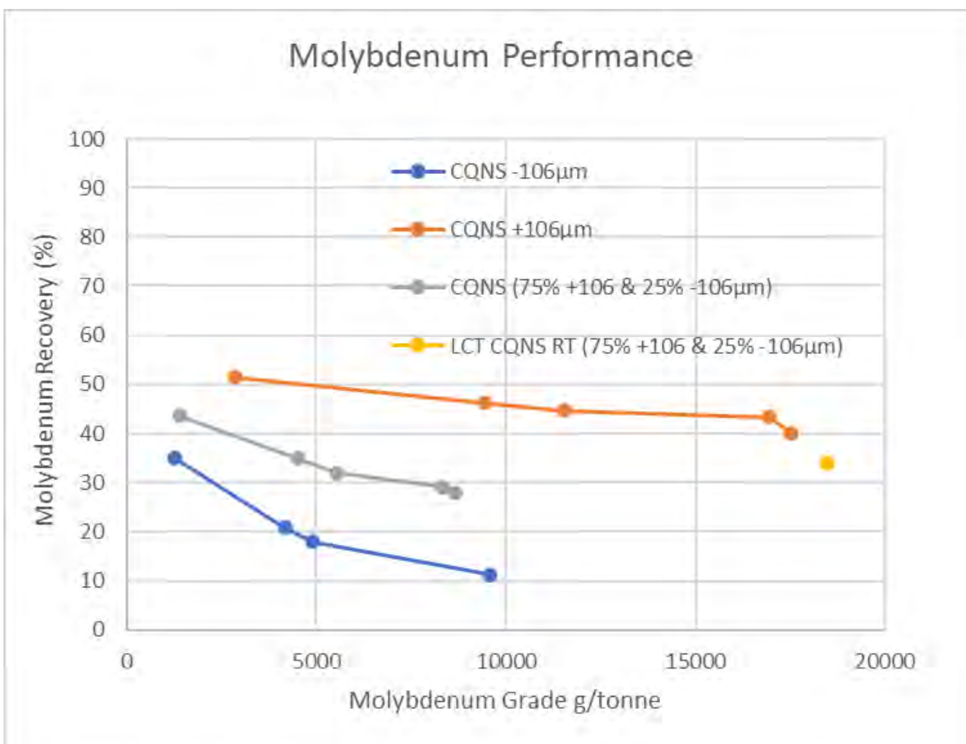


Figure 13-30: CQNS Molybdenum Blend Performance



13.4.2.6 Gravity Testing

Mineralogical testing had indicated the presence of native copper in the TEN feed sample. This form of copper usually does not respond to conventional flotation. Gravity separation was trialed on a limited basis. The coarse (TEN +106 µm) sample was subject to a Knelson gravity test, followed by gravity concentration of the Knelson concentrate via a Mozley table. Copper from the TEN oversize feed was 20% recovered into a Knelson concentrate, assaying 0.8% copper. It was further concentrated via a Mozley table, resulting in a final recovery of 5% at a grade of 2.7% copper. The results determined that the use of a gravity circuit alone would not be beneficial for these samples.

13.4.3 AGD Grinding Analysis – September 2020

AGD was commissioned by 911 Metallurgy Corp on behalf of MVC to examine the primary grinding circuit power distribution (Alex G. Doll Consulting Ltd., 2020). This analysis was undertaken as a result of the test work conducted by BML that examined the optimum liberation sizes of the two tailings streams (Base Metallurgical Laboratories, 2020).

The BML flotation test work supported a target P80 of 110µm for El Teniente tailings and 130 µm for Cauquenes tailings. These laboratory results were substantially different from the plant survey results provided to AGD showing particles sizes of approximately 170 µm for TENand 94 µm for CQNS in the existing grinding circuits.

The plant survey also indicated that the primary classification efficiency was generally poor and the underflow densities feeding the ball mills were too dilute and contained too many bypassed fines. AGD recommended that the CQNS deslime hydrocyclone underflow be re-routed to the mill discharge pump boxes to provide additional classification before milling, basically establishing a “reverse mill circuit.” No change in the flow patterns was necessary for the TEN tailings.

AGD fit various grinding metrics to the plant survey data and varying results were observed. The analysis of the data from August 2020 revealed a very large variability in operating work index between grinding lines, suggesting that some grinding lines (e.g. mill № 8) consume a third more power than supposedly duplicate grinding lines (mill № 6). This indicated an opportunity to maximize grinding efficiency across all the mills and improve the overall liberation. Further, site electrical operating practices appeared to be limiting the power draw of the grinding mills at approximately 4% below available power. AGD recommended adjusting the motor power draw to compensate for the mechanical losses in the motor of approximately 4%. This was investigated by the site electrical engineers and was deemed unfeasible post-analysis.

AGD provided the potential power distribution based on the analysis:

- CQNS: grind to a coarser 130 µm product versus the survey results of 94 µm, which would reduce the power requirements by 30%
- TEN: grind to a finer 110 µm product instead of the survey results of 170 µm, which would increase the power requirements by 60%.

Reconfigure the grinding mills with mill 5 and 6 switched to TEN duty.

- CQNS: route the primary hydrocyclone product to the ball mill discharge pump box and also improve the ball mill cyclones which would increase CQNS throughput by 30%.
- TEN: improve ball mill hydrocyclone operation which would increase TEN throughput by 3%.

Ball Mill 7: replace the motor with one rated for 4200 kW (5650 HP, currently 3850 HP). This will add about 12.8 kt/d at a 130µm P80 product size.

Switch regrind mill 1 to CQNS primary grinding duty if the motor replacement on ball mill 7 does not provide enough of a throughput gain to meet the target throughput. However, because regrind is vital for MVC performance, the regrind mill 1 was ultimately maintained as a regrind mill.

AGD indicated that optimizing the grinding circuits could result in a 20% increase in throughput for CQNS and 30% for TEN.

As a result of these recommendations and the flotation recovery data provided by BML, MVC undertook to replace the existing primary cyclone system and rebalance the grinding mill power. Further, as a result of improved primary cycloning, the need for secondary cycloning was eliminated. The size separation was vastly improved, the grind was optimized for each tailings stream and the overall flowsheet was simplified.

One major result of this program (as well as reconfiguration of the flotation circuit) was the ability to process the majority of the El Teniente tailings through the plant. An overall increase in tonnage of approximately 20% was achieved through the replacement of the primary cyclones and rebalancing the tailings distribution by reassigning mills to TEN from CQNS. Originally 5 mills were treating TEN tails and now an additional mill has been reassigned. A further mill conversion is planned later in 2021.

13.4.4 Orway Mineral Consultants Canada Ltd. Regrind Mill Sizing – July 2021

Orway Mineral Consultants Canada Ltd (OMC) was contracted to undertake a sizing of a regrind mill for MVC. MVC provided the previous Levin test work results and the process criteria. The milling circuit was designed as a closed circuit with cyclones, and a tower mill was MVC's preferred option for future installation.

The design parameters included a rougher concentrate rate of 300 tph at an unclassified feed size F80 of 63µm, with an ore SG of 3.1 and 27% solids w/w (ranging from 25 – 30% solids w/w). The target regrind product size is 80% passing 20 µm. OMC carried out modeling of the regrind circuit, and MVC also requested to include sizing of the cyclones and pumps.

13.4.4.1 Test Results

Two Levin regrind test works were carried out on two rougher concentrates at two different feed sizes. Results are summarized in Table 13-11 and shown in Figure 13-31.

Table 13-11: Levin Test Work Results Summary

Test 1 – BL844-CR1-2 CQNS		Test 2 – BL844-CR3-4 TEN	
Specific Energy, kWh/t	Product Size P80, µm	Specific Energy, kWh/t	Product Size P80, µm
0	62.7	0	107.0
10	45.7	10	46.9
20	27.7	20	34.9

Test 1 – BL844-CR1-2 CQNS		**Test 2 – BL844-CR3-4 TEN**	
Specific Energy, kWh/t	**Product Size P80, µm**	**Specific Energy, kWh/t**	**Product Size P80, µm**
30	24.0	30	28.2
40	21.5	40	25.1

Figure 13-31: Levin Test 1 Results

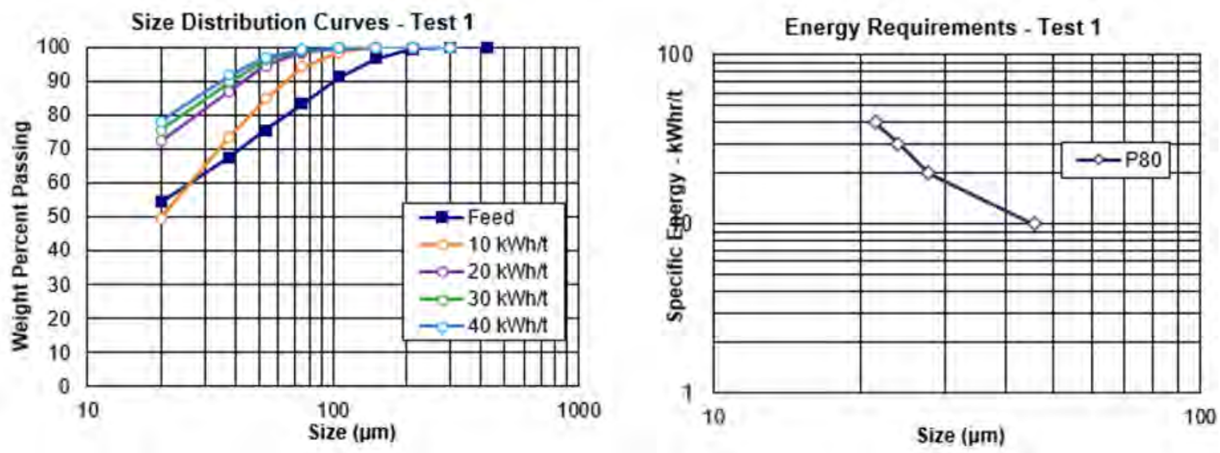
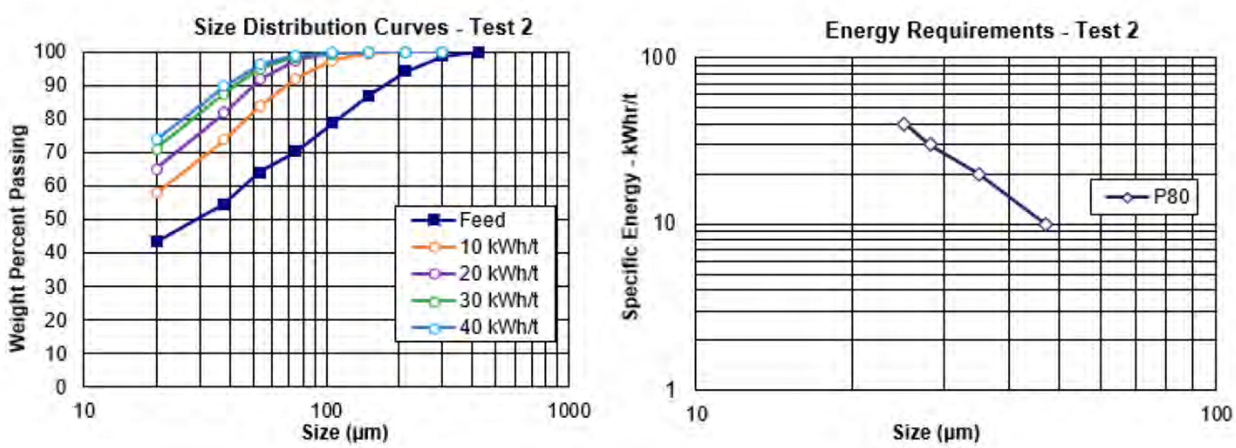


Figure 13-32: Levin Test 2



There was an abnormal slope change observed on the product size distribution (PSD) for the 10 kWh/t case, from Test 1, indicating some error in the test. In general, the Levin test is carried out on dry samples and the material may tend to bind and cake up in the mill when the product is too fine. If this occurs, then the Levin test results could overstate the power demand. Although the remaining results show a good correlation between the specific energy and product size, it may be worthwhile to consider wet testing of the slurry samples to confirm the energy demand.

Based on the circuit modeling conducted, for a 300 tph design feed rate, a 15,127 kW net milling power is required. Note that a typical 5% loss to the drivetrain is used to determine the minimum motor power required and a design contingency in the range of 5 – 15% was used to calculate the motor size required.

13.4.4.2 Proposed Regrind Mills

Either 5 x VertiMills, 3 x HIGMill6500, 5 x IsaMill15000, or 6 x VXP10000 mill would be acceptable depending on the existing layout and the plant space available. These mills can be operated in either open or closed-circuit configurations. For the open circuit, the rougher concentrate will be classified using cyclones. Cyclone overflow at the target product size will report a product storage tank or a conditioner tank, while the coarser cyclone underflow product will be ground to the product size using the regrind mills. The regrind mill discharge will report to the same storage tank and combine with the cyclone overflow product for downstream processing.

Different from the open circuit configuration, for the closed-circuit configuration, the regrind mill discharge will recycle back to the cyclone feed hopper, where it is combined with the fresh rougher concentrate for classification.

MVC requested to undertake modeling at a coarser product size, P80 of 30µm. The modeling results showed an averaged design-specific energy of 20.6 kWh/t for the P80 30µm target grind size. This value is significantly lower than the 50.4 kWh/t required to achieve a P80 20µm product. With the typical 5% loss to the drive train and a 5 – 15% design contingency, a design motor power in the range of 6.8 – 7.5 MW is required. Note that this 20.6 kWh/t specific energy and the 6.8 – 7.5 MW motor size are estimated for ultra-fine grinding mills.

OMC also analyzed the use of conventional ball mills for this regrind application at MVC's direction. Based on plant data obtained from similar operations, the regrind ball mill specific energy is 40 – 60% higher than expected from the direct Bond Rowland's formula. With the assumption that the regrind-specific energy calculated from the Levin's test results is comparable to the Bond's value, the regrind ball mill specific energy would be 28.8 – 32.9 kWh/t. Using the 5% loss to the drive train and a 10% design contingency, a total of 10.0 – 11.5 MW ball mill installed power is required to achieve the same target grind size. Given the power demand, an indicative Ø6.7m x 12.5m EGL ball mill with a 10.0 MW drive or a Ø7.3m x 11.8m EGL ball mill with an 11.5 MW will be required.

For closed-circuit configuration, 2 or 3 x VTM4500 units would be required. Two units provide a small (4%) contingency, and three units provide too much (56%) contingency. Alternatively, a combination of 2 x VTM3000 and 1 x VTM4500 provides acceptable power contingency with a total of 7.8 MW mill motor power. For this option, splitting the rougher concentrate slurry is challenging due to the uneven power demand of the three regrinding trains. For the open circuit configuration, either 1 x M50000 IsaMill; or 2 off the smaller size (i.e. 2 x M15000); or two off HIG3500 can be selected.

13.4.4.3 Proposed Cyclones and Pumps

The OMC modeling results indicate that twelve 250CVX10-73 cyclones will be required at the duty conditions for the open-circuit configuration, and fifty-four 150CVX106 cyclones for the closed-circuit configuration. For the open circuit configuration, a single cyclone cluster with a total of 16 cyclones can be used. Cyclone underflow can be split to feed the regrind mills as required.

The number of cyclones required for the closed-circuit configuration is high, depending on the mill type and the number of mill selection, the number of cyclones can be divided for each train. These regrinding trains will be operated in parallel to achieve the final product size.

The modeling results for the conventional ball mill application indicate that eight 400CVX10-111 cyclones will be required at the duty conditions for the open-circuit configuration, and twenty-four 250CVX10-73 cyclones for the closed-circuit configuration. For the open circuit configuration, a single cyclone cluster with a total of twelve cyclones can be used. Cyclone underflow can be split to feed the regrind mills as required. The total number of cyclones required for the closed-circuit configuration is thirty; including twenty-four duty and six standbys. These cyclones can be split evenly between the three regrinding trains, which will be operated in parallel to achieve the final product size.

13.4.4.4 Regrind Upgrades – Plant Changes

The MVC plant had an existing regrind mill that was employed for bank 1000 treatment, this was the treating concentrate stream from the Cascades and cleaner tails. When bank 1000 was repurposed as a primary rougher, the attached regrind mill became available and was switched to bulk rougher concentrate regrinding effectively doubling the available regrind power. A P80 of approximately 50µm is now achieved for concentrate cleaning.

13.4.5 Base Metallurgical Laboratories Test Work – May 2021

This (Base Metallurgical Laboratories, 2021) BL0707 test was work focused on the fine/coarse Flotation of TEN and CQNS samples. Effects of regrind on copper and molybdenum recovery were analyzed. Samples for this program were received in January 2021, with an additional sample arriving in April 2021. The samples were TEN cyclone overflow and underflow, CQNS cyclone overflow and underflow, bulk rougher flotation concentrate, and a rougher concentrate from the Cascades plant and coarse flotation cleaner tailings. The fines fraction represents significant copper values but has previously been shown to be impossible to upgrade into a salable concentrate. This test work represents an additional and final attempt to find alternative methods for fines recovery using alternative reagents and desliming.

13.4.5.1 Fines Rougher Flotation

The CQNS fines sample was conditioned with lime to raise the pH to 8.0 before adding the copper and molybdenum collectors. Copper collectors investigated included AP3477 (currently used at the plant) and Potassium Amyl Xanthate (PAX). PAX is a strong collector for all sulfides. Molyflo, a brand name product by Chevron Philips was tested for molybdenum recovery. Figure 13-32 and Figure 13-33 present the cumulative mass and recovery curves for copper and molybdenum for CQNS and TEN, respectively.

Figure 13-32: CQNS Fines - Copper and Molybdenum Fines Rougher Flotation

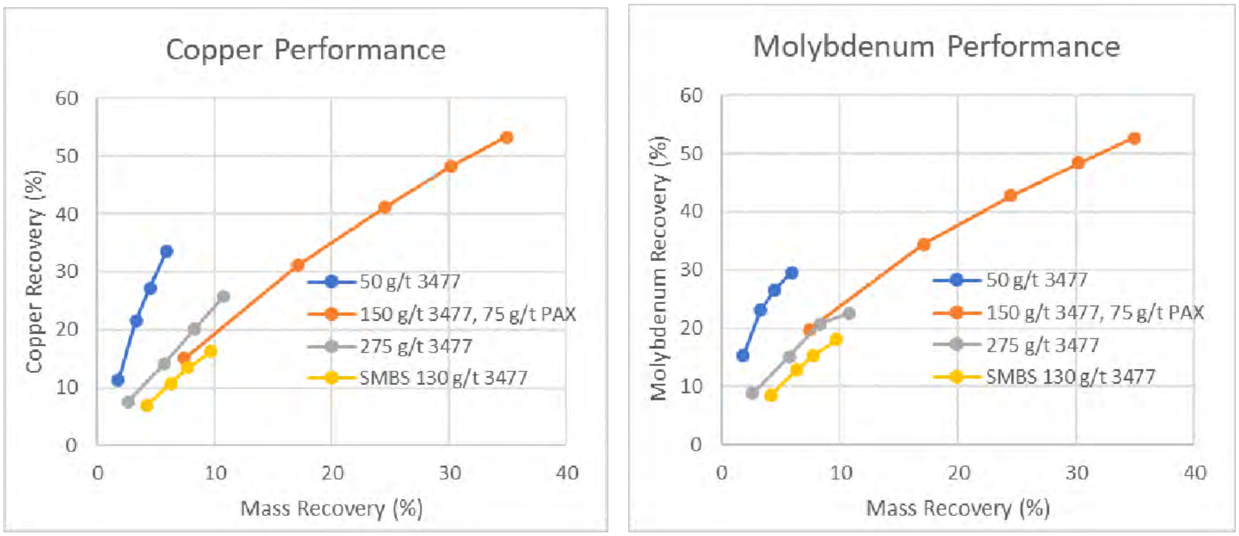
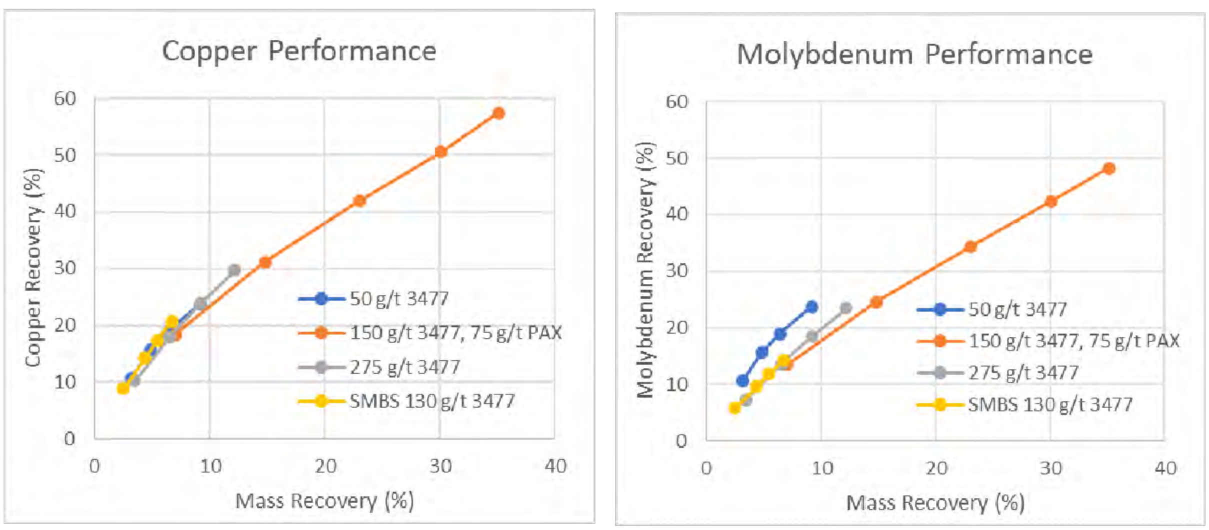


Figure 13-33: TEN Fines- Copper and Molybdenum Fines Rougher Flotation



As shown, the baseline conditions of 50 g/tonne AP3477 had the best copper recovery at the lowest mass recovery. For both samples, about 35% of the copper was recovered. Tests 3 and 4 had higher collector dosages of 3477 and included PAX in the later rougher stages. These tests achieved over 50% copper recovery. Unfortunately, the high copper recoveries were obtained at very high mass recovery. The low grade and high mass would make cleaning this rougher concentrate to final grade impossible (see below).

Sodium metabisulfite (SMBS) was employed at a low dosage for pyrite depression. SMBS did not improve performance.

13.4.5.2 Fines Cleaner Test

As a result of previous preliminary analysis related to fines flotation presented in the 2019 technical report (Henderson, 2019) the fines were reanalyzed as a potential source of additional copper. This latest test work showed that the fines are not a viable source of copper as their flotation response is very poor and a salable cleaner concentrate cannot be produced. The data is presented below for completeness.

Two cleaner tests were performed on each fines concentrate. The goal was to examine the impact of removing ultra-fine particles (slimes) from the fines rougher concentrate to determine if this improved cleaning of the fines fraction. The initial rougher concentrate was wet screened at 20 µm. The fine and coarse fraction were then cleaned separately. A summary of test conditions and results are presented in Table 13-12 and Table 13-13, respectively.

Table 13-12: Summary of Test Conditions

Stage	Reagents (g/tonne)				Time (minutes)		pH
	Lime	3477	PAX	MolyFlo	Condition	Float	
Rougher	0-2900	150	50	14	1	10	8.0
Slime Cleaner	170-540	-	50	14	1	4	10.0
Sand Cleaner A	70-170	-	20	14	1	1	10.0
Sand Cleaner B	√	-	20	-	1	2	10.0
Sand Cleaner C	√	-	20	-	1	3	10.0

Table 13-13: Fines Cleaner Test Performance

	Mass	Assay (% or g/tonne)				Distribution (%)			
	%	Cu	Fe	S	Mo	Cu	Fe	S	Mo
Test 28 - TEN Fines									
Slime Clnr Con	1.5	0.79	16.4	16.1	320	9.9	5.8	10.0	6.5
Slime Clnr Tail	14.8	0.15	4.9	1.54	81	18.4	17.1	9.3	16.0
Sand Con A	1.1	0.86	36.8	44.5	411	7.6	9.2	19.3	5.8
Sand Con B	0.3	1.15	16.4	15.7	635	2.9	1.2	1.9	2.6
Sand Con C	0.3	0.72	9.0	2.92	559	1.9	0.7	0.4	2.4
Sand Tail	10.2	0.08	3.7	5.18	66	6.3	8.7	21.5	9.0
Rougher Tail	71.8	0.09	3.4	1.28	60	53.0	57.3	37.6	57.7
Test 29 - CQNS Fines									
Slime Clnr Con	1.1	1.15	11.4	10.7	1100	6.6	3.8	25.1	6.2
Slime Clnr Tail	18.6	0.31	3.5	0.43	284	28.8	19.1	16.2	26.0
Sand Con A	0.3	2.09	35.7	43.9	4040	3.5	3.5	30.0	6.6
Sand Con B	0.2	1.16	7.4	5.98	1613	1.0	0.4	2.1	1.4
Sand Con C	0.1	0.75	4.3	1.46	742	0.4	0.1	0.3	0.4
Sand Tail	8.0	0.09	2.7	0.06	103	3.6	6.2	1.0	4.0
Rougher Tail	71.6	0.16	3.2	0.17	157	56.1	66.8	25.2	55.3

The fines rougher recovered about 45% of the copper into the rougher concentrate which contained about 28% of the feed mass, for both composites. Due to the difference in particle size between the CQNS and TEN feed streams, the mass split at the 20 µm size was slightly different for each fines rougher concentrate. The TEN and CQNS samples had 16.3% and 19.7% of the fines feed reporting the “slimes” stream, respectively. Most of the copper in the fines rougher concentrate streams, 60% and 78% for CQNS and TEN respectively, would still report to the fines circuit.

The results clearly indicate that desliming still results in very high mass pulls to the rougher concentrate and an unsalable fines cleaner concentrate grade.

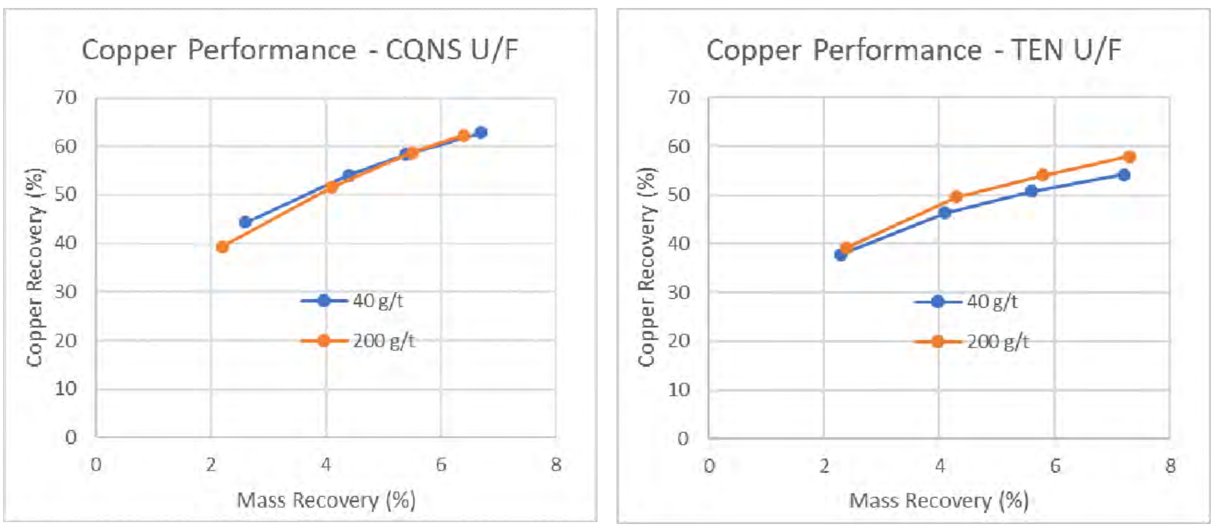
13.4.5.3 Coarse Rougher Flotation

Two rougher flotation tests were performed on each coarse cyclone underflow sample. The test conditions and results are summarized in Table 13-14 and Figure 13-34, respectively. The main difference between the two tests was the 3477 collector dosage; 40 and 200 g/tonne were tested.

Table 13-14: Summary of Test Conditions

Sample	PG µm P80	Test	g/tonne Lime	3477	Molyflo	Mass %	Assay - % or g/t Cu	S	Mo	Distribution % Cu	S	Mo
CQNS U/F	192	5	1210	40	20	6.7	2.81	14.4	1712	62.8	83.5	49.2
		11	1280	200	20	6.4	2.91	16.4	1676	62.2	89.6	48.4
TEN U/F	133	6	-	40	20	7.2	1.44	12.8	442	54.2	44.9	37.8
		12	-	200	20	7.3	1.34	14.2	419	57.9	52.0	39.6

Figure 13-34: Copper Performance in Rougher Flotation Testing

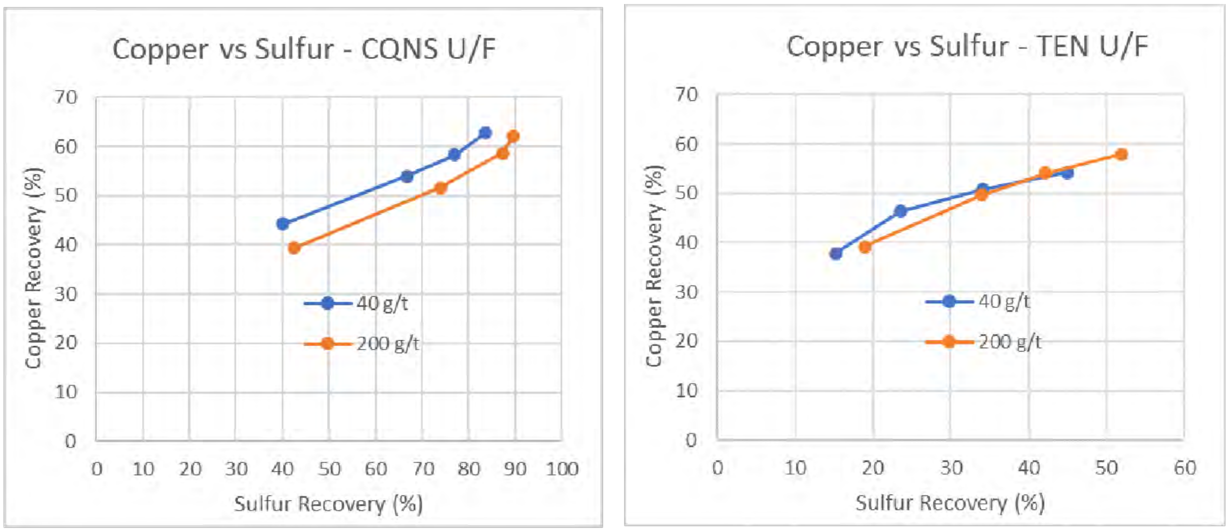


Copper and molybdenum performance was very similar for the collector dosages tested. For CQNS, copper recovery measured 62% to 63% recovery; molybdenum recovery measured 48% to 49% recovery. Rougher mass recovery was approximately 6.5% for both tests.

The TEN coarse product showed a marginal increase in copper recovery at the higher collector dosage, increasing to 58% recovery from 54% recovery at the lower collector dosage. Molybdenum recovery measured 38% to 40% recovery. Mass recovery was similar, at approximately 7.2% for both tests. These variations in performance were within test and assay variance and additional tests would be required to confirm.

Sulfur recovery showed a 6% to 7% increase for both samples at the higher collector dosage. The increase is the result of greater pyrite recovery that could cause additional challenges in cleaner flotation (Figure 13-35).

Figure 13-35: Copper vs Sulfur Selectivity



13.4.5.4 Cleaner Flotation – Effect of Regrind

Cleaner flotation tests were conducted with variations in regrind to examine the impact on concentrate grade and recovery. Despite varying regrind time, regrind discharge sizing only varied slightly, between 20 µm and 30 µm P80. Concentrate sizings were also conducted, which were a better indicator of regrind levels, with final concentrates measuring between 36 µm and 81 µm P80. A summary of tests is shown in Table 13-15.

Table 13-15: Summary of Test Conditions

			g/tonne (Ro/Clnr)		Sizing - µm P80		Assay (% or g/t)			Distribution %		
Sample	Test	Clnr pH	3477	Molyflo	Regrind	Con	Cu	S	Mo	Cu	S	Mo
CQNS U/F	14	11	40/6	20/10	28	55	34	31.7	19668.0	30.6	7.3	23.2
	17	11	40/6	20/10	30	79	16.5	39.4	11712.0	41.5	25.7	37.0
	21	11	40/6	20/10	24	43	36.8	32.8	21320.0	47.5	10.6	32.7
TEN U/F	15	11	40/6	20/10	30	69	16.5	39.7	4656	45.1	9.6	28.4
	18	11	25/3	20/10	29	81	12.5	44.4	4268	39.3	11.1	26.6
	22	11	25/3	20/10	21	36	27.0	34.1	7000	42.9	4.4	20.1
	23	11	25/3	20/10	20	53	25.0	35.5	6785	42.3	4.9	23.8

As particle sizes decreased with greater regrinding, the grade recovery curves significantly improved as shown in The final concentrate copper grade showed a direct relationship with finer concentrate grinds as shown in Figure 13-37. For CQNS, copper concentrate recovery varied from 17% at 79 µm P80, to 37% at 43 µm P80. The TEN sample ranged from 13% recovery at 81 µm P80, to 27% at 36 µm P80.

Figure 13-36. with performance curves extending up and to the right with progressively finer concentrate sizings.

The final concentrate copper grade showed a direct relationship with finer concentrate grinds as shown in Figure 13-37. For CQNS, copper concentrate recovery varied from 17% at 79 µm P80, to 37% at 43 µm P80. The TEN sample ranged from 13% recovery at 81 µm P80, to 27% at 36 µm P80.

Figure 13-36: Effect of Regrind On Copper Cleaner Recovery

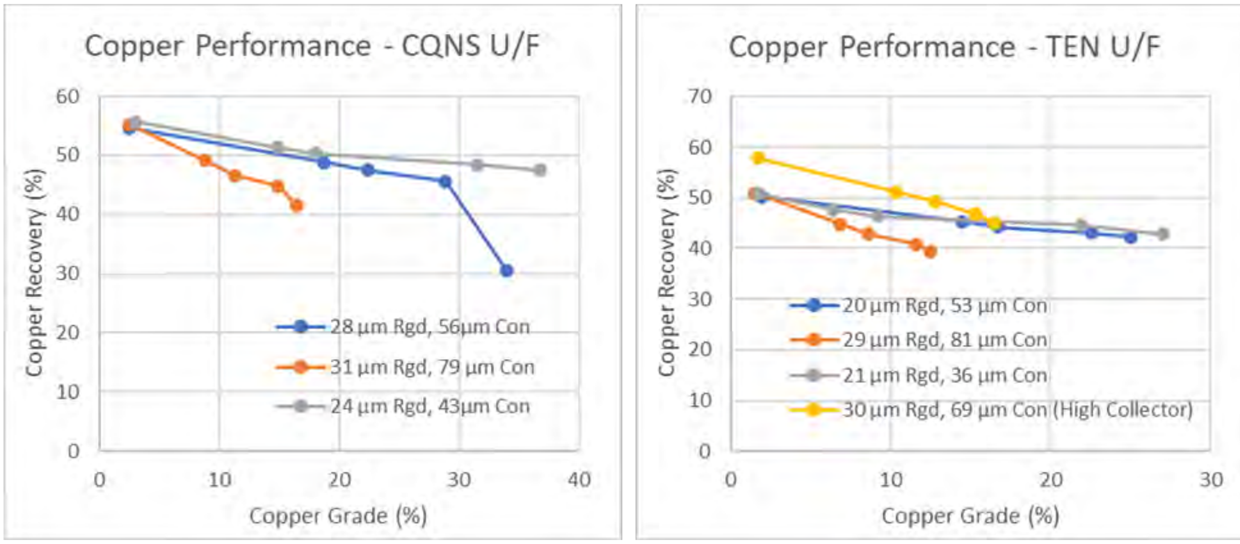
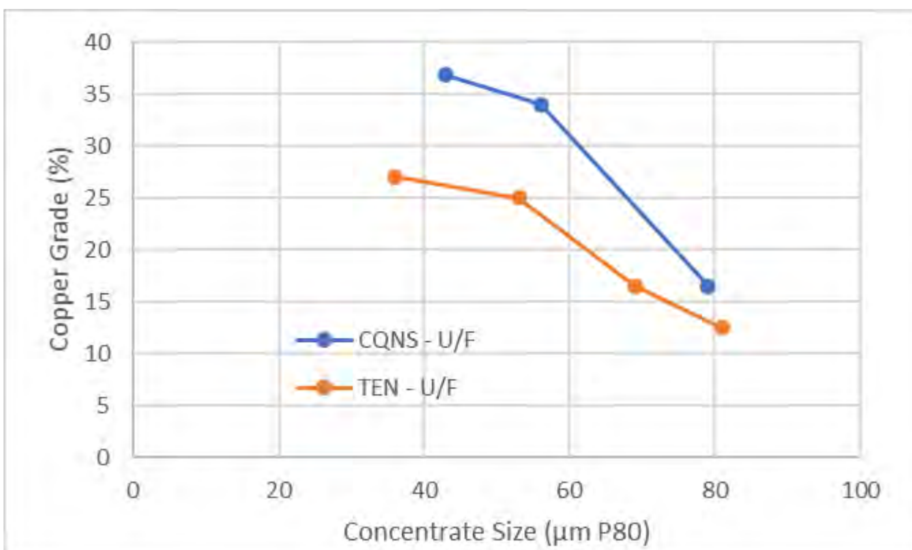


Figure 13-37: Copper Grade vs Concentrate Sizing



Sulfur grades were generally inversely proportional to copper grades, indicating improved performance as a result of pyrite rejection. The regrind improved liberation of copper sulfides from pyrite, leading to improved rejection of liberated pyrite.

One test of the TEN coarse material was conducted with additional collector dosage. This test showed a higher rougher concentrate recovery but produced a low-grade concentrate after cleaning: 17% copper recovery at a P80 of 69 µm.

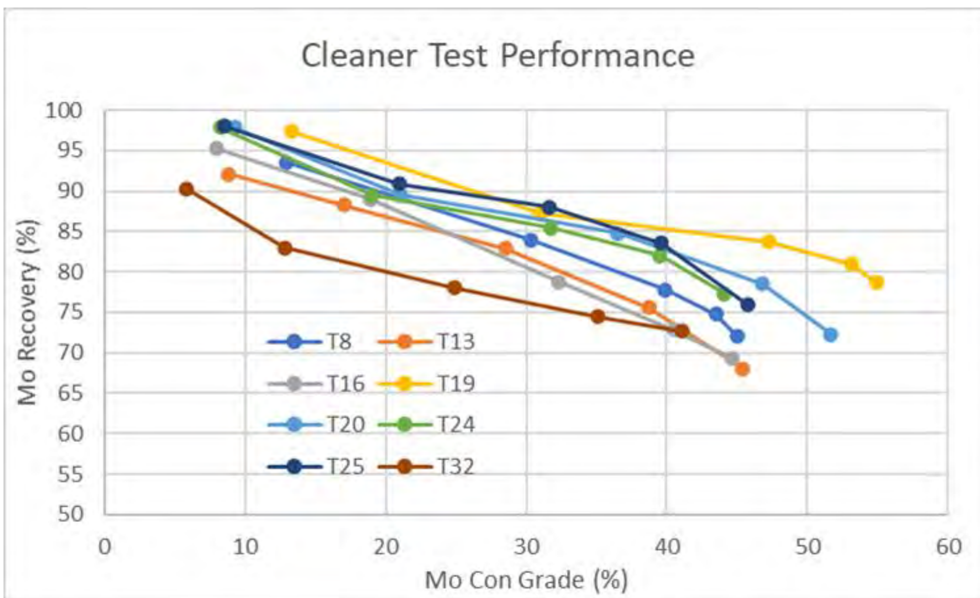
13.4.5.5 Copper and Molybdenum Separation

A total of eight cleaner tests were performed to examine the separation of the copper and molybdenum. A sample of the plant bulk concentrate was provided for this test work. A summary of key parameters and a graphical display of the results are presented in Table 13-16 and Figure 13-38, respectively. As per the plant flowsheet, a test was included with an acid wash step prior to molybdenite flotation.

Table 13-16: Summary of Test Conditions – Cu/Mo Separation

	Reagents - g/tonne			1st Clnr	Regrind			Concentrate		
Test	NaHS	Molyflo	FO	Acid Wash	Time	Stream	µm P80	µm P80	Grade (%)	Dist'n (%)
BL707-8	2980	40	-	No	0	-	72	-	45	72
BL707-13	4800	60	-	No	5	Ro Con	27	63	45	68
BL707-16	3950	60	-	No	15	Ro Con	27	54	45	69
BL707-19	5985	20	-	Yes	10	1st Con	60	55	55	79
BL707-20	3300	80	-	Yes	10	1st Con	42	54	52	72
BL707-24	3535	-	20	Yes	10	1st Con	-	51	44	77
BL707-25	2450	-	20	No	10	1st Con	-	53	46	76
BL707-32	19250	-	20	No	10	1st Con	29	50	41	73

Figure 13-38: Cleaner Test Performance Mo Flotation



Tests were performed to determine if additional regrinding would improve the concentrate grade of the molybdenite. Tests also examined the placement of the regrind in the circuit: regrinding the rougher concentrate or regrinding the 1st molybdenum concentrate. It should be noted that molybdenite is difficult to regrind and due to its particle shape, it is difficult to size. Regrinding off the rougher moly concentrate had little effect on metallurgical performance, particularly the concentrate grade (Tests T8, T13, and T16).

The acid wash tests showed the best performance. Two collectors were examined, Fuel Oil (FO), and a specialized collector, Molyflo. The plant currently uses only FO. While the data is limited, comparing tests

19 to 24 would indicate that Molyflo may provide significant benefits. This was a preliminary analysis and more detailed testing should be conducted.

Molybdenum is often separated from copper using sodium hydrosulfide (NaHS) to depress the copper and allow molybdenite separation. Most industrial processes also use nitrogen as the flotation gas. MVC does not use nitrogen. The use of nitrogen increases the effectiveness of the process and reduces the consumption of NaHS. All of the tests were performed with nitrogen, except for Test T32. As shown, the T32 test had poor metallurgical performance and significantly higher NaHS consumption.

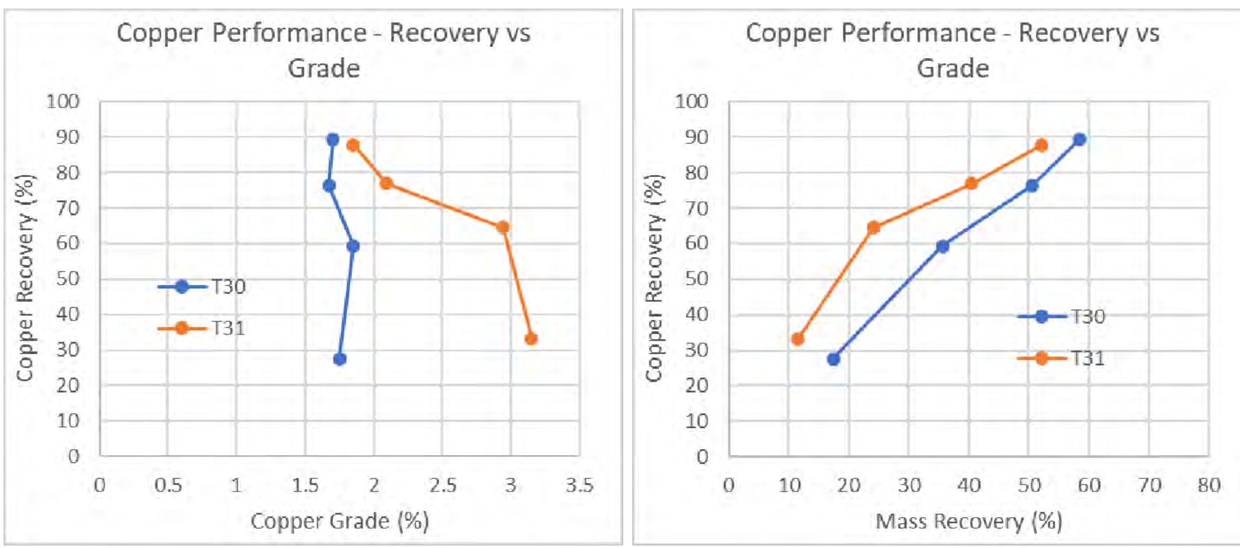
13.4.5.6 Cascade and Cleaner Tail Flotation

A rougher concentrate composite was tested to simulate cleaning of the cascade concentrate. One test was conducted as is, at a particle size of 53 µm P80, and one test was conducted with grinding before flotation. A summary of the tests is presented in Table 13-17. Test results are presented in Figure 13-39.

Table 13-17: Summary of Test Conditions

Test	Grinding	g/tonne		Mass	Assay - % or ppm			Distribution %		
		3477	Molyflo	%	Cu	S	Mo	Cu	S	Mo
31	no	100	10	58.5	1.70	42.5	658	89.5	97.6	85.9
32	yes	100	10	52.2	1.85	45.5	695	87.8	94.1	83.5

Figure 13-39: Effects of Grinding Cascade Concentrate



Test 31, with grinding before flotation, showed improved initial copper kinetics, with higher copper grade concentrate produced at similar recoveries for rougher concentrates 1 to 3. After 4 flotation stages, and an additional 100 g/tonne 3477 collector, the overall flotation performance was similar. Between 88% and 90% of the copper was recovered at a mass recovery of 52% to 59% recovery.

Further testing is required to optimize flotation conditions, including a wider range of grinding, as well as chemical conditions including pH adjustment and collector addition.

13.4.5.7 Grindability Testing

A Levin regrind energy assessment was conducted on the rougher concentrate composite. This provides an indication of regrind energy requirements to reach a target size distribution. The specific energy plot is shown in Figure 13-40. Approximately 16 kWhr/t would be required to reach a product size of 30 µm P80 (as open circuit ball milling). Correction factors can be applied to account for closed circuit grinding (Figure 13-41).

Figure 13-40: Size Distribution Effects of Energy Input

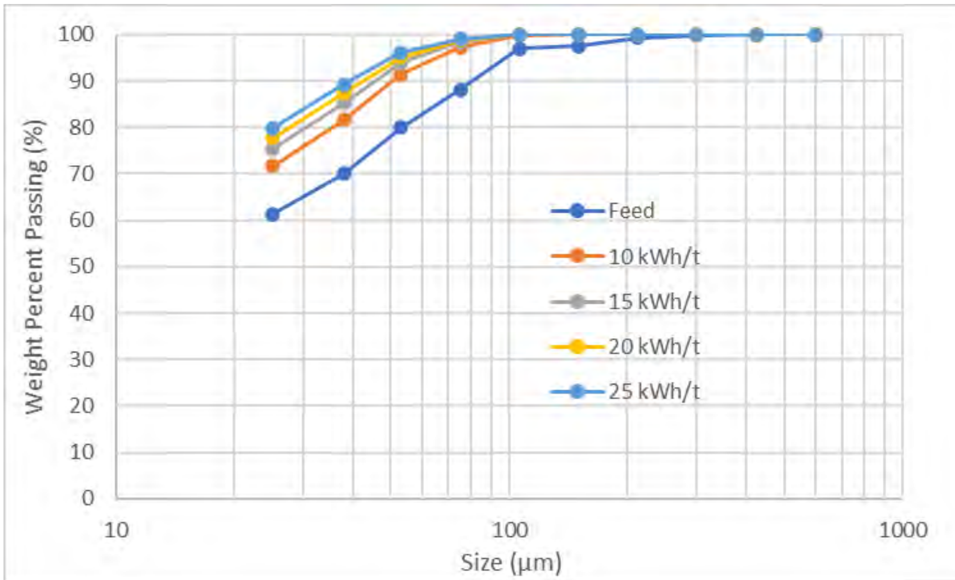
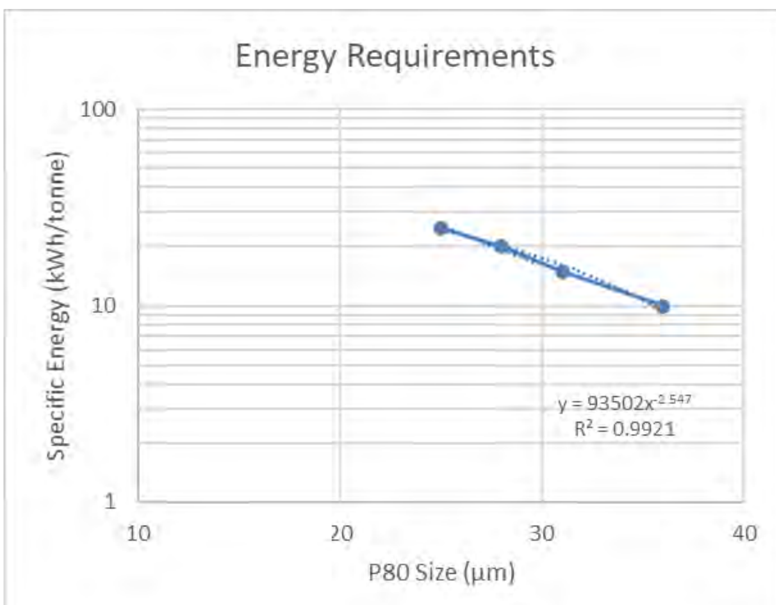


Figure 13-41: Energy Requirements vs P80 Size



13.4.6 Base Metallurgical Laboratories Test Work – October 2021

The (Base Metallurgical Laboratories, 2021) BL0844 test program focused on the evaluation of the settling and filtering properties of two samples representing the process tailings from MVC before and after copper-molybdenum separation. Two samples designated CR 1-2 CQNS and CR 3-4 TEN, were received on June 10, 2021. Only CR 1-2 CQNS was tested. Two samples designated Concentrado Colectivo CC4 and Concentrado Colectivo CC3 were received on July 16, 2021, for dewatering tests. A secondary objective was to perform Levin tests on a sample representing regrind feed produce reground samples for dewatering tests.

13.4.6.1 Levin Testing

Samples designated as CR 1-2 CQNS and CR 3-4 TEN were dried and homogenized. The feed for the Levin tests was sized at 63µm P80. The test used fixed power input values of 10, 20, 30, and 40 kWh/tonne. Results of the Levin tests are presented graphically in Figure 13-42 through Figure 13-45.

Figure 13-42: CR 1-2 CQNS Size Distribution Curve

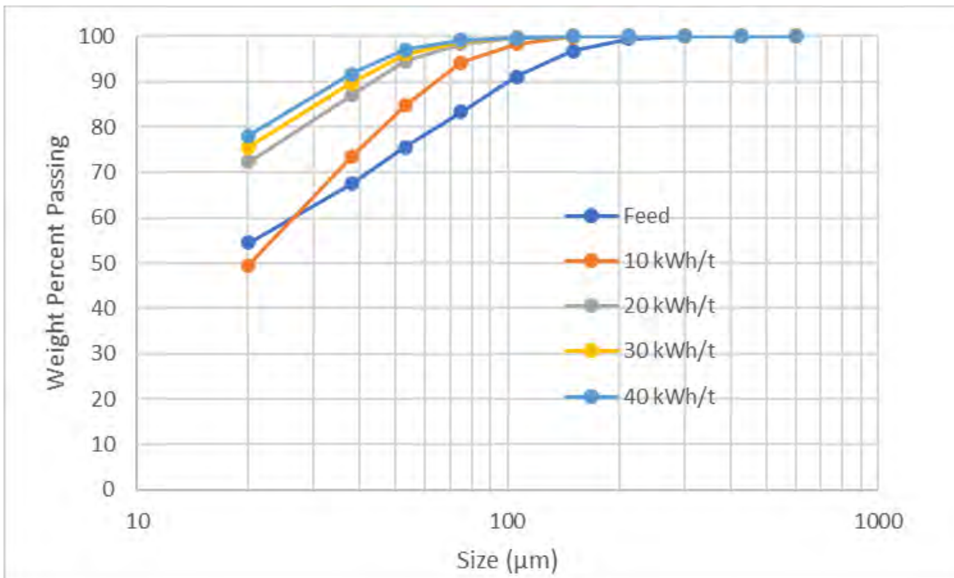


Figure 13-43: Energy Requirements for CR 1-2 CQNS

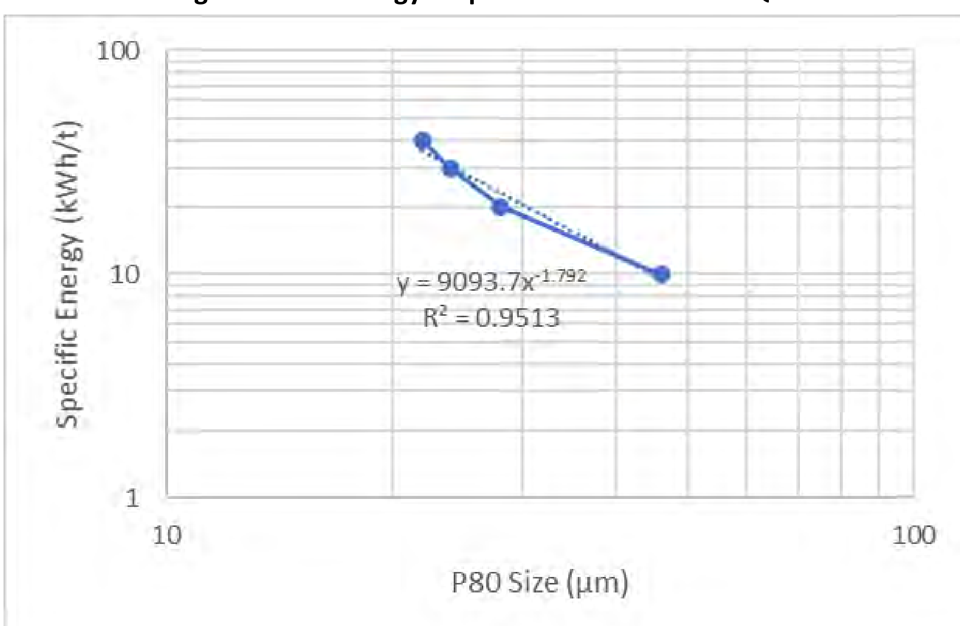


Figure 13-44: CR 3-4 TEN Size Distribution Curve

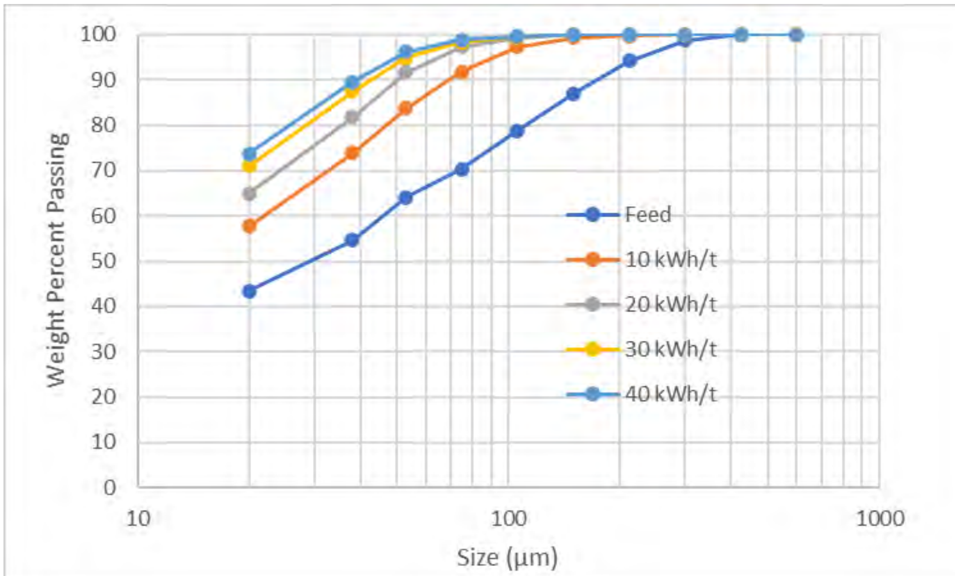
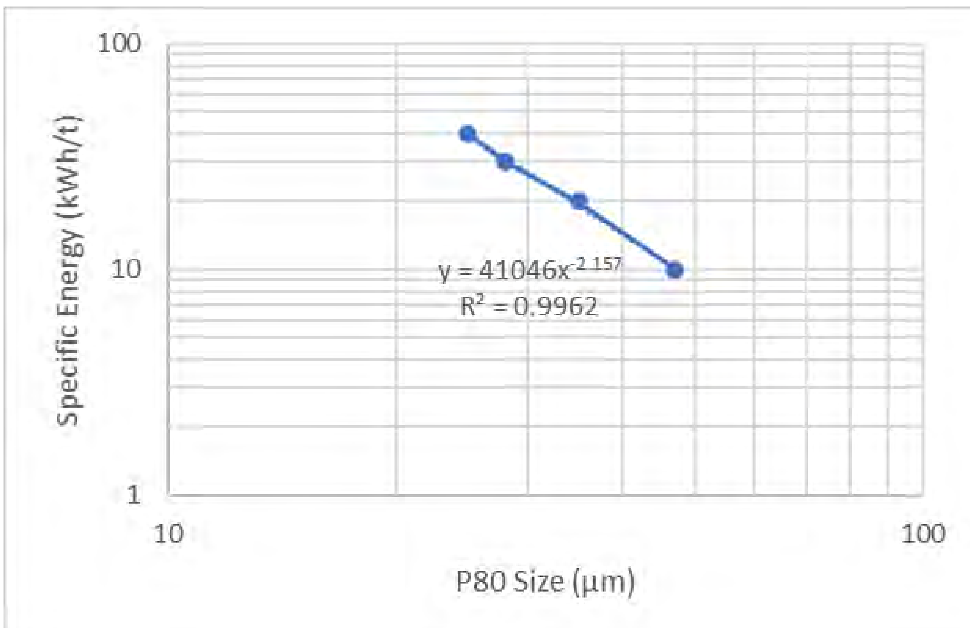


Figure 13-45: Energy Requirements for CR 3-4 TEN



13.4.6.2 Dewatering Testing

Two samples designated Concentrado Colectivo CC4 (representing the copper slimes cleaner concentrate) and Concentrado Colectivo CC3 (representing the coarse copper cleaning concentrate) were received for dewatering tests.

A representative cut from these samples was reground to a nominal 40µm P80. The samples before and after regrinding were subject to a series of static settling tests, in 1L graduated cylinders. The flocculant Magnafloc 10 was tested at various dosages. The free settling rate and final bed density were measured for the two samples at the received size of nominal 75 µm P80 and after regrinding to 40µm P80. Results of the static settling test are presented in Table 13-18.

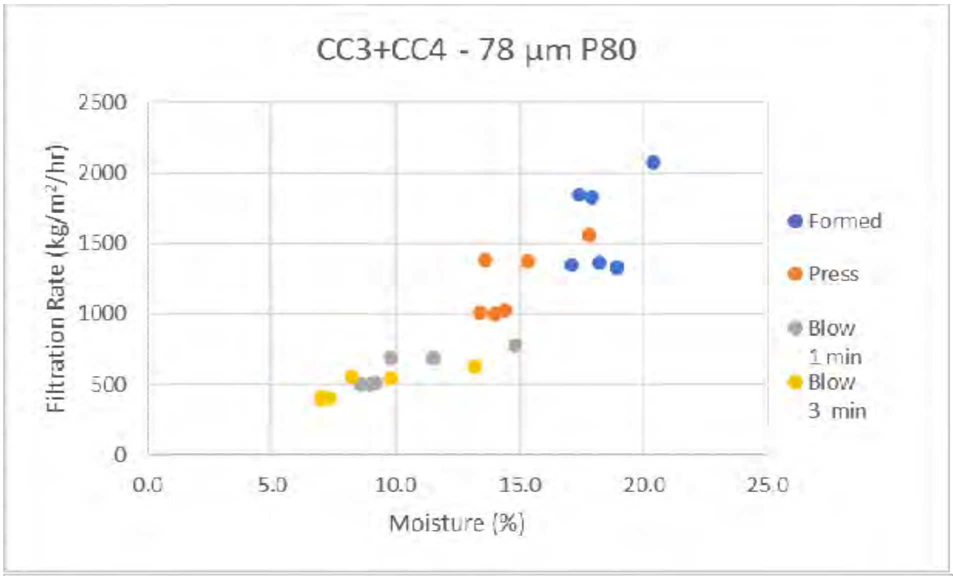
Table 13-18: Static Settling Test Results

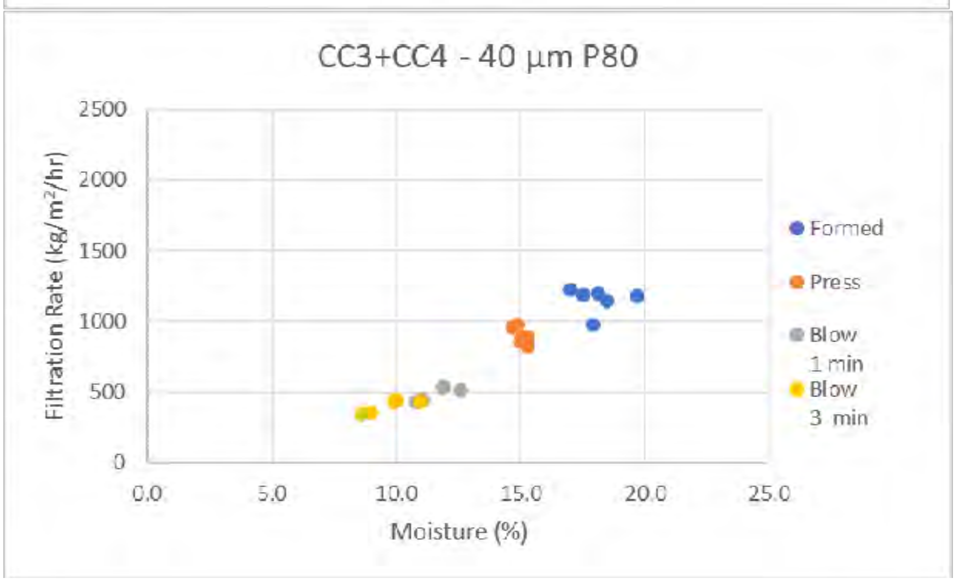
Composite	Size µm P80	Test	pH	Initial Density % Solids	Floc	Dosage g/t	Final Density % Solids	Settling Rate mm/s
CC3+CC4	78	S1	8.0	15.1	MF10	2.5	71.0	2.84
		S2	8.0	15.1	MF10	5.0	71.0	4.37
		S3	8.0	15.1	MF10	7.5	68.7	4.51
		S4	8.0	15.1	MF10	10.0	66.1	6.10
	40	S5	8.0	15.0	MF10	2.5	74.7	6.02
		S6	8.0	15.0	MF10	5.0	65.5	3.92
		S7	8.0	15.0	MF10	8.0	68.7	4.45
		S8	8.0	15.0	MF10	10.0	59.1	3.62
CC3	74	S9	11.5	12.9	MF10	2.5	62.6	3.08
		S10	11.5	12.9	MF10	5.0	60.7	4.53
		S11	11.5	12.9	MF10	7.5	59.5	4.42
		S12	11.5	12.9	MF10	10.0	59.5	5.95
	40	S13	11.5	15.1	MF10	2.5	70.5	2.84
		S14	11.5	15.1	MF10	5.0	69.1	4.39
		S15	11.5	15.1	MF10	7.5	67.7	5.33
		S16	11.5	15.1	MF10	10.0	65.1	4.44

Before regrinding, the settling rate increased as flocculant dosage was increased. After regrinding, the fastest settling rate was measured with a flocculant dosage of 10 g/tonne. At the typical plant flocculant dosages, regrind should not significantly affect the settling rate. The underflow densities were lower after regrinding.

The CC3+CC4 composite sample was also subject to pressure filtration testing before and after regrind. The filter press had a chamber thickness of 150 mm, with varying chamber width to adjust the cake thickness. Tailings samples were conditioned to represent thickener underflow samples, by adjusting density and adding flocculant. The tests consisted of three phases: filling, pressing, and blow. The filtrate was collected and measured for each stage, and the cake moisture was calculated. Filtration rates are summarized graphically in Figure 13-46.

Figure 13-46: Pressure Filtration Test Results - Final Tails





The results show that the finer product size (40 µm P80) would have a negative effect on the filtration production rate and cake moisture. This is a typical result as finer particles generally produce a cake with lower permeability.

14.0 MINERAL RESOURCE ESTIMATE

14.1 Cauquenes Tailings Deposit

The mineral resource statement presented herein represents the updated mineral resource estimate for the Cauquenes tailings impoundment in Rancagua, Chile. The updated mineral resource estimate for the Cauquenes tailings impoundment was completed by Terre Lane, SME-RM. Ms. Lane is a Qualified Person as defined by NI 43-101 and is independent of Amerigo. The most recent previous mineral resource estimate for the MVC operation included fresh tailings from El Teniente mine, the Cauquenes tailings impoundment, and the Colihues tailings impoundment and was presented in the 2019 Technical Report (Henderson, 2019) (see Section 6.4).

The mineral resources were estimated in conformity with the CIM "Estimation of Mineral Resource and Mineral Reserves Best Practices" guidelines and are reported in accordance with the Canadian National Instrument 43-101. This mineral resource estimate includes inferred mineral resources. Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no certainty that all or any part of the mineral resource will be converted into mineral reserves. The project presently has no mineral reserves.

14.1.1 Topography and Boundaries

The Cauquenes Tailings impoundment is a manmade deposit. Detailed topography for the area within the Cauquenes tailings boundary was provided to GRE by Amerigo as a dxf file. The topographic data provided by Amerigo was not rectangular, which is required within Leapfrog to generate models. GRE obtained topography for the area beyond the Cauquenes tailings from the open-source Digital Elevation Models available at a 30-metre by 30-metre grid. Ms. Lane combined the two topographies, and the resultant combined topography (Figure 14-1) was used to generate the Leapfrog model. The topography beyond the Cauquenes tailings boundary is not part of the resource estimate.

Amerigo also provided GRE with the base of the tailings impoundment in the file piso4tr.dm. Ms. Lane converted the file to a dtm triangulation file using Surpac. Amerigo also provided the location for walls, buffer zone, security zone, and basin for the Cauquenes tailings. Figure 14-2 shows the boundaries of different features which are present, and Figure 14-3 shows the conceptual design for the present features. The file, along with the topography, was used to create limits for total resource estimation (Figure 14-4). The total boundaries were used for resource estimation, and the resources were then divided for the walls, buffer zone, security zone, and basin.

Figure 14-1: Topography Used for Resource Estimation

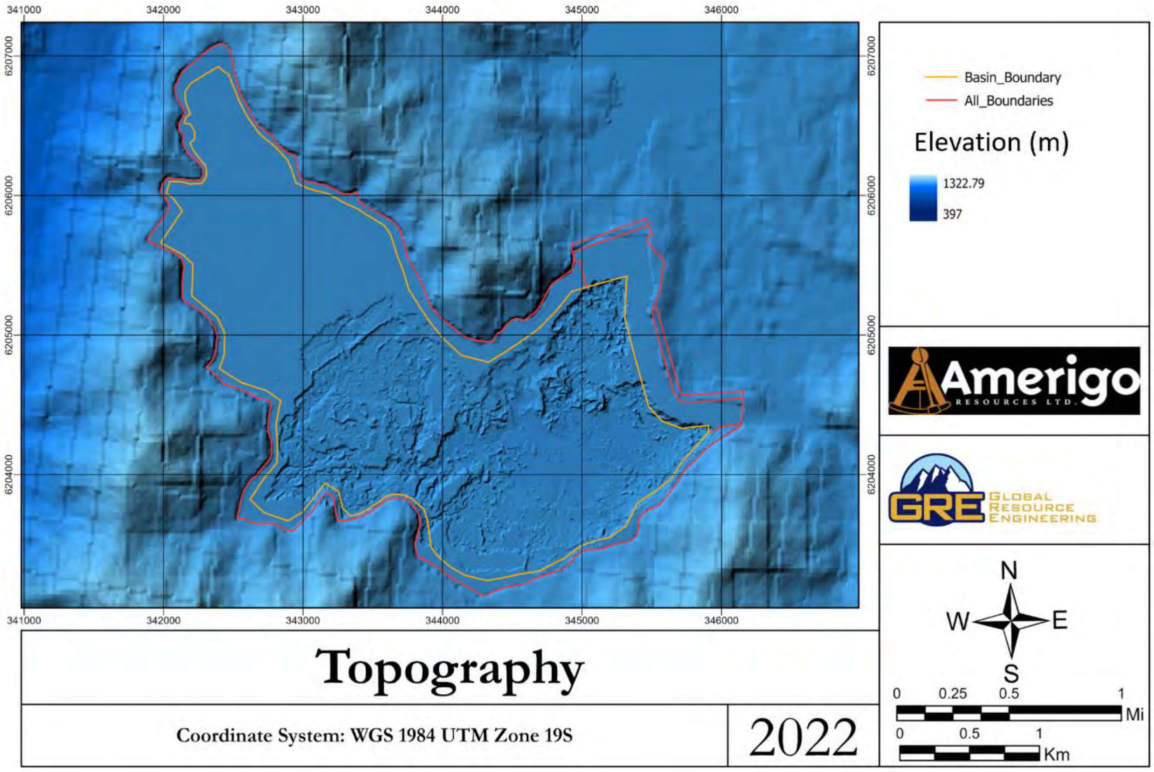


Figure 14-2: Boundaries for the present features

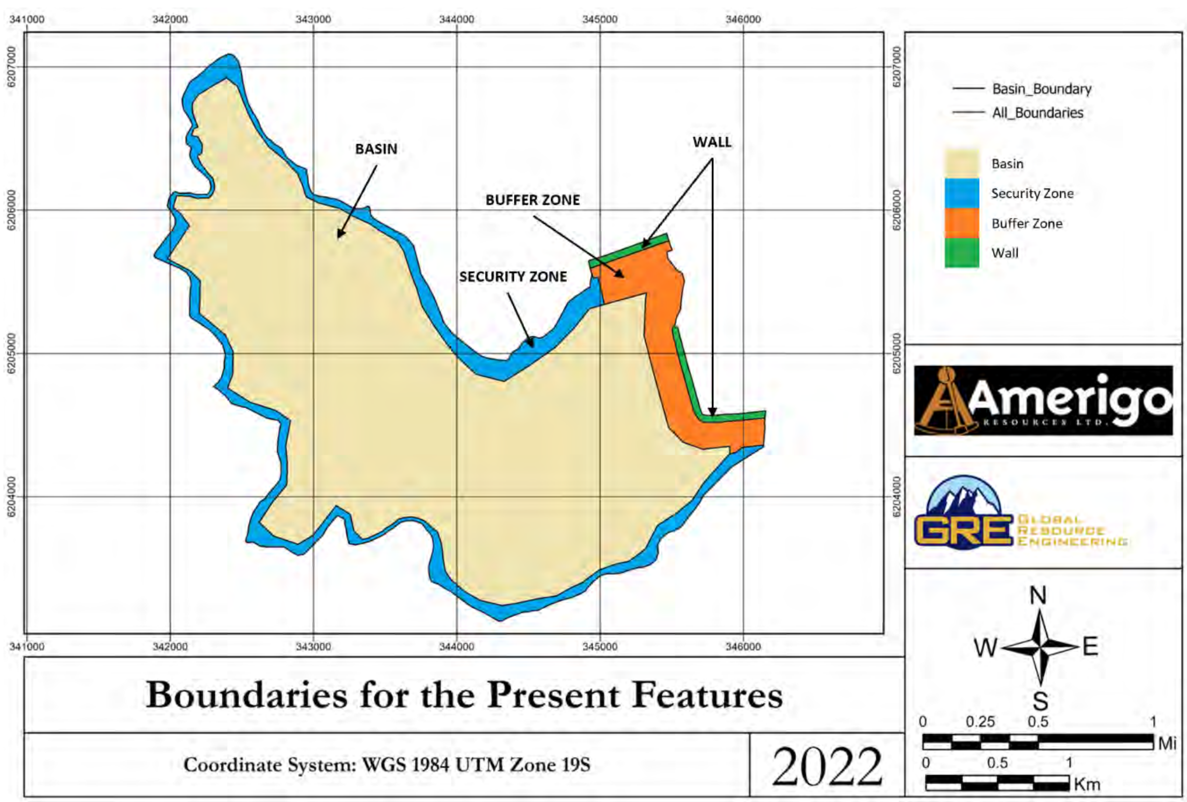
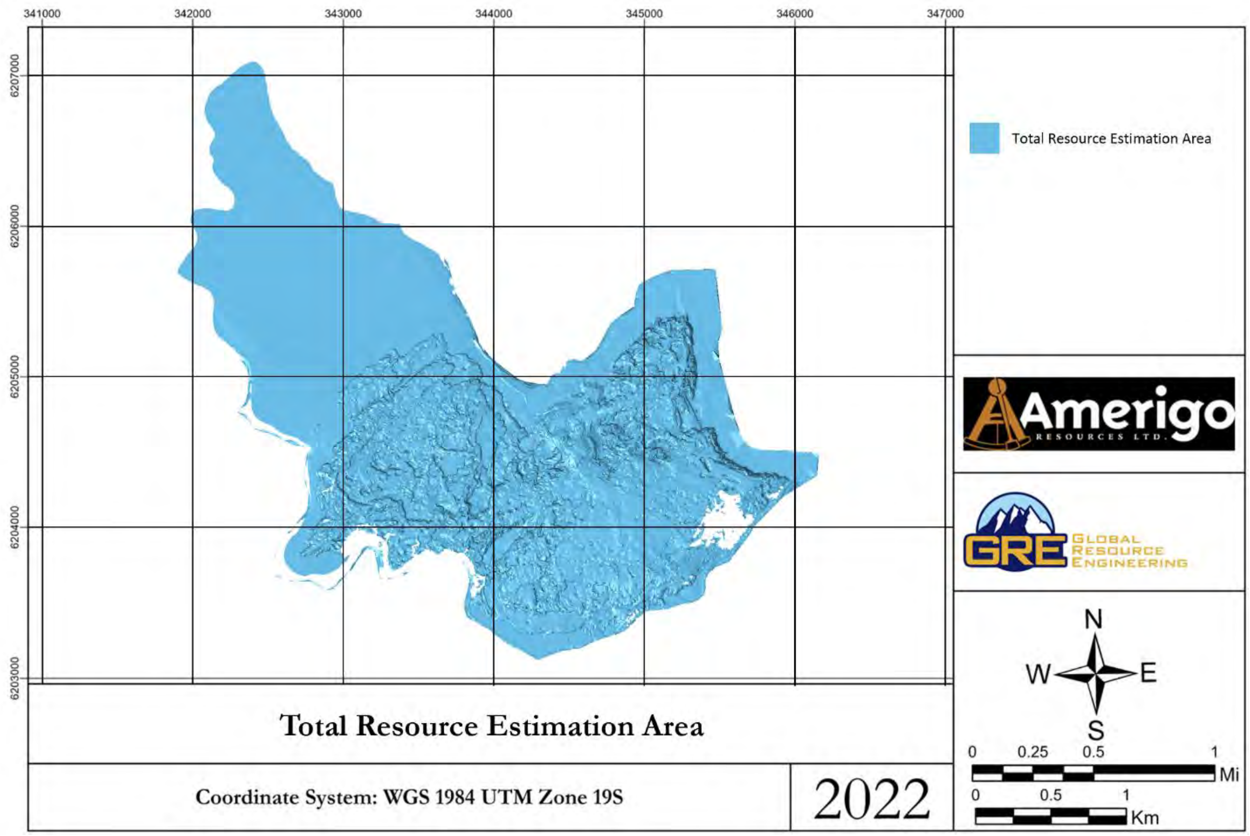


Figure 14-3: Conceptual Section Design for the Present Features

Figure 14-4: Total Resource Estimation Zone



14.1.2 Drill Hole Database

Ms. Lane received drill hole information from Amerigo for the Cauquenes tailings impoundment. The database consisted of collars for 83 drill holes. The drill hole information consisted of the total Cu grades (CuT), Mo grades, and the percentage of material that has granular size above +140 mesh size. The granular size is important as higher grades of CuT are associated with +140 mesh particles and floatable copper. The assay file contained 446 CuT, 430 Mo, and 361 granular size interval values. Drill holes were also associated with K-ratio (K-ratio $= \frac{Soluble\ Copper}{Floatable\ copper}$). There are 330 K-ratio values available. Locations of the drill holes from different Cauquenes drilling campaigns are presented in Figure 10-1. Details of the drill hole samples are presented In Section 10.0.

For the estimation of the resources, the holes within the walls (S53, S54 and S55) were not considered because the grades were high compared to those that occurred in the basin and thus overestimation in the drilling is avoided.

14.1.3 Assay Compositing

The drilling campaigns predominantly used sample intervals of 5 metres. There are some sample intervals ranging between 6 and 8 metres, but the majority of the samples are at 5 metre intervals. In order to use as much data as possible in the resource assessment, composites were created on all drilling to an average size of 5.0 meters. Therefore, the final resource database comprised was restricted to composites at a depth of 5.0 meters within the estimation zone.

14.1.3.1 Composite Analysis

Figure 14-5, Figure 14-6, Figure 14-7, and Figure 14-8 show the comparison of the uncomposited and 5-metre composites for the variables CuT, Mo, granular size, and K-ratio, respectively. Table 14-1, Table 14-2, Table 14-3, and Table 14-4 show the statistical comparison of the uncomposited and 5-metre composites for the variables CuT, Mo, granular size, and K-ratio, respectively.

Figure 14-5: Comparison of the Uncomposited and Composited Values for CuT

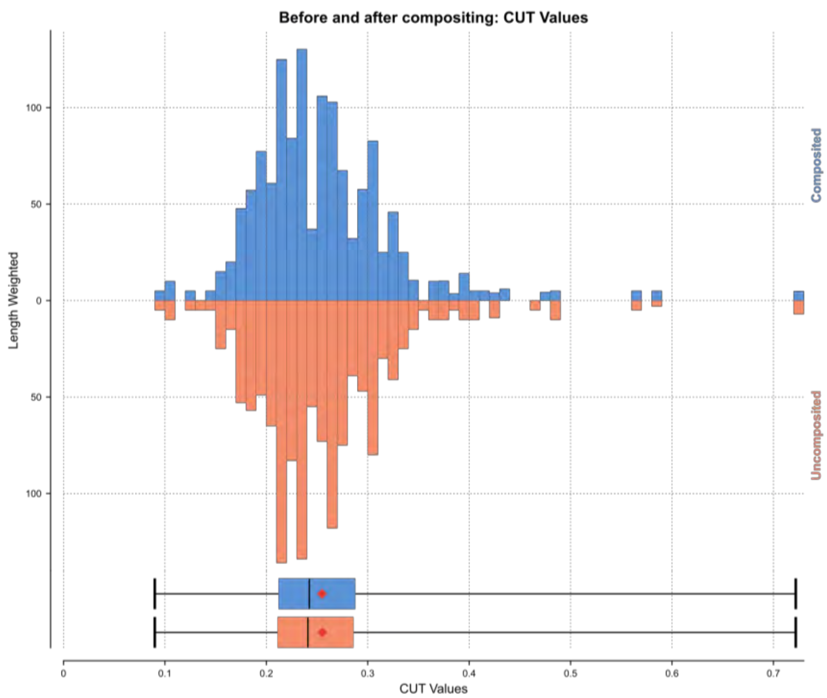


Table 14-1: Statistical Comparison of the Uncomposited and Composited Values for CuT

Parameter	Composited	Uncomposited
Count	267	259
Length	1303.329	1329
Mean	0.254148	0.255361
SD	0.070363	0.074386
CV	0.27686	0.291296
Variance	0.004951	0.005533
Minimum	0.09	0.09
Q1	0.211	0.211
Q2	0.2424	0.243
Q3	0.2878	0.286

Parameter	Composited	Uncomposited
Maximum	0.722	0.722

Figure 14-6: Comparison of the Uncomposited and Composited Values for Mo

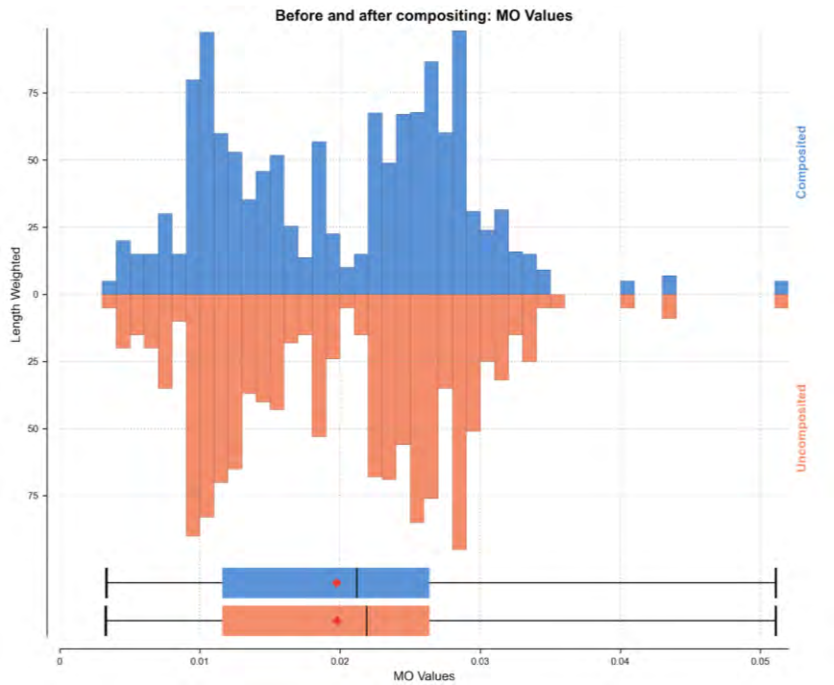


Table 14-2: Statistical Comparison of the Uncomposited and Composited Values for Mo

Parameter	Composited	Uncomposited
Count	265	257
Length	1294.329	1319
Mean	0.019698953	0.019776573
SD	0.008512768	0.008671357
CV	0.432143162	0.438466096
Variance	0.000072467	0.000075192
Minimum	0.0033224	0.0033
Q1	0.0115894	0.0116
Q2	0.02080454	0.0219
Q3	0.0264	0.0265
Maximum	0.0511	0.0511

Figure 14-7: Comparison of the Uncomposited and Composited Values for the Granular Sizes

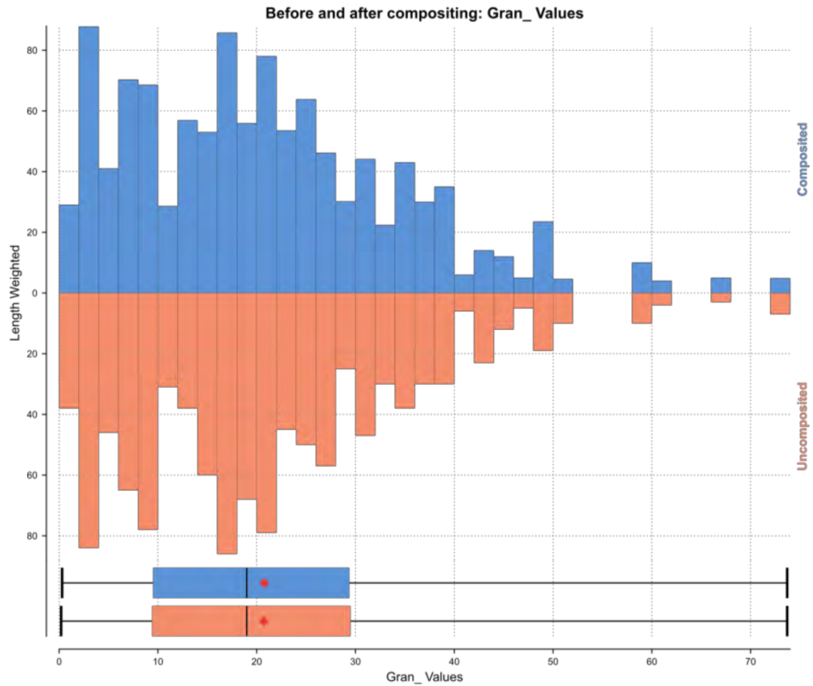


Table 14-3: Statistical Comparison of the Uncomposited and Composited Values for the Granular Sizes

Parameter	Composited	Uncomposited
Count	225	217
Length	1099.082	1119
Mean	20.63250358	20.69642538
SD	13.66992203	14.06546156
CV	0.662543059	0.679608256
Variance	186.8668	197.8372
Minimum	0.3	0.2
Q1	9.4	9.4
Q2	19	19
Q3	28.6818	29.5
Maximum	73.7	73.7

Figure 14-8: Comparison of the Uncomposited and Composited Values for the K-ratio

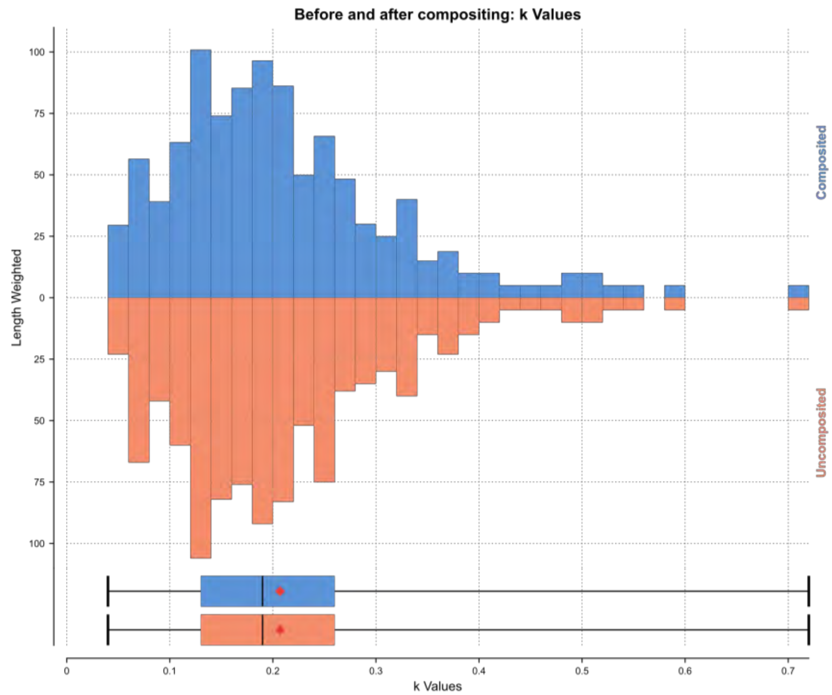


Table 14-4: Statistical Comparison of the Uncomposited and Composited Values for the K-ratio

Parameter	Composited	Uncomposited
Count	205	197
Length	998.9	1019.0
Mean	0.2069	0.2070
SD	0.1123	0.1131
CV	0.5428	0.5463
Variance	0.0126	0.0127
Minimum	0.04	0.04
Q1	0.13	0.13
Q2	0.19	0.19
Q3	0.26	0.26
Maximum	0.72	0.72

14.1.3.2 Evaluation of Outliers

Cumulative probability plots for CuT, Mo, granular size, and K-ratio were created for the composites. Based on this analysis, no outliers were observed, and the values were not clipped. The Cumulative probability plots for CuT, Mo, granular size, and K-ratio are shown in Figure 14-9, Figure 14-10, Figure 14-11, and Figure 14-12, respectively.

Figure 14-9: Cumulative Log Probability Plot for CuT

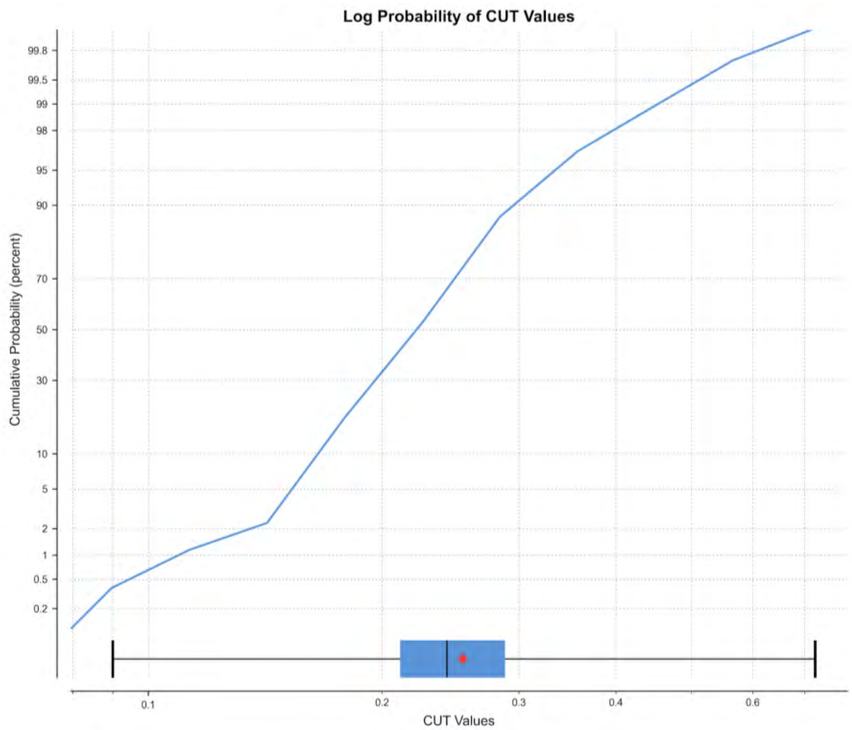


Figure 14-10: Cumulative Log Probability Plot for Mo

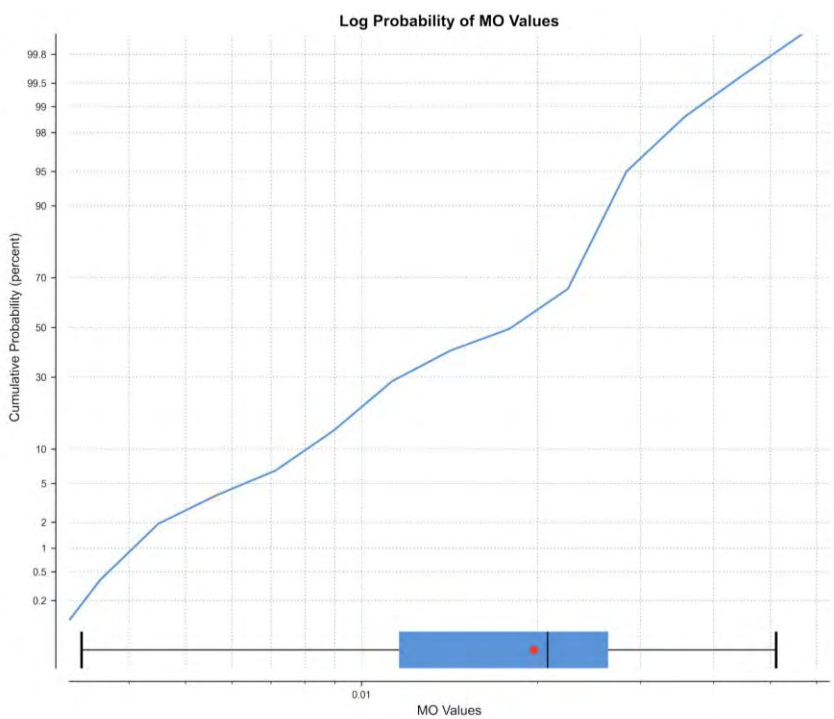


Figure 14-11: Cumulative Log Probability Plot for Granular Size

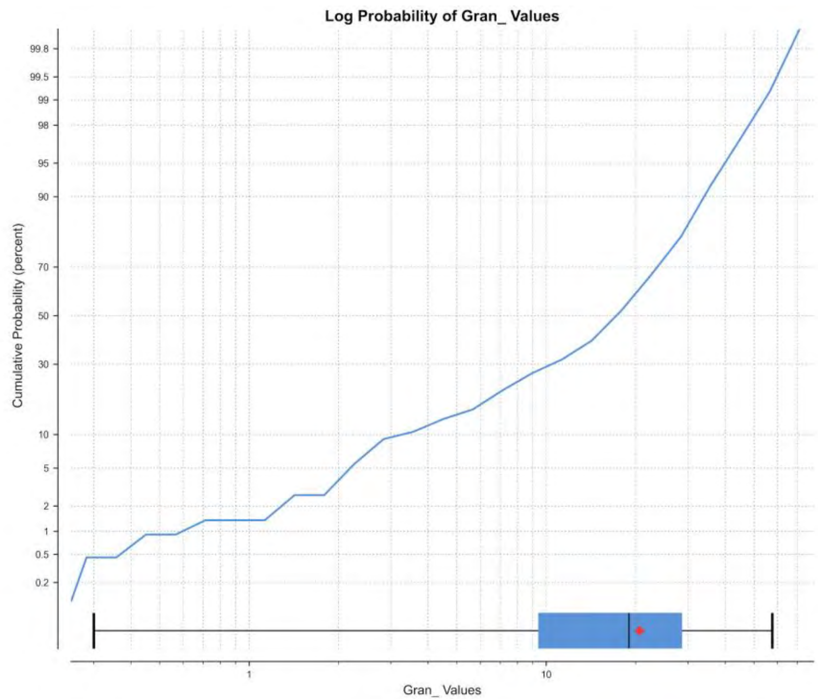
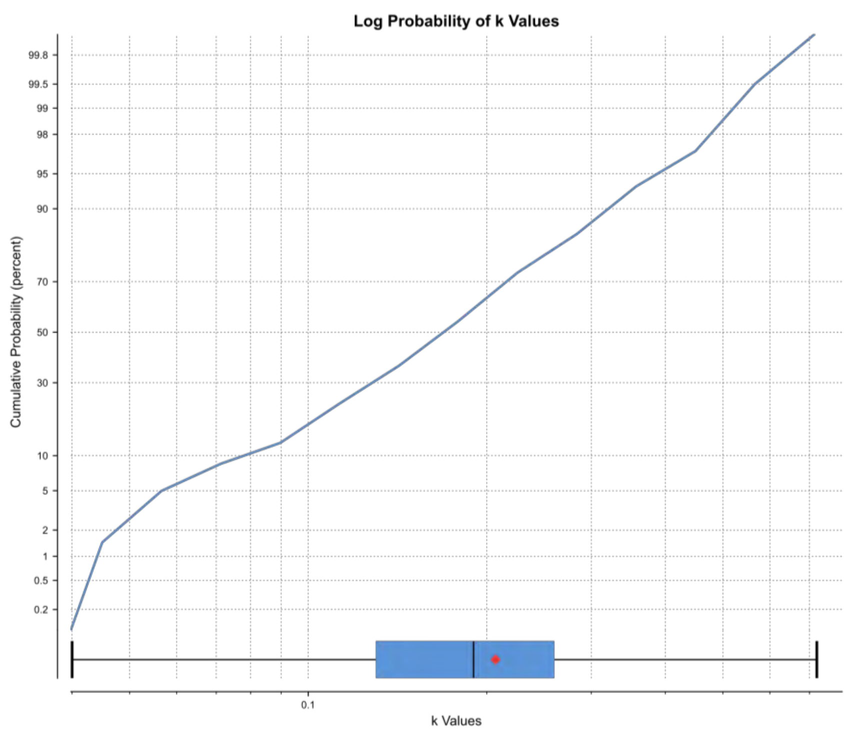


Figure 14-12: Cumulative Log Probability Plot for K-ratio



14.1.3.3 Variography

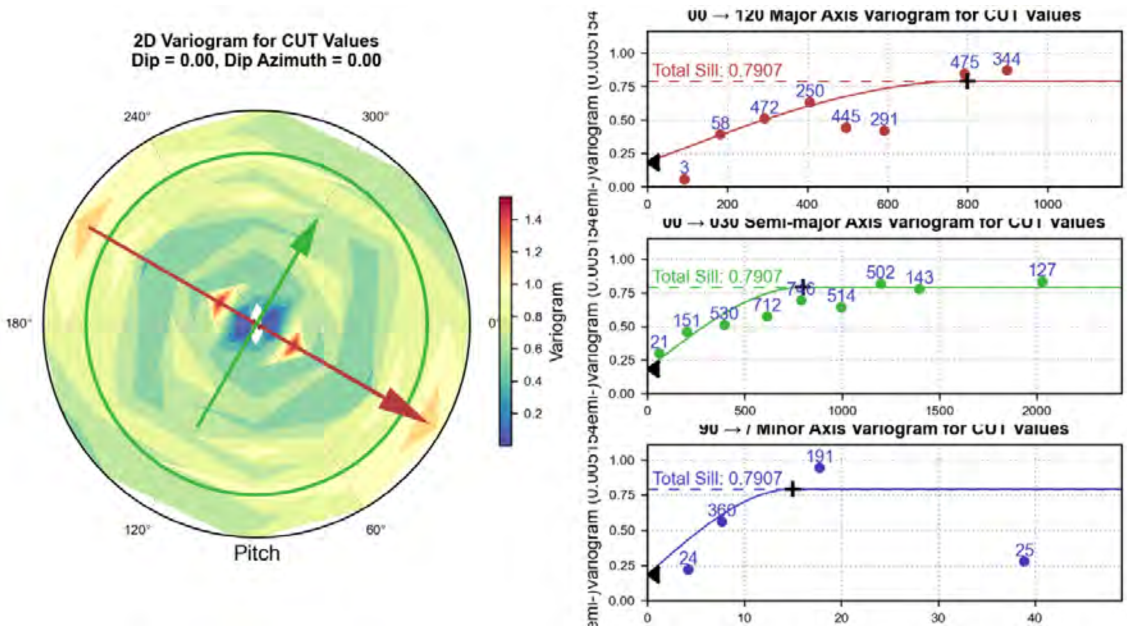
Variogram analysis was performed on the tailings deposit to determine the spread of the tailings when they were deposited. Variogram analysis was completed on the composited samples within the estimation domains to establish the direction of maximum continuity between sample pairs. The range for each variogram was found using a global variogram. The nugget was determined by examining the downhole variograms. The variograms shows large horizontal continuity with minor vertical continuity. Table 14-5 shows the Variogram parameters used for estimation.

Table 14-5: Variogram Parameters

Description	Dip	Dip Azimuth	Pitch	Major Axis	Semi-Major Axis	Minor Axis
CuT	0	0	30	800	800	15
Mo	0	0	30	600	600	20
Granular Size	0	0	30	900	900	25
K-ratio	0	0	30	600	600	25

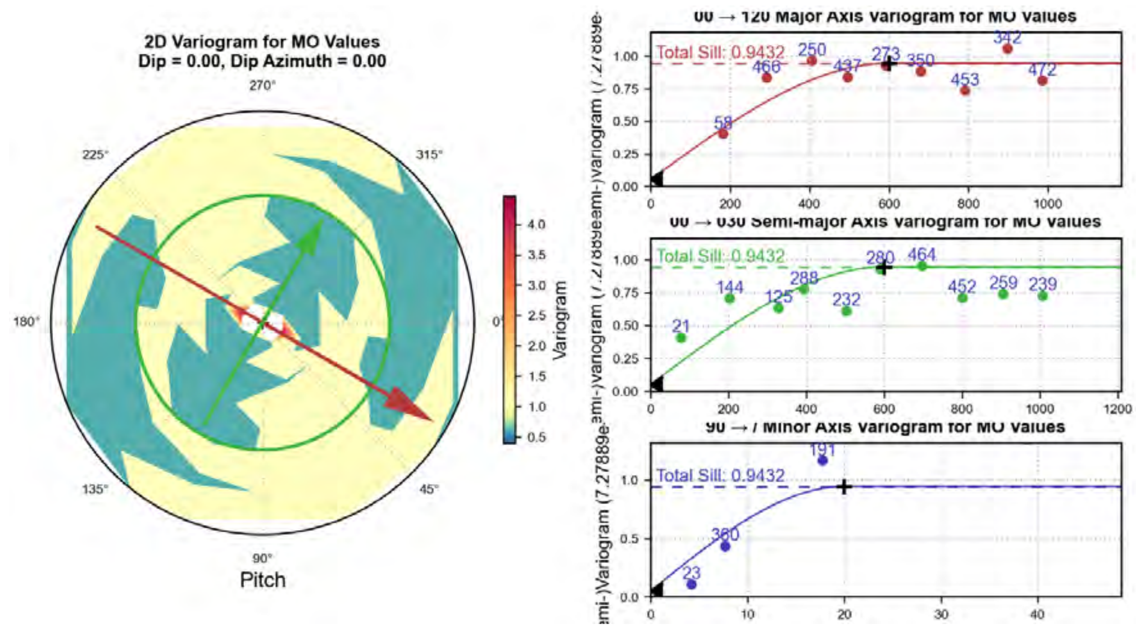
The variograms for CuT are summarized in Figure 14-13. The variograms for CuT show a horizontal range of around 800 meters and a vertical range of 15 meters.

Figure 14-13: Variogram for CuT



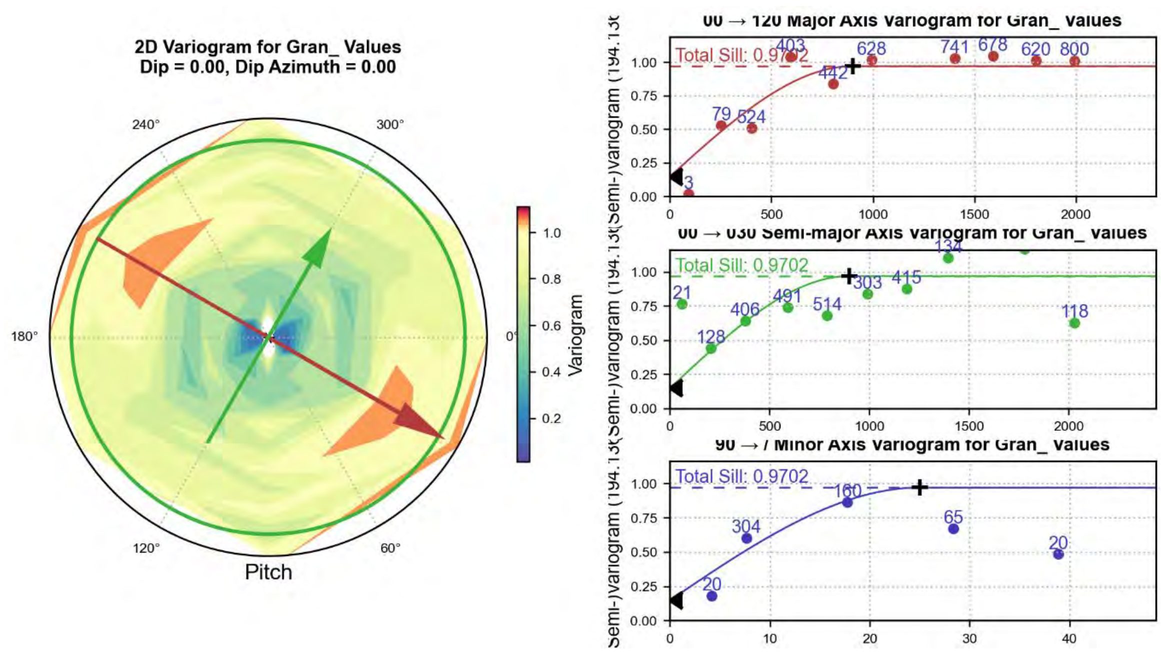
The variograms for Mo are summarized in Figure 14-14. The variograms for Mo show a horizontal range of around 600 meters and a vertical range of 20 meters.

Figure 14-14: Variogram for Mo



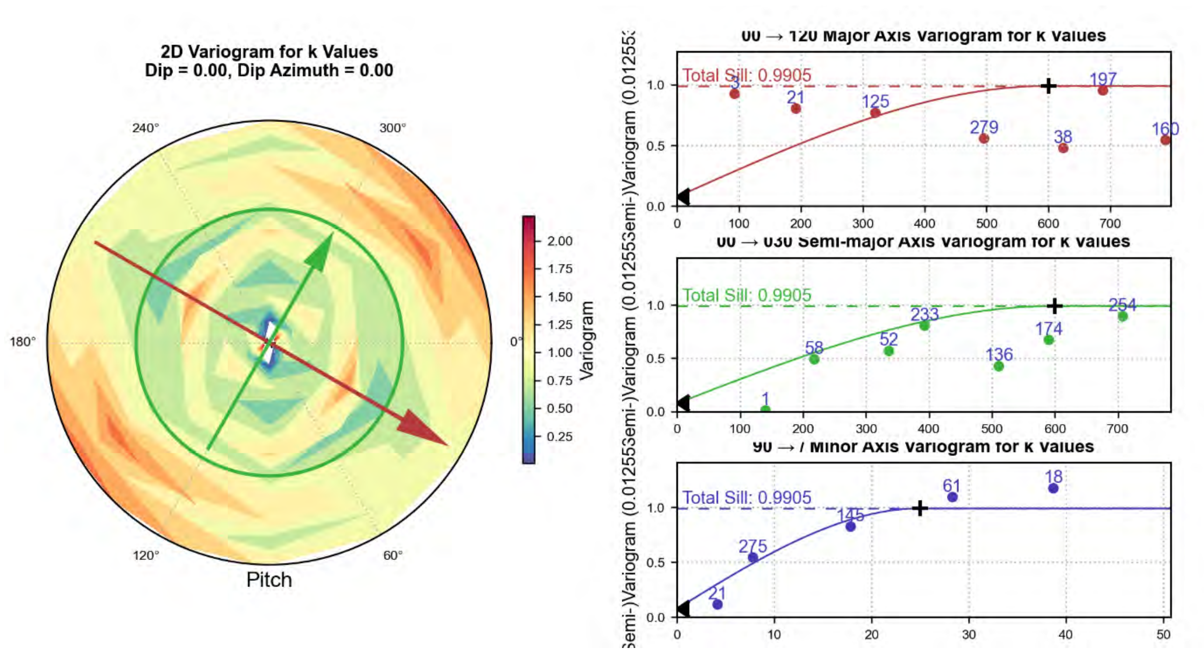
The variograms for granular sizes are summarized in Figure 14-15. The variograms for granular sizes show a horizontal range of around 900 meters and a vertical range of 25 meters.

Figure 14-15: Variogram for Granular sizes



The variograms for K-ratio are summarized in Figure 14-16. The variograms for granular sizes show a horizontal range of around 600 meters and a vertical range of 25 meters.

Figure 14-16: Variogram for K-ratio



14.1.4 Block Model

A block model with block dimensions of 25 metres x 25 metres x 5 metres was created, with 5 metres in the vertical direction. The surface of the deposit corresponds to the average elevation of 721.5 meters, and the floor or footwall of the deposit was provided by Amerigo. A comparative study was performed for grade estimation, where the grades were estimated using the Nearest Neighbor (NN), Inverse Distance squared (ID2), and Ordinary Kriging (OK). The resource estimation results use a density of 1.35 t/m^3. Table 14-6 shows the block model parameters.

Table 14-6: Block Model Parameters

Parameter	Value
Minimum X,Y,Z	341900,6203150,635 (X,Y,Z)
Parent block size	25x25x5 (X,Y,Z)
Azimuth	0
Maximum X,Y,Z	346425,6207100,750 (X,Y,Z)
Number of Blocks	657,754 = 181x158x23 (X,Y,Z)
Sub-blocking	None

The following parameters were used for estimation of different variables in the Cauquenes deposit:

- Minimum number of samples for a block: 2 composites
- Maximum number samples for a block: 20 composites
- Search Radius: ranges of the variograms
- Octants: without use of octants
- Restriction of Outliers: without restriction of outliers

14.1.4.1 Statistical Comparison

To ensure that the grade estimations are representative of the composites they are based on and to validate the resource estimation results, the block model grade estimation statistics were analyzed. Ms. Lane compared the means, quantiles, and variance between 5-meter composites, NN, ID2, and OK estimators, as shown in Table 14-7, Table 14-8, Table 14-9, and Table 14-10 for CuT, Mo, granular sizes, and K-ratio, respectively.

Table 14-7: Comparison of Composite Values to Grade Estimation Methods for CuT

Parameter	Composites	Parameter	NN	ID2	OK
Count	267	Block Count	59,135	58,812	58,812
Mean	0.254	Mean	0.258	0.257	0.259
SD	0.070	SD	0.076	0.049	0.056
CV	0.277	CV	0.294	0.191	0.214
Variance	0.005	Variance	0.006	0.002	0.003
Minimum	0.090	Minimum	0.090	0.090	0.147
Q1	0.211	Q1	0.214	0.226	0.223
Q2	0.242	Q2	0.241	0.247	0.247
Q3	0.288	Q3	0.290	0.277	0.280
Maximum	0.722	Maximum	0.722	0.635	0.615

Table 14-8: Comparison of Composite Values to Grade Estimation Methods for Mo

Parameter	Composites	Parameter	NN	ID2	OK
Count	265	Block Count	59,005	58,302	58,302
Mean	0.01970	Mean	0.02045	0.02061	0.02062
SD	0.00851	SD	0.00837	0.00703	0.00734
CV	0.43214	CV	0.40914	0.34126	0.35574
Variance	0.00007	Variance	0.00007	0.00005	0.00005
Minimum	0.00332	Minimum	0.00332	0.00383	0.00378
Q1	0.01159	Q1	0.01262	0.01503	0.01438
Q2	0.02080	Q2	0.02240	0.02233	0.02249
Q3	0.02640	Q3	0.02670	0.02589	0.02627
Maximum	0.05110	Maximum	0.05110	0.04586	0.04649

Table 14-9: Comparison of Composite Values to Grade Estimation Methods for Granular Size

Parameter	Composites	Parameter	NN	ID2	OK
Count	225	Block Count	59,631	59,501	59,501
Mean	20.6	Mean	21.3	20.5	21.0
SD	13.7	SD	14.8	9.0	10.7
CV	0.7	CV	0.7	0.4	0.5
Variance	186.9	Variance	218.7	80.3	114.1
Minimum	0.3	Minimum	0.3	0.5	1.0
Q1	9.4	Q1	9.4	14.1	13.0
Q2	19	Q2	19.2	19.6	19.8
Q3	28.7	Q3	30.3	25.4	27.5
Maximum	73.7	Maximum	73.7	66.1	64.6

Table 14-10: Comparison of Composite Values to Grade Estimation Methods for K-ratio

Parameter	Composites	Parameter	NN	ID2	OK
Count	205	Block Count	55,889	55,294	55,294
Mean	0.207	Mean	0.198	0.202	0.201
SD	0.112	SD	0.107	0.082	0.084
CV	0.543	CV	0.543	0.405	0.418
Variance	0.013	Variance	0.012	0.007	0.007
Minimum	0.040	Minimum	0.040	0.041	0.048
Q1	0.130	Q1	0.126	0.148	0.145
Q2	0.190	Q2	0.190	0.190	0.190
Q3	0.260	Q3	0.256	0.243	0.246
Maximum	0.720	Maximum	0.720	0.709	0.678

The NN estimator generates more blocks due to the lack of restrictions of having to use multiple samples and multiple drillholes to estimate a block grade. Both ID2 and OK produced similar quantiles, means, variance, etc. For CuT and granular size, the ID2 estimation shows a larger range, whereas for Mo, the OK estimation shows a larger range.

14.1.4.2 Swath Plots

Swath plots of the various estimation methods (NN, ID2, and OK) were used to compare the results from each estimation method to the composite values and examine which method smoothed the estimated grades. Figure 14-17, Figure 14-18, Figure 14-19, and Figure 14-20 show the swath plots for CuT, Mo, granular size, and K-ratio, respectively. The swath plots show a general trend that the ID2 estimator smoothed out drastic swings in grade while not over smoothing local variability.

Figure 14-17: Swath Plot X axis for CuT

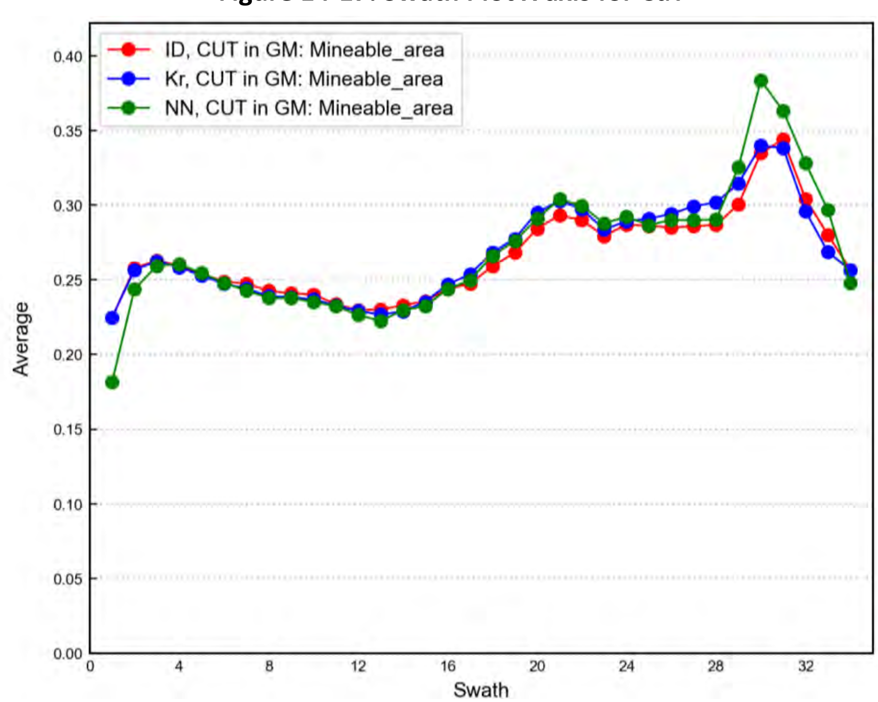


Figure 14-18: Swath Plot X axis for Mo

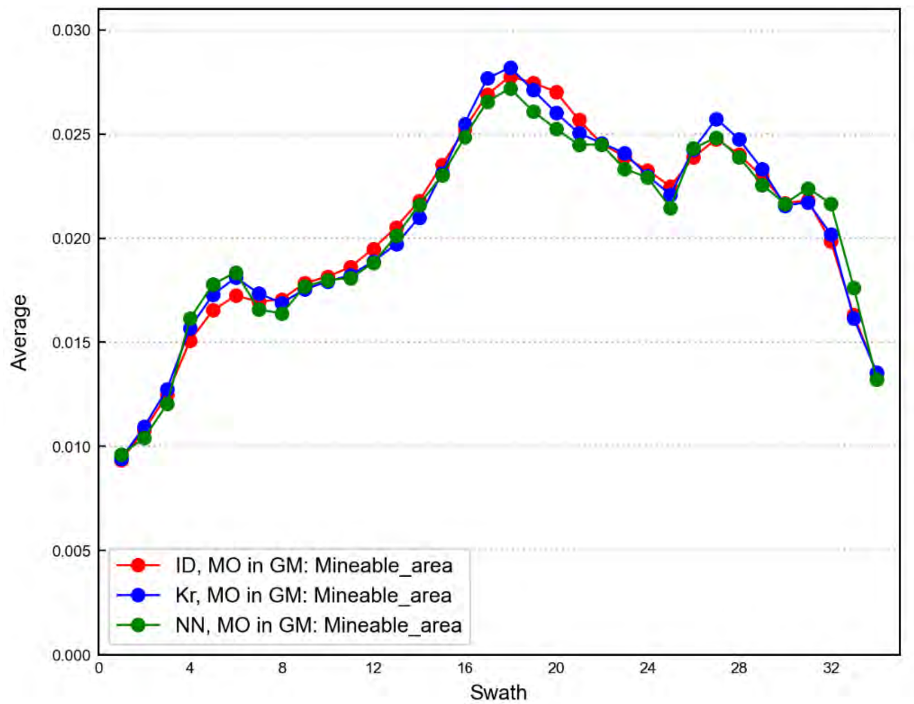


Figure 14-19: Swath Plot X axis for Granular size

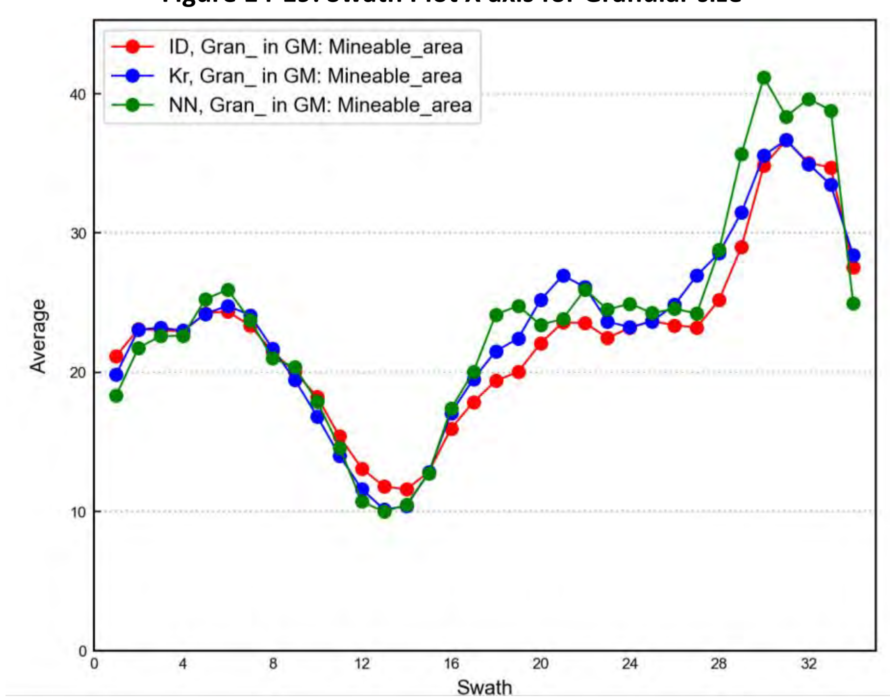
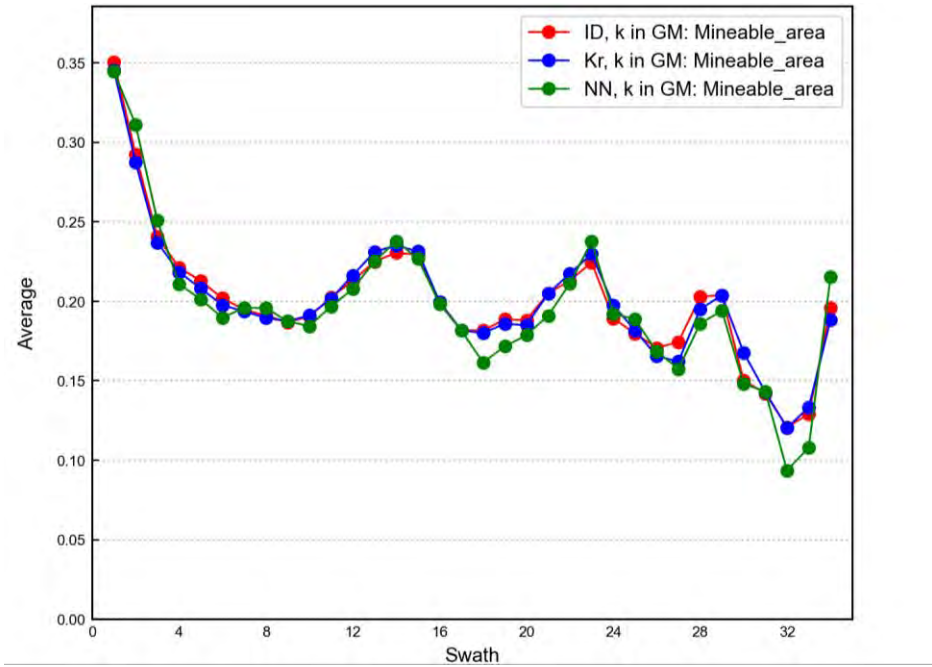


Figure 14-20: Swath Plot X axis for K-ratio



14.1.4.3 Block Model Validation

For the resource estimation, the ID2 method was selected because it smoothed out drastic swings in grade while not over-smoothing local variability. The model was validated by visually inspecting comparisons of assay and composite values to estimated block values. Figure 14-21 through Figure 14-28 show the comparison of the model grade from the assay. The comparison did not reveal any major discrepancies.

Figure 14-21: Visual Comparison Composite to Block Model Grade–- Plan View of Section 675 for CuT

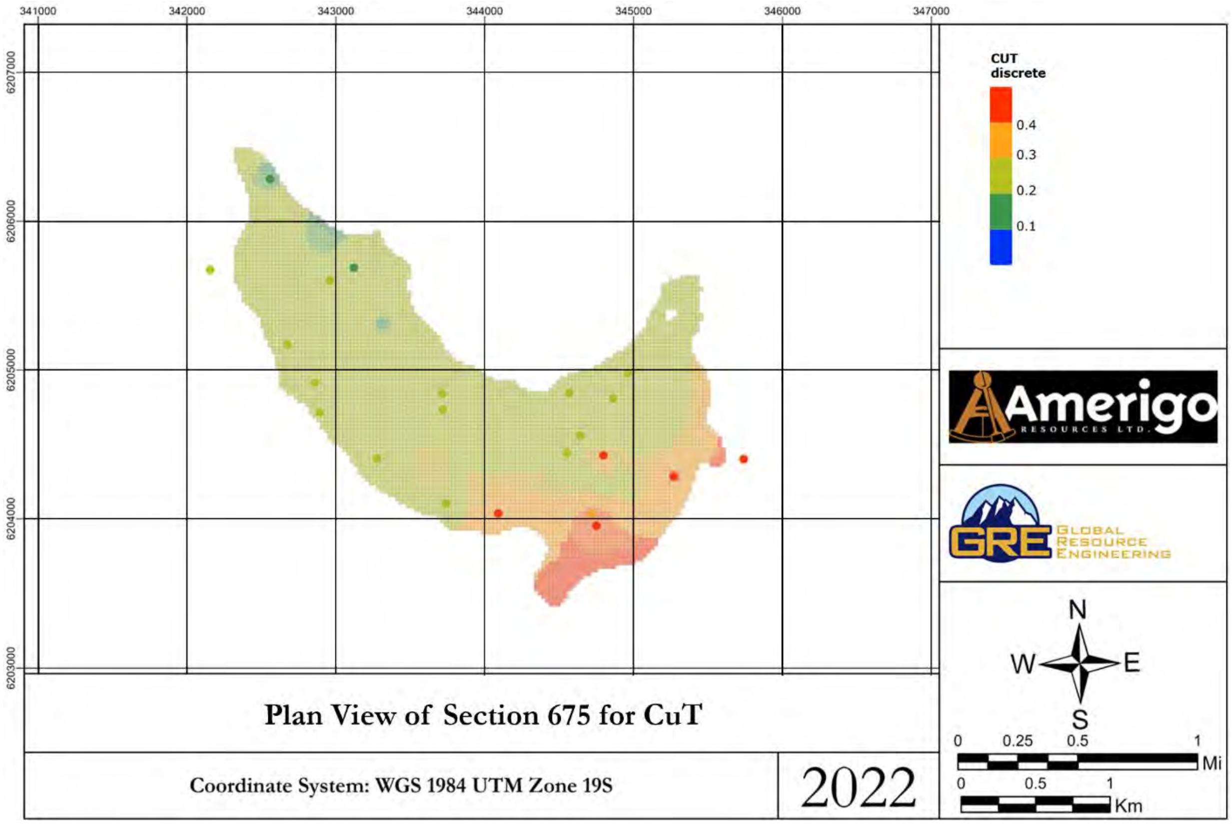


Figure 14-22: Visual Comparison Composite to Block Model Grade–- Plan View of Section 675 for Mo

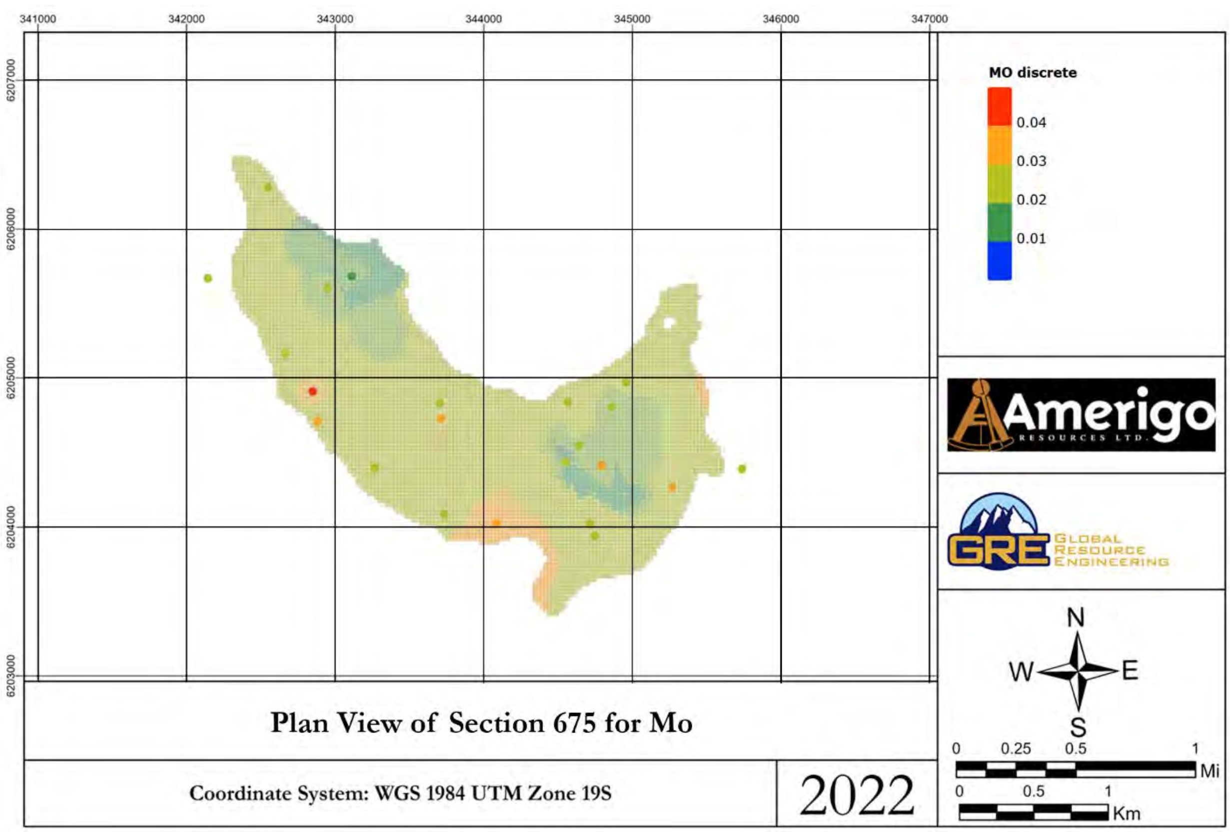


Figure 14-23: Visual Comparison Composite to Block Model –- Plan View of Section 675 for Granular size

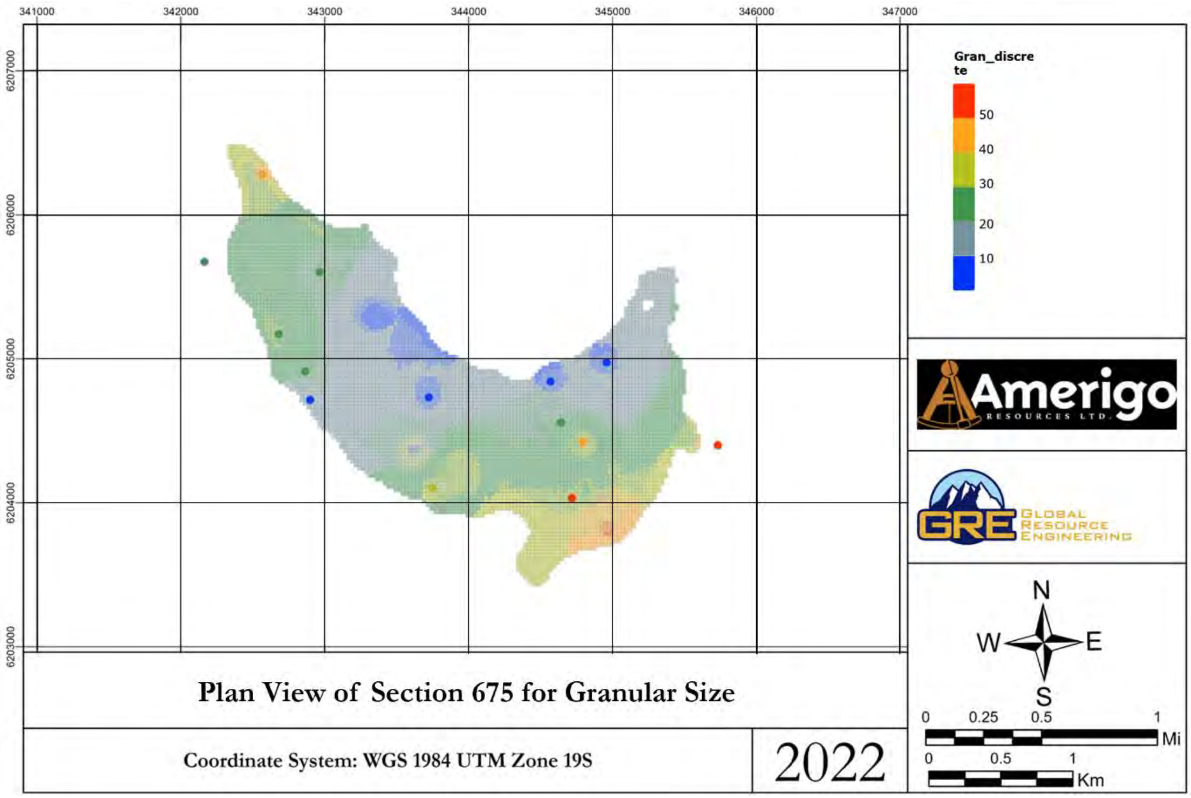


Figure 14-24: Visual Comparison Composite to Block Model–- Plan View of Section 675 for K-ratio

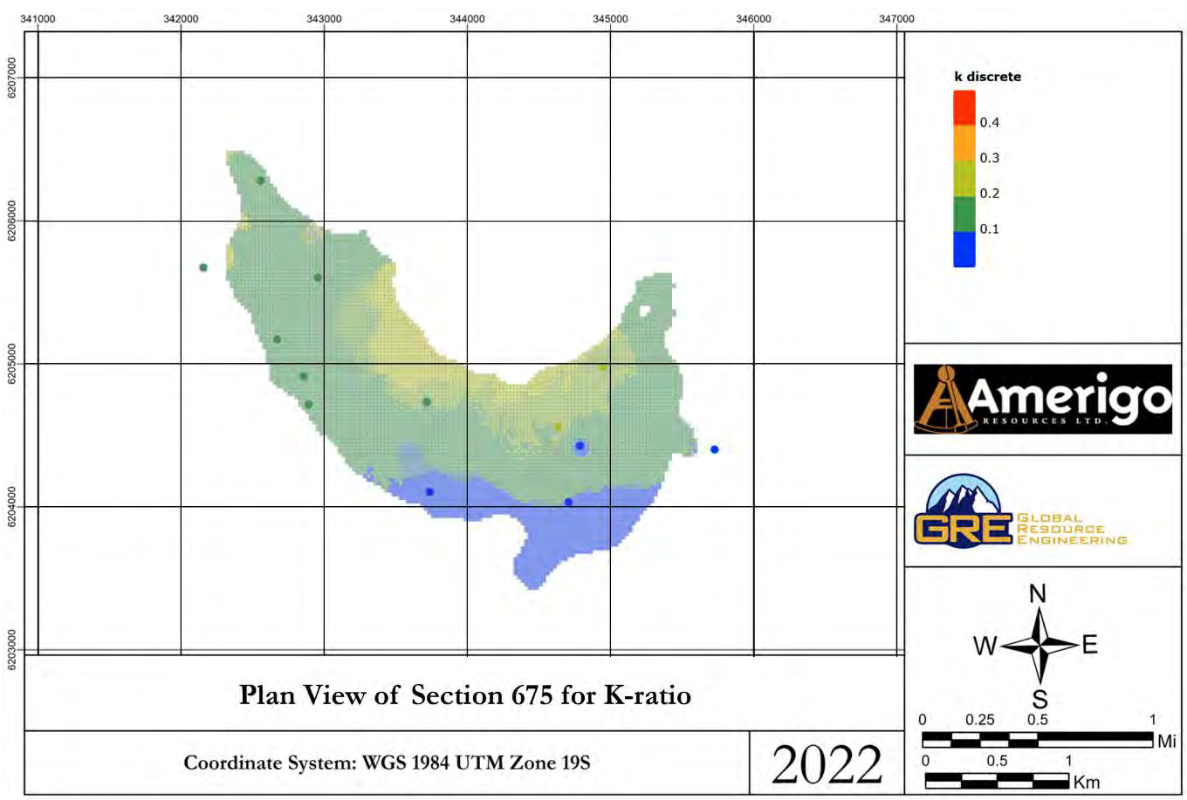


Figure 14-25: Visual Comparison Composite to Block Model – Cross Section for CuT

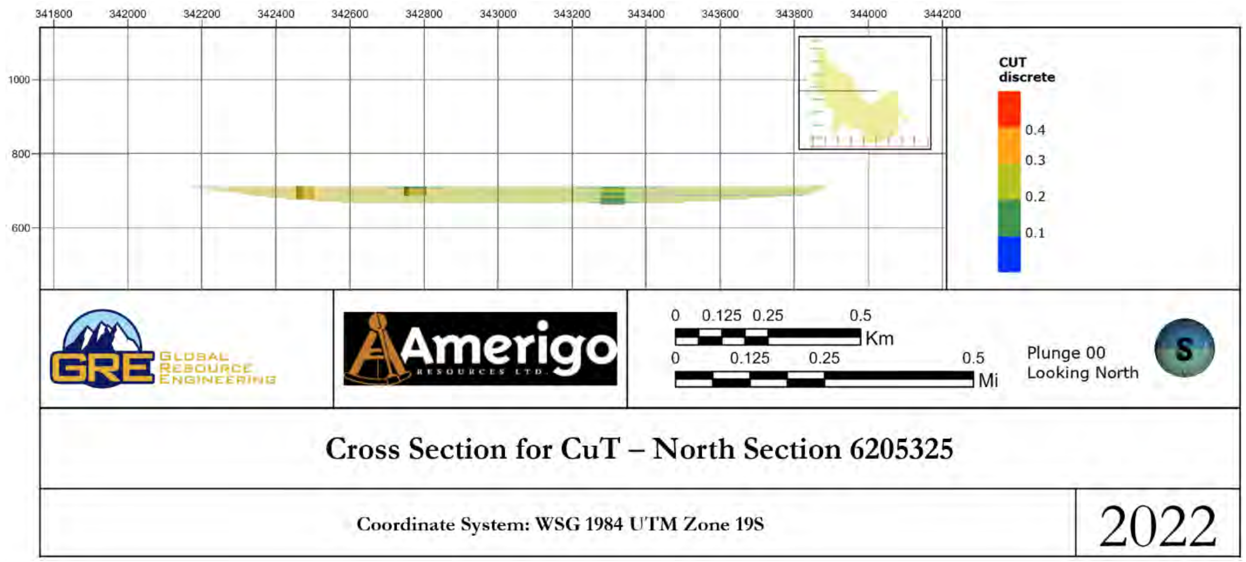


Figure 14-26: Open Pit Visual Comparison Composite to Block Model – Cross Section for Mo

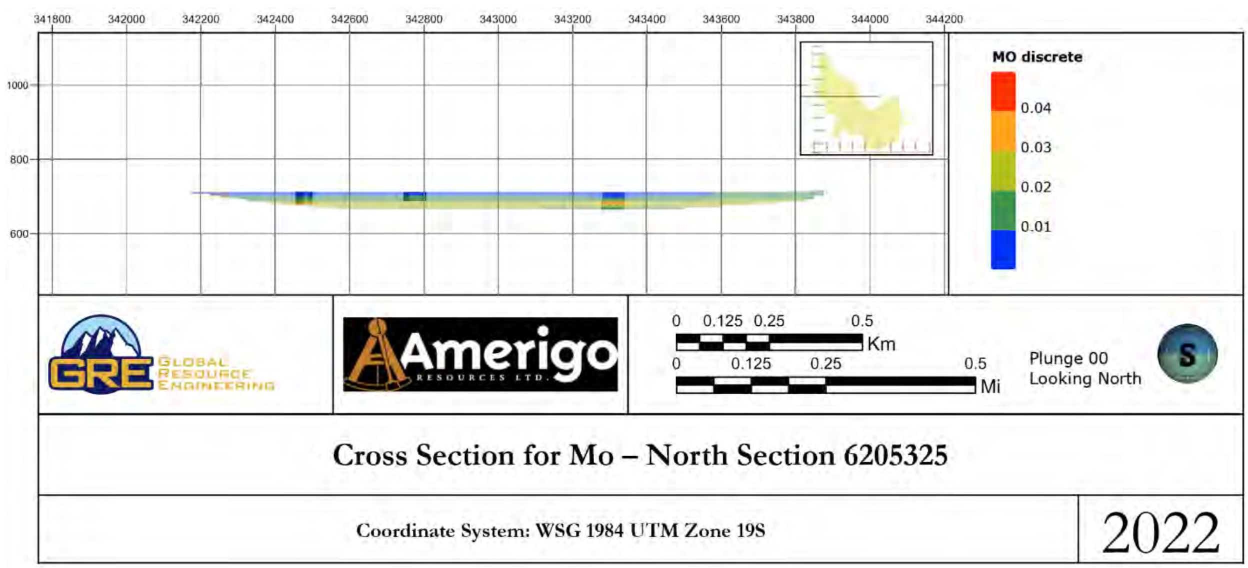


Figure 14-27: Open Pit Visual Comparison Composite to Block Model – Cross Section for Granular Size

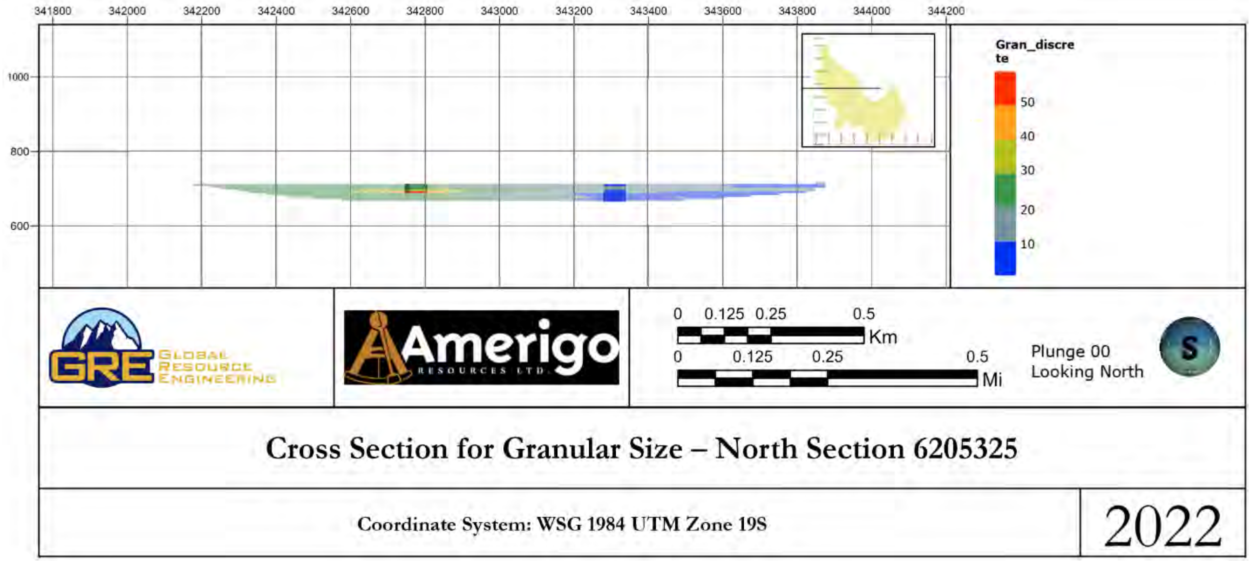
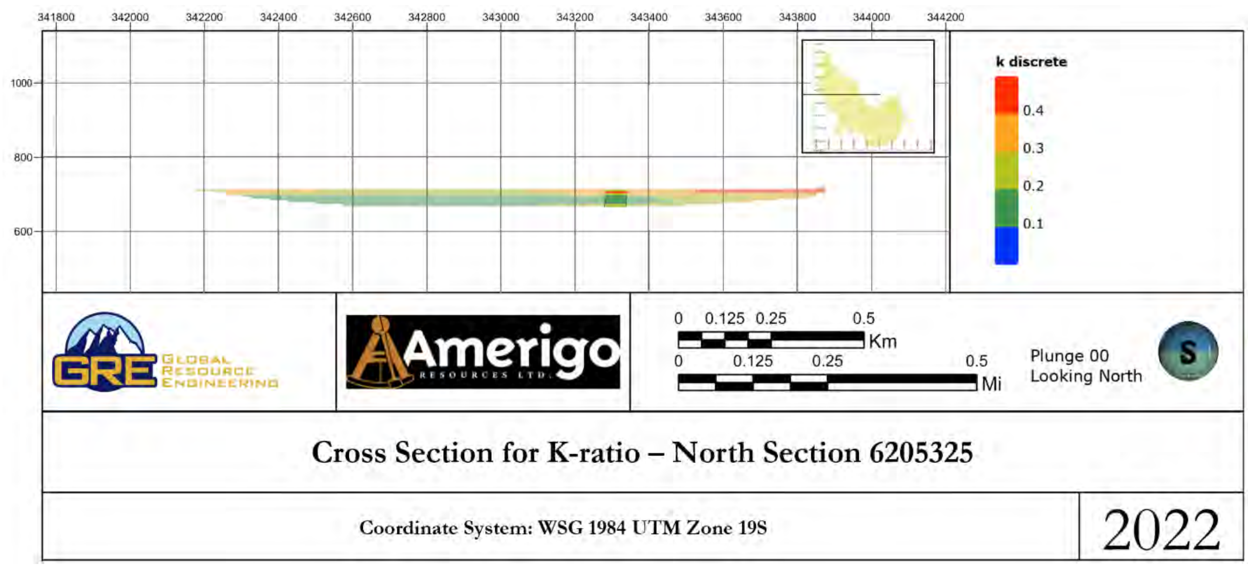


Figure 14-28: Open Pit Visual Comparison Composite to Block Model – Cross Section for K-ratio

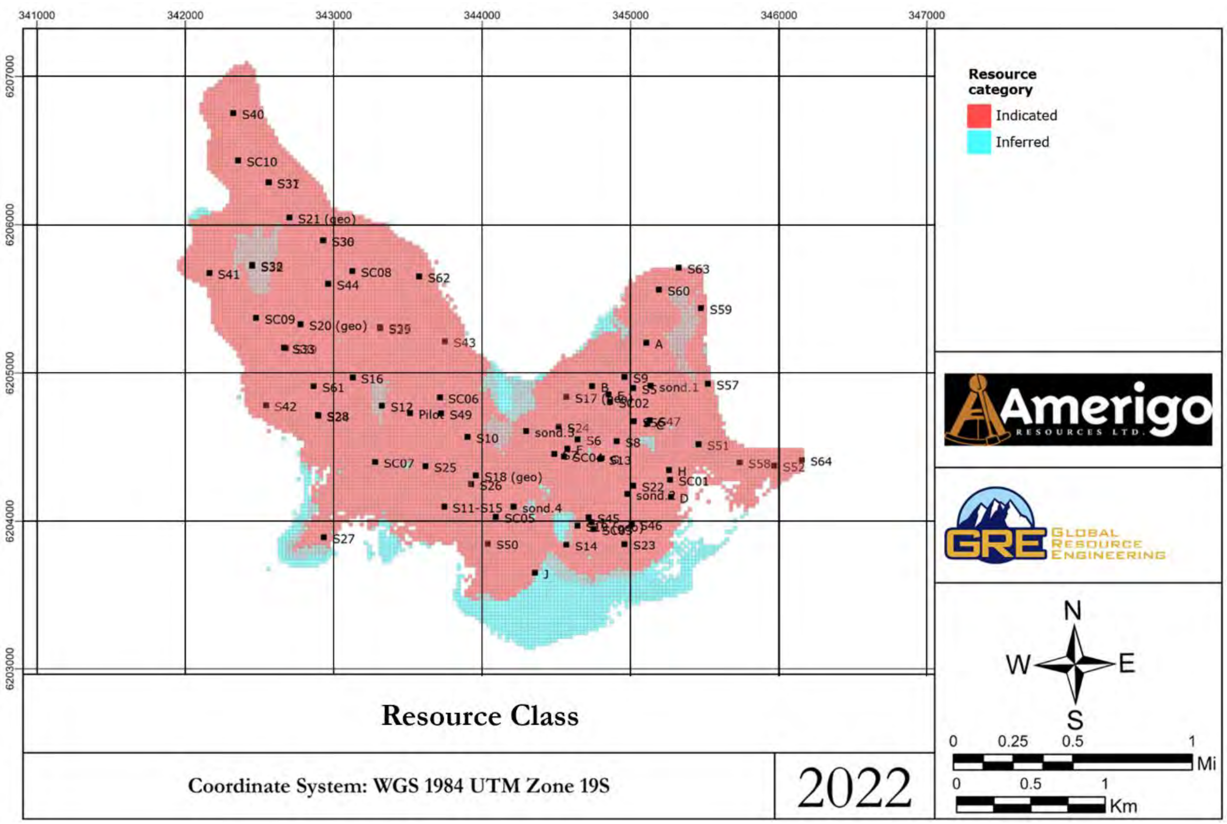


14.1.5 Resource Classification

The Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards on Mineral Resources and Mineral Reserves states that an indicated mineral resource is that part of a mineral resource for which quantity, grade or quality are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An inferred mineral resource is that part of a mineral resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. An inferred mineral resource has a lower level of confidence than that applied to an indicated mineral resource and must not be converted to a mineral reserve. An inferred mineral resource is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, trenches, pits, workings and drill holes.

For purposes of reporting the mineral resource estimate for Cauquenes, Ms. Lane has categorized all the resources as either indicated or inferred. The blocks which fall at half of the variogram range (400 metres) from a drill hole with a minimum of two composites are classified as indicated blocks. All the remaining blocks are classified as inferred. A plan view of the estimated resource classes is shown in Figure 14-29.

Figure 14-29: Cauquenes Resource Class



14.1.6 Mineral Resource Statement

CIM Definition Standards for Mineral Resources and Mineral Reserves (2014) defines a mineral resource as: "a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling." The mineral resources may be impacted by further infill and exploration drilling that may result in increase or decrease in future resource evaluations. The mineral resources may also be affected by subsequent assessment of mining, environmental, processing, permitting, taxation, socio-economic, and other factors. Mineral resources are not mineral reserves and do not have demonstrated economic viability. Mineral reserves can only be estimated based on the results of an economic evaluation as part of a Preliminary Feasibility Study or Feasibility Study. As a result, no mineral reserves have been estimated as part of this study. There is no certainty that all or any part of the mineral resources will be converted into a mineral reserve. Table 14-11 shows the mineral resources for different class without any cut-off grade.

Table 14-11: Mineral Resource for the Cauquenes Deposit

Resource Category	Mass (M t)	*Average Value*				*Material Content*		
		K Ratio	CuT (%)	Floatable Cu (%)	Mo (%)	CuT (M lbs)	Floatable Cu (M lbs)	Mo (M lbs)
Indicated	207.09	0.205	0.255	0.213	0.0203	1,163.55	973.66	92.58
Inferred	13.61	0.137	0.278	0.248	0.0238	83.41	74.52	7.15
Total	**220.70**	**0.201**	**0.256**	**0.215**	**0.0205**	**1,246.96**	**1,048.17**	**99.73**

Differences may occur in totals due to rounding.

The mining method being used at the Cauquenes deposit is hydraulic extraction of all the material apart from some areas with physical limitations. The resource statement at different cut-off grades for copper is shown in Table 14-12. The total mineral resource of 220.7 million tonnes is available , of which 185.23 million is included in the mine plan at a grade of 0.255% Cu and 0.0202% Mo, with 877 million pounds of copper and 82 million pounds of molybdenum. Table 14-13 shows the distribution of mineral resources within the different mining areas.

Table 14-12: Mineral Resource for the Cauquenes Deposit at different cut-off grades

Cut-off Grade CuT (%)	Resource Category	Mass (M t)	*Average Value*				*Material Content*		
			K Ratio	CuT (%)	Floatable Cu (%)	Mo (%)	CuT (M lbs)	Floatable Cu (M lbs)	Mo (M lbs)
0.00	Indicated	207.09	0.205	0.255	0.213	0.0203	1,163.55	973.66	92.58
	Inferred	13.61	0.137	0.278	0.248	0.0238	83.41	74.52	7.15
	Total	**220.70**	**0.201**	**0.256**	**0.215**	**0.0205**	**1,246.96**	**1,048.17**	**99.73**
0.05	Indicated	207.09	0.205	0.255	0.213	0.0203	1,163.55	973.66	92.58
	Inferred	13.61	0.137	0.278	0.248	0.0238	83.41	74.52	7.15
	Total	**220.70**	**0.201**	**0.256**	**0.215**	**0.0205**	**1,246.96**	**1,048.17**	**99.73**
0.10	Indicated	207.07	0.205	0.255	0.213	0.0203	1,163.51	973.62	92.57
	Inferred	13.61	0.137	0.278	0.248	0.0238	83.41	74.52	7.15
	Total	**220.68**	**0.201**	**0.256**	**0.215**	**0.0205**	**1,246.91**	**1,048.14**	**99.73**
0.15	Indicated	206.69	0.205	0.255	0.213	0.0203	1,162.44	972.79	92.49
	Inferred	13.61	0.137	0.278	0.248	0.0238	83.40	74.51	7.15
	Total	**220.30**	**0.201**	**0.257**	**0.216**	**0.0205**	**1,245.84**	**1,047.30**	**99.64**
0.20	Indicated	198.86	0.203	0.258	0.216	0.0204	1,129.74	946.58	89.63
	Inferred	13.38	0.135	0.280	0.250	0.0240	82.44	73.76	7.08
	Total	**212.24**	**0.199**	**0.259**	**0.218**	**0.0207**	**1,212.18**	**1,020.33**	**96.71**
0.25	Indicated	94.69	0.190	0.291	0.247	0.0200	607.09	514.74	41.78
	Inferred	6.46	0.096	0.342	0.315	0.0275	48.81	44.88	3.92
	Total	**101.16**	**0.184**	**0.294**	**0.251**	**0.0205**	**655.90**	**559.62**	**45.71**
0.30	Indicated	22.29	0.132	0.350	0.312	0.0243	171.84	153.18	11.93
	Inferred	4.06	0.070	0.387	0.362	0.0287	34.60	32.39	2.56
	Total	**26.35**	**0.122**	**0.355**	**0.319**	**0.0249**	**206.44**	**185.56**	**14.49**
0.35	Indicated	8.26	0.085	0.404	0.373	0.0277	73.53	67.94	5.05
	Inferred	2.81	0.063	0.411	0.387	0.0287	25.49	24.00	1.78
	Total	**11.07**	**0.080**	**0.406**	**0.377**	**0.0280**	**99.02**	**91.93**	**6.83**
0.40	Indicated	3.49	0.071	0.450	0.420	0.0262	34.63	32.34	2.01

Cut-off Grade CuT (%)	Resource Category	Mass (M t)	*Average Value*				*Material Content*		
			K Ratio	CuT (%)	Floatable Cu (%)	Mo (%)	CuT (M lbs)	Floatable Cu (M lbs)	Mo (M lbs)
	Inferred	1.71	0.060	0.431	0.407	0.0281	16.26	15.35	1.06
	Total	**5.20**	**0.067**	**0.444**	**0.416**	**0.0268**	**50.89**	**47.68**	**3.08**

Differences may occur in totals due to rounding.

Table 14-13: Distribution of Mineral Resources by Mining Area

Mining Area	Mass (M t)	*Average Value*				*Material Content*		
		K Ratio	CuT (%)	Floatable Cu (%)	Mo (%)	CuT (M lbs)	Floatable Cu (M lbs)	Mo (M lbs)
Buffer Zone	18.93	0.197	0.286	0.241	0.0225	119.26	100.67	9.38
Basin (Mineable Area)	185.23	0.197	0.255	0.215	0.0202	1,039.90	876.69	82.48
Security Strip	15.22	0.266	0.235	0.188	0.0212	78.83	63.05	7.11
Wall	1.32	0.164	0.308	0.266	0.0261	8.97	7.76	0.76
Total	**220.70**	**0.201**	**0.256**	**0.215**	**0.0205**	**1,246.96**	**1,048.17**	**99.73**

The resources are then further divided based on the estimated granular sizes. Table 14-14 shows the resources based on different granular size cut-offs.

Table 14-14: Mineral Resource Based on the Granular Size

				Average Value							*Material Content*					
Resource Category	Particle size	Mass (M t)	Cumulative Mass (M t) above particle size	K Ratio	CuT (%)	Cumulative CuT (%) above particle size	Floatable Cu (%)	Cumulative Floatable Cu (%) above particle size	Mo (%)	Cumulative Mo (%) above particle size	CuT (M lbs)	Cumulative CuT (M lbs) above particle size	Floatable Cu (M lbs)	Cumulative Floatable Cu (M lbs) above particle size	Mo (M lbs)	Cumulative Mo (M lbs) above particle size
Indicated	<10%	19.90	207.09	0.25	0.22	0.25	0.18	0.21	0.024	0.020	96.93	1,163.55	77.38	973.66	10.39	92.58
	10-20%	89.58	187.19	0.23	0.24	0.26	0.20	0.22	0.020	0.020	471.64	1,066.62	385.50	896.27	39.94	82.19
	20-30%	73.10	97.61	0.19	0.26	0.28	0.22	0.24	0.019	0.020	424.48	594.99	358.97	510.78	31.16	42.25
	30-40%	21.43	24.51	0.14	0.30	0.32	0.27	0.28	0.020	0.021	143.42	170.51	126.85	151.80	9.44	11.09
	40-50%	2.79	3.08	0.10	0.38	0.40	0.35	0.37	0.024	0.024	23.52	27.09	21.68	24.96	1.48	1.65
	50-60%	0.19	0.28	0.08	0.53	0.57	0.49	0.52	0.027	0.027	2.19	3.57	2.01	3.28	0.11	0.17
	>60%	0.10	0.10	0.09	0.65	0.65	0.60	0.60	0.027	0.027	1.38	1.38	1.27	1.27	0.06	0.06
	Total	**207.09**		**0.21**	**0.25**		**0.21**		**0.020**		**1,163.55**		**973.66**		**92.58**	
Inferred	<10%	0.15	13.61	0.27	0.22	0.28	0.17	0.25	0.028	0.024	0.72	83.41	0.56	74.52	0.09	7.15
	10-20%	5.97	13.47	0.17	0.22	0.28	0.19	0.25	0.021	0.024	29.57	82.69	25.44	73.95	2.83	7.06
	20-30%	5.20	7.50	0.12	0.29	0.32	0.26	0.29	0.025	0.026	32.86	53.12	29.51	48.51	2.82	4.24
	30-40%	2.30	2.30	0.07	0.40	0.40	0.38	0.38	0.028	0.028	20.26	20.26	19.00	19.00	1.41	1.41
	40-50%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
	50-60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
	>60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**13.61**		**0.14**	**0.28**		**0.25**		**0.024**		**83.41**		**74.52**		**7.15**	
Total	<10%	20.04	220.70	0.25	0.22	0.26	0.18	0.22	0.024	0.020	97.64	1,246.96	77.95	1,048.17	10.48	99.73
	10-20%	95.55	200.66	0.22	0.24	0.26	0.20	0.22	0.020	0.020	501.21	1,149.31	410.94	970.23	42.77	89.25
	20-30%	78.30	105.11	0.18	0.26	0.28	0.23	0.24	0.020	0.020	457.34	648.10	388.49	559.29	33.98	46.48
	30-40%	23.73	26.81	0.14	0.31	0.32	0.28	0.29	0.021	0.021	163.67	190.77	145.84	170.80	10.86	12.50
	40-50%	2.79	3.08	0.10	0.38	0.40	0.35	0.37	0.024	0.024	23.52	27.09	21.68	24.96	1.48	1.65
	50-60%	0.19	0.28	0.08	0.53	0.57	0.49	0.52	0.027	0.027	2.19	3.57	2.01	3.28	0.11	0.17
	>60%	0.10	0.10	0.09	0.65	0.65	0.60	0.60	0.027	0.027	1.38	1.38	1.27	1.27	0.06	0.06
	Total	**220.70**		**0.20**	**0.26**		**0.22**		**0.020**		**1,246.96**		**1,048.17**		**99.73**	

Differences may occur in totals due to rounding.

14.2 Colihues Tailings Deposit

The mineral resource estimate for the Colihues deposit is based on the historical records of the tailings dumped in the Colihues tailings impoundment and the material extracted from the Colihues tailings impoundment.

Historical records of El Teniente's mill tailings show that from 1977 to 1986 approximately 216 million tonnes of tailings at a grade 0.263% Cu were deposited in the Colihues tailings impoundment. MVC's production records show that from 2006 to 2015, approximately 72 million tonnes of tailings at a 0.265% Cu were extracted from the Colihues tailings impoundment.

Table 14-15: Historical El Teniente's Mill Tailings Deposited in the Colihues Tailings Impoundment

Year	Annual Tailings (tonnes)	Copper Grade %	Contained Cu (tonnes)
1977	9,767,003	0.246	24,027
1978	19,538,624	0.229	44,743
1979	20,441,864	0.257	52,536
1980	20,320,355	0.275	55,881
1981	18,943,890	0.271	51,338
1982	22,453,713	0.297	66,688
1983	23,381,476	0.271	63,364
1984	23,764,923	0.251	59,650
1985	26,493,078	0.247	65,438
1986	31,383,984	0.270	84,737
Total	**216,488,910**	**0.263**	**568,401**

Table 14-16: Production Record from the Colihues Tailings Impoundment

Year	Annual Tailings (tonnes)	Copper Grade %	Contained Cu (tonnes)
2006	489,661	0.276	1,352
2007	766,421	0.249	1,907
2008	2,835,295	0.260	7,381
2009	5,105,011	0.291	14,863
2010	9,740,966	0.296	28,790
2011	8,927,728	0.290	25,880
2012	11,160,771	0.283	31,574
2013	10,750,578	0.270	29,022
2014	12,860,397	0.227	29,184
2015	9,938,466	0.226	22,423
Total	**72,575,294**	**0.265**	**192,375**

Based on historical record (Table 14-15) and production record (Table 14-16), the remaining balance is 143,913,616 tonnes at 0.261% Cu. The QP observed this facility while on site. Without supporting drillholes, this should be considered an Inferred Mineral Resource. A portion of the fresh tailings from El Teniente is currently deposited in the Colihues tailings impoundment but at a lower average grade than shown in Table 14-16.

15.0 MINERAL RESERVE ESTIMATES

“Mineral Reserves” differ from “Mineral Resources” in that Mineral Reserves are known to be economically feasible for extraction. The CIM Definition Standards require the completion of a Preliminary Feasibility Study (PFS) as the minimum prerequisite for the conversion of Mineral Resources to Mineral Reserves. The MVC operation is a going concern, however GRE did not prepare a mine plan and conduct its own economic analysis, and since a PFS has not been completed for the MVC Operation mineral reserve estimates have not been made.

16.0 MINING METHODS

Tailings in the Cauquenes tailings impoundment are planned to be removed at a rate of 45,000 tonnes per day via a hydraulic monitoring system using high pressure water guns operating at 30 bar. High pressure water is directed onto the surface of the tailings in a sweeping motion to create a ditch on the surface. The monitors work horizontally and vertically, operated by remote control using a hydraulic system of electronic valves that allow them to rotate and advance. Photo 16-1 shows the hydraulic monitoring system. Photo 16-2 shows the remote control operation of the hydraulic monitoring system. Photo 16-3 shows the high pressure water guns of the hydraulic monitoring system directed at the surface. A single monitoring unit is capable of sustaining a production rate of 8,000 to 10,000 tonnes per day. Mining benches are 10 metres high, and access ramps are created to relocate the hydraulic monitors. The depth of the Cauquenes tailings deposit is approximately 50 metres, requiring five mining benches. The slurry drains to the center of the sump by gravity and is channeled by the ditches made by the monitor. The slurry has a density of approximately 47% solids and is pumped to the processing plant by means of vertical 150 kilowatt (kW) sump pumps and 350 kW horizontal booster pumps, via 10-inch high density polyethylene (HDPE) pipelines. The operation of four to six hydraulic monitors and two to four sumps is necessary to sustain a production rate of 45,000 tonnes per day.

Photo 16-1: Hydraulic Monitoring System

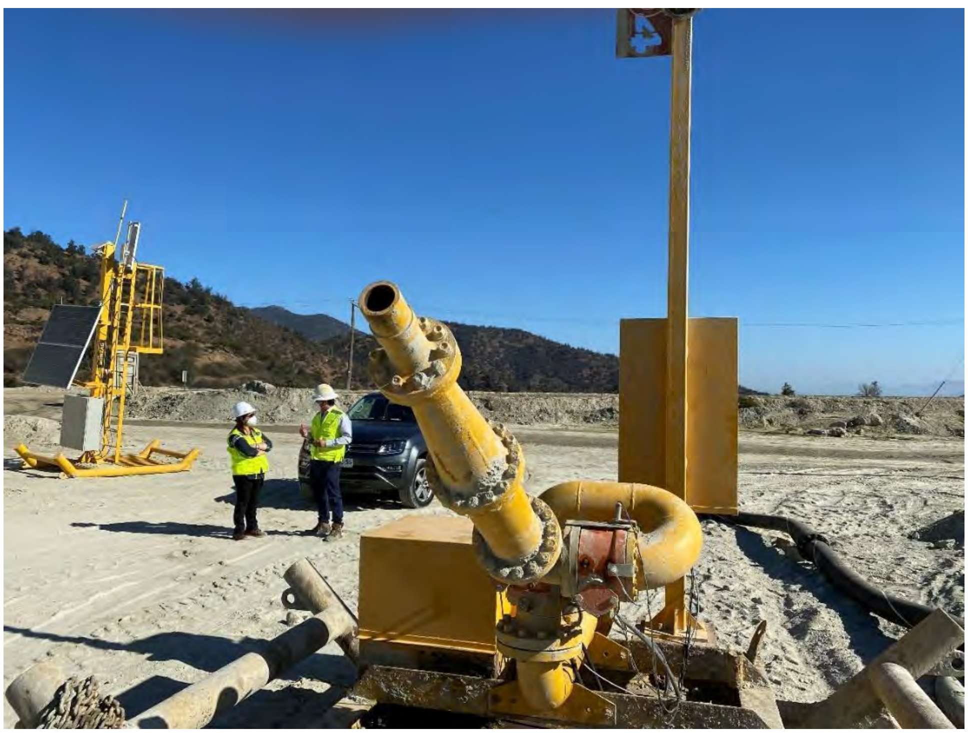


Photo 16-2: Remote Control Operation of Hydraulic Monitoring System

Photo 16-3: Hydraulic Monitor directed on the Surface

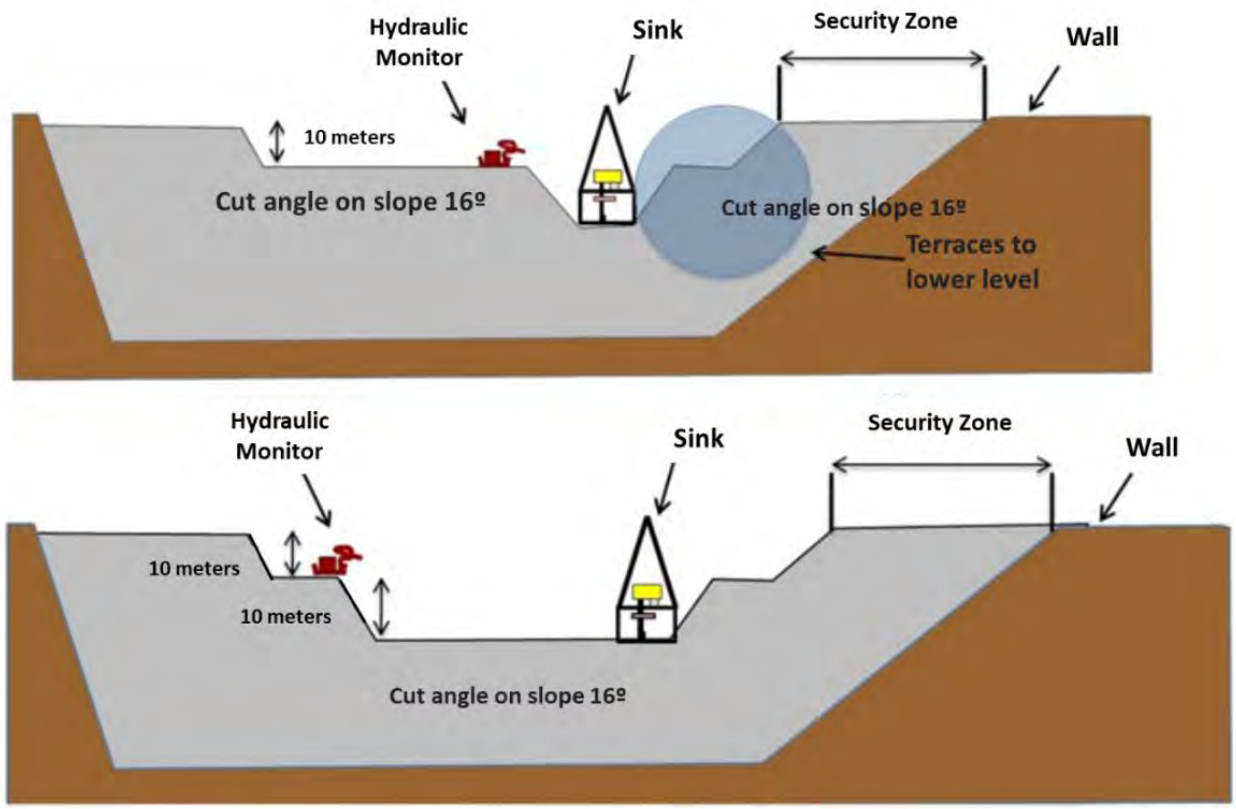
The general method of operation is as follows:

- Construct a sump in the tailings deposit and install vertical slurry pumps
- Commence extraction down to 10 metres using hydraulic monitors and allow slurry to drain to the sump
- Pump tailings to the plant at a density of 47% solids

- Reposition the monitors sequentially away from the sump to advance the extraction

This procedure is repeated until the bottom of the tailings deposit is reached, approximately 50 meters deep. Safety zones are maintained near the walls to ensure the integrity of the walls. A schematic of the extraction method is presented in Figure 16-1.

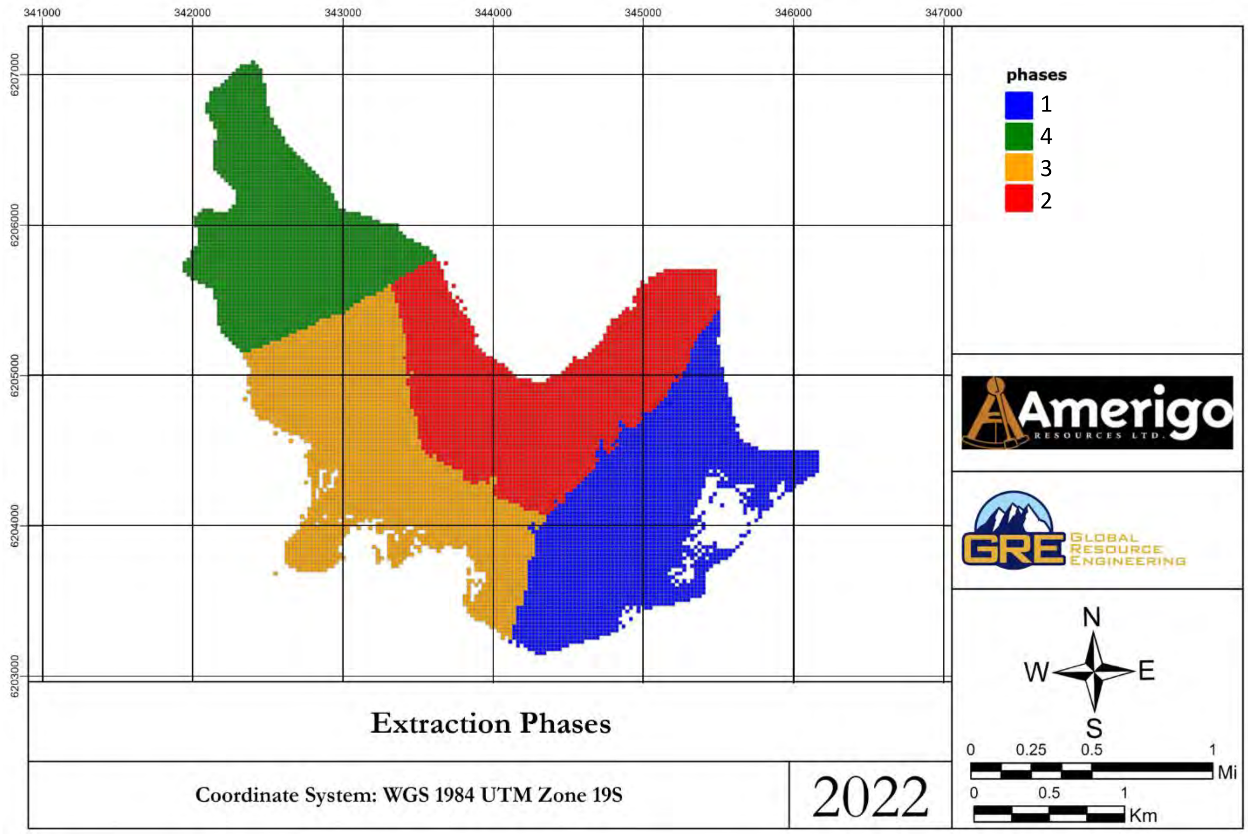
Figure 16-1: Hydraulic Extraction Schematic



16.1 Production Phases

The ideal tailings extraction plan is to employ phases, based on the granular sizes. The location with highest granular particle sizes should be extracted first as the coarse material is preferential. The material with the lowest granular sizes will be extracted last (Figure 16-2). The overall target is to extract the all the available material.

Figure 16-2: Cauquenes Tailings Impoundment Extraction Phases



The Mineral Resources by phase are shown in Table 16-1.

To date, the actual Cauquenes grade in mined areas has been lower than the grade recorded in the historical DET records (Table 6-1 and Table 6-6). In the elaboration of its production plans, MVC relies more heavily on the data provided by recent drill campaigns conducted by MVC.

Table 16-1: Cauquenes Tailings Impoundment Resources by Phase

				Average Value							*Material Content*					
Phases	**Particle size**	**Mass (M t)**	**Cumulative Mass (M t) above particle size**	**K Ratio**	**CuT (%)**	**Cumulative CuT (%) above particle size**	**Floatable Cu (%)**	**Cumulative floatable Cu(%) above particle size**	**Mo (%)**	**Cumulative Mo (%) above particle size**	**CuT (M lbs)**	**Cumulative CuT (M lbs) above particle size**	**Floatable Cu (M lbs)**	**Cumulative Floatable Cu (M lbs) above particle size**	**Mo (M lbs)**	**Cumulative Mo (M lbs) above particle size**
Phase 1	<10%	0.00	19.89	—	—	0.33	—	0.30	—	0.026	0.00	146.38	0.00	132.92	0.000	11.231
	10-20%	3.58	19.89	0.16	0.24	0.33	0.21	0.30	0.026	0.026	19.22	146.38	16.53	132.92	2.035	11.231
	20-30%	8.31	16.31	0.13	0.31	0.35	0.28	0.32	0.025	0.026	56.57	127.15	50.45	116.39	4.554	9.196
	30-40%	6.35	8.00	0.08	0.39	0.40	0.36	0.37	0.027	0.026	54.69	70.59	50.99	65.94	3.739	4.642
	40-50%	1.52	1.65	0.06	0.43	0.44	0.41	0.41	0.025	0.025	14.42	15.90	13.59	14.96	0.828	0.902
	50-60%	0.12	0.13	0.08	0.52	0.53	0.48	0.49	0.026	0.027	1.36	1.48	1.26	1.37	0.069	0.074
	>60%	0.01	0.01	0.10	0.63	0.63	0.58	0.58	0.027	0.027	0.11	0.11	0.10	0.10	0.005	0.005
	Total	19.89		**0.11**	**0.33**		**0.30**		**0.026**		**146.38**		**132.92**		**11.231**	
Phase 2	<10%	1.52	58.42	0.26	0.23	0.25	0.18	0.21	0.017	0.015	7.78	324.75	6.18	265.16	0.576	19.270
	10-20%	21.30	56.91	0.24	0.26	0.25	0.21	0.21	0.016	0.015	119.80	316.97	96.29	258.98	7.528	18.694
	20-30%	27.01	35.60	0.22	0.25	0.25	0.20	0.21	0.015	0.014	148.22	197.17	121.40	162.70	8.941	11.166
	30-40%	8.19	8.60	0.19	0.26	0.26	0.22	0.22	0.011	0.012	46.83	48.96	39.49	41.30	2.039	2.225
	40-50%	0.41	0.41	0.17	0.24	0.24	0.20	0.20	0.021	0.021	2.12	2.12	1.82	1.82	0.186	0.186
	50-60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	>60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	Total	58.42		**0.23**	**0.25**		**0.21**		**0.015**		**324.75**		**265.16**		**19.270**	
Phase 3	<10%	2.02	59.92	0.19	0.20	0.24	0.17	0.21	0.023	0.021	9.10	322.21	7.63	277.64	1.026	27.488
	10-20%	32.50	57.91	0.19	0.23	0.25	0.19	0.21	0.020	0.021	163.08	313.12	137.90	270.01	14.193	26.462
	20-30%	21.59	25.41	0.15	0.26	0.27	0.23	0.24	0.021	0.022	123.36	150.03	107.60	132.11	9.782	12.269
	30-40%	3.58	3.82	0.09	0.32	0.32	0.29	0.29	0.030	0.030	25.03	26.67	23.01	24.51	2.365	2.487
	40-50%	0.24	0.24	0.10	0.31	0.31	0.29	0.29	0.023	0.023	1.64	1.64	1.50	1.50	0.123	0.123
	50-60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	>60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	Total	59.92		**0.17**	**0.24**		**0.21**		**0.021**		**322.21**		**277.64**		**27.488**	

				Average Value							***Material Content***					
Phases	**Particle size**	**Mass (M t)**	**Cumulative Mass (M t) above particle size**	**K Ratio**	**CuT (%)**	**Cumulative CuT (%) above particle size**	**Floatable Cu (%)**	**Cumulative floatable Cu(%) above particle size**	**Mo (%)**	**Cumulative Mo (%) above particle size**	**CuT (M lbs)**	**Cumulative CuT (M lbs) above particle size**	**Floatable Cu (M lbs)**	**Cumulative Floatable Cu (M lbs) above particle size**	**Mo (M lbs)**	**Cumulative Mo (M lbs) above particle size**
Phase 4	<10%	14.09	46.99	0.25	0.22	0.24	0.18	0.19	0.024	0.024	68.73	246.56	54.92	200.96	7.602	24.490
	10-20%	26.55	32.89	0.24	0.24	0.25	0.19	0.20	0.023	0.023	139.13	177.83	112.44	146.05	13.347	16.888
	20-30%	5.91	6.35	0.16	0.27	0.28	0.24	0.24	0.025	0.025	35.71	38.70	30.90	33.61	3.281	3.541
	30-40%	0.43	0.43	0.10	0.31	0.31	0.28	0.28	0.027	0.027	2.99	2.99	2.71	2.71	0.261	0.261
	40-50%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	50-60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	>60%	0.00	0.00	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.000	0.000
	Total	46.99		**0.23**	**0.24**		**0.19**		**0.024**		**246.56**		**200.96**		**24.490**	
Total	**<10%**	**17.63**	**185.23**	**0.25**	**0.22**	**0.25**	**0.18**	**0.21**	**0.024**	**0.020**	**85.61**	**1,039.90**	**68.72**	**876.69**	**9.203**	**82.479**
	10-20%	**83.93**	**167.60**	**0.22**	**0.24**	**0.26**	**0.20**	**0.22**	**0.020**	**0.020**	**441.23**	**954.29**	**363.15**	**807.97**	**37.103**	**73.276**
	20-30%	**62.83**	**83.67**	**0.18**	**0.26**	**0.28**	**0.22**	**0.24**	**0.019**	**0.020**	**363.86**	**513.06**	**310.35**	**444.81**	**26.558**	**36.172**
	30-40%	**18.56**	**20.85**	**0.13**	**0.32**	**0.32**	**0.28**	**0.29**	**0.021**	**0.021**	**129.55**	**149.21**	**116.20**	**134.47**	**8.404**	**9.615**
	40-50%	**2.17**	**2.29**	**0.09**	**0.38**	**0.39**	**0.35**	**0.36**	**0.024**	**0.024**	**18.18**	**19.66**	**16.90**	**18.27**	**1.137**	**1.211**
	50-60%	**0.12**	**0.13**	**0.08**	**0.52**	**0.53**	**0.48**	**0.49**	**0.026**	**0.027**	**1.36**	**1.48**	**1.26**	**1.37**	**0.069**	**0.074**
	>60%	**0.01**	**0.01**	**0.10**	**0.63**	**0.63**	**0.58**	**0.58**	**0.027**	**0.027**	**0.11**	**0.11**	**0.10**	**0.10**	**0.005**	**0.005**
	Total	**185.23**		**0.20**	**0.25**		**0.21**		**0.020**		**1,039.90**		**876.69**		**82.48**	

Differences may occur in totals due to rounding.

17.0 RECOVERY METHODS

17.1 Introduction

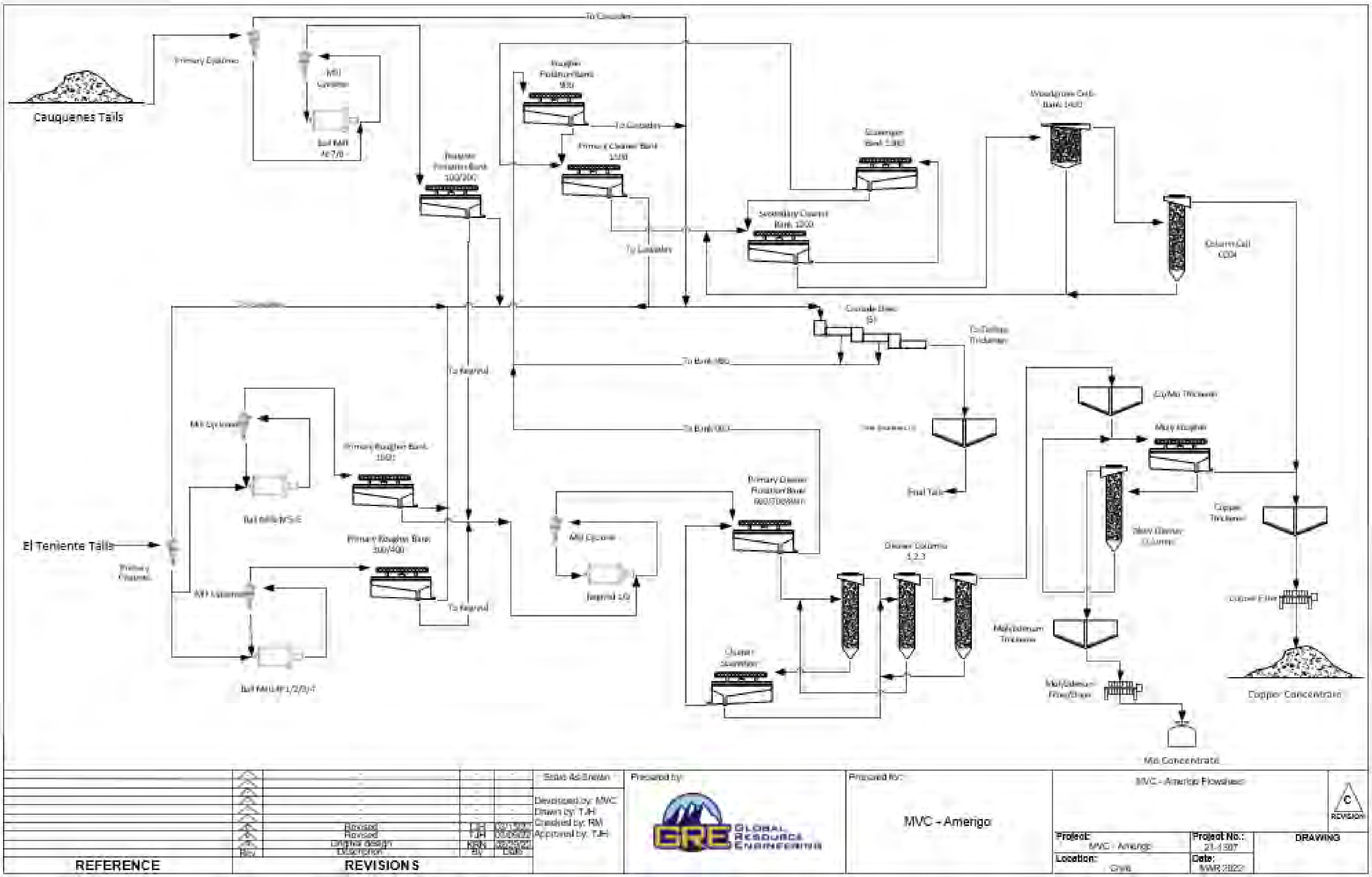
MVC initially utilizes two separate circuits to produce copper and molybdenum concentrates from fresh and historic tailings: fresh rougher tailings from the Codelco's El Teniente concentrator (TEN) and hydraulically recovered tails from the Cauquenes tailings impoundment (CQNS). Primary classification is performed on the tailings streams to separate the fine fraction for scavenging skim flotation in a cascade system and the coarse fraction is subjected to grinding before conventional flotation. The ground coarse fraction is transported to a conventional rougher/cleaner flotation circuit to produce a combined bulk copper-molybdenum concentrate. The bulk concentrate is reground and cleaned followed by selective flotation for molybdenum separation. Final tailings from both TEN and CQNS circuits report to thickening before final discharge to the El Teniente tailings channel and report to the Caren impoundment. Overflow thickener water is recirculated to the plant as process water.

The MVC Concentrator flowsheet includes:

- Primary size separation – conventional hydrocyclones
- Coarse material grinding – conventional ball mills – six for TEN and 2 for CQNS materials
- Fine material scavenging flotation in a cascade system typical of skim flotation
- Flotation – copper and molybdenum - conventional cells for roughing and scavenging and columns for primary cleaning
- Copper concentrate thickening and filtration
- Molybdenum concentrate thickening, filtration, and drying
- Final tails thickening

Figure 17-1 presents a simplified flowsheet of the MVC concentrator.

Figure 17-1: Simplified Amerigo Process Flowsheet



17.2 Plant Optimization

MVC has made significant changes to the flowsheet over the last several years. The details of these changes and the supporting analysis and test work can be found in Section 13. In general, the flowsheet has been simplified, primary separation has been improved, the primary flotation of the fine tails fraction has been curtailed, the grinding power has been redistributed to match the sizing demands, and the final tails water recovery has been improved.

17.3 Process Description

The following is a description of the process including the major unit operations. The flowsheet is split between the treatment of the fresh tailings from El Teniente and historic tailings from Cauquenes with common areas for final concentrate cleaning. The target fresh tailings concentrator throughput is 140,000 TPD. The production average for 2021 was 134,000 tpd including downtime for maintenance. Cauquenes has a target throughput of 40,000 tonnes per day (TPD) and the average for 2021 was 51,100 TPD including downtime for maintenance.

17.4 El Teniente Fresh Tailings

Fresh plant tailings from Codelco's El Teniente concentrator are subjected to primary classification. The primary classification is performed using a series of cyclone clusters consisting of five or six operating cyclones each 400mm diameter cyclones. The cyclone feed density is around 50% to 55% solids as delivered by El Teniente. Approximately 50% of the feed is rejected to the cyclone overflow as a fine product.

The underflow of each primary cyclone reports to its corresponding ball mill (6) for grinding. These ball mills (N°1 through N°6) range in motor power from 1,866 KW to 2,611 KW (2,500 to 3,500 HP) and are in a closed circuit with a cyclone cluster. The cyclone overflow targets a P80 of approximately 180 µm and reports to a distribution box where the slurry is split for rougher flotation.

Currently, five primary rougher banks are employed (Bank 100, 200, 300, 400, and 1000). Banks 100 to 400 have a volume of 2040m^3 and bank 1000 is 770m^3. The solids density into these cells ranges from 42% to 57% solids. Concentrates from the rougher flotation cells pumped to the regrind mill discharge pump box which feeds the regrind cyclones. Regrind 1 and 2 are equipped with 970 KW and 933 KW motors, respectively (1,300 HP and 1,250 HP). Tailings from the primary rougher banks report to the cascade skim flotation system.

Overflow from the regrind cyclones, at a target P80 of 50 µm, reports to primary cleaner flotation, underflow reports to the regrind circuit which is in closed circuit with the previously mentioned 400mm cyclone cluster. The regrind mills cyclone overflow reports to the primary cleaner flotation banks (Banks 600, 700, and 800). This circuit consists of conventional flotation cells with a total volume of 1,140 m^3.

Concentrate from the first cleaner banks reports to final cleaning in a series of three columns each with countercurrent concentrate flows (volumes of 392, 120, and 58 m^3). The column tails from the first column report to the conventional cleaner scavenger cells with a volume of 120m^3. The cleaner scavenger concentrate is sent back to the second cleaner column and the cleaner scavenger tailings report to Banks 600, 700, 800. Final concentrate from column 3 reports to the Cu/Mo thickener.

17.5 Cauquenes Tailings

Hydraulically recovered tails from the Cauquenes impoundment report to a series of primary cyclones with a target solids density between 50% and 53% solids. The primary classification is performed using two cyclone clusters consisting of 24 x 400 mm cyclones and 18 x 400mm cyclones. The underflow of each primary cyclone reports to its corresponding ball mill (2) for grinding. These ball mills (N°7 through N°8) range in motor power from 2,388 KW and 2,611 KW (3,200 to 3,500 HP) and are each in a closed circuit with a cyclone cluster. The mill cyclone overflow targets a P80 of approximately 130 µm and reports to a primary rougher flotation (Banks 100 and 200). Bank 100 and 200 consists of conventional cells with a total volume of 1,020 m^3.

The primary rougher concentrate combines with the TEN rougher concentrate and reports to the primary regrind cyclone cluster and is processed as the TEN rougher concentrate above.

17.6 CLEANER SCAVENGER CIRCUIT

Bank 900 treats the cascade concentrate, and Bank 600/700/800 tailings. The Bank 900 concentrates reports to the conventional first cleaner bank (Bank 1100) with a volume of 170 m^3. The tailings from the Bank 900 report to the cascade system. Concentrate from the Bank 1100 reports to the second cleaner Bank 1200 (volume 114 m^3) and the Bank 1200 concentrate reports to the tertiary cleaner bank consisting of three Woodgrove Staged Flotation Reactors with a volume of 20 m^3 (Bank 1400). The Woodgrove concentrate feeds to a fourth stage cleaner column cell (CC04) to produce the final concentrates. Bank 1200 tailings report to a cleaner scavenger bank (Bank 1300) with a volume of 114 m^3. Bank 1200 concentrate reports back to the head of the second cleaner Bank 1200 and the tails report to the primary cleaner Bank 1100).

The third consists of. The bulk concentrate thickener is 13.7 m in diameter with a target underflow density of 60%. The final copper thickener is 18 m in diameter with a target underflow density of 60% solids.

17.7 Cascade Plant

The Cascade plant is a skim flotation process acting as a scavenger unit to recover any copper and molybdenum that may have bypassed the flotation circuits and is the primary circuit for the treatment of the cyclone overflow fine fraction produced by the primary cyclones. This system consists of a non-stirred, self-aerating, gravity-assisted series of five lines of concrete cascade flotation cells each 1.80 m x 0.70 m providing 185 cascades in total. Low-grade flotation concentrate from the cascade cells at approximately 0.4% Cu is recovered and pumped back to the conventional flotation circuit Bank 900. When the Cascade is combined with the cleaner scavenger concentrate, approximately 8 to 10% additional recovery is gained.

17.8 Molybdenum Plant

The final concentrates from Fresh Tailings and Cauquenes are combined and report to the molybdenum plant for selective flotation to produce separate copper and molybdenum concentrates. Final bulk Cu/Mo concentrate containing approximately 27% Cu and 1% Mo is thickened and then subjected to selective flotation. The pulp is first conditioned to a pH 6.8 with sulfuric acid and a copper depressant reagent is added. Molybdenum concentrate is extracted from the bulk concentrate via a countercurrent selective flotation process.

The molybdenum plant consists of six 14.2 m^3 rougher cells, three 14.2 m^3 primary cleaner cells, four 5.7 m^3 secondary cleaner cells, three 5.7 m^3 tertiary cleaner cells, and five 2.8 m^3 cells to produce the final concentrate. A cleaner column has also recently been added.

The molybdenum plant tailings become the final copper concentrate. The thickened copper concentrate is filtered before storage and shipping. Molybdenum concentrate is thickened, filtered and dried, and placed in bulk bags for storage and shipping. The molybdenum thickener is 3.4 m in diameter with a target underflow density of 60% solids. The final molybdenum concentrate grade is approximately 40% Mo.

17.9 Final Tailing Thickeners

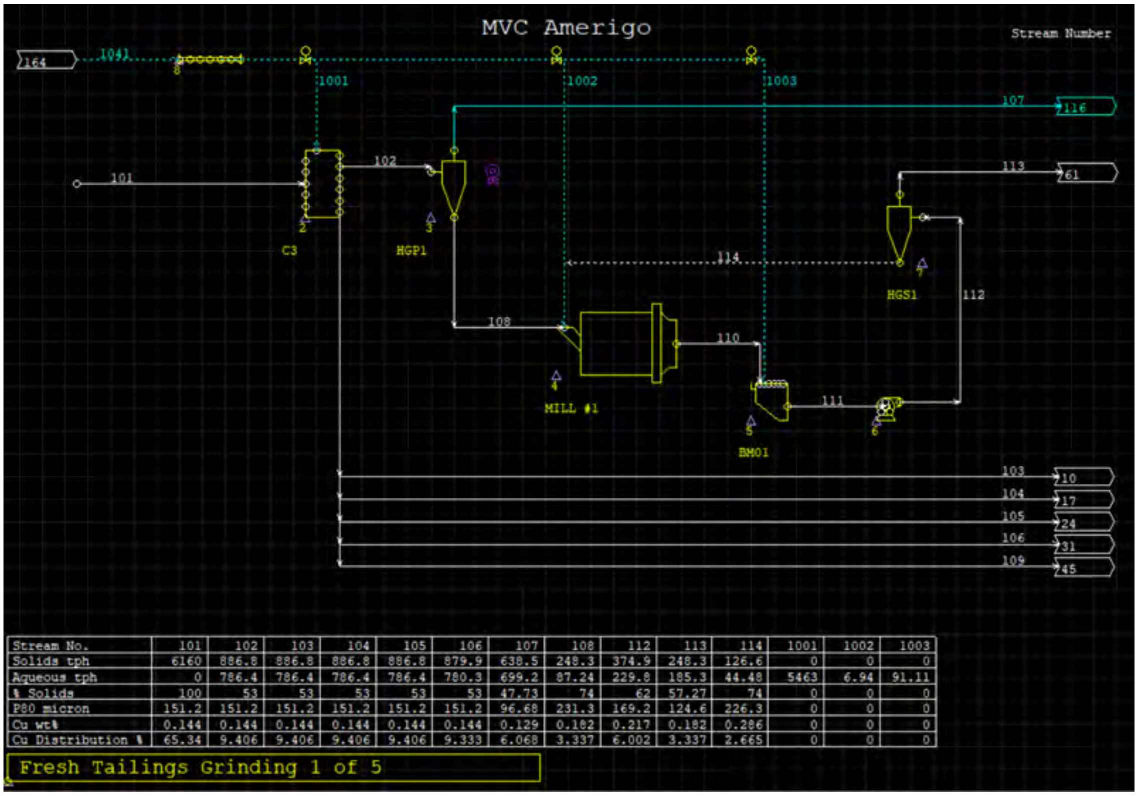
The final tailings report to a set of 3 high-rate x 100 m diameter thickeners. The thickener overflow is utilized as process water and the thickener underflow reports into the main El Teniente channel for transport to the Carén tailings impoundment. The target thickener underflow is 58% solids.

17.10 MetSim Modeling

A complete MetSim plant model was developed with collaboration between MetSim, GRE, and MVC. The model is extensive and provides predictive metal recovery based on grades, mineralogy, and tonnage. The model is also scheduled to be equipped with process control to allow control loops to be simulated and evaluated.

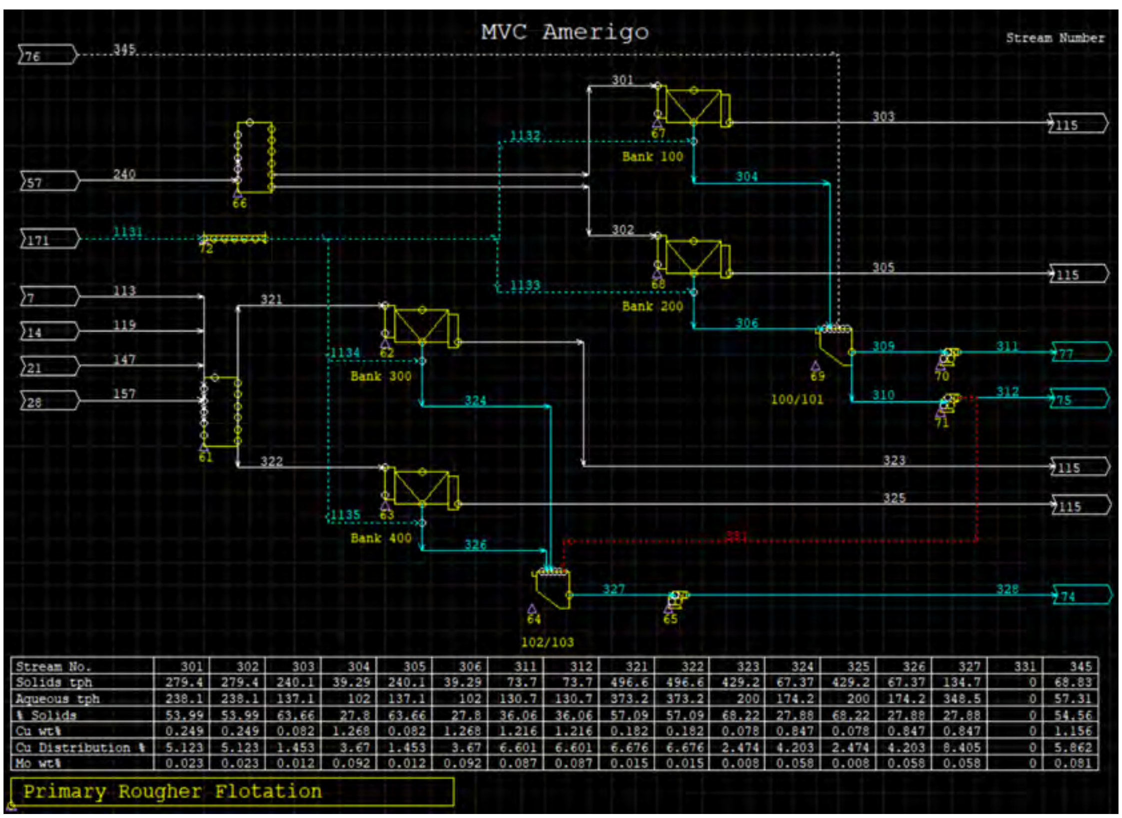
The model is equipped with a detailed set of design criteria for all equipment in the plant containing over 500 lines of input variables excluding the flotation parameters. The mass balance contains 238 stream flows with 118 pieces of data. This model allows MVC to better evaluate its plant performance under various scenarios. Figure 17-2 shows the primary cyclone separation and first grinding line and Figure 17-3 shows the initial rougher flotation circuit as examples of the various model pages.

Figure 17-2: MVC MetSim Model – Fresh Tailings Grinding Line 1



Stream No.	101	102	103	104	105	106	107	108	112	113	114	1001	1002	1003
Solids tph	6160	886.8	886.8	886.8	886.8	879.9	638.5	248.3	374.9	248.3	126.6	0	0	0
Aqueous tph	0	786.4	786.4	786.4	786.4	780.3	699.2	87.24	229.8	185.3	44.48	5463	6.94	91.11
% Solids	100	53	53	53	53	53	47.73	74	62	57.27	74	0	0	0
P80 micron	151.2	151.2	151.2	151.2	151.2	151.2	96.68	231.3	169.2	124.6	226.3	0	0	0
Cu wt%	0.144	0.144	0.144	0.144	0.144	0.144	0.129	0.182	0.217	0.182	0.286	0	0	0
Cu Distribution %	65.34	9.406	9.406	9.406	9.406	9.333	6.068	3.337	6.002	3.337	2.665	0	0	0

Figure 17-3: MVC MetSim Model – Primary Rougher Flotation



Stream No.	301	302	303	304	305	306	311	312	321	322	323	324	325	326	327	331	345
Solids tph	279.4	279.4	240.1	39.29	240.1	39.29	73.7	73.7	496.6	496.6	429.2	67.37	429.2	67.37	134.7	0	68.83
Aqueous tph	238.1	238.1	137.1	102	137.1	102	130.7	130.7	373.2	373.2	200	174.2	200	174.2	348.5	0	57.31
% Solids	53.99	53.99	63.66	27.8	63.66	27.8	36.06	36.06	57.09	57.09	68.22	27.88	68.22	27.88	27.88	0	54.56
Cu wt%	0.249	0.249	0.082	1.268	0.082	1.268	1.216	1.216	0.182	0.182	0.078	0.847	0.078	0.847	0.847	0	1.156
Cu Distribution %	5.123	5.123	1.453	3.67	1.453	3.67	6.601	6.601	6.676	6.676	2.474	4.203	2.474	4.203	8.405	0	5.862
Mo wt%	0.023	0.023	0.012	0.092	0.012	0.092	0.087	0.087	0.015	0.015	0.008	0.058	0.008	0.058	0.058	0	0.081

18.0 PROJECT INFRASTRUCTURE

18.1 Power Supply

MVC is connected to the Chilean National SIC electrical power supply grid. MVC has an existing 154 kilovolt (kV) power line with a capacity of 55 million volt-amps (MVA). The MVC 154 kV substation consists of three transformers with a total capacity of 60 MVA, equivalent to 55 megawatts (MW). In 2021, the average power consumption at MVC was 41 MW. All of the power for MVC is currently supplied by Pehuenche at a fixed price between 2020 and 2037, subject to price adjustments based on the US CPI, plus pass-through charges as levied by Chile's National Energy Commission. See Section 19.6 for details.

18.2 Water Supply

The MVC project is water intensive; therefore, managing water supply is essential to the operation of the project. Water is aggressively recycled in the process, but makeup water is essential to compensate for water losses and to account for the water which must accompany the tailings slurry to Caren. The site maintains a site-wide water balance which is the source for the numbers discussed in this section. Table 18-1 outlines the water sources.

Table 18-1: Water Supply Sources

Source	Maximum (wet season)	Minimum (dry season)	Average
	Liters per second, averaged over a month		L/s averaged over 12 months
Fresh Tailings slurry from El Tienente	1550	1422	1502
Mal Paso River	300	0	168
Nocedal Canal (from Mal Paso River)	215	147	195
Los Leones (drainage above TSFs)	500	0	117
Direct Precipitation on TSFs	91	0	34

Data from site-wide water balance, provided by MVC in 2022. Period of record is Nov 21 to Oct-22 (predicted).

Primary water outflows and losses are shown in Table 18-2.

Table 18-2: Water Losses (Sinks)

Source	Maximum (wet season)	Minimum (dry season)	Average
	Liters per second, averaged over a month		L/s averaged over 12 months
Tailings Slurry going to Caren	1803	1592	1704
Evaporation	292	80	186
Water losses to entrainment in tailings (non-recoverable)	199	82	145

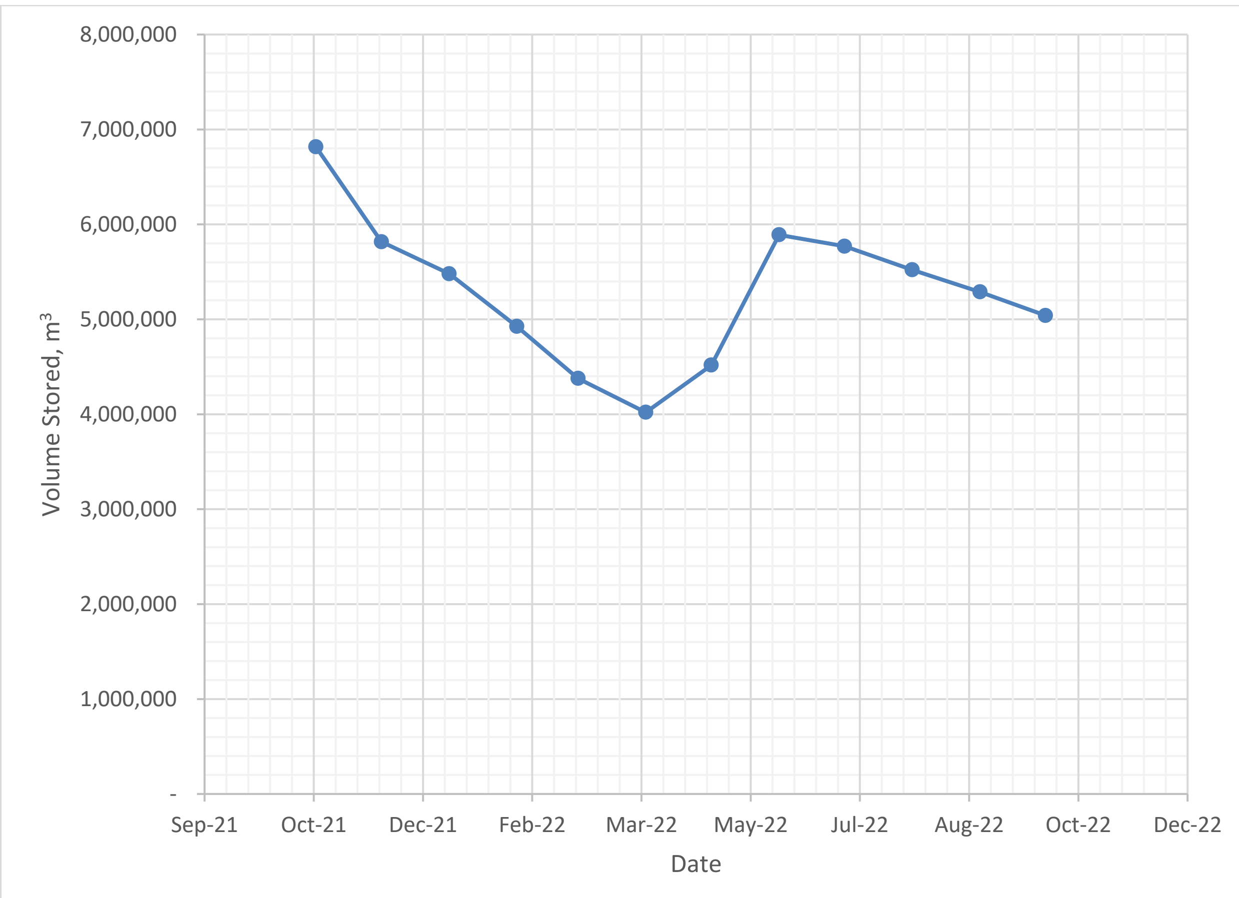
Data from site-wide water balance, provided by MVC in 2022. Period of record is Nov 21 to Oct 22 (predicted).

Table 18-1 and Table 18-2 show that tailings slurry lines, both into and out of the MVC project, are the largest single sources or sinks. Neither of these water flows are flexible because a minimum water quantity is necessary to successfully transport the tailings by slurry. The site gets its makeup water from four different sources – three sources of surface water and also from direct precipitation.

As mentioned above, the largest loss is to the slurry carrying MVC tailings to Caren. Due to the large surface area of the TSFs (2M square meters), the site has significant losses to evaporation. The next-highest loss is the entrainment of water within the mine tailings. Water entrainment is the water trapped between the tailings particles that cannot be reclaimed in the tailings pond.

MVC has the capacity to store water in the Colihues TSF. Figure 18-1 shows the variation in water stored over the period from November 2021 to October 2022 (predicted).

Figure 18-1: Colihues TSF Water Storage vs Time



MVC adjusts and manages the water balance to fill the available storage capacity at the end of the wet season. MVC also works to maintain sufficient excess water storage to manage exceptionally dry conditions without decreasing production.

Furthermore, the site manages water in cooperation (rather than competition) with Codelco. As climate conditions change, and as dry-season baseflows in the river decrease due to the loss of glacier mass, both MVC and Codelco are responding to the water stresses by modifying their water management plans. For example, MVC is improving the tailings clarifiers to reduce water loss to tailings entrainment and Codelco is looking at reclaiming water from the Caren TSF (using pumps and pipelines).

In 2020, MVC and Codelco worked together to greatly augment the water storage capacity of the Colihues TSF to its current volume of ~ 6M cubic meter by evaluating the safety and stability of the TSF with this quantity of impounded water. As a result, the site has a secure water source through a flexible network of different water sources and water storage facilities so that if one source is depleted, others can take its place.

However, GRE recommends that the site utilize a probabilistic water balance to further quantify the risks to the site water supply. This modification will bring the water balance up to industry best management practices. (see Section 26).

18.3 Security

The site is fenced, and MVC employs contract security to restrict personnel access to site via manned security stations. The MVC gate access control stations monitor and limit vehicle access to pre-approved personnel, contractors and visitors.

18.4 Assay Laboratory

The assay laboratory on site is currently operated by MVC. The facility is run 24 hours per day, 7 days per week to provide chemical analyses primarily for total copper, sulphide copper, iron, molybdenum, silver, arsenic, and free lime. Plant samples are composited every three hours, and analyses are reported to provide metallurgical balances. Metal analysis is via acid digestion and AA in a Perkins Elmer 400 machine. Copper concentrate and molybdenum concentrate samples are taken from truck shipments for moisture analysis and multi element chemical analysis. Concentrate metal analysis is via ICP and gravimetric methods. Assay laboratory quality control management is via a LIMS sample ID system and use of standards, blanks and duplicate samples.

18.5 Offices

Management and senior operations staff are based in the offices at the MVC site. MVC has a General Manager and three managers in charge of operations: Production Manager, Operational Continuity Manager, and Finance & Administration Manager. Telephone and data transmission at the site are provided by land lines.

MVC has two labour unions (plant workers and supervisors). Under Chilean labour law, collective labour agreements have a three-year term. The collective labour agreement with MVC’s plant workers has an expiry date of October 20, 2022 and the collective labour agreement with supervisors has an expiry date of January 02, 2024. In addition, MVC’s group of administrative workers, which are currently non-unionized, have a collective labour agreement that expires on December 31, 2022.

Personnel live in the local area and commute to the site each day by transportation provided by the company. Operations work a 12-hour shift, 7 days ON x 7 days OFF, with low personnel turnover.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Tailings Supply Contracts

By agreement dated April 8, 2014 (the "Signing Date"), MVC entered into a new contract (the "DET Agreement") with CODELCO Chile El Teniente Division (DET):

- amending the Fresh Tailings contract originally entered into in 1991 (the "Fresh Tailings Agreement")
- amending the contract for the processing of tailings from Colihues, the historic tailings impoundment located adjacent to MVC's facilities, entered into in 2009 (the "Colihues Agreement")
- for the processing of tailings from Cauquenes, the historic tailings impoundment located adjacent to Colihues.

All three agreements provide for production royalties payable to DET as described below, and the DET Agreement has common provisions for all three contracts, including:

- early exit of the contracts at certain predetermined times that may be exercised by DET in the face of changes unforeseen as of the Signing Date
- the review by the parties of the cost and royalty structure of each contract in the event the applicable metal price is outside of the royalty range for specific time periods. Notional royalties for copper concentrates produced from fresh tailings are determined through a sliding scale formula tied to copper prices ranging from $1.95/lb to $4.80/lb. Notional royalties for copper concentrates produced from Cauquenes historic tailings are determined through a sliding scale for copper prices ranging from $1.95/lb to $5.50/lb. Notional royalties for copper concentrates produced from Colihues historic tailings are determined through a sliding scale for copper prices ranging from $0.80/lb to $4.27lb. MVC pays a sliding scale global molybdenum royalty for molybdenum prices between $6.00/lb and $40.00/lb.
- possible extension of all three agreements on the consent of both parties
- a global royalty for molybdenum produced from all three sources.

The term of the Fresh Tailings Agreement was extended from December 31, 2021 to December 31, 2037, the royalty calculation was modified to remove punitive "dolar acuerdo/dolar observado" exchange rate provisions (which effectively increased the Fresh Tailings royalty paid by MVC to Codelco in 2013 by $5 million), and the lower royalty threshold was increased from $0.80 per pound to $1.95 per pound, the same minimum level as that for the Cauquenes royalty.

The term of the Colihues Agreement was extended from the earlier of December 31, 2019 or depletion of the Colihues deposit, to the earlier of December 31, 2037 or depletion of the Colihues deposit. MVC has the right to treat up to 45,000 tpd of ore from Colihues. The Colihues royalty provisions remain unchanged.

The term of the DET Agreement is to the earlier of December 31, 2033 or depletion of the Cauquenes deposit. MVC has the right to treat up to 85,000 tpd of ore from Cauquenes.

19.2 El Teniente Royalties

Until December 31, 2014, royalties were payable to DET in respect of copper concentrates produced by MVC. DET royalties were calculated using the average LME copper price for the month of production of the concentrates and were recorded as components of production costs.

In 2015, MVC and DET entered into a second modification to the Master Agreement which changed the legal relationship between the parties for the period from January 1, 2015 to December 31, 2022. During this period, production of copper concentrates by MVC has and will be conducted under a tolling agreement with DET. Title to the copper concentrates produced by MVC is retained by DET, and MVC earns tolling revenue, calculated as gross revenue for copper produced at applicable market prices, net of notional items (treatment and refining charges, DET copper royalties, and transportation costs). The notional DET copper royalties precisely mimic the former royalty arrangements between MVC and DET.

Notional royalties for copper concentrates produced from fresh tailings are determined through a sliding scale formula tied to copper prices ranging from $1.95/lb (13.5%) to $4.80/lb (28.4%).

Notional royalties for copper concentrates produced from Cauquenes historic tailings are determined through a sliding scale for copper prices ranging from $1.95/lb (16%) to $5.50/lb (39%)

Notional royalties for copper concentrates produced from Colihues historic tailings are determined through a sliding scale for copper prices ranging from $0.80/lb (3%) to $4.27lb (30%). The parties are required to review costs and potentially adjust notional royalty structures for copper production from Colihues tailings if the copper price remains below $1.95/lb or over $4.27/lb for three consecutive months.

MVC pays a sliding scale global molybdenum royalty for molybdenum prices between $6.00/lb (3%) and $40.00/lb (19.7%).The Master Agreement contains provisions requiring the parties to meet and review cost and notional royalty/royalty structures in the event monthly LME average prices fall below or above certain ranges for two consecutive months and projections indicate the permanence of such prices over time. The review of all notional royalty/royalty structures is to be carried out in a manner that gives priority to the viability of the Master Agreement and maintains the equilibrium of the benefits between the Parties.

The Master Agreement also sets out the schedule shown in Table 19-1 containing a projection (as of January 2014) for the supply of El Teniente Fresh Tailings:

Table 19-1: Fresh Tailings Supply

Year	Tailings		Cu Grade (%)	CuS Grade (%)	Mo Grade (%)
	Mt/a	tpd			
2014	48.9	135.711	0.120	0.078	0.008
2015	49.6	137.804	0.120	0.078	0.007
2016	50.3	139.316	0.120	0.078	0.007
2017	51.1	141.902	0.115	0.073	0.007
2018	52.1	144.636	0.115	0.071	0.008
2019	52.4	145.417	0.115	0.076	0.009
2020	48.0	132.92	0.114	0.080	0.010
2021	47.9	133.176	0.115	0.080	0.009

Year	Tailings		Cu Grade (%)	CuS Grade (%)	Mo Grade (%)
	Mt/a	tpd			
2022	47.9	133.088	0.116	0.083	0.009
2023	47.9	133.036	0.116	0.085	0.009
2024	55.0	152.459	0.115	0.084	0.008
2025	63.6	176.793	0.113	0.081	0.008
2026	63.6	176.746	0.114	0.083	0.008
2027	63.6	176.698	0.114	0.083	0.009
2028	63.8	176.668	0.114	0.084	0.009
2029	63.6	176.72	0.116	0.082	0.009
2030	63.7	176.894	0.116	0.079	0.009
2031	63.7	177.004	0.115	0.077	0.010
2032	64.0	177.15	0.114	0.074	0.009
2033	63.8	177.193	0.113	0.073	0.009
2034	63.8	177.179	0.113	0.074	0.009
2035	63.8	177.167	0.113	0.074	0.009
2036	64.0	177.158	0.114	0.075	0.010
2037	63.8	177.199	0.114	0.074	0.009
2038	63.8	177.294	0.113	0.072	0.009

19.3 Other Royalties

Pursuant to an agreement completed in March 2003 (the “Assignment Agreement”) and approved by the Company's shareholders in 2003 and amended in 2005, Steven G. Dean and Klaus M. Zeitler assigned to the Company an option to acquire MVC (the “Option”). The Assignment Agreement provided that, as consideration for the assignment of the Option to the Company, Messrs. Dean and Zeitler could choose to receive 7,500,000 common shares of the Company or a royalty (the "MVC Royalty") on MVC's copper equivalent production. Messrs. Dean and Zeitler chose to receive the MVC Royalty.

The MVC Royalty was set up as part of a tax-efficient structure whereby it is paid by way of a royalty dividend on Class A shares of Amerigo International Holdings Corp. ("AIHC"), a subsidiary of Amerigo. The Class A shares of AIHC are owned indirectly by Messrs. Zeitler and Dean and their associates. In accordance with the articles of AIHC, the holders of the Class A shares are not entitled to any dividend or to other participation in the profits of AIHC, except for a total royalty dividend, if declared by the directors of AIHC, in an amount equal to the amount of the MVC Royalty.

The MVC Royalty is calculated as follows:

- $0.01 for each pound of copper equivalent produced by MVC or any successor entity to MVC if the price of copper is under $0.80, or
- $0.015 for each pound of copper equivalent produced by MVC or any successor entity to MVC if the price of copper is $0.80 or more.

19.4 Copper Concentrate Smelting and Refining Contract

The copper concentrate produced by MVC is currently processed under a tolling or "maquila" arrangement whereby all copper concentrates produced by MVC are delivered to DET during the period from January 1, 2015 to December 31, 2022. Concentrates are trucked by DET to the Las Ventanas smelter located north of Valparaiso, approximately 240 km from MVC. The MVC copper concentrate is high quality with no penalty elements. A typical analysis is presented in Table 19-2.

Table 19-2: MVC Typical Copper Concentrate Analysis

Cu	Ag	S	Fe	As	Sb	Zn	Hg	Cd	MgO	F
27%	54g/t	25.49%	18.71%	0.12%	0.01%	0.07%	<5ppm	<0.002%	0.85%	124ppm

For 2021, MVC and DET agreed to a treatment charge of $59.5 per tonne of concentrate, marine freight of $31.50 and a refining charge of $0.0595 per pound of contained copper. In 2021, MVC's concentrate treatment charges, refinery charges, mineral content charges and moisture penalties less the credits from silver were 0.33/lb Cu.

In 2022, concentrate treatment charges, refinery charges, mineral content charges and moisture penalties less the credits from silver are anticipated to be $0.38/lb Cu. Transport cost, based on current trucking prices, is anticipated to be $0.03/lb Cu.

19.5 Molybdenum Concentrate Smelting and Refining Contract

The molybdenum concentrate produced by the MVC operation is processed under smelting contracts with Molymet and Glencore. Molybdenum concentrates are trucked to the Molymet smelter at the site called Nos, 70 km north of MVC and Glencore located approximately 100 km north of the MVC. The MVC molybdenum concentrate is high quality with no penalty elements. A typical analysis is presented in Table 19-3.

Table 19-3: MVC Typical Molybdenum Concentrate Analysis

	Mo %	Cu %	Fe %	Insol %	Oils %
40% Con	40.65	3.60	2.47	15.14	3.85

MVC and Molymet entered into a three-year evergreen sales agreement on January 1, 2020 pursuant to which MVC sells a portion of its molybdenum concentrates to Molymet, with an initial term extending to December 31, 2022. The term of the contract will be renewed automatically on an annual basis unless either of MVC or Molymet notify the counterparty of their decision not to renew the contract, notice of which needs to be provided in writing by the latest on June 30 of each year.

MVC and Glencore entered into a three-year sales agreement effective January 1, 2020 pursuant to which MVC sells a portion of its molybdenum concentrates to Glencore, with an initial term extending to December 31, 2022. The term of the contract will be renewed automatically if twelve months before the original expiry date, or any extension thereafter, neither MVC or Glencore notify the counterparty of their decision not to renew the contract.

19.6 Power Supply Contract

Power is MVC’s largest single operating cost. MVC has a long-standing relationship with Empresa Electrica Pehuenche S.A. (“Pehuenche”), a subsidiary of the Enel Group, a multinational energy company and one of the world’s leading integrated electricity and gas operators.

From October 1, 2008 to December 31, 2017, MVC had a series in contracts in place with Pehuenche for the supply of 100% of MVC’s power requirements.

Effective January 1, 2018, MVC had a single contract in place with Pehuenche for the supply of 100% of MVC’s power requirements up to December 31, 2032 (the “Power Supply Contract”). The Power Supply Contract provides for a fixed rate of $75.0/MWh (July 2017 rate, April 2017 United States Consumer Price Index (“US CPI”)), subject to price adjustments based on the US CPI, plus pass-through charges as levied by Chile’s National Energy Commission. The Power Supply Contract has minimum billing provisions for 56% of MVC’s estimated annual power consumption of 350 GwH/year, estimated at December 31, 2017 to range from $1.4 to $1.8 million per month.

Effective January 1, 2020, MVC and Pehuenche entered into a modification of MVC’s Power Supply Contract to, among other things, extend the term of the contract from December 31, 2032 to December 31, 2037, reduce the fixed power rate starting on January 1, 2020, and gradually reduce the 2020 fixed rate further during the years 2021 to 2037. The fixed rate will continue to be subject to additional pass-through charges and to semi-annual price readjustments starting on July 1, 2020 based on the US CPI of the preceding three months.

The Company has two 10 megawatt generators which are operated by a third party when the grid price exceeds the generators’ operating costs, in exchange for a fixed monthly fee and a share of revenue. The economic benefit received from the generators’ operator is reported in the Company’s financial statement as a reduction to power cost. In 2021, MVC’s average power cost was $0.0919/kWh (2020: $0.0953/kWh; 2019: $0.0987/kWh; 2018: $0.1036/kWh).

MVC's power commencing on January 1, 2020, is sourced from renewable sources and MVC received a Renewable Energy Certificate issued by the International REC Standard. Also, MVC is now certified for Energy Management System under ISO 50001.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 MVC Operations Environmental Management

MVC has been operating the tailings reprocessing facility since 1992 with all applicable permits in place. No additional permits are required to continue to meet production targets, but the site must continue to perform the necessary environmental management to maintain compliance.

20.2 MVC Environmental Impact Assessment Permits

Chile's General Bases for the Environment Law (Law 19.300), published in March 1994, was modified in January 2010 by Law 20417 and since then it has been established that the Environmental Impact Assessment System (SEIA), an environmental management instrument, applies to projects and activities of the public and private sectors as the formal approval process for a project's operation. The law assigns the execution and management of the SEIA to the Environmental Assessment Service (SEA), a public organism in Chile. Once a project is approved under the SEIA, an RCA permit (Resolución de Calificación Ambiental) is granted and the proponent can apply to individual agencies to obtain the necessary sectorial permits (PS), which cannot be denied on environmental grounds.

MVC has received several RCAs, included:

- RCA 124-2002: Modification for the Use of Tailings
- RCA 121-2003: Processing of the Colihues Tailings
- RCA 151-2004: Recovery of Molybdenum
- RCA 083-2006: Recovery of Water from the Tailings
- RCA 128-2008: Central Electrica Coilhues.
- RCA 917-2011: Increase in Treatment Capacity of Fine Tailings Colihues
- RCA 132-2014: Increase in Tailings Processing Capacity.

In 2014, MVC submitted an EIA for increasing the production capacity to a rate of 195,000 tpd (under RCA 132-2014). RCA-132-2014 was created under new regulations and is an integrated EIA for the project life; it integrates and supersedes prior versions.

In the opinion of the QP, (See Section 2.3) this EIA meets international standards because it contains: a detailed description of the project, a baseline environmental section, a list of environmental impacts and a list of environmental mitigations and alternatives. It is similar to prior EIAs listed above, but it has more emphasis on air quality, noise, and the control of hazardous chemicals. No significant changes were proposed to prior risks or mitigation measures, except that the air quality monitoring plan was expanded to include sulfur and nitrogen oxides.

The project does not have any submitted or outstanding projects in the EIA process – they are fully-permitted to execute the mining plan.

20.3 Other Environmental Permits

The site is required to have permits from other agencies (Sectors). These are called Permisos Ambientales Sectorales or PAS in Spanish. The following table shows the current PAS:

Table 20-1: Sectoral Environmental Permits (PAS in Spanish)

N°	Title of Permit	Date	Associated Agency
Res. 750	Autoriza cambio de uso de suelos del predio denominado: Hacienda de Cauquenes de la comuna de Requinoa, Provincia del Cachapoal	21-12-1994	Ministerio de Agricultura
Res 38	Autoriza el cambio de uso de suelos de parte del predio denominado Hacienda Laguna de Cauquenes	21-01-1997	Ministerio de Agricultura
OR. N° 2036	Sobre calificación de actividad industrial	01-07-2002	Servicio de Salud O´Higgins, Ministerio de Salud
OR. N° 1723	Aprobación de los proyectos de normalización de la planta de tratamiento de relaves MVC y procesamiento de relaves del depósito de Colihues	02-06-2003	SERNAGEOMIN
OR. N° 1212	Proyecto de regulación "Planta de tratamiento de relaves de Minera Valle Central" y Procesamiento de Relaves Tranque Cauquenes”	04-06-2003	SERNAGIOMIN
OR. N° 2468	Remite calificación solicitada	10-09-2003	Servicio de Salud O´Higgins, Ministerio de Salud
OR. N° 929	Propuesta de modificación del proyecto "Procesamiento de relaves del depósito de Colihues”	15-12-2004	CONAMA
Res. Ex. 1070	Permiso de Servicio Limitado de Radiocomunicaciones a la sociedad MVC S.A.	15-09-2005	Ministerio de Transportes y Telecomunicaciones
OR. N° 879	Pronunciamiento modificaciones RCA 83 -RCA 21	24-08-2006	CONAMA
Res. N° 3805	Autoriza la operación de la instalación Radiactiva	11-09-2006	Ministerio de Salud
Res. N° 4536	Autoriza bodega de almacenamiento temporal de residuos sólidos	10-11-2006	Ministerio de Salud
Res. N° 4820	Autoriza el funcionamiento de bodega de almacenamiento para equipos de radiaciones ionizantes	22-11-2006	Ministerio de Salud
OR. N° 1156	Permiso de ajuste sectorial MVC	27-11-2006	SERNAGIOMIN
Res. N° 1926	Proyecto de alcantarillado particular	21-04-2008	Seremi de Salud Región de O´Higgins
Res. N° 3397	Autoriza la explotación del sistema de agua potable particular	15-07-2009	Departamento de Acción Sanitaria, Control Ambiental, Seremi de Salud

N°	Title of Permit	Date	Associated Agency
TC4	Declaración de instalaciones de combustibles líquidos	01-12-2009	SEC
R.E.N° 1208	Aprueba proyecto de agua potable particular	01-04-2010	Seremi de Salud Región de O´Higgins
R.E.N° 1209	Aprueba proyecto de agua potable particular	01-04-2010	Seremi de Salud Región de O´Higgins
R.E.N° 1210	Aprueba proyecto de agua potable particular	01-04-2010	Seremi de Salud Región de O´Higgins
R.E.N° 2983	Modificación del Permiso de Servicio Limitado de Radiocomunicaciones otorgado a sociedad MVC S.A.	02-06-2010	Ministerio de Transportes y Telecomunicaciones
R.E.N° 192	Aprueba proyecto de agua potable particular	07-01-2011	Seremi de Salud Región de O´Higgins
R.E.N° 3284	Aprueba base proyección de construcción y funcionamiento de sitio de almacenamiento temporal de residuos sólidos industriales no peligrosos declarados	21-07-2011	Seremi de Salud Región de O´Higgins
ORD. N° 1547	Sobre aplicabilidad del Reglamento de almacenamiento de sustandias peligrosas	29-07-2011	Seremi de Salud Región de O´Higgins
R.E.N° 967	Proyecto de agua potable y alcantarillado particular	24-02-2012	Seremi de Salud Región de O´Higgins
R.E.N° 3013	Otorgamiento del Permiso de Servicio Limitado de Radiocomunicaciones a la Sociedad MVC S.A.	05-06-2012	Ministerio de Transportes y Telecomunicaciones
R.E.N° 2669	Aprueba el proyecto de "Plan de Cierre de Faenas" de la empresa minera MVC S.A., ubicado en la comuna de Requínoa, Provincia de Cachapoal, Región de O´Higgins	30-07-2012	SERNAGIOMIN
ORD. N° 4301	Resolución para Plan de cierre de faenas de MVC S.A.	31-07-2013	SERNAGIOMIN
R.E.N° 4623	Aprueba el proyecto de agua potable y alcantarillado particular	27-08-2014	Departamento de Acción Sanitaria, Control Ambiental, Seremi de Salud
R.E.N° 4624	Aprueba el proyecto de agua potable y alcantarillado particular (generación)	27-08-2014	Departamento de Acción Sanitaria, Control Ambiental, Seremi de Salud
R.E.N° 4886	Aprueba el proyecto de agua potable y alcantarillado particular (mantención)	11-09-2014	Departamento de Acción Sanitaria, Control Ambiental, Seremi de Salud
R.E.N° 1686/2014	Autorización para capturar ejemplares de especies de reptiles y anfibios en área de influencia del proyecto "Aumento de Capacidad de Beneficio”	15-09-2014	SAG

N°	Title of Permit	Date	Associated Agency
N°1278/exento	Autoriza uso de faja Proyecto Acceso Puerta N°2 de Minera Valle Central, Comuna de Requínoa, Región de O´Higgins	09-10-2014	Dirección de Vialidad, Ministerio de Obras Públicas
OR. N° 434	Cumplimiento PAS 106 para RCA N°132/2014	10-10-2014	DGA
R.E. 2461/2014	Otorga permiso ambiental sectorial proyecto "Aumento de Capacidad de Beneficio" Minera Valle Central	19-11-2014	Gobernación Provincial de Cachapoal, Ministerio del interior y Seguridad Pública
06/CA-08	Plan de Manejo corta y reforestación de bosques nativos para ejecutar obras civiles	30-11-2014	CONAF
Resolución N° 2792	Aprueba el Proyecto "Aumento de Capacidad de Beneficio" para ser aplicado en la Planta Valle Central, de la MVC S.A.	10-12-2014	SERNAGIOMIN
N°212/ Exento	Autoriza uso de faja Proyecto Mejoramiento del acceso a Población Yungay, Ruta H-35, Comuna de Requínoa, Región de O´Higgins	24-01-2015	Dirección de Vialidad, Ministerio de Obras Públicas
Resolución N°610	Aprueba modificación al proyecto "Aumento de Capacidad de Beneficio" para ser aplicado en la Planta de Valle Central de MVC S.A.	10-03-2015	SERNAGEOMIN
06/CA-27	Solicitud sobre Plan de Manejo de corta y reforestación de plantaciones para ejecutar obras civiles-D.L. N°701	02-09-2015	CONAF
R.E N°2280/2016	Aprueba el Proyecto de Plan de Cierre presentado por la compañía Minera Valle Central	26-10-2016	SERNAGEOMIN
OR. N° 1151	Autoriza uso de faja fiscal para proyecto "Mejoramiento del acceso a Población Yungay, Ruta H-35, comuna de Requínoa, Provincia de Cachapoal, Región de O´Higgins	08-08-2017	Dirección de Vialidad, Ministerio de Obras PúblicaS
R.E. N°6228	Aprobación de la actualización de Plan de Manejo de Residuos Peligrosos	10-07-2018	Seremi de Salud Región de O´Higgins
R.E. N°7355	Otorgamiento extensión plazo para ajuste de exigencias DS43/2016	24-08-2018	Seremi de Salud Región de O´Higgins
06/CA-09	Solicitud sobre modificación de Plan de Manejo, Ley 20.283	12-11-218	CONAF
R.E. N° 1067/2020	Aprueba el proyecto de modificación Proyecto "Aumento de Capacidad de Beneficio" de MVC S.A.	25-06-2020	SERNAGEOMIN
R.E. N° 1082/2021	Aprueba el proyecto definición límites de extracción a muros 0, 1 y 2, Tranque Cauquenes, de la empresa MVC S.A.	07-06-2021	SERNAGEOMIN

With the permits presented above, the site is fully-permitted and requires no additional PAS to operate.

Because MVC is a tailings reprocessing project, and because the origin and destination TSFs are the property of Codelco, it is important to note that MVC does not have liability for mine waste facilities. As a result, the EIA and PAS do not include studies or permits related to mine tailings, waste rock, open pits, or other common themes for copper mining projects.

As part of the environmental permits, both for the SEIA Process and the PAS discussed above, the site is required to perform the following monitoring programs.

Vegetation Monitoring

The site has been performing vegetation monitoring since the Cauquenes project construction stage. This includes the safeguarding and conservation of the endangered species *Avellanita bustillosii* throughout the project. Roads in areas with this endangered plan are marked with signage and managed to reduce dust with augmented water application and lower-velocity traffic. Photographic and documentary records are submitted once a month to monitor the condition of the species where it is found.

Air Quality Monitoring

Control of particulate material in tailings: To maintain the current condition of the tailings surface during construction and operation stages of the project, plans are implemented to control particulate emissions, which involve the application of water and / or suppressants. The effectiveness of these controls are assessed by comparing air quality with annual concentrations of PM10 background levels presented in the EIA Annex 20: Baseline Air Quality. Two monitoring points are installed to measure air quality and meteorology in the area surrounding Cauquenes. The monitoring results are sent to the competent authority in March of each year.

Control of particulate material in internal roads: MVC continues to control particulate emissions in internal roads, as presented in EIA Annex 13. These procedures and control measures are annually reviewed for improvement

Water Monitoring

Because the site does not have liability for a tailings facility, it does not have an external water discharge to the environment. All water in the system is either recycled, or sent to the Carin TSF. As a result, the necessary water monitoring is conducted by Coldelco as part of their management of the TSFs.

20.4 Environmental Incidents

The site has not been fined for environmental violations. However, they did have an accidental release of mine tailings totaling approximately 11 cubic meters in 2020. The incident was reported to the regulators and was remediated in a single day. Due to the incident, MVC installed additional monitoring and measurement on the tailings conveyance channel to prevent a similar spill from occurring in the future.

The site also received a notice of non-compliance with three environmental issues on June 25th, 2020. Two issues were related to reporting, and one was related to dust suppression. In response, the site filed a compliance plan which was approved by the regulators in October 2020. Once the terms of the compliance plan are complete, the site will receive no sanctions or fines.

The QP believes these incidents show that the site is actively managing environmental issues, and is rapidly responding to incidents in cooperation with regulators.

20.5 Mine Closure Requirements and Costs

As a result of entering into the DET Agreement in 2014, the Company reassessed its asset retirement obligations. The DET Agreement essentially provides that MVC will transfer its property, plant, and equipment to DET on December 31, 2037. The DET Agreement requires MVC and DET to jointly assess the revision of DET's closure plan for Cauquenes and compare it to the current El Teniente plan. In the case of any variation in the interests of El Teniente due to MVC's activities in the Cauquenes deposit, the parties will jointly evaluate the form of implementation and financing of or compensation for such variation.

Notwithstanding the above, MVC, as a company operating in the mining sector in Chile, is required to have a closure plan for its own plant, in accordance with Chilean Law 20.551. MVC's closure plan received approval from Sernageomin in October 2016. The closure plan requires revision every five years, or upon the creation of an additional facility that would require closure. This revision is underway, but considering that no additional facilities have been commissioned (or will be commissioned) there is no material change to the closure plan.

The plan establishes that mine closure will require dismantling and removal of all the main equipment and steel structures. The cascade plant will be demolished and subsequently reforested. The remaining concrete and civil works in the grinding and flotation plant, the thickeners and the molybdenum plant will be safely contained and secured. Roads will be profiled, ditches and excavations deeper than 1 metre will be filled, slopes will be stabilized and demarcated, contaminated soils will be removed, and proper site drainage will be implemented. Monitoring of air, water, soil, flora and fauna will continue after closure. As of December 31, 2021, the estimate of site restoration costs at MVC in 2038 (under Chilean Law 20.551) are approximately $12.5 million. In compliance with the applicable legislation, MVC has posted a financial guarantee in accordance with the approved plan cost schedule.

20.6 Community Relations

The potential stakeholders in the MVC operation are the local authorities, civil society organizations, and the general community. MVC has established relationships with all the stakeholders and keeps them informed and addresses their concerns.

The nearest neighbor to MVC is a farm on Route H-35, located less than 1 km away. The nearest communities are Olivar with 13,608 inhabitants and Requínoa with 27,968 inhabitants. Both towns are small agricultural communities located on the primary North-South highway (Highway 5). Rancagua is the largest community in the region with 214,344 inhabitants and this city is where most of the MVC staff live.

Project implementation has had a positive impact on local access to housing, transportation, energy, health, education, and sanitation. MVC maintains a preferential option to provide sources of employment for people in the region and its area of impact, of the 1,026 direct and indirect jobs , 99.6% reside in the O' Higgins region.

The project area has no ethnic peoples, communities, or groups protected by special laws, and no resettlement of homes or communities was necessary to establish the project.

MVC has a community engagement policy designed at maintaining a permanent relationship with nearby communities as a central part of the MVC management strategy. This policy is inclusive, participatory and transparent.

Since the start of MVC, the project has maintained a set of mechanisms for dialogue with communities, such as working groups, participatory meetings, visits to our sites and citizen dialogues. MVC has conducted studies of perception and social reputation. MVC also has a formal system to receive, investigate and respond to the complaints of the neighbors.

MVC supports the following social programs:

- Social scholarships, aimed at the development and employability of younger and older workers.
- Community talks and capacity building programs for youth and children through theater and artistic expressions.
- Collaboration agreements with higher education institutions such as the University of O'Higgins, U. Mayor, Liceo Bicentenario Óscar Castro, among others.
- Mentoring Program in partnership with the Ministry of Mining to encourage women from mining specialty high schools to employ themselves in the field.
- Collaboration Programs for Children's Foundations, who receive contributions for the recycling of supplies within MVC.

MVC spends approximately$125,000 per year on social development and investment programs.

No social or community disturbances have occurred in the operational history of MVC. MVC experienced one strike in 2016 which was resolved with a new collective bargaining agreement. No social disturbances are anticipated in the future.

21.0 CAPITAL AND OPERATING COSTS

Capital and Operating Costs for MVC were not established for this Mineral Resource Report. The MVC operation has a nearly 30 year operating history. Please refer to Amerigo's consolidated financial statements and Management's Discussion and Analysis available at the Company's website and on www.sedar.comfor financial operating data.

22.0 ECONOMIC ANALYSIS

Economic Analysis was not performed for this Mineral Resource Report. MVC is an ongoing operation. Please refer to Amerigo's consolidated company financial statements and Management's Discussion and Analysis available at the Company's website and on www.sedar.com for financial operating data.

23.0 ADJACENT PROPERTIES

Other than as described in this report, there are no material mineral properties adjacent to MVC.

24.0 OTHER RELEVANT DATA AND INFORMATION

No other relevant data is available for the MVC tailings reprocessing operation.

25.0 INTERPRETATION AND CONCLUSIONS

In the Opinion of the QP:

- MVC has valid contracts with Codelco's El Teniente Division to process Fresh Tailings, the Colihues deposit and the Cauquenes deposit and all royalty obligations to El Teniente have been sufficiently identified. Under the contracts with DET MVC has a mine life to 2037.
- MVC has been in operation since 1992 and operates within the specifications and guidelines established by Chile's Ministry of Mining, other local environmental authorities and relevant international conventions.
- The project operates under an approved Environmental Impact Management permit updated to match the current production rate.
- Total water supplies are expected to be sufficient for current and planned operational needs. The mine has a large storage capacity and flexible water sources and is capable of responding to abnormal climate conditions.
- MVC has adopted measures to conserve water within their facility but have no control over extended periods of draught that may adversely impact the ability to maintain targeted production rates.
- MVC has obtained sectorial permits from the various agencies that have authority over environmental resources, construction, operation and closure of the MVC Project.
- Exploration work conducted on the Project is appropriate to the style of mineralization. Results support the interpretations of tonnes and grade from historical records. A limited amount of drilling has been conducted on the Cauquenes deposits and mineral resource estimates have been completed.
- Sampling methods are acceptable, meet industry-standard practice, and are adequate for mineral resource estimation and mine planning purposes.
- The quality of the copper and molybdenum analytical data is reliable and sample preparation and analysis were generally performed in accordance with exploration best practices and industry standards.
- Data verification programs undertaken on the data collected from the Project adequately support the geological interpretations and the database quality, and therefore support the use of the data in mineral resource estimation.
- The geological understanding of the deposits is sufficient to support estimation of indicated and inferred mineral resources. Codelco's historical records of El Teniente's mill tailings represent a detailed account of the tonnage and grade of material deposited in the Cauquenes and Colihues deposits. These records have been verified by independent checks on tonnage and grade of the historical tailings deposits.
- Mineral resources have been estimated to industry best practices and conform to the requirements of CIM (2014).
- The metallurgical testwork completed on the Project has been appropriate to establish the optimal processing routes. Metallurgical tests on Fresh, Colihues and Cauquenes tailings were performed on samples that were representative of the mineralization. Metal recovery factors have been estimated for copper and molybdenum that appear appropriate to the mineralization styles and the planned extraction facilities.

- The major components of the flowsheet and process plant design of the MVC plant expansion are based on current technologies supported by operating data and laboratory testwork.

In the opinion of the QP, the Project that is outlined in this Technical Report has met its objectives. Mineral resources have been estimated for the Project, and a feasible development plan has been presented. The data supporting the inferred mineral resource estimates were appropriately collected, evaluated and estimated, and the Project objective of identifying tailings mineralization that could potentially support future processing operations has been achieved.

26.0 RECOMMENDATIONS

MVC has a twenty-nine year operating history of processing El Teniente's tailings and the contract with El Teniente is expected to provide a stable supply of tailings material until 2037. Sources of mill feed include Fresh Tailings, the Colihues deposit and the Cauquenes deposit. Extraction of material from the Cauquenes deposit commenced in 2015.

GRE recommends using a probabilistic water balance to better quantify the risks posed to the MVC water supply over time and with climate change.

The recommendation of the QP is to continue with the production of copper and molybdenum concentrates at MVC.

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CERTIFICATE OF QUALIFIED PERSON

I, Terre A. Lane, of 600 Grant St., Suite 975, Denver, Colorado, 80203, the co-author of the report entitled "NI 43-101 Mineral Resource Estimate Technical Report, Minera Valle Central Operation, Rancagua, Region VI, Chile" with an effective date of February 01, 2022 and an issue date of March 30, 2022 (the "Technical Report"), DO HEREBY CERTIFY THAT:

1. I am a MMSA Qualified Professional in Ore Reserves and Mining, #01407QP, and I am a Registered Member of the Society for Mining, Metallurgy, and Exploration
2. I hold a degree of Bachelor of Science (1982) in Mining Engineering from Michigan Technological University.
3. I have practiced my profession since 1982 in capacities from mining engineer to senior management positions for engineering, mine development, exploration, and mining companies. My relevant experience for the purpose of this Technical Report is as the resource estimator, mine planner, and economic modeler with 25 or more years of experience in each area.
4. I have taken classes in geology, structural geology, mineralogy, Mineral Resource estimation in university, and have taken several short courses in geostatistics subsequently.
5. I have worked in geology, managed geologic teams, created lithological and structural models, and I have been involved in or conducted the estimation of resources for several hundred projects at locations in North America, Central America, South America, Africa, Australian/New Zealand, India, China, Russia and Europe using nearly all estimation techniques.
6. I have estimated resources for many copper projects, several tailings facilities, and historic waste rock storage facilities.
7. I have created or overseen the development of mine plans for several hundred open pit and underground projects and operating mines.
8. I have been involved in or managed several hundred studies including scoping studies, prefeasibility studies, and feasibility studies.
9. I have been involved with the mine development, construction, startup, and operation of several mines.
10. I have read the definition of "Qualified Person" set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a professional organization (as defined in National Instrument 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of National Instrument 43-101.
11. I visited the Minera Valle Central Operation on February 07 and February 08, 2022 for two days.
12. I am responsible for Sections 1.0, 1.1, 1.6, 1.9, 1.10, 1.11., 2, 3, 4, 5, 14, 15, 16, 18, 19, and 21 through 27 of the Technical Report.
13. I am independent of Amerigo Resources Ltd. as described in section 1.5 by National Instrument 43-101.
14. I have not been previously involved with the Minera Valle Central Operation Project.
15. I have read National Instrument 43-101 and Form 43-101F1. The Technical Report has been prepared in compliance with the National Instrument 43-101 and Form 43-101F1.

16. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Terre A. Lane

“Terre A. Lane”

Mining Engineer

Global Resource Engineering, Ltd.

Denver, Colorado

Date of Signing: March 30, 2022

CERTIFICATE OF QUALIFIED PERSON

I, Hamid Samari, PhD, of 600 Grant St., Suite 975, Denver, Colorado, 80203, the co-author of the report entitled "NI 43-101 Mineral Resource Estimate Technical Report, Minera Valle Central Operation, Rancagua, Region VI, Chile" with an effective date of February 01, 2022 and an issue date of March 30, 2022 (the "Technical Report"), DO HEREBY CERTIFY THAT:

1. I am currently employed as senior geologist by Global Resource Engineering, Ltd.
2. I am a MMSA Qualified Professional in Geology, #01519QP.
3. I graduated with Ph.D. in geology (Tectonics - structural geology) from Tehran Azad University (Sciences & Research Branch) in 2000, a Master's degree in geology (Tectonics) from the Beheshti's University at Tehran in 1995 and a Bachelor's degree in geology from the Beheshti's University at Tehran in 1991.
4. I have practiced my profession since 1994 in capacities from expert of geology to senior geologist and project manager positions for geology, seismic hazard assessment and mining exploration.
5. I have been involved with many studies including scoping studies, prefeasibility studies, and feasibility studies.
6. I have read the definition of "Qualified Person" set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a professional organization (as defined in National Instrument 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of National Instrument 43-101.
7. I have not visited the Minera Valle Central Operation.
8. I am responsible for Sections 1.2, 1.3, 1.4, 6, 7, 8, 9, 10, 11, and 12 of the Technical Report and.
9. I am independent of Amerigo Resources Ltd. as described in section 1.5 by National Instrument 43-101.
10. I have not previously worked on the Minera Valle Central Operation Project.
11. I have read National Instrument 43-101 and Form 43-101F1. The Technical Report has been prepared in compliance with the National Instrument 43-101 and Form 43-101F1.
12. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Hamid Samari, PhD
"Hamid Samari"
Geologist
Global Resource Engineering, Ltd.
Denver, Colorado
Date of Signing: March 30, 2022

CERTIFICATE OF QUALIFIED PERSON

I, J. Todd Harvey, of 600 Grant Street, Suite 975, Denver, CO 80203, the co-author of the report entitled "NI 43-101 Mineral Resource Estimate Technical Report, Minera Valle Central Operation, Rancagua, Region VI, Chile" with an effective date of February 01, 2022 and an issue date of March 30, 2022 (the "Technical Report"), DO HEREBY CERTIFY THAT:

1. I am currently employed as Principal Process and Mining Engineer by Global Resource Engineering, Ltd.
2. I graduated with Ph.D. in Mining Engineering from the Queen's University at Kingston in 1994, a Master's degree in Mining Engineering from the Queen's University at Kingston in 1990 and a Bachelors degree in Mining Engineering in 1988 all with a specialization in mineral processing. I also hold a degree in Metallurgical Engineering and Computer Science from Ryerson University in Toronto Canada graduating in 1986 as well as an MBA from the University of New Brunswick in Saint John Canada graduating in 2001.
3. I have worked as a Process Engineer for over 35 years since my graduation from university. My relevant experience includes process due diligence/competent persons evaluations of developmental phase and operational phase mines throughout the world, including mines in the USA, Canada, Kazakhstan, Brazil, Mexico, and Africa to name a few. I have a wide range of experience in multiple mineral fields including precious metal processing and base metals such as copper, lead, and zinc.
4. I am a Registered Member (No. 04144120) of the Society for Mining, Metallurgy & Exploration Inc. (SME). I am also a member of the Association for Mineral Exploration (AME), Minerals Engineering Journal Review Board, and the Journal of Hydrometallurgy Review Board.
5. I have read the definition of "Qualified Person" set out in National Instrument 43-101 and certify that by reason of my education, affiliation with a professional organization (as defined in National Instrument 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of National Instrument 43-101.a
6. I have not visited the Minera Valle Central Operation Property.
7. I am responsible for Sections 1.5, 1.7, 13 and 17 of the Technical Report.
8. I am independent of Amerigo Resources ltd. as described in section 1.5 by National Instrument 43-101.
9. I have not previously worked on the Minera Valle Central Operation Project.
10. I have read National Instrument 43-101 and Form 43-101F1. The Technical Report has been prepared in compliance with the National Instrument 43-101 and Form 43-101F1.
11. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

J. Todd Harvey

"J. Todd Harvey"

Metallurgist

Global Resource Engineering, Ltd.

Denver, Colorado

Date of Signing: March 30, 2022

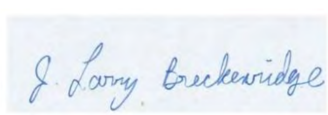
CERTIFICATE OF QUALIFIED PERSON

I, J. Larry Breckenridge, P.E., of 600 Grant Street, Suite 975, Denver, CO 80203, the co-author of the report entitled "NI 43-101 Mineral Resource Estimate Technical Report, Minera Valle Central Operation, Rancagua, Region VI, Chile" with an effective date of February 01, 2022 and an issue date of March 30, 2022 (the "Technical Report"), DO HEREBY CERTIFY THAT:

1. I am currently employed as principal environmental engineer by Global Resource Engineering, Ltd.
2. I am a graduate of Dartmouth College with a degree in Engineering Modified with Environmental Science (BA) and from the Colorado School of Mines with a Masters' degree in Environmental Engineering.
3. I am a Qualified Person under NI 43-101 because I am a registered Environmental Engineer in the State of Colorado, USA, No. 38048.
4. I have practiced the areas of water management, geochemistry, and environmental management -- exclusively for precious and base metals projects for over 25 years. I have worked with Global Resource Engineering in my same role for the last 12 years. I have participated in the permitting process for numerous mines in the United States and in Latin America. I have evaluated geochemical risk for precious metals projects and also performed water availability studies. My most-relevant experience has been the Corani project, a large-tonnage, low-grade silver development project in Peru, which was GRE's flagship client for four years. For this project, I worked on geochemistry, mine water management, pit dewatering, and environmental compliance/permitting.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I have never visited the Minera Valle Central Site.
7. I am responsible for Sub-sections 1.8, 4.4, 18.2 and Section 20.
8. I have not previously worked on the Minera Valle Central Operation Project.
9. I have read National Instrument 43-101 and Form 43-101F1 and confirm the sections of the Technical Report for which I am responsible (as listed above) have been prepared in compliance with that instrument and form.
10. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information required to be disclosed to make the report not misleading.

Mr. J. Larry Breckenridge, P.E.

"J Larry Breckenridge"



Principal Environmental Engineer
Global Resource Engineering, Ltd.
Denver, Colorado
Date of Signing: March 30, 2022