S-K 1300 Technical Report Summary on the Toquepala Operations, Tacna Department, Peru

Prepared for: Southern Copper Corporation
Prepared by: Wood Group USA, Inc.
Geosyntec Consultants International, Inc.
Report Date: December 31, 2024
Project No.: 259222

Date and Signature Page

This report entitled "S-K 1300 Technical Report Summary on the Toquepala Operations, Tacna Department, Peru" dated December 31, 2024 was prepared by qualified persons employed by the following third-party firms:

Date: 27 February 2025

"*Signed*"

On behalf of Wood Group USA, Inc.

"*Signed*"

On behalf of Geosyntec Consultants International, Inc.

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1.0 SUMMARY

1.1 Introduction

This technical report summary (the Report) on the Toquepala Operations, located in the province of Tacna, Tacna Department, Peru (the Project) was prepared for Southern Copper Corporation (Southern Copper) by qualified persons employed by Wood Group USA, Inc. (Wood) and Geosyntec Consultants International, Inc. (Geosyntec).

1.2 Terms of Reference

The Report was prepared to be attached as an exhibit to support mineral property disclosure, including mineral resource and mineral reserve estimates, for the Toquepala Operations in Southern Copper's Form 10-K for the year ending December 31, 2024.

Mineral resources and mineral reserves are reported for the Toquepala deposit. Mineral resources and mineral reserves are reported using the definitions in Subpart 229.1300 – Disclosure by Registrants Engaged in Mining Operations in Regulation S–K 1300 (S-K 1300).

Unless otherwise indicated, all financial values are reported in United States (US) dollars. The metric system is used in this Report, unless otherwise indicated.

1.3 Property Description and Ownership

The Toquepala Operations are located in the Ilabaya District, Jorge Basadre Province, Tacna Department, and are situated approximately 150 km by road from the city of Tacna, 85 km from the city of Ilo and 35 km from the city of Moquegua. The Quebrada Honda tailings storage facility (TSF) is 40 km south of the mine, and is accessed via the MO-107 route that connects Alto Camiara with Toquepala. The Toquepala Operations, Ilo smelter/refinery, port facilities and Quebrada Honda TSF are owned and operated by Southern Peru Copper Corporation, Sucursal del Perú.

The property consists of 15 mining concessions totaling 24,168.76 ha (the Property). Southern Copper also holds two beneficiation concessions. The beneficiation concessions have been amended on a number of occasions.

Southern Copper holds a "right of free use" on the uncultivated lands in the mining concessions and Quebrada Honda tailings TSF areas. There are granted easements covering the TSF and related facilities, the TSF pipelines, and water pipelines from the Lake Suches to the Toquepala Operations.

Additional surface rights will be required to support portions of the waste rock storage facilities (WRSFs) and a new TSF for the life of mine (LOM) plan. There is a reasonable expectation these rights can be obtained in the timeframe envisaged.

Southern Copper has both groundwater and surface water usage licenses, for a total extraction rate of 2,011.37 L/s.

A mining royalty is payable to the Government of Peru, based on operating income margins with graduated rates ranging from 1–12% of operating profits, with a minimum royalty charge equivalent to 1% of net sales. There is also a mining tax payable, based on operating income, with rates that range from 2–8.4%.

1.4 Geology and Mineralization

The Toquepala deposit is an example of a copper–molybdenum porphyry deposit.

The basal regional geology consists of Precambrian metamorphic rocks that are cut by Paleozoic granite, unconformably overlain by Upper Triassic to Jurassic marine volcanic and sedimentary lithologies. Overlying these rocks are late Cretaceous to early Tertiary rhyolite, andesite and agglomerate of the Toquepala Group. These lithologies are intruded by the composite, polyphase Cretaceous to Paleogene Coastal (Andean) Batholith.

Mineralization is closely associated with a complex, 1,500 m diameter intrusive center dominated by four phases of porphyritic dacite plugs, referred to as "T", "Main", "L/M" and "Late", a dacite diatreme and agglomerates, extensive hydrothermal breccias and latite porphyry stocks and dikes.

A zone of hydrothermal alteration of 5-6 km diameter has been recognized at Toquepala. The intensity of hydrothermal alteration varies from the center of the deposit towards the periphery, with four zones recognized, including a small quartz–biotite–K-feldspar ± sericite–chlorite–albite–anhydrite central (potassic) zone, a quartz–sericite–pyrite (phyllic) envelope at the periphery of the deposit, an extensive chlorite–epidote–calcite–pyrite (propylitized) zone, and a remnant argillic zone. The primary alteration type in the breccia zones is silicification, together with sericite and small amounts of clay minerals. On the breccia edges, propylitic alteration was more typical.

Mineralization consists of leached capping, oxide, enriched, transitional and primary mineralization. Leached capping, oxide, enriched and transition mineralization is mostly mined out. Primary mineralization occurs as hypogene sulfides mainly restricted to the dacite porphyry and breccias. Chalcopyrite is the dominant economic mineral with lesser bornite, molybdenite, and enargite as disseminations, fracture fillings, and breccia matrix. Economic molybdenite mineralization is associated with quartz veinlets and locally, with disseminated chalcopyrite.

1.5 History

Southern Copper has had an interest in the Project area since 1945. Prior to Southern Copper's Project interests, the area had been subject to artisanal mining activities.

Work conducted by Southern Copper and its predecessor companies included geology and photogeology studies, tunneling, churn drill, core and reverse circulation (RC) drill campaigns, metallurgical test work, and engineering studies. The Toquepala mine and the Ilo smelter commenced operations in 1960.

1.6 Exploration, Drilling, and Sampling

Drilling totals 1,464 core and RC holes (551,095 m) collected using predominantly core with lesser RC methods. Drilling that supports mineral resource estimation consists of 1,274 core holes for 477,272 m. RC, geotechnical, and blasthole drilling are not used in mineral resource estimation support.

Southern Copper conducted various geotechnical and hydrogeological investigations to assess its operation (stability of the Toquepala pit) and constructed a numerical hydrogeological model of the pit in 2015, which was updated in 2017 and 2020. Open pit slope geotechnical analysis and design is supported by data gathered from geotechnical drilling completed between 2013-2015, laboratory testing, and bench-scale structural mapping.

Laboratories used for analysis have primarily been internal company laboratories that are not accredited as well as independent, accredited laboratories.

No systematic quality control procedure was used to provide quality assurance (QA) for assaying prior to 2016. There is a significant evolution in data acquisition and data quality control (QC) practices in the different drill campaigns in the Toquepala database. Comparison of data from the 2016-2019 program with earlier data from prior programs resulted in the conclusion that copper and molybdenum grades of adjacent intersections are comparable over tens of meters, and that analyses performed in the earlier drill campaigns show no evidence of being significantly biased. The current, since 2016, assay QC program for the Toquepala site includes the insertion of field duplicates, pulp duplicates, certified reference materials, coarse blanks, fine blanks and check samples. Blank analytical results do not show contamination for copper and molybdenum for drilling campaigns from 2016–2019. Southern Copper sent pulp samples from the 2017–2019 drill program to an external laboratory for check assays. Biases relative to the internal laboratory for copper and molybdenum are considered acceptable.

1.7 Data Verification

Wood's data verification included site visits, comparisons of the Toquepala dataset with its available original sources including collar, survey, density, assay certificates and reports, a limited check assay program, and reconciliation and other operational data. Wood is of the opinion that the data verification programs for Project data adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in mineral resource and mineral reserve estimation.

1.8 Metallurgical Test Work

Recoveries in the leach–solvent extraction (SX)–electrowinning (EW) (also referred to as LESDE) plant, used to leach low-grade sulfide mineralization, were initially based on results from a pilot plant that ran from 2003–2005. A large-scale test program was completed in 2005, which involved run-of-mine (ROM) dump leach testing of three modules for at least 400 days. The forecast average life-of-mine (LOM) recovery from the LESDE plant is 13.3% (excluding leach ore existing in leach dumps). The LOM leach copper recovery including leach ore existing in leach dumps is expected to be 7.5%.

Flotation recoveries are based on flotation test work carried out in 2002. A regression analysis on the most significant variables (%Cu, %Mo, %Fe and %Cpy) was completed to provide a predictive recovery equation. The molybdenum recovery model was developed based on bench scale flotation testing carried out as part of the development plan in the period 2001–2002. Analysis of the test work results indicated that the only significant variable affecting the molybdenum recovery was grade of the molybdenum in the plant feed. The LOM expected copper recovery is estimated at 88.5% and molybdenum recovery is estimated at 70.4%. The forecast LOM copper concentrate grade is 26.74% and the molybdenum concentrate grade is forecast at 56.48%.

Samples for metallurgical testing completed in 2006 and 2021 were selected based on a wide range of copper and molybdenum grades, and the mineralogical characteristics of the ore, expressed as ratio of main mineral types. This was used by Southern Copper to develop a model that covers the ore metallurgical variability.

The copper and molybdenum concentrates produced are considered clean concentrates as they do not contain significant amounts of any deleterious elements.

Wood's qualified person (QP) considers the metallurgical data adequate for the purposes of estimating mineral resources and mineral reserves and the economic analysis in this Report.

1.9 Mineral Resource Estimates

The geological model consists of lithology, mineralization and alteration models. Estimation domains for copper were constructed based on lithology and mineralization. Silica alteration determines the boundary for molybdenum mineralization with molybdenum estimation domains defined by combined lithology groups and the silica model.

Extreme grades were identified and capped and outlier restriction used during estimation.

Several attributes were estimated included density and deleterious elements; however, only copper and molybdenum are reported in the mineral resource estimate.

Wood constrained the mineral resource estimates within conceptual pit shells using a Lerchs-Grossmann algorithm and net smelter return (NSR) cut-off values. The NSR cut-off value used for mineral resource estimation for sulfide material was $9.80/t. Low-grade sulfide material to be sent to the leach pads was reported at an NSR cut-off value of $1.91/t. Wood considers those blocks within the constraining resource pit shell and above the cut-offs applied to have reasonable prospects for economic extraction.

Mineral resources were prepared by Wood and are reported using the mineral resource definitions set out in S-K 1300 and are reported exclusive of those mineral resources that were converted to mineral reserves. The reference point for the mineral resource estimate is in situ. The mineral resource estimates for the Toquepala Operations are provided in Table 1-1.

Wood believes there is a reasonable expectation that the majority of Inferred mineral resources could be upgraded to Indicated or Measured mineral resources with continued exploration.

Wood is of the opinion that all issues relating to all relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

Table 1-1: Toquepala Mineral Resource Statement

Classification Category	Amount (Mt)	Copper Grades (%)	Molybdenum Grades (%)	Copper Metal Content (Mlb)	Molybdenum Metal Content (Mlb)
Measured					
Sulfides	99.3	0.57	0.038	1,241.2	83.0
Leach (low-grade sulfides)	11.3	0.15	-	37.4	
Total Measured	**110.7**	**0.52**	**-**	**1,278.7**	**83.0**
Indicated					
Sulfides	179.0	0.39	0.021	1,525.3	81.7
Leach (low-grade sulfides)	46.0	0.15	-	153.4	-
Total Indicated	**225.0**	**0.34**	**-**	**1,678.7**	**81.7**
Measured + Indicated					
Sulfides	278.3	0.45	0.027	2,766.6	164.8
Leach (low-grade sulfides)	57.3	0.15	-	190.8	-
Total Measured + Indicated	**335.6**	**0.40**	**-**	**2,957.4**	**164.8**
Inferred					
Sulfides	161.4	0.29	0.008	1,017.4	28.6
Leach (low-grade sulfides)	52.4	0.15	-	177.0	-
Total Inferred	**213.8**	**0.25**	**-**	**1,194.5**	**28.6**

Note: (1) The point of reference for mineral resources are in place and are current as at December 31, 2024. Mineral resources are reported exclusive of mineral reserves. Wood is responsible for the estimate.

(2) Mineral resources are constrained within an optimized pit shell based on copper and molybdenum revenues only. The following parameters were used in estimation: assumed open-pit mining methods; assumed concentration and dump leaching processes; copper price of $3.80/lb, molybdenum price of $11.50/lb; marginal NSR cut-off values of $9.80/t-processed for concentration material (approximately equivalent to 0.146% Cu), and $1.91/t-processed for leach material (approximately equivalent to 0.135% Cu); variable metallurgical recoveries (average recoveries of 87.5% for copper by concentration, 68.3% for molybdenum by concentration, and 17.0% for copper by leaching); average copper recoveries of 97.1% for smelting and 99.9% for refining; average mining cost of $2.11/t-mined; average process costs of $9.80/t-processed for concentration material, and $1.91/t for leach material; average smelting and refining cost of $0.16/lb Cu; selling costs of $0.001/lb Cu for concentration process, $1.83/lb Mo for concentration process, and $-0.005/lb Cu for leaching process; and 1% NSR royalty applied to Cu and Mo.

(3) No estimates for molybdenum are reported for leachable material as this element cannot currently be recovered using the leach process envisaged.

(4) Numbers in the table have been rounded. Totals may not sum due to rounding.

1.10 Mineral Reserve Estimates

Measured and Indicated mineral resources were converted to proven and probable mineral reserves, respectively by applying modifying factors within a mining study that meets at least prefeasibility level. Inferred mineral resources were set to waste.

Mineral reserves were constrained within an engineered pit that included consideration of appropriate pit revenue factors, reconciliation data, current topography, geotechnical pit slope recommendations, metallurgical recoveries, operating costs (mining, processing, general and administrative (G&A), smelting, refining and processing costs, solvent extraction/electrowinning (SX/EW) and selling costs), royalties, metal prices, and NSR cut-offs.

The marginal NSR cut-off values for mineral reserves to be treated by concentration ranges from $11.10/t to $11.37/t. The marginal NSR cut-off values for mineral reserves to be treated by the leach facilities ranges from $1.95/t to $2.22/t.

Mineral reserves are reported using the mineral reserve standards and definitions set out in S-K 1300. The selected point of reference for the mineral reserve estimate is at delivery to the process facility. Mineral reserves are summarized in Table 1-2. The leach ore existing in the leach dumps is reported as leach in process.

1.11 Mining Methods

The Toquepala Operations use conventional truck-and-shovel open pit mining methods.

Geotechnical criteria used in the pit design were based on guidance provided by a third-party consultant.

Seven pit phases remain in the LOM plan, starting with phase 5 and ending with phase 11. The remaining mine life is 41.2 years. Two to three pit phases will be operational at any one time to ensure that production rates can be met. A maximum mining capacity per phase of 280 Mt/a is assumed, with a maximum vertical advance rate of 11 benches per year. The mine plan assumes a maximum mining capacity of 371 Mt of annual movement and a nominal processing rate of 120 kt/d of sulfide material at the concentrator facility and 140 kt/d of leach material at the leach facility.

Table 1-2: Toquepala Mineral Reserve Statement

Classification Category and Process Type	Amount (Mt)	Copper Grades (%)	Molybdenum Grades (%)	Copper Metal Content (Mlb)	Molybdenum Metal Content (Mlb)
Proven					
Mill	1,184.8	0.57	0.040	14,987.0	1,032.5
Leach	242.9	0.21	–	1,125.9	–
Leach in process	1,864.2	0.15	–	6,171.9	–
Total Proven	**3,292.0**	**0.31**	**–**	**22,284.8**	**1,032.5**
Probable					
Mill	583.9	0.47	0.021	5,992.0	275.5
Leach	502.8	0.20	–	2,242.5	–
Leach in process	–	–	–	–	–
Total Probable	**1,086.7**	**0.34**	**–**	**8,234.5**	**275.5**
Proven + Probable					
Mill	1,768.8	0.54	0.034	20,979.0	1,307.9
Leach	745.7	0.20	–	3,368.4	–
Leach in process	1,864.2	0.15	–	6,171.9	–
Total Proven + Probable	**4,378.7**	**0.32**	**–**	**30,519.3**	**1,307.9**

Note: (1) Mineral reserves are current as of December 31, 2024. Wood is responsible for the estimates.

(2) The point of reference is the point at which the mineral reserves are delivered to the processing facility. Mineral reserves are constrained within an engineered pit based on copper and molybdenum revenues only. The following parameters were used in estimation: assumed open-pit mining methods; assumed concentration and dump leaching processes; copper price of $3.30/lb, molybdenum price of $10.00/lb; marginal NSR cut-off values of $11.10–$11.37/t-processed for concentration material (approximately equivalent to 0.184%–0.188% Cu), and $1.95–$2.22/t-processed for leach material (approximately equivalent to 0.168%–0.191% Cu); mining recovery and dilution are accounted for and generally offset each other; additional ore loss was considered on isolated blocks; variable metallurgical recoveries (average LOM recoveries of 88.5% for copper by concentration, 70.4% for molybdenum by concentration, and 13.3% for copper by leaching); average copper recoveries of 97.1% for smelting and 99.9% for refining; variable mining costs of $2.65–$4.11/t-mined; average process costs of $11.26/t-processed for concentration material, and $2.11/t for leach material; average smelting and refining cost of $0.21/lb Cu; selling costs of $0.001/lb Cu for concentration process, $1.83/lb Mo for concentration process, and $-0.005/lb Cu for leaching process; and 1% NSR royalty applied to Cu and Mo.

(3) The point of reference for the leach in process mineral reserves is in place on the leach dumps therefore no cut-off applies. The 4.3% copper recovery of leach in process material includes an allowance of 60% of leachable material that will be exposed to irrigation on the leach dumps and will be processed by SX/EW.

(4) The copper grade in the leach process represents the estimated remaining grade of material that has been loaded on the leach dumps and material that has been leaching for a period of time.

(5) No estimates for molybdenum are reported for leach material as this element cannot currently be recovered using the leach process envisaged.

(6) Numbers have been rounded. Totals may not sum due to rounding.

The sulfide crusher is located at elevation 3,260 masl in the southern zone of the pit. Crushed sulfide material is transported using a 2.0 km long conveyor belt to the west through a tunnel to the concentrator plant. The sulfide crusher throughput has a nominal 120 kt/d.

Material destined for the leach dumps can be sent either directly to the ROM leach dump or to the leach crusher that will be relocated in front of the sulfide crusher at level 3260 masl and is expected to be fully operational by the beginning of 2027. Crushed leach material is conveyed via a 6.5 km long conveyor to the crushed leach dump. The leach crusher has a nominal capacity of 140 kt/d, and the conveyor has a transport capacity of 8,350 t/h.

1.12 Recovery Methods

The process designs were based on existing technologies and proven equipment, and the process plants are installed and operating, and have multi-decade operating history.

The LESDE plant has a current annual production capacity of 24,115 t of cathode copper, and includes conventional processes used for the recovery of copper such as acidic leaching of low-grade material, SX and EW facilities. Copper is recovered from two sources, loaded pregnant leaching solution (PLS) from the Cuajone Operations oxide leaching plant, and low-grade heap leach facilities at the Toquepala mine. The sulfuric acid required is produced by acid plants located at the Ilo smelter.

The Toquepala concentrator No. 1 (C1) started operations in 1959 and, following numerous upgrades, has a current capacity of 60,000 t/d. The Toquepala concentrator No. 2 (C2) started operations in November 2018, with a design capacity of 60,000 t/d. The ore in both plants is treated in a conventional concentration circuit consisting of crushing, grinding and flotation of copper and molybdenum minerals. The copper concentrate is transported by rail to the Ilo smelter for treatment and the molybdenum concentrate is bagged and sold as a final product.

The Ilo smelter processes the copper concentrates from the Cuajone and Toquepala concentrators and produces copper anodes for the Ilo refinery. In 2007 a new smelter was commissioned at Ilo, with a nominal capacity of 1.2 Mt/a of copper concentrate.

The Ilo refinery is located in the Pampa de Caliche 9 km north of the city of Ilo. The plant was acquired by Southern Copper in 1994 and has been modernized and expanded to the current annual capacity of 294,763 t/a of copper cathodes. The Ilo refinery has the capacity to produce 125,000 kg gold, 840 kg silver, and 50,000 kg selenium annually. Although the Ilo refinery has produced these elements historically as by-products, their revenues and process costs are excluded from the mine plan and cash flow analysis since silver, gold, and selenium are not included in the mineral resource or mineral reserve estimates.

The Toquepala Operations use surface and underground water from a variety of sources as fresh make up water. All sources discharge into the Pampa de Vaca reservoir from where the fresh water is supplied to the various process plants.

Power is sourced for process needs from the Peruvian grid.

1.13 Infrastructure

All required infrastructure to support the Toquepala Operations is in place. Additional tailings storage will be required to support the LOM plan after approximately the end of 2036.

On-site infrastructure that supports the Toquepala Operations include: an open pit; four WRSFs; two low-grade sulfide leach facilities; process facilities (concentrator plants, LESDE plant, conveyor systems); warehouses, workshops, and offices; 138 kV and 220 kV power transmission lines; electrical substation and power distribution system; water handling facilities; permanent camp for operations; railway and rail yard.

Off-site infrastructure includes: access road; 138 kV and 220 kV power transmission lines; electrical substations and power distribution systems; railway; Quebrada Honda TSF; water supply system; smelter, refinery and sulfuric acid plants at Ilo; and port facilities in Ilo and Tablones.

Railways extend from Ilo to Toquepala, and a spur railway runs from the Toquepala Operations to the Cuajone Operations. Supplies such as sulfuric acid, equipment, fuel, and mining supplies are transported to the operations using the rail network. Concentrates are railed from the mine site to the Ilo smelter/refinery, and cathodes produced at the refinery are railed to the Port of Ilo. The Port of Ilo is a private port, operated by Southern Copper.

The Quebrada Honda TSF is the repository for tailings from the Toquepala and Cuajone Operations and is located southwest of the Toquepala Operations and south of the Cuajone Operations. The TSF operates as a cross-valley impoundment and is confined by two dams constructed of cyclone tailings sand. The remaining capacity of the existing TSF will support operations until approximately the end of 2036. Wood has assumed dry stack tailings as the preferred alternative to store the remaining tailings (starting from 2037) in a standalone facility located near the Quebrada Honda TSF area.

The stormwater management system includes two collection ponds located to the north of the open pit, which are designed to retain a probable maximum precipitation event from the Andean sector of the pit. Water captured by the dikes is sent to a storage pond and is used for dust mitigation along the roadways. No waters are discharged from the operations as no mining effluents are generated at the mine site. At Quebrada Honda, Southern Copper is authorized to dispose of decanted water from the tailings. Water from the TSF is used in the process plant, following treatment in a neutralization facility.

Collectively, the Toquepala and Cuajone Operations, together with the Ilo smelter/refinery complex, have five accommodation areas, which provide a permanent accommodation capacity of 4,756 persons.

Fresh water for the mine and process facilities is obtained from both ground and surface sources: Huaitire and Vizcachas groundwater wells; Lake Suches; and the Tacalaya and Honda streams. Water is transported by a network of pipelines to the operations, where it is stored in the Pampa de Vaca reservoir, located approximately 6 km northeast of the Toquepala mine.

1.14 Market Studies

Southern Copper employs a corporate strategy that is in line with the company's marketing experience, and experience with obtaining long-term contracts with strategic business partners in the Asian and European markets, as well as annual contracts with other active market participants.

Depending on concentrate quality, the concentrates are primarily sold onto Asian or European market. Normally over 60% of the molybdenum concentrate is sold to Chile, with the remainder sold into the Northern Europe, Asia and the US markets. Cathode copper is sold onto the Asian, European, Brazilian and/or North American markets.

Southern Copper provided Wood with their internal price forecast covering the period 2024-2028 and provided a long-term forecast for 2028 onward. Forecasts were based on Southern Copper's interpretations of market analysis from Wood Mackenzie, CRU and 21 analysts and banks on copper price, and six analysts and banks on molybdenum price. The long-term forecast for copper and molybdenum pricing used for mine planning and cash flow analysis over the LOM is $3.30/lb and $10.00/lb, respectively. Higher metal prices were used for mineral resources to ensure the mineral reserves are a subset of the mineral resources. The long-term price forecasts were increased by 15% to provide the mineral resource estimate copper and molybdenum price of $3.80/lb and $11.50/lb, respectively.

Toquepala Operations concentrates are sent to the Ilo smelter and refinery for processing to produce refined cathodes. When the production from the Toquepala and Cuajone Operations exceeds the smelter's capacity, a portion is sold to third parties. In recent years, these third-party sales of Toquepala and Cuajone Operations concentrates have represented about 20–25% of the annual production. Approximately 95% of the production of refined cathodes is sold under annual contracts with industrial customers (mainly copper rod producers), with whom Southern Copper has had a commercial relationship for many years, and about 5% is sold on the spot market.

The largest in-place contracts other than for product sales cover items such as bulk commodities, operational and technical services, mining and process equipment, and administrative support services. Contracts are negotiated and renewed as needed. Contract terms are typical of similar contracts that Southern Copper has entered into in Peru.

1.15 Environmental, Permitting and Social Considerations

Baseline studies were done prior to mine start-up. The data collected were used in support of the Environmental Impact Assessment (EIA).

As per permit requirements, Southern Copper has a number of monitoring programs in place, and monitors ground water, air quality, noise and biology in accordance with the commitments made in the environmental management and adjustment plan, environmental impact study, closure plans and updates to those plans and studies.

Mine closure measures were developed in accordance with the Toquepala Mine Closure Plan Modification, approved under Directorial Resolution (R.D.) N° 079-2016-MEM-DGAAM. An updated Mine Closure Plan is under MINEM evaluation. The total closure cost estimate assumed in the economic analysis is $305.9 million. The estimate is inclusive of the Peruvian general sales tax.

The Toquepala Operations and the Ilo Smelter and Refinery have all of the required permits to operate. The operations maintain a permit register and have a control and monitoring system to ensure that the requirements of each permit are monitored to comply with the relevant regulatory conditions imposed.

Additional permits will be required for the new TSF and for WRSFs.

The EIA completed in 2014 found no populations or cultivated areas that could be directly influenced by the Toquepala Operations. Southern Copper has community programs as part of its social management plan that focus on a number of key goals, including: co-existence with local communities on a good neighbors basis; promotion of local economic development; and promotion of individual community member capabilities. Reasonable mechanisms are being implemented to maintain relationships with surrounding communities, to mitigate any perceived social conflicts that could be associated with the Project.

Wood is of the opinion that the current plans to address any issues related to environmental compliance, permitting, and engagement with local individuals or groups are adequate to support mineral resources and mineral reserves.

1.16 Capital Cost Estimates

Capital cost estimates are at a pre-feasibility level of accuracy range of ±25% and includes contingency not exceeding 15%. All capital costs were expressed in third-quarter (Q3) 2024 US dollars.

In general, the Toquepala Operations have the necessary facilities to carry out the current operations. Sustaining capital costs were estimated by area and allocated over time to support the proposed mine production schedule at current production throughputs.

The sustaining capital cost estimate totals $8,469.0 million (Table 1-3), exclusive of value-added taxes.

Table 1-3: Sustaining Capital Cost Estimate

Area	Sustaining Capital Cost ($M)
Mining equipment	4,598.6
Truckshop expansion	27.7
Powerline relocation	8.9
WRSF development and land acquisition	18.0
Existing tailings storage facility (Quebrada Honda) raise	97.6
Filtered tailings plant, including land acquisition	860.3
Primary crusher relocation	59.2
Process facilities sustaining and maintenance	2,058.4
Other general sustaining and maintenance	571.1
Subtotal Direct + Indirect cost	8,299.7
Contingency	169.3
Total	**8,469.0**

Note: Totals may not sum due to rounding.

1.17 Operating Cost Estimates

Operating cost estimates are at a pre-feasibility level of confidence, having an accuracy range of ±25% and includes a contingency not exceeding 15%.

Operating costs were based on actual costs and data from Southern Copper's operating mines in Peru, Wood's experience and the proposed mine and process plans.

Table 1-4 is a summary of the operating cost estimates, exclusive of value-added taxes. General and administrative costs are included in the corresponding mining and processing costs.

Table 1-4: LOM Operating Cost Estimate

Description	Unit	Cost	Total ($M)
Mining	$/t mined[1]	2.65	23,580.0
Process	$/t processed[2]	8.98	22,588.1
Total			**46,168.2**

Note: Totals may not sum due to rounding.
(1) Including preparation costs at the crushed ore leach dump
(2) Including ore for concentration and leaching, excluding existing material in leach dumps

1.18 Economic Analysis

Certain information and statements contained in this section are forward-looking in nature and are subject to known and unknown risks, uncertainties, and other factors, many of which cannot be controlled or predicted and may cause actual results to differ materially from those presented here. Forward-looking statements include, but are not limited to, statements with respect to the economic and study parameters of the Toquepala Operations; mineral reserves; the proposed mine plan and mining strategy; ability of mine designs to withstand seismic events; dilution and extraction recoveries; processing method and rates and production rates; projected metallurgical recovery rates; infrastructure requirements; capital, operating and sustaining cost estimates; concentrates and cathodes marketability and commercial terms; the projected LOM and other expected attributes of the Project; the net present value (NPV); future metal prices and currency exchange rates; government regulations and permitting timelines; estimates of reclamation obligations; requirements for additional capital; environmental and social risks; and general business and economic conditions.

The financial analysis was performed using a discounted cash flow (DCF) method. Net annual cash flows were estimated projecting yearly cash inflows (or revenues) and subtracting projected yearly cash outflows (such as capital and operating costs, royalties, and taxes).

The financial model that supports the mineral reserve declaration was a standalone model that calculated annual cash flows based on: scheduled ore production; assumed processing recoveries; copper and molybdenum metal sale prices; projected operating and capital costs; and estimated taxes.

The financial analysis was based on an after-tax discount rate of 10%. Cash flows were assumed to occur at the end of each year and were be discounted to the beginning of 2025 (Year 1 of the economic analysis).

Costs projected within the cash flows are based on constant Q3 2024 US dollars.

Revenue was calculated from the recoverable copper and molybdenum metal and the long-term forecasts of metal prices and exchange rates. Recoverable copper and non-metal products include those recovered at the Ilo smelter and refinery from the copper concentrate feed from the mine operation, and copper and molybdenum concentrate sales.

The Toquepala Operations are anticipated to generate a pre-tax NPV of $1,348.0 million at a 10% discount rate and an after-tax NPV of $373.6 million at a 10% discount rate. As the mine is operating, and the initial capital is sunk, considerations of IRR and payback are not relevant. Before-tax and after-tax financial results are presented in Table 1-5.

The Toquepala Operations are most sensitive to fluctuations in copper price and grade, and operating cost. It is less sensitive to changes in capital costs. The operations are least sensitive to variations in molybdenum price and grade.

Table 1-5: Summary of Economic Results

Description	Unit	Value
Remaining mine life	years	41.2
Copper payable	Mlb	18,674.9
Molybdenum payable	Mlb	921.2
After-Tax Valuation Indicators		
Undiscounted cash flow	$M	6,596.2
NPV @ 10%	$M	373.6
Sustaining capital	$M	8,469.0
Closure cost (including IGV)	$M	305.9
Mining operating cost	$M	23,580.0
Process operating cost	$M	22,588.1

Note: Numbers have been rounded. IGV = value-added tax (Impuesto General a las Ventas).

1.19 Risks

Uncertainty factors that may affect the mineral resource and mineral reserve estimates were identified in Section 1.10.2 and Section 1.11.2, respectively.

Risks to the Toquepala Operations include the following.

1.19.1 Mine Plan

- The mineral reserve estimates are sensitive to metal prices. Lower metal prices than forecast in the LOM plan may require revisions to the mine plan, with impacts to the mineral reserve estimates and the economic analysis that supports the mineral reserve estimates.
- Geotechnical and hydrological assumptions used in mine planning are based on historical performance, and to date historical performance has been a reasonable predictor of current conditions. Any changes to the geotechnical, including seismicity, and hydrological assumptions could affect mine planning, affect capital cost estimates if any major rehabilitation is required due to a geotechnical (seismic) or hydrological event, affect operating costs due to mitigation measures that may need to be imposed, and impact the economic analysis that supports the mineral reserve estimates.
- Reduction in planned mining rates could delay the removal of waste and affect the ability to maintain constant feed to the plant.
- The Quebrada Honda TSF does not have sufficient storage capacity for the LOM. The mine plan assumes that a new facility location can be obtained, designs can be completed and approved by the relevant regulatory authorities, and the new facility can be constructed and commissioned prior to approximately the end of 2036. If the TSF is not available by the time envisaged, this could affect the mineral reserves, capital and operating cost estimates, and the economic analysis.
- Wood has assumed that the new TSF will be a dry-stack facility and has estimated capital and operating costs for such a facility. If the final TSF option uses a different disposal method, this could affect the mineral reserves, capital and operating cost estimates, and the economic analysis.
- The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry Standard to guide design and management of TSF's. Members and non-members of International Council on Mining and Metals (ICMM) are required to be in compliance with the GISTM over the next several years. The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently published

global tailings standard (GISTM, 2020). This may result in changes to the design criteria. Such changes may result in increases to the capital cost estimates, and changes to the operating cost estimates, which could affect the mineral reserve estimates.

- Labor cost increases or productivity decreases could impact the estimated mineral reserves, operating cost estimates and the economic analysis.
- Commodity price increases for key consumables such diesel, electricity, tires, and chemicals would negatively impact the stated mineral reserves because of the effect on the forecast operating costs.
- Legislation changes potentially affecting mining licenses and/or Southern Copper's ability to operate.

1.19.2 Metallurgical Test Work

- Past metallurgical performance of the ore material has been used to predict future performance. Unrecognized variability in the metallurgical characteristics could change the quality of the concentrate, throughput of the concentrators, recoveries and operating costs.

1.19.3 Geotechnical

- Demonstrating proper tailings management is becoming increasingly important for new and existing mining facilities and meeting the requirements of the Global International Standard on Tailings Management (GISTM) is an important step towards that process. The aim of this standard is to prevent tailings catastrophes, to restore public confidence and to promote sustainable practices that link technical tailings management with social aspects, transparency and accountability. Southern Copper is currently working to achieve these objectives for the Quebrada Honda TSF. The TSF has a geotechnical instrumentation system installed at critical locations (e.g., topographic control points, satellite control, piezometers, etc.) to monitor key parameters (e.g., displacements or surface movements of the dyke). A report listing the actions to be taken, if needed, to meet the requirements of the GISTM is currently underway by Southern Copper and it is expected to be issued in the next few months. Depending on the changes required to meet GISTM, increases in capital cost and operating cost estimates may be necessary.

1.19.4 Hydrology

- Water supply at the Toquepala Operations is dependent on fresh water sources from the Huaitire-Gentilar and Vizcachas aquifers; and the Tacalaya and Quebrada Honda streams.

Increasing pressure from climate change and communities within the watershed could impact the available water resources. Ongoing monitoring and management of the water supply systems are critical to ensure that the water supply remains viable. An investigation is currently being undertaken by Southern Copper to enhance the understanding of the aquifers and the impact of climate change on the sustainability of the water resource.

1.19.5 Environmental, Permitting and Social

- Assumed permitting and project development timelines may be longer than anticipated for the new TSF.
- Possibility of labor or social issues that could interrupt mine production.

1.20 Opportunities

Opportunities include:

- Improved geology logging of the bornite mineralization will provide the opportunity to better control the higher copper grades.
- Conversion of some or all of the Indicated mineral resources currently reported exclusive of mineral reserves to mineral reserves, with appropriate supporting studies
- Upgrade of some or all of the Inferred mineral resources to higher-confidence categories, such that such better-confidence material could be used in mineral reserve estimation and potentially reduce the mining costs through reduced waste rock to be mined
- Higher metal prices than forecast could present upside sales opportunities and potentially an increase in predicted Project economics.

1.21 Conclusions

Under the assumptions in this Report, the operations evaluated show a positive NPV over the remaining LOM and support the mineral reserves. The mine plan is achievable under the set of assumptions and parameters used.

1.22 Recommendations

The recommendations cover the discipline areas of data storage, mineral resource estimates, tailings storage and permitting. The total recommended budget estimate to complete the programs is $4.8–$5.9 million.

2.0 INTRODUCTION

2.1 Registrant

This technical report summary (the Report) on the Toquepala Operations, located in the province of Tacna, Tacna Department, Peru was prepared for Southern Copper by qualified persons (QPs) employed by Wood and Geosyntec who are third-party firms comprising mining experts.

The Toquepala Operations contains the Toquepala deposit.

2.2 Terms of Reference

2.2.1 Report Purpose

The Report was prepared to be attached as an exhibit to support mineral property disclosure, including mineral resource and mineral reserve estimates, for the Toquepala Operations in Southern Copper's Form 10-K for the year ending December 31, 2024.

2.2.2 Terms of Reference

Mineral resources and mineral reserves are reported for the Toquepala deposit. Mineral resources and mineral reserves are reported using the definitions in Subpart 229.1300 – Disclosure by Registrants Engaged in Mining Operations in Regulation S–K 1300 (S-K 1300).

Unless otherwise indicated, all financial values are reported in US dollars. The metric system is used in this Report, unless otherwise indicated.

2.3 Qualified Persons

This Report was prepared by appropriate qualified persons (QPs) from Wood and Geosyntec, whose firms are considered third-party firms comprising of mining experts. This Report was prepared by or contributed to by each third-party firm. Table 2-1 lists the sections of the Report prepared by or contributed by each third-party firm.

Table 2-1: Third-Party Firms Who Prepared This Report

Third-Party Firm	Report Sections
Wood	1.1-1.18, 1.19.1, 1.19.2, 1.19.5, 1.20, 1.21, 1.22, 2-6, 7.1, 7.2, 8-12, 13.1, 13.4-13.6, 14, 15.1-15.4, 15.7-15.9, 16-21, 22.1-22.15, 22.16.1, 22.16.2, 22.17, 22.18, 23.1-23.5, 23.8, 23.9, 24, 25
Geosyntec	1.19.3, 1.19.4, 1.22, 2.3, 2.4, 7.3, 7.4, 13.2, 13.3, 15.5, 15.6, 15.10, 22.16.3, 22.16.4, 23.6, 23.7, 23.9, 24, 25.4, 25.5

2.4 Personal Inspections

Wood and Geosyntec QPs visited the Toquepala Operations. The scope of inspection by each discipline area is summarized in Table 2-2.

2.5 Information Sources

The reports and documents listed in Section 24 and Section 25 were used to support Report preparation. Wood and Geosyntec have relied on Southern Copper (the registrant) for the information specified in Section 25.

2.6 Previous Technical Report Summaries

This Report updates a previously filed technical report summary on the Toquepala Operations titled "Toquepala Operations, Peru, Technical Report Summary", prepared by Wood, which was current as of December 31, 2022.

Table 2-2: Scope of Personal Inspection

Discipline Area	Site Visit Date	Scope of Personal Inspection
Geology/Mineral Resources	September 23-25, 2021	• Presentation on the geology of the area by Southern Copper geologist • Review of QA/QC procedures with Southern Copper personnel • Visited to the core shed; inspection of reject and pulp storage area • Pit inspection, observed blast hole sampling • Inspected the on-site mine laboratory and observed sample preparation and analysis of blast hole samples.
	February 5-7, 2024	• Reviewed the procedures for data capture in the database • Reviewed procedures for storing supporting drill hole documentation • Reviewed logging and core-cutting procedures • Visited and inspected the drilling platform of a single drill hole • Visited the sample storage facilities • Reviewed quality control processes.
	April 15, 2024	• Reviewed available drill hole documentation for historical drilling campaigns.
Infrastructure	September 29-30, 2021	• Visited the water-related infrastructure, including water supply, potable water, tanks and reservoirs providing fresh and process water. • Inspected/viewed mine facilities including the belt overland conveyor, workshops, warehouses, fuel tanks, plant, leach–solvent extraction (SX)–electrowinning (EW) (LESDE) plant, and leach dump • Toured the C1 and C2 concentrators plant, and viewed the associated workshops, warehouses • Viewed the camps, offices, schools, recreation infrastructure.
	October 1, 2021	• Visited Quebrada Honda TSF. Also visited the refinery facilities, Tablones port terminal, Simón railway yard, foundry, offices and camps, dock, warehouses and workshops in the Puerto area.
Mining	December 8, 2021	• Visited and inspected the open pit and the primary crusher.
	September 21-23, 2022	• Discussions with Southern Copper staff on aspects of mining • Visited and inspected the open pit and the primary crushers • Toured the Quebalix leach dump and SX-EW facility.

Discipline Area	Site Visit Date	Scope of Personal Inspection
	October 2-4, 2024	• Reviewed mine planning criteria with the mine superintendent • Visited the Pampa de Vaca reservoir.
Geotechnical/Tailings	October 2-3, 2024	• Visited the Quebrada Honda TSF to review and check the state of the facility and interviewed the personnel involved in the operation, maintenance and surveillance of the facility • Reviewed the geotechnical monitoring system of the structure and visited its control center • Visited the open pit, leach pad and WRSFs to assess the current state of the facilities and interviewed the working personnel involved in the operation, maintenance and control activities • Reviewed the geotechnical monitoring systems and visual assessment of the slopes.
Hydrogeology/Water Management	October 1-3, 2024	• Visited and reviewed water supply infrastructure at Lake Suches, discussed management of systems with operating personnel • Visited the Quebrada Honda TSF to review the state of the facility and interviewed personnel directly involved in the operation, maintenance, and surveillance of the facility • Visited the Toquepala open pit (including mine drainage systems), leach pad and WRSFs to assess and reviewed water management systems associated with the mine infrastructure • Visited and reviewed the water supply infrastructure associated with Pampa de Vaca reservoir.
Process	December 6-8, 2021	• Inspected the two Toquepala concentrators, pumping station from Cuajone, and the leach dumps facilities • Discussions with Southern Copper staff on aspects of metallurgy and processing.

3.0 PROPERTY DESCRIPTION

3.1 Property Location

The Property is located in the Ilabaya District, Jorge Basadre Province, Tacna Department, and is situated approximately 150 km by road from the city of Tacna, 85 km from the city of Ilo and 35 km from the city of Moquegua (Figure 3-1).

The Property centroid is situated at 17°17'05.85"S latitude and 70°36'21.10"W longitude. The center of the Toquepala open pit is located at approximately 17°14'44.64"S latitude and 70°36'48.48"W longitude. The smelter and refinery are located at about 17°29'55.44"S latitude; 71°21'36.48"W longitude and 17°34'43.68"S latitude; 71°21'11.28"W longitude, respectively. The Quebrada Honda TSF is located at approximately 17°27'43.44"S latitude and 70°47'48.60"W longitude.

3.2 Property and Title in Peru

Wood has not independently verified the following information which is in the public domain and have sourced the data from Elias (2019), Ernst and Young (2017), and KPMG (2016) as well as from official Peruvian Government websites.

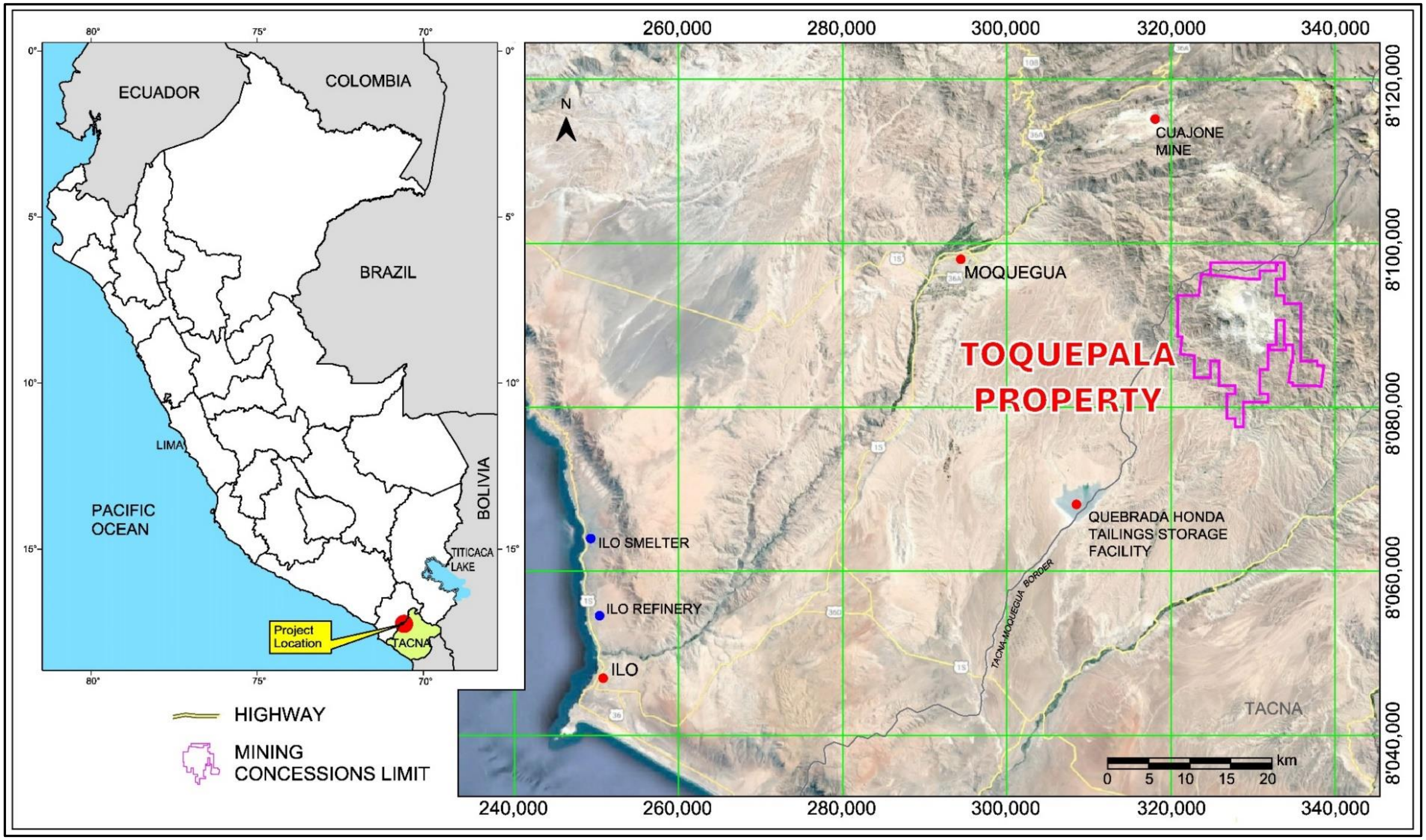
3.2.1 Regulatory Oversight

The right to explore, extract, process and/or produce minerals in Peru is primarily regulated by mining laws and regulations enacted by Peruvian Congress and the executive branch of government, under the 1992 Mining Law. The law regulates nine different mining activities: reconnaissance; prospecting; exploration; exploitation (mining); general labor; beneficiation; commercialization; mineral transport; and mineral storage outside a mining facility.

The Ministry of Energy and Mines (MINEM) is the authority that regulates mining activities. MINEM also grants mining concessions to local or foreign individuals or legal entities, through a specialized body called The Institute of Geology, Mining and Metallurgy (INGEMMET).

Other relevant regulatory authorities include the Ministry of Environment (MINAM), the National Environmental Certification Authority (SENACE), the Supervisory Agency for Investment in Energy and Mining (OSINERGMIN), the Ministry for Agriculture, and the Ministry for Culture. The Environmental Evaluation and Oversight Agency (OEFA) monitors environmental compliance.

Figure 3-1: Property Location Plan



Source: Wood, 2024

3.2.2 Mineral Tenure

Mining concessions can be granted separately for metallic and non-metallic minerals. Concessions can range in size from a minimum of 100 ha to a maximum of 1,000 ha.

A granted mining concession will remain valid providing the concession owner:

- Pays annual concession taxes or validity fees (derecho de vigencia), currently $3/ha, by June each year. Failure to pay the applicable license fees for two consecutive years will result in the cancellation of the mining concession.
- Meets minimum expenditure commitments or production levels. The minima are divided into two classes:
  - Achieve "Minimum Annual Production" by the first semester of Year 11 counted from the year after the concession was granted, or pay a penalty for non-production on a sliding scale, as defined by Legislative Decree N° 1320 which became effective on 1 January, 2019. "Minimum Annual Production" is defined as one tax unit (UIT) per hectare per year, which is S/5,150 in 2024 (about $1,355).
  - Alternatively, no penalty is payable if a "Minimum Annual Investment" is made of at least 10 times the amount of the penalty.

The penalty structure sets out that if a concession holder cannot reach the minimum annual production on the first semester of the 11th year from the year in which the concessions were granted, the concession holder will be required to pay a penalty equivalent to 2% of the applicable minimum production per year per hectare until the 15th year. If the concession holder cannot reach the minimum annual production on the first semester of the 16th year from the year in which the concessions were granted, the concession holder will be required to pay a penalty equivalent to 5% of the applicable minimum production per year per hectare until the 20th year. If the holder cannot reach the minimum annual production on the first semester of the 20th year from the year in which the concessions were granted, the holder will be required to pay a penalty equivalent to 10% of the applicable minimum production per year per hectare until the 30th year. Finally, if the holder cannot reach the minimum annual production during this period, the mining concessions will be automatically expired.

Title-holders of mining concessions that were granted before December 2008 were obliged to pay the penalty from 2019 if the title-holder did not reach either the Minimum Annual Production or make the Minimum Annual Investment in 2018.

Mining concessions will lapse automatically if any of the following events take place:

- The annual fee is not paid for two consecutive years.
- The applicable penalty is not paid for two consecutive years.
- The Minimum Annual Production Target is not met within 30 years following the year after the concession was granted.

Beneficiation concessions follow the same rules as for mining concessions. A fee must be paid that reflects the nominal capacity of the processing plant or level of production. Failure to pay such processing fees or fines for two years would result in the loss of the beneficiation concession.

3.2.3 Royalties

In 2011, the Peruvian Congress approved an amendment to the mining royalty charge. The mining royalty charge is based on operating income margins with graduated rates ranging from 1–12% of operating profits; the minimum royalty charge is equivalent to 1% of net sales. If the operating income margin is 10% or less, the royalty charge is 1% and for each 5% increment in the operating income margin, the royalty charge rate increases by 0.75%, to a maximum of 12%.

At the same time the Peruvian Congress enacted a Special Mining Tax that is also based on operating income. Rates range from 2–8.4%. If the operating income margin is 10% or less, the Special Mining Tax is 2%, and for each 5% increment in the operating income margin, the special mining rate increases by 0.4%, to a maximum of 8.4%.

3.2.4 Surface Rights

Mining companies must negotiate agreements with surface landholders or establish easements. Where surface rights are held by communities, such easements must be approved by a qualified majority of at least two thirds of registered community members. In the case of surface lands owned by communities included in the indigenous community database maintained by the Ministry of Culture, it is necessary to go through a prior consultation process before administrative acts, such as the granting of environmental permits, are finalized. For the purchase of surface lands owned by the government, an acquisition process with the Peruvian state must be followed through the Superintendence of National Properties.

Expropriation procedures have been considered for cases in which landowners are reluctant to allow mining companies to have access to a mineral deposit. Once a decision has been made by the Government, the administrative decision can only be judicially appealed by the original landowner as to the amount of compensation to be paid.

3.2.5 Water Rights

Water rights are governed by Law 29338, the Law on Water Resources, and are administered by the National Water Authority (ANA) which is part of the Ministry of Agrarian Development and Irrigation (MIDAGRI). There are three types of water rights:

- *License* – this right is granted in order to use the water for a specific purpose in a specific place. The license is valid until the activity for which it was granted terminates, for example, a beneficiary concession.
- *Permission* – this temporary right is granted during periods of surplus water availability and for water return surface such as agrarian drainage, resulting seepage of the exercise of rights of holders of licenses of use of water.
- *Authorization* – this right is granted for a specified quantity of water and for a specific purpose: works (i.e., construction), studies and soil washing. The grant period is two years, which can be extended for only two additional years, for example for drilling.

In order to maintain valid water rights valid, the grantee must:

- Make all required annual payments including financial compensation for water and use and discharges
- Abide by the conditions of the water right in that water is only used for the purpose granted.

Water rights cannot be transferred or mortgaged. However, in the case of the change of the title holder of a mining concession or the owner of the surface land who is also the beneficiary of a water right, the new title holder or owner can obtain the corresponding water right.

3.2.6 Environmental Considerations

MINAM is the environmental authority, although the administrative authority is the Directorate of Environmental Affairs (DGAAM) of MINEM. The environmental regulations for mineral exploration activities were defined by Supreme Decree No. 020-2008-EM of 2008. New regulations for exploration were defined in 2017 by Supreme Decree No. 042-2017-EM.

An Environmental Technical Report (Ficha Técnica Ambiental or FTA) is a study prepared for approval of exploration activities with non-significative environmental impacts and less than 20 drilling platforms. The environmental authority has 10 working days to make observations.

An Environmental Impact Declaration (Declaración de Impacto Ambiental or DIA) has to be presented for Category I exploration activities which have a maximum of 40 drilling platforms or disturbance of surface areas of up to 10 ha. The environmental authority has 45 working days to make observations.

A semi-detailed Environmental Impact Study (Estudio de Impacto Ambiental Semi-Detallado or EIAsd) is required for Category II exploration programs which have between 40–700 drilling platforms or a surface disturbance of more than 10 ha. The environmental authority has 96 working days to make observations. The total process including preparation of the study by a registered environmental consulting company can take 6–8 months.

A full detailed Environmental Impact Study (Estudio de Impacto Ambiental Detallado or EIAd) must be presented for mine construction. The preparation and authorization of such a study can take as long as two years.

3.2.7 Permits

In order to conduct exploitation activities, the following main permits are normally required:

- The approval of a detailed EIA (EIAd) by SENACE
- The approval of a detailed closure plan
- The approval of an authorization to build a beneficiation concession by the DGM of MINEM
- The functioning license for the beneficiation concession by the DGM of MINEM
- License for the use of water
- Explosives permits granted by Superintendencia Nacional de Aduanas y de Administracíon Tributaria (SUNAT)
- Controlled substances permit granted by SUNAT.

These main permits are in good standing for the Toquepala Operations.

3.2.8 Other Considerations

Producing mining companies must submit and receive approval for an environmental impact study that includes a social relations plan, certification that there are no archaeological remains in the area, and a draft mine closure plan. Closure plans must be accompanied by payment of a monetary guarantee.

In April 2012, Peru's Government approved the Consulta Previa Law (prior consultation) and its regulations approved by Supreme Decree N° 001-2012-MC. This requires prior consultation with any indigenous communities as determined by the Ministry of Culture, before any infrastructure or projects, in particular mining and energy projects, are developed in their areas.

Mining companies also have to separately obtain water rights from the National Water Authority and surface lands rights from individual landowners.

3.2.9 Fraser Institute Survey

Wood used the Investment Attractiveness Index from the 2023 Fraser Institute Annual Survey of Mining Companies report (the Fraser Institute survey) (Mejía and Aliakbari, 2024) as a credible source for the assessment of the overall political risk facing an exploration or mining project in Peru. The Fraser Institute annual survey is an attempt to assess how mineral endowments and public policy factors such as taxation and regulatory uncertainty affect exploration investment.

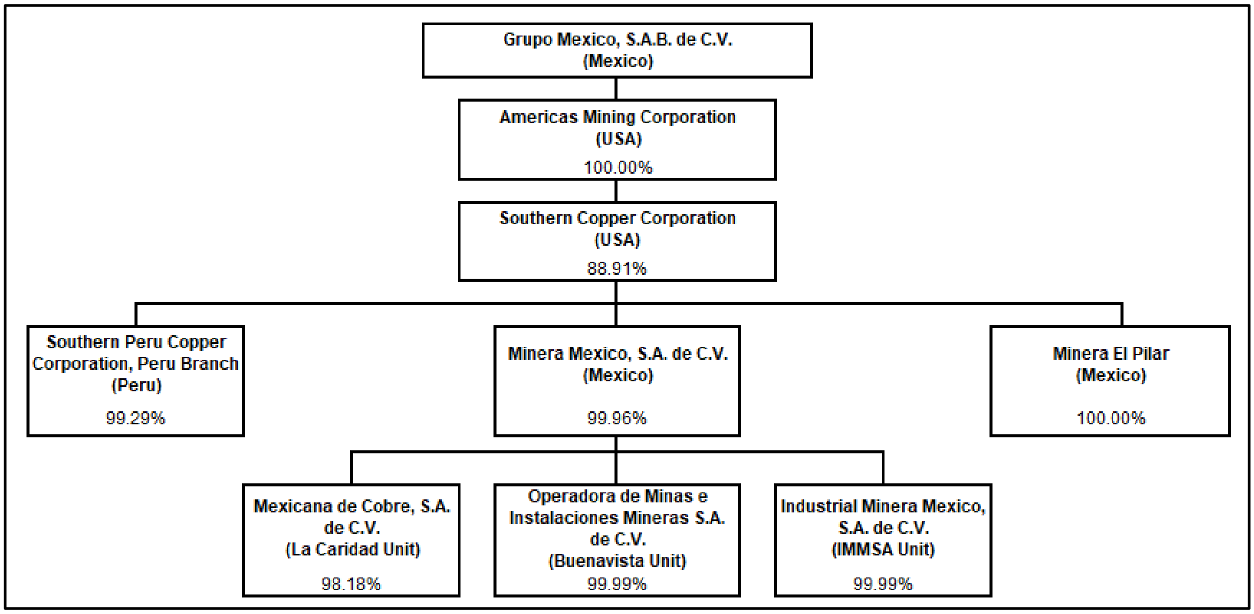
Wood used the Fraser Institute survey because it is globally regarded as an independent report-card style assessment to governments on how attractive their policies are from the point of view of an exploration manager or mining company senior management, and forms a proxy for the assessment by the mining industry of the political risk in Peru.

In 2023, the rankings were from the most attractive (1) to the least attractive (86) jurisdiction, of the 86 jurisdictions included in the survey. Peru ranked 59 out of 86 jurisdictions in the attractiveness index survey in 2023; 61 out of 86 in the policy perception index; and 42 out of 58 in the best practices mineral potential index.

3.3 Ownership

The Project is wholly owned by Southern Copper Corporation, Sucursal del Perú, which is a majority-owned, indirect subsidiary of Grupo Mexico S.A.B de CV. (Grupo Mexico). An ownership organogram is provided in Figure 3-2.

Figure 3-2: Ownership Organogram



Source: Southern Copper, 2024

3.4 Mineral Title

The Property consists of 15 mining concessions totaling 24,168.76 ha (Table 3-1). Concession locations are shown in Figure 3-3.

Mining concessions in Peru are laid out using a grid system delimited by INGEMMET.

The annual holding fee is $3.00/ha.

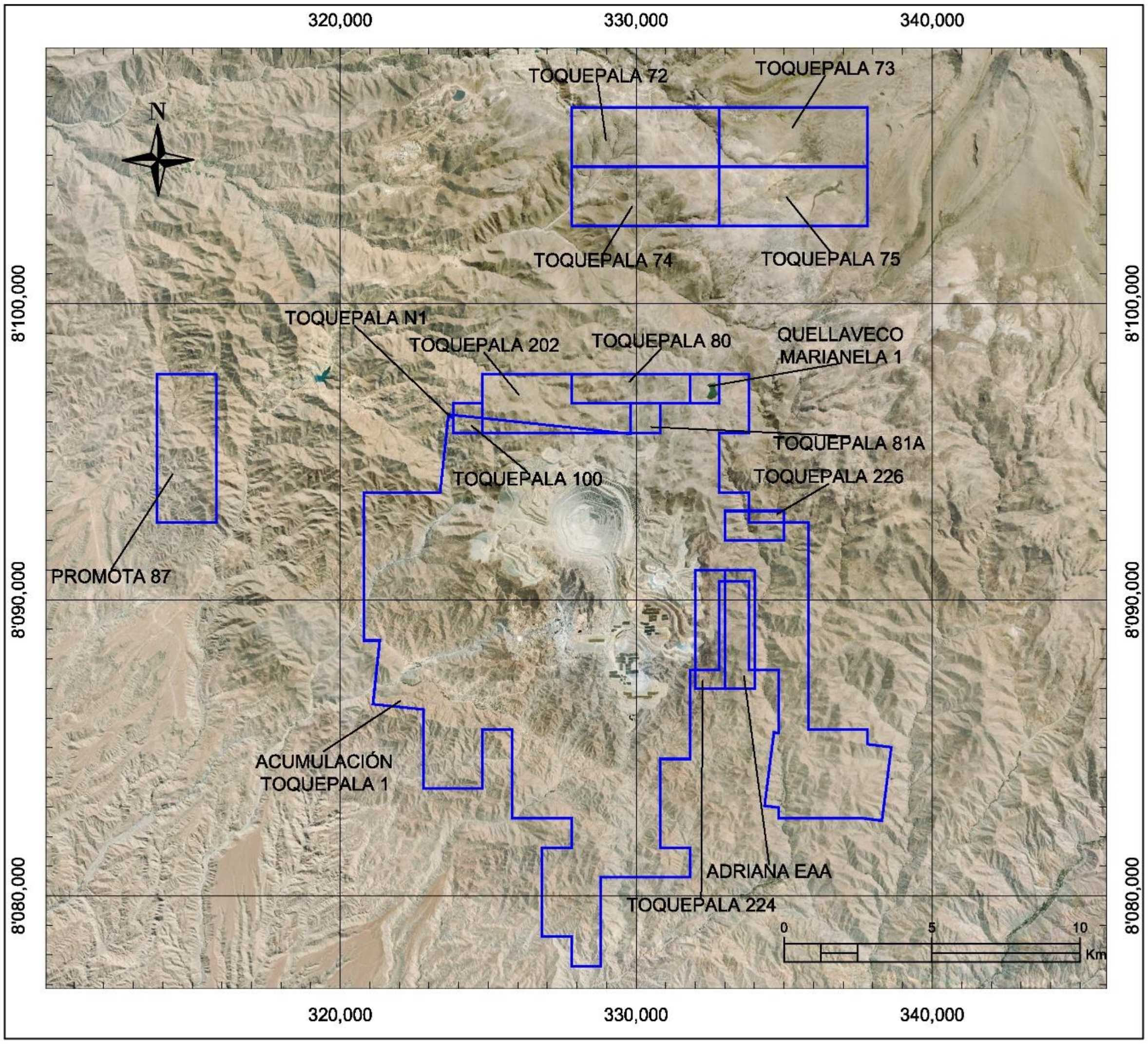
Southern Copper also holds two beneficiation concessions:

- Toquepala concentrator, registration code P0100414 granted on November 6, 2002 for a processing rate of 60,000 t/d. The beneficiation concession has been amended on several occasions:
  - April 14, 2015: increase in throughput rate to 120,000 t/d
  - January 11, 2017: area expansion to cover 300.32 ha
  - February 12, 2019: TSF embankment raise.
- Solvent extraction/electrowinning (SX/EW) Toquepala leaching plant registration code P1100414, granted on May 7, 1996 for a processing rate of 11,850 t/d.

Table 3-1: Mineral Tenure

Concession Name	Area (ha)
Acumulación Toquepala 1	17,502.45
Quellaveco Marianela 1	100.00
Toquepala 100	43.92
Toquepala 202	679.19
Toquepala 72	997.34
Toquepala 73	1,000.00
Toquepala 74	1,000.00
Toquepala 75	1,000.00
Toquepala 80	400.00
Toquepala 81A	100.00
Toquepala N1	1.20
Promota 87	1,000.00
Toquepala 224	55.86
Adriana EAA	244.14
Toquepala 226	44.65
Total	**24,168.76**

Figure 3-3: Mineral Tenure Location Plan



Source: Southern Copper, 2024

3.5 Surface Rights

Southern Copper acquired land from private owners in support of the operations. In other areas, surface rights were granted by the Peruvian State in accordance with the law, either by the granting of old mining concessions or by the granting of surface rights (DUTES) for exclusive use.

Most of the surface rights are those granted by the Peruvian State because the operations are situated on uncultivated land owned by the State. Water easements, power lines, tunnels, industrial railroad line and tailings canal are authorized by the Peruvian State, as they cross uncultivated land that is owned by the State. These surface rights will remain as long as the mining concession remains in force.

Southern Copper holds a "right of free use" on the uncultivated lands in the Toquepala mining concession and Quebrada Honda TSF areas. These surface rights will also remain as long as the mining concession remains in force.

There are granted easements covering the TSF and related facilities, the TSF pipelines, and water pipelines from the Lake Suches to the Toquepala Operations (see also discussion in Section 15).

Portions of WRSFs required for the LOM plan are outside the current area of surface rights held by Southern Copper and additional surface rights will need to be secured (see Section 17).

A new TSF will be required when the Quebrada Honda TSF reaches capacity by approximately end of 2036. Surface rights for the facility location will need to be acquired before this date (see Section 17).

3.6 Water Rights

Southern Copper has both groundwater and surface water usage licenses, for a total extraction rate of 2,011.37 L/s. The rights are summarized in Table 3-2.

3.7 Royalties

Apart from the mining royalty (see Section 3.2.3) there are no royalty agreements pertinent to the Project.

3.8 Encumbrances

There are currently no encumbrances such as liens, streaming agreements or otherwise that could affect the LOM plan.

3.9 Permitting

Permitting and permitting conditions are discussed in Section 17.

Table 3-2: Water Rights

Area	Document Number	Water Right	Date
Surface water	R.S. N° 534-72-AG	License in process of adaptation of 150 L/s of the waters of the Ticalaya and Quebrada Honda. Only for Toquepala.	June 15, 1972
	R.M. N° 00405-77-AG/DGA	License in the process of adapting the use of 60 L/s of the waters of the Cinto-Quebrada Honda river. Only for Toquepala.	April 12, 1977
	R.D. N° 053-88-AG-DGA	Modification of the R.S. N° 535-72-AG reducing the flow to 300 L/s of the Lake Suches	April 10, 1988
	R.D. N° 271-2010-ANA/AAA I C-O	Regime of the License for the use of surface water, based on volumes and flows of the R.M. N° 405-77-AG/DGA. Only for Toquepala.	December 31, 2010
	R.D. N° 2521 y 2768-2017-ANA/AAA I C-O	License to use water from the Cuajone mine pit for 463,806 m^3/year	September 4 y 21, 2017
	R.D. N° 030 y 087-ANA-AAA CO	Modification of the License for the use of water of the Cuajone mining pit, increasing to 1,936,500.00 m^3/year (61.37 L/s)	January 17 y 25, 2024
Groundwater	R.M. 00899-79-AA-AGAS	License to use a mass of 15,736,464 m^3 of groundwater through tubular wells drilled in the “Vizcachas” and “Titijones” hydrographic basins	July 09, 1979
	R.D. N° 0062-83-AG-DGASI	License to use an annual mass of up to 13,268,966 m^3 of groundwater extracted through four tube wells from the “Huaitire” basin	June 15, 1983
	R.A. N°169-95-DISRAGT-ATDRLIS	License to use groundwater in the Vizcachas basin of up to 360 L/s	July 12, 1995
	R.A. N° 002-94-DISRAG/ATDRL-S	License for the use of an annual mass of 5,991,840 m^3 of groundwater captured from tubular wells TP-11 and TP-12 drilled in the “Huaitire-Gentilar” hydrographic basin	1994
	R.A. N° 020-2003-ATDR.M/DRA.MDO	Adequacy of the water use license granted to in the R.M. N ° 00899-79-AA/DGAS and R.A. N° 002-94-DISRAG/ATDRL-S up to 9,744,624 m^3	April 1, 2003
	R.A. N° 034-2005-DRA.T/GR.TAC-ATDRL/S	Groundwater use license with a flow of 162.2 L/s equivalent to an annual mass of 5,115,139 m^3 captured by two tubular wells TP-14 and TP-15 located in the Huaitire-Gentilar basin	January 28, 2005

3.10 Violations and Fines

There are no significant violations or fines that apply to the Toquepala Operations.

3.11 Significant Factors and Risks That May Affect Access, Title or Work Programs

To the extent known to Wood, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the Project that are not discussed in this Report.

4.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

4.1 Physiography

The geography that surrounds the Property is marked by hills, small mountains and streams, with elevations ranging from 2,700–3,800 meters above sea level (masl). Elevation of the mining operations is approximately 3,365 masl.

The general direction of water runoff from the area is from the northeast to the southwest. Streams have a dendritic drainage pattern and are typically ephemeral.

Vegetation types vary, depending on terrain elevation and proximity to the ephemeral watercourses. Vegetation commonly consists of scrub and grasslands. Dryer areas are characterized by cacti species. In desert areas if there is vegetation it consists of thorny plants and shrubs.

Crops are cultivated along the banks of the Cimarrona and Toquepala Creeks.

Using classifications developed by the Peruvian-Japanese Center for Seismic Research and Disaster Mitigation (Cismid), the Property area straddles two seismic zones (JCI, 2020):

- *Destructive (VIII intensity)* – slight damage to specialized structures; considerable damage to well-built ordinary structures, with possible collapse; heavy damage to poorly-built structures; seriously damaged or destroyed masonry, and furniture completely moved out of place.
- *Very destructive (IX intensity)* – considerable damage to specialized structures, walls out of plumb; extensive damage to major buildings, with partial building collapse; and buildings displaced off foundations.

4.2 Accessibility

The mining operations are accessed from the city of Tacna via the Pan-American highway (Route 1S) and subsidiary roads TA-100, MO-107, TA-105, and TA-570 to the mine site. Alternative access is from Lima using the Pan-American highway to the town of Alto Camiara and then driving for 70 km on a paved roads (TA-100, MO-107, TA-105, and TA-570) to the Toquepala camp.

The mine site is easily accessible from the cities of Arequipa, Moquegua, Tacna and Ilo, via the Panamericana Sur highway, to Alto Camiara, and then via the 70 km paved road to the Toquepala camp.

Within the Project area access is by unpaved mine and exploration roads.

Puerto de Ilo, the port site and location of the smelter and refinery, is 148 km from the Toquepala mine via paved road.

The Quebrada Honda TSF is 40 km south of the mine and is accessed via the MO-107 and TA-100 route that that connects Alto Camiara with Toquepala.

Tacna, Moquegua, and Ilo have regularly scheduled air services from Lima.

4.3 Climate

Toquepala's climate is considered typical of desert conditions with a Köppen and Geiger classification of BWk (arid cold; Climate-Data.org, 2020). Temperatures range from an average low of 1.3°C to an average high of 20°C (JCI, 2020).

Historical annual average precipitation is around 53 mm, with the highest amount of historical precipitation occurring in the month of February (21 mm on average). Foggy conditions are common.

Winds are typically southerly, varying from south–southwest to south, to south–southeast.

Mining operations are conducted year-round. Exploration activities are conducted year-round but may be temporarily curtailed by rare heavy rainfall events.

4.4 Infrastructure

Infrastructure supporting current operations is in place (see also discussions in Section 13, Section 14, and Section 15). These Report sections also discuss water sources, electricity, personnel, and supplies for the LOM plan.

The primary water source is the 370 km^2 Lake Suches (see Section 15) situated about 40 km east of the mine site at an altitude of approximately 4,450 masl. Southern Copper has water rights or licenses for as much as 2,011.37 L/s from well fields at the Huaitire, Vizcachas and Titijones aquifers and surface water rights from Lake Suches, two small water sources: Quebrada Honda and Quebrada Tacalaya, and from the Cuajone mine pit. Two desalination plants in Ilo produce water for industrial use and domestic consumption.

The major electrical infrastructure in the Project area includes the Aricota and Cuajone hydroelectric plants and several thermal power plants. The power grid is that of the Southern Interconnected System, which has six major electrical transmission lines.

Personnel live in mine accommodation villages adjacent the operations.

Tacna is the main source of supplies and fuel.

5.0 HISTORY

The exploration and development history are outlined in Table 5-1.

Table 5-1: Exploration and Development History

Operator	Date	Comments
-	18–19th century	• Spanish Cateadores (explorers) and others
-	1930	• G. Steinmann notes copper mineralization in the Toquepala area in his book "Geology of Peru"
Cerro de Pasco Corporation (Cerro de Pasco)	1937	• Juan Oviedo Villegas delineates the central zone of the Toquepala deposit. Deposit recognized as a copper porphyry.
-	1938–1942	• Cerro de Pasco entered into a purchase option. Work conducted included topographic and geological mapping, collection of 110 channel samples, covering an area of about 8 km^2. Excavated tunnels, completed 34 drill holes (7,620 m) • Cerro de Pasco allowed the purchase agreement to expire and subsequently American Smelting and Refining Company (Asarco), through its subsidiary Northern Peru Mining and Smelting Company, entered into a new purchase option agreement on Toquepala.
Northern Peru Mining	1945	• Cerro de Pasco loses the purchase option against Northern Peru Mining,
	1945–1949	• Exploration included underground tunneling and completed metallurgy and regional engineering, geology, and photogeology studies • Initial mineral resource estimate • Reviewed potential water sources for mining operations • Acquired full property rights in mid-1948.
	1949–1955	• Drilled 139 holes (41,300 m), of which 108 drill holes were percussion and 31 were core holes; geological mapping. • Updated mineral resource estimate.
Asarco	1952–1954	• Project engineering studies • Asarco entered into a bilateral agreement with the State of Peru for the development of the Toquepala operations in 1954.

Operator	Date	Comments
Southern Peru Copper Corporation	1954	• Asarco, Cerro de Pasco, Newmont Mining Corporation and Phelps Dodge create Southern Peru Copper Corporation • Complete 10 percussion and 10 core holes in the deposit area.
	1955–1998	• Mine construction activities, including construction of the railway line, workshops, offices, infrastructure, and preparation of the deposit area for mining • Various churn drill, core and RC drilling campaigns, totaling 170,000 m in 570 holes.
	1960	• Toquepala mine and the Ilo smelter commenced operations
	1999	• Grupo Mexico acquired Asarco
	2005	• Southern Copper merged with Minera Mexico, the Mexican arm of Grupo Mexico
	2016	• 35 core holes (18,856 m) for infill purposes • 12 core holes (3,620 m) for geotechnical purposes
	2017	• 29 core holes (20,687 m) for infill purposes • 9 core holes (4,093 m) for geotechnical purposes
	2018	• 16 core holes (11,359 m) for infill purposes • 100 core holes (16,600 m) for Cerro Azul project geological exploration • 16 core holes (6,041 m) for geotechnical purposes • Toquepala second 60 kt/d concentrator commenced operations
	2019	• 30 core holes (24,479 m) for infill purposes • 22 core holes (9,436 m) for geotechnical purposes
	2020	• 20 core holes (15,555 m) for infill purposes
	2021	• 11 core holes (9,463 m) for infill purposes
	2022	• 37 core holes (17,595 m) for infill purposes • 6 core holes (3,400 m) for geotechnical purposes
	2023	• 18 core holes (9,487 m) for infill purposes

6.0 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Deposit Type and Mineralization

The Toquepala deposit is considered to be an example of a copper–molybdenum porphyry deposit.

Porphyry deposits range in age from Archean to recent, although most are Jurassic or younger, and form in in a variety of tectonic settings. Most copper–molybdenum deposits are associated with low-silica, relatively primitive dioritic to granodioritic plutons that fall on the more oxidized, magnetite-series spectrum.

Deposits commonly form irregular, oval, solid or "hollow" cylindrical and inverted cup shapes. Orebodies can occur separately, overlap each other, or be stacked on top of each other. They are characteristically zoned, with barren cores and crudely concentric metal zones that are surrounded by barren pyritic halos with/without peripheral veins, skarns, replacement manto zones and epithermal precious-metal deposits. At the scale of ore deposits, associated structures can result in a variety of mineralization styles, including veins, vein sets, stockworks, fractures, “crackled zones” and breccia pipes.

Pyrite is typically the dominant sulfide mineral, in association with chalcopyrite, bornite, chalcocite, tennantite, enargite, other copper sulfides and sulfosalts, molybdenite and electrum.

6.2 Regional Geology

The basal regional geology consists of Precambrian metamorphic rocks that are cut by Paleozoic granite, unconformably overlain by Upper Triassic to Jurassic marine volcanic and sedimentary lithologies. Overlying these rocks are late Cretaceous to early Tertiary rhyolite, andesite, and agglomerate rocks of the Toquepala Group. The Toquepala Group is subdivided into the Huaracane, Inogoya, Paralaque, and Quellaveco Formations, with the volcanic component of the individual formations deposited subaerially.

Figure 6-1 is a regional geology overview map, and Figure 6-2 shows geology in the general Project vicinity.

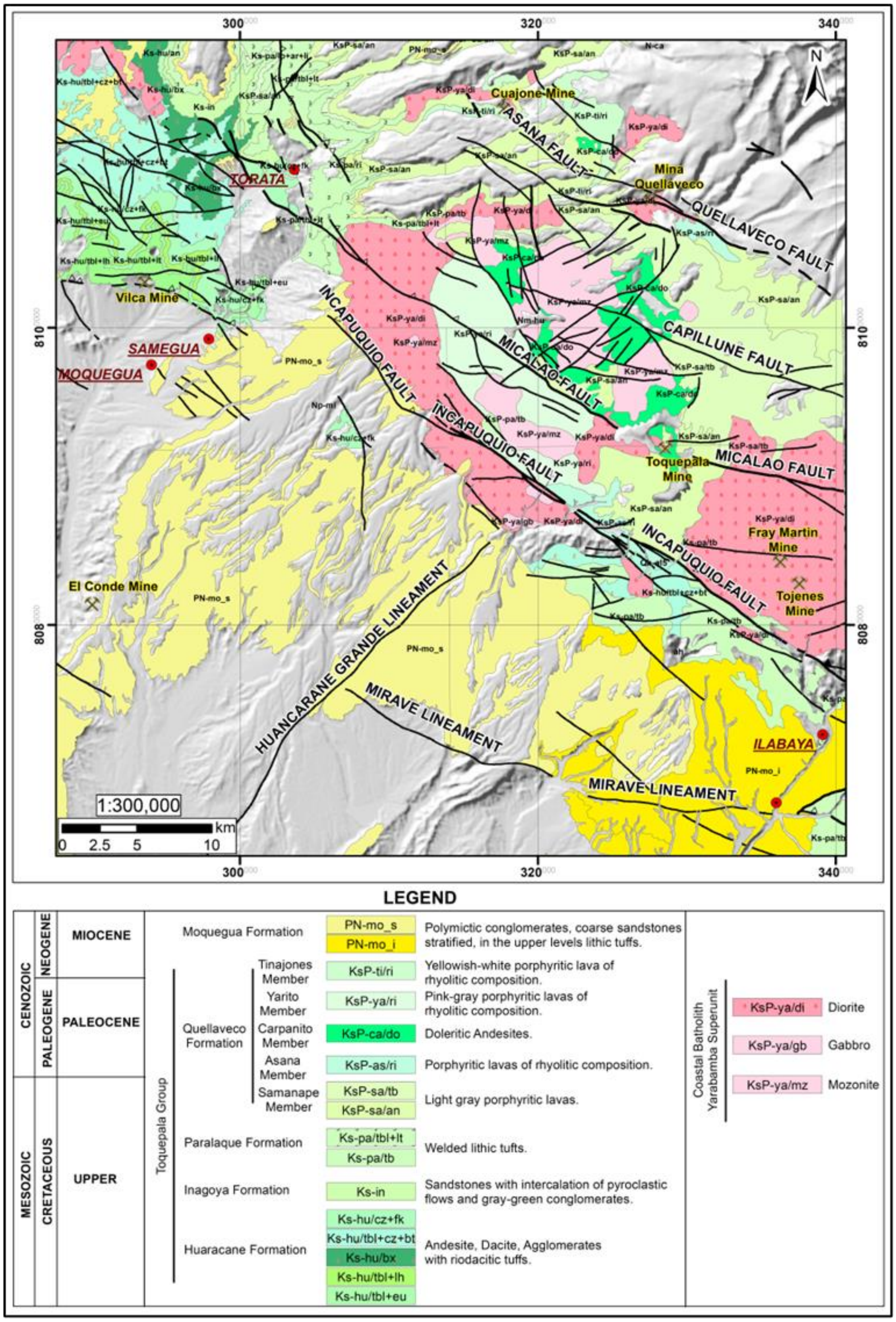
The Toquepala deposit is hosted mainly within latest Cretaceous rhyolitic and andesitic flows and ash fall deposits of the Toquepala Group and to a lesser extent within an Eocene dioritic batholith of the Yarabamba intrusive suite.

Figure 6-1: Regional Geology Map

Source: Southern Copper, 2021

Note: Grid shown is South latitude and West longitude lines.

Figure 6-2: Regional and Project Geology



Source: Southern Copper, 2024

6.3 Local Geology

6.3.1 Lithologies and Stratigraphy

The sedimentary and volcanic stratigraphy of the Toquepala area is illustrated in Figure 6-3.

A sequence of several thousand meters of volcanic rocks assigned by Bellido and Landa (1965) and Bellido (1979) to the Paralaque and Quellaveco Volcanics of the middle and upper Toquepala Group is exposed in the Toquepala district. The Paralaque Volcanics (Bellido and Landa, 1965) constitute the oldest local member of the Toquepala Group and out crop only to the south of the Incapuquio Fault (refer to Figure 6-2), where the section is composed of andesite, dacite and rhyolite flows with minor volcaniclastic and conglomeratic lenses. Exposed to the north of the fault are lavas and ash-flows of the Quellaveco Formation (Bellido, 1979).

6.3.2 Structure

The regional-scale Incapuquio fault system influenced the location of the Late Cretaceous-Early Paleogene magmatism of the Toquepala Group, and locally juxtaposes volcanic rocks of the Toquepala Group and intrusive bodies and has been traced for over 140 km from the Chilean border to the outskirts of the town of Moquegua. The amount and sense of displacement are problematic: sinistral/transcurrent, normal (southwest side down), and dextral/reverse movements have been observed by various workers.

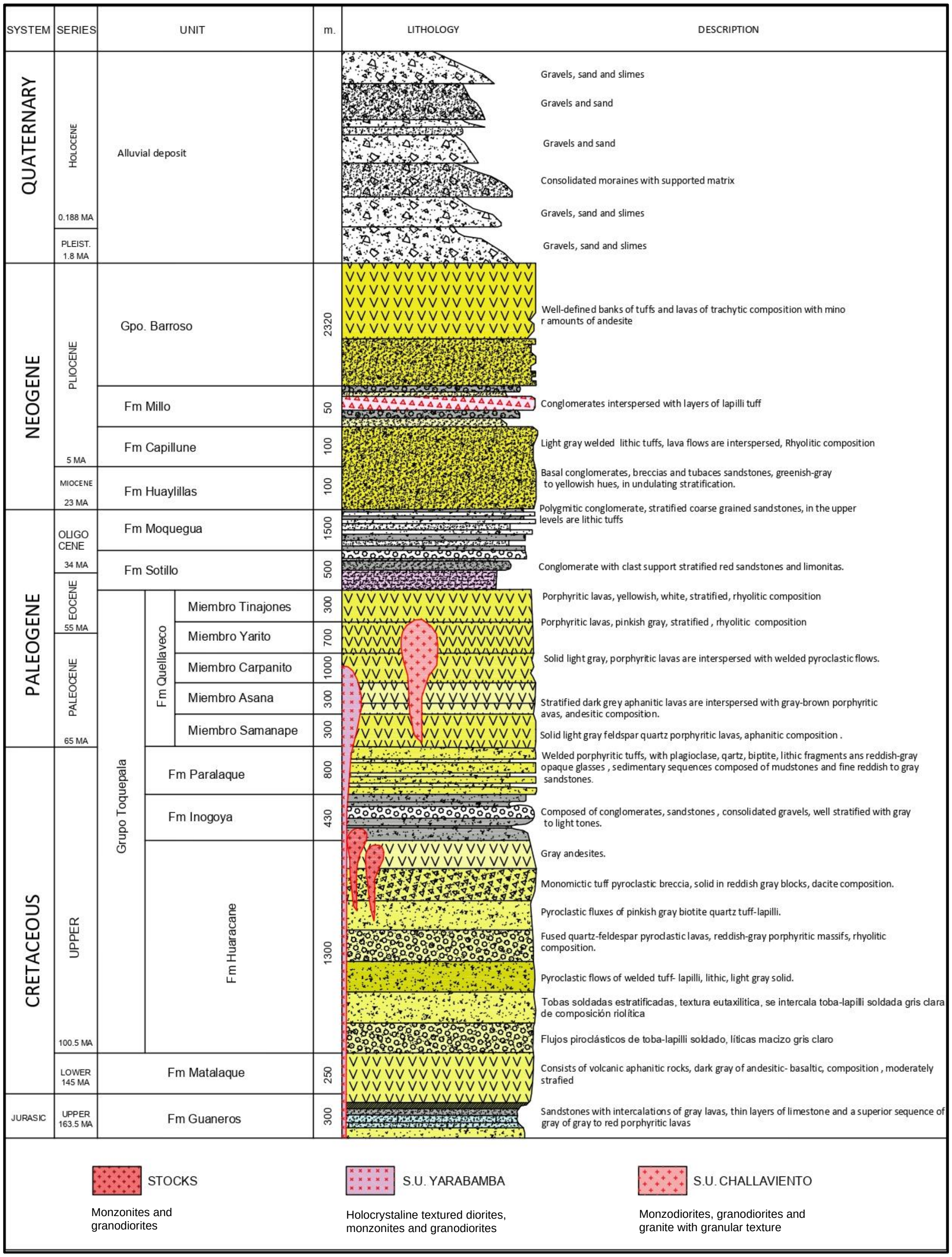
The Micalaco Fault, 6–7 km north of the Incapuquio fault system (refer to Figure 6-2), forms the southern boundary to the mineralization at Toquepala. It trends northwesterly, dips steeply, and has been traced for over 20 km. The fault zone is narrow throughout much of its course, but in the vicinity of the mine it broadens to several hundred meters.

The Toquepala Alignment is defined by dacite porphyry intrusions, breccias, and agglomerates trending 15–20°. This alignment crosses the mineralized zone in the central and eastern part of the pit, can reach 500 m in width, and is best developed north of the Micalaco Fault.

The Sargento and Yarito Faults and other secondary fault systems represent local alignments of breccias and faults.

Cretaceous and Tertiary volcanic strata in the mine area dip consistently at a low angle to the southwest. This tilting post-dates the extrusion of the regionally extensive ash-flow tuffs of the post-ore Huaylillas Formation and it is inferred that the Toquepala hydrothermal system has itself been tilted 5–20° to the southwest.

Figure 6-3: Stratigraphic Column



Source: Martínez and Zuloaga, 2000

Folds in the area exhibit north–northwest orientations and are parallel to the Incapuquio fault system. On a local scale, in the Quebrada Honda TSF area, there are folds of low amplitude (<25 m), with northwest–southeast directions. Two monoclines have been identified in the TSF area that show strongly-sheared folded layers.

6.3.3 Alteration Age

The age of the main hydrothermal and intrusive events related to copper mineralization is 55.0 ± 0.21 to 55.91 ± 0.4 Ma, based on dating of igneous biotite and hydrothermal sericite using $^{40}Ar/^{39}Ar$ techniques.

6.4 Property Geology

6.4.1 Deposit Dimensions

The deposit is ovoid, extending over a 3.3 x 3.5 km area. Mineralization has been drill tested to about 950 m from the original land surface. Drilling from within the pit base indicates primary mineralization extends for an additional 930 m below the pit bottom.

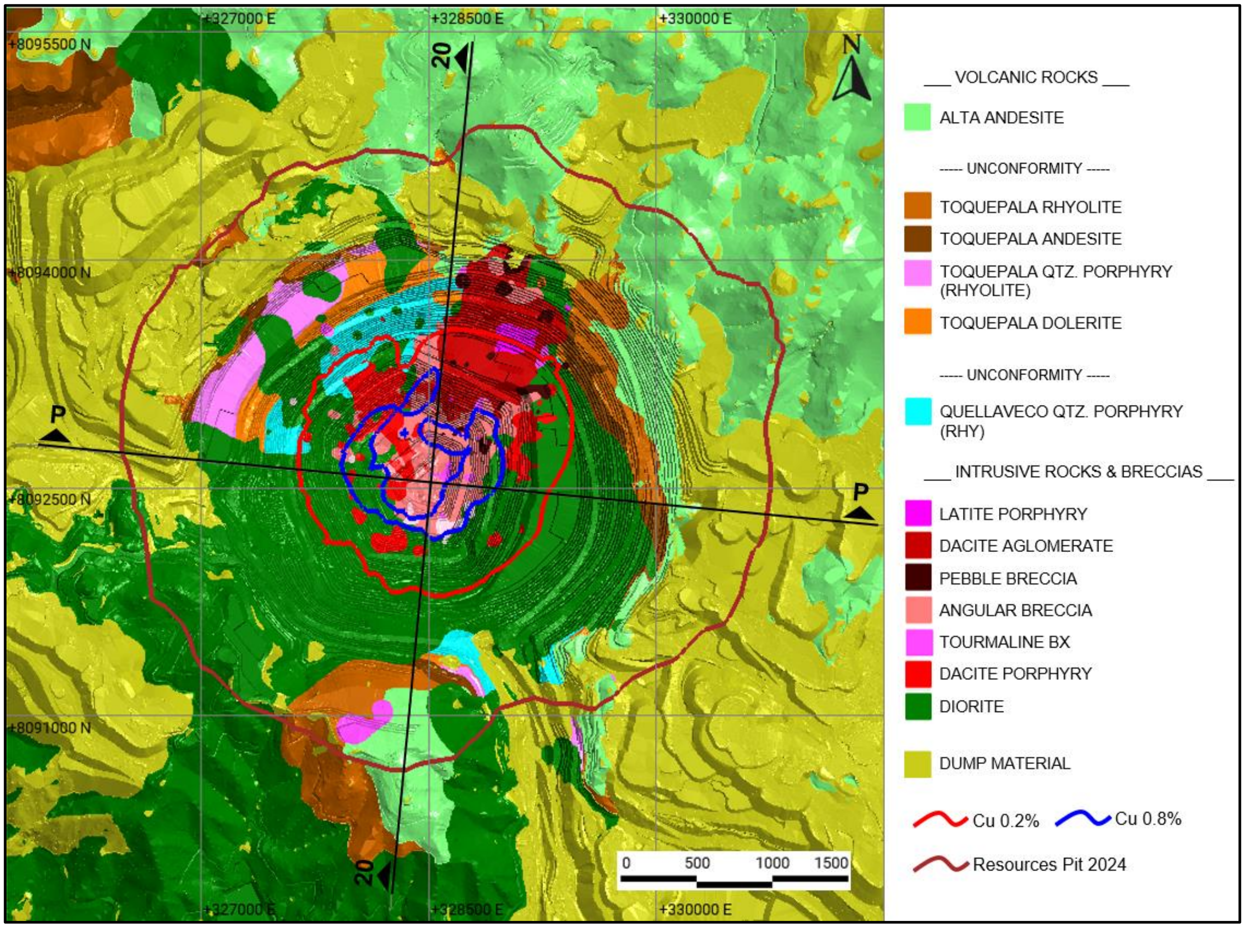
A geology map is provided in Figure 6-4. Cross-sections through the deposit are included as Figure 6-5 and Figure 6-6.

6.4.2 Lithologies

Mineralization is closely associated with a complex, 1,500 m diameter intrusive center dominated by four phases of porphyritic dacite plugs, referred to as "T", "Main", "L/M" and "Late", a dacite diatreme and agglomerates, extensive hydrothermal breccias and latite porphyry stocks and dikes.

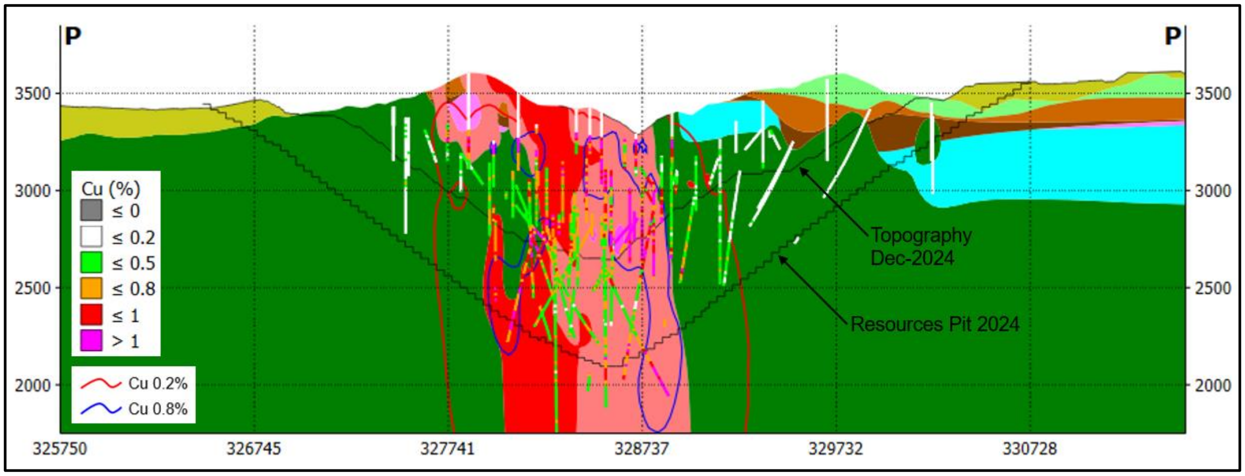
The main lithologies are volcanic units (Table 6-1), intrusive rocks (Table 6-2) and breccias (Table 6-3).

Figure 6-4: Toquepala Operations Geology Map



Source: Wood, 2024

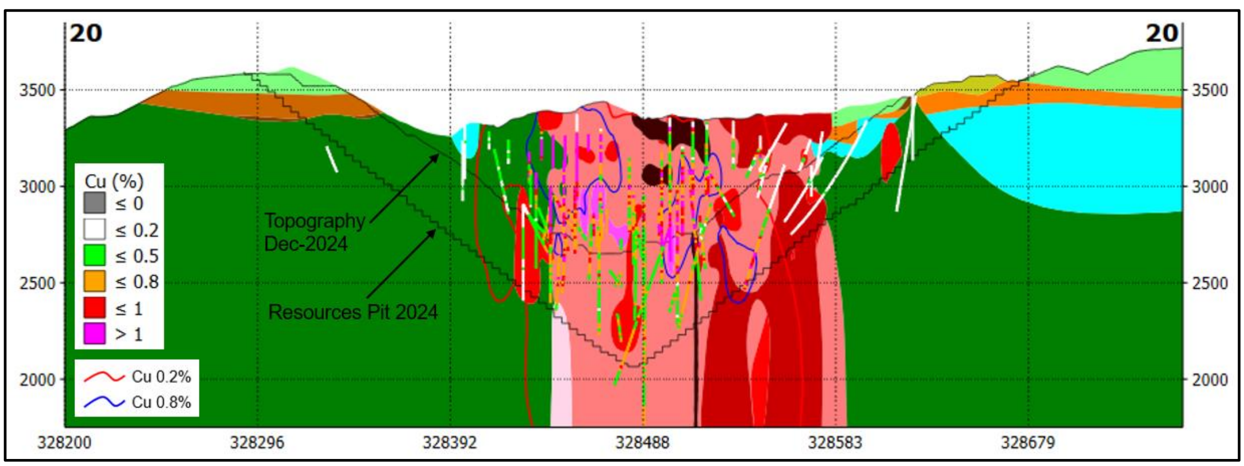
Figure 6-5: Geological Cross-section P



Source: Wood, 2024

Note: West–east section P, looking north. Legend key provided in Figure 6-4

Figure 6-6: Geological Cross-section 20



Source: Wood, 2024

Note: Southwest–northeast section 20, looking west. Legend key provided in Figure 6-4

Table 6-1: Volcanic Rocks

Unit	Description
Upper Andesite	Andesite flows, breccias, agglomerates, and volcaniclastic rocks
Toquepala Rhyolite	Flow-banded rhyolites. Used as a marker bed within the overall stratigraphic section
Toquepala Andesite	Gray, aphanitic andesite lava flows
Toquepala Quartz Porphyry	Large concentration of medium to coarse grained quartz crystals. Can be locally silicified. Chlorite–epidote–calcite (propylitically) altered. secondary argillic alteration in the leached cap produced hematite and jarosite on fractures and fillings in cavities
Toquepala Dolerite	Black, aphanitic rock with high magnetic susceptibility. May be adjacent to an andesitic lapilli tuff. It is typically weakly to moderately chlorite–calcite–pyrite (propylitically) altered. Chalcopyrite occurs along fractures and veinlets
Quellaveco Quartz Porphyry	Cream–violet colored rhyolite with fluidal textures and fiamme. Chlorite–calcite–pyrite (propylitically) altered

Table 6-2: Intrusive Rocks

Unit	Description
Diorite	Porphyritic and medium to coarse grained. Chalcopyrite occurs with pyrite as disseminations and as fracture fillings. Molybdenite occurs as fracture fillings and disseminations. Alteration is dominantly weak to moderate chlorite–calcite–epidote–pyrite (propylitic). Some areas exhibit weak to moderate quartz–sericite alteration (phyllic) or weak to moderate silicification

Table 6-3: Breccias

Unit	Description
Angular breccia	Polymict fragments of dacite porphyry, diorite, tourmaline breccia, and latite porphyry in a gray silica matrix with chalcopyrite, molybdenite, and pyrite. Chalcopyrite fills cavities and "D" veins is disseminated in the matrix and fragments. Molybdenite fills fractures and "B" veinlets and is disseminated in the matrix. Strong to moderate quartz–sericite alteration (phyllic) was followed by moderate to weak quartz–K-feldspar–biotite ± chlorite (potassic) alteration.
Tourmaline breccia	Fragments of dacite porphyry in a matrix of tourmaline. Alteration is dominantly moderate chlorite–epidote–pyrite (propylitic). Tourmaline has also been recognized as sporadically disseminated clots, in veinlets, filling cavities and filling fractures.
Pebble breccia	Dike-like body of rounded, polymict fragments of diorite, dacite, latite porphyry, rhyolite, and andesite in the range of 1–20 cm in a matrix of rock flour and gray silica. In some areas, the matrix is latite porphyry. Mineralization consists of cavity filling and disseminated chalcopyrite, molybdenite, and pyrite. Sparse tourmaline and rhodochrosite veinlets. Weak to moderate chlorite–epidote–calcite–pyrite (propylitic) alteration occurs throughout this breccia. Minor quartz–sericite (phyllic) alteration and silicification occur locally.

6.4.3 Structure

Regional structures that were important in intrusive emplacement are outlined in Section 6.3.2.

In the mine area, the Toquepala Lineament appears to control some aspects of mineralization. The lineament is based on the distribution of three porphyry stocks, two breccia bodies, numerous pebble, and thin intrusive dikes within the mine as well as the Cerro Toquepala, Cerro Azul and Totoral breccia pipes along a 20° azimuth. The lineament is controlled by a north–northeast-trending pre-mineral fault system.

6.4.4 Alteration

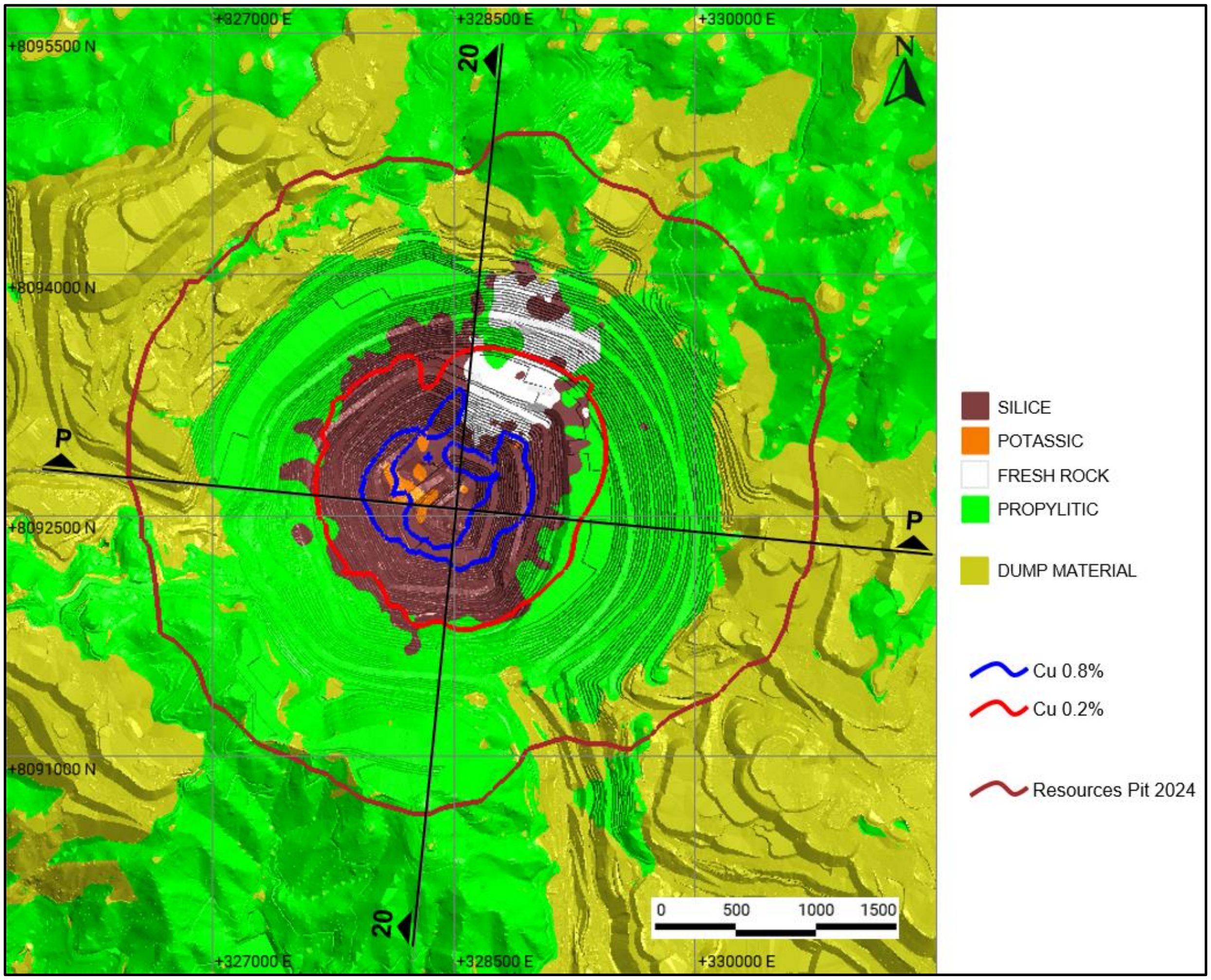
A 5–6 km diameter zone of hydrothermal alteration was recognized. The intensity of hydrothermal alteration varies from the center of the deposit towards the periphery, with four zones identified (Figure 6-7 to Figure 6-9):

- A small quartz–biotite–K-feldspar ± sericite–chlorite–albite–anhydrite central (potassic) zone 400 m wide with chalcopyrite and chalcocite as the dominant copper-bearing minerals, molybdenite, and pyrite (FeS2) uneconomic iron material. Potassic alteration occurred in the nucleus of the system, progressing to a phyllic alteration in the periphery. Type "B" and "D" veinlets developed within the potassic zone and are associated with the hypogenic sulfides responsible for fixing copper in the system.
- A quartz–sericite–pyrite (phyllic) envelope at the periphery of the deposit of 700 m. The presence of hydrothermal gypsum is a guide for the low-grade copper and molybdenum mineralization.
- A chlorite–epidote–calcite–pyrite (propylitized) zone extending more than 2 km.
- A remnant argillic zone located to the north of the deposit.

A supergene quartz–kaolin–chlorite and clay (argillic) alteration zone occur in the weathered portion of the deposit.

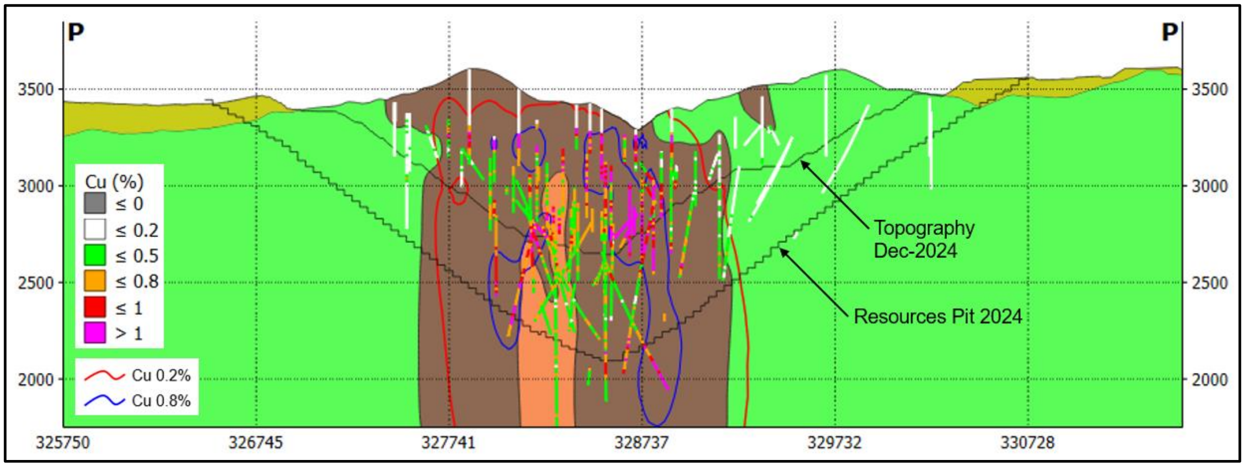
The primary alteration type in the breccia zones is silicification, together with sericite and small amounts of clay minerals. On the breccia edges, propylitic alteration is more typical.

Figure 6-7: Alteration Type Map



Source: Wood, 2022

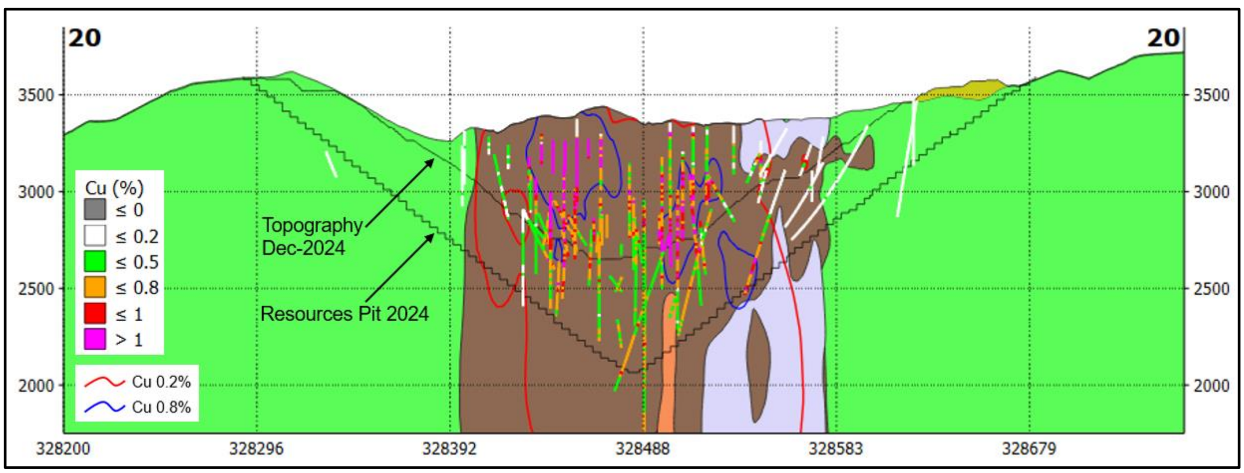
Figure 6-8: Alteration Type Cross-Section P



Source: Wood, 2024

Note: West–east section P, looking north. Legend key provided in Figure 6-7

Figure 6-9: Alteration Type Cross-Section 20



Source: Wood, 2024

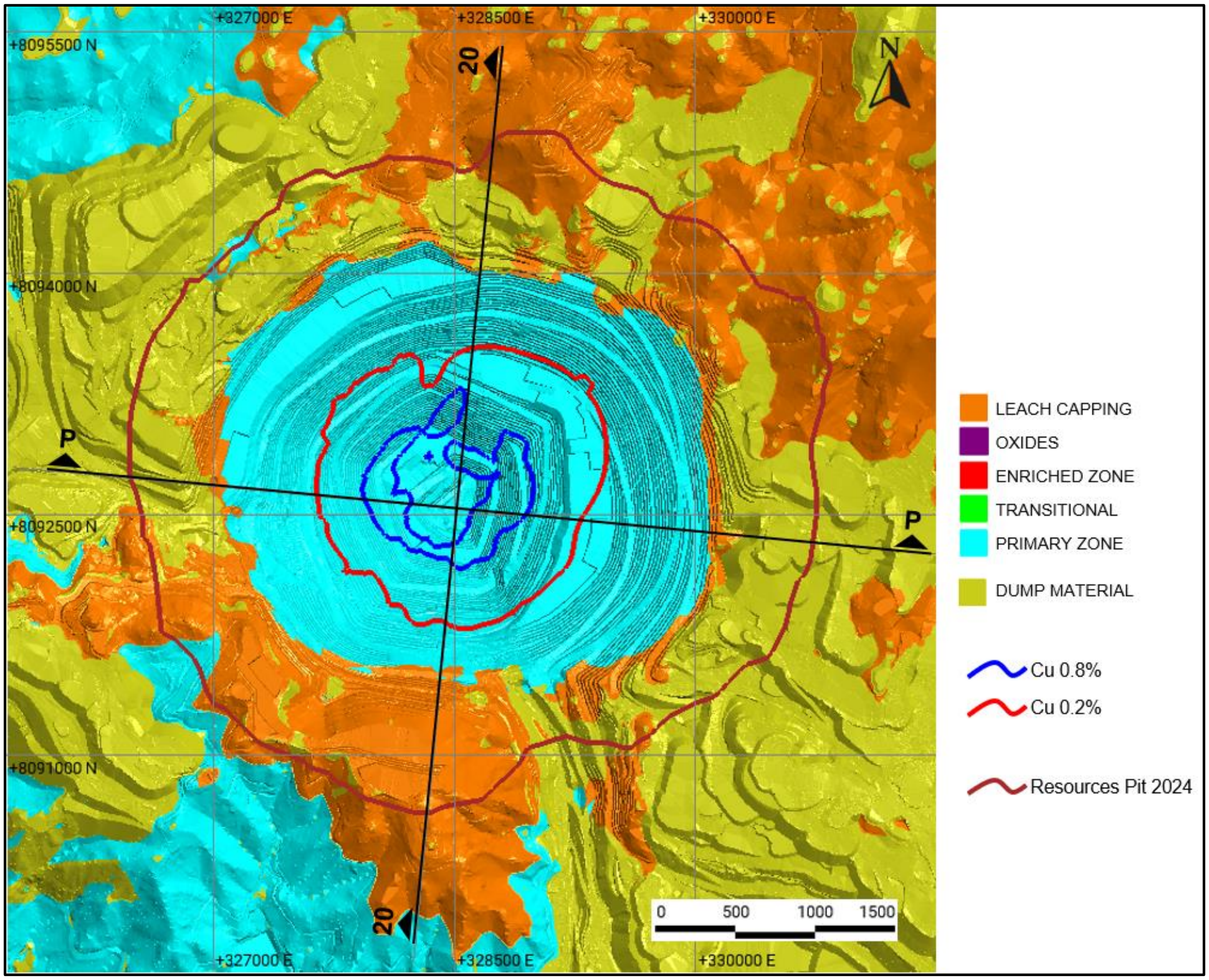
Note: Southwest–northeast section 20, looking west. Legend key provided in Figure 6-7

6.4.5 Mineralization

6.4.5.1 Mineralization Types

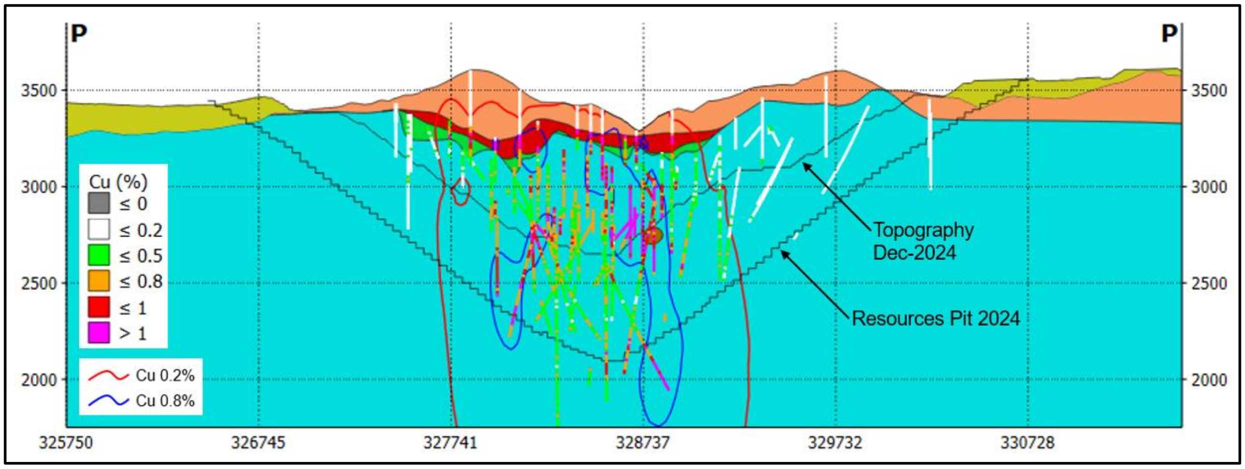
Mineralization consists of leached capping, oxide, enriched, transitional and primary mineralization (Figure 6-10 to Figure 6-12). The first four types have largely been mined out.

Figure 6-10: Mineralization Type Map



Source: Wood, 2024

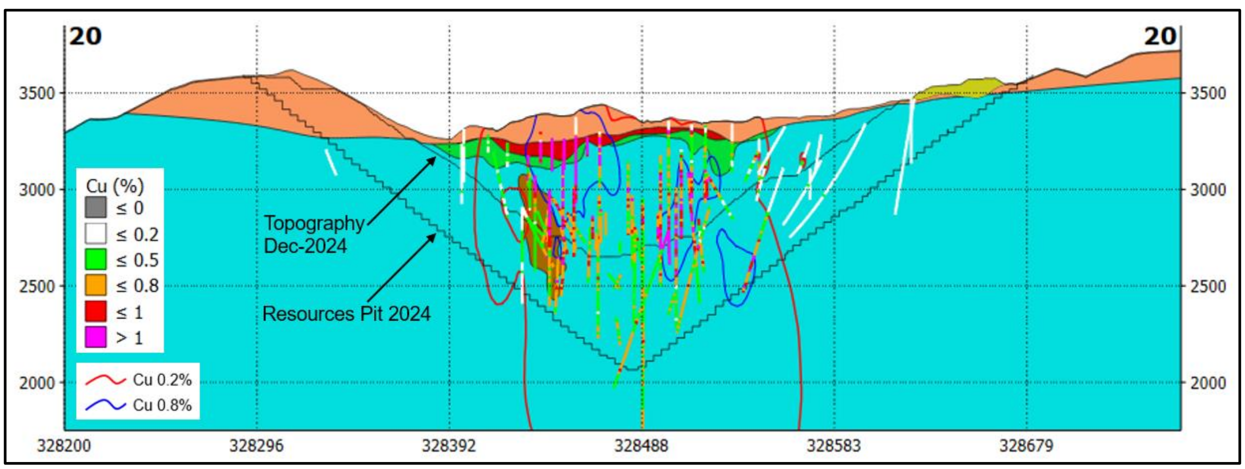
Figure 6-11: Mineralization Type Cross-Section P



Source: Wood, 2024

Note: West–east section P, looking north. Legend key provided in Figure 6-10

Figure 6-12: Mineralization Type Cross-Section 20



Source: Wood, 2024

Note: Southwest–northeast section 20, looking west. Legend key provided in Figure 6-10

Mineralization types include:

- Leached capping is predominantly limonite (jarosite 30%, hematite 60% and goethite 10%) mostly disseminated and in fractures. It is mostly mined out; however, remnants occur around the periphery of the pit.
- Oxide mineralization is very sparse and may be entirely mined out.

- Enriched mineralization consists of 90% chalcocite, and 10% digenite, covellite, and bornite in breccia matrix, disseminations, and veinlets. This material has the highest copper grades and is mostly mined out.
- Transition mineralization is about 60% chalcopyrite, 25% chalcocite and 15% molybdenite and bornite as breccia matrix, disseminations, and veins associated with quartz. It is mostly mined out, but remnants are localized on the west edge of the pit.
- Primary copper mineralization occurs as hypogene sulfides mainly restricted to the dacite porphyry and breccias. Chalcopyrite is the dominant economic mineral (90% of mineralization) with 10% bornite, molybdenite, and enargite as disseminations fracture fillings, and breccia matrix. It is associated with potassic alteration (biotite and/or K-feldspar) with about 1% of pyrite (pyrite to chalcopyrite ratio of about 3:1) associated with magnetite and anhydrite. Economic molybdenite mineralization is associated with quartz veinlets and locally, with disseminated chalcopyrite.

In the phyllic zone, pyrite is present as 10% of the rock. The pyrite to chalcopyrite ratio is about 12:1, associated with minor molybdenite, bornite, chalcocite, sphalerite, and galena.

6.4.5.2 Paragenesis

Mineralization and alteration are related to four hydrothermal events, known as the Early, Tourmaline, Main, and Late stages.

The Early stage (characterized by potassic and sodic alteration and by chalcopyrite–pyrite stockwork mineralization), represents about 5% of the deposit's copper, and largely followed the first (T) dacite porphyry intrusive event, but came before the Main and dacite porphyries intrusions. The latter two intrusions are essentially barren but are the most extensively exposed of the dacite porphyries in the pit.

A voluminous sulfide barren tourmaline breccia pipe with scarce tourmaline–quartz veins represents the Tourmaline stage, and was emplaced after the Main and dacite porphyries intrusions. The tourmaline breccias comprise quartz–sericite-altered clasts in a tourmaline–quartz matrix.

The tourmaline breccias were subsequently re-opened and the wall rocks fractured by the Main stage hydrothermal fluids to essentially emplace all of the molybdenite and most of the chalcopyrite mineralization. This resulted in the development of typically 3 mm wide quartz-rich veins that followed continuous fractures and had no well-defined alteration envelopes.

Chalcopyrite–pyrite veins, fracture coatings and fracture-controlled disseminations were also formed. Fragments of rock in the mineralized breccia matrix were intensely altered to sericite with tourmaline that occurred in veinlets and as cavity fillings by tourmaline. Gangue consists of quartz and gypsum. Veinlets are locally filled by quartz crystals jointly with scaly aggregates of sericite; these at the same time are cut by veinlets of a later hydrothermal event that resulted in pyrite weakly replacing chalcopyrite. Bornite occurs in <40 µm pyrite voids and as a replacement of chalcopyrite. In turn, bornite is locally replaced by tennantite and covellite. Molybdenite occurred as <200 µm anhedral crystals located in the matrix interstices or pores and contained inclusions of rutile and chalcopyrite.

Between 54–52 Ma the dacite porphyry was emplaced and added sulfide mineralization as well as anhydrite. This medium-grained intrusive introduced rutile characterized by aggregates of anhedral crystals filling cavities in quartz, plagioclase, and gypsum gangue and as encrustations on chalcopyrite. Pyrite occurred as subhedral cubic crystals <260 µm, with edges replaced by chalcopyrite. Laminar molybdenite was deposited in the gangue and included in the chalcopyrite with <40 µm molybdenite grain sizes. Chalcopyrite as anhedral aggregates occurred in microfractures together with anhydrite and gypsum and replaced pyrite from its edges and in smaller proportion as disseminations. Tennantite was present in <30 µm pores in chalcopyrite.

The dacite agglomerate and latite porphyry, which are not cut by the Main stage veining, were emplaced following the formation of the main hypogene mineralization, but were coeval with the extensive Late stage, copper-poor, quartz–sericite–pyrite–andalusite alteration and more localized advanced argillic development. This intrusive phase was also responsible for large-scale phreatomagmatic eruptions that produced a 300 m diameter pebble breccia pipe and a swarm of pebble dikes.

7.0 EXPLORATION

7.1 Exploration

7.1.1 Grids and Surveys

The topographic survey used for the mineral resource estimate includes field surveys completed as of August 15, 2023 with a projection of mining advance to the end of December 2024 in UTM coordinate system (Zone 19K – WGS 84 datum).

The topographic data was acquired by the mining surveying department using a local coordinate grid, then transformed using the SCtrx algorithm, developed by Global Mapping S.A.C. General management of operations requested the change of these local coordinates to UTM coordinates in order to standardize the coordinate system in the operational areas. The project was executed by contractor company Global Mapping S.A.C.

7.1.2 Geological Mapping

Geological mapping is undertaken to refine understanding of the lithological contacts encountered in the pit with the lithologies outside the final pit outline. Pit face mapping is conducted at 1:2,000 scale.

7.1.3 Geochemistry

No geochemical exploration has been conducted since the mine started operations.

7.1.4 Geophysics

No geophysical surveys for exploration purposes have been conducted since the mine started operations.

Geophysical surveys have been performed in support of geotechnical designs. Seismic refraction surveys were conducted by third-party consultants Arce Geofísicos and SGA Geofísica EIRL in 2011 and 2018, respectively. The surveys focused on defining peak particle velocities in the pit structural domains. Surveys consisted of ionic trajectory tomography, seismic refraction, and multichannel analysis of surface waves technologies.

7.1.5 Interpretation of the Exploration Information

The Toquepala mine has been operating since 1960, and all exploration data generated prior to mine start-up is long superseded by mining and drill data.

7.1.6 Exploration Potential

Exploration potential is recognized at the Cerro Azul prospect, which is located 2 km northeast of the Toquepala open pit. The prospect is anomalous in copper and molybdenum and is associated with brecciation. The superimposed anomalies are about 1.4 x 0.8 km in area, with average values of 100–300 ppm Cu and 20–700 ppm Mo.

A geological map of the prospect is provided in Figure 7-1.

7.2 Drilling

7.2.1 Overview

Drilling totals 1,464 core and RC holes (551,095 m), and is summarized in Table 7-1.

Drilling that supports mineral resource estimation consists of 1,274 core holes (477,272 m) as summarized in Table 7-2. In this update, 237 new drill holes were added, of which 86 drill holes corresponding to the 2020 – 2023 campaigns, and 151 historical drill holes that were previously ignored due to lack of supporting documentation.

Drill collar locations up to 2023 are shown on an operator basis in Figure 7-2. Collars of those drill holes used in mineral resource estimation are shown in Figure 7-3.

RC, geotechnical, and blasthole data were not used for the mineral resource estimation as these holes represent a different support.

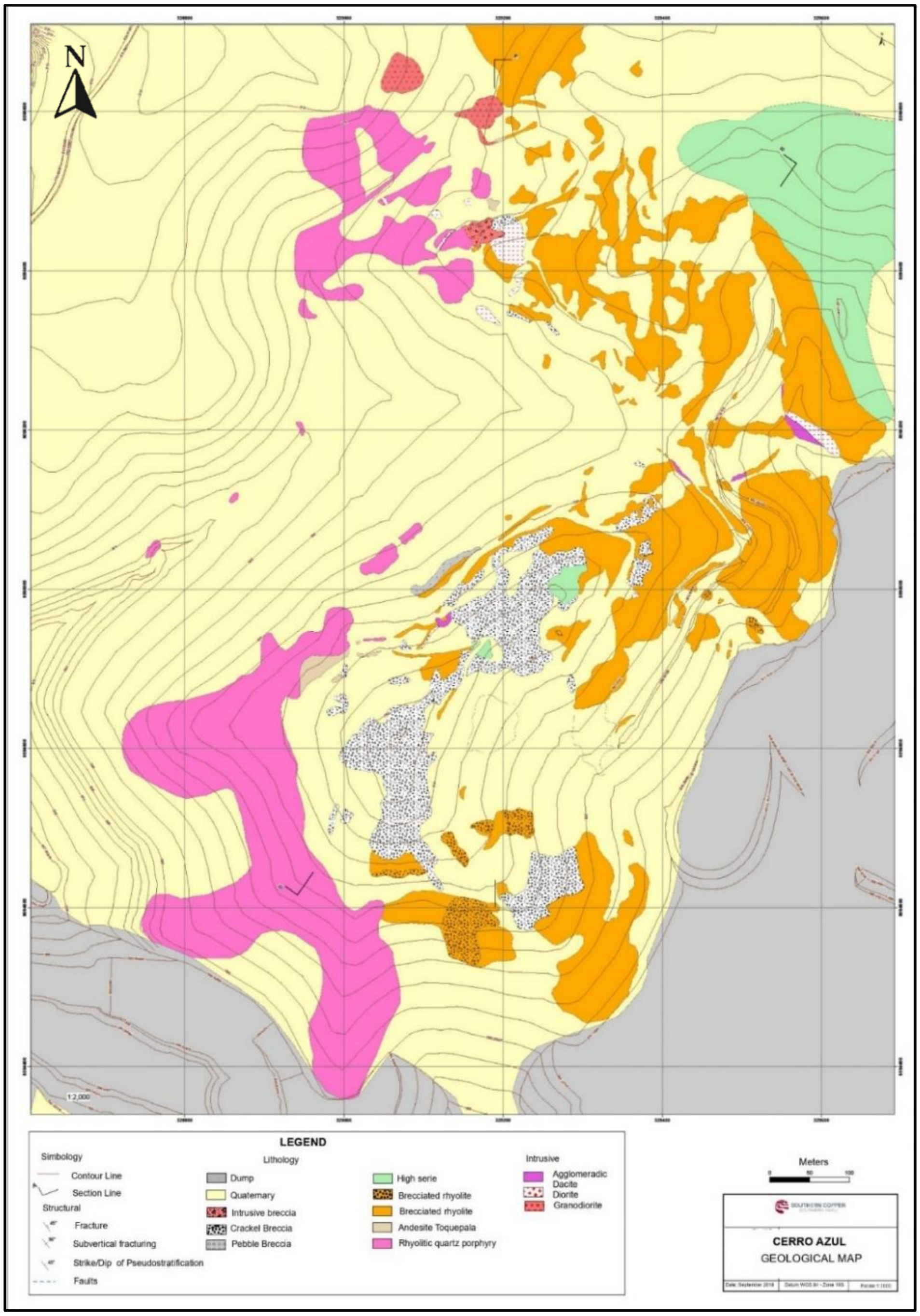
7.2.2 Drill Methods

Approximately 94% of the data in the database is core drilling and 6% is RC.

Holes are generally drilled vertically and collared on section lines spaced 60 m apart.

A total of 267 drill holes were inclined holes, which represent 21% of total drill holes used in estimation; the remaining drilling was vertical.

Figure 7-1: Cerro Azul Prospect Geological Map



Source: Southern Copper, 2021

Note: High Serie - mainly pyroclastics and ignimbrites, volcanic sequence of Quellaveco Formation.

Table 7-1: Drill Summary Table

		Geological		RC		Geotechnical		Total	
Year	Operator	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled
1940	Cerro de Pasco	8	1,856.20	-	-	-	-	**8**	**1,856.20**
1941		14	2,968.09	-	-	-	-	**14**	**2,968.09**
1942		14	2,976.87	-	-	-	-	**14**	**2,976.87**
1949	Northern Peru	7	1,840.58	-	-	-	-	**7**	**1,840.58**
1950		39	11,832.87	-	-	-	-	**39**	**11,832.87**
1951		89	26,856.55	-	-	-	-	**89**	**26,856.55**
1952		3	579.15	-	-	-	-	**3**	**579.15**
1962	Southern Copper	6	1,295.41	-	-	-	-	**6**	**1,295.41**
1963		9	906.77	-	-	-	-	**9**	**906.77**
1965		3	1,278.64	-	-	-	-	**3**	**1,278.64**
1966		9	2,178.20	-	-	-	-	**9**	**2,178.20**
1967		5	1,446.58	-	-	-	-	**5**	**1,446.58**
1968		7	487.37	-	-	-	-	**7**	**487.37**
1969		14	2,283.25	-	-	-	-	**14**	**2,283.25**
1970		3	1,118.31	-	-	-	-	**3**	**1,118.31**
1973		1	394.72	-	-	-	-	**1**	**394.72**
1974		6	2,100.39	-	-	-	-	**6**	**2,100.39**
1975		6	2,375.32	-	-	-	-	**6**	**2,375.32**
1976		15	2,700.20	-	-	-	-	**15**	**2,700.20**
1977		27	6,721.25	-	-	-	-	**27**	**6,721.25**
1978		22	6,971.72	-	-	-	-	**22**	**6,971.72**

Year	Operator	Geological		RC		Geotechnical		Total	
		No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled
1979	Southern Copper	18	7,142.37	-	-	-	-	**18**	**7,142.37**
1980		3	1,497.18	-	-	-	-	**3**	**1,497.18**
1981		11	1,954.10	-	-	-	-	**11**	**1,954.10**
1982		9	2,506.83	-	-	-	-	**9**	**2,506.83**
1983		1	316.29	-	-	-	-	**1**	**316.29**
1985		5	763.34	-	-	-	-	**5**	**763.34**
1986		7	639.46	-	-	-	-	**7**	**639.46**
1987		3	156.06	-	-	-	-	**3**	**156.06**
1993		40	13,528.02	-	-	-	-	**40**	**13,528.02**
1994		32	10,113.09	-	-	-	-	**32**	**10,113.09**
1995		17	8,301.36	7	1,836.00	-	-	**24**	**10,137.36**
1996		31	20,422.37	34	9,394.00	-	-	**65**	**29,816.37**
1997		35	8,339.90	-	-	-	-	**35**	**8,339.90**
1998		18	7,634.08	-	-	-	-	**18**	**7,634.08**
1999		58	31,117.47	29	9,929.00	-	-	**87**	**41,046.47**
2000		47	23,364.89	-	-	1	600.00	**48**	**23,964.89**
2001		49	21,758.05	11	3,339.00	-	-	**60**	**25,097.05**
2002		28	8562.56	-	-	-	-	**28**	**8562.56**
2003		30	4870.04	-	-	-	-	**30**	**4870.04**
2004		20	5983.89	-	-	-	-	**20**	**5,983.89**
2005		30	6813.86	-	-	-	-	**30**	**6813.86**

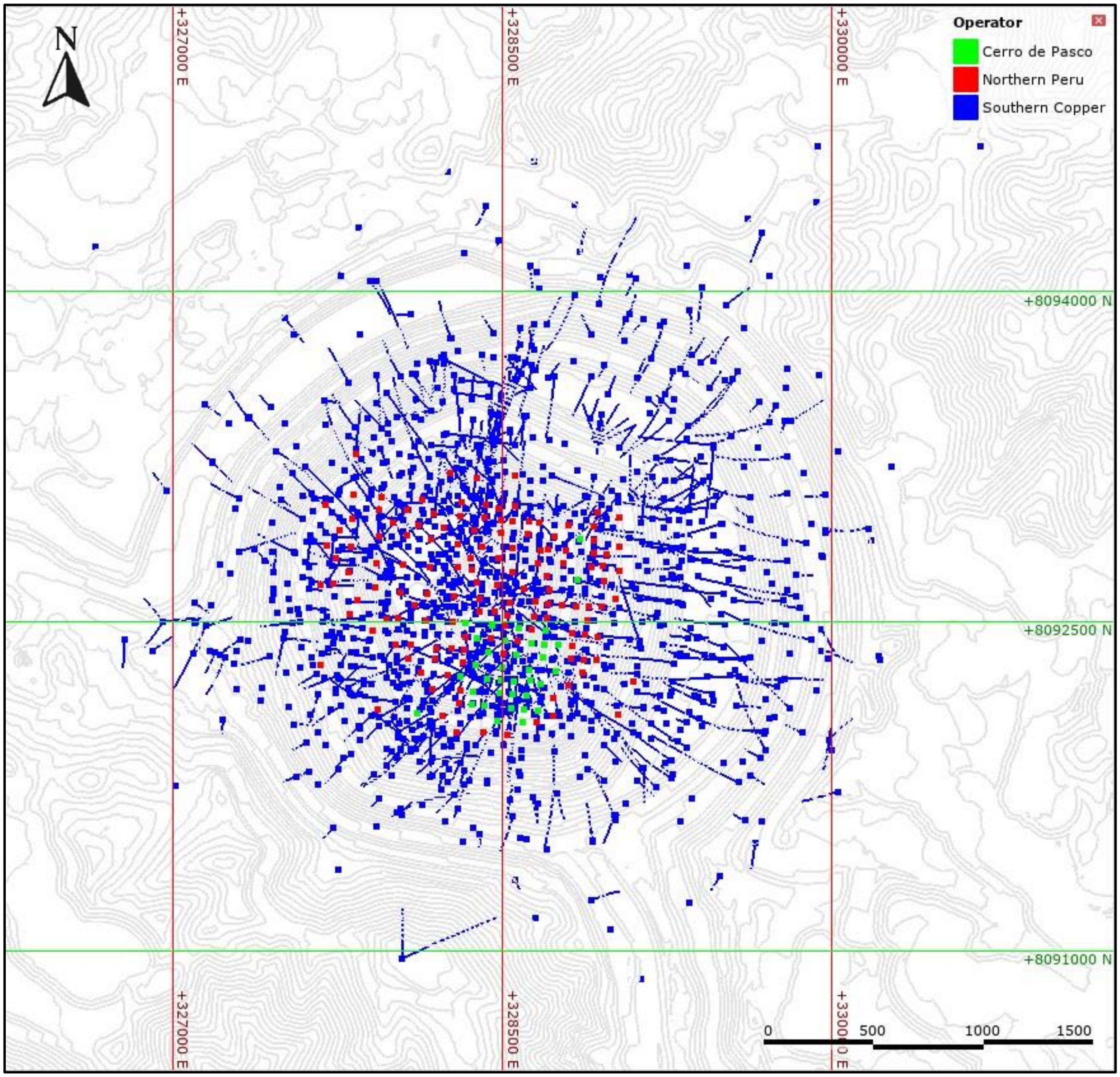
Year	Operator	Geological		RC		Geotechnical		Total	
		No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled	No. of Drill Holes	Meters Drilled
2006	Southern Copper	35	5,400.32	-	-	-	-	**35**	**5,400.32**
2007		40	6,241.28	-	-	-	-	**40**	**6,241.28**
2008		30	6,477.70	-	-	-	-	**30**	**6,477.70**
2009		41	17,192.17	-	-	-	-	**41**	**17,192.17**
2010		36	11,737.93	-	-	11	2,201.65	**47**	**13,939.58**
2011		7	3,860.00	-	-	20	5,250.20	**27**	**9,110.20**
2012		6	2,550.20	-	-	-	-	**6**	**2,550.20**
2013		8	3,799.95	-	-	45	20,952.52	**53**	**24,752.47**
2014		16	6,047.35	-	-	2	750.00	**18**	**6,797.35**
2015		2	1,030.00	-	-	23	11,481.35	**25**	**12,511.35**
2016		35	18,855.90	-	-	12	3,619.85	**47**	**22,475.75**
2017		29	20,686.55	-	-	9	4,092.80	**38**	**24,779.35**
2018		16	11,359.35	-	-	16	6,041.40	**32**	**17,400.75**
2019		30	24,478.80	-	-	22	9,436.45	**52**	**33,915.25**
2020		20	15,555.00	-	-	-	-	**20**	**15,555.00**
2021		11	9,462.50	-	-	-	-	**11**	**9,462.50**
2022		37	17,594.75	-	-	6	3,400.00	**43**	**20,994.75**
2023		18	9,487.45	-	-	-	-	**18**	**9,487.45**
Total		**1,216**	**458,770.85**	**81**	**24,498.00**	**167**	**67,826.22**	**1,464**	**551,095.07**

Table 7-2: Drilling Supporting Mineral Resource Estimation

Year	Operator	No. of Drill Holes	Meters Drilled
1940	Cerro de Pasco	8	1,856.20
1941		14	2,968.09
1942		14	2,976.87
1949	Northern Peru	7	1,840.58
1950		39	11,832.87
1951		89	26,856.55
1952		3	579.15
1962	Southern Copper	6	1,295.41
1963		9	906.77
1965		3	1,278.64
1966		9	2,178.20
1967		5	1,446.58
1968		7	487.37
1969		14	2,283.25
1970		3	1,118.31
1973		1	394.72
1974		6	2,100.39
1975		6	2,375.32
1976		15	2,700.20
1977		27	6,721.25
1978		22	6,971.72
1979		18	7,142.37
1980		3	1,497.18
1981		11	1,954.10
1982		9	2,506.83
1983		1	316.29
1985		5	763.34
1986		7	639.46
1987		3	156.06
1993		40	13,528.02
1994		32	10,113.09
1995		24	10,137.36
1996		63	29,516.37
1997		35	8,339.90

Year	Operator	No. of Drill Holes	Meters Drilled
1998	Southern Copper	18	7,634.08
1999		87	41,046.47
2000		41	21,594.91
2001		59	24,386.00
2002		27	8262.56
2003		29	4676.23
2004		17	5382.62
2005		24	5058.53
2006		34	5,150.32
2007		40	6,241.28
2008		30	6,477.70
2009		41	17,192.17
2010		35	11,711.87
2011		7	3,860.00
2012		6	2,550.20
2013		8	3,799.95
2014		15	5,957.75
2015		2	1,030.00
2016		35	18,855.90
2017		29	20,686.55
2018		16	11,359.35
2019		30	24,478.80
2020		20	15,555.00
2021		11	9,462.50
2022		37	17,594.75
2023		18	9,487.45
Total		**1,274**	**477,271.75**

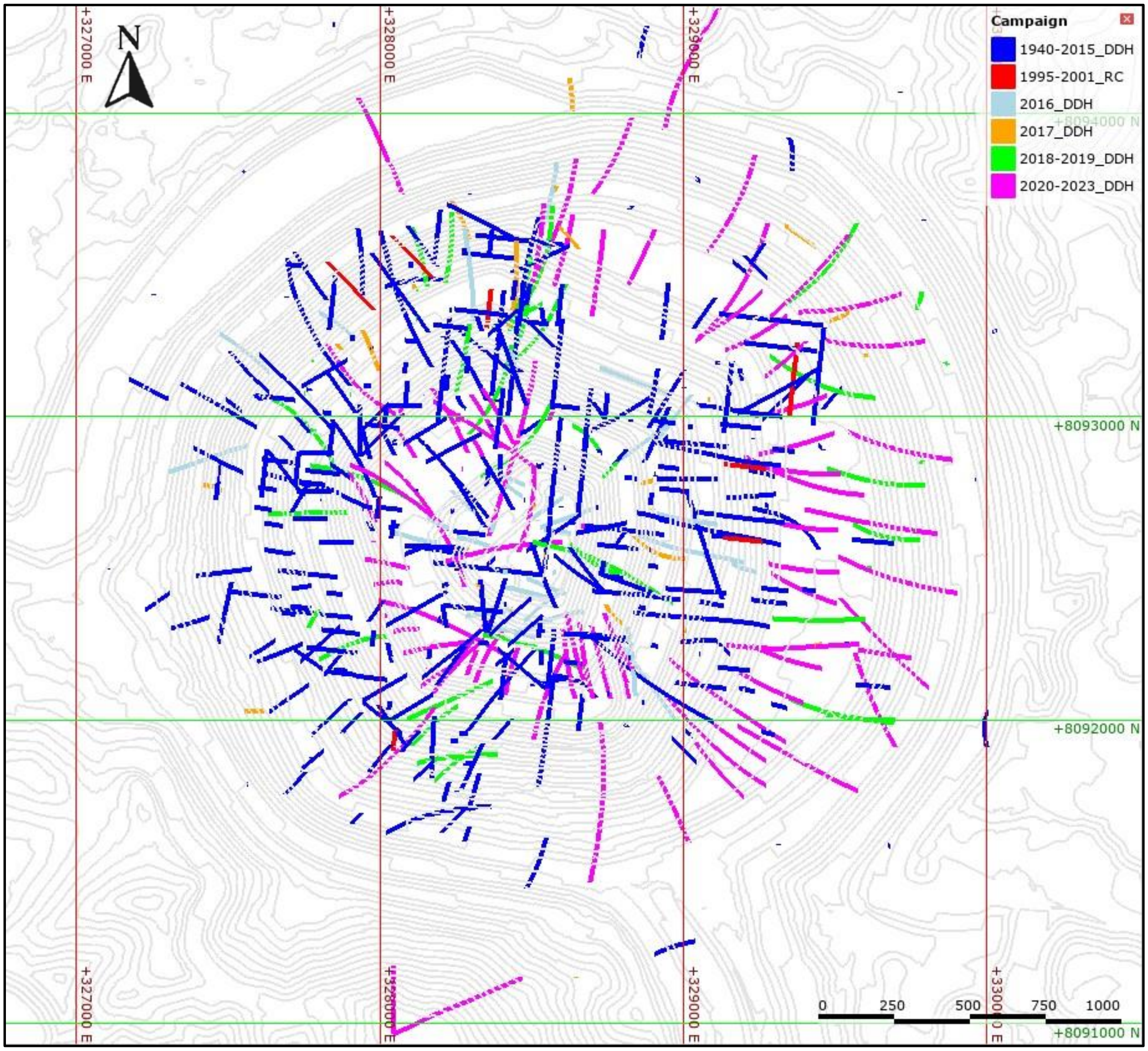
Figure 7-2: Drill Collar Location Plan



Source: Wood, 2024

Note: Bar scale is in meters.

Figure 7-3: Drill Collar Location Plan for Drilling Supporting Mineral Resource Estimates



Source: Wood, 2024

Note: Bar scale is in meters.

7.2.3 Logging

Core boxes are transferred from the drill platform to the core shack by technical services personnel. Since 2019, photographs have been taken of wet core.

Historically, geological data were recorded on paper log forms; however, since mid-2018, logging data have been entered directly into a tablet through acQuire data entry. Logging currently uses pre-set geological codes.

Logging consists of collection of:

- *Structural data* – fracture intensity, fracture fill, presence of faults, tectonic breccias, core angles, rock quality data (RQD)
- Geological *data* – lithology, alteration, mineralization, mineralogy, degree of weathering
- Recovery.

7.2.4 Recovery

Core recoveries were reported by Southern Copper to be generally good.

Wood reviewed drill core recovery data for 196 drill holes completed during 2016–2023 that were recorded in the database. Histogram and probability plots show 99% of the drill intervals achieved over 95% core recovery for those drill holes reviewed.

7.2.5 Collar Surveys

Collar surveys for the 2001–2023 drill campaign were performed by mine surveyors using differential GPS equipment (GNS8). No formal survey certificate was produced so survey data in the database cannot be verified against original documents.

The collar survey method for the earlier campaigns is not known, and there are no original hard copy data to verify the collar locations in the database.

Collar surveys are in the local Toquepala mine grid system based on the UTM Zone 19 coordinate system.

7.2.6 Downhole Surveys

The majority of the drill holes are vertical.

Downhole surveys were not systematically performed during the pre-2009 drill campaigns.

The survey data includes a total of 16,442 records for 1,464 drill holes.

Holes drilled from 1940–2009 are identified as historical holes. From the 1,026 historical drill holes, 874 do not have any downhole survey records.

Gyroscopic downhole surveys were completed for 29% of the holes in the mineral resource database. Approximately 30% of the holes >100 m deep were surveyed and only 2% of holes in the mineral resource database <100 m deep have downhole surveys. About 93% of holes in the 2016–2023 campaigns have downhole surveys.

From the 1,274 drill holes used in estimation, 711 drill holes are located below the current topography of which 48% (338) were surveyed using Flexit/Maxibor/Gyromaster or other instrument.

The lack of downhole survey in older drill holes is a potential source of error in the location of deeper drill hole intersections.

7.2.7 Comment on Material Results and Interpretation

The term "true thickness" is not generally applicable to porphyry-style deposits as the entire rock mass is potentially mineralized and there is often no preferred orientation to the mineralization. In areas that display porphyry-style mineralization, in general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for those drill holes are typically greater than the true widths of the mineralization at the drill intercept point.

Drilling and surveying were conducted in accordance with industry standard practices at the time the drill data were collected and provide suitable coverage of the mineralization. The collar and downhole survey methods used provide reliable sample locations. Logging procedures provide consistency in descriptions.

The interpretation of the drilling results is summarized in representative drill section sections illustrated in Figure 6-5, Figure 6-6, Figure 6-8, Figure 6-9, Figure 6-11, Figure 6-12, Figure 11-2, and Figure 11-3.

There are uncertainties in the downhole surveys for historical drilling; however, there are enough properly surveyed holes located below the current topography to provide confidence in the available drilling data.

In Wood's opinion, the quantity and quality of existing drilling data are sufficient for resource estimation, but Wood recommends that all holes have well documented, proper collar and downhole surveys.

7.3 Hydrogeology

Southern Copper conducted various geotechnical and hydrogeological investigations to assess its operation (stability of the Toquepala pit) and constructed a numerical hydrogeological model of the pit in 2015, which was updated in 2017 and 2020.

The updated conceptual models and 3D numerical models, allowed for better hydrogeological characterization based on data obtained from vibrating wire piezometers (hydraulic head), point hydraulic tests (slug tests), and the installation of sub-horizontal drains.

7.3.1 Sampling Methods and Laboratory Determinations

Historically, several hydrogeological studies have been conducted at the Toquepala mine. These include conceptual models developed between 2015 to 2022, which provided a general understanding of the groundwater flow system and its interaction with mining activities. The operations have a total of 152 hydraulic measurements available, collected in the period between 1999 to 2022. Tests performed included LeFranc and Lugeon packer, slug, and injection or extraction tests:

- The first hydrogeological model of the Toquepala mine was presented by Itasca S.A. & Piteau Associates (Itasca) (2015) using the MINEDW program. This model included hydraulic tests from 2013 and reinterpretations from 1999, defining hydrogeological units (HUs) based on structural domain (Upper Domain, Lower Domain, Fault Domain, Micalaco Fault, DAM)s.
- In 2016, Itasca (2017) updated the model, integrating 2015 hydraulic data and updating the conceptual understanding of the three structural HUs to include18, (hydro) stratigraphic units. The model included piezometry data from 20 piezometers and achieved better calibration.
- Amphos 21, contracted by Anddes, updated the 3D hydrogeological model in 2020 using the FEFLOW code, optimizing elements for the pit's expansion to 2036. This model included new hydraulic tests and piezometer data. Sub-horizontal drains were installed in 2019 to reduce pore pressures.
- The updated conceptual model (Tierra Group 2022) included reviewing data from six vibrating wire piezometers and characterized the identified HUs according to the hydrogeological properties to define aquifers, aquitards, and aquicludes.

Laboratories used for the hydrological testing included Anddes Laboratory (Anddes), which is independent of Southern Copper, and the non-independent mine laboratory. Both laboratories performed tests using American Society for Testing and Materials (ATSM) standards

7.3.2 Groundwater Models

During the 2022 study the groundwater models were updated and refined by integrating more recent data and improving the accuracy of predictions regarding groundwater behavior and potential impacts on mining operations. Based on the interpreted data, the hydrogeology conceptualization identified three HUs which are described as follows:

- *Hydrogeological Unit 1 (UH1)* – Characterized as an aquifer, composed of the sub-units of waste deposits (DAM) and fill (FLL) found in the surface part with permeable characteristics, where minimal recharge to the subsurface can occur from rainfall and infiltration of surface runoff flows.
- *Hydrogeological Unit 2 (UH2)* – Characterized as an aquiclude (almost impermeable), composed of the sub-units dacites (DAC-GA, DAC), diorites (DIO-GA and DIO), Quellaveco porphyry (QUQ-GA and QUQ), and porphyritic latite (INT and INT-GA), located below and above the gypsum alteration top, as well as porphyritic dacite below the gypsum top.
- *Hydrogeological Unit 3 (UH3)* – Characterized as an aquitard (impermeable), characterized by porphyritic dacite (INT), volcanics (VOL), and Micalaco Fault (FMIC), located above the gypsum alteration surface, as well as hydrothermal breccias (BXS and BXS_GA) within and outside the gypsum top, corresponding to semi-permeable materials.

The deep hydrogeological system mainly consists of hydrogeological units UH2 and UH3 and groundwater flow is preferential pathways created by structures with permeable characteristics such as the Micalaco Fault. The interpreted groundwater contours for the years 2020, 2021, and 2022, showed that the groundwater flow direction is northeast-southwest, while in the Toquepala pit, the groundwater flow direction is concentric, towards the pit lake.

The piezometric levels remain high and have a trend very similar to previous models, mainly due to the very low permeability of the rocks, although with some minimal greater declines in some areas near the pit walls, which could be related to the presence of more fractured rocks as a result of blasting or the installation of sub-horizontal drains in recent years.

7.3.3 Water Balance

The Toquepala project is located in the upper sub-basin of the Cinto River, in the Honda ravine valley. Watercourses in the ravines have sporadic flows due to rainfall events, and surface runoff is intermittent with high flow rates and flow velocities but low frequency. The low permeability of riverbed materials results in limited local aquifer recharge. The area has minimal rainfall, so the main aquifer recharge comes from precipitation on the western edge of the Western Cordillera, generating regional recharge with underground flow to the southwest. Evaporation exceeds precipitation, making local recharge negligible. For the Toquepala mine, underground flow (recharge) comes from the northeast as lateral recharge. Water outcrops occur when the topographic level is near the water level, causing small seeps on slope walls and discharge at the pit bottom (pit lake) due to pressure release. Southern Copper has recorded seasonal seepage on the slopes.

A water balance was developed for the operations covering an area of about 10 x 11 km. The system is almost in equilibrium based on the stability of the pit lake level, and limited variations in the water levels in piezometric readings taken within the pit, in the pit walls, and outside the pit limits. The assessment is based on:

$$\text{Inputs} - \text{outputs} = \pm \Delta S$$

where:

- $\pm \Delta S$ is the storage variation
- inputs = recharge by precipitation infiltration, totaling 17 L/s
- outputs = evaporation (1 L/s) + filtrations and springs (4 L/s) + other (12 L/s), to total 17 L/s

7.3.4 Comment on Results

The 2022 numerical hydrogeological model achieved calibration to piezometric levels through sensitivity analysis. With this sensitivity analysis, an adjustment of the hydraulic conductivity values was undertaken based on interpreted data and where gaps existed, with literature data, considering values in similar rock types in other similar mining projects. It is noted that calibration can be further improved as the conceptual model and large-scale flow regime are better understood, particularly in sectors of the mine pit that have not yet been investigated for their hydrogeological properties and potential hydraulic connection to the open pit (north and south sectors).

Existing data collection, interpretation and hydrogeological modeling has used a thorough and methodical approach. The emphasis on calibration and sensitivity analysis to improve model accuracy highlights the need for more comprehensive site-specific data to further refine the model.

7.4 Geotechnical

Open pit slope geotechnical analysis and design is supported by data gathered from geotechnical drilling completed between 2013–2015, laboratory testing, and bench-scale structural mapping. The work was reviewed and summarized in a report by Itasca–Piteau (2017).

7.4.1 Sampling Methods and Laboratory Determinations

The field investigation for the open pit included two geotechnical core drilling campaigns (2013, 2015) and associated laboratory testing, as well as structural mapping.

Approximately 20% of the 2013 core holes were oriented using the Reflex ACT II core orientation tool and bore hole televiewer surveys were performed on some or all of the 2013 core holes. Logging for both the 2013 and the 2015 drilling campaigns consisted of lithology, alteration, and presence of clay, as well as the parameters needed to determine the rock mass rating (Bieniawski, 1976) for each core run.

Testing included unconfined compressive strength, Brazilian tensile, triaxial, and direct shear tests.

Laboratories used for the geotechnical testing included SGS in Santiago, Chile, and Mécanica de Rocas, Ltda. In Calama, Chile. Both laboratories performed tests using ATSM standards.

7.4.2 Structural Mapping

Structural mapping at the Toquepala open pit was conducted in six mapping campaigns from 2012 through 2015 which consisted of pit wide traverses totaling >24 km in length (John Fedorowich Structural Geology Consulting, Inc., 2015). Data collected included structure orientations, true fault thicknesses, character of fault breccia, gouge and fracturing, shear sense, and field estimates of intact rock strength, joint roughness coefficient, and observed persistence. Mapping was performed using a Trimble R8 RTK digital global positioning system instrument to measure the exposed outlines of the major fault breccia zones.

From the mapping a set of 293 fault outcrop polygons for fault breccia zones exposed within the Toquepala mine was produced. This information was assembled in 3D, together with historical fault mapping and current fault traces.

7.4.3 Facilities

Waste Rock Storage Facilities

Multiple field and laboratory testing programs were conducted from early 2016 to early 2018 in the areas of the current WRSFs and heap leach pads. These tests consisted of the following:

- Sixty excavation test pits with depths of 1.5 to 5.0 m
- One borehole
- Ten field density tests using the water replacement method
- Ten overall particle size distribution tests
- Two sampling points of waste rock material
- Geophysical tests consisting of 10 seismic refraction lines with a total length of 2,375 m, eight Multichannel Analysis of Surface Waves (MASW) tests and eight microtremor array measurement (MAM) tests
- Sampling for laboratory testing as well as on-site testing (on-site density determination and body velocity measurements).

The stability analyses were carried out following a limit equilibrium for static and pseudo static conditions, the latter associated with an operational earthquake based on the seismic risk study carried out by the company ZER Geosystem Perú SAC in 2013.

The reconfirmation sequence for the WRSF slopes proposed by Southern Copper achieves favorable stability conditions, which meet the acceptability criteria, in static and pseudo static conditions for the geometries representing the end of 2020 and 2021.

Geotechnical monitoring for the WRSFs is performed by satellite monitoring and six extensometers distributed in the area. Readings in the latest report (June 2024) are within the normal values according to the alert levels reported.

During their site visit to the different WRSFs, the Geosyntec QP observed that the structures generally appear to be in good condition.

Tailings Storage Facility

A review of the operational Quebrada Honda TSF was conducted in accordance with good practice recommendations, which included a visual inspection of the facility and a review of monitoring data and reports. The Quebrada Honda facility serves as a TSF for both Toquepala and Cuajone Operations. Below is a summary of the different studies that have been conducted, and reviewed by Geosyntec:

Main Dam:

- Woodward-Clyde (1994): 12 test pits and five boreholes
- Klohn Crippen (2002): three boreholes.
- Arcadis (2013): six test pits, 21 boreholes, 20 sampling points, 21 MASW profiles and 10 geophysical profiles (seismic refraction and ReMi).

Lateral Dam:

- Klohn Crippen (2002): Five test pits, seven boreholes and one field cut.
- Arcadis (2013): Four test pits, 10 boreholes, seven sampling points, eight MASW profiles and eight ReMi profiles.

AMEC (2006) recommended more investigations of the mudstone layers. Arcadis (2013) verified the thickness through field and laboratory tests and updated the stability analyses. The stability analyses results presented in these studies indicate with the calculated factors of safety (FoS) met the minimum engineering criteria established for this type of structure.

The Main Dam is currently instrumented with one radar, 14 open tube piezometers, 23 vibrating wire piezometers and two accelerometers. The Lateral Dam is currently instrumented with two radars, 37 open tube piezometers, 14 vibrating wire piezometers and two accelerometers. According to the reporter (July 2024), the readings of the different instruments are within normal values.

Based on the site review, the slopes of the main and lateral dams appear to be in good condition with no signs of instability or signs of erosion. Construction of the Main Dam is currently being carried out using the downstream method disposing cyclone tailings.

7.4.4 Comment on Results

Lithologic and geomechanical logging protocols, laboratory test equipment used and QA/QC checks on the logging and laboratory tests were not available for review. Based on the 2017 Itasca–Piteau (2017) report:

- There is no information available as to any QA/QC procedures that may have been in place during data collection

- An independent review committee is tasked with preparation of test work protocols and selection of the laboratories where the tests were performed.
- No procedures and protocols for mine design are currently in place.
- No geotechnical risk register or seismic management plan is mentioned.

Geosyntec reviewed summaries of the field investigation reports and laboratory test data presented in Itasca-Piteau (2017) was conducted and indicates that the information used to support their design of the pit slopes described for this open pit study appears to be consistent with generally accepted industry standard practice for the level of geotechnical stress required to support open pit designs at the pre-feasibility level (Read & Stacey, 2010).

8.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 Sampling Methods

Core samples are taken at 3 m intervals from the top of the drill hole. Samples are halved using a core splitter, with half sent to the laboratory and half retained in the core box as a record. In areas of soft or friable rock, a spatula is used to collect the sample.

Samples are placed into pre-labeled bags that are subsequently closed using a security seal.

Whole core has been used at times for metallurgical determinations and bulk density testing.

8.2 Sample Security Methods

Sample security from drill point to laboratory relied upon the fact that samples were either always attended to or stored in a secure area prior to shipment to the external laboratory. Chain-of-custody procedures consisted of completing sample submittal forms to be sent to the laboratory with sample shipments to ensure that all samples were received by the laboratory.

8.3 Density Determinations

The density database contains 28,187 density records from 171 holes drilled from the 2016-2023 campaigns. Density determinations performed prior to 2016 do not have supporting information.

The density determination was performed by GeoSim personal using the water immersion method from 2016 until 2021. From 2021 to 2022, the density determination was performed in Certimin SA (Certimin) laboratory, and from 2022 to 2023 it was performed by the SGS del Perú SAC (SGS) laboratory, both laboratories used the wax-coated immersion method.

8.4 Analytical and Test Laboratories

Laboratories used over the Project history include:

- Certimin sample preparation is located in Arequipa and sample analysis is located in Lima: initially used in 2016 for both sample preparation and analysis. Subsequently used from 2018 to date as the sample preparation laboratory, and 2017 to date as the external umpire laboratory. Certimin is independent of Southern Copper; accreditations: ISO 9001, ISO 14001 and ISO 45001.

- SGS, Arequipa was used for sample preparation in 2017 and since 2023 has been used for sample analysis with samples sent to their Lima laboratory. SGS is independent of Southern Copper; accreditations: ISO 9001, ISO 14001, ISO 17025, ISO 37001, and ISO 45001.
- Inspectorate Services Perú SAC, Arequipa (Inspectorate) was used for analysis in 2017; independent of Southern Copper; accreditations: ISO 9001, ISO 14001 AND ISO 17025.
- Ilo smelter laboratory – used for sample analysis from 2017 to date; not independent; not accredited.
- Toquepala mine laboratory – used for sample analysis before 2016; not independent; not accredited.

8.5 Sample Preparation

No information was provided to Wood as to the sample preparation methods used at the Ilo smelter laboratory.

Certimin protocols in 2016 consisted of drying, crushing to 90% passing ¼ mesh (6.35 mm) followed by a second crushing stage to 90% passing 10 mesh (2 mm), and pulverizing to 85% passing -200 mesh. The later Certimin sample preparation protocol consisted of drying, crushing to 6 mm, followed by a second crushing stage to 90% passing -10 mesh, and pulverizing to 95% passing -140 mesh.

SGS protocols consisted of drying, crushing to 6 mm, followed by a second crushing stage to 90% passing -10 mesh, and pulverizing to 95% passing -140 mesh.

8.6 Analysis

Before 2016, copper and molybdenum were determined by aqua regia digestion with an atomic absorption (AA) finish. These samples were analyzed at the Toquepala mine laboratory.

Samples in 2016 were prepared and analyzed at Certimin for copper by AAS following a four-acid digestion and inductively-coupled plasma (ICP) optical emission spectroscopy (OES) for other elements.

Samples in 2017 were prepared by SGS using a two-acid digest. Samples were analyzed by multispectral (20 elements) determinations, either at the internal Ilo laboratory or Inspectorate.

Since 2018 assaying has been performed at the internal Ilo laboratory, subsequently the SGS laboratory has also been used from 2023. The samples were prepared by Certimin using a digestion and analyzed with an ICP-mass spectrometry (MS) finish. Total copper analyses were performed on samples with >1% Cu using AA. Sequential copper analyses were also conducted, as were carbonate assays.

8.7 Quality Assurance and Quality Control

8.7.1 1940–2015

No systematic quality control procedure was used to provide quality assurance for assaying prior to 2016.

There is a significant evolution in data acquisition and data quality control practices in the different drill campaigns in the Toquepala database. To gauge the potential impact of poorer quality data, and uncertainty about data quality Wood produced a nearest neighbor model for blocks below the end of year 2020 topographic surface and above a 0.3% Cu cut-off grade. Blocks from 2016–2019 with assay QA/QC represents 51% of the total. Comparison of data from the 2016–2019 program with earlier data from prior programs resulted in the conclusion that the means of copper and molybdenum grades of adjacent intersections are comparable over tens of meters, and that analyses performed in the earlier drill campaigns are not significantly biased.

8.7.2 2016–Present

The current assay quality control program for the Toquepala site includes the insertion of field duplicate, pulp duplicate, certified reference materials (standards), coarse blank, fine blank and check samples.

Sampling precision and analytical precision in Toquepala were evaluated using twin samples and pulp duplicates, respectively. Toquepala used the hyperbolic method to assess sampling and analytical precision (Simon, 2004). Max–min plots were constructed for copper and molybdenum. Precision level is considered as acceptable if the proportion of failures (failure rate) does not exceed 10% using as failure limit the $y^2=m^2x^2+b^2$ hyperbola evaluated for a 30% relative error. Failure rates from 2016–2023 indicate acceptable sampling and analytical precision.

Standards were used to assess accuracy and were prepared by Target Rocks Peru S.A.C. (Target Rocks). Most of the standards showed acceptable bias levels. Wood identified a few results outside the limits that are being investigated and monitored. In the 2022–2023 campaigns, Wood identified some issues with the lower detection limit (LDL) for molybdenum analyses from SGS, where LDL > certificated value, reporting a false bias of 94.2% and 13.6% for each year, respectively. Wood recommends properly selecting the type of analysis with a detection limit lower than the background of deposit.

Preparation and analysis certificates for coarse and fine blank samples were provided by Target Rocks. Coarse blank samples are calcareous material (12 mm particle size), and blank fine samples are siliceous sand. Blank analytical results do not show contamination for copper and molybdenum for drilling campaigns from 2016–2023.

In the 2021 campaign, Wood identified the calcareous material sometimes reported values greater than five times the practical detection limit (LPL). Wood recommends to correctly evaluate the type of blank material to be used.

In the 2022–2023 campaigns, Wood identified some issues with LDL for copper, molybdenum, arsenic and zinc samples analyzed at SGS, where LDL > certificated value, reporting as false contamination for these elements.

Southern Copper sent pulp samples from the 2017–2019 drill program to Certimin for check assays. Biases relative to the Ilo laboratory ranged from 1.2% to 4.9% for copper and from -5.0% to 1.0% for molybdenum, both of which are considered acceptable. Check sample reports after 2019 were not available.

8.8 Database

The Toquepala database was migrated to the acQuire database platform in November 2011. The database stores both core and blasthole drill data.

Southern Copper states that the following protocols are in place:

- Assay data are uploaded directly into acQuire from the Ilo laboratory's OPUS software system.
- QA/QC data are reviewed to check if there are issues; if so, the batch is requested to be re-assayed.
- Density data are stored in an Excel spreadsheet.
- Survey data are uploaded directly into acQuire from digital reports (certificates).

Geological information from core is logged by geologists. Historically, these geological data were recorded on paper log forms; however, since mid-2018, logging data have been entered directly into a tablet or computer through Acquire data entry. The files are loaded directly into the database. Geological data include information regarding lithology, structure, alteration, mineralization, mineralogy, and supergene material. Logging utilizes pre-set geological codes.

Data are regularly backed up.

Wood notes that the absence of original hard copy survey and assay certificates makes evaluation of database integrity difficult.

8.9 Opinion on Sample Preparation, Security, and Analytical Procedures

In the Wood QP's opinion, the sample preparation, security, and analytical procedures, and QA/QC protocols for the samples used in mineral resource estimation are acceptable for the purposes used.

9.0 DATA VERIFICATION

9.1 Data Verification by Qualified Person

9.1.1 Site Visit

QP representatives from Wood and Geosyntec visited the Toquepala Operations as outlined in Section 2.4. Observations from the visit were incorporated into Wood and Geosyntec's conclusions as appropriate to the discipline areas in this Report or incorporated into the recommendations in Section 23.

9.1.2 Database Audit

Wood requested documentation for 101 randomly-selected drill holes from Southern Copper, which represent 11% of the 887 drill holes that had mineralized intercepts below the August 2023 pit topographic surface.

A significant number of data were not available for the requested drill holes:

- *Collar:* 88 drill holes had no collar records
- *Survey*: 76 drill holes had no survey records
- *Assay*: 54 drill holes had no assay records
- *Recovery*: 55 drill holes had no recovery or RQD records
- *Geology*: two drill holes had no logging records
- *Density*: 55 drill holes had no density records.

A high rate of unavailable documentation was observed, from 2% to 87%. Wood recommends that Southern Copper continue to attempt to locate and compile such documentation to be used during future audits and ensure that all future programs are properly documented.

In order to assess data integrity, Wood performed comparisons of the Toquepala dataset and its available original sources including collar, survey, density, assay certificates and reports; however, due to the lack of supporting documentation the data comparison was limited.

Systematic storage of supporting documentation is not part of the current procedures. Wood recommends that a document storage system be implemented, and all supporting documentation be properly stored.

Wood compared 8,706 assay records from 47 drill holes against their respective assay certificates representing 5% of the total records. This review included copper, soluble coppers, molybdenum, iron and soluble iron. Subsequently arsenic, silver, zinc, lead, sulfur and CO_3 were added to the revision. No significant discrepancies were found.

Wood compared 11,234 recovery records against their respective recovery certificates, which represent 26% of the total recovery records included in the database. Discrepancies for 32 records were observed reflecting an error rate of 0.3%, well below the maximum of 1% considered by industry to be an acceptable limit in data integrity review.

Wood compared 805 logging records belonging to 99 drill holes against their respective log reports. Minor discrepancies for 239 records were observed, which represent an error rate of 30%. Some discrepancies could be related to subsequent re-logging; however, reasons for discrepancies should be verified and documented by Southern Copper. Wood recommends verification of all records from available log reports, and inclusion of these verified data in the Project database.

Wood compared 7,350 density records belonging to 35 drill holes against their respective density reports; these records represent 26% of the total density records included in the database. No discrepancies were observed.

In 2021, Wood compared 23,817 copper and molybdenum assay records from 2016–2019 against their respective assay certificates, representing 95% of the total records for that period. No significant discrepancies were observed. Assay records prior to 2015 were unable to be verified by Wood because no documentation was available. Data prior to 2016 is identified as historical. These records are also located above the current surface.

9.1.3 Check Assay Program

In 2021, Wood selected 113 pulps from holes drilled from 1995–2019 and arranged for re-assay at Certimin. Biases of the Certimin data relative to the Toquepala mine laboratory for copper and molybdenum ranged from -5.0% to 3.4%, which is within acceptable limits in Wood's opinion.

9.1.4 Peer Review

Wood requested that information, conclusions, and recommendations presented in the body of this Report be peer reviewed by Wood subject matter experts or experts retained by Wood in each discipline area as a further level of data verification.

Peer reviewers reviewed the information in the areas of their expertise as presented in this Report. This could include checks of numerical data, consistency of presentation of information between the different Report sections, consistency of interpretation of the data between different discipline areas, checks for data omissions, verification that errors identified during Wood's gap analyses were appropriately addressed or mitigated, and reviewed the appropriateness of the Wood opinions, interpretations, recommendations, and conclusions.

9.2 Opinion on Data Adequacy

Wood's QP considers that a reasonable level of verification has been completed, and that no material issues would have been left unidentified from the programs undertaken.

Wood is of the opinion that the data verification programs for Project data, in combination with mine operational data, adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in mineral resource estimation, mineral reserve estimates, and the mine plans.

10.0 MINERAL PROCESSING AND METALLURGICAL TESTING

10.1 Introduction

Mining operations commenced in 1960, and the original samples supporting metallurgical test work and process designs are long since mined out. However, additional metallurgical test programs have been conducted during mine operations.

10.2 Test Laboratories

Three different laboratories were used to perform metallurgical test work to support the Project, of which one was an internal Toquepala metallurgical laboratory and two were external, Laboratorio Metalurgico Chapi in Lima (Chapi) and ThyssenKrupp Research Centre (ThyssenKrupp). The internal laboratory was not independent of Southern Copper. Chapi and ThyssenKrupp were independent of Southern Copper.

There is no international standard of accreditation provided for metallurgical testing laboratories or metallurgical testing techniques.

10.3 Metallurgical Test Work

A total of 66 composite samples from plant operations over a period of nine months were tested for hardness using the Bond ball mill work index (BWi) in the Chapi laboratory. Samples were also sent to ThyssenKrupp for high pressure grind roll (HPGR) test work. This test work and subsequent modeling indicate a throughput of 60 kt/d capacity in hard material (BWi of 17.9 kWh/t) and approximately 65 kt/d in normal material (BWi of 15 kWh/t).

A total of 133 samples from different mine zones were subjected to copper and molybdenum flotation testing by the internal metallurgical group at the Toquepala metallurgical laboratory during 2002.

10.4 Recovery Estimates

10.4.1 Leach Recoveries

The Toquepala deposit contains low-grade sulfides that are amenable to leaching. The ores are subjected to ferric bacterial leaching, copper is recovered to solution that is treated in a leach–solvent extraction (SX)–electrowinning (EW) (LESDE) plant to produce cathode copper. The Toquepala mine laboratory was used to perform the chemical assays of all leaching test work samples. Six modules of crushed ore were prepared and tested under different conditions in a pilot plant from 2003–2005. Based on the test results, a recovery model for crushed ore was established as follows:

$$\%Rec\ CuT = (0.0755 \times Ln(t) + 0.0793) \times ISAC + (0.1845 \times Ln(t) - 0.8476) \times ISCN + (0.1233 \times Ln(t) - 0.6927) \times Ins)$$

where:

CuT = total copper
ISAC = solubility index acid
ISCN = solubility index cyanide
Ins= insoluble.

Subsequent to the above and considering the performance of the LESDE plant, the recovery model was revised and updated as follows:

$$\%Rec\ CuT = 0.58471 \times ISAC + 0.49905 \times ISCN + 0.1022 \times Ins$$

where:

CuT = total copper
ISAC = solubility index acid
ISCN = solubility index cyanide
Ins= insoluble.

A large-scale test was completed in 2005 and involved run-of-mine (ROM) dump leach testing of three modules for at least 400 days. Based on the results, a recovery model for ROM was established as follows:

$$\%\ Rec.\ CuT = (0.1187 \times Ln(t) - 0.3816) \times ISAC + (0.1148 \times Ln(t) - 0.5862) \times ISCN + (0.0991 \times Ln(t) - 0.5686) \times Ins)$$

where:

CuT = total copper
ISAC = solubility index acid
ISCN = solubility index cyanide
Ins= insoluble.

The LOM expected copper recovery is estimated at 13.3% (excluding leach ore existing in leach dumps). The LOM leach copper recovery including leach ore existing in leach dumps is 7.5%.

10.4.2 Flotation Recoveries

The copper recovery model based on flotation test work was carried out in 2002. A total of 133 representative samples of the following 15 years of plant production were prepared by and sent to the internal laboratory for rougher flotation testing. Analyses included copper, oxide copper (Cuox), acid soluble copper (CuSAC), molybdenum and iron. A mineralogical study on the chalcopyrite and pyrite was completed.

A regression analysis on the most significant variables (%Cu, %Mo, %Fe and %Cpy) was completed to provide a predictive recovery equation. The equation that best fitted the copper recovery and remains currently in use is:

$$\%\ Cu\ Rec. = 91.7798 - 0.000102 \times TMSD + 6.71336 \times \%Cu$$
$$- 59.8073 \times \%Cuox - 0.14877 \times (\%Py/\%Cpy)$$

where TMSD = dry milled tonnage per day

The molybdenum recovery model was developed based on bench scale flotation testing carried out as part of the development plan in the period 2001–2002. Analysis of the test work results indicated that the only significant variable affecting the molybdenum recovery is the grade of the molybdenum in the plant feed. The equation that best fitted the molybdenum recovery and remains currently in use is:

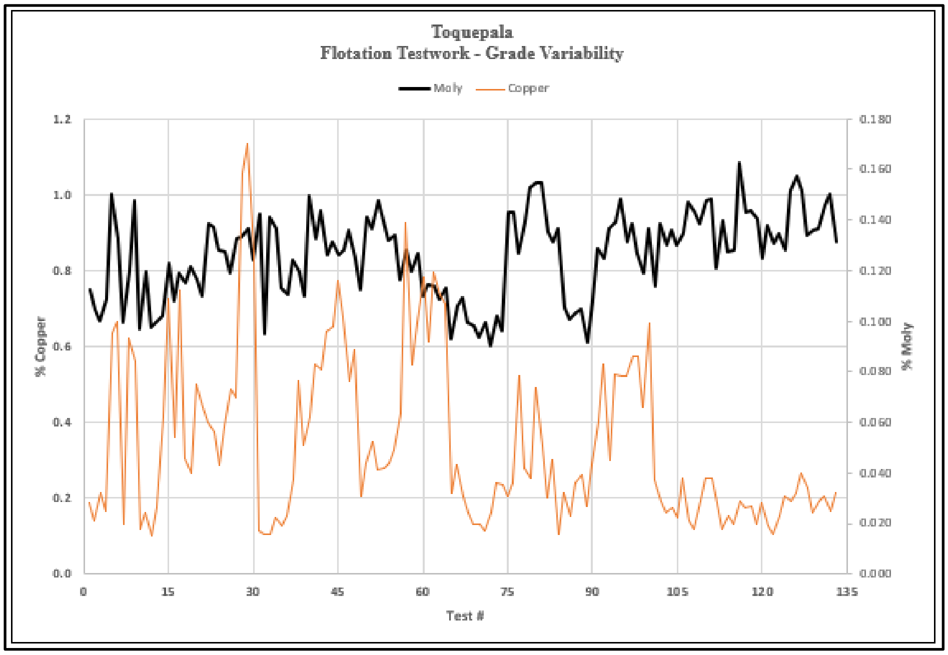
$$\%\ Mo\ Rec. = 8 \times \ln(\%\ Mo) + 91.97 + (0.75 - \%\ Cu) \times 11 + (3.0 - \%\ Fe) \times 2.4$$

The LOM expected copper recovery is estimated at 88.5% and molybdenum recovery is estimated at 70.4%. The forecast LOM copper concentrate grade is 26.74% and the molybdenum concentrate grade is forecast at 56.48%.

10.5 Metallurgical Variability

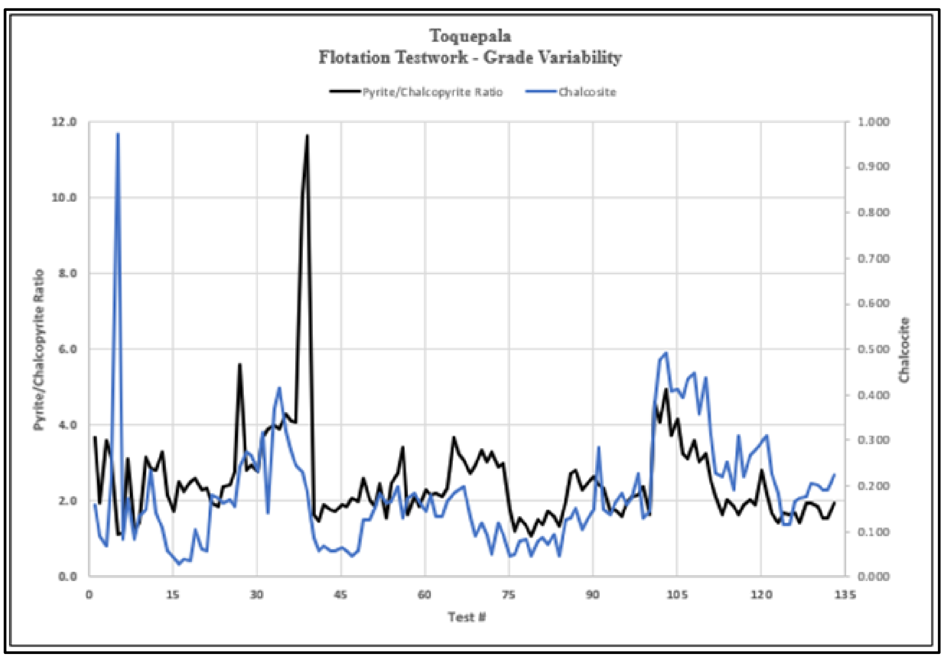
Samples tested in the 2002 program were selected based on a wide range of copper and molybdenum grades (Figure 10-1), and the mineralogical characteristics of the ore, expressed as ratio of main mineral types (Figure 10-2). This was used by Southern Copper to develop a model that covers the ore variability.

Figure 10-1: Grade Variability in Flotation Test Samples



Source: Southern Copper

Figure 10-2: Flotation Test Pyrite: Chalcopyrite Ratio Variability



Source: Southern Copper

10.6 Deleterious Elements

The copper and molybdenum concentrates produced are considered clean concentrates as they do not contain significant amounts of any deleterious elements.

10.7 Opinion on Data Adequacy

A significant amount of test work was performed on the Toquepala sulfide ore at bench scale level, while the oxide ore was tested at pilot and industrial level. The test work data have generated sufficient information to develop plant throughput estimates, copper and molybdenum recovery models for the sulfide ore, and a copper recovery model for the oxide ore. Furthermore, the developed models have been improved and updated over time to take into account the actual plant performance.

Test work on the sulfide ore was performed on selected samples representing the first 15 years of plant production and included comminution and flotation testing. The selected sulfide samples cover a wide range of copper and molybdenum content as well as the mineralogical characteristics of the ore.

The available metallurgical test work information is considered by Wood to be of an acceptable quality to at least pre-feasibility level of study, and are considered adequate to support the metallurgical inputs to the mineral resources, mineral reserves, and the economic analysis. However, Wood does recommend dedicated metallurgical drilling and test work to confirm these assumptions.

The copper concentrate produced at both concentrators is considered to be a clean concentrate, and no penalties are expected as the concentrate does not contain any significant amounts of deleterious elements.

11.0 MINERAL RESOURCE ESTIMATES

11.1 Introduction

The mineral resource estimates were prepared by Wood in accordance with definitions under S-K 1300. Total copper, acid soluble copper, cyanide soluble copper, molybdenum, iron, and acid soluble iron were estimated using ordinary kriging. Density and deleterious elements such as arsenic, zinc, lead, silver, carbonate and sulfur were estimated using inverse distance (ID).

The database used for estimation considers 1,274 drill holes totaling 477,272 m. Geological wireframes were constructed in Leapfrog Geo® software based on geological interpretations, assay results, logged geological information, and structural data.

The mineral resource estimates are reported within a conceptual pit shell generated using the Lerchs-Grossmann algorithm above a NSR cut-off value of $9.80/t.

11.2 Geological Models

Wood constructed a geological model including the modeling of lithology, alteration, mineralization and gypsum domains.

The lithology model consists of 14 domains with the main units being diorite, dacite porphyry, and angular breccia lithologies. Five mineralization domains were modeled. including a high CuCN/CuT ratio envelope within the primary zone that delineated the bornite zone.

Four alteration types comprise the alteration model, and an additional gypsum envelope was constructed to define iron and density domains. Geological model codes are summarized in Table 11-1.

Table 11-1: Geological Model Codes

Lithology Code	Lithology Abbreviation	Lithology
1	Aa	Alta Andesite
2	Tr	Toquepala Rhyolite
3	Ta	Toquepala Andesite
4	Tq	Toquepala Quartz Porphyry
5	Td	Toquepala Dolerite
6	Qq	Quellaveco Quartz Porphyry
7	Lp	Latite Porphyry
8	Da	Dacite Agglomerate
15	Px	Pebble Breccia
9	Dp	Dacite Porphyry
10	Di	Diorite
12	DiBx	Diorite Breccia
13	Bx	Angular Breccia
14	BxT	Tourmaline Breccia
Mineralization Code	**Mineralization Abbreviation**	**Mineralization**
310	P	Primary
311	T	Transitional
312	E	Enriched
313	LC	Leach Capping
316	RTCN	Bornite Zone
Alteration Code	**Alteration Abbreviation**	**Alteration**
301	Fsh	Fresh Rock
302	Prop	Propylitization
304	Qs	Sericite
307	Qs-K	Potassic
Gypsum Code	**Gypsum Abbreviation**	**Gypsum**
55	G/A	Zone with Gypsum/Anhydrite
56	No G/A	Zone without Gypsum/Anhydrite

11.3 Exploratory Data Analysis

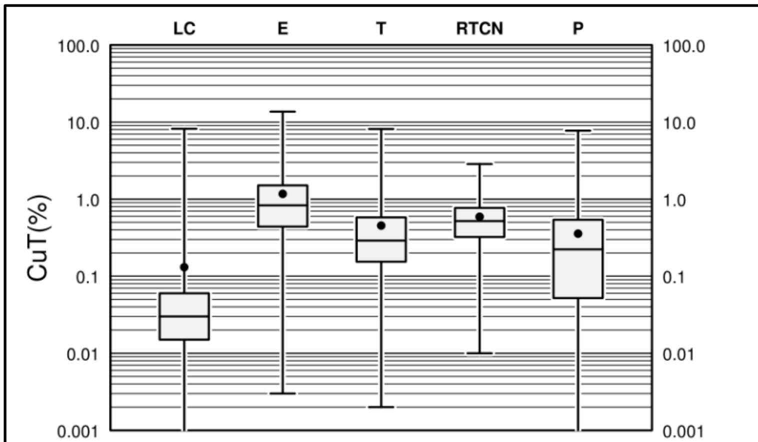
Exploratory data analysis (EDA) on raw assay data was completed to establish suitable estimation domains. Histograms, probability plots, and box plots were used to evaluate assay data distribution for copper, soluble coppers, molybdenum, iron, soluble iron and deleterious elements.

Histograms showed at least two well-differentiated populations for copper distribution. Values less than 0.1% Cu represent 35% of the total population. The other elements do not show distinguishable change in distribution.

Boxplots show the copper distribution is well controlled by mineralization domain (Figure 11-1), which corresponds to a typical copper porphyry deposit. Boxplots by lithology domain show that breccias (DiBx, Bx, BxT and Px) and porphyry dacite (Dp) are the most important mineralized lithologies with an average copper grade greater than 0.4%.

A 0.1% CuT grade shell envelope was constructed to divide the copper population into two subdomains marginal copper and potential copper ore subdomains. This value was determined based on the distribution of the analytical results for copper.

Figure 11-1: Boxplot of Total Copper Grades over the Mineralized Zones



	LC	E	T	RTCN	P	
No. of data	12945	9231	7597	3748	134727	No. of data
Mean	0.131	1.171	0.454	0.591	0.357	Mean
Maximum	8.170	13.650	8.110	2.853	7.740	Maximum
U.Quartile	0.060	1.510	0.580	0.769	0.540	U.Quartile
Median	0.030	0.830	0.290	0.520	0.223	Median
L.Quartile	0.015	0.440	0.154	0.323	0.052	L.Quartile
Minimum	0.000	0.003	0.002	0.010	0.000	Minimum
Variance	0.236	1.388	0.243	0.136	0.162	Variance
CV	3.717	1.006	1.086	0.624	1.127	CV
Skewness	8.786	2.819	3.541	1.636	2.381	Skewness

Source: Wood, 2024

11.4 Composites

The assay data were composited on 7.5 m intervals, broken at lithology boundaries. Composite intervals <3.75 m at the bottoms of holes and lithological boundaries were appended to the previous composite interval during the compositing run. Un-sampled or un-assayed intervals were ignored.

11.5 Estimation Domains

The 14 lithologies were grouped into five lithology groups: volcanics (Aa, Tr, Ta, Tq, Td and Qq), post-mineral intrusions (Lp and Da), porphyry dacite (Dp), diorite (Di) and breccias (Px, DiBx, Bx and BxT).

All material below the current pit topography is primary sulphide mineralization. The leached, oxide, enriched and transitional zones have almost been mined out or do not impact the current model.

The combination of lithology groups, and mineralization zones were used for total copper domain definition, soluble coppers and deleterious elements. Table 11-2 summarizes the criteria for defining estimation domains and basic statistics by domain for total copper. Domain 400 corresponds to all material outside of 0.1% CuT grade shell envelope; Domain 401 to 403 correspond to leached, secondary enrichment and transitional mineralization, respectively and are treated as independent units due to their spatial arrangement and mineralization style; Domain 404 corresponds volcanic rocks in primary mineralization; Domain 405 corresponds post-mineral intrusions; Domains 406 and 407 correspond to Dp and Di which were to subdivided using a 0.3% CuT grade shell envelope, associated with the intensity of mineralization due to the superimposition of mineralized events; Domain 408 correspond to breccias; and Domain 409 correspond to all material in the bornite zone. The economic mineral is mainly found in Dp and Di rocks (407), mineralized breccias (408) and the bornite zone (409) with average copper grades greater than 0.5%.

Silica alteration determines the boundary for molybdenum mineralization. Lower molybdenum grades are related to silica alteration for diorite rock and some contact areas in the agglomerated dacite. The combined lithology groups with silica wireframe boundaries were used for defining molybdenum domains.

Iron zoning is controlled by gypsum occurrence. The combined lithology groups, and primary mineralization with gypsum model boundaries were used for iron and soluble iron domain definition. The iron domains were used for modeling density.

The Table 11-3 summaries average values for main metals and deleterious elements in the copper estimation domains.

Table 11-2: Estimation Domain for Total Copper

Domain Code	Mineral Zone	Lithology	No. of Comps	Min	Max	Mean	Std. Dev.	CV
All			62,875	0.00	10.99	0.38	0.45	1.20
400[1]	All	All	15,712	0.00	1.51	0.03	0.04	1.19
401	Leach	All	1,653	0.01	5.56	0.16	0.37	2.36
402	Enriched	All	2,216	0.01	10.99	1.19	1.08	0.91
403	Transitional	All	2,385	0.01	5.52	0.46	0.46	0.98
404	Primary	Volcanic rocks	2,671	0.00	2.66	0.17	0.16	0.94
405	Primary	Post-mineral Intrusions	985	0.00	2.76	0.21	0.2	0.94
406[2]	Primary	Dp & Di	12,081	0.00	4.07	0.21	0.15	0.74
407[2]	Primary	Dp & Di	9,620	0.02	3.57	0.57	0.28	0.50
408	Primary	Breccias	13,895	0.00	6.51	0.70	0.42	0.60
409	Bornite Zone	All	1,487	0.07	2.61	0.59	0.33	0.57

Note: (1) Outside to 0.1% CuT grade shell envelope
(2) Using 0.3% CuT grade shell envelope to divide into two zones

Table 11-3: Average Values for the Main Metals and Deleterious Elements in the Copper Estimation Domains

	Main Metals (Mean Value)					Deleterious Elements (Mean Value)					
Domain Code	CuCN (%)	CuSAC (%)	Mo (%)	Fe (%)	FeSAC (%)	As (%)	Ag (oz)	Pb (%)	Zn (%)	S (%)	CO_3 (%)
All	0.04	0.01	0.018	3.59	0.42	0.004	0.09	0.007	0.013	3.22	2.03
400	0.00	0.00	0.002	3.13	0.55	0.004	0.05	0.007	0.018	1.08	2.78
401	0.08	0.02	0.013	3.87	0.36	0.004	0.11	0.011	0.018	1.66	1.40
402	0.42	0.06	0.014	4.28	0.28	0.005	0.09	0.004	0.024	3.26	1.05
403	0.08	0.02	0.010	4.32	0.36	0.005	0.10	0.008	0.020	3.63	1.12
404	0.03	0.01	0.003	3.50	0.42	0.005	0.08	0.007	0.016	2.40	1.56
405	0.01	0.01	0.009	2.73	0.43	0.003	0.06	0.008	0.012	1.90	4.14
406	0.02	0.01	0.003	4.81	0.42	0.004	0.08	0.007	0.013	4.40	1.89
407	0.07	0.02	0.026	3.37	0.31	0.004	0.12	0.006	0.007	4.51	1.52
408	0.05	0.01	0.047	3.09	0.32	0.005	0.12	0.006	0.009	4.15	1.68
409	0.24	0.03	0.028	4.14	0.31	0.008	0.12	0.005	0.006	6.00	1.36

Note: CuCN = cyanide soluble copper; CuSAC = acid soluble copper; FeSAC = acid soluble iron. Iron and acid soluble iron are used to calculate the percentage pyrite and percentage chalcopyrite which is used in the block recovery formula used by mining.

11.6 Grade Capping/Outlier Restrictions

Wood performed the analysis of high-grade capping in composites for total copper, soluble coppers, molybdenum, iron and soluble iron using cumulative probability plots by estimation domain. Thresholds for each domain were selected as the value where a break in the grade continuity is observed. The results of the outlier analysis for total copper are summarized in Table 11-4.

The metal at risk associated with the capping level was evaluated. The highest percentage of risk (12.8%) was observed in the Domain 401 (leached mineralization), but the number of composites in this domain represents only 2.6% of the total data, therefore the associated risk has been reasonably controlled.

Due to the similar distribution in the grades for deleterious elements, no clusters of high grades were observed.

The density values were capped between 2.50 to 2.90 g/cm^3.

Table 11-4: Outliers Analysis for Total Copper

Domain Code	No. of Comps	Max Comps (%)	Capping Value (%)	No. of Comps Capped	Affected Records (%)	Mean Comps (%)	Mean Capped Comps (%)	Loss Metal (%)
All	62,875	10.99	-	80	0.1	0.38	0.38	-0.3
400	15,712	1.51	0.35	19	0.1	0.03	0.03	-1.0
401	1,653	5.56	1.20	25	1.5	0.16	0.14	-12.8
402	2216	10.99	8.00	3	0.1	1.19	1.19	-0.2
403	2,385	5.52	3.20	4	0.2	0.46	0.46	-0.4
404	2,671	2.66	1.40	3	0.1	0.17	0.17	-0.7
405	985	2.76	1.20	3	0.3	0.21	0.21	-0.9
406	12,081	4.07	-	-	-	0.21	0.21	-
407	9,620	3.57	2.00	23	0.2	0.57	0.57	-0.2
408	13,895	6.51	-	-	-	0.70	0.70	-
409	1,487	2.61	-	-	-	0.59	0.59	-

11.7 Variography

Experimental variograms were modeled for total copper, soluble coppers, molybdenum, iron and soluble iron by estimation domain with two spherical structures. The nugget effect was determined with down-the-hole variograms.

The deleterious elements do not show a clearly defined preferential anisotropy. The tolerances were increased to obtain a suitable direction, used in the estimation.

Results for total copper variography analysis are summarized in Table 11-5. Because of domain 406 have an annular shape it was necessary to divide in three sectors. As there is limited data for domains 408 and 409, they were modeled together.

11.8 Estimation Methods

A non-rotated block model was defined for the block grade estimate to provide high resolution at geological boundaries. Block dimensions were 20 x 20 x 15 m.

OK with three-pass estimation approach was used to populate total copper, soluble coppers, molybdenum, iron and soluble iron in the block model. Total copper grade estimation was completed within each estimation domain in which the search radii were increased from 130 m to 260 m. The search radii were defined based on the drilling hole spacing of main estimation domains (407, 408 and 409). Pass three estimates the edges of domains with low sample density and has no minimum composite restrictions. High-yield restriction on high-grade samples was applied to limit the smearing of higher grades as summarized in Table 11-6.

Soluble coppers were estimated by OK with the same copper estimation domains and normalized to the copper value.

Molybdenum, iron and soluble iron follow a similar search strategy used in the total copper block grade estimation.

For blocks that were not estimated in the three passes, an average value was assigned based on the domain of the block.

Block grade estimation for deleterious elements used ID to the second or third power. Estimation was conducted with two passes, increasing the search radii in each pass. Blocks that were not estimated in the first and second pass, were populated assigning the average value by each domain. No clusters of high grades were observed; however, high yield restriction was imposed during estimation.

Density was estimated using ID to the second power. The estimation parameters used are the same as the iron estimation domains. Blocks that were not estimated with these criteria, were populated assigning the average value of the respective domain.

Table 11-5: Variogram Parameters for Total Copper by Estimation Domain

Estimation Domain		**401**	**402**	**403**	**404**	**405**	**406-1**	**406-2**	**406-3**	**407**	**408/409**
1st rotation (L) in Z		180	-164	-43	-139	-28	-141	-54	-161	-3	-111
2nd rotation (R) in X		-3	1	4	-1	81	5	18	-14	-9	59
3rd rotation (L) in Y		-176	-169	176	-118	180	72	103	-93	56	44
Nugget		0.1	0.1	0.1	0.25	0.2	0.4	0.4	0.4	0.15	0.1
1st Structure	Model type	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical
	Sill (C1)	0.45	0.45	0.45	0.55	0.4	0.45	0.45	0.35	0.5	0.5
	Range in Y	45	225	120	90	60	100	60	75	90	95
	Range in X	75	180	120	70	45	70	50	60	110	75
	Range in Z	25	100	100	20	35	50	30	45	85	75
2nd Structure	Model type	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical	Spherical
	Sill (C2)	0.45	0.45	0.45	0.2	0.4	0.15	0.15	0.25	0.35	0.4
	Range in Y	125	450	450	400	270	180	300	300	500	600
	Range in X	125	250	450	285	105	240	350	380	400	400
	Range in Z	35	400	250	70	55	180	130	90	225	240

Table 11-6: Total Copper Estimation Parameters

Estimation Domain		401	402	403	404	405	406-1	406-2	406-3	407	408	409
Interpolation method		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
1st rotation in Z		180	-164	-43	-139	-28	-141	-54	-161	-3	-111	-111
2nd rotation in Y		-3	1	4	-1	81	5	18	-14	-9	59	59
3rd rotation in X		-176	-169	176	-118	180	72	103	-93	56	44	44
1st pass	*Ellipsoid search*											
	Max Range (m)	130	130	130	130	130	130	130	130	130	130	130
	Intermediate Range (m)	130	130	130	130	130	130	130	130	130	130	130
	Vertical Range (m)	50	50	50	50	50	50	50	50	50	50	50
	Min N° of Composites	5	7	7	5	5	5	5	5	7	7	7
	Max N° of Composites	15	18	18	15	15	15	15	15	18	18	24
	Max N° Composites per Hole	3	3	3	2	2	2	2	2	3	3	3
	Capped Grade	1.2	8	3.2	1.4	1.2	-	-	-	2	-	-
2nd pass	*Ellipsoid search*											
	Max Range (m)	195	195	195	195	195	195	195	195	195	195	195
	Intermediate Range (m)	195	195	195	195	195	195	195	195	195	195	195
	Vertical Range (m)	75	75	75	75	75	75	75	75	75	75	75
	Min N° of Composites	3	4	4	3	3	3	3	3	7	7	7
	Max N° of Composites	14	16	16	14	14	14	14	14	16	16	20
	Max N° Composites per Hole	3	3	3	2	2	2	2	2	3	3	3
	Capped Grade	1.2	8	3.2	1.4	1.2	-	-	-	2	-	-

Estimation Domain		401	402	403	404	405	406-1	406-2	406-3	407	408	409
3rd pass	*Ellipsoid search*											
	Max Range (m)	260	260	260	260	260	260	260	260	260	260	260
	Intermediate Range (m)	260	260	260	260	260	260	260	260	260	260	260
	Vertical Range (m)	100	100	100	100	100	100	100	100	100	100	100
	Min N° of Composites	3	4	4	3	3	3	3	3	4	4	4
	Max N° of Composites	12	14	14	12	12	12	12	12	14	14	16
	Max N° Composites per Hole	-	-	-	-	-	-	-	-	-	-	-
	Capped Grade	1.2	8	3.2	1.4	1.2	-	-	-	2	-	-
	High Yield Restriction Threshold	0.1	1.2	0.5	0.2	0.2	0.2	0.2	0.2	0.6	0.7	0.6
	Max Ranger (m)	30	30	30	30	30	30	30	30	30	30	30
	Intermediate Range (m)	30	30	30	30	30	30	30	30	30	30	30
	Vertical Range (m)	30	30	30	30	30	30	30	30	30	30	30

11.9 Validation

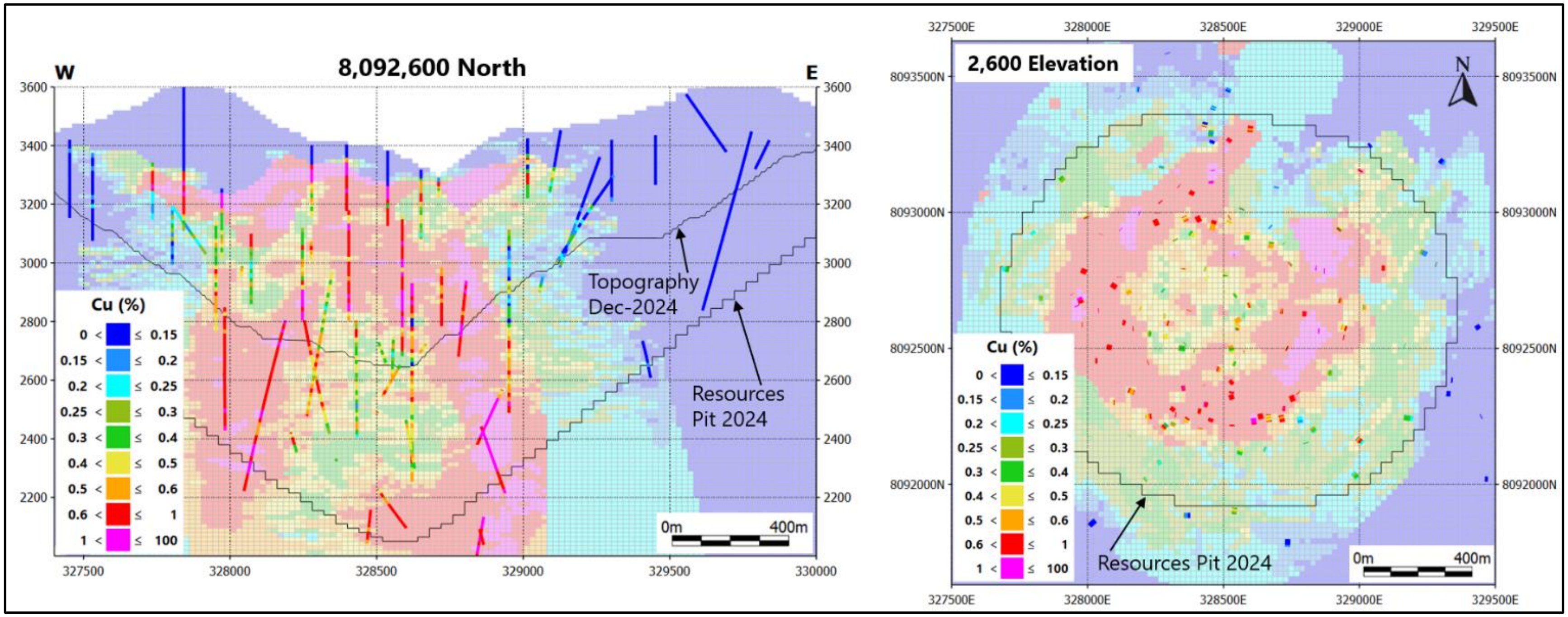
Model validation included visual and geostatistical methods:

- Visual inspection on vertical sections and plans showed that the total copper (Figure 11-2), soluble coppers, molybdenum (Figure 11-3), iron and soluble iron block model grades correlated well with the composite data.
- Summary statistics were tabulated for the OK and nearest-neighbor (NN) models. Wood considers a grade estimate to be unbiased if the OK estimate and NN mean grades are within ±5%. Wood considers the global bias of all domains to be within acceptable limits.
- Local grade trends for copper and molybdenum by domain were evaluated with swath plots constructed for easting, northing, and elevation. Correspondence between copper and molybdenum OK and NN grade was generally good. However, where data density was low, some mismatches were observed.
- A change of support selectivity check was completed for the main total copper domains. In general, the validation demonstrates reasonable correlation between the distributions for the OK estimate and the adjusted NN distribution. Consequently, there is limited smoothing in the estimate.

Wood performed a review of available reconciliation data based on the quarterly and annual variances from 2019–2024, and noted the following:

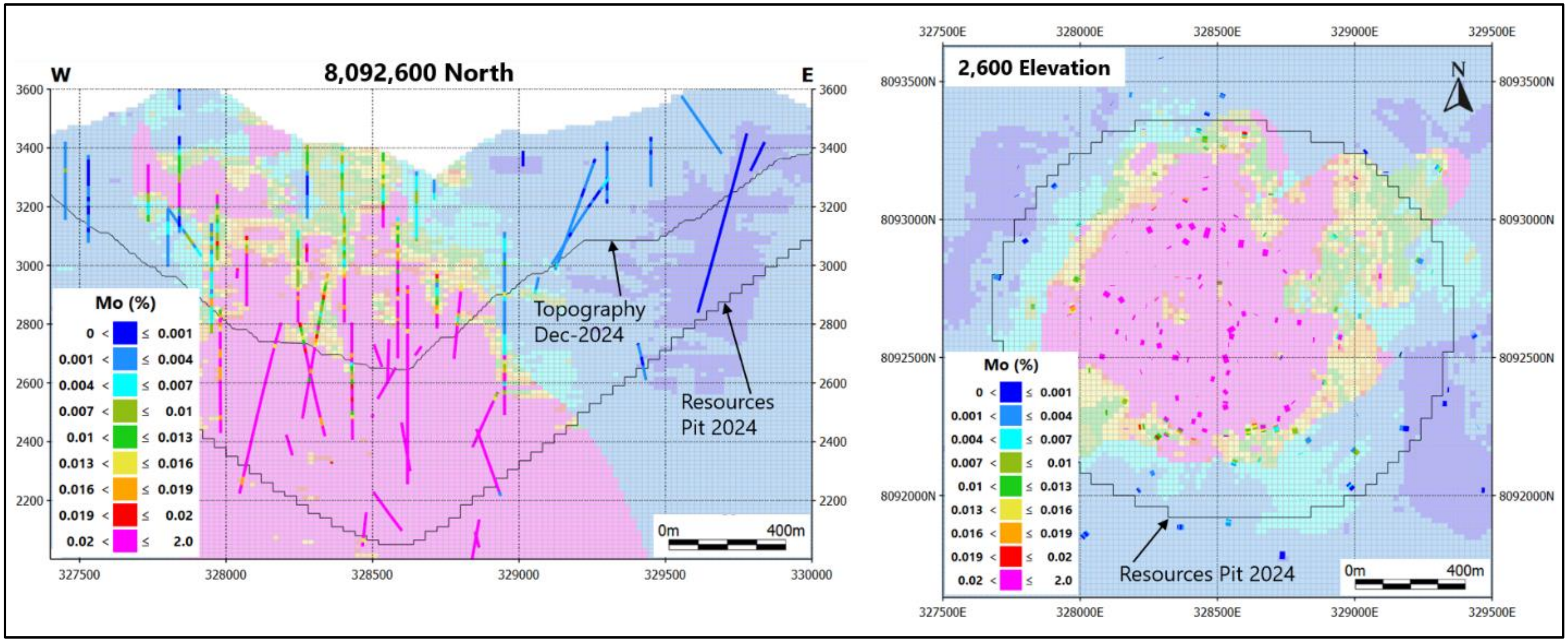
- At a zero copper cut-off from 2019 to first quarter of year 2024, no significant bias was noted in tonnage, copper, or molybdenum grade.
- Above the 0.3% CuT cut-off grade, from 2019 to 2020, the resource model overestimated (between 10% to 15%) the copper grade and underestimates the ore tonnage (see Figure 11-4). During this period some of the mined areas located at the edges of the pit were estimated with historical drill holes.

Figure 11-2: Visual Validation for Total Copper – View to North and Plan



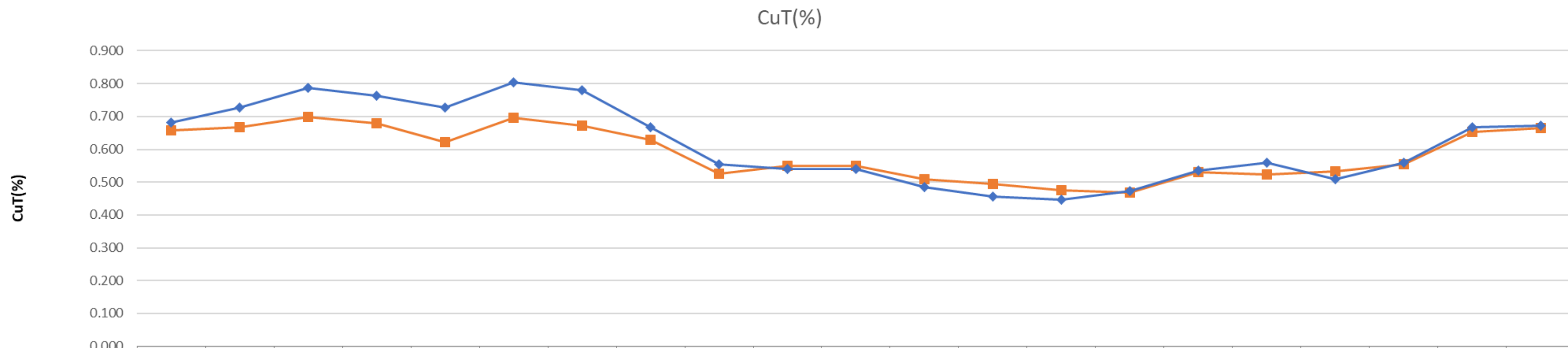
Source: Wood, 2024

Figure 11-3: Visual Validation for Molybdenum – View to North and Plan



Source: Wood, 2024

Figure 11-4: Quarterly Reconciliation Above the 0.3% CuT Cut-off Grade



	2019_1Q	2019_2Q	2019_3Q	2019_4Q	2020_1Q	2020_2Q	2020_3Q	2020_4Q	2021_1Q	2021_2Q	2021_3Q	2021_4Q	2022_1Q	2022_2Q	2022_3Q	2022_4Q	2023_1Q	2023_2Q	2023_3Q	2023_4Q	2024_1Q
Ore Control	0.658	0.667	0.699	0.679	0.622	0.695	0.673	0.630	0.525	0.550	0.549	0.510	0.495	0.476	0.467	0.530	0.523	0.533	0.554	0.652	0.665
Resources	0.682	0.727	0.787	0.763	0.727	0.804	0.780	0.667	0.555	0.541	0.540	0.484	0.455	0.446	0.473	0.535	0.559	0.510	0.559	0.668	0.673

Source: Wood, 2024

11.10 Confidence Classification of Mineral Resource Estimate

11.10.1 Mineral Resource Confidence Classification

Mineral resource classification considered three main aspects, data density, geological and grade continuity, and the quality of the information used in the estimate.

Density data evaluation was performed by analyzing the drill hole spacing of the current pattern, which determines an optimal drill hole grid that ensures a production scenario within an acceptable confidence interval. This exercise was conducted on the main estimation domains (407, 408 and 409) for total copper.

The following criteria were used for classifying mineral resources:

- *Measured* – within 90 m to the nearest composite estimated from a minimum of three drill holes.
- *Indicated* – within 120 m to the nearest composite estimated from a minimum of two drill holes
- *Inferred* – within 160 m to the nearest composite with a minimum of one drill hole.

Blocks classified applying these criteria were then smoothed to eliminate isolated blocks or blocks within a different classification. These blocks were assimilated by the majority category, ensuring the coherence and continuity of the results.

11.10.2 Uncertainties Considered During Confidence Classification

Wood considers that the Toquepala deposit has sufficient drilling information to support Measured categories. However, there are zones at the periphery of pit where historical holes do not have an appropriate QA/QC program, that increases the uncertainty in the estimated block. Therefore, an indicator was created to evaluate the proportion of historical data used in the grade estimate. Block estimates using more than 50% of historical holes were limited to the Indicated category and block estimates using only historical holes were assigned to the Inferred category. The good reconciliation results where grade control aligns closely with the grades predicted by historical drilling allows for this confidence classification.

11.11 Reasonable Prospects of Economic Extraction

11.11.1 Input Assumptions

Wood constrained the mineral resource estimate within a conceptual pit shell using a Lerchs-Grossmann algorithm and the parameters are summarized in Table 11-7.

11.11.2 Commodity Price and Market

Southern Copper provided Wood with Southern Copper's internal metal price forecast and a presentation on their market outlook. The long-term commodity price forecast was applied over the 41.2-year expected mine life. Forecasts were based on Southern Copper's interpretations of market analysis from Wood Mackenzie, CRU and 21 analysts and banks on copper price.

Wood reviewed the Southern Copper long-term mineral reserve forecast price for copper of $3.30/lb and for molybdenum of $10.00/lb over the life of mine and concluded that the copper and molybdenum prices selected by Southern Copper are reasonable in comparison to the prices being used by Southern Copper's industry peers.

Industry-accepted practice is to use a higher metal price for the mineral resource estimates than the pricing used for mineral reserves. This is to ensure that the mineral reserves are a subset of the mineral resources. The long-term copper price forecast of $3.30/lb for mineral reserves was increased by 15% to provide the mineral resource estimate copper price of $3.80/lb. Similarly, the long-term molybdenum price forecast of $10.00/lb for mineral reserves was increased by 15% to provide the mineral resource estimate molybdenum price estimate of $11.50/lb.

The assumed exchange rate was US$1.00 = PENS/3.80. This exchange rate was provided by Southern Copper.

Southern Copper is engaged with selling mine production into the copper and molybdenum markets and has a reasonable basis for their assumptions. The market for the mine production is discussed in Section 16.

Table 11-7: Input Parameters Mineral Resource Pit Shell

Parameter	Unit	Value
Price		
Copper	$/lb	3.80
Molybdenum	$/lb	11.50
Mining		
Reference mining cost (rock)[1]	$/t	2.11
Reference mining cost (fill)[1]	$/t	1.38
Incremental haulage cost up	$/t	-
Incremental haulage cost down	$/t	-
Processing		
Concentration and tailings process cost[1]	$/t	9.80
Leaching and SX/EW process cost[1]	$/t	1.91
Selling[1]		
Concentrate Cu net payable price[2]	$/lb	3.49
Concentrate Mo net payable price[3]	$/lb	9.29
Leach Cu net payable price[4]	$/lb	3.65
Minimum Modified Mining Royalty[5]	% NSR	1
Average Recoveries		
Concentrate Cu	%	87.5
Concentrate Mo	%	68.3
Leaching Cu	%	17.0
Cut-offs[6]		
Sulfide NSR cut-off value	$/t	9.80
Leach NSR cut-off value	$/t	1.91
Pit slopes		
Variable overall slope angles	degree	30–38

Note: Numbers have been rounded.

(1) Excluding sustaining capital costs.

(2) Concentrate Cu net payable price per pound produced includes the following: smelting and refining recoveries (97.1% and 99.9%, respectively), treatment costs of $0.17/lb Cu (excluding sustaining costs), copper selling cost of $0.001/lb Cu, and 1% NSR royalty.

(3) Concentrate Mo net payable price per pound produced includes a molybdenum selling cost of $1.83/lb Mo, and 1% NSR royalty.

(4) Leach Cu net payable price per pound produced includes a copper selling cost of $-0.005/lb Cu, and 1% NSR royalty. The copper selling cost is a negative because cathode copper attracts a premium.

(5) 5As per current Peruvian mining taxation regime.

(6) Marginal cut-offs (excluding mining costs).

11.11.3 Cut-offs

The NSR cut-off value used for mineral resource estimation for sulfide material was $9.80/t. Low-grade sulfide material sent to the leach facilities was reported at a NSR cut-off value of $1.91/t. The inputs to the NSR cut-off values are shown in Table 11-7. Operating costs were based on actual costs, data from Southern Copper's operating mines in Peru, Wood's experience, and the proposed mine and process plans. Wood used slightly more optimistic assumptions on costs for mineral resources than those used for mineral reserves over the 41.2-year assumed mine life.

Wood considers those blocks within the constraining resource pit shell and above the NSR cut-off values applied have reasonable prospects for economic extraction.

11.12 Mineral Resource Estimate

11.12.1 Mineral Resource Statement

Mineral resources are reported using the mineral resource standards and definitions set out in S-K 1300 and are reported exclusive of those mineral resources converted to mineral reserves. The selected point of reference for the mineral resource estimate is in place (before mining). Mineral resources are summarized in Table 11-8.

Wood believes there is a reasonable expectation that the majority of Inferred mineral resources could be upgraded to Indicated or Measured mineral resources with continued exploration.

11.12.2 Uncertainties (Factors) That May Affect the Mineral Resource Estimate

Additional to what are described elsewhere in this Report, sources of uncertainty that may affect the mineral resource estimates include:

- Unrecognized complexities and other changes to the interpretation of the geological model such as presence of unrecognized mineralization off-shoots; faults, dikes, and other structures
- Uncertainties regarding interpreted geological and grade shape, and geological and grade continuity assumptions
- Unrecognized variability in the metallurgical recovery
- Uncertainties in the technical and economic input assumptions used to derive the open pit shell used to constrain the estimates and determination of the cut-offs

Table 11-8: Toquepala Mineral Resource Statement

Classification Category	Amount (Mt)	Copper Grades (%)	Molybdenum Grades (%)	Copper Metal Content (Mlb)	Molybdenum Metal Content (Mlb)
Measured					
Sulfides	99.3	0.57	0.038	1,241.2	83.0
Leach (low-grade sulfides)	11.3	0.15	-	37.4	
Total Measured	**110.7**	**0.52**	**-**	**1,278.7**	**83.0**
Indicated					
Sulfides	179.0	0.39	0.021	1,525.3	81.7
Leach (low-grade sulfides)	46.0	0.15	-	153.4	-
Total Indicated	**225.0**	**0.34**	**-**	**1,678.7**	**81.7**
Measured + Indicated					
Sulfides	278.3	0.45	0.027	2,766.6	164.8
Leach (low-grade sulfides)	57.3	0.15	-	190.8	-
Total Measured + Indicated	**335.6**	**0.40**	**-**	**2,957.4**	**164.8**
Inferred					
Sulfides	161.4	0.29	0.008	1,017.4	28.6
Leach (low-grade sulfides)	52.4	0.15	-	177.0	-
Total Inferred	**213.8**	**0.25**	**-**	**1,194.5**	**28.6**

Note: (1) The point of reference for mineral resources are in place and are current as at December 31, 2024. Mineral resources are reported exclusive of mineral reserves. Wood is responsible for the estimate.

(2) Mineral resources are constrained within an optimized pit shell based on copper and molybdenum revenues only. The following parameters were used in estimation: assumed open-pit mining methods; assumed concentration and dump leaching processes; copper price of $3.80/lb, molybdenum price of $11.50/lb; marginal NSR cut-off values of $9.80/t-processed for concentration material (approximately equivalent to 0.146% Cu), and $1.91/t-processed for leach material (approximately equivalent to 0.135% Cu); variable metallurgical recoveries (average recoveries of 87.5% for copper by concentration, 68.3% for molybdenum by concentration, and 17.0% for copper by leaching); average copper recoveries of 97.1% for smelting and 99.9% for refining; average mining cost of $2.11/t-mined; average process costs of $9.80/t-processed for concentration material, and $1.91/t for leach material; average smelting and refining cost of $0.16/lb Cu; selling costs of $0.001/lb Cu for concentration process, $1.83/lb Mo for concentration process, and $-0.005/lb Cu for leaching process; and 1% NSR royalty applied to Cu and Mo.

(3) No estimates for molybdenum are reported for leachable material as this element cannot currently be recovered using the leach process envisaged.

(4) Numbers in the table have been rounded. Totals may not sum due to rounding.

- Unrecognized issues with environmental, permitting and social license
- Unrecognized variations in the geotechnical (including seismicity), hydrogeological and mining assumptions
- Uncertainties in estimated blocks located in the periphery of the pit that are estimated with only historical holes.

These uncertainties were factored into the final confidence classification assigned to the mineral resource estimates.

11.12.3 Opinion Statement

Wood's QP is of the opinion that any issues that arise in relation to relevant technical and economic factors are likely to influence the prospect of economic extraction can be resolved with further work. Porphyry-copper style deposits are a well-known and studied deposit type, and Southern Copper has more than 60 years of experience with mining the Toquepala deposit and has managed the uncertainties that have occurred to date during mining.

12.0 MINERAL RESERVE ESTIMATES

12.1 Introduction

Measured and Indicated mineral resources were converted to proven and probable mineral reserves, respectively by applying the modifying factors within a prefeasibility level mining study of the current and planned Toquepala mining operations. The LOM plan for the Toquepala mining operations is considered by Wood to be technically achievable and economically viable and is a reasonable basis for determining the mineral reserves. Inferred mineral resources were set to waste.

12.2 Development of Mining Case

12.2.1 Pit Optimization

Pit optimization was performed using the Lerchs-Grossmann (LG) algorithm in GEOVIA Whittle software. A summary of the economic and technical parameters used for the pit optimization of the Toquepala deposit is presented in Table 12-1.

Nested pit shells were run from revenue factors (RF) ranging from 0.4 to 1.2 (Figure 12-1, Figure 12-2, and Figure 12-3). The revenue factor is a multiplier applied to the base metal price and, subsequently, used in the pit optimization. For example, a RF of 1.0 corresponds to a copper base price of $3.30/lb. A revenue factor of 0.5 multiplies the base metal price by 0.5 to determine the price used in the optimization and pit shells.

For final pit selection, Southern Copper's corporate guidelines dictate that LOM production and metal content be maximized. As such, the revenue factor 1.0 pit shell was selected as the guide for the final pit design.

12.2.2 Adjustment Factors

Mining dilution was not applied as the reconciliation results for tonnage and grade is good. However, isolated ore/waste block smoothing was applied to the mineable blocks in order to avoid quantifying block volumes that would not be operationally extractable, and the impact on mineral content is<1%.

A 100% mining recovery was used because of good reconciliation.

Table 12-1: Input Parameters Mineral Reserve Pit Shell

Parameter	Unit	Value
Price		
Copper	$/lb	3.30
Molybdenum	$/lb	10.00
Mining		
Reference mining cost (rock)[1]	$/t	2.65
Reference mining cost (fill)[1]	$/t	1.92
Incremental haulage cost up	$/t	0.012
Incremental haulage cost down	$/t	0.018
Processing		
Concentration and tailings process cost[1]	$/t	11.26
Leaching and SX/EW process cost[1]	$/t	2.11
Selling[1]		
Concentrate Cu net payable price[2]	$/lb	2.97
Concentrate Mo net payable price[3]	$/lb	7.85
Leach Cu net payable price[4]	$/lb	3.17
Minimum Modified Mining Royalty[5]	% NSR	1
Average LOM Recoveries[6]		
Concentrate Cu	%	92.1
Concentrate Mo	%	70.4
Leaching Cu	%	16.1
Cut-offs[7]		
Concentration NSR cut-off value	$/t	11.10–11.37
Leaching NSR cut-off value	$/t	1.95–2.22
Pit slopes		
Variable overall slope angles	degree	30–38

Note: Numbers have been rounded. All costs and metal prices assumptions are fixed over the 41.2-year LOM.

(1) Including sustaining capital costs.

(2) Concentrate Cu net payable price per pound produced includes the following: smelting and refining recoveries (97.1% and 99.9%, respectively), treatment costs of $0.21/lb Cu (including sustaining costs), copper selling cost of $0.001/lb Cu, and 1% NSR royalty.

(3) Concentrate Mo net payable price per pound produced includes a molybdenum selling cost of $1.83/lb Mo, and 1% NSR royalty.

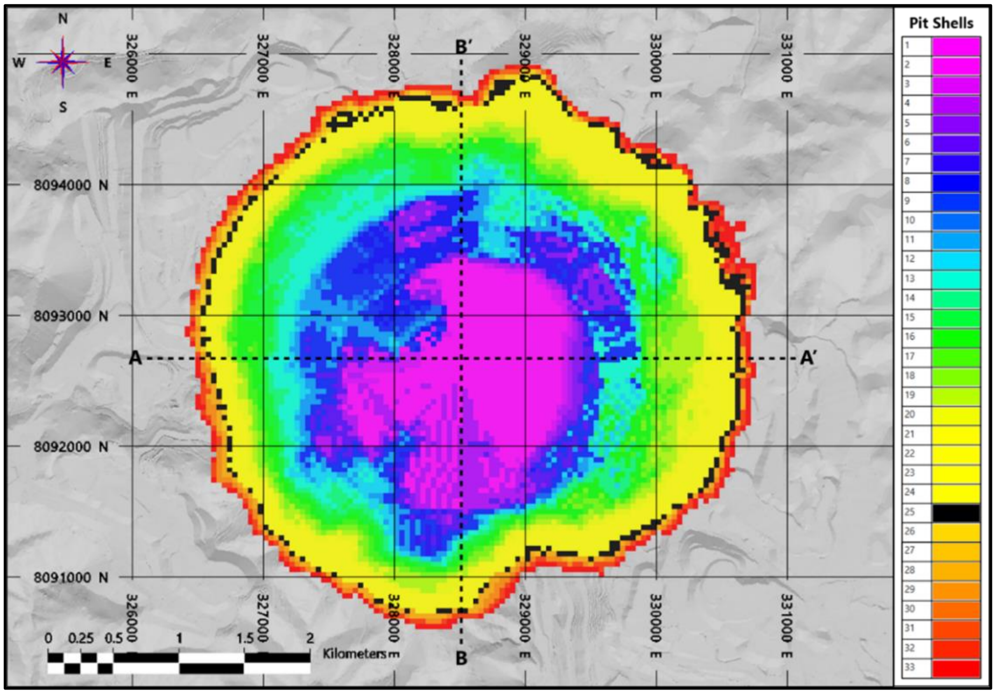
(4) Leach Cu net payable price per pound produced includes a copper selling cost of $-0.005/lb Cu, and 1% NSR royalty. The copper selling cost is a negative because cathode copper attracts a premium.

(5) As per current Peruvian mining taxation regime.

(6) Average metallurgical recovery within the open pit, excluding leach ore existing in leach dumps

(7) Variable marginal cut-offs (discounting mining costs).

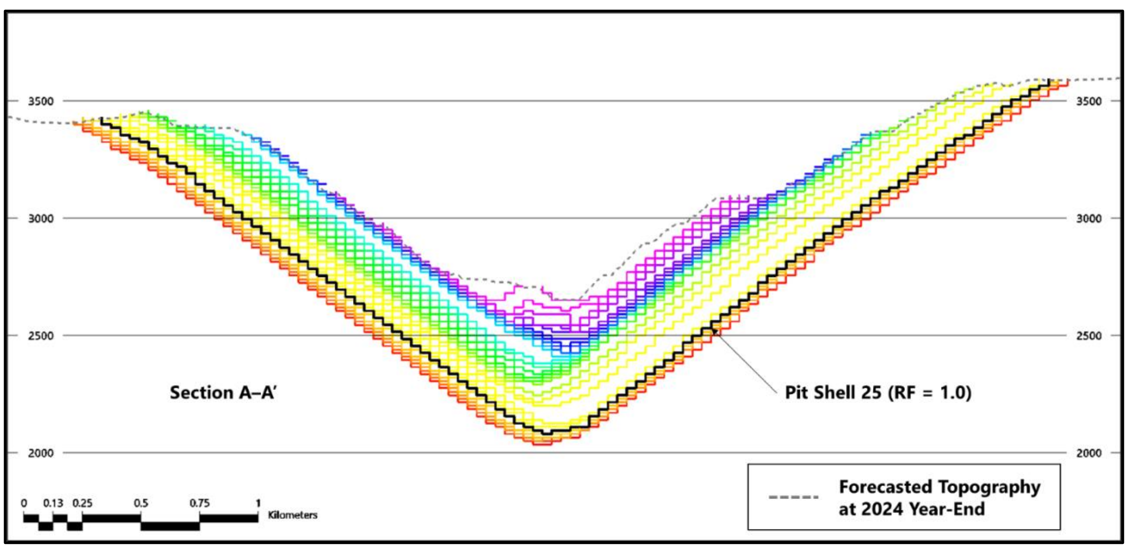
Figure 12-1: Nested Pit Shells from Pit Optimization (Plan View)



Source: Wood, 2024

Note: Pit shell 25 = RF 1.0

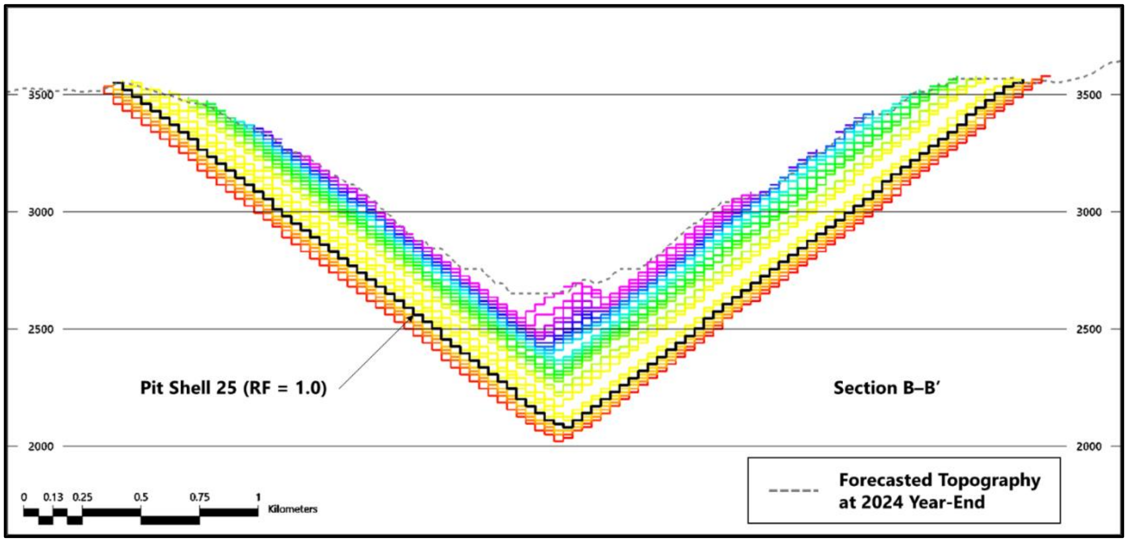
Figure 12-2: Nested Pit Shells from Pit Optimization (Section View A–A′)



Source: Wood, 2024

Note: See Figure 12-1 for legend.

Figure 12-3: Nested Pit Shells from Pit Optimization (Section View B–B')



Source: Wood, 2024

Note: See Figure 12-1 for legend.

12.2.3 Topography

Surface topography was provided by Southern Copper and corresponds to the forecasted topography to the end of 2024. The topography surface was used to determine the proportion of blocks below the surface.

12.2.4 Slope Angles

Geotechnical zones used for the pit optimization were based on guidance provided by Itasca/Piteau (2017).

An overall slope angle (OSA) was assigned to the different geotechnical zones. The OSA were estimated based on Southern Copper's 2022 reserve pit design (Table 12-2).

Table 12-2: Overall Slope Angle by Geotechnical Zones

Zone	OSA[1] (degree)
MS	33
SE, VIII	32
DS, ES, M, IV, VII	35
II	37
III	38
V	36
I, VI	38
Fill[2]	30
Undefined[3]	30

Note: (1) OSA calculated based on Toquepala reserve pit design 2022
(2) Fill zone calculated based on Toquepala fill solids 2024
(3) Fill zone parameters used for undefined zone

12.2.5 Metallurgical Recoveries

Copper metallurgical recoveries were included in the block model for concentration and leaching processes using formulas and definitions provided by Southern Copper. Molybdenum metallurgical recoveries were included in the block model for concentration.

The fixed metallurgical recoveries of copper by smelting (97.1%), refining (99.9%), and SX/EW (99.9%) were considered.

12.2.6 Mining Costs

The reference mining cost used was $2.65/t mined, which includes a base mining cost of $2.11/t mined and a mining sustaining cost of $0.54/t mined. The base mining cost was estimated using a long-term average mining cost from previous reserve estimates and adjusted with operating cost data from the last three years. The mining sustaining cost was estimated based on capital costs escalated to 2024, which include capital for mine equipment, mine maintenance, waste disposal (land acquisition), and powerline relocation.

For pit optimization, three reference levels were established depending on the type of material extracted from the pit:

- *Concentration sulfide reference level* – Elevation 3,250 masl was considered as the pit exit level for material that goes to the sulfide crusher.

- *Leaching sulfide reference level* – Elevation 3,250 masl was considered as the pit exit level for material that goes to the leach crusher or ROM leach dump.
- *Waste reference level* – Elevation 3,565 masl was considered as the pit exit level for material that goes to the WRSFs.

In addition to the reference mining cost, an incremental haulage cost was applied depending on the type of material extracted from the pit and the established reference levels. An incremental cost of $0.012/t mined was applied for each bench above the established reference level, and $0.018/t mined was applied for each bench below the established reference level.

Finally, a mining cost reduction of $0.73/t mined was applied only to fill material, since drilling and blasting costs have already been incurred for this material type.

12.2.7 Processing Costs

For processing, two main process flows have been established:

- *Concentration process flow* – Corresponds to the concentration, smelting, and refining processes material directed to the sulfide crusher.
- *Leaching process flow* – Corresponds to the leaching, and SX/EW processes material directed to the leach crusher or ROM leach dump.

For the concentration process flow, the following processing costs have been considered.

The concentration and tailings cost used was $11.26/t processed, which includes a concentration and tailings operating cost of $9.80/t processed and a concentration and tailings sustaining capital cost of $1.46/t processed. The concentration operating cost was estimated using a combination of actual cost averages from previous years, adjusted to account for the long-term based on expected variations of key commodities costs such as energy, consumables, and services. Operating costs associated with tailings disposal at the existing Quebrada Honda TSF are included as part of concentration costs.

An additional tailings operating cost was considered for the alternate tailings processing and storage option required to process the remaining LOM ore once the existing Quebrada Honda TSF reaches the ultimate storage capacity at approximately the end of 2036. Wood assumed dry stack tailings as the preferred alternative to process and store the remaining tailings (starting from 2037). Costs from a 2020 internal study of another Southern Copper project that considered disposal of tailings by comingling waste rock and filtered tailings materials were used to develop the operating cost estimate, complemented with engineering judgement on costs derived from projects of similar applications, and escalation to Q3 2024 using normalization factors.

The concentration and tailings sustaining capital cost was estimated based on a combination of previous capital cost estimates escalated to 2024 and on unit costs derived from the 2024–2028 sustaining and maintenance cost schedule developed by Southern Copper. These include capital for primary crusher relocation, truckshop expansion, concentrators ongoing sustaining, concentrators maintenance, other ongoing sustaining and maintenance, Quebrada Honda TSF expansion, and new tailings thickening and filtering plant.

The smelting and refining cost used was $0.21/lb Cu produced, which includes a smelting and refining operating cost of $0.16/lb Cu produced and a smelting and refining sustaining capital cost of $0.04/lb Cu produced. The smelting and refining operating cost was estimated using a combination of actual cost averages from previous years, adjusted to account for the long-term based on expected variations of key commodities costs such as energy, consumables, and services. The smelting and refining sustaining capital cost was estimated based on unit costs derived from the 2024–2028 sustaining and maintenance cost schedule developed by Southern Copper, which includes sustaining and maintenance costs for the Ilo smelter and refinery.

For the leaching process flow, the following processing costs have been considered.

The leaching and SX/EW cost used was $2.11/t processed, which includes a leaching and SX/EW operating cost of $1.91/t processed and a leaching and SX/EW sustaining capital cost of $0.20/t processed. The leaching and SX/EW operating cost was estimated using a projection of the leaching and SX/EW costs provided by Southern Copper based on a long-term leach and cathodes production schedule, operational parameters, and main consumable costs based on data from their operations. The leaching and SX/EW sustaining cost was estimated based on unit costs derived from the 2024–2028 sustaining and maintenance cost schedule developed by Southern Copper, which includes capital for leaching and SX/EW ongoing sustaining and maintenance.

The general and administrative (G&A) cost is included into the processing costs.

12.2.8 Treatment Charges

For the concentration process, a copper treatment charge of $0.001/lb Cu produced was used, which includes a metal deduction, a refining charge, an ocean freight cost, and a cathode premium. The cathode premium reduces the treatment charge, producing a slightly positive final value. In addition, a molybdenum treatment charge of $1.83/lb Mo concentrated was used, which includes a roasting charge and an ocean freight cost.

For the leaching process, a copper treatment charge of $-0.005/lb Cu produced was used, which includes an ocean freight cost and a cathode premium. This cathode premium reduces the treatment charge, producing a negative final value.

12.2.9 Royalties

A 1% NSR royalty was applied to copper and molybdenum for the pit optimization, which corresponds to the minimum modified mining royalty (refer to discussion in Section 3.2.3).

12.2.10 Commodity Price and Market

Southern Copper is currently engaged in and has established a market for selling products from the Toquepala mine. A summary of the market is discussed in Section 16. Long-term metal prices of $3.30/lb Cu and $10.00/lb Mo were used to estimate mineral reserves over the LOM, and were provided by Southern Copper. Supporting information related to these prices can be found in Section 16.4.

12.2.11 Cut-offs

The marginal NSR cut-off values for mineral reserves to be treated by concentration ranges from $11.10/t to $11.37/t. The marginal NSR cut-off values for mineral reserves to be treated by the leach facilities ranges from $1.95/t to $2.22/t.

The inputs to the cut-off values are shown in Table 12-1. Operating costs were based on actual costs and data from Southern Copper's operating mines in Peru, Wood's experience and the proposed mine and process plans.

The formulas used to calculate the concentration and leaching marginal NSR cut-off values were:

$$COVC = (MCC - MCW) + CTC$$

$$COVL = (MCL - MCW) + LXC$$

where:

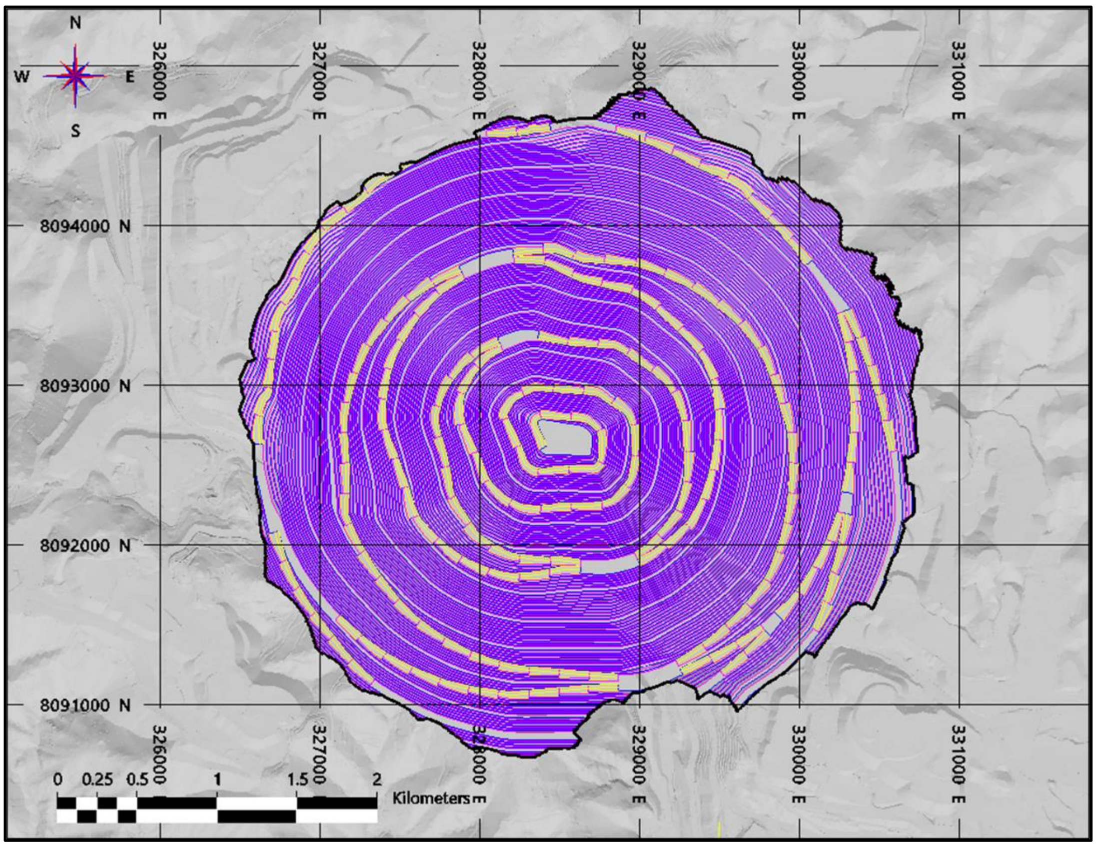
COVC = Concentration NSR cut-off value ($/t-processed for concentration material)
COVL = Leaching NSR cut-off value ($/t-processed for leaching material)
MCC = Concentration mining cost ($/t-mined for concentration material)
MCL = Leaching mining cost ($/t-mined for leaching material)
MCW = Waste mining cost ($/t-mined for waste material)

CTC = Concentration and tailings cost ($/t-processed for concentration material)
LXC = Leaching and SX/EW cost ($/t-processed for leaching material)

12.2.12 Pit Design

Figure 12-4 shows a plan view of the final pit design. This final pit is the result of the extraction of seven mining phases, which are described in more detail in Section 13.

Figure 12-4: Final Pit Design (Plan View)



Source: Wood, 2024

12.2.13 Ore Versus Waste Determinations

The criteria for the determination of ore and waste included the following:

- Measured and Indicated mineral resources that correspond to sulfide material were evaluated for being amenable to concentration processing. The economic sulfide material above the concentration NSR cut-off value was defined as concentration/sulfide material.
- The remaining sulfide material was then evaluated for amenability to the leaching process. The Measured and Indicated mineral resources that were above the leaching NSR cut-off value was defined as leaching/leach material.
- All remaining material was defined as waste material.

The formulas used to calculate the NSR for the concentration and leaching materials were:

$$NSRC = (CU \times RCUC \times RCUS \times RCUR \times (PCU - SCUC - SRC) \times (1 - ROY) \times CF) + (MO \times RMOC \times (PMO - SMOC) \times (1 - ROY) \times CF)$$

$$NSRL = CU \times RCUL \times RCUX \times (PCU - SCUL) \times (1 - ROY) \times CF$$

where:

NSRC = Concentration NSR ($/t-processed for concentration material)
NSRL = Leaching NSR ($/t-processed for leaching material)
CU = Copper grade (%)
MO = Molybdenum grade (%)
RCUC = Copper recovery by concentration (%)
RCUS = Copper recovery by smelting (%)
RCUR = Copper recovery by refining (%)
RMOC = Molybdenum recovery by concentration (%)
RCUL = Copper recovery by leaching (%)
RCUX = Copper recovery by SX/EW (%)
PCU = Copper price ($3.30/lb)
PMO = Molybdenum price ($10.00/lb)
SCUC = Copper selling cost for concentration process ($/lb Cu produced)
SMOC = Molybdenum selling cost for concentration process ($/lb Mo concentrated)
SCUL = Copper selling cost for leaching process ($/lb Cu produced)
SRC = Smelting and refining cost ($/lb Cu produced)
ROY = NSR royalty (modified mining royalty) (1%)
CF = Conversion factor between units (2,204.62 lb/t)

All costs and metal prices used in the mineral reserve determination were fixed over the LOM of 41.2 years.

12.3 Mineral Reserve Estimate

12.3.1 Mineral Reserve Statement

Mineral reserves are reported using the mineral reserve standards and definitions set out in S-K 1300. The selected point of reference for the mineral reserve estimate is at delivery to the process facility. Mineral reserves are summarized in Table 12-3.

The leach ore existing in the leach dumps is reported as leach in process.

12.3.2 Uncertainties (Factors) That May Affect the Mineral Reserve Estimate

Additional to what are described elsewhere in this Report, sources of uncertainty that may affect the mineral reserve estimates include:

- Uncertainties in the long-term metal price and exchange rate assumptions
- Unrecognized variability in the metallurgical recovery
- Uncertainties regarding interpreted geological model supporting the mineral resource estimates
- Uncertainties in the input assumptions used to derive the mineable shapes applicable to the open pit mining methods used to constrain the estimates
- Unrecognized variations to inputs to the NSR cut-off values applied to the estimates
- Unrecognized variations in geotechnical (including seismicity), hydrogeological and mining method assumptions
- Unrecognized issues with environmental, permitting, and social license assumptions.

To assess the impact of a number of these uncertainties on the mineral reserves, a pit optimization sensitivity analysis was performed for the sulfide and leach mineralization by varying the metal price, mining cost, processing cost, and metallurgical recovery.

Variations in the metal price and metallurgical recovery generate the greatest impact on the mineral reserve estimates. A variation in mining and processing costs generates a significant impact on the mineral reserve estimates.

Table 12-3: Toquepala Mineral Reserve Statement

Classification Category and Process Type	Amount (Mt)	Copper Grades (%)	Molybdenum Grades (%)	Copper Metal Content (Mlb)	Molybdenum Metal Content (Mlb)
Proven					
Mill	1,184.8	0.57	0.040	14,987.0	1,032.5
Leach	242.9	0.21	–	1,125.9	–
Leach in process	1,864.2	0.15	–	6,171.9	–
Total Proven	**3,292.0**	**0.31**	**–**	**22,284.8**	**1,032.5**
Probable					
Mill	583.9	0.47	0.021	5,992.0	275.5
Leach	502.8	0.20	–	2,242.5	–
Leach in process	–	–	–	–	–
Total Probable	**1,086.7**	**0.34**	**–**	**8,234.5**	**275.5**
Proven + Probable					
Mill	1,768.8	0.54	0.034	20,979.0	1,307.9
Leach	745.7	0.20	–	3,368.4	–
Leach in process	1,864.2	0.15	–	6,171.9	–
Total Proven + Probable	**4,378.7**	**0.32**	**–**	**30,519.3**	**1,307.9**

Note: (1) Mineral reserves are current as of December 31, 2024. Wood is responsible for the estimates.

(2) The point of reference is the point at which the mineral reserves are delivered to the processing facility. Mineral reserves are constrained within an engineered pit based on copper and molybdenum revenues only. The following parameters were used in estimation: assumed open-pit mining methods; assumed concentration and dump leaching processes; copper price of $3.30/lb, molybdenum price of $10.00/lb; marginal NSR cut-off values of $11.10–$11.37/t-processed for concentration material (approximately equivalent to 0.184%–0.188% Cu), and $1.95–$2.22/t-processed for leach material (approximately equivalent to 0.168%–0.191% Cu); mining recovery and dilution are accounted for and generally offset each other; additional ore loss was considered on isolated blocks; variable metallurgical recoveries (average LOM recoveries of 88.5% for copper by concentration, 70.4% for molybdenum by concentration, and 13.3% for copper by leaching); average copper recoveries of 97.1% for smelting and 99.9% for refining; variable mining costs of $2.65–$4.11/t-mined; average process costs of $11.26/t-processed for concentration material, and $2.11/t for leach material; average smelting and refining cost of $0.21/lb Cu; selling costs of $0.001/lb Cu for concentration process, $1.83/lb Mo for concentration process, and $-0.005/lb Cu for leaching process; and 1% NSR royalty applied to Cu and Mo.

(3) The point of reference for the leach in process mineral reserves is in place on the leach dumps therefore no cut-off applies. The 4.3% copper recovery of leach in process material includes an allowance of 60% of leachable material that will be exposed to irrigation on the leach dumps and will be processed by SX/EW.

(4) The copper grade in the leach process represents the estimated remaining grade of material that has been loaded on the leach dumps and material that has been leaching for a period of time.

(5) No estimates for molybdenum are reported for leach material as this element cannot currently be recovered using the leach process envisaged.

(6) Numbers have been rounded. Totals may not sum due to rounding.

13.0 MINING METHODS

13.1 Introduction

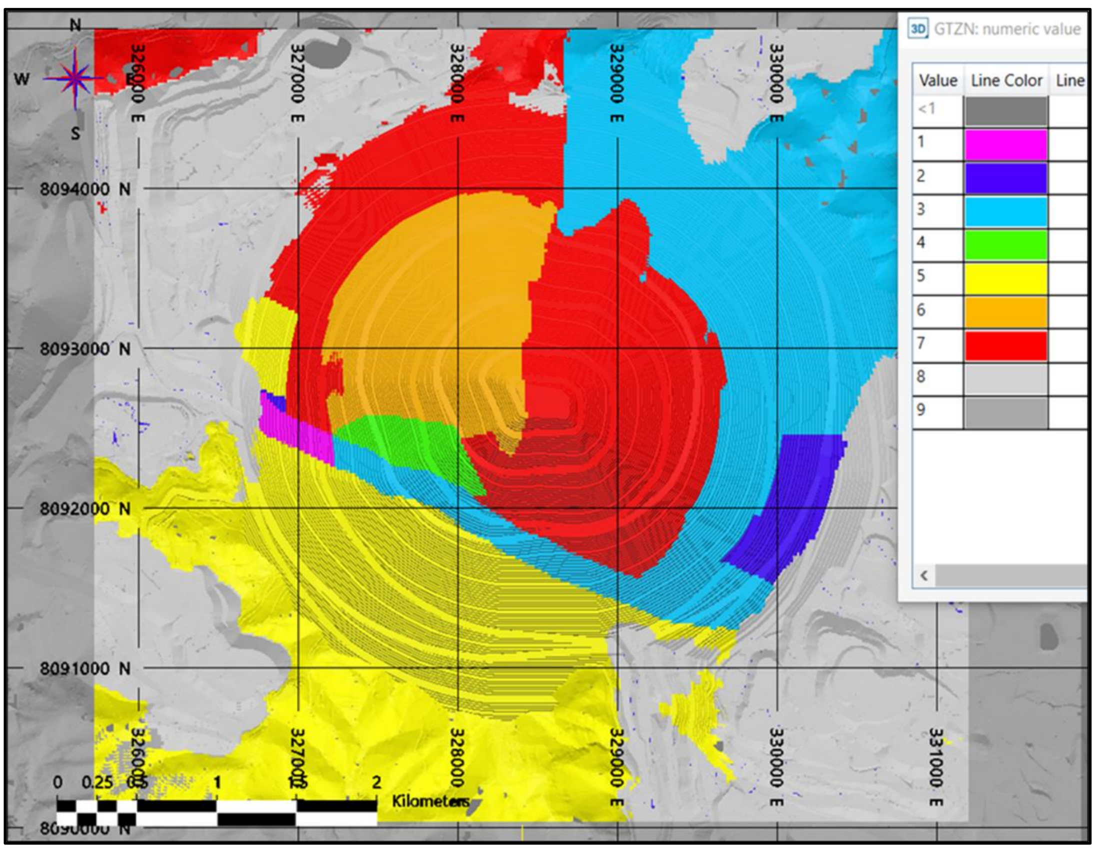
The Toquepala Operations use conventional truck-and-shovel open pit mining methods.

13.2 Geotechnical Considerations

Geotechnical criteria used in the pit design were based on guidance provided by Itasca/Piteau (2017). The geotechnical zones in relation to the pit outline are shown in Figure 13-1, and the pit slopes used in mine design are included in Table 13-1.

The fill material parameters were used by default for all blocks with an undefined GTZN code.

Figure 13-1: Geotechnical Zones Projected to Final Pit Design Surface



Source: Wood, 2024

Table 13-1: Pit Slope Design Criteria by Geotechnical Zone

Zone	GTZN Code	Bench Height (m)	Bench Face Angle (degree)	Inter-Ramp Angle (degree)	Catch Berm Width (m)	Maximum Inter-Ramp Height (m)
MS	1	15	65	36	13.7	150
SE, VIII	2	15	65	37	12.9	150
DS, ES, M, IV, VII	3	15	65	38	12.2	150
II	4	15	65	42	9.7	150
III	5	15	65	43	9.1	150
V	6	15	65	44	8.5	150
I, VI	7	15	65	45	8.0	150
Fill	8	15	38	32	4.8	90
Undefined	9	15	38	32	4.8	90

13.3 Hydrogeological Considerations

The groundwater flow at the Toquepala mine pit is generally associated with areas of higher permeability, which in many cases function as drains (faults, contacts, fractures, stratification, etc.) in a low permeability medium. Recharge of the hydrogeological system (aquifer) originates from precipitation on the western edge of the Western Cordillera, which generates regional recharge, and groundwater flows preferentially towards the southwest. Precipitation and evaporation records indicate that evaporation (evapotranspiration) is greater than precipitation, so local recharge is null. For the Toquepala mine area, it is estimated that the inflow of underground flow (recharge) comes from the northeast part, as lateral groundwater flow of the hydrogeological system.

Records from six multilevel vibrating wire piezometers, five located to the northwest of the pit (pit edge) and one located in the northeast part (inside the pit), show that the water levels are relatively stable. Piezometric levels between the three aquifer units show the same trends and minimal differences, suggesting that the units respond as a single aquifer. Based on the piezometric interpretation, the elevation contours show a gradual water level decline in response to the annual mining advance (preferential discharge to the pit). The number of water level observation points should be increased to verify the current interpreted elevation contours, as a more detailed interpretation is needed as mining progresses. Water outcrops occur when the topography level is close to the piezometric level, which generates the outflow of groundwater to the surface as small seepages through the slope walls. Due to deepening of the mine pit, discharge is generated at the bottom of the pit (pit lake) by pressure release (approximately 12 L/s), which is captured through a sump and used for dust suppression. The sump pump can extract up to 120 L/s, to allow for excess water capture in case of rainfall accumulation. The discharge mechanism for the flows generated by seepage in the walls is through sub-horizontal drains installed at the bottom of the pit, with the aim of reducing pore pressures in the pit walls. Flow readings from the sub-horizontal drains are quite low (less than 1 L/s).

13.4 Operations

13.4.1 Pit Phases

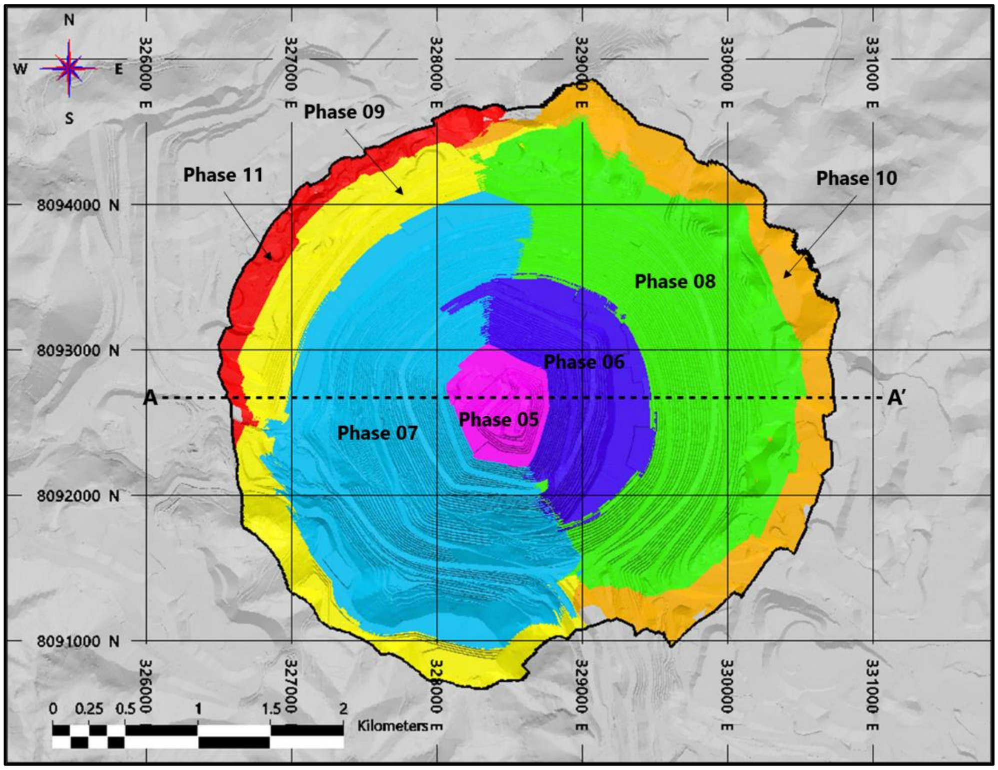
The open pit mine has a circular conical shape with a diameter of approximately 3 km. The 2024 year-end forecasted topography shows the highest elevation of the pit walls is located on the northeast wall at 3,665 masl, and the bottom of the pit is at 2,650 masl. The maximum depth of the final pit will be at 2,170 masl.

Seven pit phases remain in the LOM plan, starting with phase 5 and ending with phase 11. The remaining mine life is 41.2 years. The parameters used in the phase designs are summarized in Table 13-2. The final pit is shown by phase in Figure 13-2 and in cross-section view in Figure 13-3.

Table 13-2: Pit Design Criteria Summary

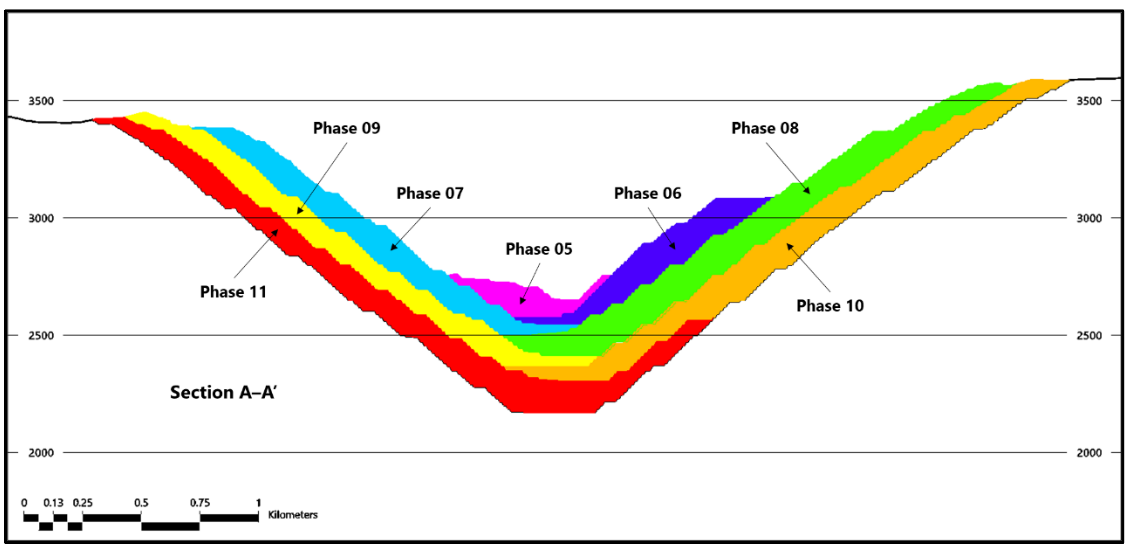
Design Criteria	Unit	Value
Bench height	m	15
Minimum mining width	m	100
Ramp width	m	40
Ramp gradient	%	8
Geotechnical berm width	m	20
Bench face angle	degree	See Table 13-1
Inter-ramp angle	degree	See Table 13-1
Catch berm width	m	See Table 13-1
Inter-ramp height	m	See Table 13-1

Figure 13-2: LOM Pit Phases (Plan View)



Source: Wood, 2024

Figure 13-3: LOM Pit Phases (Section View)



Source: Wood, 2024

13.4.2 Throughput

The mine plan assumes a maximum mining capacity of 371 Mt of annual movement and a nominal processing rate of 120 kt/d of sulfide material at the concentrator facility and 140 kt/d of leach material at the leach facility.

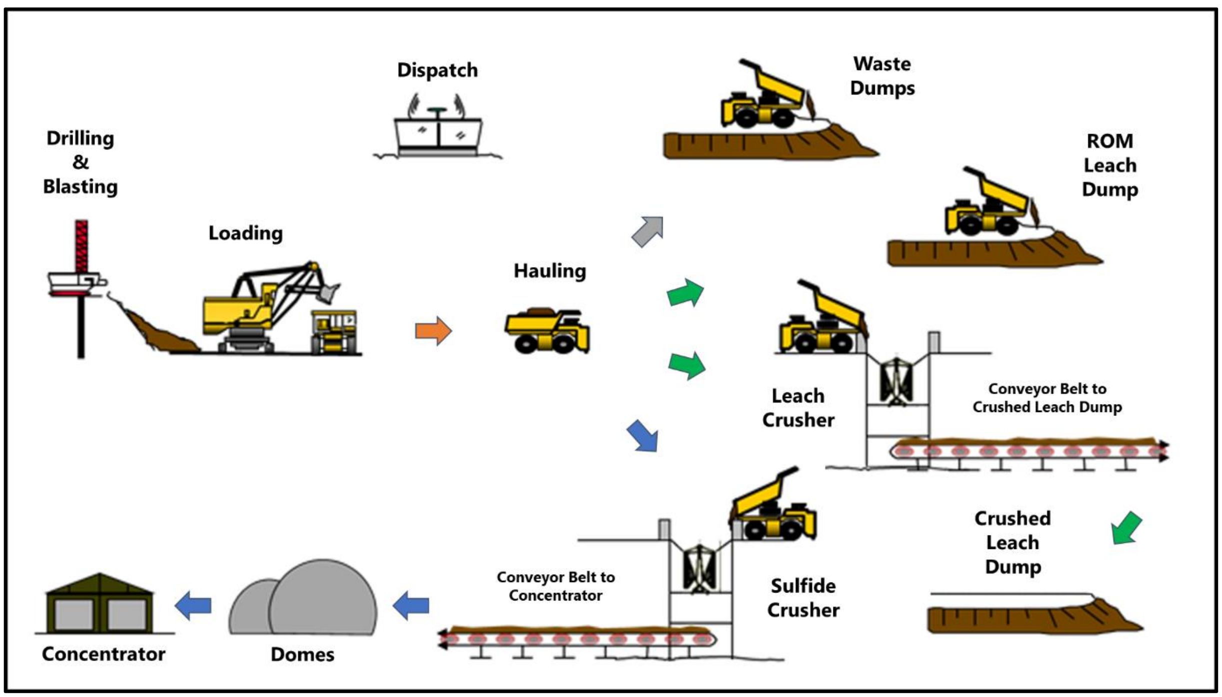
13.4.3 Operations

The mining operations are shown in the flow diagram in Figure 13-4.

Mining is conducted using two 12-hour shifts. The mining operations can be summarized as:

- Initial drilling and blasting
- Loading, using shovels, of the blasted material into haul trucks
- Transport of ore and waste, depending on destination to WRSFs, ROM leach dump, leach crusher, and sulfide crusher.

Figure 13-4: Mine Operation Flow Diagram



Source: Wood, 2024

The sulfide crusher is located at elevation 3,260 masl in the southern zone of the pit. Crushed sulfide material is transported using a 2.0 km long conveyor belt to the west through a tunnel to the concentrator plant. The sulfide crusher throughput has a nominal 120 kt/d.

Material destined for the leach dumps can be sent either directly to the ROM leach dump, or to the leach crusher that will be relocated in front of the sulfide crusher at level 3,260 masl beginning in 2025 and is expected to be fully operational by the beginning of 2027. Crushed leach material is conveyed via a 6.5 km long conveyor to the crushed leach dump. The leach crusher has a nominal capacity of 140 kt/d, and the conveyor has a transport capacity of 8,350 t/h.

13.4.4 Production Plan

The LOM plan assumes that all material processed by concentration goes to the sulfide crusher. Material that will be processed by dump leaching goes primarily to the leach crusher with the remaining material sent to the ROM leach dump. The point of transfer from mining to processing is at the point of the conveyors or delivery to the ROM leach dump. While the crusher is being relocated, material will be sent directly to the ROM leach dump.

Two to three pit phases will be operational at any one time to ensure that production rates can be met. A maximum mining capacity per phase of 280 Mt/a is assumed, with a maximum vertical advance rate of 11 benches per year. The mine plan assumes:

- 2025: phases 5 and 6 are in the production stage, and phase 7 is undergoing stripping.
- 2027: phase 8 will commence stripping, and phases 6 and 7 will be in production.
- 2033: phase 9 will commence stripping, and phases 7 and 8 will be in production.
- 2039: phase 10 will commence stripping, and phases 8 and 9 will be in production.
- 2040: phase 11 will commence stripping, phase 10 will continue stripping, and phases 8 and 9 will be in production.
- 2046: phase 11 will continue stripping, phases 9 and 10 will be in production.
- 2050: phase 11 will commence production.

Three WRSFs will be used:

- The north WRSF will be used from 2026 to 2066 and will receive material mainly from phases 9, 10, and 11.
- The southeast WRSF will be used from 2025 to 2042 and will receive material mainly from phases 6, 7, and 8.

- The south WRSF will be used from 2025 to 2047 and will receive material mainly from phases 7, 8, and 9.

The material movement envisaged in the LOM plan is provided in Figure 13-5.

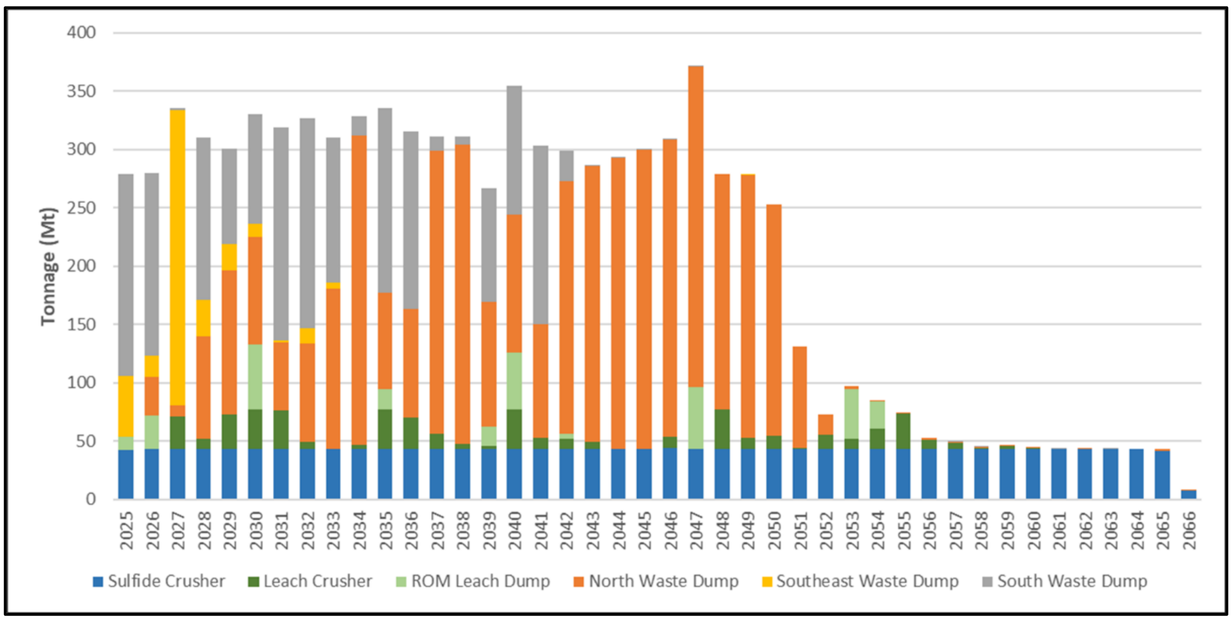
Figure 13-6 shows that the mine plan is expected to maintain a constant feed of approximately 42.9 Mt/a to the sulfide crusher for most of the LOM. The average copper grades are expected vary from 0.3–0.8%.

The leach crusher will operate at a maximum effective capacity of 34.5 Mt/a (Figure 13-7). The average copper grades are consistently around 0.2%.

Table 13-3 and Table 13-4 show the material movement on an annualized basis.

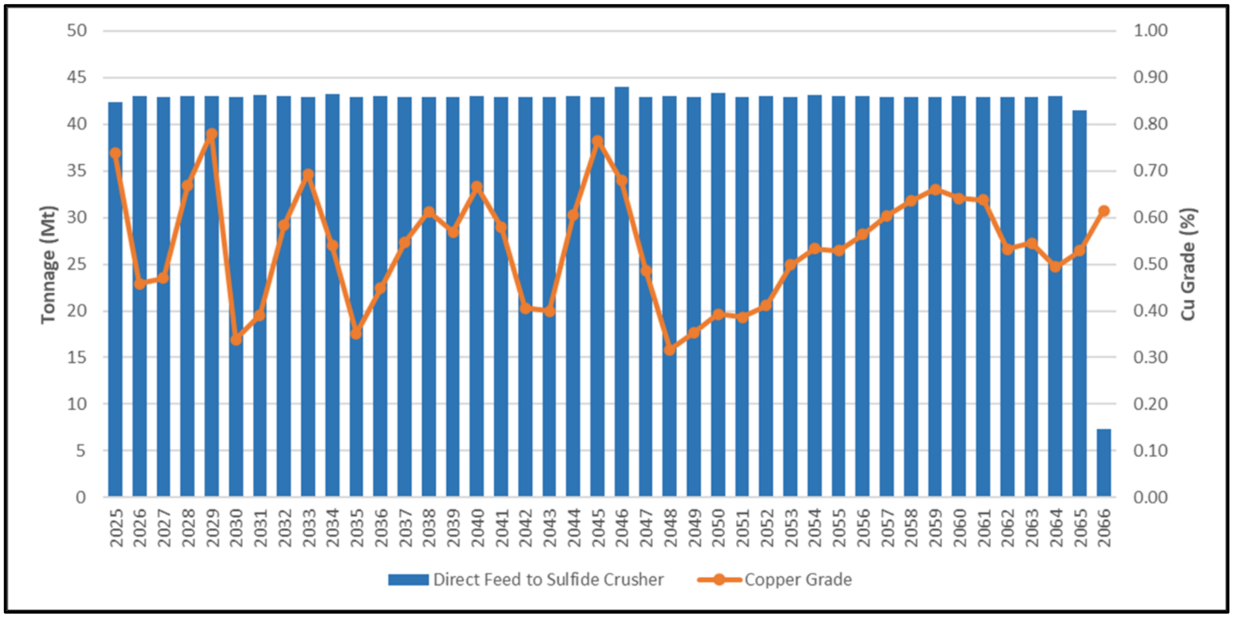
The final LOM pit layout plan is provided in Figure 13-8.

Figure 13-5: LOM Material Movement by Destinations



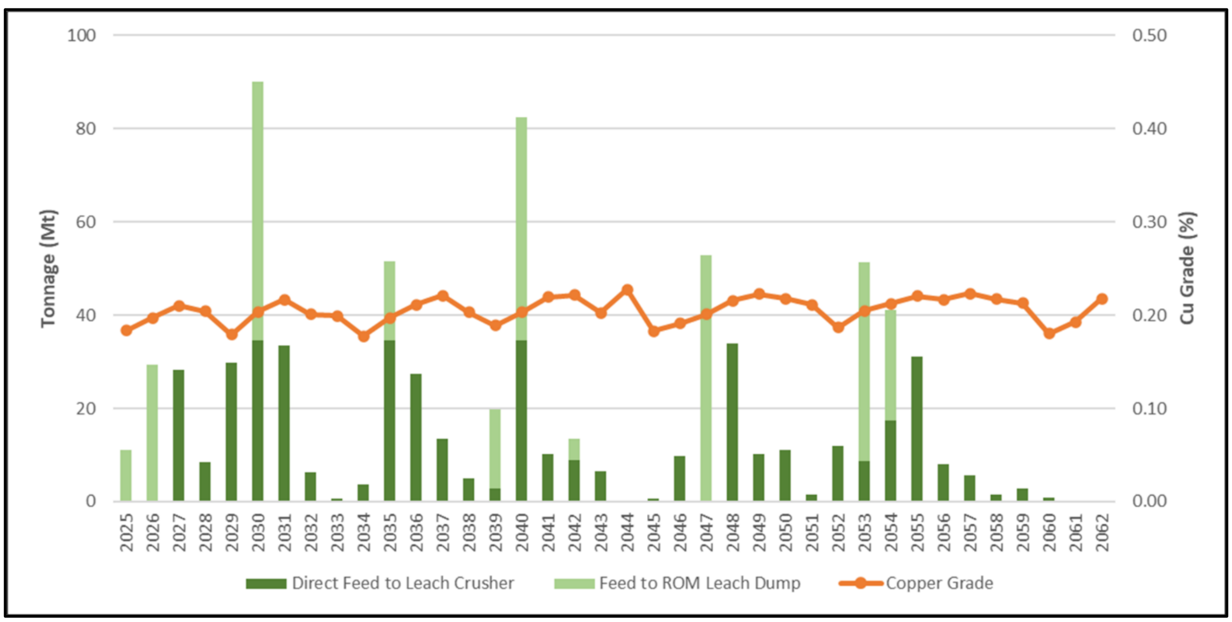
Source: Wood, 2024

Figure 13-6: LOM Feed to Sulfide Crusher



Source: Wood, 2024

Figure 13-7: LOM Feed to Leach Crusher and ROM Leach Dump



Source: Wood, 2024

Table 13-3: LOM Material Movement Plan (Sulfide and Leach Material)

	Sulfide Material					Leach Material					
	Sulfide Crusher					Leach Crusher			ROM Leach Dump		
		Grade		Recovery							
Year	Tonnage (Mt)	Cu (%)	Mo (%)	Cu (%)	Mo (%)	Tonnage (Mt)	Cu Grade (%)	Cu Recovery (%)	Tonnage (Mt)	Cu Grade (%)	Cu Recovery (%)
2025	42.4	0.74	0.051	90.0	70.4	-	-	-	11.0	0.18	15.7
2026	43.0	0.46	0.037	87.8	72.8	-	-	-	29.3	0.20	15.3
2027	42.9	0.47	0.011	87.8	58.3	28.3	0.21	15.2	-	-	-
2028	43.0	0.67	0.021	89.1	61.9	8.5	0.20	15.9	-	-	-
2029	43.0	0.78	0.045	90.8	67.4	29.7	0.18	16.8	-	-	-
2030	42.9	0.34	0.009	85.8	65.2	34.5	0.20	17.2	55.5	0.20	16.8
2031	43.1	0.39	0.010	86.3	58.3	33.5	0.22	18.1	-	-	-
2032	43.0	0.58	0.022	88.1	63.6	6.3	0.20	19.3	-	-	-
2033	42.9	0.69	0.040	89.0	68.5	0.6	0.20	15.5	-	-	-
2034	43.3	0.54	0.067	88.5	76.3	3.8	0.18	15.8	-	-	-
2035	42.9	0.35	0.011	86.4	65.0	34.5	0.20	15.6	17.0	0.20	15.5
2036	43.0	0.45	0.011	87.7	58.8	27.4	0.21	15.4	-	-	-
2037	42.9	0.55	0.018	88.8	64.0	13.6	0.22	15.9	-	-	-
2038	42.9	0.61	0.023	89.1	64.7	4.9	0.20	16.4	-	-	-
2039	42.9	0.57	0.022	88.6	65.5	2.9	0.19	15.1	16.8	0.19	15.8
2040	43.0	0.67	0.039	89.3	68.7	34.5	0.20	16.0	47.9	0.20	16.0
2041	42.9	0.58	0.054	89.6	73.2	10.2	0.22	16.7	-	-	-
2042	42.9	0.41	0.041	87.3	74.0	8.8	0.22	17.3	4.6	0.23	16.2
2043	42.9	0.40	0.008	86.6	56.8	6.4	0.20	18.9	-	-	-
2044	43.0	0.61	0.020	88.7	61.7	0.1	0.23	17.5	-	-	-
2045	42.9	0.76	0.031	89.6	65.5	0.6	0.18	15.3	-	-	-

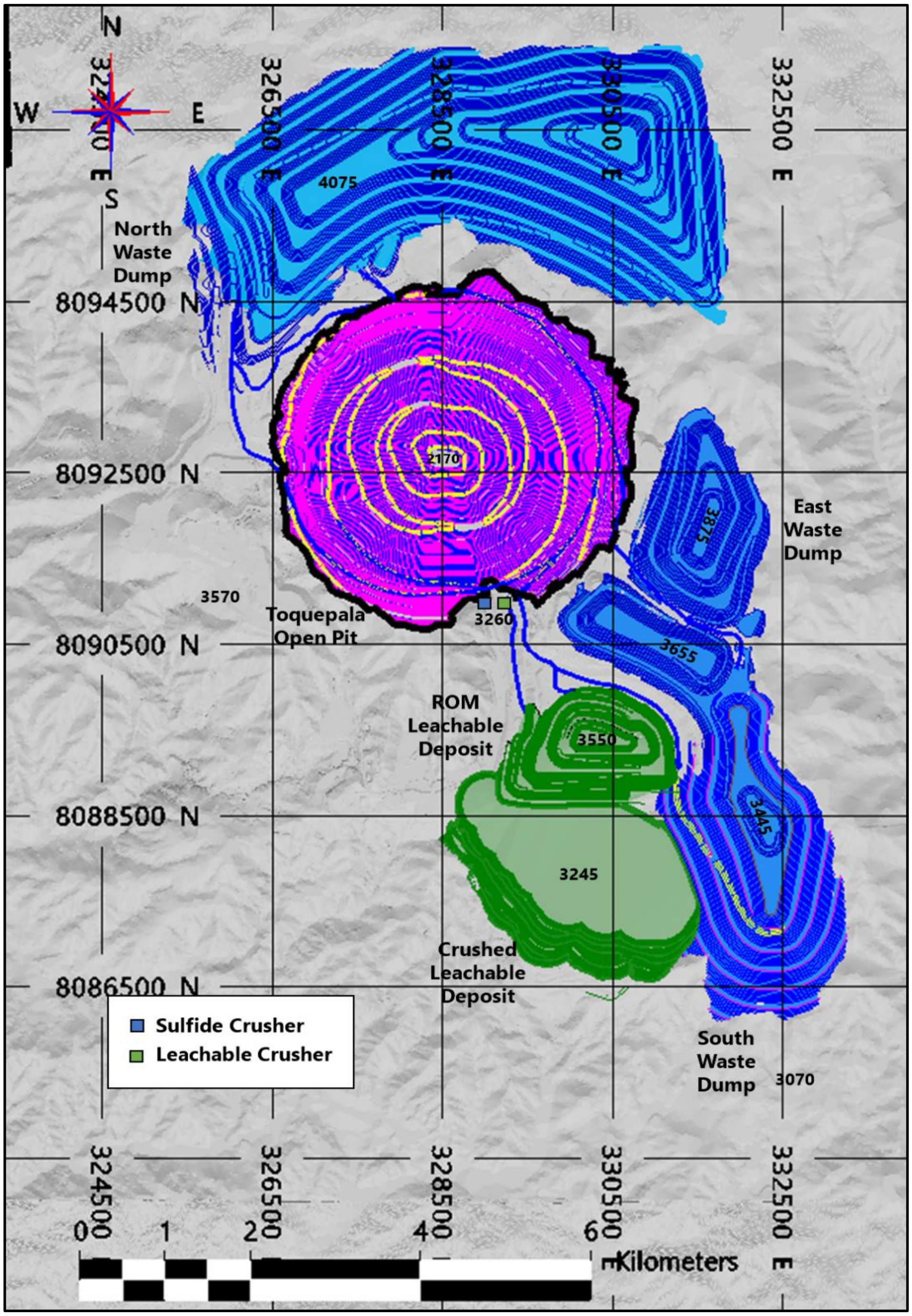
Year	Sulfide Material					Leach Material					
	Sulfide Crusher					Leach Crusher			ROM Leach Dump		
		Grade		Recovery							
	Tonnage (Mt)	Cu (%)	Mo (%)	Cu (%)	Mo (%)	Tonnage (Mt)	Cu Grade (%)	Cu Recovery (%)	Tonnage (Mt)	Cu Grade (%)	Cu Recovery (%)
2046	44.0	0.68	0.061	89.3	73.8	9.7	0.19	14.9	-	-	-
2047	42.9	0.49	0.069	88.0	76.7	-	-	-	52.9	0.20	16.1
2048	43.0	0.32	0.007	85.7	61.4	33.9	0.22	16.1	-	-	-
2049	42.9	0.35	0.013	86.3	65.0	10.1	0.22	16.2	-	-	-
2050	43.4	0.39	0.012	86.7	61.6	11.2	0.22	15.6	-	-	-
2051	42.9	0.39	0.009	87.1	58.8	1.4	0.21	15.3	-	-	-
2052	43.0	0.41	0.013	87.2	63.3	11.9	0.19	15.6	-	-	-
2053	42.9	0.50	0.023	88.1	66.3	8.7	0.22	15.1	42.5	0.20	15.2
2054	43.1	0.53	0.030	88.4	68.7	17.4	0.21	16.2	23.7	0.22	15.7
2055	43.0	0.53	0.032	88.3	69.4	31.1	0.22	15.0	-	-	-
2056	43.0	0.56	0.018	88.7	61.3	8.0	0.22	15.0	-	-	-
2057	42.9	0.60	0.035	88.7	68.6	5.7	0.22	14.7	-	-	-
2058	42.9	0.64	0.040	88.9	69.5	1.4	0.22	16.1	-	-	-
2059	42.9	0.66	0.049	89.1	71.2	2.9	0.21	15.3	-	-	-
2060	43.0	0.64	0.058	89.3	72.7	0.8	0.18	14.8	-	-	-
2061	42.9	0.64	0.072	89.2	74.2	0.2	0.19	14.8	-	-	-
2062	42.9	0.53	0.066	88.7	74.6	0.1	0.22	16.6	-	-	-
2063	42.9	0.55	0.074	88.7	75.0	-	-	-	0.6	0.21	15.3
2064	43.0	0.49	0.057	88.3	73.9	-	-	-	-	-	-
2065	41.4	0.53	0.047	88.5	72.3	-	-	-	-	-	-
2066	7.3	0.61	0.050	89.1	72.5	-	-	-	-	-	-
Total/Average	**1,768.8**	**0.54**	**0.034**	**88.5**	**70.4**	**443.7**	**0.21**	**16.1**	**302.0**	**0.20**	**15.9**

Table 13-4: LOM Material Movement Plan (Waste and LOM Total)

Year	Waste Material by WRSF			All Materials Grand Total Tonnage (Mt)
	North Waste Dump Tonnage (Mt)	Southeast Waste Dump Tonnage (Mt)	South Waste Dump Tonnage (Mt)	
2025	-	52.8	172.7	278.9
2026	32.9	18.1	156.6	279.9
2027	9.3	253.5	1.8	335.9
2028	88.2	31.3	139.1	310.1
2029	123.8	22.3	81.5	300.3
2030	92.5	10.8	93.9	330.1
2031	57.8	2.1	182.6	319.2
2032	84.7	12.9	179.7	326.7
2033	136.9	5.2	124.7	310.4
2034	265.4	-	15.9	328.3
2035	83.1	-	157.7	335.3
2036	93.1	-	151.8	315.4
2037	242.9	-	12.0	311.4
2038	256.7	-	6.8	311.3
2039	106.7	-	97.7	267.0
2040	118.9	-	110.4	354.8
2041	96.8	-	153.6	303.4
2042	216.6	-	25.7	298.8
2043	236.8	-	1.0	287.1
2044	249.7	-	-	292.9
2045	256.5	-	-	300.0
2046	254.8	-	-	308.6
2047	275.1	-	-	371.0
2048	201.8	-	-	278.7
2049	225.0	-	-	278.0
2050	198.6	-	-	253.1

Year	Waste Material by WRSF North Waste Dump Tonnage (Mt)	Waste Material by WRSF Southeast Waste Dump Tonnage (Mt)	Waste Material by WRSF South Waste Dump Tonnage (Mt)	All Materials Grand Total Tonnage (Mt)
2051	87.0	-	-	131.4
2052	18.0	-	-	73.0
2053	2.7	-	-	96.9
2054	1.0	-	-	85.3
2055	0.7	-	-	74.8
2056	1.3	-	-	52.4
2057	0.8	-	-	49.5
2058	0.3	-	-	44.7
2059	0.6	-	-	46.4
2060	0.9	-	-	44.7
2061	0.3	-	-	43.4
2062	0.0	-	-	43.0
2063	0.0	-	-	43.6
2064	0.0	-	-	43.0
2065	1.5	-	-	42.9
2066	0.2	-	-	7.5
Total	**4,120.1**	**409.1**	**1,865.2**	**8,908.8**

Figure 13-8: LOM Layout Plan



Source: Wood, 2024

Note: The figure shows the relocated leachable crusher.
"Leachable Deposit" = "Heap Leach Dump"

13.5 Equipment

Production drilling (27–31 cm diameter) is carried out using electrical equipment for production drilling, and pre-split drilling (12.7 cm diameter) uses diesel equipment.

For blasting, Quantex explosive and electronic detonators are used in all blasts. Drills are relocated as needed, and for longer distances can be transported using a lowboy.

Electric shovels (bucket capacities from 43–57 m^3) and front-end loaders are used to load haul trucks. The shovels are primarily used for the mining of final slopes, production, and ramps. The front-end loaders are generally used in narrower zones, in pioneering pit phases, and for auxiliary work.

Haul trucks vary in capacity, from 218–363 tonnes, and are used to transport material to the different end destinations, such as the WRSFs, ROM leach dump, leach crusher, and sulfide crusher.

Track (crawler) dozers are used for ramp construction and pioneer phases, provide support to front-end loaders, and are used for WRSF maintenance. Wheel dozers are used primarily for road maintenance, in conjunction with motor graders. Water trucks are used for dust control. An excavator fleet is employed in slope profiling, mining of crests and narrow areas, pioneering phases, and reconfiguration of the WRSFs.

Peak requirements by machinery type are summarized in Table 13-5.

13.6 Personnel

Peak personnel numbers are estimated at 908 employees including technical, management, operational, and maintenance personnel.

Table 13-5: LOM Peak Equipment Requirements

Area	Equipment Type	Peak
Drilling	BUC 49HR – electric drill	1
	P&H 320XPC – electric drill	14
	CAT MD6640 – electric drill	2
	SVK DR580 – diesel drill	1
	SVK DI650i – diesel drill	5
Loading	BUC 495HR – electric shovel	1
	P&H 4100A – electric shovel	2
	P&H 4100XPC – electric shovel	7
	LTU 1850 – front-end loader	1
	LTU 2350 – front-end loader	2
Hauling	CAT 793D – truck	13
	CAT 794AC – electric truck	4
	CAT 797F – truck	31
	KOM 930E-4 – electric truck	3
	KOM 930E-4SE – electric truck	2
	KOM 980E-4 – electric truck	12
	KOM 980E-4 – electric truck	153
Support	CAT D11T – crawler dozer	14
	CAT 834 – wheel dozer	15
	KOM WD600 – wheel dozer	2
	CAT 24M – motor grader	6
	CAT 777F – water truck	1
	CAT 785C – water truck	1
	KOM HD1500 – water truck	5
	CAT 374 – excavator	3
	KOM PC800LC – excavator	2

14.0 PROCESSING RECOVERY METHODS

14.1 Process Method Selection

The process designs were based on existing technologies and proven equipment. The process plants are installed and are operating and have a multi-decade operating history.

The Toquepala LESDE plant was designed to treat low-grade sulfides from the Toquepala mine which are uneconomical to be treated in the concentrators. The material is deposited in dumps and a portion of the contained copper is recovered by conventional dump leaching and SX/EW.

Toquepala Concentrators No. 1 (C1) and No. 2 (C2) are designed to treat sulfide material and produce copper and molybdenum concentrates.

The copper concentrates produced are treated at the Ilo smelter and refinery to produce copper cathodes as the final product.

14.2 Flowsheets

Summary flowsheets for the heap leach operation and C1 and C2 are provided in Figure 14-1, Figure 14-2, and Figure 14-3, respectively.

14.3 Heap Leach and Solvent Extraction–Electrowinning Circuit

14.3.1 Overview

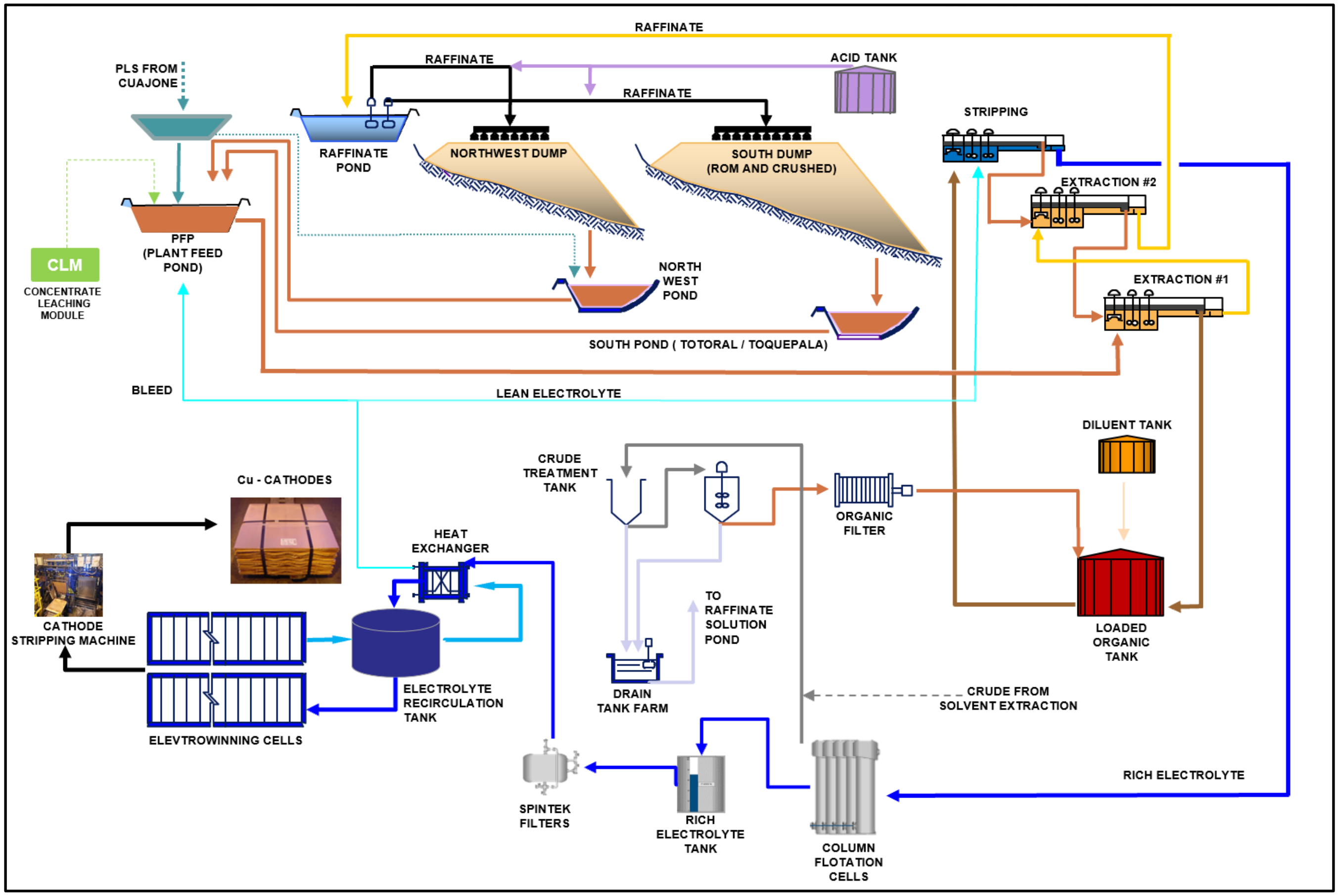
The LESDE plant has a current annual production of 24,115 t of cathode copper, and includes conventional processes used for the recovery of copper such as acidic leaching of low-grade material, SX and EW facilities.

Copper is recovered from three sources:

- Loaded pregnant leach solution (PLS) coming from the oxide leaching plant located at the Cuajone mine, approximately 30 km north of Toquepala
- Low-grade heap leach dumps at the Toquepala mine
- The PLS obtained from the concentrate leaching module (CLM) goes to the plant feed pound.

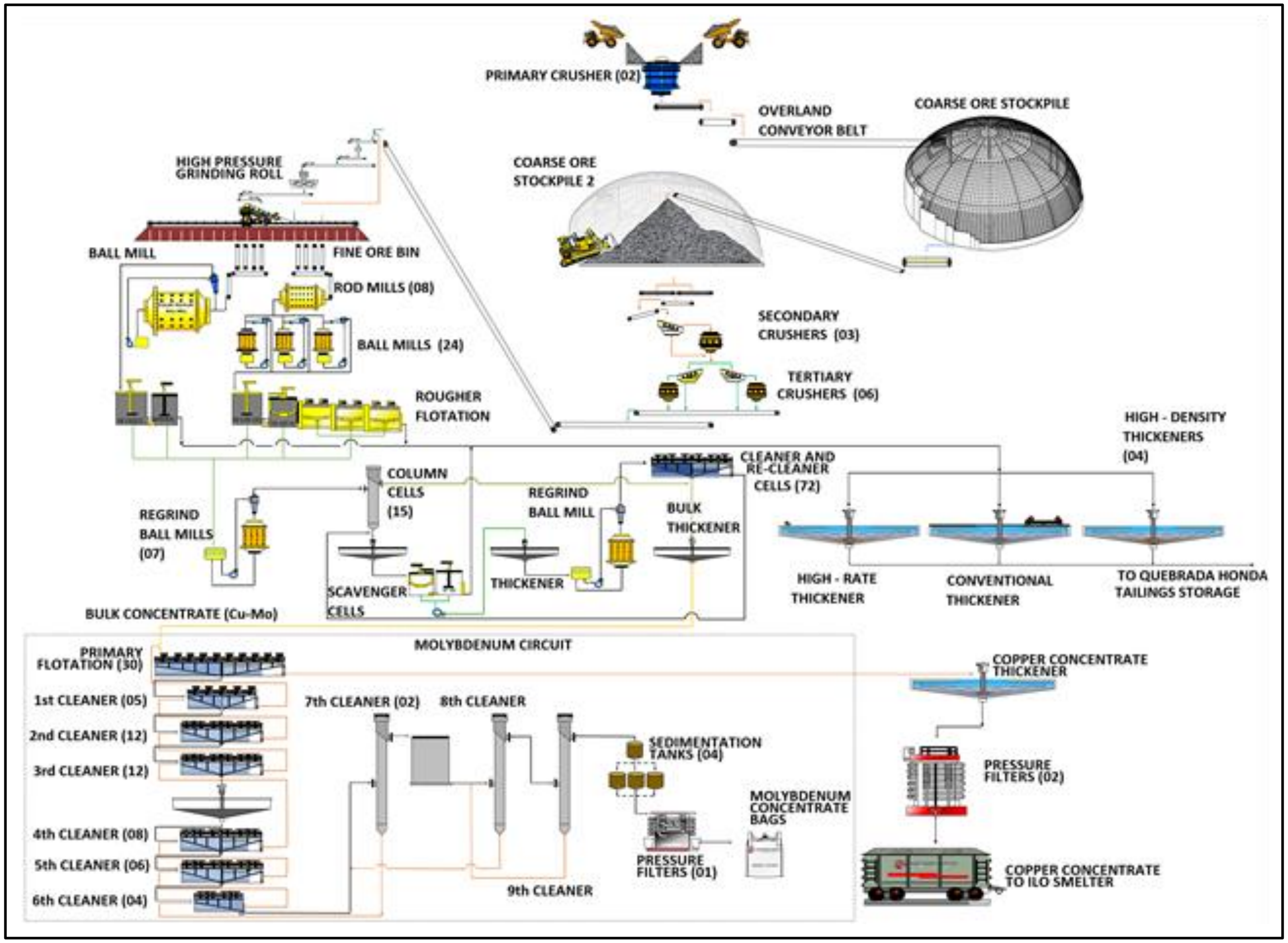
The sulfuric acid required in the LESDE plant is produced by acid plants located at the Ilo smelter.

Figure 14-1: Toquepala Summary Flowsheet Leaching–SX/EW Plant



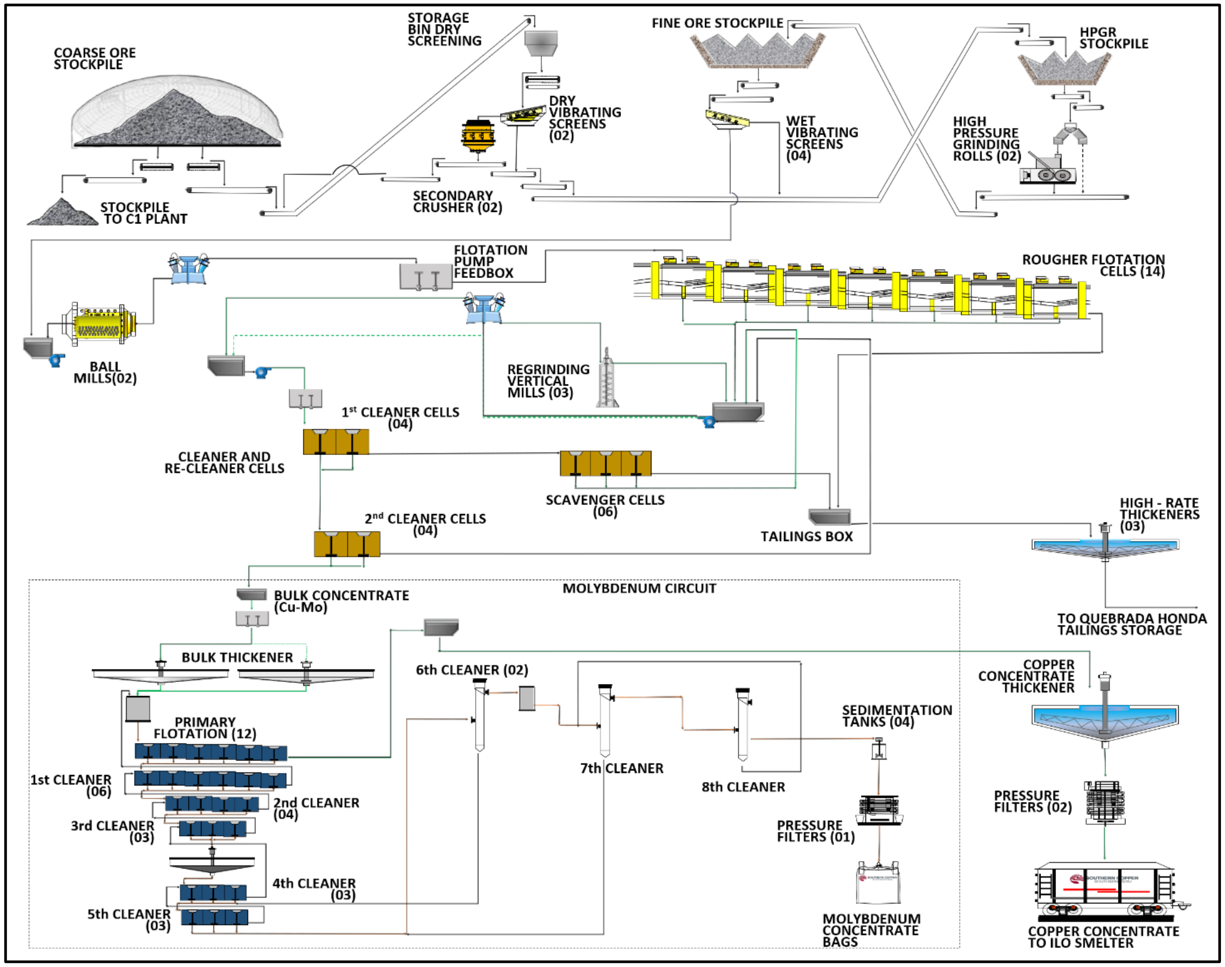
Source: Southern Copper, 2024

Figure 14-2: Summary Flowsheet Toquepala Concentrator No. 1



Source: Southern Copper, 2021

Figure 14-3: Summary Flowsheet Toquepala Concentrator No. 2



Source: Southern Copper, 2021

14.3.2 Sulfide Leaching

The heap leach facilities are situated to the south and northwest of the Toquepala open pit, are >100 m in height and have widely variable granulometry.

A network of pipes distributes irrigation solutions via a series of leaching strips (irrigation areas). Through these irrigation lines the material is first conditioned with a sulfuric acid solution before being irrigated with raffinate solution. Sulfides are leached through prolonged irrigation periods that include resting periods to promote oxidation of sulfide copper minerals.

Periodically, the leach dump is ripped to improve air circulation to promote bacteria that oxidize the iron and sulfur from the low-grade sulfides. Ripping also facilitates a more efficient percolation of the irrigation solution from the surface of the leach dump into the interior of the heap.

Raffinate flows by gravity through the ore dissolving the copper to obtain a PLS. The PLS is collected in collection ponds located in the lower part of the leaching dumps and pumped to the SX stage. During the 2024 operating year, the PLS produced from leaching had a copper content of 0.66 g/L of copper in solution.

14.3.3 Solvent Extraction

At the SX circuit, the PLS generated is purified and the copper content is concentrated to obtain a rich electrolyte.

The SX circuit is a counter-current extraction of copper from the PLS to an organic solution, and then to an electrolyte solution for electrowinning. This rich electrolyte solution is sent to a tank farm area where the rich electrolyte is further purified by flotation and filtration to remove fine solids and trapped organic reagent. After purification, the electrolyte is heated through heat exchangers and then sent to the EW circuit.

The SX circuit at Toquepala consists of nine conventional mixer-settler tanks divided in three trains operating in parallel. Each train, named A, B and C has two extraction tanks (2E) and one re-extraction or stripping tank (1S). In the first two mixer-settlers of each train (2E) the PLS is mixed with a copper-free organic solution or stripped organic. The organic solution selectively captures the copper ions from the PLS solution leaving the other undesirable ions (impurities) in the aqueous solution. The aqueous solution, or raffinate, has a very low copper concentration and is then acidified and returned to the Toquepala leach dumps.

The copper-loaded organic advances to the stripping stage where it is mixed with a spent electrolyte coming from the EW circuit. At the stripping stage, due to a high concentration of acid in the spent electrolyte, the copper loaded in the organic phase is discharged back to the electrolyte solution forming a copper-loaded rich electrolyte. After purification at the tank farm, the rich electrolyte advances to the EW circuit, whereas the stripped organic returns to the extraction stage.

14.3.4 Electrowinning

In the EW circuit, the copper contained in the rich electrolyte solution is plated onto stainless steel cathode blanks by action of direct current. Copper cathodes with a purity of 99.999% are stripped off the blanks and sold as a final product. The spent electrolyte is returned to the stripping stage at the SX circuit.

The EW operations at Toquepala consist of two tank houses. At the North tank house, the EW process is performed in 122 polymer concrete cells, each cell containing 62 cathodes and 63 anodes. The South tank house hosts 40 cells, each cell containing 64 anodes and 63 cathodes. The South tank house has not been operational since 2005.

The electrolyte enters each cell from the bottom through a perforated PVC pipe that evenly distributes the rich electrolyte in each cell. By action of the applied direct current the copper is plated on the stainless-steel cathodes. The electrolyte overflows from the cells with a lower concentration of copper and is pumped back to the SX circuit as spent electrolyte. The stainless-steel plates remain submerged for a controlled period of time until an adequate copper cathode weight is achieved. The cathodes are removed from the EW cells by using an overhead crane and sent to the cathode stripping machine.

The copper deposited on the stainless-steel sheets is delaminated using a cathode stripping machine. The copper sheets or cathodes pass through a corrugating press, depending on the customer's requirements, forming bundles of no more than 2,500 kg. The stainless-steel sheets return to the cells for the next cycle of electrowinning. The copper bundles are manually secured with steel strapping and taken by forklift to railway platforms for shipment to the Port of Ilo where the bundles are routed to either domestic or international destinations.

14.3.5 Equipment Sizing

A summary of the equipment requirements for the heap leach and SX/EW facility is included in Table 14-1.

Table 14-1: Toquepala LESDE Plant Major Process Equipment

Function	Description	Quantity
Raffinate pumping	400 HP pumps	2
	800 HP pumps	4
	1500 HP pumps	3
PLS pumping	800 HP pumps	5
	1500 HP pumps	9
	1750 HP pumps	6
	2000 HP pumps	1
Extraction/stripping	Mixer-settler tanks, HDPE/concrete, 25 HP mixers	9
Organic pumping	125 HP pumps	4
Electrolyte pumping	125 HP pumps	10
Crud removal	Centrifuge	1
Electrolyte filtration	Filters, 30 m^3 capacity, each	5
Electrolyte heating	Heat exchangers	6
Copper electrowinning (North tank house)	Rectifiers, 23,000 A, each	2
	Electrolytic cells, 62 cathodes, 63 anodes	122
Cathodes stripping machine	450 cathodes/hour	1

14.3.6 Power and Consumables

14.3.6.1 Power

Power consumption over the LOM is based on copper production, and is expected to decrease as the copper production decreases. There is sufficient power capacity available to support the LOM plan.

14.3.6.2 Water

The Toquepala Operations use surface and underground water from a variety of sources as fresh make up water. All sources discharge into the Pampa de Vaca reservoir from where fresh water is supplied to the various process plants.

In the LESDE plant, fresh water is required mainly for the replacement of losses due to evaporation and wetting of dry leachable material.

Water supplies are expected to be sufficient for the purposes of the LOM plan.

14.3.6.3 Consumables

The primary consumables in the LESDE plant include sulfuric acid, diluent, extractant, cobalt sulfate and grain refining.

The LOM plan envisages that the same consumables will be used for the duration of the LOM plan.

14.3.7 Personnel

Personnel numbers include 57 multifunctional operators and 14 staff employees, employed in operations, technical services and maintenance.

14.4 Sulfide Process Plant

14.4.1 Overview

The Toquepala Concentrator No. 1 (C1) started operations in 1959 and was initially designed to process 32,660 t/d of ore. Since then, many changes and upgrades have been made to increase the processing capacity, and the current capacity is 60,000 t/d.

The Toquepala Concentrator No. 2 (C2) started operations in November 2018, with a design capacity of 60,000 t/d.

The ore in both plants is treated in a conventional concentration circuit consisting of crushing, grinding and flotation of copper and molybdenum minerals. The copper concentrate is transported by rail to the Ilo Smelter for treatment and the molybdenum concentrate is bagged and sold as a final product.

14.4.2 Toquepala Concentrator No. 1

14.4.2.1 Primary Crushing

ROM material is received from the open pit by truck and unloaded onto two primary gyratory crushers (60 x 113 inch) located to the north of the open pit. Crushed material (nominal 80% passing size (P_{80}) of 140 mm) is then collected in a discharge box at the bottom of the crusher. An arrangement of two conveyors transports the crushed material for approximately 2,200 m to temporary storage in coarse ore stockpile No. 1 with a capacity of 141,000 t.

14.4.2.2 Secondary and Tertiary Crushing

Four apron feeders reclaim ore from beneath coarse ore stockpile No. 1, and the ore is transported to coarse ore stockpile No. 2 with a capacity of 60,000 t. Ore from stockpile No. 2 is delivered to three double-deck vibrating screens (two that are 7 x 14 ft and one that is 8 ft x 14 ft) via belt feeders. The oversize material feeds three MP-800 secondary cone crushers to generate a particle size product of minus 38 mm. Undersize material from the screens and the product of the crushers is then screened in six tertiary screens.

The coarse fraction from the tertiary screens is crushed in six conical tertiary crushers. The product from the crushers and the fine product from the tertiary screens are then transported to a high pressure grinding roll (HPGR) surge bin. The feed to the HPGR has a particle size average of 12–14 mm.

14.4.2.3 Quaternary Crushing

Fine material from the HPGR surge bin unloads onto a 2.4 x 1.65 m HPGR with an installed power of 5.3 MW. The HPGR product is conveyed to a fines hopper of 25,000 t of capacity. The HPGR produces material in the range of 8–10 mm.

14.4.2.4 Grinding

Grinding is performed in two parallel lines. The first line uses eight rod mills rated at 746 kW as the primary grinding stage, and 24 ball mills rated at 597 kW each as the secondary grinding stage. The second line uses a single stage 21 x 33.5 ft ball mill with an installed power of 7,085 kW working in closed circuit with cyclones. Product slurry from both lines is monitored by particle size analyzers and fed to the flotation stage with an average particle size of 200 µm.

14.4.2.5 Bulk Flotation

Primary bulk flotation is carried out in five flotation lines. Four lines consist of one cell of 130 m^3, one cell of 100 m^3 and six cells of 42.5 m^3. The fifth flotation line consists of two cells of 130 m^3 and four cells of 60 m^3. The primary bulk concentrate is then fed to seven 8 x 13 ft (260 kW) regrind ball mills working in closed circuit with cyclones.

The regrind product is fed to a bulk cleaning stage via two distributors. The south distributor distributes the concentrate to eight 8 x 40 ft conventional column cells, and the north distributor distributes the concentrate to seven 8 x 40 ft column cells. Concentrate from the cleaning flotation has a metal grade of 26.5% Cu and 1.0% Mo. Tails from the cleaning flotation are transferred to two intermediate thickeners (No.°1 and No.°2) to increase the solids contents and to condition the tails for a scavenger flotation stage.

Scavenger flotation is performed in three tank cells of 50 m^3 and one cell of 60 m^3. The scavenger concentrate is transferred to an intermediate thickener and then pumped to an 8 x 13 ft regrinding mill (260 kW). Re-grinded scavenger concentrate is fed to three re-cleaning flotation lines, each one with 24 cells of 1.13 m^3 capacity. Scavenger tails together with the rougher flotation tails make up the final tailings. Re-cleaning flotation tails are returned to the scavenger flotation stage.

Concentrate from the re-cleaning flotation joins the concentrate from the cleaning flotation to form the bulk copper–molybdenum concentrate. The bulk concentrate is the final product of the bulk flotation plant and is sent by gravity to the 140 ft diameter copper–molybdenum thickener.

14.4.2.6 Molybdenum Plant

The molybdenum plant processes the copper–molybdenum bulk concentrate in a rougher circuit and nine cleaner stages. The bulk concentrate is fed to the rougher circuit composed of 30 cells each with 2.83 m^3 capacity. Tails from the rougher stage is sent to the 30.5 m diameter copper concentrate thickener. Rougher concentrate is pumped to the 1st cleaner stage (5 x 2.83 m^3 cells), and the concentrate from the 1st cleaner is fed to the 2nd cleaner stage (12 x 40 ft^3 cells) together with the 3rd cleaner tails. Tails from the 1st cleaner return to the rougher flotation stage.

Concentrate from the 2nd cleaner together with the 4th cleaner stage tails are fed to the 3rd cleaner stage which consists of twelve 40 ft^3 cells. Concentrate from the 3rd cleaner, after passing through an intermediate thickener, is pumped to the 4th cleaner stage together with tails from the 5th cleaner stage. Concentrate from the 4th cleaner stage (eight 40 ft^3 cells) is pumped to the 5th cleaner stage that consist of six cells of 40 ft^3 and its concentrate is sent to the 6th cleaner stage (four 40 ft^3 cells). Concentrate from the 6th cleaner stage feeds the 7th cleaner stage and the tails return to the 5th cleaner cells.

The 7th cleaning is performed in two 3 x 40 ft column cells and the concentrate from the 7th cleaning is thermally treated in two heat exchangers. The treated concentrate is fed to the 8th cleaning stage and the tail returns to the 6th cleaning. The 8th cleaning stage is performed in one 3.5 x 40 ft column cell and its concentrate is fed to the 9th cleaning stage (2 x 40 ft column cell). Tails from the 8th cleaning returns to the 7th cleaning stage. The concentrate from the 9th cleaning stage is the final molybdenum concentrate.

The final molybdenum concentrate is decanted in four tanks and pumped to a 40 t/d vertical filter. Dried molybdenum concentrate is bagged and sold as the final product.

14.4.2.7 Filtration Plant

Copper concentrate (copper–molybdenum rougher tailings) is thickened in a 100 ft copper concentrate thickener to 60% solids. The thickener underflow is pumped to a distributor tank that feeds the concentrate to two vertical Larox filters with capacities of treating 600 t and 960 t/d of concentrates. Both filters produce concentrates cakes with 8.5–10% moisture. Final copper concentrate is transported by rail to the Ilo smelter and refinery for processing.

14.4.2.8 Tailings Thickening

All tailings generated in the flotation circuit are discharged to a tailings distribution box. The tailings are evenly distributed to three 46 m hi-density thickeners. The overflow water is recycled, pumped to two recovered water tanks, and reused as process water in the grinding and flotation circuits. The underflow from the thickeners, at 60% solids, comprises the final tailings and is sent by gravity to the Quebrada Honda TSF.

14.4.3 Toquepala Concentrator No. 2

14.4.3.1 Primary Crushing

The C1 primary crushing circuit is shared with C2. From coarse ore stockpile No. 1 the material is fed to the C2 secondary crushing circuit with a nominal 80% passing size (P_{80}) of 140 mm.

14.4.3.2 Secondary Crushing

Four apron feeders reclaim ore from beneath coarse ore stockpile No. 1 and transfer it to a secondary crushing surge bin of 1,648 t of capacity. Two apron feeders under the surge bin deliver ore to two double-deck banana screens of 3.4 x 7.6 m. The oversize feeds two MP-1250 secondary crushers producing a P_{80} product of 50 mm. Undersize material from the screens and the product of the crushers are transferred to the tertiary crushing stage.

14.4.3.3 Tertiary Crushing

The product from the previous crushing stage is temporarily stored in a HPGR surge bin before being fed to two 2.4 x 1.65 m HPGRs. Each HPGR has an installed power of 5,300 kW and operates in closed circuit with four wet screens. Product from the HPGRs (-18 mm) is transferred to four double-deck vibrating screens (3.7 x 8.5 m) through a surge bin. The ore is wet classified, producing an undersize fine slurry that becomes the feed to the grinding circuit, and a coarse washed oversize material that is recirculated to the HPGR surge bin.

14.4.3.4 Grinding

Grinding is done in two parallel lines where each line consists of a cyclone feed pumpbox, a cyclone cluster (12 x 33 inches), and a gearless ball mill (7.6 x 12.4 m effective grinding length) rated at 15 MW. The cyclone pumpbox receives the product slurry from the HPGR wet screening at 31% solids and the ball mill product at 72% solids. Water is added to the pumpbox to control the solids content before the slurry is pumped to the cyclone cluster at 55% solids. Cyclone overflow slurry at a P_{80} of 180 µm is the flotation circuit feed, whereas cyclone underflow is gravity fed to the ball mills. Operating in closed circuit with the cyclones, the ball mill product is discharged to the cyclone pumpbox at a circulating load rate of 350%.

14.4.3.5 Bulk Flotation

Primary bulk flotation is performed in two flotation lines. Each line consists of seven 300 m^3 cells, of which five cells are forced-air type and two cells are induced-air type. Tailings from primary flotation flow by gravity to a tailings collector box. The primary bulk concentrate gravity flows to a regrind cyclone pumpbox where the cyclone underflow is fed to three VTM-1250 (932 kW) vertical regrind mills working in closed circuit with cyclones.

The regrind cyclone overflow product with a P_{80} of 33 µm is fed to two lines of 1st cleaning flotation via a distributor. Each line consists of two 130 m^3 induced-air cells producing a concentrate that gravity feeds to a 2nd cleaning stage. Tails from the cleaning flotation are transferred to a scavenger flotation stage consisting of two lines of three 130 m^3 cells each. Scavenger concentrate is returned to the regrind pumpbox and the scavenger tails join the rougher tails at the tailings collector box as final tails.

The 1st cleaner concentrate gravity flows to the 2nd cleaning flotation consisting of two lines of two 70 m^3 cells. The 2nd cleaner tails gravity flow to the regrind cyclone pumpbox. The 2nd cleaner concentrate is the final bulk copper–molybdenum concentrate and is sent to a 40 m diameter bulk thickener at the molybdenum plant.

14.4.3.6 Molybdenum Plant

The C2 molybdenum plant processes the copper–molybdenum bulk concentrate in a rougher circuit and eight cleaner stages. The bulk copper–molybdenum concentrate is fed from the bulk thickener underflow to the rougher circuit, composed of two lines of six 8.5 m^3 cells each. Tails from the rougher stage is pumped to a 40 m diameter copper concentrate thickener. Rougher concentrate from both lines is pumped to the 1st cleaner stage (6 x 4.25 m^3 cells), and the concentrate from the 1st cleaner is fed to the 2nd cleaner stage (4 x 4.25 m^3 cells) together with the 3rd cleaning tails. Tails from the 1st cleaner returns to the rougher flotation stage.

Concentrate from the 2nd cleaner together with the 4thcleaner stage tails are fed to the 3rd cleaner stage of three 4.25 m^3 cells. Concentrate from the 3rd cleaner, after passing through an intermediate thickener, is pumped to the 4th cleaner stage together with tails from the 5th cleaner stage. Concentrate from the 4th cleaner stage (three 4.25 m^3 cells) is pumped to the 5th cleaner stage consisting of three 4.25 m^3 cells. Concentrate from the 5th cleaner stage feeds the 6th cleaner stage and the tails return to the 4th cleaner cells.

The 6th cleaning stage is carried out in two 1.1 x 10.5 m (10 m^3) column cells. The concentrate from the 6th cleaning is thermally treated in a heat exchanger increasing the slurry temperature to around 65°C. The treated concentrate is then fed to the 7th cleaning stage, and the tails return to the 6th cleaner cells. The 7th cleaning stage is performed in one 1.1 x 10.5 m column cell and its concentrate is fed to the 8th cleaning stage (1.1 x 10.5 m column cell). Tails from the 8th cleaning returns to the 7th cleaning stage. Concentrate from the 8th cleaning stage is the final molybdenum concentrate.

The final molybdenum concentrate is decanted in four tanks to achieve 40% solids and then pumped to a filter press. Filtered molybdenum concentrate is deposited in 1,950 kg bags and sold as the final product.

The LOM expected molybdenum recovery for both concentrators is estimated at 70.4% based on an average molybdenum concentrate grade of 56.48%.

14.4.3.7 Filtration Plant

Copper concentrate (copper–molybdenum rougher tailings) is thickened in a conventional 40 m thickener to 65% solids. Thickener underflow is pumped to a distributor tank that feeds the concentrate to two vertical Larox filters of 96 m^2 each. Product from the filters is a concentrate cake of 8–10% moisture. Final copper concentrate is transported by rail to the Ilo smelter for processing.

The LOM expected copper recovery for both concentrators is estimated at 88.5% based on an average copper grade of 26.74%.

14.4.3.8 Tailings Thickening

Rougher and scavenger tailings from the tailings collection box are discharged to a tailings distribution box. The tailings are evenly distributed to three 46 m hi-rate thickeners. The overflow water is recycled, pumped to recovered water tanks, and reused as process water in the grinding and flotation circuits as needed. The underflow from the thickeners, at an average of 61% solids, is sent by gravity to the Quebrada Honda TSF.

14.4.4 Equipment Sizing

Equipment requirements for C1 and C2 are summarized in Table 14-2 and Table 14-3, respectively.

14.4.5 Power and Consumables

14.4.5.1 Power

The total power consumption for the Toquepala C1 and C2 plants in the 2024 operating year was 397.2 MWh and 472.0 MWh, respectively. Grinding represented about 50.6% and 53.6% of the total consumed power in C1 and C2, respectively. Power supplies are expected to be sufficient for the purposes of the LOM plan.

14.4.5.2 Water

Water sources are discussed in Section 14.3.6.2.

Make up water in C1 and C2 is required to replace that lost in concentrates, tailings sent to the TSF, and evaporation. Recycled water from the Quebrada Honda TSF is pumped primarily to the Toquepala C2 plant at an average rate of 200 L/s.

Water supplies are expected to be sufficient for the purposes of the LOM plan.

Table 14-2: C1 Major Process Plant Equipment

Function	Description	Quantity
Primary crushing (C1 & C2)	Gyratory crusher, 60" x 113"	2
Secondary crushing	Cone crushers, Metso MP-800, 597 kW each	3
Tertiary crushing	Cone crushers, HP-700, 522 kW each	4
	Cone crushers, HP-800, 597 kW each	2
Quaternary crushing	HPGR, 2.4 m x 1.65 m, 5.3 MW	1
Primary grinding	Fuller ball mill, 21 ft D x 33.5 ft L, 7,085 kW	1
	Marcy rod mills, 10 ft D x 14 ft L, 597 kW	8
Secondary grinding	Allis Chalmers ball mill, 10.5 ft D x 13 ft L, 597 kW	19
	Svedala ball mill, 10.5 ft D x 13 ft L, 597 kW	4
	Marcy ball mill, 10.5 ft D x 14 ft L, 597 kW	1
Rougher concentrate regrind	Marcy ball mills, 8 ft D x 13 ft L, 260 kW	7
Rougher flotation	Wemco cells, 130 m^3	6
	Outokumpu cells, 100 m^3	4
	Wemco cells, 42.5 m^3	24
	Wemco cells, 60 m^3	4
Cleaner flotation	Column cells, 8 ft x 40 ft	15
Scavenger flotation	Outokumpu Cells, 50 m^3	3
	Wemco Cells, 60 m^3	1
Scavenger concentrate regrind	Marcy Ball Mill, 8 ft x 13 ft, 260 kW	1
Re-cleaner flotation	Agitair No. 48 Cells, 1.13 m^3	72
Mo rougher	Wemco Cells, 2.83 m^3	30
Mo 1st cleaner	Agitair No. 48 Cells, 1.13 m^3	5
Mo 2nd cleaner	Agitair No. 48 cells, 1.13 m^3	12
Mo 3rd cleaner	Agitair No. 48 cells, 1.13 m^3	12
Mo 4th cleaner	Agitair No. 48 cells, 1.13 m^3	8
Mo 5th cleaner	Agitair No. 48 cells, 1.13 m^3	6
Mo 6th cleaner	Agitair No. 48 cells, 1.13 m^3	4
Mo 7th cleaner	Column cells, 3 ft x 40 ft	2
Mo 8th cleaner	Column cells, 3.5 ft x 40 ft	1
Mo 9th cleaner	Column cells, 2 ft x 40 ft	1
Mo concentrate filter	Larox 4 chambers filter, 40 dry t per day.	1
Cu concentrate filter	Larox PF-60 10 plates filter, 600 dry t per day.	1
	Larox PF-96 16 plates filter, 960 dry t per day.	1
Tailings thickening	Tenova hi-density thickener, 46 m diameter	3

Table 14-3: C2 Major Process Plant Equipment

Function	Description	Quantity
Primary crushing (C1 & C2)	Gyratory crusher, 60 "x 113", 750 kW each	2
Secondary crushing	Cone crushers, Metso MP-1250, 932 kW each	2
Tertiary crushing	HPGR, 2.4 m x 1.65 m, 5.3 MW	2
Primary grinding	Ball mill, 7.6 ft D x 12.4 EGL, 15 MW each	2
Rougher concentrate regrind	Vertical mills VTM-1250, 932 kW each	3
Rougher flotation	Dorr Oliver type cells, 300 m^3	10
	Wemco type cells, 300 m^3	4
1st cleaner flotation	Flotation cells, 130 m^3	4
Scavenger flotation	Flotation cells, 130 m^3	6
2nd cleaner flotation	Flotation cells, 70 m^3	4
Mo rougher	Wemco type cells, 8.5 m^3	12
Mo 1st cleaner	Wemco type cells, 4.25 m^3	6
Mo 2nd cleaner	Dorr Oliver type cells, 4.25 m^3	4
Mo 3rd cleaner	Dorr Oliver type cells, 4.25 m^3	3
Mo 4th cleaner	Dorr Oliver type cells, 4.25 m^3	3
Mo 5th cleaner	Dorr Oliver type cells, 4.25 m^3	3
Mo 6th cleaner	Eriez EFD column cells, 1.1 x 10.5 m, 10 m^3	2
Mo 7th cleaner	Eriez EFD column cells, 1.1 x 10.5 m, 10 m^3	1
Mo 8th cleaner	Eriez EFD column cells, 1.1 x 10.5 m, 10 m^3	1
Mo concentrate filter	Larox PF, 7.9 m^2, 5 plates	1
Cu concentrate filter	Larox PF, 96 m^2, 16 plates	2
Tailings thickening	Tenova Hi-rate thickener, 46 m dia. x 13.7 m height	3

14.4.5.3 Consumables

The primary consumables used in the concentration process include flotation reagents such as: collectors, frother, flocculant, sodium hydrosulfide, and lime. Steel grinding media are consumed during comminution in the ball and vertical mills.

The LOM plan envisages that the same consumables will be used for the duration of the LOM plan.

14.4.6 Personnel

The total personnel operating C1 and C2 consists of 240 employees, working in the areas of management, operations, process and general services, and the TSF.

14.5 Ilo Smelter

14.5.1 Overview

The Ilo smelter commenced operations in 1960 to support the Toquepala Operations and was expanded in 1976 to accommodate the Cuajone Operations. In 1995 a Teniente converter and the first acid and oxygen plants were implemented. At that time the Ilo smelter operated with two reverberatory furnaces and one Teniente converter as smelting units, seven Peirce Smith converters, two blister casting plants, and one acid and oxygen plant.

In 2007 a new smelter was commissioned with a nominal capacity of 1,200,000 t/a of copper concentrate. The new smelter consists of one single Isasmelt smelting unit associated with two rotary holding furnaces, four Peirce Smith converters, two anode furnaces associated with twin anode casting wheels, two acid plants, two oxygen plants, and auxiliary services plants.

The Ilo smelter processes the copper concentrates from the Cuajone and Toquepala concentrators and produces copper anodes for the Ilo refinery.

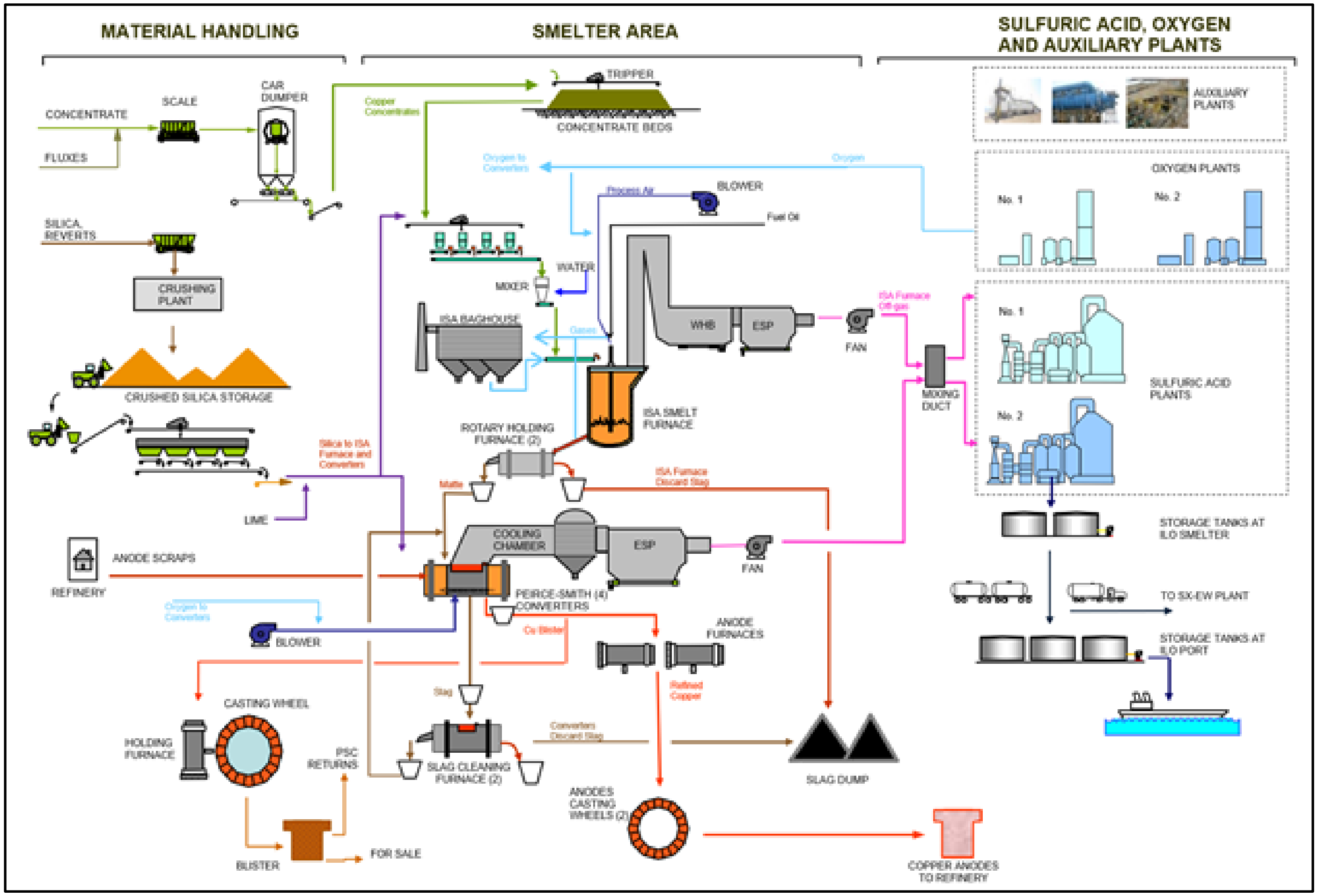
14.5.2 Flowsheet

The flowsheet for the Ilo smelter is provided in Figure 14-4.

14.5.3 Concentrate Smelting

At the smelter, the copper concentrate is mixed with silica flux before being fed to the smelting furnace. The primary smelting unit is an Isasmelt furnace which uses bath-smelting process technology. The furnace is a vertical refractory-lined vessel in which a specially-designed submerged-combustion lance is inserted into a bath of molten material. The furnace is continuously fed, through the lance, with copper concentrates and an oxygen-enriched air stream that creates vigorous agitation of the bath and rapid reaction rate.

Figure 14-4: Summary Flowsheet Ilo Smelter



Source: Southern Copper, 2021

The bath principally consists of molten iron–silicate slag and molten copper matte. Due to the turbulent state of the bath, the matte and slag are tapped out together periodically through a single tap hole to either of two rotary holding furnaces via water-cooled copper launders. At the rotary holding furnaces the molten products are allowed to separate in a clean slag and matte molten phases that are poured separately. The rotary holding furnaces also provide surge capacity between the continuous operation of the Isasmelt furnace and the batch Peirce Smith converter cycles. Slag from the rotary holding furnaces is sent directly to the slag dump area.

The off-gas from the Isasmelt furnace, at approximately 1,050°C, is vented into a waste heat boiler where it is cooled to 350°C. Gases are then passed through a five-field electrostatic precipitator, where they are cleaned of entrained dust. Lastly, gases pass through a mixing duct and are combined with Peirce Smith converter off-gas streams before being treated in the sulfuric acid plants.

14.5.4 Matte Conversion

A 63% copper matte molten phase from the rotary holding furnace vessels is treated in four Peirce Smith converters. Three Peirce Smith converters are hot while the fourth is on stand-by mode or under maintenance. At any time, a maximum of two converters are being blown.

In the converters the copper matte is oxidized in two sequential steps:

- Iron sulfides in the matte are oxidized with oxygen-enriched air and added silica, producing slag that is sent to the two slag cleaning rotary furnaces, where pig iron is used as the reducing agent.
- Copper sulfides contained in the matte are then oxidized with oxygen-enriched air to produce blister copper, containing approximately 99.3% copper.

The off-gases are diluted and collected by water cooled hoods and conducted by the gas handling system to the acid plant. The gas handling system consists of evaporative cooling chambers, a manifold, two electrostatic precipitators, fans and ductwork connecting to the mixing duct.

14.5.5 Anode Refining and Casting

The blister copper is refined in two anode furnaces by oxidation to remove sulfur with compressed air injected into the bath. Finally, the oxygen content of the molten copper is adjusted by reduction with the injection of liquefied petroleum gas with steam into the bath. Copper anodes containing approximately 99.78% copper are cast in two casting wheels and transported by railroad to the Ilo refinery located around 10 km southeast of the smelter. The smelter can also produce blister copper bars when the anode furnaces are under brick repair.

The generated gases are oxidized in an oxidation/dilution chamber, cooled, and then cleaned in a baghouse.

Typical compositions of a copper anode produced at the Ilo smelter are provided in Table 14-4.

Table 14-4: Average Chemical Composition of Anodes Produced

Cu (%)	As (ppm)	Bi (ppm)	Sb (ppm)	O_2 (ppm)	S (ppm)	Pb (ppm)	Zn (ppm)
99.78	350	84	29	798	31	87	8

14.5.6 Acid Plants

The off-gases from the smelter are treated in two acid plants (No. 1 and No. 2) to recover over 92% of the incoming sulfur, producing sulfuric acid at a concentration of 98.5%. The gas stream from the smelter with a concentration of 11.3% SO_2 is split between the two plants, both being double absorption and double contact. Approximately 16% of the produced acid is used at the Cuajone and Toquepala facilities with the balance sold to third parties.

In 2010, the Ilo smelter marine trestle started operations. This facility allows the direct loading of sulfuric acid onto ships, avoiding hauling cargo through the city of Ilo. The 500-m-long marine trestle was the last part of the Ilo smelter modernization project. Currently all overseas shipments of sulfuric acid are made using the marine trestle.

14.5.7 Oxygen Plant and Ancillary Systems

The oxygen required within the smelter processes is generated by two oxygen plants. Oxygen plant No. 1 has a capacity of 272 st/d and plant No. 2 has a capacity 1,045 st/d.

Concentrates from Cuajone and Toquepala are relatively clean, so all the metallurgical dust generated is recycled to the Isasmelt furnace. Arsenic trioxide is added to the copper to meet the required quality of the anode which will allow the co-precipitation of antimony and bismuth together with arsenic during the electrorefining process at the Ilo refinery.

The smelter includes a seawater intake system, two desalination plants to provide water for the process, and an electric substation.

14.5.8 Equipment Sizing

A list of the major mechanical equipment in the Ilo smelter is presented in Table 14-5.

Table 14-5: Ilo Smelter, Major Mechanical Equipment and Operational Parameters

Function	Description	Unit	Value
Isasmelt furnace	Dimensions (height x ID)	m x m	17 x 5.5
	Capacity	t/a	1,2000,000
	Availability	%	86.5
	Target matte grade	%	63
	Oxygen enrichment	% O_2	65-70
Rotary holding furnaces	Units	number	2
	Dimensions (diameter x length)	m x m	4.7 x 15.3
	Reducing agent	—	Pig iron
	Discard slag target (Cu)	%	0.9
Peirce Smith converters	Units	number	4
	Dimensions (diameter x length)	m x m	3.96 x 10.7
	Tuyeres (number and diameter)	No. / inches	48 / 2
	Enriched air flow	Nm^3/h	46,800
	O_2 enrichment – slag blow	% O_2	24
	O_2 enrichment – copper blow	% O_2	22
Anode fire refining furnace	Units	number	2
	Dimensions (diameter x length)	m x m	4.6 x 10.7
	Capacity (each)	t	400
	Casting wheels	model	Twin M18 Outokumpu
	Capacity	t/h	100
Converter slag treatment furnace	Units	number	2
	Dimensions (diameter x length)	m x m	3.96 x 10.97
	Reducing agent, consumption	—	Pig iron
	Discard slag target	% Cu	1.0
	Sulfuric acid plant No. 1: off-gas treatment, SO_2	Nm^3/h, (%)	112,568 (12.8)
	Sulfuric acid plant No. 2: off-gas treatment, SO_2	Nm^3/h, (%)	304,580 (11.7)
	Oxygen plant No. 1 capacity	st/d	272
	Oxygen plant No. 2 capacity	st/t	1,045
	Oxygen produced, purity	% O_2	95

14.5.9 Power and Consumables

Consumptions of utilities and other consumables are expected to be similar for the LOM as seen in recent operations.

14.5.9.1 Power

The Ilo smelter currently uses power sourced from the state company Electroperu S.A, (Electroperu), a private power generator, Kallpa Generation S.A., (Kallpa) and a small portion is hydro-generated at the Cuajone facilities. Power is distributed over a 224-km closed loop transmission circuit, which is interconnected with the Peruvian electrical network.

The 2024 annual power consumption of the Ilo smelter was 356,040 MWh. The oxygen and acid plants accounted for around 63% of the total consumption. Power supplies are expected to be sufficient for the purposes of the LOM plan.

14.5.9.2 Water

Fresh water is required at the smelter cooling system, smelter boiler, and acid plant process. The water is supplied from seawater desalination plants.

Water supplies are expected to be sufficient for the purposes of the LOM plan.

14.5.9.3 Consumables

Consumables used in the smelter include fuel, refractory bricks, silica flux, and arsenic trioxide.

The LOM plan envisages that the same consumables will be used for the duration of the LOM plan.

14.5.10 Personnel

Personnel numbers at the Ilo smelter total 355 persons for operations and 390 persons for maintenance. Maintenance personnel provide services for both the smelter and the Ilo refinery.

14.6 Ilo Refinery

14.6.1 Overview

The Ilo refinery is located in the Pampa de Caliche, 9 km north of the city of Ilo. The original plant design was built in 1975 by Minero Perú with a treatment capacity of 150,000 t of 99.95% pure electrolytic copper cathodes per year. The plant was acquired by Southern Copper in 1994 and modernized to produce 246,000 t/a of copper cathodes. It was subsequently expanded to the current annual capacity of 294,763 t/a of copper cathodes. The Ilo refinery has the capacity to produce 128,000 kg of silver, 840 kg of gold, and 50,000 kg selenium annually. Although selenium, silver, gold, platinum and palladium have been historically produced as a by-product of the refinery, these metals have not been included in the mineral resource or mineral reserve estimates, and any revenues from these metals have not been recognized in the Toquepala Operations.

14.6.2 Flowsheet

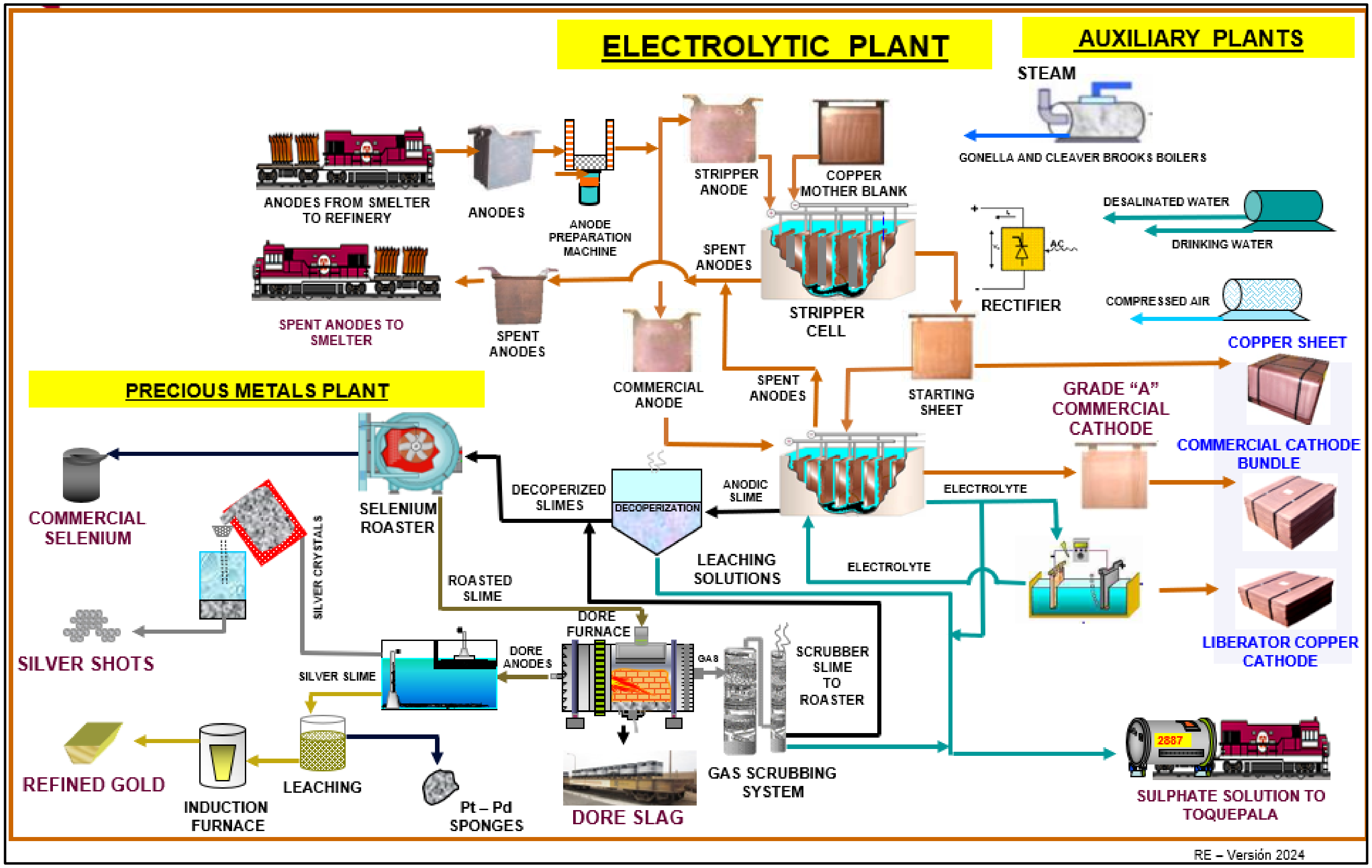
The current flowsheet is included as Figure 14-5.

14.6.3 Electrolytic Plant

The anodes produced at the Ilo smelter are transported by rail to the Ilo refinery. After unloading they are pressed to improve their shape before being loaded to the electrolytic cells. The anodes are immersed in a cell containing copper sulphate and sulfuric acid in solution which serves as the electrolyte. By the action of electrical current the copper anode dissolves in the electrolyte and deposits on a cathode surface. This process produces cathodes with a 99.99% copper content. Impurities such as arsenic, bismuth, antimony and sulfur are not deposited on the cathode and are eliminated in the electrolyte. Other valuable impurities such as gold, silver, platinum and selenium have historically been recovered from the anode sludge in the precious metals plant but are not recognized as part of the revenue generated by the Toquepala Operations.

The copper cathodes are produced in 996 commercial electrowinning cells including 52 starter cells in which starter cathode sheets are produced. Each commercial cell is loaded with 52 anodes of 435 kg and 53 starter cathodes of 7 kg. At the end of the electrorefining cycle, the cathodes are removed from the cells and rinsed in three stages: agitated hot water, high pressure hot water, and vapor rinse to eliminate sulfates from the surface of the cathodes.

Figure 14-5: Summary Flowsheet Ilo Refinery



Source: Southern Copper, 2024

Corroded anodes are rinsed at the end of the refining cycle using condensed hot water. Around 14% in weight of the total copper in anodes arriving at the refinery is returned to the smelter for recycling as corroded anodes.

In order to control the concentration of dissolved copper, a portion of the electrolyte is treated in the electrolytic liberator cells where insoluble anodes are used to produce cathodes of 99.99 % copper.

The anodic sludge produced in the electrolytic cells is received in settling tanks to separate it from the electrolyte, and then leached in oxidation tanks for 24 h at 80°C with an aerated diluted acid solution to dissolve entrapped copper in the sludge. Copper-free sludge is then washed and centrifuged to obtain commercial anodic sludge with a moisture content of <14% and copper content of <2%. The commercial sludge is then sent to the precious metals plant for the recovery of silver, gold, selenium and small amounts of platinum and palladium.

To maintain the balance of impurities in the electrolyte, the resulting leach solution from the anodic sludge leaching is sent by rail to the Toquepala leaching plant.

The copper cathode production for 2024 was 287,904 t and the average chemical composition is indicated in Table 14-6. The LOM cathode composition is expected to be similar to that shown.

Table 14-6: Average Cathode Chemical Composition (2020)

Cu (%)	Ag (ppm)	Se (ppm)	Ni (ppm)	Pb (ppm)	Fe (ppm)	S (ppm)	Bi (ppm)	Sb (ppm)	As (ppm)	Te (ppb)	Zn (ppm)
99.998	10	0.01	0.01	0.01	0.01	5	0.01	0.01	0.01	0.01	0.01

14.6.4 Precious Metals Plant

The commercial anodic slime is processed at the precious metals plant, with oxygen and sulfur dioxide, in an electric roaster oven to produce commercial selenium with a purity of 99.5%. Selenium-free slime is then melted in a doré furnace to produce doré anodes.

The doré anodes are placed on Thum cells for electro-refining, producing silver crystals and slimes. Produced silver crystals, with a purity of 99.99% are melted in an induction furnace to generate commercial silver shot as a final product. The silver slime undergoes an acid digestion process to obtain gold dust that is then smelted to produce 99.99% pure gold bullion.

14.6.5 Equipment Sizing

The major mechanical equipment in the Ilo refinery is summarized in Table 14-7.

Table 14-7: Ilo Refinery Major Mechanical Equipment and Design Parameters

Area	Description	Unit	Value
Anodes	Commercial anode weight (per unit)	kg	435
	Commercial anode area (avg.)	m^2	0.855
	Stripper anode weight (per unit)	kg	445
	Dissolved anodes	t/d	810
	Composition – copper	%	>99.6
	Composition – oxygen	ppm	500–1,300
	Composition – sulfur	ppm	<45
	Composition – arsenic	ppm	280–550
Electrowinning cells – commercial and starter sheets	Number of cells	units	996
	Anodes per cell	units	52
	Cathodes per cell	units	53
	Cathode starting weight	kg	7
	Electrolyte flow per cell	L/min	25
	Electrolyte total flow	m^3/h	1494
	Current intensity	A	29,500
	Current density	A/m^2	278
	Current efficiency	%	97.8
Liberator electrowinning cells	Number of cells	units	24
	Electrolyte flow per cell	L/min	25
	Electrolyte total flow	m^3/h	60
	Current intensity	A	15,000
	Current density	A/m^2	138
	Current efficiency	%	95
Electrolyte composition	Copper	g/L	41–45
	Sulfuric acid	g/L	167–173
	Arsenic	g/L	7.5–10.5
	Antimony	g/L	≤0.45
	Bismuth	g/L	≤0.4

Area	Description	Unit	Value
Cathode production and composition	Copper cathodes	t/a	294,763
	Cathode weight per unit	kg	180 ± 30
	Cathode length x width	m x m	1.02 x 1.02
	Copper	%	>99.99
	Silver	ppm	<20
	Sulfur	ppm	<10
Precious metals plant	Slime treated	t/a	460
	Slime composition – copper	%	<2.5
	Slime composition – moisture	%	≤14.5
	Selenium electric oven – capacity	t/h	2.6
	Doré furnace – capacity	dry t/batch	10.5
	Silver refining cells	Units	28
	Silver refining cells current	A	150
IDE Aquaport desalination plant	Desalination plant	m^3/d	1,000
Steam system	Gonella	t/h	20
	Cleaver & Brooks	t/h	20
Rectifier commercial cells	ABB (450 VDC)	KA	2 x 15
	Friem (460 VDC)	KA	2 x 20
Rectifier liberator cells	Friem (120 VDC)	KA	1 x 25

14.6.6 Power and Consumables

14.6.6.1 Power

The Ilo refinery uses the same power sources and network as outlined in Section 14.5.9.1. LOM requirements are estimated at an average 95 MW/a. The majority of the power requirement is from the electrolytic plant.

For 2024, the annual power consumption in the Ilo refinery was 95,276 MWh, and the electrolytic plant accounted for around 89% of the total consumption.

There is sufficient power capacity available to support the LOM plan.

14.6.6.2 Water

All water consumed in the Ilo refinery is desalinated seawater. For this purpose, the refinery has a desalination plant with a nominal capacity of 1,000 m^3 of treated water per day.

Water supplies are expected to be sufficient for the purposes of the LOM plan. Water consumption is expected to be in line with previous operating experience.

14.6.6.3 Consumables

Consumables used in the refinery include animal glue, thiourea, hydrochloric acid, and sulfuric acid. The precious metals plant uses diesel, sodium carbonate, sodium nitrate, borax, calcium carbonate, anthracite, nitric acid, hydrochloric acid, sulfur dioxide, and oxygen.

The LOM plan envisages that the same consumables will be used for the duration of the LOM plan.

14.6.7 Personnel

The personnel count for the Ilo refinery totals 218 persons for operations and 390 persons for maintenance. Maintenance personnel provide services for both the refinery and the Ilo smelter.

15.0 INFRASTRUCTURE

15.1 Introduction

On-site infrastructure that supports the Toquepala Operations include:

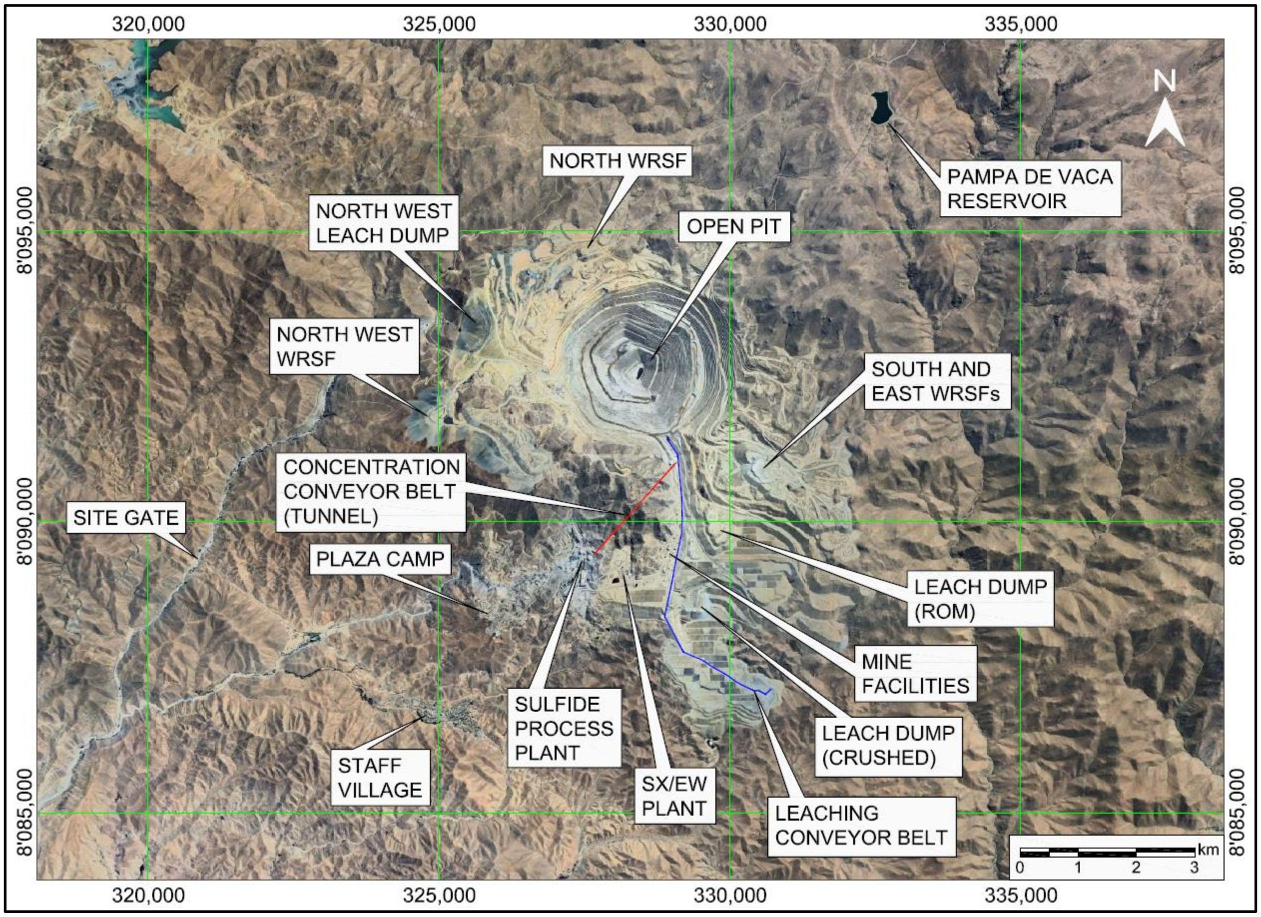
- One open pit
- Four WRSFs
- Two low-grade sulfide leach facilities (one crushed and one ROM)
- Process facilities, including two concentrators and one LESDE (SX-EW) plants, conveyor systems
- Warehouses, workshops, and offices
- 138 kV and 220 kV power transmission lines
- Electrical substation and power distribution system
- Water handling facilities
- Permanent camp for operations
- Railway and rail yard.

Off-site infrastructure includes:

- Access road
- 138 kV and 220 kV power transmission lines
- Electrical substations and power distribution systems
- Railway
- Quebrada Honda TSF
- Water supply system
- Smelter, refinery and sulfuric acid plants in Ilo
- Port facilities in Ilo including dock and storage areas, rail yard, and wagon repair shop
- Desalination plants at the Ilo smelter
- Port facilities in Tablones, where hydrocarbons and sulfuric acid are unloaded and sent to the mine site
- Simón railway yard, which has assembly and dispatch areas, as well as workshops and offices.

A site layout is shown in Figure 15-1. The location of the Ilo smelter and refinery, and port is shown in Figure 3-1.

Figure 15-1: Toquepala Site Layout



Source: Wood, 2024

15.2 Roads and Logistics

The Toquepala and Cuajone Operations, together with the Ilo smelter and refinery, are connected by a network of public roads and a private railway operated by Southern Copper.

15.2.1 Roads

The Toquepala Operations are accessed from the city of Tacna via the Pan-American South Highway PE-1S to the town of Alto Camiara. Departmental roads TA-100, MO-107 and TA-105 are followed to the junction with the mine access road.

Personnel are transported to the mine site from the staff village and plaza permanent camps.

The TSF at Quebrada Honda is situated 40 km southwest of the Toquepala Operations. It is accessed via the departmental road TA-100 and MO-107 from the town of Alto Camiara.

15.2.2 Rail

Railways extend from Ilo to Toquepala, and a spur railway runs from the Toquepala Operations to the Cuajone Operations. Supplies such as sulfuric acid, equipment, fuel, and mining supplies are transported to the operations using the rail network. Concentrates are railed from the mine site to the Ilo smelter/refinery, and cathodes produced at the refinery are railed to the Port of Ilo.

The Simón rail yard near the Port of Ilo includes train assembly yard and train dispatch areas, balance-weighing of concentrates, anodes, blister, cathodes and loads, one diesel fuel tank for refueling locomotives, a locomotive workshop, and a train operations office.

15.2.3 Port

The Port of Ilo is a private port, operated by Southern Copper. It has two berths and can take vessels to 40,000 tonnes deadweight. The port is the export point for copper cathodes, copper concentrate, sulfuric acid and molybdenum concentrate; and the import location for general containerized and loose cargo to support operations. Supporting the port is a 182 m-long pier, breakwater, offices storage terminals, warehouses and laydown areas, storage tanks and pipelines, spill containment infrastructure, enclosure fencing, and an operations control center.

The Tablones port terminal is located 15 km north of the Port of Ilo, and consists of two facilities:

- Marine trestle facility used to load sulphuric acid. The facility can accommodate a ship mooring capacity of up to 37,000 tonnes deadweight, and is 11 m deep and 180 m long.
- Multiple buoy facility used to unload hydrocarbons. The facility can accommodate a tanker mooring capacity of up to 70,000 tonnes deadweight, and is 13 m deep and has a submarine pipeline that is 600 m long.

Supporting the port is an access road; enclosure fencing; a marine rock wall; an electrical power system that supplies 13.8 kV; spill containment infrastructure; hoses, pipes and cranes for product loading; mechanical equipment including plant and instrumentation air; and an operations control center.

15.3 Stockpiles

There are two coarse ore stockpiles, used for temporary storage, that feed Toquepala concentrators C1 and C2, respectively.

15.4 Waste Rock Storage Facilities

The WRSFs are described in Section 13. Three facilities are currently in use and will be expanded throughout the LOM. There is sufficient capacity in the WRSFs for LOM requirements.

Portions of the WRSFs required for the LOM plan are outside the current area of surface rights held by Southern Copper, and additional surface rights will need to be secured (see Section 17).

15.5 Tailings Storage Facilities

The Quebrada Honda TSF is the repository for tailings from the Toquepala and Cuajone Operations. It is situated southwest of the Toquepala Operations and south of the Cuajone Operations. Tailings deposition commenced in December 1996. When built, the facility is designed to have a total ultimate capacity of 2,347 Mt. The remaining capacity is about 850 Mt, which is sufficient to support approximately 12 years of production, from 2025–2036, based on the current production rates at the Toquepala and Cuajone Operations.

The TSF operates as a cross-valley impoundment and is confined by two dams constructed of compacted cyclone tailings sand. Among them, the main dam, located southwest of the impoundment, is being raised with the downstream construction method; and the lateral dam, located southeast of the impoundment is being raised with the center-line construction method. Tailings are discharged into the impoundment via steel and HDPE pipelines and placed over the cell using graders. The tailings sand of tailings dams is further flattened using vibratory smooth rollers to achieve compacted tailings zones. The tailings supernatant pool is located at the north end of the impoundment away from the two dams where water is reclaimed and transported back to the process plant.

Additional tailings storage capacity will be required after approximately the end of 2036, see discussion in Section 18.2.1.

The former Ite tailings disposal area was located on a narrow coastal plain in southern Peru, approximately 50 km southwest of the port of Ilo. Tailings from Toquepala and Cuajone process plants were discharged into Ite Bay from 1959–1996. The Plan for Environmental Management and Adjustment (PAMA in the Spanish acronym) was completed in 1997 and covers rehabilitation.

15.6 Water Management Structures

The Toquepala Operations is located in a dry area with minor rainfall and surface runoff during the months of January to March. The surface drainage system is used to divert rainwater away from the open pit and WRSFs.

Runoff water from precipitation is captured 1 km and 1.5 km north of the pit over an unnamed ravine and Toquepala ravine, respectively. In these areas, there are two rainwater control structures (dikes) designed to retain a probable maximum precipitation event from the Andean part of the pit. These structures consist of earth dikes with concrete waterproofing on the upstream face; water flows are intercepted by the dike reservoirs and used for dust suppression on the access roads. This prevents runoff from geotechnically affecting the walls of the waste and leachable dumps located to the north and east of the Toquepala pit. No water is discharged from the operations because no mining effluents are generated at the mine site.

The water used in the production process of the concentrator plants is recovered through thickening equipment and is pumped to a pool or process recovery pond where it is stored for reuse. The pool is a reinforced concrete structure with a water storage capacity of 10,000 m^3. It is built in an excavation on natural ground, approximately 75.1 m long, 23.0 m wide, and 7.5 m deep.

At Quebrada Honda, Southern Copper is authorized to dispose of decanted water from the tailings. Water from the TSF is used in the Toquepala process plant, following treatment in a neutralization facility.

15.7 Built Infrastructure

In general, the Toquepala mine has the necessary facilities to carry out its current operations. Costs have been included as part of the capital and operating cost estimates to account for that additional infrastructure that will be required later in the LOM to support the proposed mine production schedule at current production throughputs, and include the following:

- Truckshop expansion to serve increased mining equipment fleet

- WRSF development
- Existing TSF raise
- Filtering tailings plant and land acquisition for tailings management. It has been assumed that, once the existing Quebrada Honda TSF reaches the ultimate storage capacity by approximately the end of 2036, the Toquepala Operations will dispose filtered tailings in a standalone dry stack facility to be located near the Quebrada Honda TSF area, as limited space is available on the Toquepala site. Southern Copper is of the opinion that the company will have sufficient time to complete the designs and permit for this facility.
- Leach primary crusher relocation.

15.8 Camps and Accommodation

Collectively, the Toquepala and Cuajone Operations, together with the Ilo smelter/refinery complex, have five accommodations areas, which provide a permanent accommodation capacity of 4,756 persons. Temporary modular accommodation has the capacity to house an additional 946 personnel.

The Toquepala Operations have two accommodation/village areas, referred to as the staff village and plaza camp, situated to the southwest of the open pit. The plaza camp houses approximately 1,000 workers and their families and staff village houses around 200 workers and their families. These villages have lodging facilities, medical and hospital support, a central food facility, recreational facilities, educational centers, churches, and grocery and household retail stores. A small airport is located adjacent the staff village.

15.9 Power and Electrical

The energy supply for the Toquepala Operations comes from the National Interconnected Electric System (SEIN), primarily from natural gas-fired thermal power plants located in the Chilca–Lima district of Perú and the Puerto Bravo plant located in Mollendo, and from the Antunez de Mayolo and Cerro del Aguila hydroelectric power plants.

Power is transmitted to the Southern Copper facilities in transmission networks of 500, 220 and 138 kV, using two Southern Copper-owned transmission lines of 138 kV (225 km long) and 220 kV (240 km long).

At each facility, power is stepped down using a series of substations and distributed to the areas and equipment requiring electricity. At the mine site, the Plaza substation (138/23 kV) has two 80 MVA transformers, one which is operating, and the second located near the concentrator. The transformers step down the voltage to the levels required for mine site usage.

Southern Copper has an energy supply contract with the companies Kallpa and Electroperú and a maintenance contract for the transmission lines owned by Southern Copper and the main substations that are reported to Peru's power grid coordinator, Comité de Operación Económica del Sistema Interconectado Nacional (COES).

15.10 Water Supply

Southern Copper is authorized to abstract 2,011.37 L/s (from fresh water sources for the Cuajone and Toquepala operations. Water management practices implemented at site has reduced the annual freshwater intake at site to be at approximately 1,600 L/s per year for recent years, 2023 and 2024. Freshwater for the mine and process facilities is obtained from groundwater and surface sources located approximately 50 km from the mining operations:

- Vizcachas and Huaitire aquifers
- Lake Suches
- Tacalaya and Honda streams

Water is transported by a network of pipelines to the operations, where it is stored in the Pampa de Vaca reservoir, located approximately 6 km northeast of the Toquepala mine. The reservoir has a storage capacity of 1.6 Mm^3, sufficient for 12 days operation in the event of an interruption in the upstream pipeline system. Monitoring systems are in place to record volume abstracted, groundwater level drawdown, surface water abstraction, and lagoon level fluctuations.

The largest consumer of fresh water at site is the concentrator plant. The water used in the plant is recovered through thickening equipment. This water is pumped to a pool (recovered water reservoir), where it is stored for reuse. The pool is a reinforced concrete structure with a capacity to store 10,000 m^3 of water. It is built in an excavation on natural ground, approximately 75.1 m long, 23.0 m wide, and 7.5 m deep. The plant also requires fresh water for certain processes. Fresh water is stored in a cylindrical tank with a capacity of 3,500 m^3.

A potable water treatment plant at Toquepala uses reverse osmosis and has a treatment capacity of 28 L/s. Water is supplied to the mining offices and the two accommodation/village areas. The treated water is stored in high-density polyethylene tanks.

Water abstraction from the Lake Suches was reduced to zero in 2023 and 2024 due to the increase of recovered tailings water that is pumped back from Quebrada Honda TSF to the process plant along a 10.2 km steel pipeline.

16.0 MARKET STUDIES

16.1 Markets

16.1.1 Copper

Copper futures are exchange-traded contracts on all of the world's major commodity exchanges. Copper is the world's third most widely used metal after iron and aluminum and is primarily consumed in industries such as construction and industrial machinery manufacturing.

The Toquepala Operations produce copper concentrates and copper anodes and cathodes.

16.1.2 Molybdenum

Molybdenum is mainly used as an alloying agent in stainless steel, and also in the manufacture of aircraft parts and industrial motors. The biggest producers of the metal are: China, United States, Chile, Peru and Mexico. Molybdenum futures are available for trading in The London Metal Exchange (LME). Prices are generally determined by principal-to-principal negotiations between producers, trading houses, and end users.

The Toquepala Operations produce molybdenum concentrates.

16.1.3 Gold and Silver

Gold and silver are contained in the copper concentrate and not as a separate product from the mine. Silver shots and gold-bearing doré are produced at the Ilo smelter. No recognition of revenues from gold and silver are made in the mine plan or the economic analysis in this Report as these metals have not been included in the mineral resource and mineral reserve estimates.

16.2 Market Strategy

Southern Copper employs a corporate strategy that is in line with the company's marketing experience, and experience with obtaining long-term contracts with strategic business partners in the Asian and European markets, as well as annual contracts with other active market participants.

Typically, over 60% of the molybdenum concentrate is sold to Chile, with the remainder sold into the Northern Europe, Asia and the US markets.

Typically, around 4.50% of the copper anodes produced are sold to third parties (i.e., Asia). The remaining anodes are used to produce cathodes at the Ilo refinery.

Cathode copper is sold onto the Asian, European, Brazilian and/or North American markets.

16.3 Product Marketability

16.3.1 Toquepala Operations

The principal product specifications require copper concentrates to be free from radioactivity. Deleterious impurities harmful to smelting and/or refining processes, are based on the China Inspection and Quarantine Services limit specifications for the import of copper concentrates into China as follows:

- Pb .... ≤6.0%
- As .... ≤0.5%
- F .... ≤0.1%
- Cd .... ≤0.05%
- Hg .... ≤0.01%

The principal payable commodities within the concentrates from the Toquepala Operations are copper and molybdenum. Although gold and silver exists as a by-product in the concentrate, no recognition of revenue from gold and silver is made in this Report because these metals have not been included in the mineral resource or mineral reserve estimates.

16.3.2 Ilo Smelter

The cathodes, anodes, and by-products produced at the Ilo smelter and refinery are considered by Southern Copper to be readily marketable. The principal payable commodities are copper, silver, and gold.

16.4 Commodity Pricing

Southern Copper provided Wood with Southern Copper's internal metal price forecast and a presentation on their market outlook. The long-term commodity price forecast was applied over the 41.2-year expected mine life. Forecasts were based on Southern Copper's interpretations of market analysis from Wood Mackenzie, CRU and 21 analysts and banks on copper price, and six analysts and banks on molybdenum price.

Wood reviewed the Southern Copper long-term forecast price for copper of $3.30/lb over the LOM, and concluded that the copper price selected by Southern Copper is reasonable in comparison to the prices being used by Southern Copper's industry peers.

It is industry-accepted industry practice to use higher metal prices for the mineral resource estimates than the pricing used for mineral reserves. The higher metal prices used for mineral resources helps ensure that the mineral reserves are a subset of the mineral resources. The long-term copper price forecast of $3.30/lb for mineral reserves was increased by 15% to provide the mineral resource estimate copper price of $3.80/lb which was fixed over the 41.2-year life of mine.

Wood reviewed the Southern Copper long-term forecast price for molybdenum of $10.00/lb over the life of mine and concluded that the molybdenum price selected by Southern Copper is reasonable compared to what others have recently been using in the industry. The Southern Copper molybdenum price forecast of $10.00/lb was increased by 15% to $11.50/lb to provide the input to the mineral resource constraining pit shell and NSR cut-off and fixed over the 41.2-year life of mine.

Cash flows use the same metal price assumptions as were used for the mineral reserves and are fixed over the life of mine.

The assumed exchange rate for cash flow analysis purposes was US$1.00 = PENS/3.80. This exchange rate was provided by Southern Copper.

16.5 Contracts

Toquepala Operations concentrates are sent to the Ilo smelter and refinery for processing to produce refined cathodes. When the production from Toquepala and Cuajone Operations exceeds the smelter's capacity, a portion is sold to third parties. In recent years, these third-party sales of Toquepala and Cuajone Operations concentrates have represented about 20–25% of the annual production. Approximately 95% of the production of refined cathodes is sold under annual contracts with industrial customers (mainly copper rod producers), with whom Southern Copper has had a commercial relationship for many years, and about 5% is sold on the spot market.

The largest in-place contracts other than for product sales cover items such as bulk commodities, operational and technical services, mining and process equipment, and administrative support services. Contracts are negotiated and renewed as needed.

Contract terms are typical of similar contracts that Southern Copper has entered into in Peru.

17.0 ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

17.1 Baseline and Supporting Studies

Baseline studies were done prior to mine start-up, and included assessments of air quality, noise, vibrations, water and sediment quality, flora and fauna surveys, and the human environment, including archaeological surveys. The data collected were used in support of the EIA.

The EIA included an environmental management plan aimed at mitigating potential impacts on water quality, biological resources, archaeological resources, and socioeconomic factors. The EIA was further supported by supplementary technical reports that identified updated technologies and modifications to enhance and to complement the actions outlined in the original environmental management plan.

Requirements and plans for:

- Waste rock disposal are described in Section 15.4.
- Tailings disposal are described in Sections 15.5 and 18.2.1.
- Water management are described in Sections 13.3 and 15.6.

17.2 Environmental Considerations/Monitoring Programs

In accordance with permit requirements, Southern Copper has established monitoring programs to track ground water, air quality, noise and biological conditions. These programs align with the commitments made in the environmental management and adjustment plan, environmental impact study, closure plans and their subsequent updates.

Southern Copper has approval to discharge 98 L/s of treated industrial water from the Quebrada Honda TSF to the Locumba River. The mine must monitor the water being discharged, and the river water quality every three months, under Directorial Resolution (R.D.) N° 190-2018-ANA-DCERH (26/11/2018).

17.3 Closure and Reclamation Considerations

Mine closure measures were developed in accordance with the Toquepala Mine Closure Plan Modification, approved under Directorial Resolution R.D. N° 079-2016-MEM-DGAAM. An updated mine closure plan ("Second Update of the Mine Closure Plan for the Toquepala Mining Unit") is under MINEM evaluation and expected to be approved in first quarter (Q1) of 2025.

Closure plans cover temporary, progressive, and final closure stages, and post-closure maintenance and monitoring. The overall objective is to ensure that the final configuration of the facilities at closure is physically, chemically, and hydrologically stable over the long term.

Closure costs are included in the mine site financial model as cash costs on an annual basis. The current closure cost estimates for the Toquepala Operations and the Quebrada Honda TSF, completed in February 2024, are $134.0 million and $36.0 million, respectively, including general sales tax.

For this assessment, the Quebrada Honda TSF closure costs and the Ilo smelter and refinery closure costs were allocated to the Cuajone and Toquepala Operations proportionally to nominal mill feed throughputs of each and the total LOM concentrate fed by each mine, respectively. The Ilo smelter and refinery closure cost estimate completed in September 2024 is $86.0 million. A provision of $103.3 million, including general sales tax, was included to account for the closure cost of the standalone filtered tailings plant and dry-stack tailings facility assumed. The total closure cost estimate assumed in the economic analysis for the Toquepala Operations is $305.9 million, inclusive of the Peruvian general sales tax.

The closure costs include:

- Progressive closure (over 7 years): $21.8 million
- Final closure (over 2 years): $105.3 million
- Post closure (over 5 years): $6.9 million
- Proportional costs Quebrada Honda TSF: $20.6 million
- Dry-stack tailings: $103.3 million
- Proportional costs Ilo smelter and refinery: $48.0 million.

17.4 Permitting

17.4.1 Current Operations

The Toquepala Operations and the Ilo smelter and refinery have all of the required permits to operate (Table 17-1 and Table 17-2).

Table 17-1: Key Permits, Toquepala Operations

Permit Number	Permit	Date Issued	Permit Authority
Environmental			
Report N° 354-95-EM-DGM/DPDM	EIA of the Cuajone -Toquepala Integrated Leaching Project	August 4, 1995	Ministry of Energy and Mines/General Mining Directorate
R.D. N° 042-97-EM/DGM	Environmental Management and Adaptation Program	January 31, 1997	Ministry of Energy and Mines/General Mining Directorate
Report N° 660-98-EM-DGM/DPDM	EIA of the SX/EW Tank House-Plant Expansion Project	November 10, 1998	Ministry of Energy and Mines/General Mining Directorate
Report N° 147-99-EM-DGM/DPDM	EIA Leaching of the Northwest Dumps	March 13, 1999	Ministry of Energy and Mines/General Mining Directorate
R.D. N° 339-2001-EM/DGAA	Modification of the Environmental Management and Adaptation Program	October 26, 2001	Ministry of Energy and Mines/General Directorate of Mining Environmental Affairs
R.D. N° 333-2009-MEM/AAM	U.P. Mine Closure Plan Toquepala	October 23, 2009	Ministry of Energy and Mines/General Directorate of Mining Environmental Affairs
R.D. N° 052-2013-MEM/AAM	First Update of the U.P. Mine Closure Plan. Toquepala	February 20, 2013	Ministry of Energy and Mines// General Directorate of Mining Environmental Affairs
R.D. N° 611-2014-MEM/DGAAM	EIA of the Toquepala Concentrator Expansion and Quebrada Honda Tailings Reservoir Expansion Project (ERQH)	December 17, 2014	Ministry of Energy and Mines/General Directorate for Mining Environmental Affairs
R.D. N° 079-2016-MEM-DGAAM	Modification of the Mine Closure Plan of the Toquepala Mining Unit	March 16, 2016	Ministry of Energy and Mines/General Directorate of Mining Environmental Affairs

Permit Number	Permit	Date Issued	Permit Authority
R.D. No. 072-2019-SENACE-PE/DEAR	First Supporting Technical Report of the Toquepala Mining Unit	April 26, 2019	National Environmental Certification Service for Sustainable Investments (Senace)
R.D. No. 103-2019-SENACE-PE/DEAR		July 3, 2019	
R.D. No. 040-2021-SENACE-PE/DEAR R.D. No. 00117-2021-SENACE-PE/DEAR	Second Supporting Technical Report of the Toquepala Mining Unit	Compliance (Art. 1), Non-compliant (Art.2) March 12, 2021 Rejected Reconsideration Request (August 27, 2021)	National Environmental Certification Service for Sustainable Investments (Senace)
R. D. No. 00059-2023-SENACE PE/DEAR	Third Supporting Technical Report of the Toquepala Mining Unit	April 21, 2023	National Environmental Certification Service for Sustainable Investments (Senace)
R.D. No. 0083-2023/MINEM-DGAAM	Second Update of the Mine Closure Plan for the "Toquepala" Mining Unit	Disapproved, May 12, 2023 (ANDDES) (submitted March 23, 2021) Resubmitted in v.3, (March 2024?)	Ministry of Energy and Mines/General Directorate of Mining Environmental Affairs

Permit Number	Permit	Date Issued	Permit Authority
Water			
Resolution N° 534-72-AG	Authorization in the process of adapting a water license for the use of up to 150 L/s	June 15, 1972	Ministerio de Agricultura/Dirección General de Aguas y Suelos
Resolution N° 00405-77-AG/DGA	Authorization in the process of adapting a water license for the use of up to 60 L/s of the waters of the Cinto-Quebrada Honda river	April 12, 1977	Ministerio de Agricultura/Dirección General de Aguas y Suelos
R.D. N° 053-88-DGAS-UA-SUTD	Modification of Resolution R.S. N° 535-72-AG from 2,000 L/s to 300 L/s	April 20, 1988	Ministerio de Agricultura/Dirección General de Aguas y Suelos
R.D. N° 27-2010-ANA/AAA I C-O	Regularization of the License for the Use of Surface Water, reallocating volumes of the R.M. N ° 405-77-AG/DGA	December 31, 2010	National Water Authority
R.D. N° 0062-83-AG-DGASI	License to use an annual mass of up to 13,268,966 m^3 of groundwater extracted through four tube wells from the "Huaitire" Basin	June 15, 1983	Ministry of Agriculture
R.A. N° 002-94-DISRAG/ATDR/S	License for the use of an annual mass of 5'991,840 m^3 of groundwater captured from tubular wells TP-11 and TP-12 drilled in the "Huaitire-Gentilar" Hydrographic Basin	1994	Ministry of Agriculture
R.A. N° 169-95-DISRAGT/ATDRL/S	Groundwater Use License in the Vizcachas Basin up to 360 L/s	July 12, 1995	Ministry of Agriculture
R.A. N° 020-2003-ATDR.M/DRA.M	Adaptation of Water Use License granted to in the R.M. N ° 00899-79-AA/DGAS and R.A. N ° 002-94-DISRAG/ATDRL-S up to 9'744,624 m^3	April 1, 2003	Ministry of Agriculture
R.A. N° 0034-2005-DRA.T/GR.TAC/ATDRL/S	Groundwater Use License with a flow of 162.2 L/s, equivalent to an annual mass of 5'115,139 m^3 captured by two tubular wells TP-14 and TP-15 located in the Huaitire-Gentilar Basin.	January 28, 2005	Ministry of Agriculture

Permit Number	Permit	Date Issued	Permit Authority
Discharges			
R.D. N° 190-2018-ANA-DCERH	Extend the Authorization for the Discharge of Treated Industrial Wastewater from the Quebrada Honda reservoir	November 26, 2018	National Water Authority
Construction and Operation			
R.D. N° 178-94-EM/DGM	• Approve the disposal and storage of tailings from the Toquepala and Cuajone concentrators of the "Quebrada Honda" • Approve the construction license of a dam and tailings field	May 27, 1994	Ministry of Energy and Mines
R.D. N° 166-96-EM/DGM	Approve the Processing Concession for the "SX/EW Toquepala Leaching Plant" with an area of 60 ha	May 17, 1996	Ministry of Energy and Mines
Report N° 493-98-EM-DGM/DPDM	Authorization for the operation of the “Quebrada Honda” tailings deposit	August 24, 1998	Ministry of Energy and Mines
Report N° 291-2003-EM-DGM/DPDM	Authorization to expand the installed capacity of the Processing Plant "SX/EW Toquepala Leaching Plant"	May 19, 2003	Ministry of Energy and Mines
Resolution N° 378-2011-MEM-DGM/V	Modification of the "Toquepala Concentrator" Processing Concession for the Expansion of Additional Facilities Area without modifying the installed capacity of the plant.	October 24, 2011	Ministry of Energy and Mines
Resolution N° 144-2015-MEM-DGM/V	Modification of the "Toquepala Concentrator" Processing Concession for the Expansion of Installed Capacity from 60,000 Mt/d to 120,000 Mt/d	April 14, 2015	Ministry of Energy and Mines

Permit Number	Permit	Date Issued	Permit Authority
R.D. N° 0015-2017-MEM/DGM	• Expansion of the "Toquepala Concentrator" Processing Concession to 300.32 ha. • Operation authorization of Primary Crusher No. 2, transportation system, intermediate stockpile and auxiliary facilities of the technological improvement project of the Toquepala Processing Plant	January 11, 2017	Ministry of Energy and Mines
Resolution N° 0058-2019-MEM-DGM/V	Modification of the "Toquepala Concentrator" Processing Concession, for the expansion of the tailings dam "Embalse de Quebrada Honda" from elevation 1,190 masl. to 1,240 masl with expansion of the area	February 12, 2019	Ministry of Energy and Mines
R.D. N° 047-2019-SENACE-PE/DEAR	First Supporting Technical Report of the Cuajone–Toquepala Integrated Leaching Project	March 05, 2019	National Environmental Certification Service for Sustainable Investments (Senace)
M-CLS-NT-00078-2019	Modification of the Environmental Impact Assessment of the Cuajone-Toquepala Integrated Leaching Project (Anticipated Classification ToR)	April 17, 2019	National Environmental Certification Service for Sustainable Investments (Senace)
CARTA N° 137-2019-SENACE-PE/DEAR		May 3, 2019	
Resolution N° 0273-2019-MEM-DGM/V	Approval for the operation of the Phase I Copper Plant equipment at a new capacity of 120,000 t/d	June 03, 2019	Ministry of Energy and Mines

Note: R.D. = Directorial Resolution; R.A. = Administrative Resolution

Table 17-2: Key Permits, Ilo Smelter/Refinery

Permit Number	Permit	Date Issued	Permit Authority
R.D. N° 078-69-EM/DGM	Definitive Operating Authorization for the Ilo smelter, with a production of 400 st/d of blister copper	August 21, 1969	Ministry of Energy and Mines
Report N° 056-94-EM-DGM/DRDM	Operation Authorization of the Ilo copper refinery with a capacity of 533 t/d for the treatment of blister copper	May 27, 1994	Ministry of Energy and Mines
R.D. N° 042-97-EM-DGM	Adaptation and Environmental Management Program (PAMA) for the U.P. Toquepala, U.P. Cuajone, U.P. Ilo and the Ilo Smelter	January 31, 1997	
R.D. N° 024-98-EM/DGE	Adaptation and Environmental Management Program (PAMA) for the Ilo Power Plant	June 18, 1998	
Report N° 506-97-EM-DGM/DPDM	Authorization of the Ilo Smelter, with an expanded capacity of 658 t/d	September 2, 1998	Ministry of Energy and Mines
R.D. N° 273-98-EM/DGM	Environmental Impact Assessment for the Mining Activity of Non-metallic Minerals of the “Cantera Chuza” Production Unit	September 24, 1998	
Report N° 204-2000-EM-DGM-DPDM	Operation authorization of the “La Fundición” Processing Concession with a capacity of 3,100 t/d of copper concentrate	June 20, 2000	Ministry of Energy and Mines
R.D. N° 023-2002-EM-DGAA	Modification of the PAMA for the Smelter and Power Plant	January 23, 2002	
Report N° 080-2002-EM-DGM/DPDM	Authorization for the operation of the Ilo smelter, with a capacity of 800 t/d	March 14, 2002	Ministry of Energy and Mines
R.D. N° 366-2003-EM-DGAA	Modification of the PAMA for the Ilo Smelter, referring to the Smelter Modernization Project	September 1, 2003	
R.D. N° 365-2006-MEM-AAM	Environmental Impact Assessment for the Maritime Terminal Project for Sulfuric Acid Shipment - Bahía de Tablones, to be carried out in Bahía Tablones, Pacocha District, Ilo Province	November 5, 2007	

Permit Number	Permit	Date Issued	Permit Authority
R.D. N° 457-2013-MEM-AAM	Supporting Technical Report for the Technological Improvement of the Concentrate Handling System at the Southern Peru Copper Corporation Industrial Port - Ilo Port Yard	December 2, 2007	
R.D. N° 065-2009-MEM-AAM	Shutdown Plan for the Process/Installation related to the IsaSmelt Furnace Building Hygiene Chimney, part of the Copper Smelter, located in Pacocha District, Ilo Province, Moquegua Department	March 23, 2009	
R.D. N° 312-2009-MEM-AAM	Closure Plan of the Ilo Production Unit	October 12, 2009	
R.D. N° 404-2009-MEM-AAM	Closure Plan of the Maritime Terminal for Sulfuric Acid Shipment at Bahía Tablones	December 10, 2009	
Resource N° 1961695	Operation authorization to capacity of 3,770 t/d	February 4, 2010	Ministry of Energy and Mines
Resolution N° 520-2010-MEM-DGM/V	Modification of the Ilo Copper Refinery Processing Concession without modification of installed capacity	December 30, 2010	Ministry of Energy and Mines
R.D. N° 318-2011-MEM-AAE	Environmental Impact Statement (DIA) of the Project “New Ilo 3 Electrical Substation”	October 27, 2011	
R.D. N° 053-2013-MEM-AAM	Update of the Mine Closure Plan for the Ilo Mining Unit and the Maritime Terminal for Sulfuric Acid Shipment at Bahía Tablones	February 20, 2013	
Oficio 2477-2013-MEM/AAE	Technical Report on the Installation of an Auxiliary Steam Boiler	September 4, 2013	
R.D. N° 341-2013 MEM/AAE	Environmental Management Plan for the Adaptation to the Discharge and Reuse Program for Treated Wastewater from the Ilo1 Thermal Power Plant	November 20, 2013	
R.D. N° 349-2013 MEM/AAE	Environmental Management Plan for Adaptation to the Water Environmental Quality Standards for the Ilo1 Thermal Power Plant	November 22, 2013	

Permit Number	Permit	Date Issued	Permit Authority
R.D. N° 457-2013-MEM-AAM	Supporting Technical Report for the Technological Improvement of the Concentrate Handling System at the Southern Peru Copper Corporation Industrial Port - Ilo Port Yard	December 2, 2013	
R.D. N° 006-2015/DREMM-GRM	Environmental Impact Assessment of the Project "220 kV Transmission Line S.E. Ilo 3 – T46 (from the 220 kV Moquegua – Tía María Transmission Line)	February 13, 2015	
R.D. N° 154-2016-MEM-DGAAM	Supporting Technical Report - Environmental Technological Improvement of the Ilo Mining Unit and Related Works	May 19, 2016	
R.D. N° 010-2019/MEM-DGAAM	Second Update of the Mine Closure Plan for the Ilo Mining Unit	January 24, 2019	
R.D. N° 111-2019-SENACEPE/DEAR	Second Supporting Technical Report for the Ilo Mining Unit	July 11, 2019	National Environmental Certification Service for Sustainable Investments (Senace)
R.D. N° 118-2019-SENACE-PE/DEAR		July 23, 2019	
R.D. N° 105-2020-SENACE-PE/DEAR	Third Supporting Technical Report for the Ilo Mining Unit	September 9, 2020	National Environmental Certification Service for Sustainable Investments (Senace)
R.D. N° 00161-2022-SENACE-PE/DEAR	Modification of the Environmental Impact Assessment of the Ilo Mining Unit (Plan de Participación Ciudadana)	November 7, 2022	National Environmental Certification Service for Sustainable Investments (Senace)
R.D. N° 00126-2023-SENACE-PE/DEAR	Fourth Supporting Technical Report for the Ilo Mining Unit	September 20, 2023	National Environmental Certification Service for Sustainable Investments (Senace)

Permit Number	Permit	Date Issued	Permit Authority
R.D. N° 00107-2024-SENACE-PE/DEAR, and INFORME N° 00714-2024-SENACE-PE/DEAR	Fifth Supporting Technical Report for the Ilo Mining Unit	August 16, 2024	National Environmental Certification Service for Sustainable Investments (Senace)
-	Third Update of the Mine Closure Plan for the Ilo Mining Unit	Under review	Ministry of Energy and Mines

Note: R.D. = Directorial Resolution

The operations maintain a permit register, which includes a record of the legal permits obtained, the approval authority, permit validity period and expiration dates, permit status (current, canceled or replaced) and whether the permit requires renewal. The operations also include a control and monitoring system designed to ensure compliance with the requirements of each permit and the relevant regulatory conditions imposed.

17.4.2 Additional Permitting Requirements

Some portions of the proposed WRSFs required to support the mine plan are located outside the area currently held by Southern Copper under surface rights. Additional surface rights will need to be secured.

Additional tailings storage capacity will be required once the existing Quebrada Honda TSF reaches its maximum capacity, anticipated by the end of 2036. Wood has assumed that the Toquepala mine will manage filtered tailings using a standalone dry stack facility located near the Quebrada Honda TSF area, as space available at the Toquepala site is limited.

Southern Copper believes that it has sufficient time to acquire the necessary surface rights, obtain the required permits and secure the assignment of mining concessions to support the planned expansion of the WRSFs and the development of the new TSF.

17.5 Social Considerations, Plans, Negotiations and Agreements

The EIA, completed in 2014, concluded that no populations or cultivated areas would be directly affected by the Toquepala Operations. The Area of Indirect Influence was identified as encompassing the districts of Locumba and Ilabaya, in the province of Jorge Basadre, Tacna, and the district of Moquegua in the province of Mariscal Nieto, Moquegua.

An updated social baseline conducted in 2021 found that the Locumba and Ilabaya districts, within the Area of Indirect Influence, each had populations of fewer than 10,000 people. Moquegua has a population of approximately 68,000. The primary activities in Locumba include agriculture, livestock, forestry, and fishing. In Ilabaya, the main economic activity is construction, while in Moquegua, the predominant activities are commerce and the repair of motor vehicles and motorcycles.

Southern Copper has community programs as part of its social management plan that focus on a number of key goals, including:

- Co-existence with local communities on a good neighbors basis
- Promotion of local economic development
- Promotion of individual community member capabilities.

The programs under the social management plan include:

- Communication and consultation program
- Participatory environmental monitoring and surveillance program
- Local employment program
- Local capacity building program
- Institutional strengthening program
- Water infrastructure improvement program
- Conflict prevention program
- Social closure program.

Reasonable mechanisms are being implemented to maintain relationships with surrounding communities, to mitigate any perceived social conflicts that could be associated with the Project.

Southern Copper has communication channels and tools in place, based on the company's community development model, which allow the company to recognize potential conflicts early, to work with the community to find appropriate solutions to address their concerns, and generate positive social license conditions for the continued operation of Southern Copper's mining projects.

17.6 Opinion on Adequacy of Current Plans to Address Issues

After reviewing the information provided, Wood's QP is of the opinion that Southern Copper has appropriately implemented a system to identify and mitigate social issues that arise during operations. Wood considers that Southern Copper has a clear understanding of the social risks associated with the Project and that they are reasonably manageable for the Toquepala Operations. Additionally, Wood considers Southern Copper's current plans are adequate to address any issues related to environmental compliance, permitting, and engagement with local individuals or groups.

18.0 CAPITAL AND OPERATING COSTS

18.1 General and Administrative Costs

General and administrative costs are included in the corresponding mining and processing costs.

18.2 Introduction

Capital and operating cost estimates are at a minimum at a pre-feasibility level of confidence, with an accuracy range of ±25%, and an overall contingency of no more than 15%.

18.3 Capital Cost Estimates

18.3.1 Basis of Estimate

In general, the Toquepala Operations have the necessary facilities to carry out its current operations. Sustaining capital costs were estimated by area and allocated over time to support the proposed mine production schedule at current production throughputs, and include the following:

- Mine equipment fleet increase and replacement, and maintenance
- Truckshop expansion to serve increased mining equipment fleet
- WRSF development and required land acquisition
- Existing Quebrada Honda TSF raise
- Filtered tailings plant and land acquisition for tailings management
- Leach primary crusher relocation
- Powerline relocation
- Process facilities sustaining and maintenance
- Other general sustaining and maintenance.

All capital costs were expressed in Q3 2024 US dollars unless otherwise stated. Where costs used in the estimate were provided in currencies other than US dollars, the following exchange rate as provided by Southern Copper, was used:

- 2024: US$1.00 = PENS/3.80

No allowances were made for fluctuations in exchange rates.

18.3.1.1 Mining

Mine equipment requirements were estimated by operating area (drilling, loading, hauling, support, etc.) based on the proposed LOM plan and equipment replacement ratios provided by Southern Copper. Capital costs for the major mine mobile equipment were based on recent pricing provided by Southern Copper and support mine mobile equipment were based on purchases made by Southern Copper in recent years. Support mine mobile equipment costs account for approximately 10% of the total mine mobile equipment cost. No contingency was applied to mining equipment costs. Mine equipment maintenance costs were accounted for based on unit costs derived from the 2025–2029 sustaining and maintenance cost schedule developed by Southern Copper and a percentage of major equipment costs to account for spare parts based on benchmark, resulting in an overall unit cost of $0.16/t mined.

18.3.1.2 Truckshop Expansion

A truckshop expansion is required in about 2028, to accommodate maintenance of a larger mining fleet. Eight additional bays will be added to the existing Toquepala truckshop. Costs were used from an internal study on another Southern Copper project and adjusted to account for difference in size and escalation to Q3 2024 using a combination of escalation factors and recent rates to develop the capital cost estimate. Indirect costs were applied based on benchmark factors. A contingency of 20% of the direct and indirect cost was included.

18.3.1.3 Waste Rock Storage Facility Development and Land Acquisition

Additional land is required for the development of WRSFs to support the LOM mine production schedule. Land acquisition costs were provided by Southern Copper based on ongoing negotiations with landowners and market surveys.

18.3.1.4 Quebrada Honda Tailings Storage Facility Expansion

The costs associated with the raise of the existing Quebrada Honda TSF accounts for the works to expand the TSF to its maximum design storage capacity until approximately the end of 2036, which include:

- Main and lateral dikes drainage systems
- Relocation of the catchment pond of the lateral dike
- Relocation of cyclone station 2101
- Relocation of offices, workshops, control room and tanks
- Supporting equipment, barges and lime plant sustaining costs.

These costs were estimated by Southern Copper in 2021 based on a combination of overall costs incurred in similar previous works executed, quantities derived from conceptual designs and unit costs from similar previous works executed, and costs allowances, and were escalated to Q3 2024 using a combination of escalation factors and recent rates. Costs are inclusive of direct and indirect costs and a contingency of 20% of the direct and indirect costs. These costs were distributed between the Cuajone and Toquepala Operations proportionally to nominal mill feed throughputs of each.

18.3.1.5 Filtered Tailings Plant

Additional tailings storage capacity is required to accommodate tailings from processing of the remaining LOM ore once the existing Quebrada Honda TSF reaches the ultimate storage capacity at approximately the end of 2036. Wood assumed dry stack tailings as the preferred alternative to process and store the remaining tailings (starting from 2037).

It is assumed that the Toquepala Operations will dispose the filtered tailings in a standalone dry stack facility to be located near the Quebrada Honda TSF area, as limited space is available on the Toquepala site. The capital cost estimates include:

- Costs for the procurement and development of required facilities for the thickening/drying/filtering process infrastructure for the tailings materials and subsequent disposal in the dry stack facility. Costs from a 2020 internal study of another Southern Copper project that considered disposing tailings by comingling waste rock and filtered tailings materials were used and adjusted to account for difference in throughput and escalation to Q3 2024 using a combination of escalation factors and recent rates to develop the capital cost estimate at a conceptual level, complemented with engineering judgement and costs derived from projects of similar applications. Indirect costs were applied based on benchmark factors. A contingency of 20% of the direct and indirect cost was included.
- Costs for the procurement and development of the pumping system to pump the recovered water at the tailings filtering plant to the Toquepala Operation were estimated by Southern Copper at a conceptual level, based on the costs incurred in a previous similar project that was executed by Southern Copper, and were escalated to Q3 2024. A contingency of 15% of the direct and indirect cost was included.
- $21.3 million for the power supply with the cost provided by Southern Copper and escalated to Q3 2024.
- Land acquisition costs as provision for tailings management space as provided by Southern Copper based on market surveys.

Sustaining costs of $0.9 million each year and $17.3 million every three years were included for relocating conveyors for continued operation, equipment replacement associated with the conveyor systems, and additional cost related to changing/updating filtering equipment.

18.3.1.6 Leach Crusher Relocation

To allow pit development, the low-grade sulfide primary crusher will need to be relocated. For operational purposes, Southern Copper expects to undertake this work in about 2025–2026. The associated cost was estimated by Southern Copper in 2021 based on quantities derived from a conceptual design and cost allowances, and was escalated to Q3 2024 using a combination of escalation factors and recent rates. Indirect costs were applied based on benchmark factors. A contingency of 20% of the direct cost was included.

18.3.1.7 Powerline Relocation

To allow pit development, an existing powerline will need to be relocated. The relocation of this component is expected to be executed in 2028. The associated cost was estimated by Southern Copper based on costs incurred on similar previous works executed by Southern Copper that were escalated to Q3 2024 using a combination of escalation factors and recent rates. This estimate is inclusive of indirect costs and 20% contingency.

18.3.1.8 Process and Other Sustaining and Maintenance Costs

Process facilities sustaining and maintenance, and other general sustaining and maintenance costs were accounted for based on the following unit costs derived from the 2025–2029 sustaining and maintenance cost schedule developed by Southern Copper.

- Processing facilities sustaining and maintenance:
  - Concentrators = $0.65/t processed for sustaining and maintenance
  - LESDE area = $594.20/t of cathode produced
  - Ilo smelter and refinery = $25.53/t of concentrate treated
- Other sustaining and maintenance = $0.23/t processed (concentration and leaching).

The build up for these costs are well understood and no contingency is required.

18.3.2 Capital Cost Estimate Summary

The LOM sustaining capital cost estimate totals $8,469.0 million (Table 18-1) and includes an overall contingency of no more than 15%. Costs are inclusive of indirect costs.

Capital costs were applied in the financial model excluding value-added tax.

Table 18-1: Sustaining Capital Cost Estimate

Area	Sustaining Capital Cost ($M)
Mining equipment	4,598.6
Truckshop expansion	27.7
Powerline relocation	8.9
WRSF development and land acquisition	18.0
Existing tailings storage facility (Quebrada Honda) raise	97.6
Filtered tailings plant, including land acquisition	860.3
Primary crusher relocation	59.2
Process facilities sustaining and maintenance	2,058.4
Other general sustaining and maintenance	571.1
Subtotal Direct + Indirect cost	8,299.7
Contingency	169.3
Total	**8,469.0**

Note: Totals may not sum due to rounding.

18.4 Operating Cost Estimates

18.4.1 Basis of Estimate

Operating costs were based on actual costs and data from Southern Copper's operating mines in Peru, Wood's experience and the proposed mine and process plans.

18.4.2 Mining Costs

Operating costs incorporated operational life, average availabilities, and efficiencies for the major mine equipment fleet. The equipment operating time inputs were adjusted by Southern Copper to reflect operating considerations.

Inputs for drill productivity and blasting accessory costs were provided by Southern Copper. Explosives costs were estimated by consumption ratios provided by Southern Copper, based on operational data.

The inputs and main consumable costs were provided by Southern Copper. Additional load-and-haul design criteria were based on operational parameters from the Cuajone Operations.

Vehicle speeds and diesel consumption were based on grouping roads with similar inclinations into segments.

The mine equipment power consumption rate was provided by Southern Copper. The estimated fuel price for the LOM was $3.05/gal and the energy price was $0.081/kWh.

The maintenance and repair cost includes the costs to repair and replace parts including rebuild labor. The replacement cost for truck tires is $50,327/tire with a life of 5,554 hours.

The technical manpower required was estimated based on the actual organizational structure.

Salaries were provided by Southern Copper.

The total material mined is estimated at 8,908 Mt. Mine operating costs are forecast to average $2.86/t mined over the LOM. The mine cost increases gradually starting at $2.45/t mined in Year 1 (2025) to a cost of $3.08/t mined in year 41 (2065), due to the increase in ex-pit hauling distance (WRSFs) and the deepening of the pit.

In addition to mining costs, costs associated with the material preparation for leaching at the crushed ore leach facility are also accounted for in this area.

18.4.3 Process Costs

Process operating costs were based on a combination of actual cost averages over the period 2019 - 2024 adjusted to account for the LOM based on expected variations of key commodity costs such as energy, consumables, and services; and a projection of the leaching and SX/EW costs provided by Southern Copper based on the leach and cathodes production schedule and operational parameters and main consumable costs based on data from their operations. Processing costs include concentration costs, leaching and SX/EW cathode recovery, and smelting and refining at Ilo, which are inclusive of:

- Labor costs
- Power and fuel costs for usage by equipment, vehicles and infrastructure
- Materials costs for the concentrators included consumables such as grinding media, crushing and grinding liners, and reagents. For the leaching and SX/EW plant included costs of piping supplies and reagents such as sulfuric acid, cobalt sulfate, and extractants. For the smelter this cost element included the cost of silica, refractory and steel consumables, piping and electrical supplies, and liquified petroleum gas. For the refinery, this cost element included electrical supplies, reagents, piping and valves, and laboratory supplies

- The "services and other" cost element includes the cost of water, contractor work costs (operation and maintenance), laboratory services, and other indirect costs.

Operating costs associated with tailings disposal at the existing Quebrada Honda TSF are included as part of concentrator costs.

Silver shots and gold-bearing doré bars are normally produced in the Ilo refinery; however, as neither revenue from the silver shots and gold-bearing doré bars nor the production costs for the silver shots and gold-bearing doré bar were considered in the economic analysis, the cost estimate reported for the Ilo refinery excludes the precious metals plant operating cost.

Operating costs estimates for the concentrators are presented in Table 18-2, for the LESDE facility in Table 18-3, for the Ilo smelter in Table 18-4, and for the Ilo refinery in Table 18-5.

Table 18-2: Toquepala Concentrator Operating Costs

Area	Concentrator No. 1 ($/t processed)	Concentrator No. 2 ($/t processed)
Labor	1.16	0.65
Fuels	0.02	0.01
Power	1.62	1.91
Materials	4.14	4.51
Services and others	1.41	0.94
Total	**8.35**	**8.02**

Note: Numbers have been rounded. Totals may not sum due to rounding.

Table 18-3: Toquepala Leaching and SX/EW Operating Costs

Area	LOM Costs Range ($/lb Cu recovered)
Labor	0.12 – 1.15
Fuels	0.04 – 0.41
Power	0.37 – 1.76
Materials	0.05 – 0.55
Services and Others	0.12 – 1.12
Total	**1.01 – 4.53**

Note: Numbers have been rounded. Totals may not sum due to rounding.

Table 18-4: Ilo Smelter Operating Costs

Area	Adjusted Average 2020–2024 ($/t of concentrate processed)
Labor	32.53
Fuels	9.73
Power	21.90
Materials	36.92
Services and Others	21.70
Total	**122.77**

Note: Numbers have been rounded. Totals may not sum due to rounding.

Table 18-5: Ilo Refinery Operating Costs

Area	Adjusted Average 2020–2024 ($/lb Cu recovered)
Labor	0.0232
Fuels	0.0004
Power	0.0086
Materials	0.0091
Services and Others	0.0197
Total	**0.0610**

Note: Numbers have been rounded. Totals may not sum due to rounding.

In addition to the estimates described above, an alternate tailings processing and storage option is required to process the remaining LOM ore once the existing Quebrada Honda TSF reaches the ultimate storage capacity at approximately the end of 2036. Wood assumed dry stack tailings as the preferred alternative to store the remaining tailings (starting from 2037) in a standalone dry-stack facility to be located near the Quebrada Honda TSF area, as limited space is available on the Toquepala site. A cost of $2.15/t was estimated at a conceptual level from a 2020 internal study of another Southern Copper project that considered disposing tailings by comingling waste rock and filtered tailings materials, complemented with a conceptual estimate developed by Southern Copper, engineering judgement on costs derived from projects of similar applications, and escalation to Q3 2024 using escalation factors.

A cost of $9.6 M/a was included for the operation of the filtered tailings pilot plant with the cost provided by Southern Copper. This cost was applied from 2025 to 2036 (the year before the main thickening/drying/filtering process infrastructure is assumed to start operations) and distributed between the Cuajone and Toquepala Operations proportionally to nominal mill feed throughputs of each.

18.4.4 Operating Cost Estimate Summary

Table 18-6 is a summary of the operating cost estimates with an accuracy range of ±25%, an overall contingency of no more than 15% is included, and exclusive of value-added taxes.

Table 18-6: Toquepala LOM Operating Cost Estimate

Description	Unit	Cost	Total ($M)
Mining	$/t mined[1]	2.65	23,580.0
Process	$/t processed[2]	8.98	22,588.1
Total			**46,168.2**

Note: Totals may not sum due to rounding.
(1) Including preparation costs at the crushed ore leach dump
(2) Including ore for concentration and leaching, excluding existing material in leach dumps

19.0 ECONOMIC ANALYSIS

19.1 Forward-looking Information Caution

Certain information and statements contained in this section are forward-looking in nature and are subject to known and unknown risks, uncertainties, and other factors, many of which cannot be controlled or predicted and may cause actual results to differ materially from those presented here. Forward-looking statements include, but are not limited to, statements with respect to the economic and study parameters of the Toquepala Operations; mineral reserves; the proposed mine plan and mining strategy; ability of mine designs to withstand seismic events; dilution and extraction recoveries; processing method and rates and production rates; projected metallurgical recovery rates; infrastructure requirements; capital, operating and sustaining cost estimates; concentrates and cathodes marketability and commercial terms; the projected LOM and other expected attributes of the Project; the NPV; future metal prices and currency exchange rates; government regulations and permitting timelines; estimates of reclamation obligations; requirements for additional capital; environmental and social risks; and general business and economic conditions.

19.2 Methodology

The financial analysis was performed using a discounted cash flow (DCF) method. Net annual cash flows were estimated projecting yearly cash inflows (or revenues) and subtracting projected yearly cash outflows (such as capital and operating costs, royalties, and taxes).

The financial model that supports the mineral reserve declaration was a standalone model that calculated annual cash flows based on: scheduled ore production; assumed processing recoveries; metal sale prices; projected operating and capital costs; and estimated taxes.

The financial analysis was based on an after-tax discount rate of 10%. Cash flows were assumed to occur at the end of each year and were discounted to the beginning of 2025 (Year 1 of the economic analysis).

Costs projected within the cash flows are based on constant Q3 2024 US dollars.

Revenue was calculated from the recoverable and copper and molybdenum metal and the long-term forecasts of metal prices and exchange rates. Recoverable copper metal and non-metal products include those recovered at the Ilo smelter and refinery from the copper concentrate feed from the mine operation and copper and molybdenum concentrate sales.

19.3 Input Parameters

19.3.1 Mineral Reserves and Mine Life

The mineral reserves estimate was summarized in Section 12.3. The projected production schedule and mine life was provided in Section 13.4.

19.3.2 Metallurgical Recoveries

The metallurgical recovery forecast was provided in Section 10.4.

19.3.3 Smelting and Refining Terms

The following long-term commercial terms and charges were used in the cash flow model. These were based on current contract terms. Transport costs were based on average costs incurred from 2022 to mid-2024 using escalated values to Q3 2024.

19.3.3.1 Copper Concentrate

Based on Southern Copper's preliminary forecast, the cash flow assumes that on average, in those years when the total annual copper concentrate production from Cuajone and Toquepala operations is equal or less than the Ilo smelter nominal capacity (1.2 Mt/a of Cu concentrate), all the copper concentrate from the Cuajone and Toquepala operations will be treated at the Ilo smelter. In those years when the total annual copper concentrate production from Cuajone and Toquepala operations is higher than the Ilo smelter nominal capacity, 10% minimum or surplus production will be sold to third parties.

A concentrate transport loss of 0.2% was included, based on benchmarks. A concentrate moisture of 7.92%, which was the average value from January to October 2024, was considered for the copper concentrate.

The following commercial terms were applied to the portion of the copper concentrate that is assumed to be sold to third parties:

- Payability factors:
  - Payable copper of 96.5%, subject to a minimum deduction of 1.0 unit
- Treatment and refining charges:
  - Treatment charge = $80.00/dmt
  - Copper refining charge = $0.08/lb Cu payable.

Ocean freight costs were estimated at $47.88/wmt of copper concentrate from the port of Ilo. These costs were based on average costs from 2022 to mid-2024 using escalated values to Q3 2024. Land transport (by rail) and port costs were included in the operating costs.

19.3.3.2 Molybdenum Concentrate

Typically, over 60% of the molybdenum concentrate is sold to Chile, with the remainder sold into the Northern Europe, Asia, and the US markets. The following commercial terms were assumed:

- Payability factors:
  - Payable molybdenum of 100%
- Treatment and refining charges:
  - Roasting charge of $1.70/lb Mo payable. This cost was based on the average cost from 2022 to mid-2024 using escalated values to Q3 2024
- No price participation or penalties were applicable
- No transport losses were considered.

A concentrate moisture of 9.09% was used for the molybdenum concentrate, which was the average value from January to October 2024.

Ocean freight costs were estimated at $286.83/t Mo contained in concentrate from the port of Ilo. This cost was based on the average from 2022 to mid-2024 using escalated values to Q3 2024. Land transport (by rail) and port costs were included in the operating costs.

19.3.3.3 Copper Cathodes

The copper cathodes produced are typically sold to different markets located in the Americas, Europe, and Asia. The following commercial terms were assumed:

- Payable copper of 100%, subject to a premium of $105.64/t. This cost was based on the average premium from 2022 to mid-2024 using escalated values to Q3 2024.
- No price participation was applicable.

Ocean freight costs were estimated at $94.91/t Cu from the port of Ilo. This cost was based on the average cost from 2022 to mid-2024 using escalated values to Q3 2024. Land transport (by rail) and port costs were included in the operating costs.

19.3.3.4 Ilo Smelter and Refinery

Copper Blister/Anodes

Typically, about only about 4.5% of the copper anodes produced are sold to third parties, which are primarily located in Asia. Most of the anodes, 95.5%, are sent to the Ilo refinery for cathode production. The anode copper content is assumed at 99.7%. The remaining 0.3% of the anode content includes silver, gold, sulfur, oxygen and other elements, none of which are assumed payable in the economic analysis as they have not been estimated in the mineral resources and mineral reserves. The following commercial terms were assumed:

- Payability factors:
  - Payable copper of 100%, subject to a deduction of 0.3%
- No price participation was applicable
- Treatment and refining charges:
  - Treatment charge: zero
  - Refining charge: $167.93/t of anode. This cost was based on the average cost from 2022 to mid-2024 using escalated values to Q3 2024.

Ocean freight costs were estimated at 74.18/t Cu from the port of Ilo. This cost was based on the average cost from 2022 to mid-2024 using escalated values to Q3 2024. Land transport (by rail) and port costs were included in the operating costs.

Copper Cathodes

Cathode assumptions are the same as those detailed under Section 19.3.3.3.

Silver Shots

Silver shots have been produced and are typically sold to the US, Brazil, Peru, Chile, Argentina, and Colombia. Because silver was not estimated in the mineral resources or mineral reserves, silver shot revenue is not included in the production schedule or economic analysis, nor were silver shot production costs considered.

Gold Doré Bars

Gold-bearing doré bars have been produced in the past are sold locally in Perú. Because gold was not estimated in the mineral resources or mineral reserves, gold-bearing doré bar's revenue is not included in the production schedule or economic analysis, nor were the gold-bearing doré bar's production costs considered.

Sulfuric Acid

Approximately 88% of the sulfuric acid produced is sold within South America, with 60% of that acid production figure going to Chile, and 40% to Peru. The remaining 12% is used in the Cuajone and Toquepala Operations.

Southern Copper assumes in its cash flow planning that the Tia Maria project will source the required sulfuric acid for that operation from the Ilo smelter and refinery at the cost of production, which represents approximately 720,000 t/a, or about 60% of the total acid production from the Ilo smelter.

All other revenue from acid sales apart from that from the Tia Maria project have been excluded from the financial model.

19.3.4 Commodity Price and Exchange Rate Assumptions

Revenue was calculated from the recoverable copper and molybdenum metal and the long-term forecast of metal prices and exchange rates. Revenue from the sale of a copper concentrate is included based on the contained metal, accountability factors and the long-term forecast for metals prices and exchange rates. Recoverable copper metal include those recovered at the Ilo smelter and refinery from the copper concentrate feed from the mine operation.

Commodity price and exchange rate forecasts were provided in Section 16.4.

19.3.5 Capital Costs

The capital cost estimate was summarized in Section 18.2.

19.3.6 Operating Costs

The operating cost estimate was summarized in Section 18.3.

19.3.7 Royalties

Special mining taxes and the modified mining royalty are discussed in Section 3.2.3. There are no other royalties payable on the Toquepala Operations.

19.3.8 Working Capital

Working capital provisions in the cash flow analysis included:

- 60 days in accounts receivable, including revenue
- 30 days in accounts payable, including concentrates, anodes and cathodes selling costs, operating costs, special mining tax and modified mining royalty.

19.3.9 Closure and Reclamation Costs

Closure costs were provided in Section 17.3. Closure costs were allocated in the relevant cash flow years based on the progressive, final and post closure schedule. It was assumed that closure cost accruals are not required, and closure obligations will be satisfied by either escrow with other Southern Copper assets as collateral, a bond, or a bank letter of credit.

The salvage value was assumed to be zero.

19.3.10 Financing

All expenditures were assumed to be financed with 100% equity, i.e., no debt was considered.

19.3.11 Inflation

No escalation or inflation was applied. All amounts were constant (real) Q3 2024 terms.

19.3.12 Taxation Considerations

The taxation modeled within the financial analysis is based on the taxation scheme that was provided and validated by Southern Copper.

The assumptions include:

- All expenses excluded the value-added tax (Impuesto General a las Ventas (IGV)), except for closure costs which do include IGV

- Modified mining royalty (Law N° 29788)
- Special mining tax (Law N° 29789)
- Employee profit sharing of 8% of taxable income
- Corporate income tax rate of 29.5%
- Complementary mining pension fund applied at 0.5% of taxable income after employee profit sharing
- Tax loss carried forward not applicable.

Tax depreciation is straight line and is divided into the following categories:

- Non-depreciable: land acquisition
- 10 years (10% annual): mining and process equipment (including sustaining and maintenance items)
- 20 years (5% annual): filtered tailings plant and supporting infrastructure (including pilot plant), primary crusher relocation, and Ilo smelter and refinery ongoing sustaining and maintenance items
- 30 years (3.3% annual): mine support facilities (truckshop), expansion of existing TSF, and other ongoing sustaining and maintenance items (not included in schedules above).

The same rates are used for financial depreciation.

Depreciation from previous expenditures and existing assets, including those from the Ilo smelter and refinery, in the amount of $1,676.5 million, as provided by Southern Copper, was accounted for in the financial model for both tax and financial depreciation.

19.4 Results of Economic Analysis

The Toquepala Operations are anticipated to generate a pre-tax NPV of $1,348.0 million at a 10% discount rate and an after-tax NPV of $373.6 million at a 10% discount rate.

As the mine is operating, and the initial capital is sunk, considerations of IRR and payback are not relevant.

A cash flow summary is provided in Table 19-1, and the LOM cash flow forecast on an annualized basis in Table 19-2 to Table 19-6.

Table 19-1: Summary of Economic Results

Description	Unit	Value
Remaining mine life	years	41.2
Copper payable	Mlb	18,674.9
Molybdenum payable	Mlb	921.2
After-Tax Valuation Indicators		
Undiscounted cash flow	$M	6,596.2
NPV @ 10%	$M	373.6
Sustaining capital	$M	8,469.0
Closure cost (including IGV)	$M	305.9
Mining operating cost	$M	23,580.0
Process operating cost	$M	22,588.1

Note: Numbers have been rounded. IGV = value-added tax (Impuesto General a las Ventas)

Table 19-2: Cash Flow Forecast on an Annual Basis (2025–2033)

Area	Unit	Total	2025	2026	2027	2028	2029	2030	2031	2032	2033
MINE PRODUCTION											
Waste mined	Mt	**6,394.4**	225.5	207.6	264.6	258.6	227.6	197.2	242.6	277.3	266.8
Total ore mined	Mt	**2,514.5**	53.4	72.3	71.3	51.5	72.7	132.9	76.6	49.4	43.5
Sulfide Ore Mined (concentration)											
Sulfides ore mined	Mt	**1,768.8**	42.4	43.0	42.9	43.0	43.0	42.9	43.1	43.0	42.9
Cu head grade	%	**0.54**	0.74	0.46	0.47	0.67	0.78	0.34	0.39	0.58	0.69
Mo head grade	%	**0.034**	0.051	0.037	0.011	0.021	0.045	0.009	0.010	0.022	0.040
Oxide/Sulfide Ore Mined (leaching)											
Oxide ore mined	Mt	**745.7**	11.0	29.3	28.3	8.5	29.7	90.0	33.5	6.3	0.6
Cu head grade	%	**0.20**	0.18	0.20	0.21	0.20	0.18	0.20	0.22	0.20	0.20
PROCESS PRODUCTION											
Feed to Mill (sulfides)											
Sulfide ore feed	Mt	**1,768.8**	42.4	43.0	42.9	43.0	43.0	42.9	43.1	43.0	42.9
Cu feed grade	%	**0.54**	0.74	0.46	0.47	0.67	0.78	0.34	0.39	0.58	0.69
Mo feed grade	%	**0.034**	0.051	0.037	0.011	0.021	0.045	0.009	0.010	0.022	0.040%
Feed to Leach (sulfide/oxide)											
Sulfide/oxide ore feed	Mt	**745.7**	11.0	29.3	28.3	8.5	29.7	90.0	33.5	6.3	0.6
Cu feed grade	%	**0.20**	0.18	0.20	0.21	0.20	0.18	0.20	0.22	0.20	0.20
METAL RECOVERY											
Concentration											
Cu recovered	Mlb	**18,568.7**	620.7	381.0	390.9	565.6	671.6	275.3	320.8	488.7	583.6
Mo recovered	Mlb	**921.2**	33.4	25.8	6.2	12.2	28.4	5.6	5.6	13.4	25.6
Leaching											
Cu recovered	Mlb	**713.5**	39.7	35.7	33.3	29.4	27.6	28.1	28.5	24.9	19.8

Area	Unit	Total	2025	2026	2027	2028	2029	2030	2031	2032	2033
PAYABLE METALS											
Cu payable	Mlb	**18,674.9**	639.2	404.5	411.7	576.2	676.5	294.6	339.0	497.2	583.6
Mo payable	Mlb	**921.2**	33.4	25.8	6.2	12.2	28.4	5.6	5.6	13.4	25.6
METAL VALUE											
Cu payable value	$M	**62,404.0**	2,130.6	1,353.5	1,377.5	1,923.7	2,255.8	985.6	1,134.1	1,659.7	1,945.4
Mo payable value	$M	**9,211.7**	334.2	258.4	62.0	121.7	284.5	56.4	55.8	133.7	256.4
Total Metal Value	**$M**	**71,615.7**	**2,464.8**	**1,611.9**	**1,439.5**	**2,045.4**	**2,540.3**	**1,042.0**	**1,189.9**	**1,793.4**	**2,201.8**
TREATMENT AND REFINING CHARGES (TC&RCS)											
Cu concentrate TC&RCs	$M	**(382.9)**	(38.8)	-	-	(20.4)	(36.5)	-	-	(19.0)	(34.5)
Cu (Ilo) anodes TC&RCs	$M	**(55.9)**	(1.5)	(1.3)	(1.3)	(1.6)	(1.7)	(0.9)	(1.1)	(1.3)	(1.4)
Mo concentrate TC&RCs	$M	**(1,562.3)**	(56.7)	(43.8)	(10.5)	(20.6)	(48.2)	(9.6)	(9.5)	(22.7)	(43.5)
Total TC&RCs	**$M**	**(2,001.1)**	**(96.9)**	**(45.1)**	**(11.8)**	**(42.6)**	**(86.4)**	**(10.5)**	**(10.5)**	**(43.0)**	**(79.4)**
TRANSPORT COSTS											
SX/EW cathodes transport	$M	**(30.7)**	(1.7)	(1.5)	(1.4)	(1.3)	(1.2)	(1.2)	(1.2)	(1.1)	(0.9)
Cu concentrate transport	$M	**(159.1)**	(16.1)	-	-	(8.5)	(15.2)	-	-	(7.9)	(14.4)
Ilo anodes transport	$M	**(24.7)**	(0.6)	(0.6)	(0.6)	(0.7)	(0.7)	(0.4)	(0.5)	(0.6)	(0.6)
Ilo cathodes transport	$M	**(667.2)**	(17.4)	(15.2)	(15.6)	(18.7)	(19.9)	(11.0)	(12.8)	(15.9)	(16.8)
Mo concentrate transport	$M	**(119.8)**	(4.3)	(3.4)	(0.8)	(1.6)	(3.7)	(0.7)	(0.7)	(1.7)	(3.3)
Total Transport Costs	**$M**	**(1,001.6)**	**(40.2)**	**(20.6)**	**(18.4)**	**(30.7)**	**(40.7)**	**(13.3)**	**(15.2)**	**(27.2)**	**(35.9)**
NET SMELTER RETURN	**$M**	**68,613.0**	**2,327.6**	**1,546.2**	**1,409.3**	**1,972.1**	**2,413.2**	**1,018.2**	**1,164.2**	**1,723.2**	**2,086.5**
PRODUCTION COSTS											
Mining	$M	**(23,580.0)**	(681.8)	(680.4)	(788.7)	(757.4)	(760.0)	(788.6)	(769.8)	(763.9)	(797.0)
Process	$M	**(22,588.1)**	(517.3)	(502.0)	(502.3)	(521.7)	(528.6)	(468.5)	(480.2)	(496.3)	(497.9)
G&A	$M	**-**	-	-	-	-	-	-	-	-	-
Total Production Costs	**$M**	**(46,168.2)**	**(1,199.1)**	**(1,182.4)**	**(1,291.0)**	**(1,279.1)**	**(1,288.6)**	**(1,257.0)**	**(1,250.0)**	**(1,260.2)**	**(1,294.9)**

Area	Unit	Total	2025	2026	2027	2028	2029	2030	2031	2032	2033
MMR AND SMT											
Modified Mining Royalty	$M	**(904.6)**	(25.2)	(15.7)	(14.3)	(20.0)	(24.5)	(10.3)	(11.8)	(17.5)	(21.2)
Special Mining Tax	$M	**(539.8)**	(26.6)	(2.6)	-	(10.1)	(25.6)	-	-	(4.2)	(12.5)
MMR and SMT	**$M**	**(1,444.4)**	**(51.8)**	**(18.3)**	**(14.3)**	**(30.2)**	**(50.1)**	**(10.3)**	**(11.8)**	**(21.7)**	**(33.8)**
NET OPERATING EARNINGS	**$M**	**21,000.4**	**1,076.7**	**345.4**	**104.1**	**662.9**	**1,074.5**	**(249.1)**	**(97.6)**	**441.4**	**757.8**
TAXES											
Employee profit share	$M	**(1,269.9)**	(67.4)	(8.9)	-	(31.9)	(66.6)	-	-	(14.5)	(38.2)
Complementary mining pension fund	$M	**(73.0)**	(3.9)	(0.5)	-	(1.8)	(3.8)	-	-	(0.8)	(2.2)
Income tax	$M	**(4,286.5)**	(227.6)	(30.2)	-	(107.8)	(224.9)	-	-	(48.8)	(129.0)
Total Taxes	**$M**	**(5,629.3)**	**(298.9)**	**(39.6)**	**-**	**(141.5)**	**(295.4)**	**-**	**-**	**(64.2)**	**(169.4)**
CAPITAL COSTS											
Sustaining capital	$M	**(8,469.0)**	(268.5)	(264.1)	(365.1)	(303.6)	(145.5)	(169.3)	(147.0)	(220.9)	(313.2)
Total Capital Costs	**$M**	**(8,469.0)**	**(268.5)**	**(264.1)**	**(365.1)**	**(303.6)**	**(145.5)**	**(169.3)**	**(147.0)**	**(220.9)**	**(313.2)**
CLOSURE COST											
Closure cost	$M	**(305.9)**	-	-	-	-	(2.7)	(2.7)	(2.7)	(2.7)	(2.7)
WORKING CAPITAL											
Change in Working Capital	$M	**0.0**	(291.1)	130.2	34.0	(95.7)	(74.5)	231.9	(24.6)	(93.9)	(59.6)
NET CASH FLOW											
Before tax	$M	**12,225.6**	517.1	211.6	(227.0)	263.5	851.8	(189.2)	(271.9)	123.9	382.3
After tax	$M	**6,596.2**	218.2	172.0	(227.0)	122.0	556.4	(189.2)	(271.9)	59.8	212.9

Note: Totals may not sum due to rounding. MMR = modified mining royalty. SMT = special mining tax.

Table 19-3: Cash Flow Forecast on an Annual Basis (2034–2043)

Area	Unit	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
MINE PRODUCTION											
Waste mined	Mt	281.2	240.8	244.9	255.0	263.5	204.4	229.3	250.3	242.4	237.8
Total ore mined	Mt	47.0	94.5	70.4	56.5	47.8	62.6	125.5	53.1	56.4	49.3
Sulfide Ore Mined (concentration)											
Sulfides ore mined	Mt	43.3	42.9	43.0	42.9	42.9	42.9	43.0	42.9	42.9	42.9
Cu head grade	%	0.54	0.35	0.45	0.55	0.61	0.57	0.67	0.58	0.41	0.40
Mo head grade	%	0.067	0.011	0.011	0.018	0.023	0.022	0.039	0.054	0.041	0.008
Oxide/Sulfide Ore Mined (leaching)											
Oxide ore mined	Mt	3.8	51.5	27.4	13.6	4.9	19.7	82.4	10.2	13.5	6.4
Cu head grade	%	0.18	0.20	0.21	0.22	0.20	0.19	0.20	0.22	0.22	0.20
PROCESS PRODUCTION											
Feed to Mill (sulfides)											
Sulfide ore feed	Mt	43.3	42.9	43.0	42.9	42.9	42.9	43.0	42.9	42.9	42.9
Cu feed grade	%	0.54	0.35	0.45	0.55	0.61	0.57	0.67	0.58	0.41	0.40
Mo feed grade	%	0.067	0.011	0.011	0.018	0.023	0.022	0.039	0.054	0.041	0.008
Feed to Leach (sulfide/oxide)											
Sulfide/oxide ore feed	Mt	3.8	51.5	27.4	13.6	4.9	19.7	82.4	10.2	13.5	6.4
Cu feed grade	%	0.18	0.20	0.21	0.22	0.20	0.19	0.20	0.22	0.22	0.20
METAL RECOVERY											
Concentration											
Cu recovered	Mlb	455.3	287.9	373.2	460.2	516.6	477.5	564.1	491.2	335.1	327.4
Mo recovered	Mlb	48.8	7.0	6.0	11.0	14.1	13.9	25.5	37.2	28.5	4.5
Leaching											
Cu recovered	Mlb	16.6	19.5	21.7	19.8	16.7	15.3	21.7	21.8	19.6	16.5

Area	Unit	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
PAYABLE METALS											
Cu payable	Mlb	456.8	298.3	382.9	465.0	516.3	477.1	567.0	496.9	344.0	333.5
Mo payable	Mlb	48.8	7.0	6.0	11.0	14.1	13.9	25.5	37.2	28.5	4.5
METAL VALUE											
Cu payable value	$M	1,525.8	998.0	1,281.1	1,553.6	1,724.4	1,594.3	1,892.4	1,660.5	1,151.0	1,115.7
Mo payable value	$M	488.2	70.5	59.7	109.5	141.3	138.8	254.6	372.5	284.6	45.4
Total Metal Value	**$M**	**2,014.0**	**1,068.5**	**1,340.8**	**1,663.2**	**1,865.6**	**1,733.1**	**2,147.0**	**2,033.0**	**1,435.6**	**1,161.1**
TREATMENT AND REFINING CHARGES (TC&RCS)											
Cu concentrate TC&RCs	$M	(13.0)	-	-	(9.8)	(14.2)	(10.1)	(22.2)	(10.4)	-	-
Cu (Ilo) anodes TC&RCs	$M	(1.3)	(1.0)	(1.2)	(1.4)	(1.5)	(1.4)	(1.5)	(1.5)	(1.1)	(1.1)
Mo concentrate TC&RCs	$M	(82.8)	(12.0)	(10.1)	(18.6)	(24.0)	(23.5)	(43.2)	(63.2)	(48.3)	(7.7)
Total TC&RCs	**$M**	**(97.1)**	**(12.9)**	**(11.4)**	**(29.7)**	**(39.6)**	**(35.1)**	**(66.9)**	**(75.1)**	**(49.4)**	**(8.8)**
TRANSPORT COSTS											
SX/EW cathodes transport	$M	(0.7)	(0.8)	(0.9)	(0.9)	(0.7)	(0.7)	(0.9)	(0.9)	(0.8)	(0.7)
Cu concentrate transport	$M	(5.4)	-	-	(4.1)	(5.9)	(4.2)	(9.2)	(4.3)	-	-
Ilo anodes transport	$M	(0.6)	(0.4)	(0.5)	(0.6)	(0.7)	(0.6)	(0.7)	(0.7)	(0.5)	(0.5)
Ilo cathodes transport	$M	(15.7)	(11.5)	(14.9)	(16.5)	(17.9)	(17.1)	(18.3)	(17.6)	(13.3)	(13.0)
Mo concentrate transport	$M	(6.4)	(0.9)	(0.8)	(1.4)	(1.8)	(1.8)	(3.3)	(4.8)	(3.7)	(0.6)
Total Transport Costs	**$M**	**(28.7)**	**(13.6)**	**(17.1)**	**(23.4)**	**(27.0)**	**(24.4)**	**(32.4)**	**(28.4)**	**(18.4)**	**(14.8)**
NET SMELTER RETURN	**$M**	**1,888.1**	**1,041.9**	**1,312.3**	**1,610.0**	**1,799.0**	**1,673.6**	**2,047.7**	**1,929.5**	**1,367.8**	**1,137.5**
PRODUCTION COSTS											
Mining	$M	(817.5)	(851.4)	(829.2)	(804.3)	(802.6)	(743.1)	(876.0)	(770.2)	(761.3)	(737.0)
Process	$M	(486.6)	(459.5)	(483.4)	(578.1)	(581.8)	(575.0)	(583.3)	(577.0)	(549.8)	(547.2)
G&A	$M	-	-	-	-	-	-	-	-	-	-
Total Production Costs	**$M**	**(1,304.1)**	**(1,310.9)**	**(1,312.6)**	**(1,382.4)**	**(1,384.4)**	**(1,318.2)**	**(1,459.3)**	**(1,347.2)**	**(1,311.1)**	**(1,284.3)**

Area	Unit	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
MMR AND SMT											
Modified Mining Royalty	$M	(19.2)	(10.6)	(13.3)	(16.3)	(18.3)	(17.0)	(20.8)	(19.6)	(13.9)	(11.5)
Special Mining Tax	$M	(6.2)	-	-	-	(3.1)	(2.3)	(7.1)	(7.0)	-	-
MMR and SMT	**$M**	**(25.4)**	**(10.6)**	**(13.3)**	**(16.3)**	**(21.4)**	**(19.2)**	**(27.9)**	**(26.6)**	**(13.9)**	**(11.5)**
NET OPERATING EARNINGS	**$M**	**558.6**	**(279.5)**	**(13.6)**	**211.3**	**393.3**	**336.2**	**560.5**	**555.8**	**42.9**	**(158.3)**
TAXES											
Employee profit share	$M	(21.2)	-	-	-	(10.7)	(7.5)	(23.9)	(23.5)	-	-
Complementary mining pension fund	$M	(1.2)	-	-	-	(0.6)	(0.4)	(1.4)	(1.4)	-	-
Income tax	$M	(71.7)	-	-	-	(36.0)	(25.3)	(80.5)	(79.3)	-	-
Total Taxes	**$M**	**(94.2)**	**-**	**-**	**-**	**(47.3)**	**(33.3)**	**(105.8)**	**(104.2)**	**-**	**-**
CAPITAL COSTS											
Sustaining capital	$M	(392.2)	(467.9)	(530.5)	(156.3)	(148.7)	(143.3)	(376.2)	(127.7)	(237.9)	(460.8)
Total Capital Costs	**$M**	**(392.2)**	**(467.9)**	**(530.5)**	**(156.3)**	**(148.7)**	**(143.3)**	**(376.2)**	**(127.7)**	**(237.9)**	**(460.8)**
CLOSURE COST											
Closure cost	$M	(2.7)	(2.8)	(0.0)	-	-	-	-	-	-	-
WORKING CAPITAL											
Change in Working Capital	$M	31.8	146.6	(44.2)	(45.0)	(31.6)	15.6	(52.5)	9.8	91.3	39.1
NET CASH FLOW											
Before tax	$M	195.6	(603.7)	(588.3)	10.0	213.0	208.4	131.8	437.8	(103.8)	(580.1)
After tax	$M	101.4	(603.7)	(588.3)	10.0	165.7	175.2	26.0	333.6	(103.8)	(580.1)

Note: Totals may not sum due to rounding. MMR = modified mining royalty. SMT = special mining tax.

Table 19-4: Cash Flow Forecast on an Annual Basis (2044–2053)

Item	Unit	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
MINE PRODUCTION											
Waste mined	Mt	249.8	256.5	254.8	275.2	201.8	225.0	198.6	87.0	18.0	2.7
Total ore mined	Mt	43.2	43.6	53.7	95.8	76.9	53.0	54.5	44.3	55.0	94.1
Sulfide Ore Mined (concentration)											
Sulfides ore mined	Mt	43.0	42.9	44.0	42.9	43.0	42.9	43.4	42.9	43.0	42.9
Cu head grade	%	0.61	0.76	0.68	0.49	0.32	0.35	0.39	0.39	0.41	0.50
Mo head grade	%	0.020	0.031	0.061	0.069	0.007	0.013	0.012	0.009	0.013	0.023
Oxide/Sulfide Ore Mined (leaching)											
Oxide ore mined	Mt	0.1	0.6	9.7	52.9	33.9	10.1	11.2	1.4	11.9	51.2
Cu head grade	%	0.23	0.18	0.19	0.20	0.22	0.22	0.22	0.21	0.19	0.20
PROCESS PRODUCTION											
Feed to Mill (sulfides)											
Sulfide ore feed	Mt	43.0	42.9	44.0	42.9	43.0	42.9	43.4	42.9	43.0	42.9
Cu feed grade	%	0.61	0.76	0.68	0.49	0.32	0.35	0.39	0.39	0.41	0.50
Mo feed grade	%	0.020	0.031	0.061	0.069	0.007	0.013	0.012	0.009	0.013	0.023
Feed to Leach (sulfide/oxide)											
Sulfide/oxide ore feed	Mt	0.1	0.6	9.7	52.9	33.9	10.1	11.2	1.4	11.9	51.2
Cu feed grade	%	0.23	0.18	0.19	0.20	0.22	0.22	0.22	0.21	0.19	0.20
METAL RECOVERY											
Concentration											
Cu recovered	Mlb	510.5	648.6	587.6	405.1	257.2	289.4	325.8	319.0	340.9	415.3
Mo recovered	Mlb	11.5	19.3	43.4	50.2	4.0	7.9	6.8	5.1	7.6	14.4
Leaching											
Cu recovered	Mlb	14.0	11.3	10.4	14.1	18.2	17.1	14.7	12.0	10.9	14.7

Item	Unit	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
PAYABLE METALS											
Cu payable	Mlb	507.7	638.5	578.8	406.2	267.2	297.2	330.1	320.8	340.8	416.7
Mo payable	Mlb	11.5	19.3	43.4	50.2	4.0	7.9	6.8	5.1	7.6	14.4
METAL VALUE											
Cu payable value	$M	1,695.9	2,132.0	1,933.9	1,359.2	893.9	994.5	1,104.6	1,073.3	1,140.4	1,394.3
Mo payable value	$M	115.1	193.1	433.6	502.5	39.8	79.4	68.4	51.5	75.5	143.6
Total Metal Value	**$M**	**1,811.0**	**2,325.1**	**2,367.5**	**1,861.7**	**933.8**	**1,073.9**	**1,173.0**	**1,124.7**	**1,215.9**	**1,537.9**
TREATMENT AND REFINING CHARGES (TC&RCS)											
Cu concentrate TC&RCs	$M	(12.9)	(19.9)	(12.5)	-	-	-	-	-	-	-
Cu (Ilo) anodes TC&RCs	$M	(1.5)	(1.8)	(1.8)	(1.3)	(0.9)	(1.0)	(1.1)	(1.1)	(1.1)	(1.4)
Mo concentrate TC&RCs	$M	(19.5)	(32.7)	(73.5)	(85.2)	(6.8)	(13.5)	(11.6)	(8.7)	(12.8)	(24.4)
Total TC&RCs	**$M**	**(33.9)**	**(54.5)**	**(87.8)**	**(86.6)**	**(7.6)**	**(14.4)**	**(12.7)**	**(9.8)**	**(13.9)**	**(25.7)**
TRANSPORT COSTS											
SX/EW cathodes transport	$M	(0.6)	(0.5)	(0.4)	(0.6)	(0.8)	(0.7)	(0.6)	(0.5)	(0.5)	(0.6)
Cu concentrate transport	$M	(5.3)	(8.3)	(5.2)	-	-	-	-	-	-	-
Ilo anodes transport	$M	(0.7)	(0.8)	(0.8)	(0.6)	(0.4)	(0.4)	(0.5)	(0.5)	(0.5)	(0.6)
Ilo cathodes transport	$M	(17.9)	(22.1)	(21.0)	(16.1)	(10.2)	(11.5)	(13.0)	(12.7)	(13.6)	(16.5)
Mo concentrate transport	$M	(1.5)	(2.5)	(5.6)	(6.5)	(0.5)	(1.0)	(0.9)	(0.7)	(1.0)	(1.9)
Total Transport Costs	**$M**	**(26.0)**	**(34.2)**	**(33.1)**	**(23.9)**	**(11.9)**	**(13.7)**	**(15.0)**	**(14.4)**	**(15.5)**	**(19.6)**
NET SMELTER RETURN	**$M**	**1,751.1**	**2,236.4**	**2,246.6**	**1,751.2**	**914.2**	**1,045.8**	**1,145.4**	**1,100.6**	**1,186.4**	**1,492.6**
PRODUCTION COSTS											
Mining	$M	(748.3)	(816.2)	(831.7)	(943.6)	(803.7)	(791.5)	(748.9)	(399.2)	(236.2)	(269.9)
Process	$M	(579.0)	(603.4)	(607.5)	(564.7)	(528.7)	(535.8)	(549.4)	(542.9)	(547.9)	(566.9)
G&A	$M	-	-	-	-	-	-	-	-	-	-
Total Production Costs	**$M**	**(1,327.3)**	**(1,419.5)**	**(1,439.3)**	**(1,508.3)**	**(1,332.4)**	**(1,327.3)**	**(1,298.3)**	**(942.1)**	**(784.1)**	**(836.7)**

Item	Unit	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
MMR AND SMT											
Modified Mining Royalty	$M	(17.8)	(22.7)	(22.8)	(17.8)	(9.3)	(10.6)	(11.6)	(11.1)	(12.0)	(15.1)
Special Mining Tax	$M	(2.9)	(12.7)	(12.3)	-	-	-	-	-	(2.1)	(9.9)
MMR and SMT	**$M**	**(20.7)**	**(35.4)**	**(35.1)**	**(17.8)**	**(9.3)**	**(10.6)**	**(11.6)**	**(11.1)**	**(14.1)**	**(25.0)**
NET OPERATING EARNINGS	**$M**	**403.1**	**781.5**	**772.2**	**225.2**	**(427.4)**	**(292.1)**	**(164.5)**	**147.4**	**388.3**	**630.9**
TAXES											
Employee profit share	$M	(9.9)	(39.1)	(38.1)	-	-	-	-	-	(7.1)	(29.3)
Complementary mining pension fund	$M	(0.6)	(2.2)	(2.2)	-	-	-	-	-	(0.4)	(1.7)
Income tax	$M	(33.4)	(132.1)	(128.7)	-	-	-	-	-	(24.1)	(98.9)
Total Taxes	**$M**	**(43.9)**	**(173.4)**	**(169.1)**	**-**	**-**	**-**	**-**	**-**	**(31.6)**	**(129.9)**
CAPITAL COSTS											
Sustaining capital	$M	(308.3)	(416.2)	(196.6)	(291.4)	(305.6)	(156.6)	(180.4)	(103.9)	(125.7)	(104.2)
Total Capital Costs	**$M**	**(308.3)**	**(416.2)**	**(196.6)**	**(291.4)**	**(305.6)**	**(156.6)**	**(180.4)**	**(103.9)**	**(125.7)**	**(104.2)**
CLOSURE COST											
Closure cost	$M	-	-	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
WORKING CAPITAL											
Change in Working Capital	$M	(99.6)	(73.3)	(2.7)	86.5	129.9	(22.6)	(18.6)	(21.7)	(27.3)	(46.4)
NET CASH FLOW											
Before tax	$M	(4.7)	291.9	572.9	20.3	(603.2)	(471.4)	(363.6)	21.7	235.2	480.2
After tax	$M	(48.6)	118.5	403.8	20.3	(603.2)	(471.4)	(363.6)	21.7	203.6	350.3

Note: Totals may not sum due to rounding. MMR = modified mining royalty. SMT = special mining tax.

Table 19-5: Cash Flow Forecast on an Annual Basis (2054–2063)

Item	Unit	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
MINE PRODUCTION											
Waste mined	Mt	1.0	0.7	1.3	0.8	0.3	0.6	0.9	0.3	-	-
Total ore mined	Mt	84.2	74.1	51.1	48.6	44.3	45.8	43.8	43.1	43.0	43.6
Sulfide Ore Mined (concentration)											
Sulfides ore mined	Mt	43.1	43.0	43.0	42.9	42.9	42.9	43.0	42.9	42.9	42.9
Cu head grade	%	0.53	0.53	0.56	0.60	0.64	0.66	0.64	0.64	0.53%	0.55
Mo head grade	%	0.030	0.032	0.018	0.035	0.040	0.049	0.058	0.072	0.066	0.074
Oxide/Sulfide Ore Mined (leaching)											
Oxide ore mined	Mt	41.1	31.1	8.0	5.7	1.4	2.9	0.8	0.2	0.1	0.6
Cu head grade	%	0.21	0.22	0.22	0.22	0.22	0.21	0.18	0.19	0.22	0.21
PROCESS PRODUCTION											
Feed to Mill (sulfides)											
Sulfide ore feed	Mt	43.1	43.0	43.0	42.9	42.9	42.9	43.0	42.9	42.9	42.9
Cu feed grade	%	0.53	0.53	0.56	0.60	0.64	0.66	0.64	0.64	0.53	0.55
Mo feed grade	%	0.030	0.032	0.018	0.035	0.040	0.049	0.058	0.072	0.066	0.074
Feed to Leach (sulfide/oxide)											
Sulfide/oxide ore feed	Mt	41.1	31.1	8.0	5.7	1.4	2.9	0.8	0.2	0.1	0.6
Cu feed grade	%	0.21	0.22	0.22	0.22	0.22	0.21	0.18	0.19	0.22	0.21
METAL RECOVERY											
Concentration											
Cu recovered	Mlb	448.2	442.8	474.4	507.2	535.2	557.5	543.5	538.4	447.1	457.8
Mo recovered	Mlb	19.5	20.8	10.3	22.9	26.2	32.7	39.7	50.3	46.3	52.8
Leaching											
Cu recovered	Mlb	17.6	19.6	17.0	13.8	11.3	9.8	8.5	7.3	6.1	4.9

Item	Unit	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
PAYABLE METALS											
Cu payable	Mlb	451.4	448.2	476.2	504.4	529.0	548.7	534.0	527.9	438.6	447.8
Mo payable	Mlb	19.5	20.8	10.3	22.9	26.2	32.7	39.7	50.3	46.3	52.8
METAL VALUE											
Cu payable value	$M	1,510.4	1,499.6	1,593.2	1,685.5	1,767.6	1,831.8	1,782.2	1,762.6	1,465.4	1,496.1
Mo payable value	$M	194.9	208.0	102.7	228.9	262.2	327.0	396.7	502.7	462.9	528.1
Total Metal Value	**$M**	**1,705.3**	**1,707.5**	**1,695.9**	**1,914.4**	**2,029.7**	**2,158.8**	**2,178.9**	**2,265.3**	**1,928.2**	**2,024.2**
TREATMENT AND REFINING CHARGES (TC&RCS)											
Cu concentrate TC&RCs	$M	-	-	-	(10.8)	(11.9)	(19.7)	(20.8)	(17.3)	(9.5)	(9.7)
Cu (Ilo) anodes TC&RCs	$M	(1.5)	(1.5)	(1.6)	(1.5)	(1.6)	(1.5)	(1.5)	(1.5)	(1.3)	(1.4)
Mo concentrate TC&RCs	$M	(33.1)	(35.3)	(17.4)	(38.8)	(44.5)	(55.5)	(67.3)	(85.3)	(78.5)	(89.6)
Total TC&RCs	**$M**	**(34.5)**	**(36.7)**	**(19.0)**	**(51.1)**	**(58.0)**	**(76.7)**	**(89.5)**	**(104.1)**	**(89.3)**	**(100.7)**
TRANSPORT COSTS											
SX/EW cathodes transport	$M	(0.8)	(0.8)	(0.7)	(0.6)	(0.5)	(0.4)	(0.4)	(0.3)	(0.3)	(0.2)
Cu concentrate transport	$M	-	-	-	(4.5)	(5.0)	(8.2)	(8.6)	(7.2)	(3.9)	(4.0)
Ilo anodes transport	$M	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)	(0.6)	(0.6)
Ilo cathodes transport	$M	(17.8)	(17.6)	(18.9)	(18.2)	(19.1)	(18.5)	(17.7)	(18.2)	(16.0)	(16.4)
Mo concentrate transport	$M	(2.5)	(2.7)	(1.3)	(3.0)	(3.4)	(4.3)	(5.2)	(6.5)	(6.0)	(6.9)
Total Transport Costs	**$M**	**(21.8)**	**(21.8)**	**(21.6)**	**(26.9)**	**(28.6)**	**(32.0)**	**(32.6)**	**(32.9)**	**(26.8)**	**(28.1)**
NET SMELTER RETURN	**$M**	**1,649.0**	**1,649.0**	**1,655.2**	**1,836.4**	**1,943.1**	**2,050.0**	**2,056.9**	**2,128.3**	**1,812.0**	**1,895.4**
PRODUCTION COSTS											
Mining	$M	(249.1)	(234.4)	(196.0)	(188.9)	(181.6)	(185.2)	(174.7)	(167.7)	(168.2)	(143.2)
Process	$M	(584.6)	(581.2)	(590.2)	(584.2)	(590.0)	(586.0)	(582.1)	(583.7)	(569.2)	(571.6)
G&A	$M	-	-	-	-	-	-	-	-	-	-
Total Production Costs	**$M**	**(833.7)**	**(815.5)**	**(786.2)**	**(773.0)**	**(771.6)**	**(771.2)**	**(756.8)**	**(751.4)**	**(737.3)**	**(714.8)**

Item	Unit	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
MMR AND SMT											
Modified Mining Royalty	$M	(16.7)	(18.3)	(21.9)	(33.3)	(41.1)	(47.6)	(50.3)	(55.5)	(38.3)	(44.1)
Special Mining Tax	$M	(16.6)	(19.1)	(22.0)	(31.2)	(37.2)	(42.3)	(44.3)	(48.2)	(34.8)	(39.2)
MMR and SMT	**$M**	**(33.3)**	**(37.4)**	**(43.9)**	**(64.4)**	**(78.3)**	**(89.9)**	**(94.6)**	**(103.7)**	**(73.1)**	**(83.3)**
NET OPERATING EARNINGS	**$M**	**782.0**	**796.0**	**825.1**	**998.9**	**1,093.2**	**1,188.9**	**1,205.5**	**1,273.2**	**1,001.6**	**1,097.4**
TAXES											
Employee profit share	$M	(43.9)	(48.2)	(52.7)	(68.0)	(77.3)	(85.3)	(87.7)	(93.5)	(72.2)	(79.0)
Complementary mining pension fund	$M	(2.5)	(2.8)	(3.0)	(3.9)	(4.4)	(4.9)	(5.0)	(5.4)	(4.1)	(4.5)
Income tax	$M	(148.1)	(162.7)	(178.0)	(229.6)	(261.1)	(288.0)	(296.0)	(315.6)	(243.6)	(266.5)
Total Taxes	**$M**	**(194.5)**	**(213.7)**	**(233.7)**	**(301.5)**	**(342.9)**	**(378.3)**	**(388.8)**	**(414.5)**	**(319.9)**	**(350.1)**
CAPITAL COSTS											
Sustaining capital	$M	(107.2)	(131.3)	(103.5)	(119.8)	(110.4)	(78.4)	(68.6)	(78.1)	(58.1)	(58.3)
Total Capital Costs	**$M**	**(107.2)**	**(131.3)**	**(103.5)**	**(119.8)**	**(110.4)**	**(78.4)**	**(68.6)**	**(78.1)**	**(58.1)**	**(58.3)**
CLOSURE COST											
Closure cost	$M	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(2.8)	(2.9)	(2.9)	(2.9)	(17.8)
WORKING CAPITAL											
Change in Working Capital	$M	(26.2)	(1.3)	(1.4)	(32.2)	(17.2)	(18.5)	(3.0)	(12.7)	50.0	(15.8)
NET CASH FLOW											
Before tax	$M	648.6	663.3	720.1	846.8	965.6	1,089.3	1,131.0	1,179.5	990.7	1,005.4
After tax	$M	454.1	449.6	486.4	545.3	622.7	711.0	742.2	765.1	670.7	655.4

Note: Totals may not sum due to rounding. MMR = modified mining royalty. SMT = special mining tax.

Table 19-6: Cash Flow Forecast on an Annual Basis (2064–2073)

Item	Unit	2064	2065	2066	2067	2068 – 2094
MINE PRODUCTION						
Waste mined	Mt	-	1.5	0.2	-	-
Total ore mined	Mt	43.0	41.4	7.3	-	-
Sulfide Ore Mined (concentration)						
Sulfides ore mined	Mt	43.0	41.4	7.3	-	-
Cu head grade	%	0.49	0.53	0.62	-	-
Mo head grade	%	0.057	0.047	0.051	-	-
Oxide/Sulfide Ore Mined (leaching)						
Oxide ore mined	Mt	-	-	-	-	-
Cu head grade	%	-	-	-	-	-
PROCESS PRODUCTION						
Feed to Mill (sulfides)						
Sulfide ore feed	Mt	43.0	41.4	7.3	-	-
Cu feed grade	%	0.49	0.53	0.62	-	-
Mo feed grade	%	0.057	0.047	0.051	-	-
Feed to Leach (sulfide/oxide)						
Sulfide/oxide ore feed	Mt	-	-	-	-	-
Cu feed grade	%	-	-	-	-	-
METAL RECOVERY						
Concentration						
Cu recovered	Mlb	413.6	427.6	89.5	-	-
Mo recovered	Mlb	39.8	31.0	5.9	-	-
Leaching						
Cu recovered	Mlb	4.1	-	-	-	-

Item	Unit	2064	2065	2066	2067	2068 – 2094
PAYABLE METALS						
Cu payable	Mlb	404.5	413.6	86.6	-	-
Mo payable	Mlb	39.8	31.0	5.9	-	-
METAL VALUE						
Cu payable value	$M	1,353.3	1,381.8	289.7	-	-
Mo payable value	$M	398.5	309.8	59.1	-	-
Total Metal Value	**$M**	**1,751.8**	**1,691.6**	**348.8**	**-**	**-**
TREATMENT AND REFINING CHARGES (TC&RCS)						
Cu concentrate TC&RCs	$M	-	(9.1)	-	-	-
Cu (Ilo) anodes TC&RCs	$M	(1.4)	(1.3)	(0.3)	-	-
Mo concentrate TC&RCs	$M	(67.6)	(52.5)	(10.0)	-	-
Total TC&RCs	**$M**	**(69.0)**	**(62.9)**	**(10.3)**	**-**	**-**
TRANSPORT COSTS						
SX/EW cathodes transport	$M	(0.2)	-	-	-	-
Cu concentrate transport	$M	-	(3.8)	-	-	-
Ilo anodes transport	$M	(0.6)	(0.6)	(0.1)	-	-
Ilo cathodes transport	$M	(16.5)	(15.3)	(3.6)	-	-
Mo concentrate transport	$M	(5.2)	(4.0)	(0.8)	-	-
Total Transport Costs	**$M**	**(22.4)**	**(23.7)**	**(4.5)**	**-**	**-**
NET SMELTER RETURN	**$M**	**1,660.4**	**1,605.0**	**334.0**	**-**	**-**
PRODUCTION COSTS						
Mining	$M	(140.2)	(139.6)	(42.0)	-	-
Process	$M	(573.1)	(530.4)	(99.1)	-	-
G&A	$M	-	-	-	-	-
Total Production Costs	**$M**	**(713.4)**	**(670.0)**	**(141.2)**	**-**	**-**

Item	Unit	2064	2065	2066	2067	2068 – 2094
MMR AND SMT						
Modified Mining Royalty	$M	(31.0)	(31.5)	(3.4)	-	-
Special Mining Tax	$M	(28.8)	(29.0)	-	-	-
MMR and SMT	**$M**	**(59.8)**	**(60.5)**	**(3.4)**	**-**	**-**
NET OPERATING EARNINGS	**$M**	**887.2**	**874.5**	**189.5**	**-**	**-**
TAXES						
Employee profit share	$M	(62.4)	(61.7)	-	-	-
Complementary mining pension fund	$M	(3.6)	(3.5)	-	-	-
Income tax	$M	(210.5)	(208.4)	-	-	-
Total Taxes	**$M**	**(276.5)**	**(273.6)**	**-**	**-**	**-**
CAPITAL COSTS						
Sustaining capital	$M	(73.8)	(53.9)	-	-	-
Total Capital Costs	**$M**	**(73.8)**	**(53.9)**	**-**	**-**	**-**
CLOSURE COST						
Closure cost	$M	(18.8)	(20.1)	(134.9)	(24.5)	(58.6)
WORKING CAPITAL						
Change in Working Capital	$M	39.7	6.0	166.7	44.2	-
NET CASH FLOW						
Before tax	$M	834.2	806.5	221.3	19.7	(58.6)
After tax	$M	557.7	532.9	221.3	19.7	(58.6)

Note: Totals may not sum due to rounding. MMR = modified mining royalty. SMT = special mining tax.

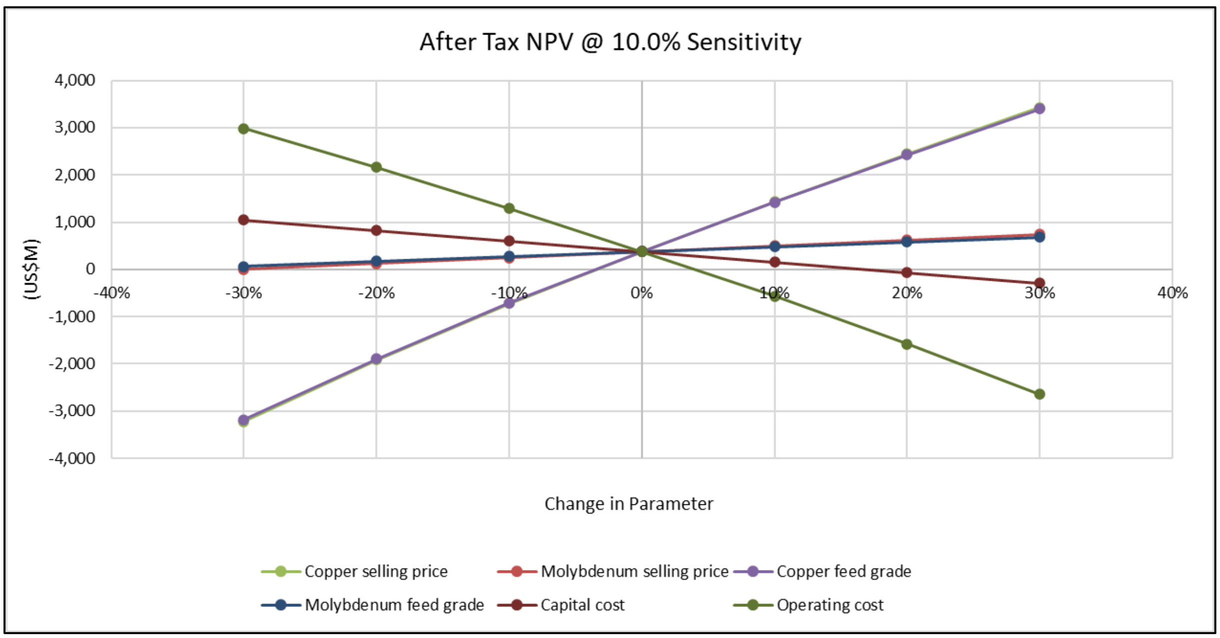
19.5 Sensitivity Analysis

A sensitivity analysis was performed to identify potential impacts on the after-tax NPV of variations in metal prices, grades, sustaining capital costs and operating costs. The results of this analysis are presented in Figure 19-1. For the purpose of the sensitivity to metal grades, it was assumed that the capacity of the processing facilities is not a constraint.

The Toquepala Operations are most sensitive to fluctuations in copper price and grade, and operating cost. It is less sensitive to changes in capital costs. The operations are least sensitive to variations in molybdenum price and grade.

Table 19-7 presents the Toquepala operation after-tax NPV at a range of discount rates from 8–12% with the base case highlighted.

Figure 19-1: After-Tax NPV Sensitivity (10% discount rate)



Source: Wood, 2024

Table 19-7: After-Tax NPV Sensitivity to Discount Rates (base case is bolded and highlighted)

Discount Rate	After-Tax NPV ($M)
NPV @ 8%	528.2
NPV @ 9%	435.5
NPV @ 10%	**373.6**
NPV @ 11%	332.7
NPV @ 12%	306.0

20.0 ADJACENT PROPERTIES

This Chapter is not relevant to this Report.

21.0 OTHER RELEVANT DATA AND INFORMATION

There is no additional information or explanation necessary to provide a complete and balanced presentation of the value of the Property to Southern Copper.

22.0 INTERPRETATIONS AND CONCLUSIONS

22.1 Introduction

The QPs of the third-party firms note the following interpretations and conclusions, based on their analysis of the data available for this Report.

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

The Toquepala Operations and the Ilo smelter/refinery are owned and operated by Southern Peru Copper Corporation, Sucursal del Perú.

Southern Copper have been operating the Toquepala Operations for decades and have a well-established understanding of what is required to operate the mine.

22.3 Geology and Mineralization

The Toquepala deposit is considered to be an example of a porphyry copper–molybdenum deposit.

The geological understanding of the settings, lithologies, and structural and alteration controls on mineralization is sufficient to support estimation of mineral resources.

22.4 Exploration, Drilling, Sampling and Data Verification

The mine has been operating since 1960, and all exploration data generated prior to mine start-up is long superseded by mining and drill data.

No material factors were identified with the data collection from the drill programs that could significantly affect mineral resource estimation.

The term “true thickness” is not generally applicable to porphyry-style deposits as the entire rock mass is potentially mineralized and there is often no preferred orientation to the mineralization. In areas that display porphyry-style mineralization, in general, most drill holes intersect mineralized zones at an angle, and the drill hole intercept widths reported for those drill holes are typically greater than the true widths of the mineralization at the drill intercept point.

Sampling methods, sample preparation, analysis and security were acceptable for mineral resource estimation. The collected sample data adequately reflect deposit dimensions and the style of the deposits. Sampling is representative of the copper and molybdenum grades.

No systematic quality control procedure was used to provide quality assurance for assaying prior to 2016. There is a significant evolution in data acquisition and data quality control practices in the different drill campaigns in the Toquepala database. Comparison of data from the 2016-2019 drill programs with earlier data from prior programs resulted in the conclusion that the means of copper and molybdenum grades of adjacent drill hole intersections are comparable over tens of meters, and that analyses performed in the earlier drill campaigns are not significantly biased.

The current assay quality control program for the Toquepala site includes the insertion of field duplicates, pulp duplicates, standards, coarse blanks, fine blanks and check samples. Wood reviewed the available data and found no material issues with assay quality.

22.5 Data Verification

The Wood QP is of the opinion that the data verification programs for Project data adequately support the geological interpretations, the analytical and database quality, and therefore support the use of the data in mineral resource and mineral reserve estimation.

22.6 Metallurgical Test Work

Original samples supporting metallurgical test work and process designs have long since been mined out. Test work has continued throughout mine operations including bench scale testing of sulfide ore and pilot and industrial testing on oxide ore.

Recovery models for the sulfide and oxide ore have been developed and updated over time to account for actual plant performance. However, assumptions regarding the metallurgical characteristics of ore to be mined over the next 10 to 15 years should be confirmed with dedicated drilling, sampling and metallurgical test work.

The copper and molybdenum concentrates produced are considered clean concentrates as they do not contain significant amounts of any deleterious elements.

22.7 Mineral Resource Estimates

The mineral resource estimate for the Project conform to industry-accepted practices and is reported using the standards and definitions set out in S-K 1300. Wood considers the Toquepala deposit to have sufficient drilling information to support Measured and Indicated classification confidence categories. However, there are zones in the periphery of pit where historical holes do not have an appropriate QA/QC program, increasing the uncertainty in the estimated block which has locally resulted in the downgrading of mineral resource classification.

Sources of uncertainty that may affect the mineral resource estimates include: unrecognized complexities and other changes to the interpretation of the geological model such as presence of unrecognized mineralization off-shoots; faults, dikes and other structures; uncertainties regarding interpreted geological and grade shape, and geological and grade continuity assumptions; unrecognized variability in the metallurgical recovery; uncertainties in the technical and economic input assumptions used to derive the conceptual open pit shell that is used to constrain the estimates and determination of the cut-off; unrecognized variations in the geotechnical (including seismicity), hydrogeological and mining assumptions; unrecognized issues with environmental, permitting and social license; and uncertainties in estimated blocks located in the periphery of the pit that are estimated with only historical holes.

22.8 Mineral Reserve Estimates

The mineral reserve estimate for the Project conforms to industry-accepted practices and is reported using the definitions set out in S-K 1300. Mineral reserves were converted from Measured and Indicated mineral resources, assuming conventional open pit mining methods and use of conventional equipment. Mineral resources were converted to mineral reserves by using a detailed mine plan, engineering analysis, and consideration of appropriate modifying factors within a mining study that is at least at a prefeasibility level.

Sources of uncertainty that may affect the mineral resource estimates include: uncertainties in the long-term metal price and exchange rate assumptions; unrecognized variability in the metallurgical recovery; uncertainties regarding interpreted geological model supporting the mineral resource estimates; uncertainties in the input assumptions used to derive the mineable shapes applicable to the open pit mining methods used to constrain them mineral reserve estimates; unrecognized variations to inputs to the NSR cut-off values applied to the estimates; unrecognized variations in geotechnical (including seismicity), hydrogeological and mining method assumptions; unrecognized issues with environmental, permitting, and social license assumptions.

22.9 Mining Methods

Open pit operations are conducted using conventional methods and a conventional truck and shovel fleet. Open pit mining operations are conducted year-round.

The mine plans are based on the current knowledge of geotechnical, hydrological, mining and processing information.

Seven pit phases remain in the LOM plan, starting with phase 5 and ending with phase 11. Three pit phases will be operational at any one time, to ensure that production rates can be met. A maximum mining capacity per phase of 280 Mt/a is assumed, with a maximum vertical advance rate of 11 benches per year. The mine plan assumed a maximum mining capacity of 370 Mt of annual movement and a nominal processing rate of 120 kt/d of sulfide ore at the concentrator and 140 kt/d of leachable material at the leach facility.

22.10 Recovery Methods

The processing methods are conventional to the industry. The comminution and recovery processes are widely used with no significant elements of technological innovation.

The process plant flowsheet designs were based on test work results, previous study designs and industry-standard practices.

The LESDE plant produces cathode copper, and includes conventional processes used for the recovery of copper such as acidic leaching of low-grade material, SX and EW facilities.

The ore in both concentrators is treated in a conventional concentration circuit consisting of crushing, grinding and flotation of copper and molybdenum minerals. The copper concentrate is transported by rail to the Ilo smelter for treatment, and the molybdenum concentrate is bagged and sold as a final product.

The process plants will produce variations in recovery due to the day-to-day changes in ore type or combinations of ore type being processed. These variations are expected to trend to the forecast recovery value for monthly or longer reporting periods.

The Ilo smelter processes the copper concentrates from the Cuajone and Toquepala concentrators and produces copper anodes for the Ilo refinery.

22.11 Infrastructure

Infrastructure required to support open pit mining operations is in place.

The remaining capacity in the Quebrada Honda TSF will support operations until approximately the end of 2036. Southern Copper is currently evaluating alternatives of TSF expansions or new disposal methods to accommodate additional tailings after the Quebrada Honda TSF reaches its ultimate capacity.

For this assessment, Southern Copper has determined that, once the existing Quebrada Honda TSF reaches its ultimate storage capacity, the Toquepala Operations will dispose filtered tailings in a standalone dry stack facility to be located near the Quebrada Honda TSF area, as limited space is available on the Toquepala site. Costs have been included as part of the capital and operating cost estimates to account for additional infrastructure and land acquisition required and Wood considers there to be adequate time to finalize designs, permit construction, and commission the additional TSF capacity before it is needed.

22.12 Market Studies

Southern Copper is actively engaged in the market and sales their mine product into the market and understands it well. The marketing approach is consistent with what is publicly available on industry norms, and the information can be used in mine planning and financial analyses for the products from the Toquepala Operations in the context of this Report.

The principal payable commodities within the concentrates from the Toquepala Operations are copper and molybdenum. The copper cathodes and anodes produced at the Ilo smelter and refinery are considered by Southern Copper to be readily marketable. Copper concentrates are readily marketable due to the grade and absence of deleterious elements.

The long-term forecast copper price of $3.30/lb and molybdenum price of $10.00/lb used for mine planning and cash flow analysis were fixed over the LOM and are based on Southern Copper's interpretations of market analysis from Wood Mackenzie, CRU and 21 analysts and banks on copper price, and six analysts and banks on molybdenum price The long-term price forecasts were increased by 15% to provide the mineral resource estimate copper and molybdenum price of $3.80/lb and $11.50/lb, respectively.

The largest in-place contracts other than for product sales cover items such as bulk commodities, operational and technical services, mining and process equipment, and administrative support services. Contracts are negotiated and renewed as needed. Contract terms are typical of similar contracts that Southern Copper has entered into in Peru.

22.13 Environmental, Permitting and Social Considerations

Baseline and supporting studies support current and proposed mine designs, operations, and permitting.

As per permit requirements, Southern Copper has a number of monitoring programs in place.

Mine closure measures were developed and approved under Directorial Resolution R.D. N° 079-2016-MEM-DGAAM. An updated mine closure plan is under evaluation and expected to approved in 2025. Closure costs have been adequately accounted for in the financial model. The Toquepala Operations and the Ilo smelter and refinery have all of the required permits to operate. The operations maintain a permit register.

Some portions of the proposed WRSFs that support the mine plan are located outside the area currently held by Southern Copper under surface rights. Additional surface rights will need to be secured. Wood believes that Southern Copper has sufficient time to acquire the necessary surface rights, obtain the required permits and secure the assignment of mining concessions to support the planned expansion of the WRSFs and the development of a new TSF required in approximately 2036.

Southern Copper has communication channels and tools in place, based on the company's community development model, which allow the company to recognize potential conflicts early, to work with the community to find appropriate solutions to address their concerns, and generate and maintain positive social license conditions for the continued operation of Southern Copper's mining projects. Wood considers that social risks to the Project are well understood by Southern Copper and have processes in place to reasonably manage those risks.

22.14 Capital Cost Estimates

Capital cost estimates are at a minimum at a pre-feasibility level of confidence, having an accuracy range of ±25% and a contingency amount not exceeding 15%.

The sustaining capital cost estimate totals $8,469.0 million, excluding value-added tax.

22.15 Operating Cost Estimates

Operating cost estimates are at a minimum at a pre-feasibility level of confidence, having an accuracy range of ±25% and a contingency amount not exceeding 15%.

The operating cost estimate for the LOM is $46,168.2 million, excluding value-added tax.

22.16 Economic Analysis

The financial analysis was performed using a DCF method. Net annual cash flows were estimated projecting yearly cash inflows (or revenues) and subtracting projected yearly cash outflows (such as capital and operating costs, and taxes).

Cash flows were assumed to occur at the end of each year and were discounted to the beginning of 2025 (Year 1 of the economic analysis). Costs projected within the cash flows are based on constant Q3 2024 US dollars. Revenue was calculated from the recoverable metal and the long-term forecasts of metal prices and exchange rates. Recoverable copper metal and non-metal products include those recovered at the Ilo smelter and refinery from the copper concentrate feed from the mine operation and copper and molybdenum concentrate sales.

The Toquepala Operations are anticipated to generate a pre-tax NPV of $1,348.0 million at a 10% discount rate and an after-tax NPV of $373.6 million at a 10% discount rate. As the mine is operating, considerations of IRR and payback are not relevant.

The Toquepala Operations are most sensitive to fluctuations in copper price and grade, and operating cost. It is less sensitive to changes in capital costs. The operations are least sensitive to variations in molybdenum price and grade.

22.17 Risks

Uncertainty factors that may affect the mineral resource and mineral reserve estimates were identified in Section 11.12.2 and Section 12.4, respectively.

Risks to the Toquepala Operations include the following.

22.17.1 Mine Plan

- The mineral reserve estimates are sensitive to metal prices. Lower metal prices than forecast in the LOM plan may require revisions to the mine plan, with impacts to the mineral reserve estimates and the economic analysis that supports the mineral reserve estimates.
- Geotechnical and hydrological assumptions used in mine planning are based on historical performance, and to date historical performance has been a reasonable predictor of current conditions. Any changes to the geotechnical, including seismicity, and hydrological assumptions could affect mine planning, affect capital cost estimates if any major rehabilitation is required due to a geotechnical (seismic) or hydrological event,

affect operating costs due to mitigation measures that may need to be imposed, and impact the economic analysis that supports the mineral reserve estimates.

- Reduction in planned mining rates could delay the removal of waste and affect the ability to maintain constant feed to the plant.
- The Quebrada Honda TSF does not have sufficient storage capacity for the LOM. The mine plan assumes that a new facility location can be obtained, designs completed and approved by the relevant regulatory authorities, and the new facility can be constructed and commissioned prior to 2036. If the TSF is not available by this time, this could affect the mineral reserves, capital and operating cost estimates, and the economic analysis.
- The new TSF will be a dry-stack facility and estimated capital and operating costs for such a facility have been included in the financial analysis. If the final TSF option uses a different disposal method, this could affect the mineral reserves, capital and operating cost estimates, and the economic analysis.
- The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry standards to guide design and management of TSFs. Members and non-members of International Council on Mining and Metals (ICMM) are required to be in compliance with the GISTM over the next several years. The TSF design needs to be revisited and be revised as needed to be in full compliance with the recently-published global tailings standard (GISTM, 2020). This may result in changes to the design criteria. Such changes may result in increases to the capital cost estimates, and changes to the operating cost estimates, which could affect the mineral reserve estimates.
- Labor cost increases or productivity decreases could impact the estimated mineral reserves, operating cost estimates and the economic analysis.
- Commodity price increases for key consumables such diesel, electricity, tires, and chemicals would negatively impact the stated mineral reserves because of the effect on the forecast operating costs.
- Assumed permitting and project development timelines may be longer than anticipated for the new TSF.
- Legislation changes potentially affecting mining licenses and/or Southern Copper’s ability to operate.

22.17.2 Metallurgical Test Work

- Past metallurgical performance of the ore material has been used to predict future performance. Unrecognized variability in the metallurgical characteristics could change the quality of the concentrate, throughput of the concentrators, recoveries and operating costs.

22.17.3 Geotechnical

- Demonstrating proper tailings management is becoming increasingly important for new and existing mining facilities and meeting the requirements of the Global International Standard on Tailings Management (GISTM) is an important step towards that process. The aim of this standard is to prevent tailings catastrophes, to restore public confidence and to promote sustainable practices that link technical tailings management with social aspects, transparency and accountability. Southern Copper is currently working to achieve these objectives for the Quebrada Honda TSF. The TSF has a geotechnical instrumentation system installed at critical locations (e.g., topographic control points, satellite control, piezometers, etc.) to monitor key parameters (e.g., displacements or surface movements of the dyke). A report listing the actions to be taken, if needed, to meet the requirements of the GISTM is currently underway by Southern Copper and it is expected to be issued in the next few months. Depending on the changes required to meet GISTM, increases in capital cost and operating cost estimates may be necessary.

22.17.4 Hydrology

- Water supply at the Toquepala Operations is dependent on fresh water sources from the Huaitire-Gentilar and Vizcachas aquifers; and the Tacalaya and Quebrada Honda streams. Increasing pressure from climate change and communities within the watershed could impact the available water resources. Ongoing monitoring and management of the water supply systems are critical to ensure that the water supply remains viable. An investigation is currently being undertaken by Southern Copper to enhance the understanding of the aquifers and the impact of climate change on the sustainability of the water resource.

22.17.5 Environmental, Permitting and Social

- Assumed permitting and project development timelines may be longer than anticipated for the new TSF.
- Possibility of labor or social issues that could interrupt mine production.

22.18 Opportunities

Opportunities include:

- Improved geology logging of the bornite mineralization will provide the opportunity to better control the higher copper grades.
- Conversion of some or all of the Indicated mineral resources currently reported exclusive of mineral reserves to mineral reserves, with appropriate supporting studies.
- Upgrade of some or all of the Inferred mineral resources to higher-confidence categories, such that it could be included in the mine plan and converted to mineral reserves, reduce mining costs by reducing the waste stripping, and extend the mine life.
- Higher metal prices than forecast could result in higher sales revenues and potentially an increase in predicted Project economics.

22.19 Conclusions

Under the assumptions presented in this Report, the Toquepala Operations have a positive net present value from the forecast cash flows and support the mineral reserve estimates.

23.0 RECOMMENDATIONS

23.1 Introduction

The recommended work programs total $4.8–$5.9 million.

23.2 Database

Drill hole documentation was not readily available for a significant number of drill holes. Systematic storage of supporting documentation is not part of the current procedures. Wood recommends that a document storage system be implemented for all supporting documentation be properly stored.

This work is estimated at $0.1–$0.2 million.

23.3 Mineral Resources

There are zones in the periphery of the pit where historical holes do not have appropriate QA/QC program increasing the uncertainty in the estimated block. Wood recommends that Southern Copper drill 20 twin holes totaling 8,000 m in the areas where historical drilling is located without supporting documentation.

This work is estimated at $1.5–$2.0 million.

23.4 Metallurgical Test Work

Dedicated metallurgical drilling and test work is recommended for material that is expected to be mined over the next 10 to 15 years to confirm the assumed metallurgical characteristics of the ore.

Total estimated cost is $1.8 million and considers 10 drill holes averaging 250 m at a drilling cost of $300/m.

23.5 Mine Plan

Evaluate the option of selecting a lower revenue factor pit shell for the ultimate open pit, eliminating the removal of a significant amount of waste and accessing the deeper ore through a bulk underground mine operation.

Update the 2017 geotechnical evaluation of the pit using more recent drilling information.

This work is estimated at $1.2–$1.5 million.

23.6 Tailings Storage Facility

The new Global Industry Standard on Tailings Management (GISTM) provides a set of industry standards to guide design and management of TSFs. Members and non-members of International Council on Mining and Metals (ICMM) are required to follow the GISTM over the next several years. The TSF design should be revisited and revised where needed to ensure full compliance with the recently published global tailings standard (GISTM, 2020).

This work of engineering evaluation is estimated at $0.1–$0.2 million.

23.7 Tailings and Waste Management

The Quebrada Honda TSF design capacity is estimated to be reached in 2036. For the purposes of this Report, Geosyntec assumed that tailings from the Toquepala Operations will dispose of filtered tailings in a standalone dry stack facility that would be located near the Quebrada Honda TSF area, as limited space is available at the Toquepala site.

Southern Copper should review the most appropriate storage mechanisms for tailings materials for the LOM after 2036, based on LOM storage requirements and site conditions. Initial designs will be conceptual and based on existing geotechnical investigation and tailings characterization data. Conceptual designs are expected to be sufficient to support assessment of potential permitting and surface rights requirements at this stage.

The engineering design work required to advance to a prefeasibility level study is estimated at $0.8–$1.0 million.

23.8 Permitting

Southern Copper should:

- identify the surface rights required to support the preferred tailings management facility and the path needed to secure these rights and obtain the necessary agreements with current surface rights holders.
- determine the permitting path, types of permits and quantity of permits and authorizations required to construct and operate the selected facility.
- confirm if any additional baseline studies will be required in support of permit applications for the preferred tailings facility.

The permitting determination work is estimated at $0.05–$0.1 million.

23.9 Summary of Costs

The costs for the recommended work are summarized in Table 23-1.

Table 23-1: Costs for Recommended Work Programs

Item	Cost ($M)
Database	0.1-0.2
Mineral Resources	1.5-2.0
Metallurgical Test Work	1.8
Mine Plan	0.4-0.6
Tailings Storage Facility	0.1-0.2
Tailings and Waste Management	0.8-1.0
Permitting	0.1
Total	**4.8-5.9**

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24.2 Abbreviations and Symbols

Abbreviation/Symbol	Term
3D	three-dimensional
AA	atomic absorption
AAS	atomic absorption spectrometry
EIA	Environmental Impact Assessment
EW	electrowinning
G&A	general and administrative
GPS	global positioning system
HPGR	high pressure grinding rolls
ICP	inductively coupled plasma
ICP-MS	inductively coupled plasma–mass spectrometry
ICP-OES	inductively coupled plasma-optical emission spectroscopy
LESDE	leach–solvent extraction (SX)–electrowinning (EW) in the Spanish acronym
LOM	life-of-mine
Mlb	million pounds
Mt	million tonnes
MWh	megawatts
NN	nearest neighbor
NSR	net smelter return
OK	ordinary kriging
PEN$	Peruvian nuevo sol
QA/QC	quality assurance and quality control
QP	Qualified Person
RC	reverse circulation
RQD	rock quality designation
ROM	run-of-mine
st	short tons
SX	solvent extraction
t	metric tonne
TSF	tailings storage facility
US	United States
US$	United States dollars
WRSF	waste rock storage facility

24.3 Glossary of Terms

Term	Definition
aquifer	A geologic formation capable of transmitting significant quantities of groundwater under normal hydraulic gradients.
argillic alteration	Introduces any one of a wide variety of clay minerals, including kaolinite, smectite and illite. Argillic alteration is generally a low temperature event, and some may occur in atmospheric conditions.
Atterberg limit	A measure of the critical water contents of a fine-grained material.
azimuth	The direction of one object from another, usually expressed as an angle in degrees relative to true north. Azimuths are usually measured in the clockwise direction, thus an azimuth of 90 degrees indicates that the second object is due east of the first.
ball mill	A piece of milling equipment used to grind ore into small particles. It is a cylindrical shaped steel container filled with steel balls into which crushed ore is fed. The ball mill is rotated causing the balls themselves to cascade, which in turn grinds the ore.
beneficiation	Physical treatment of crude ore to improve its quality for some specific purpose. Also called mineral processing.
Bond ball mill work index/Bond work index (BWi)	A measure of the energy required to break an ore to a nominal product size, determined in laboratory testing, and used to calculate the required power in a grinding circuit design.
Brazilian tensile test	Indirectly determines the tensile strength of a rock
bullion	Unrefined gold and/or silver mixtures that have been melted and cast into a bar or ingot.
comminution/crushing/grinding	Crushing and/or grinding of ore by impact and abrasion. Usually, the word "crushing" is used for dry methods and "grinding" for wet methods. Also, "crushing" usually denotes reducing the size of coarse rock while "grinding" usually refers to the reduction of the fine sizes.
concentrate	The concentrate is the valuable product from mineral processing, as opposed to the tailing, which contains the waste minerals. The concentrate represents a smaller volume than the original ore.

Term	Definition
counter-current decantation (CCD)	A process where a slurry is thickened and washed in multiple stages, where clean water is added to the last thickener, and overflows from each thickener are progressively transferred to the previous thickener, countercurrent to the flow of thickened slurry.
cut-off grade	A grade level between two alternative courses of action. Material above the cut-off is dealt with in one way, while material with a grade below the cut-off is dealt with in another way. For example: the cut-off grade between material being directed to the mill or to the leach dump; or the grade level between material being directed to the stockpile or the waste dump.
data verification	The process of confirming that data has been generated with proper procedures, has been accurately transcribed from the original source and is suitable to be used for mineral resource and mineral reserve estimation.
density	The mass per unit volume of a substance, commonly expressed in grams/ cubic centimeter.
development	Often refers to the construction of a new mine or; is the underground work carried out for the purpose of reaching and opening up a mineral deposit. It includes shaft sinking, cross-cutting, drifting and raising.
dilution	Waste or low-grade rock which is unavoidably removed along with the ore in the mining process.
direct shear strength	Method used to determine the shear strength of a material. Shear strength is defined as the maximum resistance that a material can withstand when subjected to shearing.
easement	Areas of land owned by the property owner, but in which other parties, such as utility companies, may have limited rights granted for a specific purpose.
electrowinning.	The removal of precious metals from solution by the passage of current through an electrowinning cell. A direct current supply is connected to the anode and cathode. As current passes through the cell, metal is deposited on the cathode. When sufficient metal has been deposited on the cathode, it is removed from the cell and the sludge rinsed off the plate and dried for further treatment.

Term	Definition
encumbrance	An interest or partial right in real property which diminished the value of ownership, but does not prevent the transfer of ownership. Mortgages, taxes and judgements are encumbrances known as liens. Restrictions, easements, and reservations are also encumbrances, although not liens.
feasibility study	• A feasibility study is a comprehensive technical and economic study of the selected development option for a mineral project, which includes detailed assessments of all applicable modifying factors, as defined by this section, together with any other relevant operational factors, and detailed financial analysis that are necessary to demonstrate, at the time of reporting, that extraction is economically viable. The results of the study may serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. • A feasibility study is more comprehensive, and with a higher degree of accuracy, than a pre-feasibility study. It must contain mining, infrastructure, and process designs completed with sufficient rigor to serve as the basis for an investment decision or to support project financing.
flotation	Separation of minerals based on the interfacial chemistry of the mineral particles in solution. Reagents are added to the ore slurry to render the surface of selected minerals hydrophobic. Air bubbles are introduced to which the hydrophobic minerals attach. The selected minerals are levitated to the top of the flotation machine by their attachment to the bubbles and into a froth product, called the "flotation concentrate." If this froth carries more than one mineral as a designated main constituent, it is called a "bulk float". If it is selective to one constituent of the ore, where more than one will be floated, it is a "differential" float.
flowsheet	The sequence of operations, step by step, by which ore is treated in a milling, concentration, or smelting process.
frother	A type of flotation reagent which, when dissolved in water, imparts to it the ability to form a stable froth.
gangue	The fraction of ore rejected as tailing in a separating process. It is usually the valueless portion, but may have some secondary commercial use

Term	Definition
heap leaching	A process whereby valuable metals, usually gold and silver, are leached from a heap or pad of crushed ore by leaching solutions percolating down through the heap and collected from a sloping, impermeable liner below the pad.
high pressure grinding rolls (HPGR)	A type of crushing machine consisting of two large studded rolls that rotate inwards and apply a high pressure compressive force to break rocks.
Indicated mineral resource	An Indicated mineral resource is that part of a mineral resource for which quantity and grade or quality are estimated on the basis of adequate geological evidence and sampling. The term adequate geological evidence means evidence that is sufficient to establish geological and grade or quality continuity with reasonable certainty. The level of geological certainty associated with an Indicated mineral resource is sufficient to allow a qualified person to apply modifying factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.
Inferred mineral resource	• 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. The term limited geological evidence means evidence that is only sufficient to establish that geological and grade or quality continuity is more likely than not. The level of geological uncertainty associated with an Inferred mineral resource is too high to apply relevant technical and economic factors likely to influence the prospects of economic extraction in a manner useful for evaluation of economic viability. • A qualified person must have a reasonable expectation that the majority of Inferred mineral resources could be upgraded to Indicated or Measured mineral resources with continued exploration; and should be able to defend the basis of this expectation before his or her peers.
internal rate of return (IRR)	The rate of return at which the net present value of a project is zero; the rate at which the present value of cash inflows is equal to the present value of the cash outflows.
Lerchs–Grossmann	An algorithm used to design the contour of an open pit so as to maximize the difference between the total mine value of ore extracted and the total extraction cost of ore and waste.
life of mine (LOM)	Number of years that the operation is planning to mine and treat ore, and is taken from the current mine plan based on the current evaluation of ore reserves.

Term	Definition
Measured mineral resource	A Measured mineral resource is that part of a mineral resource for which quantity and grade or quality are estimated on the basis of conclusive geological evidence and sampling. The term conclusive geological evidence means evidence that is sufficient to test and confirm geological and grade or quality continuity. The level of geological certainty associated with a Measured mineral resource is sufficient to allow a qualified person to apply modifying factors, as defined in this section, in sufficient detail to support detailed mine planning and final evaluation of the economic viability of the deposit.
mill	Includes any ore mill, sampling works, concentration, and any crushing, grinding, or screening plant used at, and in connection with, an excavation or mine.
mineral reserve	• A mineral reserve is an estimate of tonnage and grade or quality of Indicated and Measured mineral resources that, in the opinion of the qualified person, can be the basis of an economically viable project. More specifically, it is the economically mineable part of a Measured or Indicated mineral resource, which includes diluting materials and allowances for losses that may occur when the material is mined or extracted. • The determination that part of a Measured or Indicated mineral resource is economically mineable must be based on a preliminary feasibility (pre-feasibility) or feasibility study, as defined by this section, conducted by a qualified person applying the modifying factors to Indicated or Measured mineral resources. Such study must demonstrate that, at the time of reporting, extraction of the mineral reserve is economically viable under reasonable investment and market assumptions. The study must establish a life of mine plan that is technically achievable and economically viable, which will be the basis of determining the mineral reserve. • The term economically viable means that the qualified person has determined, using a discounted cash flow analysis, or has otherwise analytically determined, that extraction of the mineral reserve is economically viable under reasonable investment and market assumptions. • The term investment and market assumptions include all assumptions made about the prices, exchange rates, interest and discount rates, sales volumes, and costs that are necessary to determine the economic viability of the mineral

Term	Definition
	reserves. The qualified person must use a price for each commodity that provides a reasonable basis for establishing that the project is economically viable.
mineral resource	• A mineral resource is a concentration or occurrence of 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 economic extraction. • The term material of economic interest includes mineralization, including dumps and tailings, mineral brines, and other resources extracted on or within the earth's crust. It does not include oil and gas resources, gases (e.g., helium and carbon dioxide), geothermal fields, and water. • When determining the existence of a mineral resource, a qualified person, as defined by this section, must be able to estimate or interpret the location, quantity, grade or quality continuity, and other geological characteristics of the mineral resource from specific geological evidence and knowledge, including sampling; and conclude that there are reasonable prospects for economic extraction of the mineral resource based on an initial assessment, as defined in this section, that he or she conducts by qualitatively applying relevant technical and economic factors likely to influence the prospect of economic extraction.
net smelter return (NSR)	A defined percentage of the gross revenue from a resource extraction operation, less a proportionate share of transportation, insurance, and processing costs.
open pit	A mine that is entirely on the surface. Also referred to as open-cut or open-cast mine.
phyllic alteration	Minerals include quartz-sericite-pyrite
plant	A group of buildings, and especially to their contained equipment, in which a process or function is carried out; on a mine it will include warehouses, hoisting equipment, compressors, repair shops, offices, mill or concentrator.
potassic alteration	A relatively high temperature type of alteration which results from potassium enrichment. Characterized by biotite, K-feldspar, adularia.
preliminary feasibility study, pre-feasibility study	• A preliminary feasibility study (prefeasibility study) is a comprehensive study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a qualified person has determined (in the case of underground mining) a preferred mining method, or

Term	Definition
	(in the case of surface mining) a pit configuration, and in all cases has determined an effective method of mineral processing and an effective plan to sell the product. • A pre-feasibility study includes a financial analysis based on reasonable assumptions, based on appropriate testing, about the modifying factors and the evaluation of any other relevant factors that are sufficient for a qualified person to determine if all or part of the Indicated and Measured mineral resources may be converted to mineral reserves at the time of reporting. The financial analysis must have the level of detail necessary to demonstrate, at the time of reporting, that extraction is economically viable
probable mineral reserve	A probable mineral reserve is the economically mineable part of an indicated and, in some cases, a Measured mineral resource. For a probable mineral reserve, the qualified person's confidence in the results obtained from the application of the modifying factors and in the estimates of tonnage and grade or quality is lower than what is sufficient for a classification as a proven mineral reserve, but is still sufficient to demonstrate that, at the time of reporting, extraction of the mineral reserve is economically viable under reasonable investment and market assumptions. The lower level of confidence is due to higher geologic uncertainty when the qualified person converts an Indicated mineral resource to a probable reserve or higher risk in the results of the application of modifying factors at the time when the qualified person converts a Measured mineral resource to a probable mineral reserve. A qualified person must classify a Measured mineral resource as a probable mineral reserve when his or her confidence in the results obtained from the application of the modifying factors to the Measured mineral resource is lower than what is sufficient for a proven mineral reserve.
propylitic	Characteristic greenish color. Minerals include chlorite, actinolite and epidote. Typically contains the assemblage quartz-chlorite-carbonate
proven mineral reserve	A proven mineral reserve is the economically mineable part of a Measured mineral resource. For a proven mineral reserve, the qualified person has a high degree of confidence in the results obtained from the application of the modifying factors and in the estimates of tonnage and grade or quality. A proven mineral reserve can only result from conversion of a Measured mineral resource.

Term	Definition
qualified person	A qualified person is an individual who is a mineral industry professional with at least five years of relevant experience in the type of mineralization and type of deposit under consideration and in the specific type of activity that person is undertaking on behalf of the registrant; and an eligible member or licensee in good standing of a recognized professional organization at the time the technical report is prepared. For an organization to be a recognized professional organization, it must: • Be either: – An organization recognized within the mining industry as a reputable professional association, or – A board authorized by U.S. federal, state or foreign statute to regulate professionals in the mining, geoscience or related field • Admit eligible members primarily on the basis of their academic qualifications and experience • Establish and require compliance with professional standards of competence and ethics • Require or encourage continuing professional development • Have and apply disciplinary powers, including the power to suspend or expel a member regardless of where the member practices or resides; and • Provide a public list of members in good standing.
quebrada	Gorge or ravine
reclamation	The restoration of a site after mining or exploration activity is completed.
refining	A high temperature process in which impure metal is reacted with flux to reduce the impurities. The metal is collected in a molten layer and the impurities in a slag layer. Refining results in the production of a marketable material.
refractory	Gold mineralization normally requiring more sophisticated processing technology for extraction, such as roasting or autoclaving under pressure.
rock quality designation (RQD)	A measure of the competency of a rock, determined by the number of fractures in a given length of drill core. For example, a friable ore will have many fractures and a low RQD.
rod mill	A rotating cylindrical mill which employs steel rods as a grinding medium.

Term	Definition
royalty	An amount of money paid at regular intervals by the lessee or operator of an exploration or mining property to the owner of the ground. Generally based on a specific amount per tonne or a percentage of the total production or profits. Also, the fee paid for the right to use a patented process.
run-of-mine	Rehandle where the raw mine ore material is fed into the processing plant's system, usually the crusher. This is where material that is not direct feed from the mine is stockpiled for later feeding. Run-of-mine relates to the rehandle being for any mine material, regardless of source, before entry into the processing plant's system.
solvent extraction-electrowinning (SX/EW)	A metallurgical technique primarily applied to copper ores, in which metal is dissolved from the rock by organic solvents and recovered from solution by electrolysis.
specific gravity	The weight of a substance compared with the weight of an equal volume of pure water at 4°C.
supergene	Mineral enrichment produced by the chemical remobilization of metals in an oxidized or transitional environment.
tailings	Material rejected from a mill after the recoverable valuable minerals have been extracted.
triaxial compressive strength	A test for the compressive strength in all directions of a rock or soil sample.
uniaxial compressive strength	A measure of the strength of a rock, which can be determined through laboratory testing, and used both for predicting ground stability underground, and the relative difficulty of crushing.

25.0 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

25.1 Introduction

The Wood and Geosyntec QPs consider it is reasonable to rely on Southern Copper for the following aspects of modifying factors because Southern Copper has considerable experience in developing and operating mines in Peru similar to the Toquepala Operations, and elsewhere in the Americas and employs subject matter experts in the matters identified below.

25.2 Macroeconomic Trends

Wood QPs fully relied on the registrant for information relating to discount rates, foreign exchange rates, and taxes.

This information is used in the economic analysis in Section 19. It supports the mineral resource estimate in Section 11, and the mineral reserve estimate in Section 12.

25.3 Marketing Information

Wood QPs fully relied on the registrant for information relating to:

- Information relating to market studies/markets for the mine products, marketing and sales contracts, product valuation and metal prices, product specifications, refining and treatment charges, transportation costs, agency relationships, material contracts (e.g., mining, concentrating, smelting, refining, transportation, handling, and forward sales contracts), and contract status (in place, renewals).

This information is used when discussing the market, metal prices and contract information in Section 16, and in the economic analysis in Section 19. It supports the mineral resource estimate in Section 11, and the mineral reserve estimate in Section 12.

25.4 Legal Matters

Wood and Geosyntec QPs fully relied on the registrant for information relating to:

- Information relating to the corporate ownership interest, the mineral tenure (concessions, payments to retain, obligation to meet expenditure/reporting of work conducted), surface rights, water rights (water take allowances), royalties, encumbrances, easements and rights-of-way, violations and fines, permitting requirements, ability to maintain and renew permits, monitoring requirements and monitoring frequency, and bonding requirements.

This information is used in support of the property ownership information in Section 3, the permitting, closure and surface rights discussions in Section 15, Section 17 and Section 23, and the economic analysis in Section 19. It supports the mineral resource estimate in Section 11, and the mineral reserve estimate in Section 12.

25.5 Environmental Matters

Wood and Geosyntec QPs fully relied on the registrant for information relating to:

- Information relating to baseline and supporting studies for environmental permitting, environmental permitting and monitoring requirements, ability to maintain and renew permits, emissions controls, closure planning, closure and reclamation bonding and bonding requirements, sustainability accommodations, and monitoring for and compliance with requirements relating to protected areas and protected species.

This information is used when discussing environmental and permitting information in Section 3, Section 17, and closure costs and reclamation bonding information in Section 17 and Section 19. It supports the mineral resource estimate in Section 11, and the mineral reserve estimate in Section 12.

25.6 Stakeholder Accommodations

Wood QPs fully relied on the registrant for information relating to:

- Information relating to social and stakeholder baseline and supporting studies, hiring and training policies for workforce from local communities, partnerships with stakeholders (including national, regional, and state mining associations; trade organizations; fishing organizations; state and local chambers of commerce; economic development organizations; non-government organizations; and state and federal governments), and the community relations plan.

This information is used in the social and community discussions in Section 17, and the economic analysis in Section 19. It supports the mineral resource estimate in Section 11, and the mineral reserve estimate in Section 12.

25.7 Governmental Factors

Wood QPs fully relied on the registrant for information relating to:

- Information relating to taxation and government royalty considerations at the Project level.

This information is used in the economic analysis in Section 19. It supports the mineral resource estimate in Section 11, and the mineral reserve estimate in Section 12.