JDS Energy & Mining Inc.

NI 43-101 TECHNICAL REPORT

PORCO PROJECT

POTOSI, BOLIVIA

EFFECTIVE DATE – 21 December 2021
REPORT DATE – 21 December 2021

SANTACRUZ silver mining, ltd

PREPARED FOR

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This report entitled NI 43-101 Technical Report for the Porco Project, Potosi, Bolivia, effective as of 21 December 2021 was prepared and signed by the following authors:

Original document signed and sealed by:

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Wayne Corso, P. E. — Date Signed

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NOTICE

JDS Energy & Mining, Inc. prepared this National Instrument 43-101 Technical Report, in accordance with Form 43-101F1, for Santacruz Silver Mining, Ltd. The quality of information, conclusions and estimates contained herein is based on: (i) information available at the time of preparation; (ii) data supplied by outside sources, and (iii) the assumptions, conditions, and qualifications set forth in this report.

Santacruz Silver Mining, Ltd. filed this Technical Report with the Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. Except for the purposes legislated under provincial securities law, any other use of this report by any third party is at that party's sole risk.

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1 EXECUTIVE SUMMARY

1.1 Introduction

JDS Energy & Mining Inc. (JDS) was commissioned by Santacruz Silver Mining, Ltd. (Santacruz) to carry out a Technical Report of the Porco Project, a resource development base metal project located in the state of Potosi, Bolivia.

The Porco Mine has been active for nearly 500 years and is currently producing Zinc/Silver and Lead/Silver concentrates. The complex consists of an underground mine, concentrator plant, maintenance workshop, tailing storage facility, water treatment plant, supplies warehouse, main office, two hospitals and Yancaviri Camp.

On October 11, 2021, Santacruz entered into a definitive share purchase agreement (the "**Definitive Agreement**") with Glencore whereby Santacruz agreed to acquire a portfolio of Bolivian silver assets (the "**Assets**") from Glencore (the "**Transaction**"). The Assets include: (a) Glencore's 45% interest in the Bolivar Mine and the Porco Mine, held through an unincorporated joint venture between Glencore's wholly-owned subsidiary Sociedad Minera Illapa C.V. ("**Illapa**") and Corporación Minera de Bolivia ("**COMIBOL**"), a Bolivian state-owned entity; (b) a 100% interest in the Sinchi Wayra business, which includes the producing Caballo Blanco mining complex; (c) the Soracaya exploration project; and (d) the San Lucas ore sourcing and trading business.

Pursuant to the Definitive Agreement, Santacruz will acquire all of Glencore's properties, assets and businesses related to the Assets by acquiring various Glencore subsidiaries. The consideration for the Transaction will be payable through upfront consideration of US$20 million in cash on closing (subject to customary working capital adjustments), and deferred consideration of US$90 million secured against the Assets. The deferred consideration consists of cash payments of US$22.5 million payable on each anniversary of the closing date for four years and is subject to certain accelerated payment features based on cash flows and silver and zinc prices. Glencore will also retain a 1.5% net smelter returns royalty on the Assets and will have a right to acquire 100% of the offtake from the Assets on market terms to be set forth in definitive agreements to be entered into at closing.

1.2 Location and Access and Ownership

The Porco complex is located in the Porco Municipality of the Antonio Quijarro Province, in the Potosí Department, Bolivia. UTM W-84 Coordinates: 7806780E; 188096N at an elevation of 4,174 masl.

50 km southwest of Potosí City, via paved highway, the mine is 150 km from a commercial airport at Uyuni and 581 km from the capital city of La Paz. The site is accessible by the towns of Porco and Agua de Castilla, 3.5 km and 5.0 km respectively via secondary gravel roads. Concentrates are transported 5 km by truck from Porco Concentrator to the Yancaviri Warehouse and rail station. From there rail takes the concentrate directly to the Pacific port of Antofagosta, Chile.

Figure 1-1: Project Location

Source: Kirkham (2021)

Porco Mine is currently owned by the Bolivian government (COMIBOL) with exclusive mining held pursuant to an unincorporated joint venture (the "**Illapa JV**") between private owner operator Sociedad Minera Illapa S.A. (Illapa). Pursuant to the Illapa JV, Illapa holds a 45% interest in the Porco Project, and the Bolivian Government (COMIBOL) which holds a 55% interest in the Porco Project. Illapa is a wholly-owned indirect subsidiary of Glencore Plc.

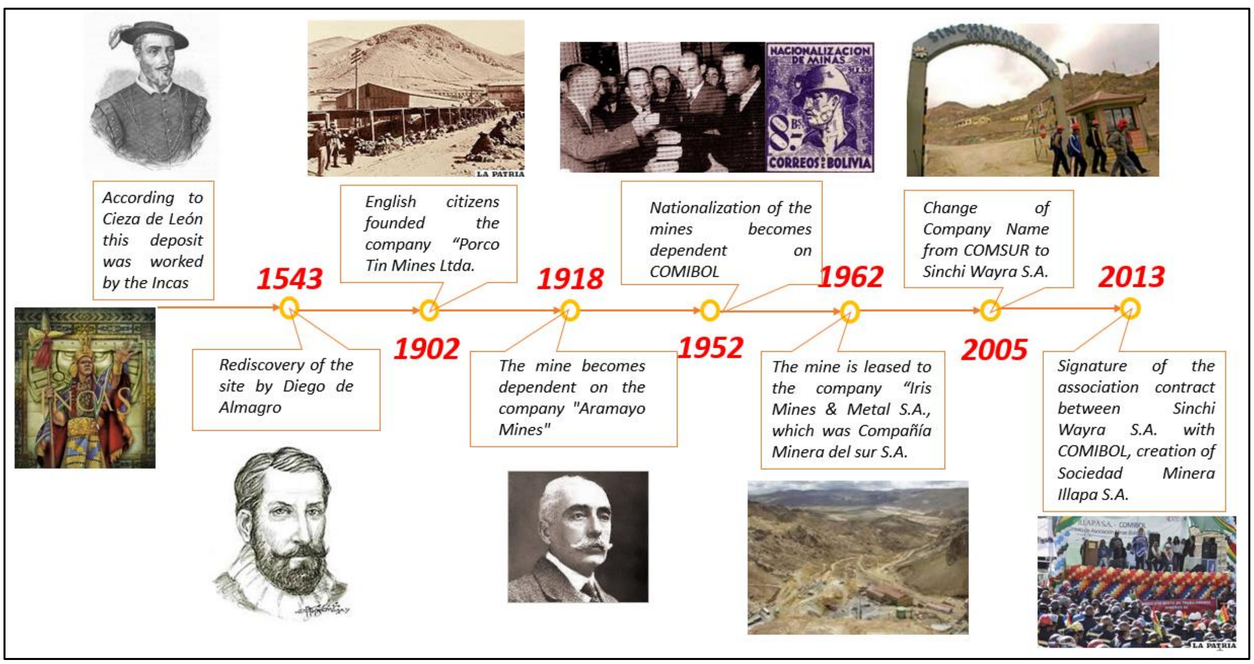
In the event of any controversy, the Illapa JV has an arbitration clause with seat in La Paz, Bolivia, under UNCITRAL Rules. The Illapa Joint Venture took effect on December 4, 2014 and the duration of the agreement is 15 years, with the possibility of extending the term for the same duration.

1.3 History

The Porco deposit has been active for centuries. Modern development of the deposit on a commercial scale started in the 20th century and under various owners producing silver, tin, lead and zinc. After Nationalization in the 1950’s Tin was produced by the Bolivian State entity (COMIBOL), The current ownership structure, mine configuration and production products was established in 2013. The project produces Lead and Zinc concentrates from a dedicated on-site process plant.

Porco mine is currently owned by the Contrato de Asociacion Sociedad Miner Illapa S.A. which is a partnership between private owner operators (Glencore/Sinchi Wayra) and the Bolivian Government (COMIBOL). Operations are managed by Sinchi Wayra S.A. and sale of concentrates are subject to an Off-take Agreement with Glencore International AG as buyer, under Contracts N°180-13-14212-P, and N°062-13-14190-P, both entered in 2013, with all their addendums and amendments. These agreements are “evergreen” meaning that they are in effect through the life of mine.

Figure 1-2: Project History



Source: Glencore (2021)

Porco mine has been in some form of development and/or operations for over 500 years. Most relevant production figures from the last few years with modern production methods in place are tabulated in Table 1-1. Mine production for 2021 is on target to produce approximately 100,000 t of mineralized material.

Table 1-1: Mine Production

Porco
Production

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Production	ACT 2017	ACT 2018	ACT 2019	ACT 2020	EST02 2021
1ry Dev (km)	0.9	1.5	1.6	1.5	1.5
2ry Dev (km)	8.4	8.9	8.5	3.2	4.1
Extraction (k mt)	**224**	**237**	**217**	**83**	**93**
Treatment (k mt)	**225**	**233**	**220**	**83**	**93**
Zn (%)	7.4	6.9	7.1	7.7	7.9
Pb (%)	0.8	0.6	0.6	0.7	0.4
Ag (g/t)	110.2	84.4	65.6	72.2	69.1
Zn conc (k mt)	**31.2**	**30.6**	**28.9**	**11.8**	**13.8**
Pb conc (k mt)	**2.5**	**1.9**	**2.0**	**0.8**	**0.5**
Recoveries					
Zn (%)	91.9	91.8	93.6	92.8	93.2
Pb (%)	75.5	73.0	75.2	75.0	55.1
Ag (%)	89.6	88.0	85.6	85.7	85.2
Own Source Metal					
Zn (k fmt)	15.3	14.9	14.5	5.9	6.9
Pb (k fmt)	1.3	1.0	1.0	0.4	0.2
Ag (M Oz)	0.7	0.6	0.4	0.2	0.2

GLENCORE

Source: Glencore (2021)

The Porco deposit consists of multiple, relatively thin high-grade veins. The mining methods used vary according to the continuity, dip, and width of these veins. Current mining methods employed include sublevel longhole stoping with backfill, shrinkage stoping, and some cut and fill.

Currently the mine is separated into two main areas: Hundimiento and Central zones:

- “Hundimiento” is the more modern section of the mine and is developed mostly with trackless methods using an access ramp to move men and materials between levels. The mineralized zones are predominantly wider and steeper dipping thus, stoping is 85% AVOCA mining and 15% shrinkage. This area is completely isolated from the Central zone and trucks its mineralized material to surface via an access ramp; sublevels are driven on nominal 15 m spacing with sill drifts in vein driven 3.0 m x 3.0 m, an average of 7 stopes produces about 300 t/d of mineralized material (Figure 6-7). All waste rock stays in the mine as backfill; and

- “Central” is 100% conventional shrinkage mining (Figure 6-6). Mineralized material is hauled via rail on each active level to the shaft for hoisting to surface. Levels are spaced at a nominal 45 m and level connections are via manway raises and the main shaft. rifts are 2.2 m x 2.0 m, raises are driven manually, and an average of 17 active stopes produces about 400 t/d of mineralized material. All waste rock stays in the mine as backfill.

Currently each mining area provides roughly 50% of the total mine production which, during the two years leading up to 2019 has been about 700 t/d (225,000 t/a).

1.4 Geology and Mineralization

The Bolivar, Porco and Caballo Blanco deposits are located in the central part of the Eastern Cordillera, a thick sequence of Paleozoic marine siliciclastic and argillaceous sedimentary rocks deposited on the western margin of Gondwana and deformed in a fold-thrust belt. There were two major tectonic cycles in the Paleozoic: The Lower Paleozoic Famatinian cycle (the Tacsarian and Cordilleran cycles of Bolivia), and the Upper Paleozoic Gondwana cycle (Subandean cycle of Bolivia).

The Porco silver-zinc-tin deposit is located 35 km southwest of the Cerro Rico de Potosí deposit on the southeastern edge of the Los Frailes volcanic field. It was the first silver deposit discovered in Bolivia, with exploitation dating to pre-colonial times. The geology has been described by Sugaki et al. (1983), Cunningham et al. (1993, 1994a, b) and Jiménez et al. (1998).

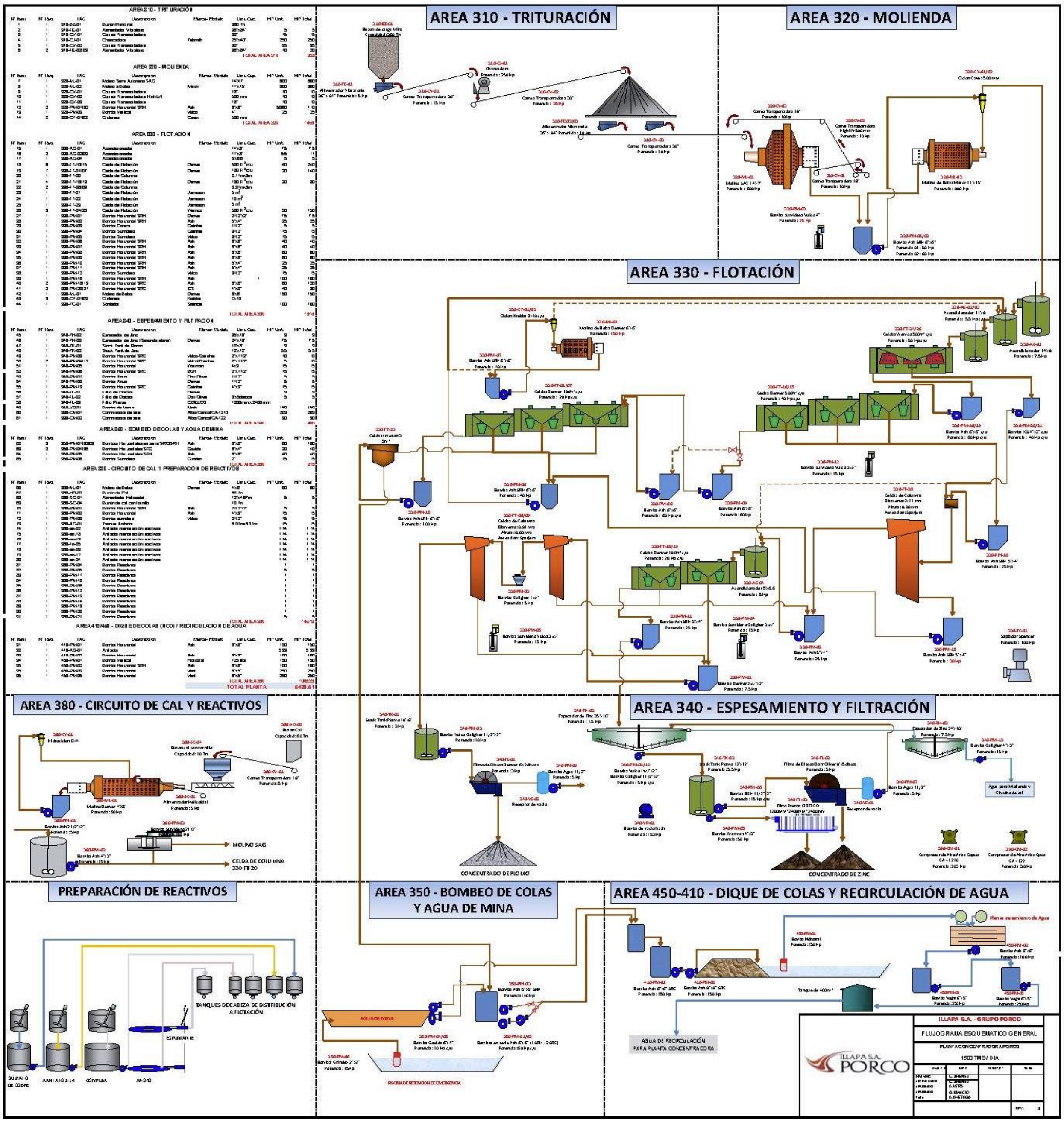
The deposit is hosted by a north-south-elongated caldera that is 5.0 km x 3.0 km and formed at 12.0 ± 0.4 Ma with the eruption of the crystal-rich dacitic Porco Tuff. Well defined topographic walls of the caldera cut Ordovician phyllites and Cretaceous sandstones. The 12.1 ± 0.4 Ma Apo Porco stock (4,886 masl) occurs on the southern margin of the caldera. Mineralization is associated with the younger 8.6 ± 0.3 Ma Huayna Porco stock (4,528 masl) in the center of the caldera. Radial dykes, alteration and metals are zoned around the stock. To the north, the Porco Tuff is overlain by the ignimbrites of the Los Frailes Formation dated at 6 to 9 Ma.

Mineralization occurs in NNE to NE-trending veins that cut the Porco Tuff about 1 km east of the Huayna Porco stock. The deposit is zoned around the stock with cassiterite proximal to the stock and base metals, mainly sphalerite and galena, further away. The upper parts of the veins are silver-rich with pyrargyrite, acanthite and stephanite. The main structure is the San Antonio vein which strikes N10º - 30ºE and dips between 70º and 85º to the east. It is 300 m in vertical extent and 1.2 m to 2.0 m in width. To the south, the vein branches into the Oriente, Misericordia, and Santos veins, whose lengths vary between 500 m to 1,500 m. The main ore minerals are pyrite, sphalerite, galena, argentiferous galena, native silver, chalcopyrite, and arsenopyrite in a gangue of quartz. Other important structures are the Muestra Grande vein on Huayna Porco Hill, where the grade reached 2,300 g/t Ag (Sugaki et al., 1983), and the Rajo Zúñiga vein, which strikes N30ºE and dips 75º-80ºE. The latter vein, with widths between 1.0 m and 1.5 m, was exploited in a 100 m x 20 m open pit. This altered dacite-hosted vein is accompanied by associated veinlets and disseminations in the wall rock and consists of cassiterite, wolframite, galena, silver sulphosalts, and pyrite.

1.5 Metallurgical Testing and Mineral Processing

The Porco Mine is currently operating; therefore, the metallurgical assessment is based on operational history. The recoveries and concentrate grades discussed are derived from the operational period of August 2020 to July 2021. The operating conditions have been divided into company mined ore and toll. The two types of ore are processed separately. The flowsheet for the Porco mill can be seen in Figure 1-3.

Figure 1-3: Porco Mill Flowsheet



Source: Glencore (2021)

The feed that is treated contains lead, zinc, and silver in recoverable quantities. The process uses differential flotation to first float off a lead concentrate, containing approximately 53% lead, and then a zinc concentrate that is approximately 50% zinc.

In the company feed, silver is recovered to both concentrates, with approximately 50% to the lead concentrate and 35% to the zinc concentrate. The lead concentrate silver grades are 6,500 g/t Ag for the lead concentrate and 275 g/t Ag for the zinc concentrate. For the toll feed, the recoveries are reversed with 37% of the siler reporting to the lead concentrate and 48% of the siler reporting to the zinc concentrate. The concentrate grades for the toll ore are typically 2,900 g/t Ag for the lead concentrate and 310 g/t Ag for the zinc concentrate.

The expected recoveries and concentrate grades can be found in Table 1-2.

Table 1-2: Estimated Metallurgical Recoveries, Concentrate Grades and Mineral Processing Factors

Parameter	Unit	Concentrates			
		Lead Concentrate		Zinc Concentrate	
		Company Feed	Toll Feed	Company Feed	Toll Feed
Zn Recovery	%	N/A	N/A	93	86
Pb Recovery	%	12.46*(Lead feed grade %) + 68.98	8.28*(Lead feed grade %) + 63.58	N/A	N/A
Ag Recovery	%	0.919 x (Silver Feed Grade) + 37.743	32	-0.0957 x (Silver Feed Grade) + 47.874	50
Concentrate Grade					
Zn	%	12	12	50	50
Pb	%	51	56	0.39	0.55
Ag	g/t	6,480	2,900	273	310

*Variable with Cu concentrate pull factor.

1.6 Historic Mineral Resource Estimate

Glencore's Resources & Reserves report as of December 31, 2020 disclosed Porco, Bolivar and Caballo Blanco mineral resource statements as well as mineral reserve estimates as of December 31, 2020, which remain current for Glencore as of the date hereof. As the mineral resource and mineral reserve estimates pre-date Santacruz's agreement to acquire the Assets, Santacruz is treating them as "historical estimates" under National Instrument 43-101 - Standards of Disclosure for Mineral Projects (NI 43-101), but they remain relevant as the most recent mineral resource and reserves estimates for Bolivar, Porco and Caballo Blanco. Given the source of the estimates, Santacruz considers them reliable and relevant for the further development of the Project; and accordingly, they should be relied upon only as a historical resource and reserve estimate of Glencore, which pre-dates Santacruz's agreement to acquire the Assets however, the Company is not treating the historical estimates as current Mineral Resources or Mineral Reserves.

A "Qualified Person" as per NI 43-101 has not done sufficient work to classify the historical estimate as current Mineral Resources or Mineral Reserves and Santacruz is not treating the historical estimate as current Mineral Resources or Mineral Reserves. Further drilling and resource modelling would be required to upgrade or verify these historical estimates as current mineral resources or reserves for the respective assets.

Table 1-3: Historical Mineral Resource Estimate

Category	Tonnes (Mt)	Zinc (%)	Lead (%)	Silver (g/t)
Measured Mineral Resources	0.7	10.68	0.63	83
Indicated Mineral Resources	0.4	10.86	0.77	114
Measured + Indicated Mineral Resources	1.1	10.74	0.68	93
Inferred Mineral Resources	2.2	11.78	0.84	98

Source: Glencore (2020)

Notes:

1. The Mineral Resources have been calculated in accordance with definitions in accordance with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code), the 2016 edition of the South African Code for Reporting of Mineral Resources and Mineral Reserves (SAMREC) and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standards on Mineral Resources and Reserves (2014).
2. The ZnEq = (Zn% + (Pb% * 0.73) + (Ag g/t * 0.019290448)).
3. The Mineral Resources have been calculated in accordance with definitions adopted by the Canadian Institute of Mining, Metallurgy and Petroleum. Employees of Glencore have prepared these calculations.
4. Mineral resources are not mineral reserves until they have demonstrated economic viability. Mineral resource estimates do not account for a resource's mineability, selectivity, mining loss, or dilution.
5. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.
6. All figures are rounded to reflect the relative accuracy of the estimate and therefore numbers may not appear to add precisely.
7. Reported in-situ Mineral Resources do not consider mineral availability by underground mining methods.
8. Historical Mineral Reserves and Resources are inclusive of Mineral Reserves shown at 100% ownership.

1.7 Infrastructure

The underground mine and process plant are supported by the site infrastructure built up over five centuries of mining activity. Potosi city is 50 km to the NW via paved highway and the mine is 150 km via paved National Highway 5 from a commercial airport at Uyuni and 581 km to the capital, La Paz. A 5 km gravel access road to the mine site goes through the communities of Agua de Castilla and Porco.

Concentrates are transported 5 km by truck from Porco Concentrator to the Yancaviri Warehouse and rail Station in Agua de Castilla. From there rail takes the concentrate directly to the Pacific port of Antofagosta, Chile.

Electrical power is supplied from the national grid via 69 kV transmission lines from the Landara substation to El Tambo II substation, where voltage is transformed from 69 to 24.9 kV for distribution to the mine site. The site has two separate electrical substations: Mine and Plant, where the voltage is transformed from 24.9 kV to 3.3 kV, 440 V and 220 V.

Water is sourced mostly from the mine discharge of 35 l/s which is treated for use in the process plant as part of a zero-discharge system. Potable water for the mine and surrounding communities are sourced at the Jalsuri well.

1.8 Environmental, Permitting, and Social Relations

Glencore has implemented a sophisticated management approach to sustainability consistent with their practices worldwide. From the 2019 Sustainability Report:

> *"Our commitment to responsible and sustainable mining has strengthened over the years, based on the alignment to Glencore's international policies and procedures and the major sustainability initiatives to which we subscribe. All our policies and procedures seek compliance with Bolivia's legal rules, but our goal is to go beyond them and so follow standards that exceed legislation and address all the impacts from our operations."*

This integrative approach is evident in the Bolivar operation. Areas addressed and monitored include People, Occupational Health & Safety, Governance and Compliance, Stakeholder Engagement, Contributing to Community, Environmental Management, and Product Stewardship & Material Handling. As part of this integrated program, environmental elements including Water, Air, Tailings and Waste Management programs are in place and actively monitored. Annual Sustainability reports are produced which summarize the KPI's of the entire project.

Sociedad Minera Illapa SA, in compliance with the internal policy of caring for the health and wellbeing of its employees and mine resources, an Integrated Management System based on the ISO 14001 standard and the ISO 45001 Risk Prevention standard is currently being implemented. with the precepts of mitigating risks and improving business performance through a safer work environment and a healthier workforce.

A large part of how the mine operation interacts with nearby communities is related to the Cooperativa system. This system is based on establishing informal agreements with local miners who independently mine ore in designated areas, and toll mill at the Porco plant. Resources in the upper central zone are made available to the Cooperativas who mine the material and deliver it to the process plant. They are paid based on weight and sample grades. After the material is processed, some reconciliation mechanism is used to adjust the payment based on actual recoveries. This system helps to direct the energies of the informal miners into an opportunity for legitimate production and steady income while also helping to minimize the activity of illegal mining.

However, illegal mining is still being carried out at Porco mine and was observed on our site visit. Forced access to mining areas through destruction of ventilation brattices and gates causes direct losses, while mining in unauthorized areas causes instability and reduced productivity as well as creating a safety hazard to both the perpetrators and the mine workforce.

1.9 Conclusions and Recommendations

1.9.1 Conclusions

The Porco mine has been active for nearly 500 years and is currently producing Zinc/Silver and Lead/Silver concentrates. The complex consists of an underground mine, concentrator plant, maintenance workshop, tailing storage facility, water treatment plant, supplies warehouse, main office, two hospitals and Yancaviri Camp.

On October 11, 2021, Santacruz entered into a definitive share purchase agreement (the "Definitive Agreement") with Glencore whereby Santacruz agreed to acquire a portfolio of Bolivian silver assets (the "Assets") from Glencore (the "Transaction"). The Assets include: (a) Glencore's 45% interest in the Bolivar Mine and the Porco Mine, held through an unincorporated joint venture between Glencore's wholly-owned subsidiary Sociedad Minera Illapa C.V. ("Illapa") and Corporación Minera de Bolivia ("COMIBOL"), a Bolivian state-owned entity; (b) a 100% interest in the Sinchi Wayra business, which includes the producing Caballo Blanco mining complex; (c) the Soracaya exploration project; and (d) the San Lucas ore sourcing and trading business. JDS Energy & Mining Inc. (JDS) was commissioned by Santacruz Silver Mining Ltd. (Santacruz) to prepare this Technical Report to support the disclosure of the acquisition for the Bolivar Project by Santacruz pursuant to the Transaction.

The mine is currently divided into three sections one section which mines remnants and extensions of existing veins by conventional methods and antiquated infrastructure, a second section which is separate and amenable to more modern techniques and trackless equipment, and a third in the upper levels which is mined by the Cooperatives by agreement. Glencore has embarked on a program of modernizing the mine taking advantage of advances in mining equipment and methods where possible:

- Safety is of paramount importance at the mine and concerns have been successfully addressed with the establishment of training programs, systems, and the incorporation of a safety culture into mine operations;
- Glencore production trends call for reduction of production rates at Porco. The mine is quite spread out and covers a large area relative to production rate. Thus, the mine has a very high fixed cost component due to support services and infrastructure;
- Illegal mining is an issue, and control of unauthorized personnel into the mine is a challenge for the owners. Unauthorized access and mining raise the potential for safety risks as well as impact to the resource itself, mine production and productivity;
- Planned future development mostly follows the current resource down dip which will not only incur higher haulage, ventilation, and water handling costs with depth, but considerable capital investment for development and shaft sinking. Full understanding and definition of the

resource would help to better plan development, slow vertical decent, and get the most value from current development; and

- Historic processing at the Bolivar mill demonstrates the metallurgy of the material mined at Bolivar. The operational data is validated by the monthly reconciliation based on the concentrate shipped to the smelter and the final reconciliation between the smelter and the mine.

Many risks exist which are common to most mining projects including operating and capital cost escalation, permitting and environmental compliance, unforeseen schedule delays, changes in regulatory requirements, ability to raise financing and metal price. Many of these ever-present risks can be mitigated with adequate engineering, planning and pro-active management. The most significant risks to this project and its continued development are related socio-economic and geo-political factors:

- Areas surrounding and adjacent to Porco are being actively mined by mining cooperatives which are organized independent mining bodies. They are an influential population recognized by the government as a valid economic entity for local development and conduct their activities on separate claims, in abandoned mines, or granted areas adjacent to existing operations *(as is the case with Porco, where the upper levels of the mine are mined by cooperatives)*. They are an important group with which to work for good community stability, and rogue operators within this group can pose specific risks related to ownership and safety; and

- The Porco Mine, along with the other Glencore operations have established mechanisms for purchase and processing of mineralized material from these operations and have established strong mutually beneficial working relationships with many of the local mining Cooperatives. Currently an environment of good business and good community relations exists.

Current operation of the Porco Mine is subject to a joint venture agreement with the Bolivian government ("COMIBOL") which has been in effect since 2014. Continued operation under this agreement is reliant upon a stable political and socio-economic climate. Impacts of government instability are difficult to predict and preempt:

- Historic political instability in Bolivia has cost Glencore dearly in nationalized assets. The current JV structure with COMIBOL seems to be a reasonable response to minimize this risk, but not eliminate it completely.

1.9.2 Recommendations

The Porco complex has been in operation for centuries and continued operation under new ownership is expected to continue under similar operating parameters. Therefore, the recommended work program is focused on immediate validation and verification of the historic resource in compliance with NI 43-101, followed by or concurrent with, an operational focus on technical evaluation of production methods to identify areas to increase profitability.

The QPs recommend verification and delineation of the Historic Resource which is the subject of this report. Total cost of the program is estimated at US $ 147k (Table 1-4) and consists of:

- Review and revise resource classification criteria to insure NI 43-101 compliance; and
- Validate and verify the historic resource and complete a technical report in order that the resource be considered current and may be relied upon.

Table 1-4: 2022 Recommended Work Program and Budget

Description	#	Unit	$/Unit	Total $ (000's)
Data Compilation, Model Update including QA/QC	100	hrs	250	25
Validate and Verify Historic Resources	180	hrs	250	45
Review and Revise Resource Classification	80	hrs	250	20
Reporting	150	hrs	250	38
Sub total				**128**
Contingency	15	%		19
Total				**147**

As well, other potential areas of opportunity were observed by the QPs during the site visit and data analysis stages of this report. It is suggested that in addition to routine continuous improvement programs, project management consider focusing technical and production resources in the following areas:

- A detailed life of mine plan and economic evaluation based on the updated resource should be done to justify required capital investment for continued production. Reduction in the number of work areas may allow for profitable mining at lower production rates. Fixed costs resulting from support services and infrastructure could then be reduced;

- Good work is being done to identify and quantify specific stope dilution. Analysis and incorporation of findings into mining method selection, stope planning and mine operations is an opportunity to increase project value;

- Effective barriers to unauthorized mine entry, both physical and economic, especially into active mine areas must be established. For example, intensively exploiting fewer mineralized zones may further separate company mine production from that of the Cooperatives and illegal miners and prove effective in minimizing the impact of unauthorized mining on safety and production;

- Investigate opportunities to raise Process Plant throughput and reduce downtime to improve project economics; and

- Metallurgical testwork to investigate opportunities to increase recoveries through grinding, reagent dosage or newer flotation technologies.

2 INTRODUCTION

JDS Energy & Mining Inc. (JDS) was commissioned by Santacruz to prepare a Technical Report in accordance with the Canadian Securities Administrators' National Instrument 43-101 and Form 43-101F1, collectively referred to as National Instrument (NI) 43-101 for the Porco Project (Porco or the Project) located in the state of Potosi, Bolivia.

On October 11, 2021, Santacruz entered into the Definitive Agreement with Glencore whereby Santacruz agreed to acquire a portfolio of Bolivian silver assets from Glencore. The Assets include: (a) Glencore's 45% interest in the Bolivar Mine and the Porco Mine, held through an unincorporated joint venture between Glencore's wholly-owned subsidiary Illapa and COMIBOL, a Bolivian state-owned entity; (b) a 100% interest in the Sinchi Wayra business, which includes the producing Caballo Blanco mining complex; (c) the Soracaya exploration project; and (d) the San Lucas ore sourcing and trading business.

Pursuant to the Definitive Agreement, Santacruz will acquire all of Glencore's properties, assets and businesses related to the Assets by acquiring various Glencore subsidiaries including 100% of the shares of Illapa. The consideration for the Transaction will be payable through upfront consideration of US$20 million in cash on closing (subject to customary working capital adjustments), and deferred consideration of US$90 million secured against the Assets. The deferred consideration consists of cash payments of US$22.5 million payable on each anniversary of the closing date for four years and is subject to certain accelerated payment features based on cash flows and silver and zinc prices. Glencore will also retain a 1.5% net smelter returns royalty on the Assets and will have a right to acquire 100% of the offtake from the Assets on market terms to be set forth in definitive agreements to be entered into at closing.

2.1 Terms of Reference

The report was prepared to support a disclosure of the acquisition for the Porco Project by Santacruz pursuant to the Transaction.

2.2 Qualifications and Responsibilities

The Qualified Persons (QPs) preparing this report are specialists in the fields of geology, exploration, mineral resource estimation, metallurgy and mining.

None of the QPs or any associates employed in the preparation of this report has any beneficial interest in Santacruz and neither are any insiders, associates, or affiliates. The results of this report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between Santacruz and the QPs. The QPs are being paid a fee for their work in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience, and professional association, are considered QPs as defined in the NI 43-101, and are members in good standing of appropriate professional institutions / associations. The QPs are responsible for the specific report sections as listed in Table 2-1.

Table 2-1: QP Responsibilities

Qualified Persons	Company	QP Responsibility / Role	Report Section(s)
Wayne Corso, P.E.	JDS Energy & Mining Inc.	Author, Mining, Project Manager	1,2,3,4,5,6.1,6.2,12.4,25,26,27,28,29
Garth Kirkham, P. Geo.	Kirkham Geosystems Inc.	Geology, QA/QC, Data Verification, Drilling, Resource Estimate	1,6.5,7,8,9,10,11,12.1,12.2,25,26,27,28
Tad Crowie, P. Eng.	JDS Energy & Mining Inc.	Metallurgy	1,6.3,6.4,12.3,26,27,28

2.3 Site Visit

In accordance with National Instrument 43-101 guidelines, site visits are summarized in Table 2-2.

Table 2-2: QP Site Visits

Qualified Person	Company	Date	Accompanied by	Description of Inspection
Wayne Corso, P.E.	JDS Energy & Mining Inc.	August 11, 2021	Alfredo Salles (Sinchi Wayra), Olaf Meijer (Glencore), Site Management	Porco project site; including process plant, select working areas of the underground mine, discussions with site personnel
Garth Kirkham, P. Geo.	Kirkham Geosystems Inc.	August 11, 2021	Alfredo Salles (Sinchi Wayra), Olaf Meijer (Glencore), Site Management	Porco project site; including select working areas and faces underground, discussions with site personnel
Tad Crowie, P. Eng.	JDS Energy & Mining Inc.	August 11, 2021	Alfredo Salles (Sinchi Wayra), Olaf Meijer (Glencore), Site Management	Porco project site; including select working areas underground, Process plant, and tailing storage facility discussions with site personnel

2.4 Units, Currency and Rounding

The units of measure used in this report are as per the International System of Units (SI) or "metric" except for Imperial units that are commonly used in industry (e.g., ounces (oz.) and pounds (lb.) for the mass of precious and base metals).

All dollar figures quoted in this report refer to US dollars (US$ or $) unless otherwise noted.

Frequently used abbreviations and acronyms can be found in Section 29. This report includes technical information that required subsequent calculations to derive subtotals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the QPs do not consider them to be material.

This report may include technical information that requires subsequent calculations to derive sub-totals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, JDS does not consider them to be material.

2.5 Sources of Information

This report is based on information collected by JDS during a site visit performed on August 11, 2021 and on additional information provided by Glencore throughout the course of JDS's investigations. Other information was obtained from the public domain. JDS has no reason to doubt the reliability of the information provided by Glencore. This technical report is based on the following sources of information.

3 RELIANCE ON OTHER EXPERTS

The QP's opinions contained herein are based on information provided by Santacruz and others throughout the course of the study. The QPs have taken reasonable measures to confirm information provided by others and take responsibility for the information.

The QPs used their experience to determine if the information from previous reports was suitable for inclusion in this Technical Report and adjusted information that required amending.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Porco Mine and Plant is located in the Porco Municipality of the Antonio Quijarro Province, in the Potosí Department, Bolivia. UTM W-84 Coordinates: 7806780E; 188096N at an elevation of 4,174 masl. Figure 4-1).

Figure 4-1: Project Location Map

Source: Kirkham (2021)

4.2 Property Description and Tenure

The Porco mine is owned by the Bolivian Government (COMIBOL) with exclusive mining rights held pursuant to an unincorporated joint venture (the "**Illapa JV**") between private owner operator Sociedad Minera Illapa S.A. (Illapa). Pursuant to the Illapa JV, Illapa holds a 45% interest in the Porco Project, and the Bolivian Government (COMIBOL) which holds a 55% interest in the Porco Project. Illapa is a wholly-owned indirect subsidiary of Glencore Plc.

Illapa itself owns no mineral tenements in this district (Table 4-1 and Figure 4-2).

Santacruz will acquire 100% of the shares of Illapa pursuant to the Transaction, as more particularly described in Section 2. There are no royalties or encumbrances existing on the properties now as they relate to Glencore's ownership. In addition to cash payment described, a 1.5% NSR royalty forms part of the purchase price that Santacruz will pay to Glencore. The only known existing agreements that will bind Santacruz is that of the Illapa JV.

The Porco mine produces Zinc/Silver and Lead/Silver concentrates. The complex consists of an underground mine, concentrator plant, maintenance workshop, tailing storage facility, water treatment plant, supplies warehouse, main office, two hospitals and Yancaviri Camp as shown in Figure 4-3.

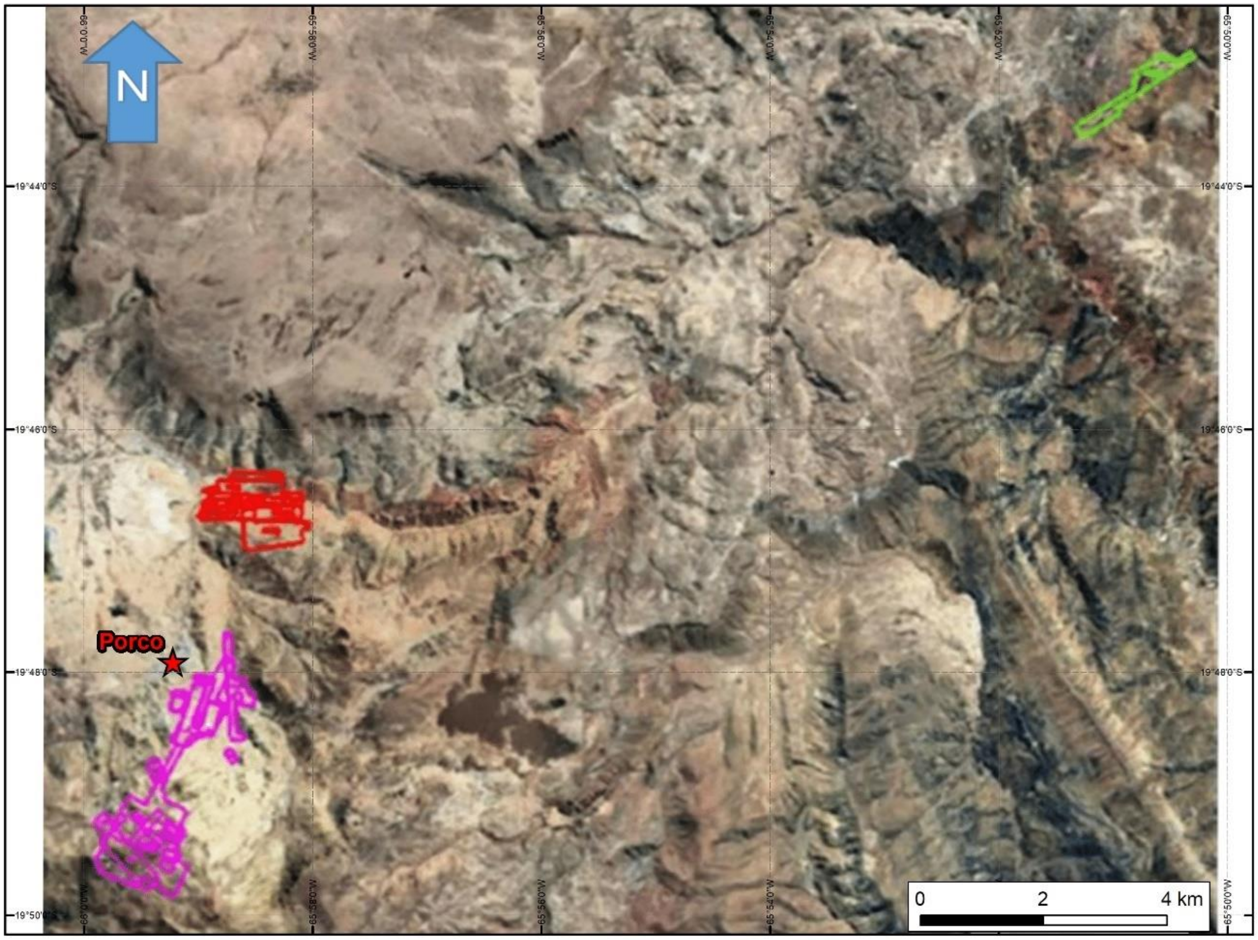
Environmental liabilities observed consist mostly of historic tailing storage facilities and mine workings. Recent audits verify environmental legal compliance and associated closure plan costing.

Table 4-1: Mineral Tenements (Sinchi Wayra contribution)

Area	Ates
Porco Mining Project (Ca – Mbp) First Group (Purple) Hectáreas: 344	La Esperanza, Socorro Del Pobre, Minerva, Santa Elena, Carmen, Iruputungo, Caccha, Hundimiento, Wally, La Rica, Soledad, San José, Esperanza Candelaria y Veneros Jalantaña
Porco Mining Project (Ca – Mbp) Second Group (Red) Hectáreas: 149	Electra, Paracaidas, Demasias Papicito, Sucesivas Primera Mamacita, Papicito, Mamicita Sucesivas Segunda Papicito y Sucesivas Primera Papicito
Individual Contract (Green) Hectáreas: 40	Precaución

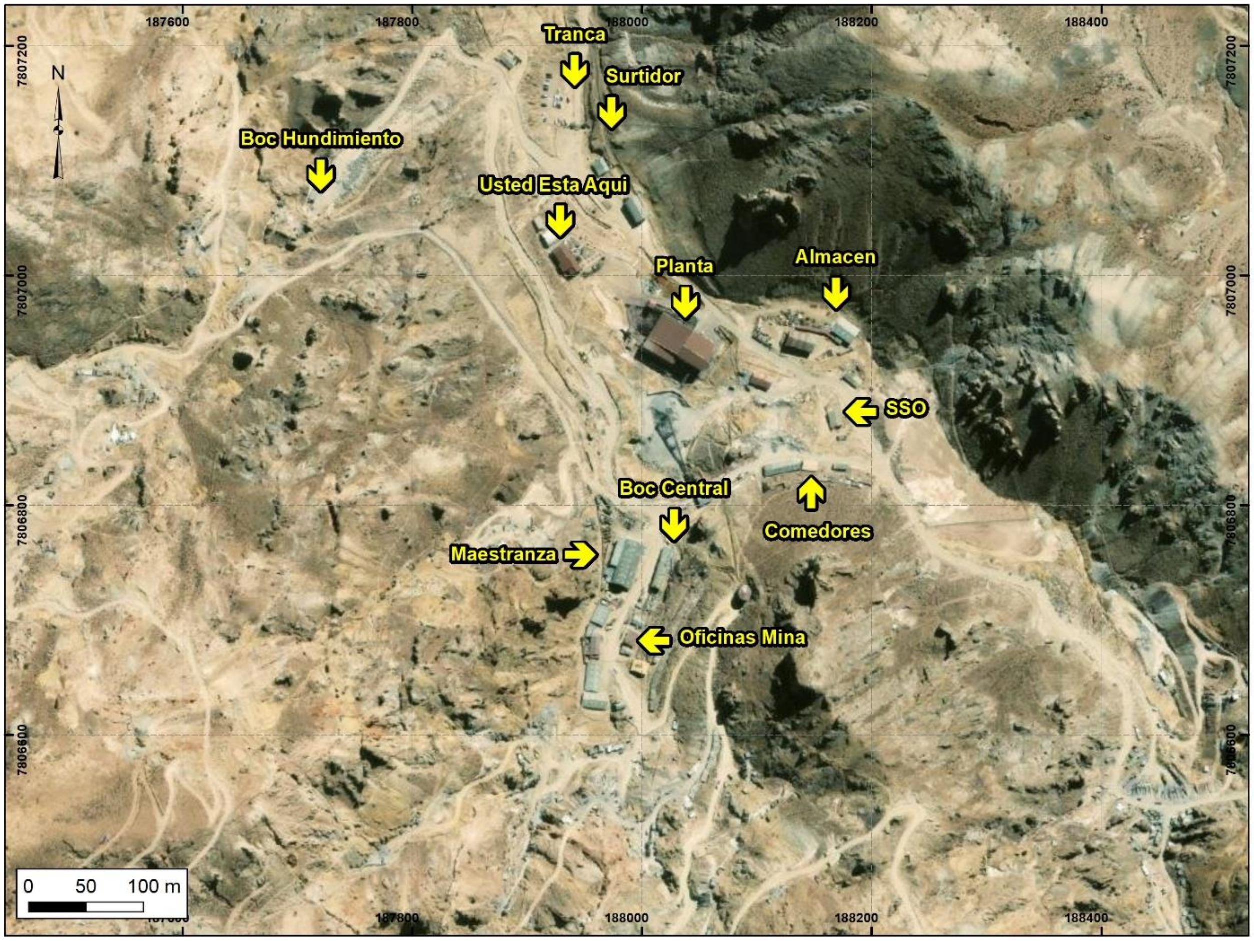
Source: Glencore (2021)

Figure 4-2: Mineral Tenement Locations



Source: Kirkham (2021)

Figure 4-3: Porco Mine Site



Source: Kirkham (2021)

4.3 Environmental, Permitting and Social Relations

Glencore implemented a sophisticated management approach to sustainability consistent with their practices worldwide. From the 2019 Sustainability Report:

> *"Our commitment to responsible and sustainable mining has strengthened over the years, based on the alignment to Glencore's international policies and procedures and the major sustainability initiatives to which we subscribe. All our policies and procedures seek compliance with Bolivia's legal rules, but our goal is to go beyond them and so follow standards that exceed legislation and address all the impacts from our operations."*

This integrative approach is evident in the Porco operation. Areas addressed and monitored include:

- Employees;
- Occupational Health & Safety;
- Governance and Compliance;
- Stakeholder Engagement;
- Contributing to Community;
- Environment; and
- Product Stewardship & Material Handling.

4.3.1 Regulatory Framework

Bolivia's central statute governing environment protection is Law 1333, of 27 April 1992; specific regulations for which are set out in Regulation of Environmental Prevention and Control, December 8, 1995. Special Decree No. 24782 of 31 July 1997 sets out specific environmental requirements related to mining. Breaching environmental obligations can result in criminal liability under the Bolivian Constitution, in addition to other administrative penalties (such as a loss of mining rights).

An Environmental Impact Assessment (EIA) would be required for a project the scale of a mining and processing operation. As well, public consultation with any potentially affected indigenous communities and local populations may also be necessary. Granting of the operating permit allows the proponent to obtain the appropriate operating licenses, which must be updated with any relevant changes during the life of the operation.

Specialized environmental authorities control compliance. As required under the license, any impact on the environment must be reported to these authorities. Remediation measures and rehabilitation projects are compulsory, and financial reserve funds are maintained annually to cover closure costs. A final closing study on the effect on the environment will also be required, and restitution met.

On February 25, 2014, a Declaration of Environmental Adequacy Certificate was issued by the Ministry of Environment and Water addressing the proper license updating procedure carried out by Sinchi Wayra S.A. during the transfer of the Bolivar Mine to Sociedad Minera Illapa S.A. In the same manner, the updating of the Porco Mine License, was addressed and approved by the Ministry of Environment and Water, on February 21, 2014, in the transfer procedure from Sinchi Wayra to Illapa.

Illapa was granted the Mining Identification Number 02-0697-04, by the SENARECOM (National Service of Control and Registration of Minerals and Metals Commercialization, for its acronym in Spanish), which expires on September 25, 2022:

a. Porco: Sinchi Wayra transferred the Porco Mine and plant, which was recognized in the Declaration of Environmental Adequacy (DAA) N.° 051203-02-DAA-0031/10 dated February 21, 2014. The DAA has the character of an environmental license. Last updated April 4, 2017; and

b. The General Direction of War Logistics and Material issued a Registration Certificate under number 0668/2019, for the use of explosives and accessories in mining activities. Expiring date: August 26, 2023.

Sociedad Minera Illapa SA, in compliance with the internal policy of caring for the health and wellbeing of its employees and mine resources, is implementing an Integrated Management System based on the ISO 14001 standard and the ISO 45001 Risk Prevention standard with the precepts of mitigating risks and improving business performance through a safer work environment and a healthier workforce.

In compliance with D.L. 16998 of Hygiene, Occupational Safety and Well-being, directives of the Industrial Safety and Occupational Health regulations are met with programs such as: unplanned and planned workplace Inspections, keeping company standards current, Occupational Health Monitoring (dust, noise, gases, heat stress, vibrations), meetings of the Joint Safety Committee, five-minute talks before the start of daily work, personal protective equipment, breathalyzer control, induction and training of personnel with safety issues, and Investigation of accidents .

New employees are trained on topics including workplace safety procedures, safe work environment, relations with communities, safety standards, and the use of the integrated management system for Occupational Health and Safety of Sociedad Minera Illapa SA.

4.3.2 Current Status

Environmental Closure Plan: Main Plan Projected to closure in 2028 (JV contract). Currently, some progressive closing work is being carried out.

As per focus areas in the Sustainability program:

- Employees – establishing relationships based on trust and promoting a culture of prevention and safe environments. Quality employment opportunities are offered with non-discriminatory hiring. In 2019, the Porco mine employed a total of 445 employees and 241 contractors, 6% of whom were women. Although labor benefits at Porco result in a relatively low turnover rate of 6%, it has increased from 3% just two years previous. 85% of employees at Porco are unionized, a decrease of 3.3% from the previous year. Glencore guarantees freedom of association and the right to collective bargaining;

- Occupational Health & Safety – realizing the inherent personal risks of mining it is evident that emphasis is being placed on improving safety performance through practical programs and training. Response to the first fatality (January 2021) at Porco since 2012, included the shutdown of the mine and preventative renovation and elimination of timber chutes which were the cause of the accident. Incident analysis, and decisive action have helped to improve safety performance and prevent recurrence of incidents;

- Health – Medical care is provided to employees through third party health insurers at Porco and Agua da Castilla Hospitals. Regular occupational health examinations are given to all workers and treatment provided when prescribed. In 2019, occupational health factors at Porco, were monitored led by consulting company “Envirolab”, during which lighting, ventilation, air quality, thermal stress, vibration, and occupational noise, were analyzed and found to fall within legal standards;

- Community - The neighboring communities house workers, contractors, and their families. Most of them reside in Porco and Agua Castilla, which lie proximal to the mine. In 2019, USD 479,628 was invested in the development of neighboring communities, benefitting approximately 5,000 families;

- Education – In Porco and Agua de Castilla, three main programs are in place:

  - Provision of salaries for 15 teachers and principals at J.M. Linares and Agua Castilla schools;

  - Provision of meals for students and food preparation personnel; and

  - A scholarship program has also been established for outstanding students, who study aboard in the capital cities. These programs not only help the local communities, but they provide Porco with trained professionals.

- Economic Development – Illapa promotes the labor development of the community by supporting more than 150 mothers and housewives with programs including Batik cloth painting, nutrition and embroidery;

- Environment - In 2019, the river covering system was completed in Agua de Castilla; and

- Local needs - In 2019, the construction of a multifunctional sports facility and repairs to the football field were completed. As well, the company sponsored various cultural, sports, and civic activities.

4.3.3 Environment

4.3.3.1 Water Management

At Porco, the process plant and underground mine work on a closed circuit with zero discharge. Although Illapa has the necessary discharge permit, water recycling is maximized in order to minimize the use of surface fresh water, from the Jalsuri spring. The use of fresh water is reserved for potable use by the campsite and offices, and for preparation of certain reagents at the process plant.

4.3.3.2 Tailings Management

The active Tailings Storage Facility (dam "D") began operations on March 3, 1998. Initially designed by AGRA Earth & Environmental Ltda. For the first two phases., and AMEC for the current active expansion. The facility meets current international standards. The impoundment is of downstream construction and the dam lined with 60 mil HDPE. A system of well and piezometers are in place to monitor the facility's performance. Construction of Phase VI begun in 2018 was completed in 2019 and included recommended work to reinforce areas of the foundation.

4.3.3.3 Waste Management

Porco currently disposes of all waste rock underground; thus, surface management is not required. Process tailing and sludge from the water treatment plant are both stored in the Tailing Storage Facility (dam "D"). Domestic waste is collected by the Porco cleaning company, who is supported by Illapa with equipment and a front-end loader, to move the waste in Porco's sanitary landfill. Hospitals in Agua de Castilla and Porco generate a considerable amount of biological hospital waste, which is classified and carefully stored for subsequent incineration.

4.3.4 Community Interaction

The town of Porco has been a mining area since colonial times, and mining is its main source of income. It is inhabited by civilians with various activities, mine workers, their families, and cooperative miners. Illapa works closely with the closest towns, i.e., Porco and Agua de Castilla, as well as the smaller, satellite communities totaling approximately 16,000 people. As well, Illapa engages with two Cooperatives that work at, and adjacent to, the Porco operation.

The Covid Pandemic dominated Community needs and was answered with support from Illapa. However underlying long term aid programs remained intact. COVID-19 prevention supplies were provided such as alcohol gel, liquid alcohol, bleach, masks, and gloves. Informative posters for prevention awareness were also posted. Provisions kits were also supplied, in view of the economic crisis caused by the pandemic.

Support to education was affected by the early conclusion of the school year; however, financial support for teachers' wages and administrative personnel was provided, as well as the adoption of biosecurity measures for the return of in-person classes. This project benefits 1000 students and will continue in 2021.

4.3.4.1 Mining Cooperatives

A large part of how the mine operation interacts with nearby communities is related to the Cooperativa system. This system is based on establishing informal agreements with local miners who independently mine in designated areas, and toll mill at the Porco plant. Resources in the upper central zone are made available to the Cooperativas who mine the material and deliver it to the process plant. They are paid based on weight and sample grades. After the material is processed, some reconciliation mechanism is used to adjust the payment based on actual recoveries. This system helps to direct the energies of the informal miners into an opportunity for legitimate production and steady income while also helping to minimize the activity of illegal mining.

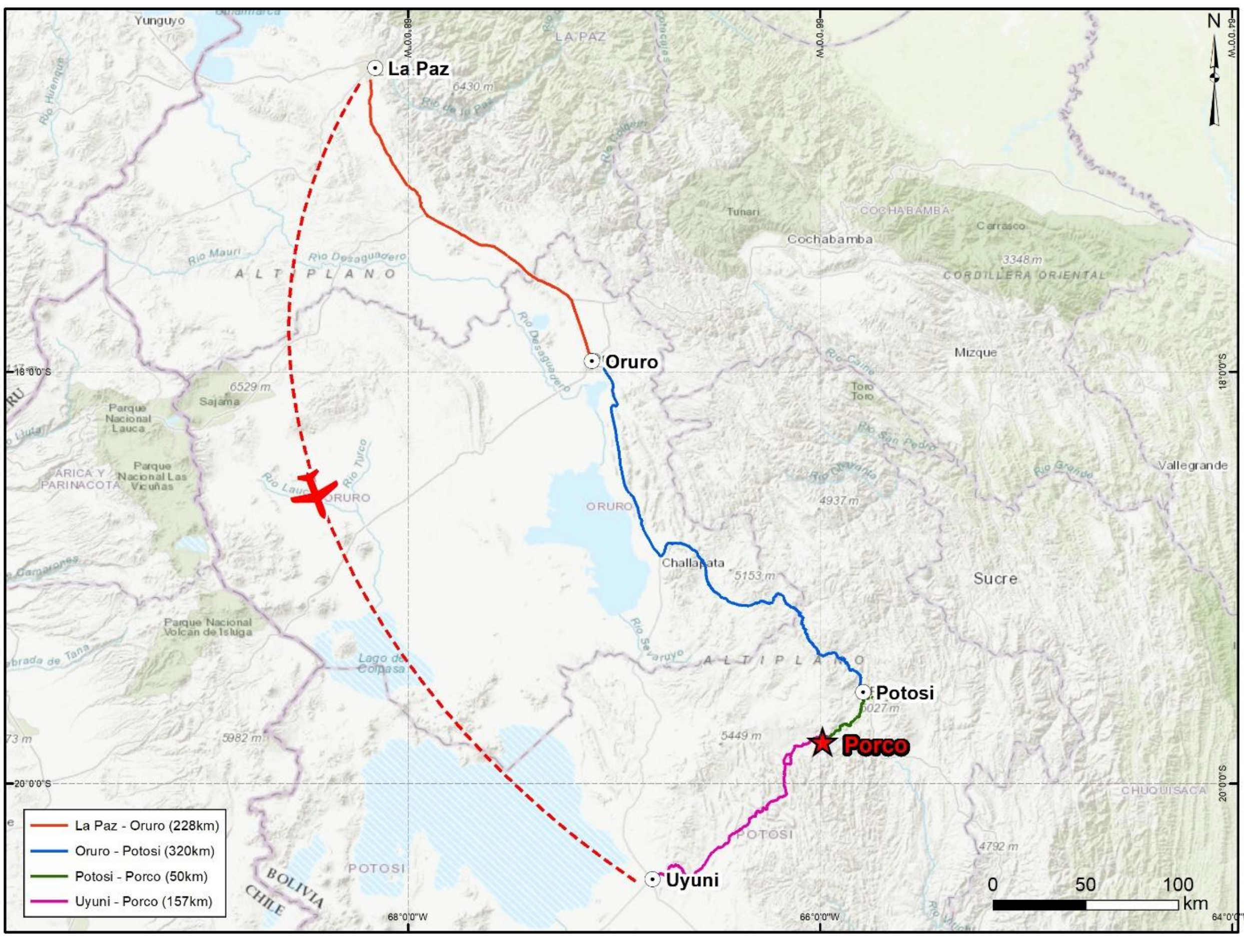
However, illegal mining is still being carried out at Porco mine and was observed on our site visit. Forced access to mining areas through destruction of ventilation brattices and gates causes direct losses, while mining in unauthorized areas causes instability and reduced productivity as well as creating a safety hazard to both the perpetrators and the mine workforce.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

Porco Mine is located in Bolivia, Potosi Department, Antonio Quijarro province, 50 km southwest of Potosí City. The mine is 150 km via paved National Highway 5 from a commercial airport at Uyuni and 581 km to the capital, La Paz. A 5 km gravel access road to the mine site goes through the communities of Agua de Castilla and Porco (Figure 5-1).

Figure 5-1: Project Location Map (showing region)



Source: Kirkham (2021)

Concentrates are transported 5 km by truck from Porco Concentrator to the Yancaviri Warehouse and rail Station in Agua de Castilla. From there rail takes the concentrate directly to the Pacific port of Antofagosta, Chile.

5.2 Climate and Physiography

The climate at site in a semi-arid ecological zone known as the high mountain prairie of Puno; This eco-region occupies the central-east and south slope of the Royal Range in Potosí and Chuquisaca. The deposit's outstanding features are the geological massifs Apo-Porco and Huayna Porco, and the ravines that pass through Jalantaña, Porco and Agua Castilla. Geologically, it is located at the southern end of the Los Frailes Range, within the polymetallic strip of the Eastern Andes.

According to the land use classification system of the USDA Soil Conservation Service (US Department of Agriculture), it has been determined that soil class IV predominates which are, soils with reduced arable layers and little use for agriculture.

Average Altitude is 4,147 m with temperatures ranging from 17 to -7ºC, and rainfall averaging 380 mm/yr.

5.3 Infrastructure

The underground mine and process plant are supported by the site infrastructure built up over five centuries of mining activity Figure 5-2.

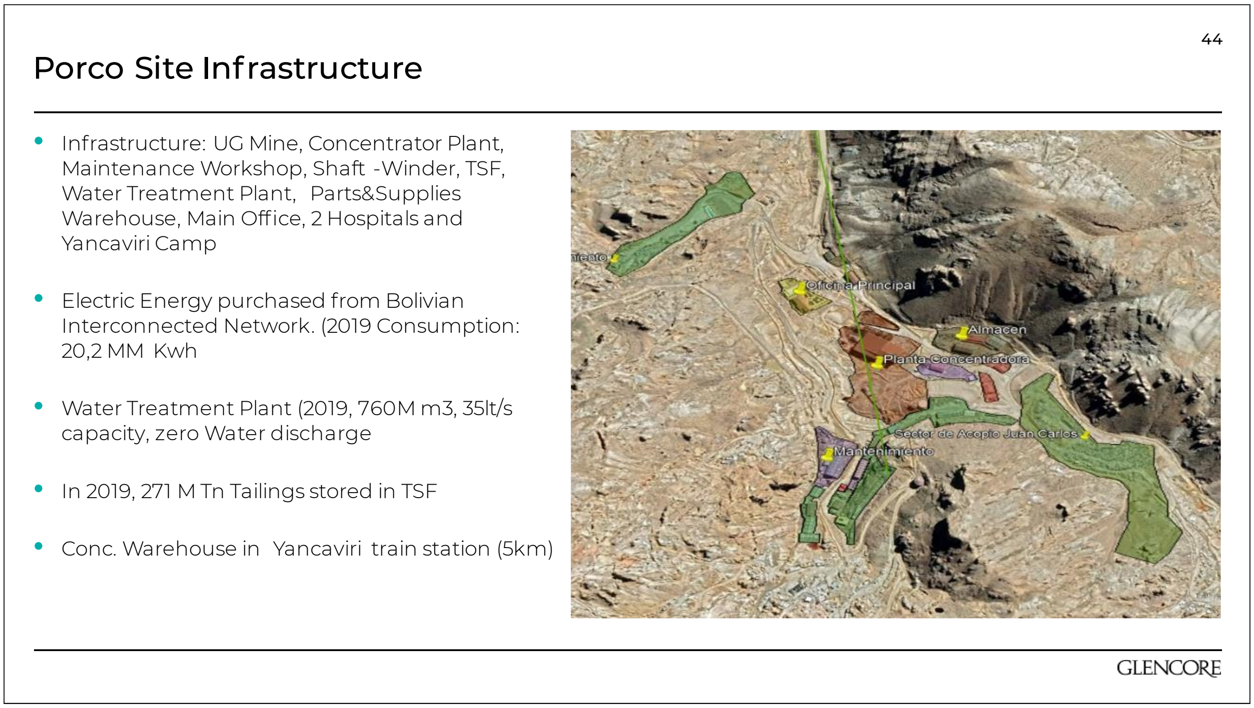
Electrical power is supplied from the national grid via 69 kV transmission lines from the Landara substation to El Tambo II substation, where voltage is transformed from 69 to 24.9 kV for distribution to the mine site. The site has two separate electrical substations: Mine and Plant, where the voltage is transformed from 24.9 kV to 3.3 kV, 440 V and 220 V.

Water is sourced mostly from the mine discharge of 35 l/s which is treated for use in the process plant as part of a zero-discharge system. Potable water for the mine and surrounding communities are sourced at the Jalsuri well.

Most of the workers live in the towns of Agua de Castilla and Porco, while the technical personnel live in the Yancaviri camp, there are a total of 35 units built complete with recreation areas, and in both communities, there are health services at Hospitals in both Porco, and Agua de Castilla, as well as supply and grocery markets.

The mine utilizes one modern Tailings Storage Facility and hosts 8 inactive facilities on site as well. All facilities are monitored and audited regularly by a third-party engineering firm Figure 5-3.

Figure 5-2: Porco Site Infrastructure



Source: Glencore (2021)

The active Tailings Storage Facility (dam "D") began operations on March 3, 1998. Initially designed by AGRA Earth & Environmental Ltda. For the first two phases., and AMEC for the current active expansion. The facility meets current international standards. The impoundment is of downstream construction and the dam lined with 60 mil HDPE. A system of wells and piezometers are in place to monitor the facility's performance. Construction of Phase VI began in 2018 and included recommended work to reinforce areas of the foundation.

Tailings are discharged along the inside face of the dam at 25-29% solids, forming a tailings beach for additional support, and keeping the water away from the dam. The water reclaim system consists of a barge mounted pump system to form a closed loop with the process plant. The site is zero discharge.

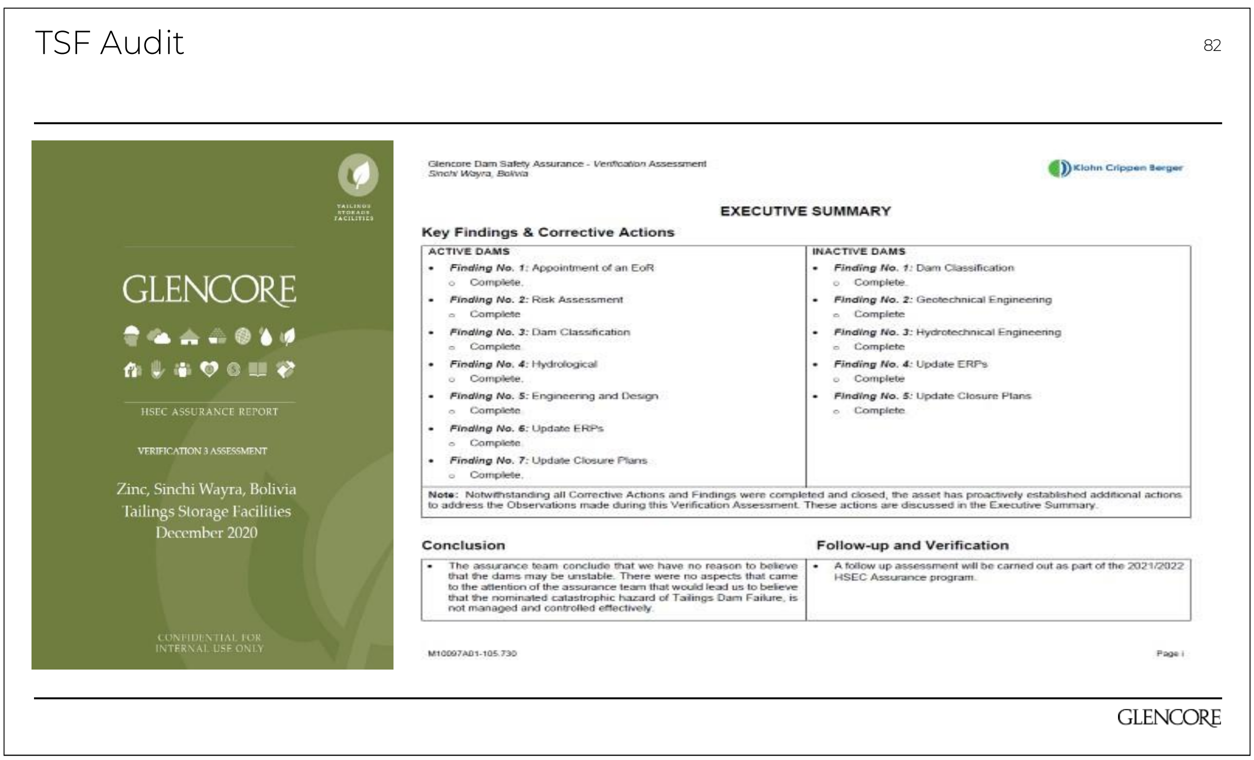
Table 5-1: Tailings Facility "D" Statistics

Parameters	Unit	Porco
Crest Elevation	masl	4.036,77
Spillway Elevation	masl	4035,77
Tailings Elevation	masl	4036

Parameters	Unit	Porco
Water Elevation	masl	4034,65
Life Dam	months	6-7
Design Freeboard	m (by construction)	1
Current Freeboard	m	1,35
Design Tailings beach length	m	100
Current Tailings beach length	m prom.	150
Design Water Volume	m^3	200.000
Current Water Volume	m^3	138.000
Operations Maintenance and Surveillance Manual		M.O.
Engineer of Record (EoR)		AMEC/WOOD

Source: Glencore (2021)

Figure 5-3: TSF Audit Summary



Source: Glencore (2021)

6 HISTORY

6.1 Management and Ownership

Evidence of silver mining at Porco goes back to pre-Columbian times. Porco was a silver source for the Inca, later the Spanish, and others through the late 19th century. As the world silver market began to collapse in the 1880's and early 1890's, a major shift to tin mining began to meet the increased demand of the industrialized world. Wealthy tin barons in Bolivia held much influence in national politics until they were marginalized by the nationalization of the three largest tin mining companies following the 1952 revolution. Bolivian miners played a critical part in the country's organized labor movement from the 1940s to the 1980s and continue to be an important stakeholder.

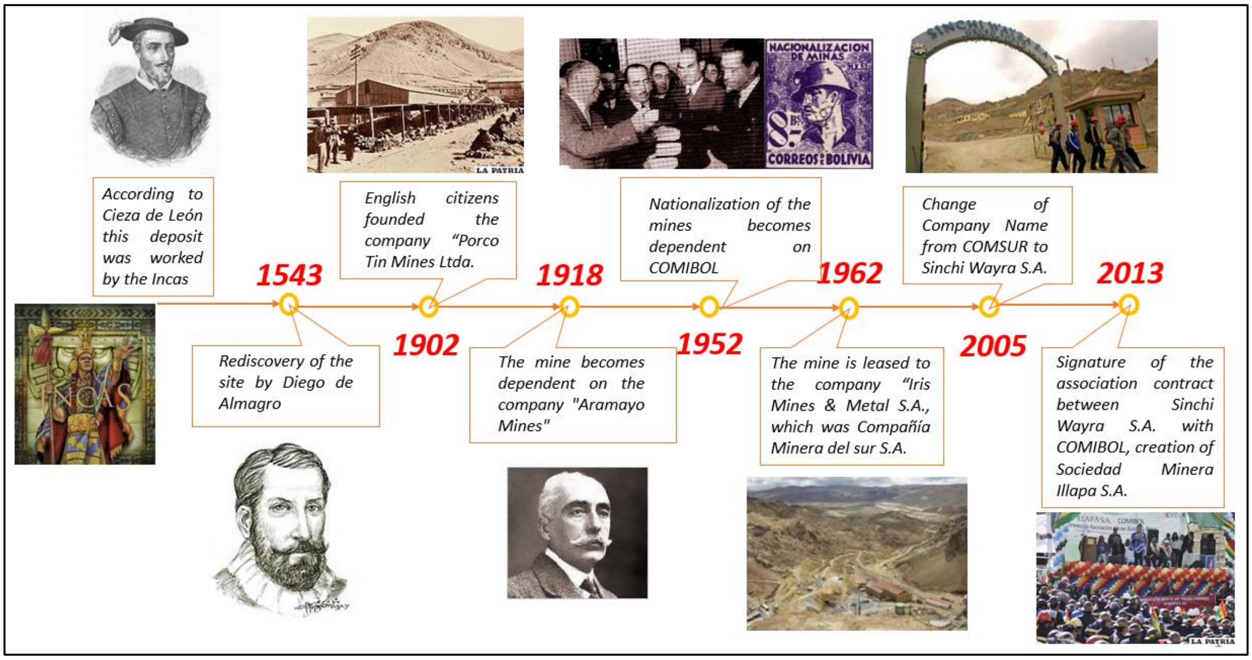
Porco became a resource of newly formed Bolivian Mining Corporation (COMIBOL), under whose management it operated until leased to private "Iris Mines" through subsidiary Compania Minera del Sur (COMSUR) in 1962. Emergency economic measures by the government in response to the international tin market crash in 1985 included massive layoffs of miners. The shift to base metal production is the space where the Porco mine has been ever since, under the management of Sinchi Wayra S.A. (formerly COMSUR S.A.), and currently under a joint venture agreement with the Bolivian government (COMIBOL) named Illapa S.A. Sinchi Wayra S.A. and (COMIBOL) entered this Joint Venture Agreement (the Illapa JV) on December 4, 2014, by virtue of Public Deed N° 1356/2014. The Illapa JV has a duration of 15 years, with the possibility of extending the term for the same duration.

Sinchi Wayra S.A. (Sinchi Wayra) is a wholly owned subsidiary of Glencore Plc, one of the most diversified, vertically integrated producers, processors and marketers of natural products in the world. Sinchi Wayra S.A. is the producing operator that is part of Glencore's Zinc Department, operating the largest underground mines in Bolivia and producing zinc-silver and lead-silver concentrates. The payments and participations of the Illapa JV are of 55% for COMIBOL and 45% for Illapa of the net cash flow.

Sociedad Minera Illapa S.A. (Illapa) is registered as a private company under the activities of mine operations and exploration. In the event of any controversy, the Illapa JV has an arbitration clause with seat in La Paz, Bolivia, under UNCITRAL Rules.

Sale of concentrates are subject to an Off-Take Agreement with Glencore International AG as buyer, under Contract N°180-13-14212-P, and Contract N°062-13-14190-P, both entered into in 2013, with all their addendums and amendments. These agreements are "evergreen" meaning that they are in effect through the life of mine.

Figure 6-1: Project History



Source: Glencore (2021)

6.2 Mine Operations

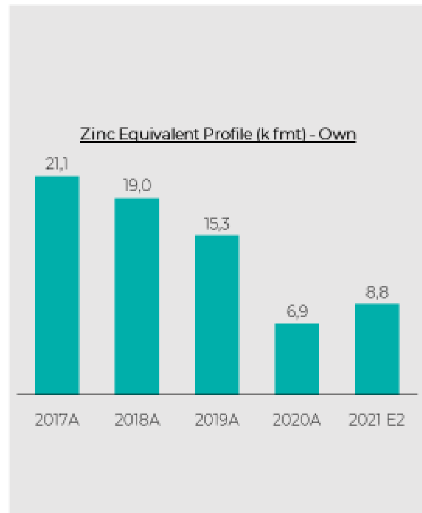
Porco mine has been in some form of development and/or operations for over 500 years. Most relevant production figures from the last few years with modern production methods in place are tabulated in Figure 6-2. Production for 2021 is on target to produce approximately 100,000 t of mineralized material.

Figure 6-2: Historic Production

Porco
Production

49

Production	ACT 2017	ACT 2018	ACT 2019	ACT 2020	EST02 2021
1ry Dev (km)	0.9	1.5	1.6	1.5	1.5
2ry Dev (km)	8.4	8.9	8.5	3.2	4.1
Extraction (k mt)	224	237	217	83	93
Treatment (k mt)	225	233	220	83	93
Zn (%)	7.4	6.9	7.1	7.7	7.9
Pb (%)	0.8	0.6	0.6	0.7	0.4
Ag (g/t)	110.2	84.4	65.6	72.2	69.1
Zn conc (k mt)	31.2	30.6	28.9	11.8	13.8
Pb conc (k mt)	2.5	1.9	2.0	0.8	0.5
Recoveries					
Zn (%)	91.9	91.8	93.6	92.8	93.2
Pb (%)	75.5	73.0	75.2	75.0	55.1
Ag (%)	89.6	88.0	85.6	85.7	85.2
Own Source Metal					
Zn (k fmt)	15.3	14.9	14.5	5.9	6.9
Pb (k fmt)	1.3	1.0	1.0	0.4	0.2
Ag (M Oz)	0.7	0.6	0.4	0.2	0.2



GLENCORE

Source: Glencore (2021)

The Porco deposit consists of multiple, relatively thin high-grade veins. The mining methods used vary according to the continuity, dip, and width of these veins. Current mining methods employed include sublevel longhole stoping with backfill, shrinkage stoping, and some cut and fill.

Currently the mine is separated into two main areas: Hundimiento and Central zones.

- “Hundimiento” is the more modern section of the mine and is developed mostly with trackless methods using an access ramp to move men and materials between levels. The mineralized zones are predominantly wider and steeper dipping thus, stoping is 85% AVOCA mining and 15% shrinkage. This area is completely isolated from the Central zone and trucks its mineralized material to surface via an access ramp; sublevels are driven on nominal 15 m spacing with sill drifts on vein driven 3.0 m x 3.0 m. An average of 7 stopes produces about 300 t/d of ore (Figure 6-7). All waste rock stays in the mine as backfill; and

- “Central” is 100% conventional shrinkage mining (Figure 6-6). Ore is hauled via rail on each active level to the shaft for hoisting to surface. Levels are spaced at a nominal 45 m and level connections are via manway raises and the main shaft. Drifts are 2.2 m x 2.0 m, raises are driven manually, and an average of 17 active stopes produces about 400 t/d of ore. All waste rock stays in the mine as backfill.

Currently, each mining area provides roughly 50% of the total mine production which, during the two years leading up to 2019 has been about 700 t/d (225,000 t/a). Although trackless methods are being introduced to the Porco mine, much of the production is still very dependent on conventional shrinkage mining which is dictated somewhat by the orientation and characteristics of the mineralized zones. Bulk methods are being used in Hundimiento where the mineralized zones are wider, steeper, and somewhat more consistent. Where mining is being carried out by conventional shrinkage methods, planning to adjust stope sizes and sequencing is being implemented to maximize production flexibility and minimize mineralized material held in shrinkage stope inventory.

Production for 2021 is expected to be approximately half of that mined in 2019.

Central zone production is mostly from the strike extents of know vein systems on multiple levels (-60 to -330) and stopes tend to be thin and inconsistent. future extraction of known Central zone resources call for the 100 m deepening of the Production shaft. Hundimiento zone is following the known resource down dip with ramp access.

In the Central area, mineralized material is rail hauled to local ore passes for collection at main rail haulage levels where it is hauled to the Central shaft (Cuadro Nuevo) for hoisting to surface. The deepest haulage level currently serviced by this main shaft is at level -330. Central zone hosts one additional shaft (Cuadro Antiguo) used for men, materials, ventilation, and services. Hundimiento, mineralized material is hauled directly to surface with diesel low-profile trucks via the main access ramp. There exists one service shaft in this area as well.

Central and Hundimiento have separate ventilation systems appropriate for the type of mining done in each area. Central flow is 102,000 m^3/h. Volumes in the Hundimiento area have been increased to account for the use of diesel equipment.

The mobile equipment fleet is detailed below (Table 6-1). Most all trackless equipment is operated in Hundimiento and most rail equipment in Central Zone. Equipment observed on the site visit looked well maintained but it is older. Most of the mobile equipment is over 5 years old however the fleet should be capable of meeting current production targets.

Mine water is handled by a dewatering system utilizing the service shafts for 4" pipelines. "Central" produces about 25 l/s of water and Hundimiento, another 11 l/s. Water is collected and sent to the TSF where it is reclaimed for process plant use and further treated for reuse for drilling and dust suppression in the mine.

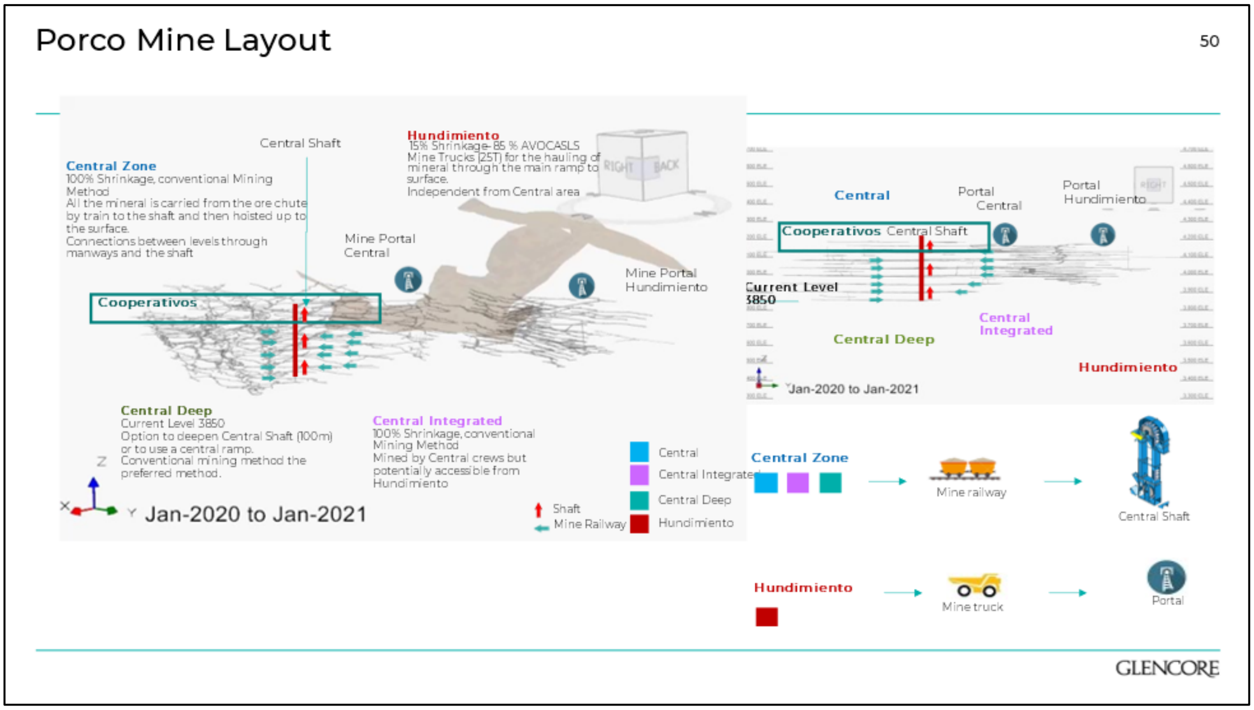
The shaft equipment including the hoist is old but well maintained and serviceable. Glencore has gone to great lengths to bring the equipment up to modern safety standards. Development of deeper resources in Central Zone call for deepening the shaft and/or ramping down.

Mine Labor was reported at about 305 employees up until 2020 when it was reduced to 250. Production has also moved from 226,000 t/a to 83,000 t/a. Actual productivity moved from 2.4 tonnes per manshift to 1.1 tonnes per manshift.

Table 6-1: Porco Mine Equipment List

Make	Model	Number
Scoop		
JARVIS CLARK	JS-100E	1
SANVICK	LH202E	1
ATLAS COPCO	ST-2G	7
Mine Truck		
DUX	DT-12	4
Drill		
RESEMN	MINI RAPTOR DH	1
RESEMIN	RAPTOR 44	1
RESEMIN	MUKI FF	2
Conventional Equipment		
	Battery Locomotives	20
	Overshot rail muckers	21
	Rocker Cars	40
	Jackleg Drills	30
	Stoper Drills	80

Figure 6-3: Porco General Mine Layout



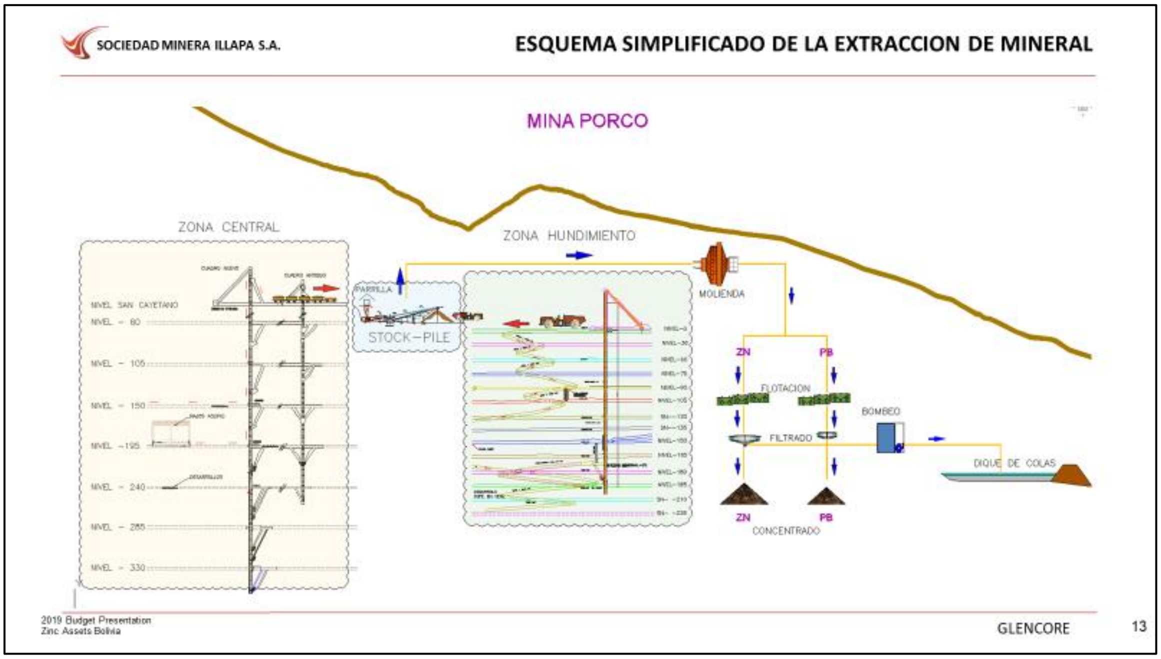
Source: Glencore (2021)

As illustrated in Figure 6-3, the mining in the upper areas, and adjacent to active mining operations, is carried out by “Cooperativas”. These groups are independent miners with which Illapa has informal agreements allowing them to mine certain areas of the deposit. Ore mined under this agreement is processed at the Porco plant on a toll basis. In 2013, it was agreed that Sociedad Minera Illapa S.A. would exploit the levels lower than elevations 4,213 and 4,225, in the central area. However, members of the Cooperatives regularly violate the agreement and access active mining areas below these agreed boundaries, which is both a safety and production issue. As well, environmental licenses and controls are not in place for Cooperatives and little or nothing is done to regulate the environment in their work areas.

The production from cooperative mined areas is separate from that planned and exploited by Illapa. The Cooperative system is one method for Glencore to reduce illegal activity and have some influence on operating standards and control over areas being mined, however the impacts of blocked mine access, unauthorized entry, and activities in active mining areas remain significant.

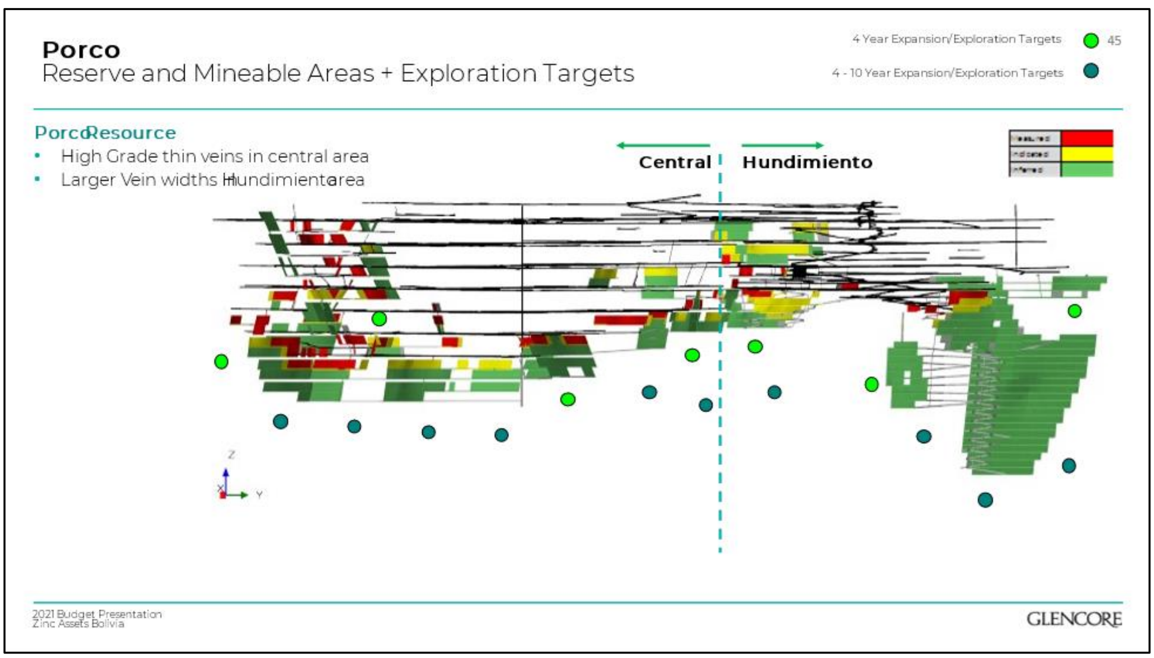
Most recently, production was affected in early 2021 because of a voluntary 2-month shutdown. Glencore decided to stop all production and inspect all ore chutes in the mine in response to a fatal accident from a failed timber chute. During this stoppage the cooperatives blocked access to the mine for 6 days.

Figure 6-4: Ore Movement



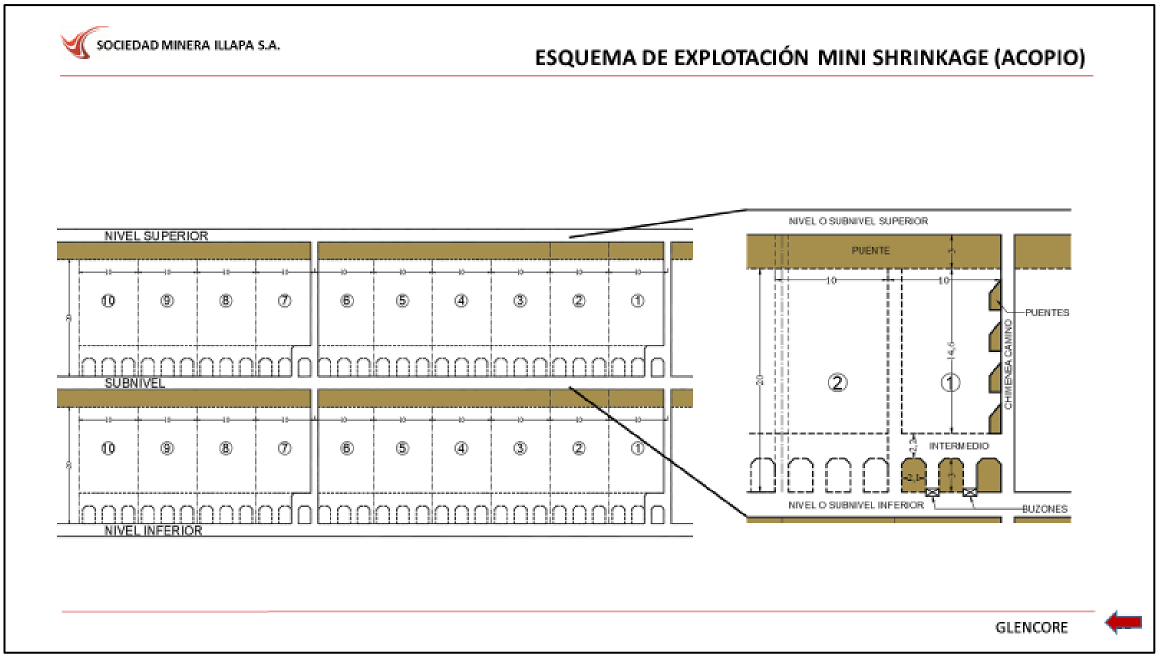
Source: Glencore (2021)

Figure 6-5: Resource Location and Exploration Targets



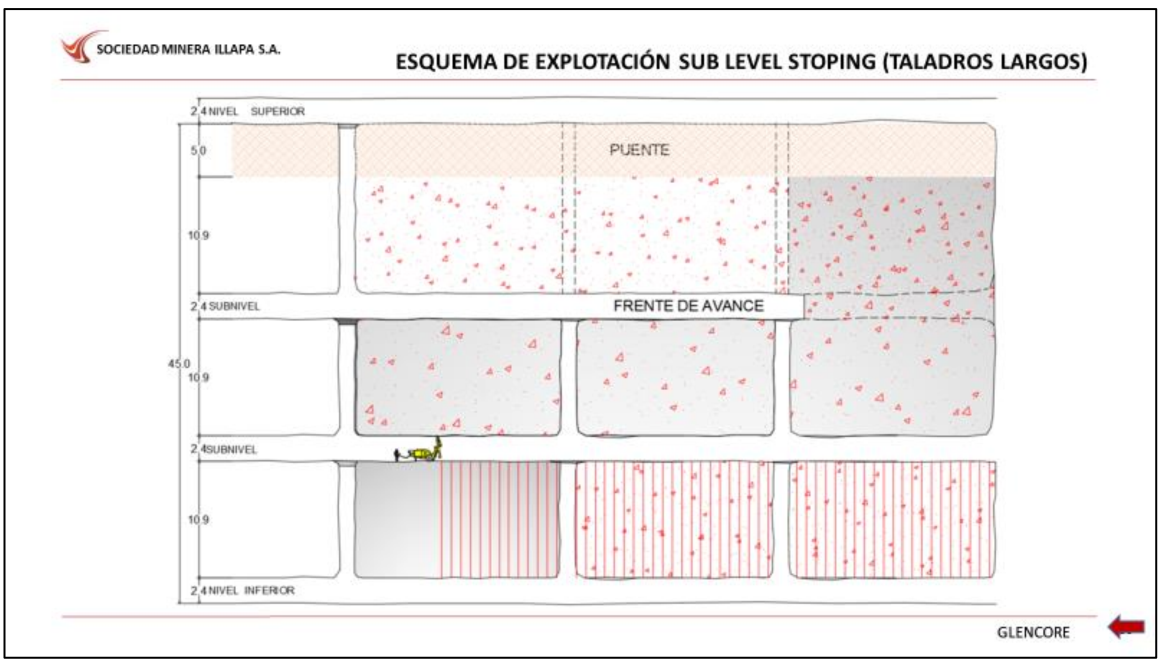
Source: Glencore (2021)

Figure 6-6: Modified Shrinkage Stoping at Porco



Source: Glencore (2021)

Figure 6-7: Sublevel Stoping as Practiced at Porco



Source: Glencore (2021)

6.3 Processing

The processing plant at the Porco mine has been in continuous production since it was built in 1992. The Porco process uses differential flotation to produce 2 concentrates: lead and zinc. Both concentrates contain high values of Silver with the lead concentrates containing approximately 6,000 g/t Ag and the zinc concentrates containing approximately 300 g/t Ag. The mill flowsheet can be seen in Figure 6-24.

The Porco Mill, which has 2 sources of feed (company feed and toll feed), has been in production since 1992. The mill processes the company and toll feeds separately.

The mill uses a crushing, grinding, and flotation flowsheet to recover a lead concentrate and a zinc concentrate. Both concentrates are sold to the Antafagasta smelter in Chile. The mill flowsheet can be found in Figure 6-24 in Section 6.3.3.

The mill generally separates company and toll feed into different days, but there are a few days where the feed is processed on the same day, with a shutdown in between to separate them.

The feed grades for the company feed are measured as is typical for a processing plant, by taking samples from the process at the cyclone overflow and performing a reconciliation each month based on concentrate produced and tailings samples. The toll ore has extra sampling as part of the contract with the local minors. The ore is received by San Lucas, often in 1-2 t lots, where it is weighed and sampled. The ore is combined on a toll feed stockpile to be fed to the mill. The toll feed follows the same sampling and reconciliation procedure as the company ore.

The reagents utilized at the Porco mill are generally the same for the toll and company ores.

The processing plant targets approximately 45% of the feed to be toll feed, due to the prevalence of artisanal miners in the area. The artisanal miners can loosely be separated into “legal” (Cooperatives), and “illegal” (or documented and undocumented) groups. The Porco mill only receives feed from the “legal” artisanal miners.

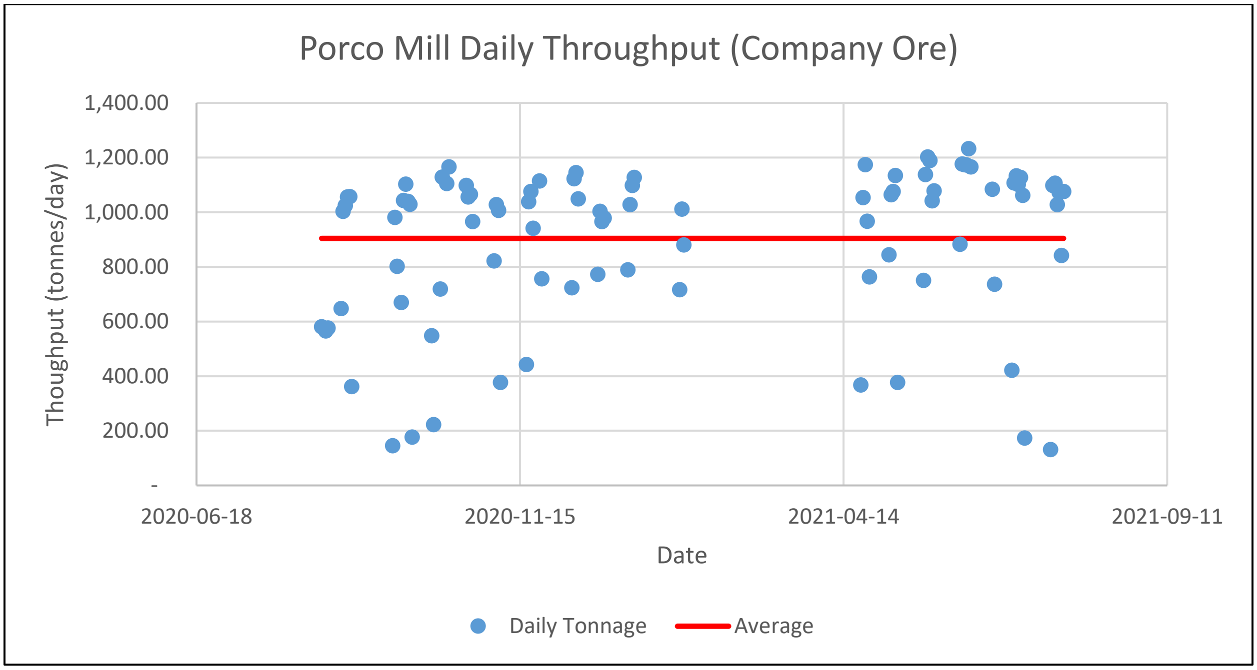
6.3.1 Company Feed Processing

Data from August 2020 to July 2021 was used to develop the expected metallurgical performance of the Porco mill. This data was used to determine throughput, recovery and concentrate grade relationships. The results will be discussed in the upcoming sections.

6.3.1.1 Mill Throughput

The expected availability for the mill is 95.5% and the utilization is 95% for an expected operating time of 90.7%. The actual throughput from August 2020 to July 2021 can be found in Figure 6-8.

Figure 6-8: Porco Mill Company Feed Throughput 2020/2021



The throughput of company feed through the Porco mill during the analyzed period was a little lower than the stated target, with the average of the days it operated being 904 t/d. During the analyzed period, the mill ran company feed over 91 whole or partial days and processed 82,290 tonnes of feed. The data suggests that the feed rate is not achieving the target throughput for company feed.

The target grind for the Porco plant is 100 µm.

6.3.1.2 Feed Grades

For the period examined, the unreconciled feed grades for the company feed were 7.82% zinc, 0.67% lead, and 124 g/t silver. The feed was somewhat variable with standard deviations of 1.05, 0.20, and 67.94 for zinc, lead, and silver respectively. These values fall within the expected ranges for Porco feed. The unreconciled feed grades can be seen in Figure 6-9, Figure 6-10, and Figure 6-11.

Figure 6-9: Zinc Feed Grade 2020/2021

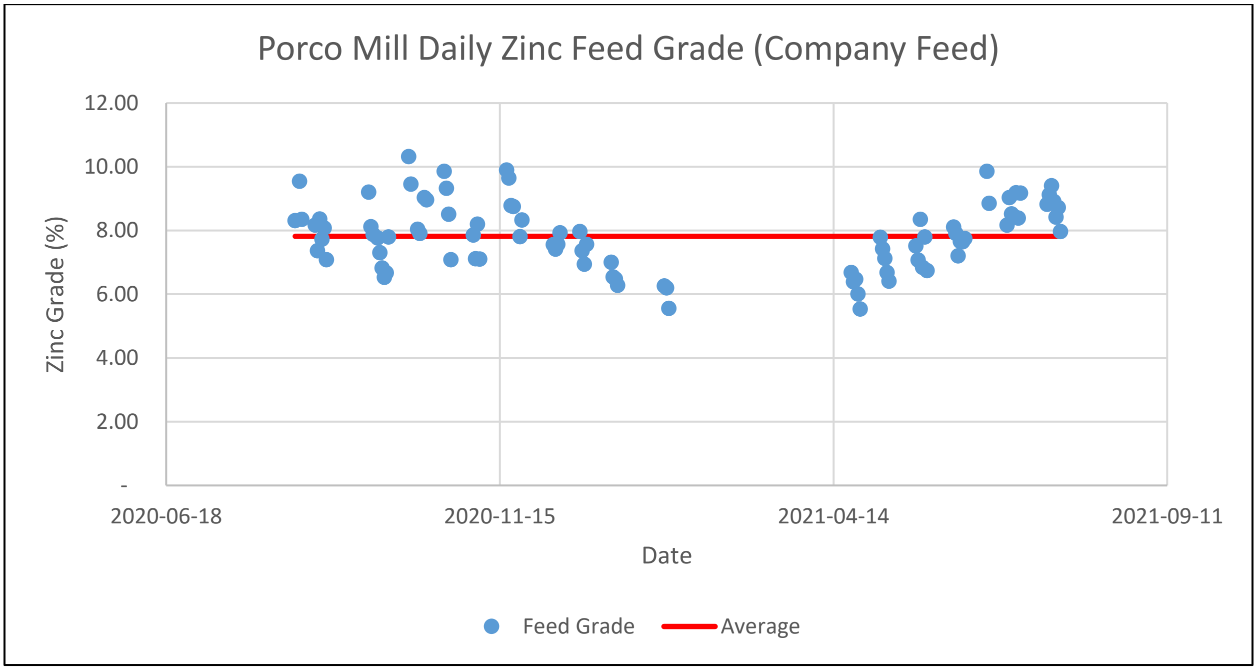


Figure 6-10: Lead Feed Grade 2020/2021

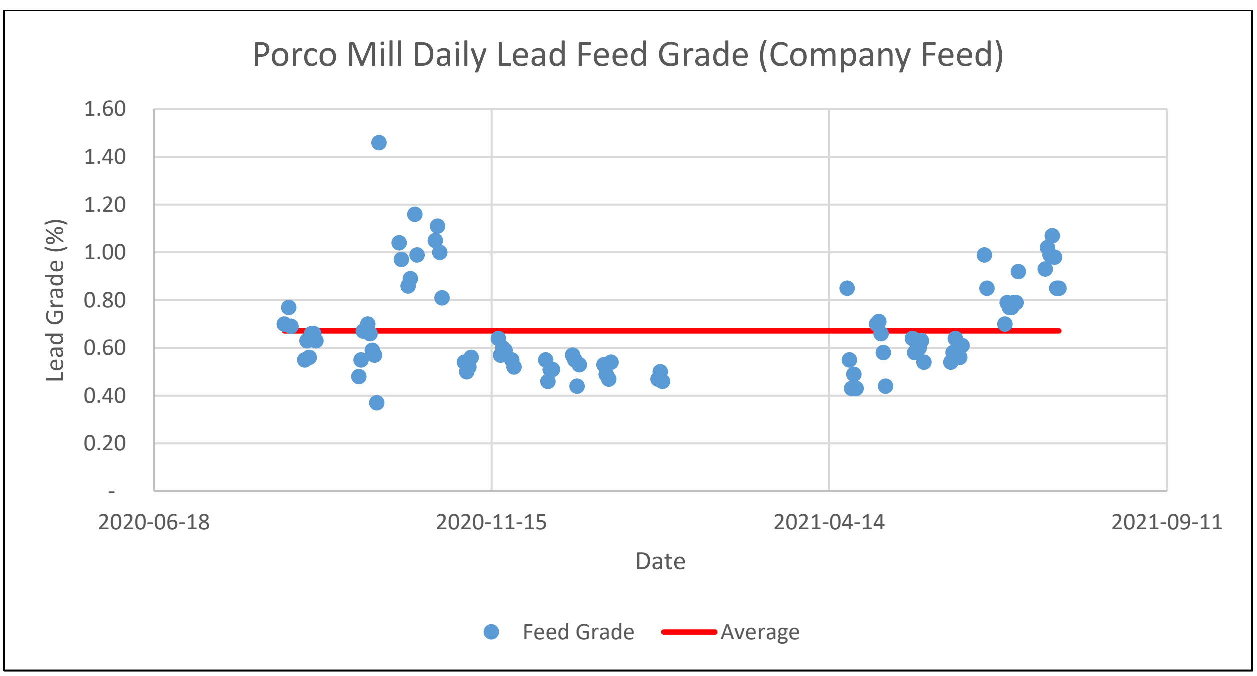
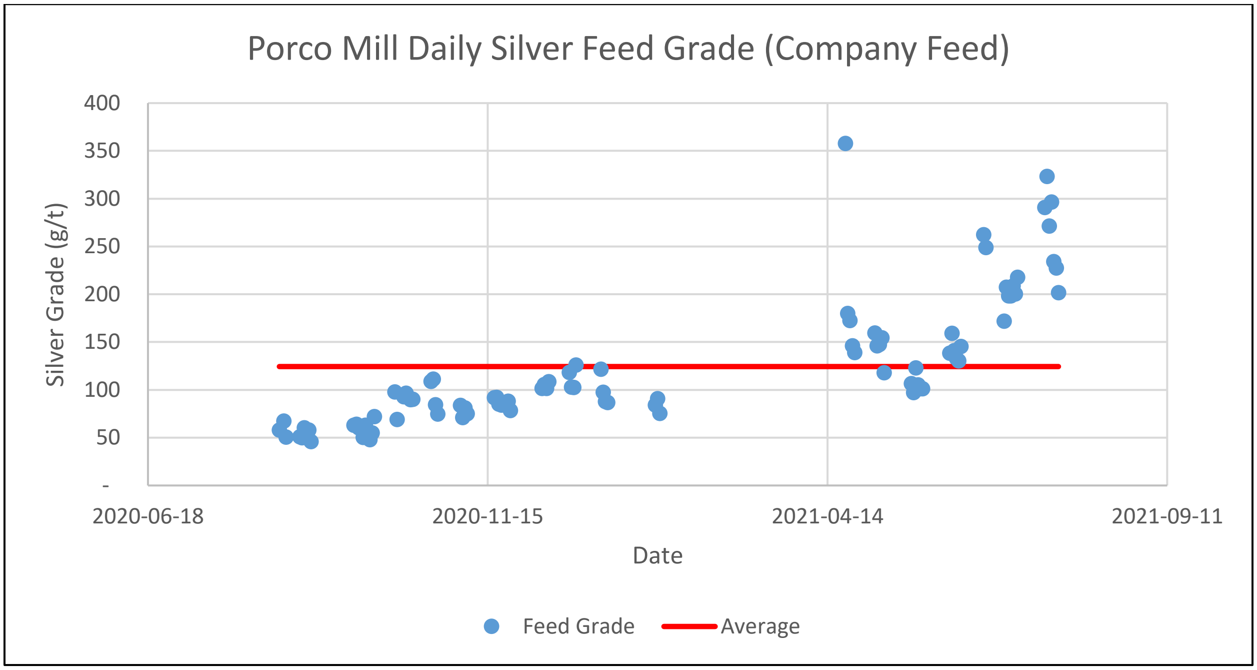


Figure 6-11: Silver Feed Grade 2020/2021



The mill feed grades are measured at the lead circuit flotation feed or also known as the cyclone overflow.

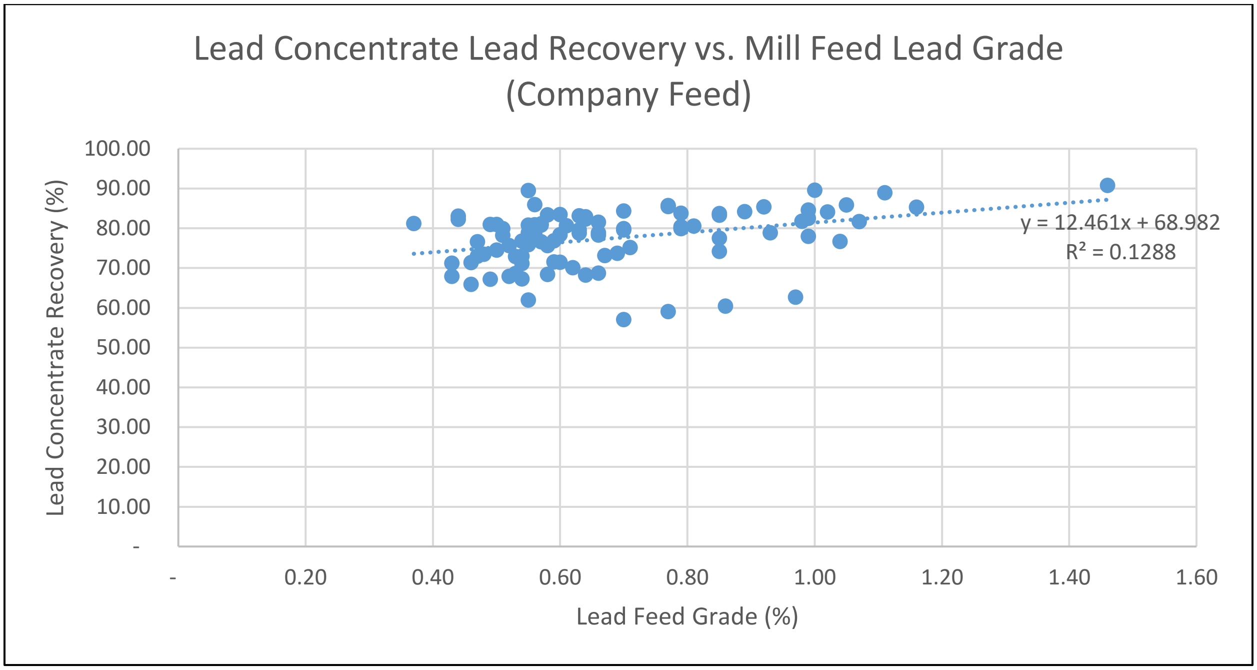
6.3.1.3 Lead Production

The lead concentrate produced during evaluated period measured 844 t which represents 1.03% of the feed to the plant.

The average grade of the lead concentrate was 51.27% lead, 11.77% zinc, and 6,480 g/t silver. The recoveries to the lead concentrate were 77.56%, 49.79%, and 1.50% for lead, silver, and zinc respectively.

The relationship between the lead feed grade and the lead recovery to the lead concentrate can be seen in Figure 6-12. While there is some variability, especially in the lower lead feed grades, a clear relationship can be seen between lead feed grade and recovery to the lead concentrate.

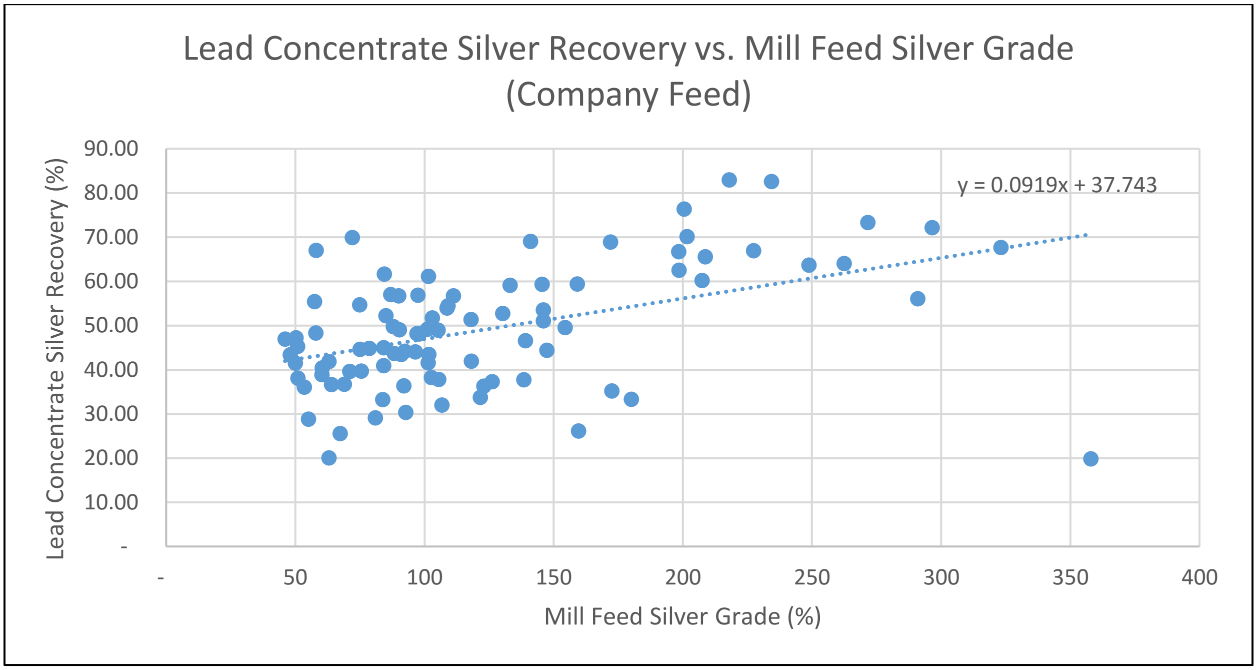
Figure 6-12: Mill Lead Concentrate Recovery vs. Lead Feed Grade



From the above analysis, the recovery relationship for lead to the lead concentrate will be considered: 12.46*(Lead feed grade %) + 68.98.

The silver recovery to both the lead and zinc concentrates is a byproduct of the flotation process; the silver is associated with the lead and zinc minerals and follows them into the concentrates. The recovery of silver to the lead concentrate can be seen in Figure 6-13, In this case, the silver recovery appears to be correlated to the silver grade in the feed (although the relationship is weak) and therefor the relationship of 0.0919*(Silver feed grade %) + 37.743 will be used for this report.

Figure 6-13: Silver Recovery to the Lead Concentrate vs. Mill Feed Silver Grade



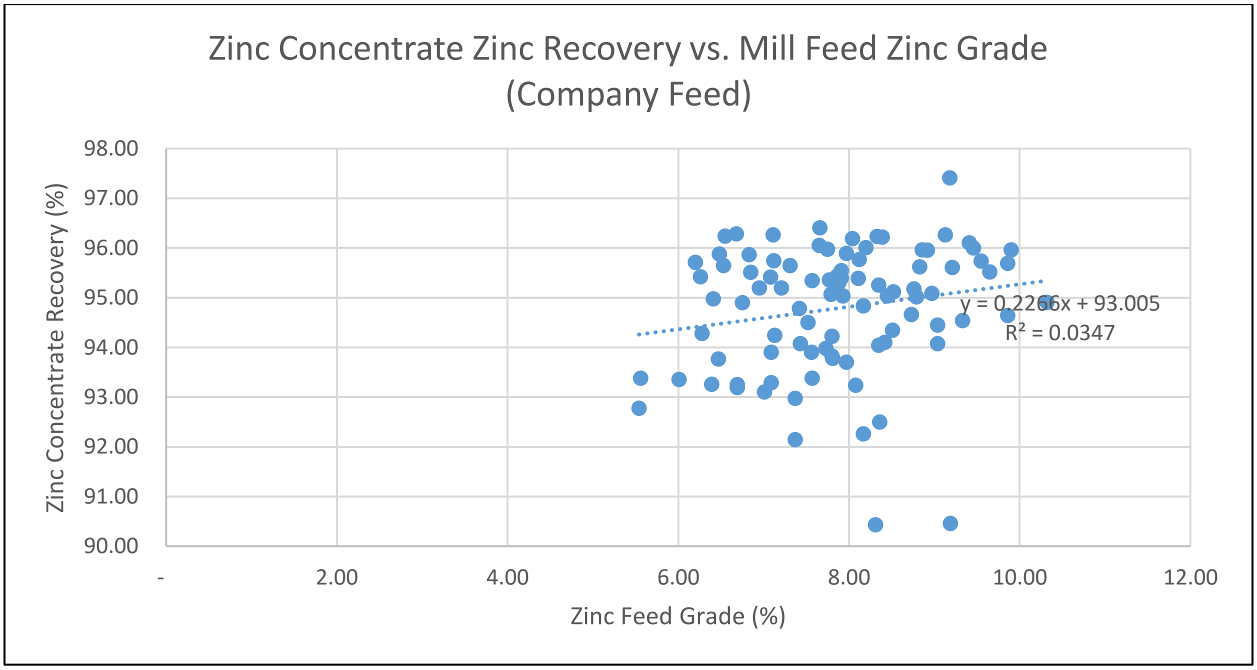
6.3.1.4 Zinc Production

The lead rougher and cleaner tailings report to the zinc circuit conditioning tanks where copper sulphate and additional collector and frother are added to float a zinc concentrate, with silver. The zinc concentrate accounts for approximately 14.87% of the feed mass.

Over the period analyzed, the unreconciled zinc concentrate production was 12,240 t with average grades of 49.81% zinc, 0.39% lead, and 273 g/t silver. The recoveries to the zinc concentrate were 94.78, 35.24, and 8.78 for zinc, silver, and lead respectively.

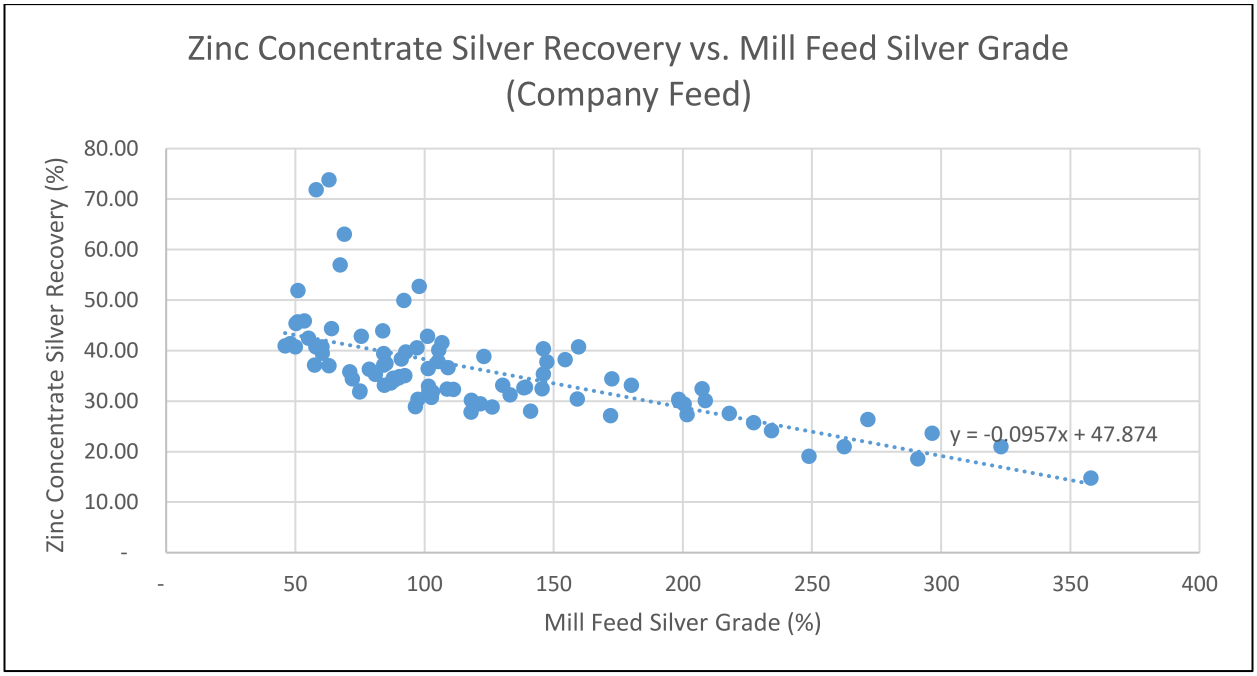
The zinc recovery as a function of the feed grade was examined and found to be a poor relationship for determining expected zinc recovery to the zinc concentrate as can be seen in Figure 6-14. It was determined in this case that the best option was to assign a zinc recovery to the zinc concentrate of 93%, which is the average value over the period examined.

Figure 6-14: Zinc Recovery to the Zinc Concentrate vs. Mill Feed Zinc Grade



The silver recovery to the zinc concentrate can be seen in Figure 6-15. In this case, the recovery has a negative relationship to the feed grade, presumably due to the positive correlation that the silver recovery to the lead concentrate has with the silver feed grade. The relationship for the silver recovery to the zinc concentrate will be taken as -0.0957 x (Silver Feed Grade) + 47.874.

Figure 6-15: Silver Recovery to the Zinc Concentrate vs. Mill Feed Silver Grade



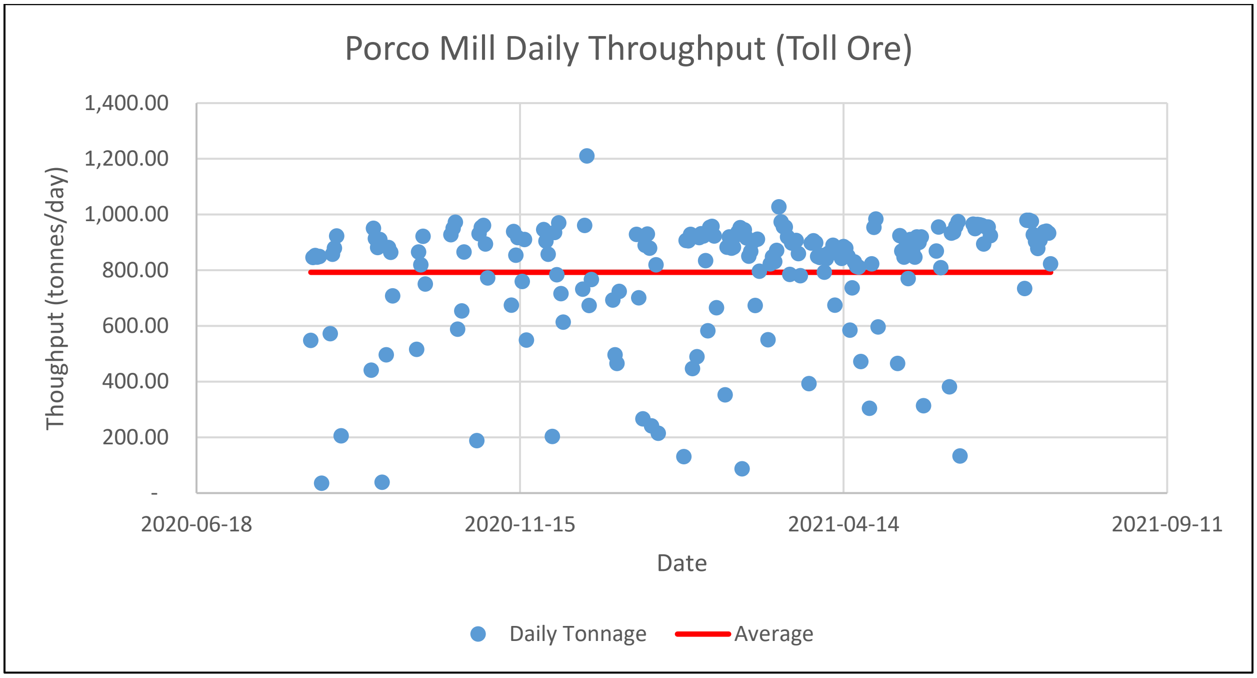
6.3.2 Toll Feed Processing

Data from the same time period, August 2020 to July 2021, was used to develop the expected metallurgical performance of the Porco mill on toll feed. As was the case for the company feed, the data was used to determine throughput, recovery and concentrate grade relationships.

6.3.2.1 Mill Throughput

As with the company feed, the expected availability for the mill is 95.5% and the utilization is 95% for an expected operating time of 90.7% for the toll feed. A summary of the throughput from August 2020 to July 2021 can be found in Figure 6-16.

Figure 6-16: Porco Mill Toll Feed Throughput 2020/2021



The throughput of company feed through the Porco mill during the analyzed period was slightly lower than the stated target, with the average of the days it operated being 792.44 t/d. During the analyzed period, the mill ran company feed over 194 whole or partial days and processed 153,733 t of feed. The data suggests that the feed rate is slightly below the target throughput for toll feed.

The target grind for the Porco plant toll feed is 100 µm.

6.3.2.2 Feed Grades

For the period examined, the unreconciled feed grades for the company feed were 11.92% zinc, 1.40% lead, and 144 g/t silver. The feed was somewhat variable with standard deviations of 1.75, 0.37, and 33.78 for zinc, lead, and silver respectively. These values fall within the expected ranges for Porco toll feed. The unreconciled feed grades can be seen in Figure 6-17, Figure 6-18, and Figure 6-19.

Figure 6-17: Toll Feed Zinc Grade 2020/2021

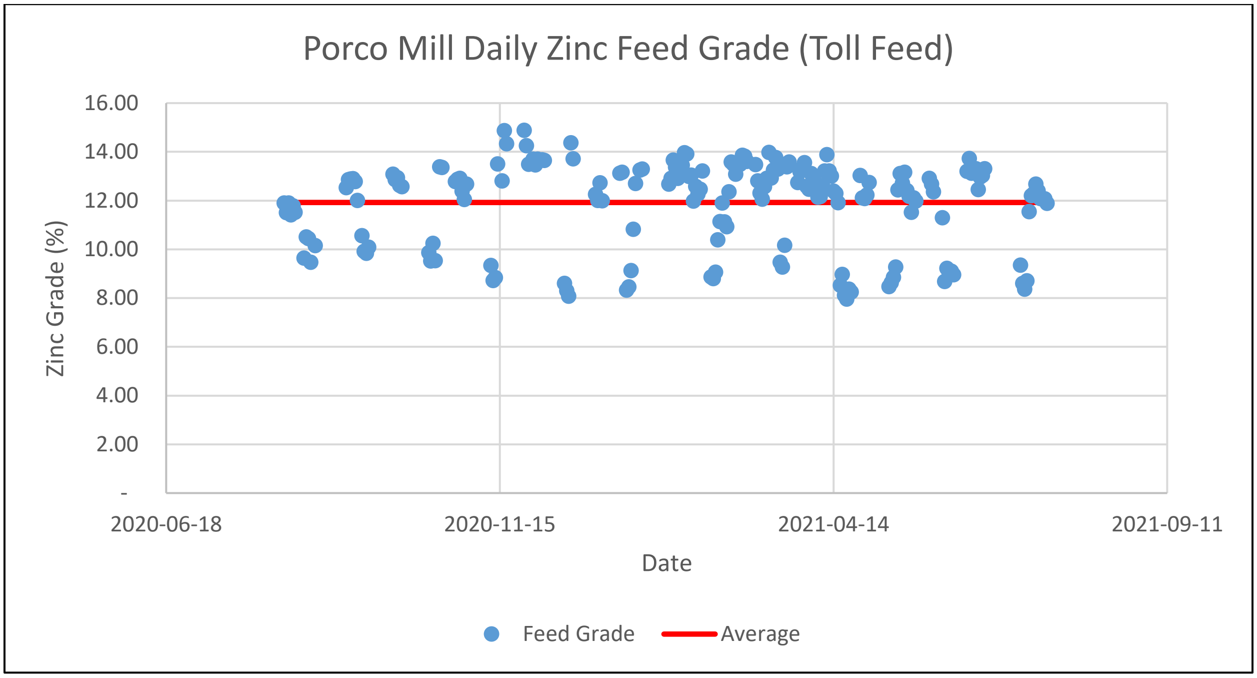


Figure 6-18: Toll Feed Lead Grade 2020/2021

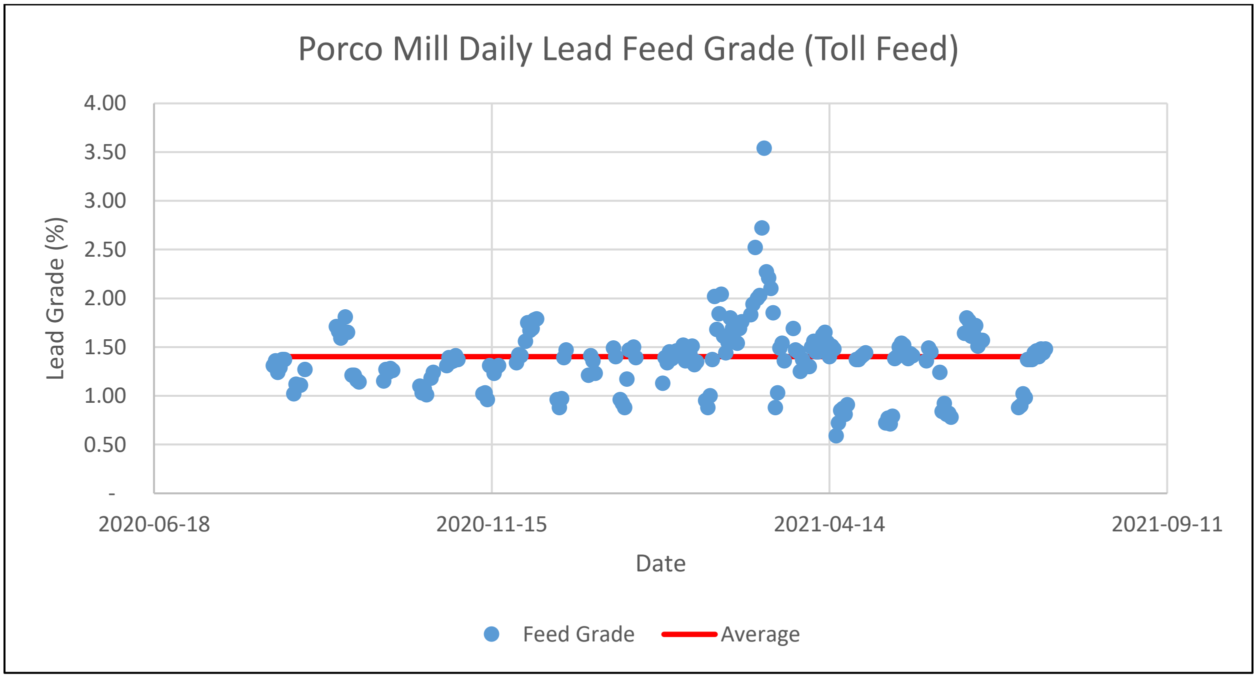
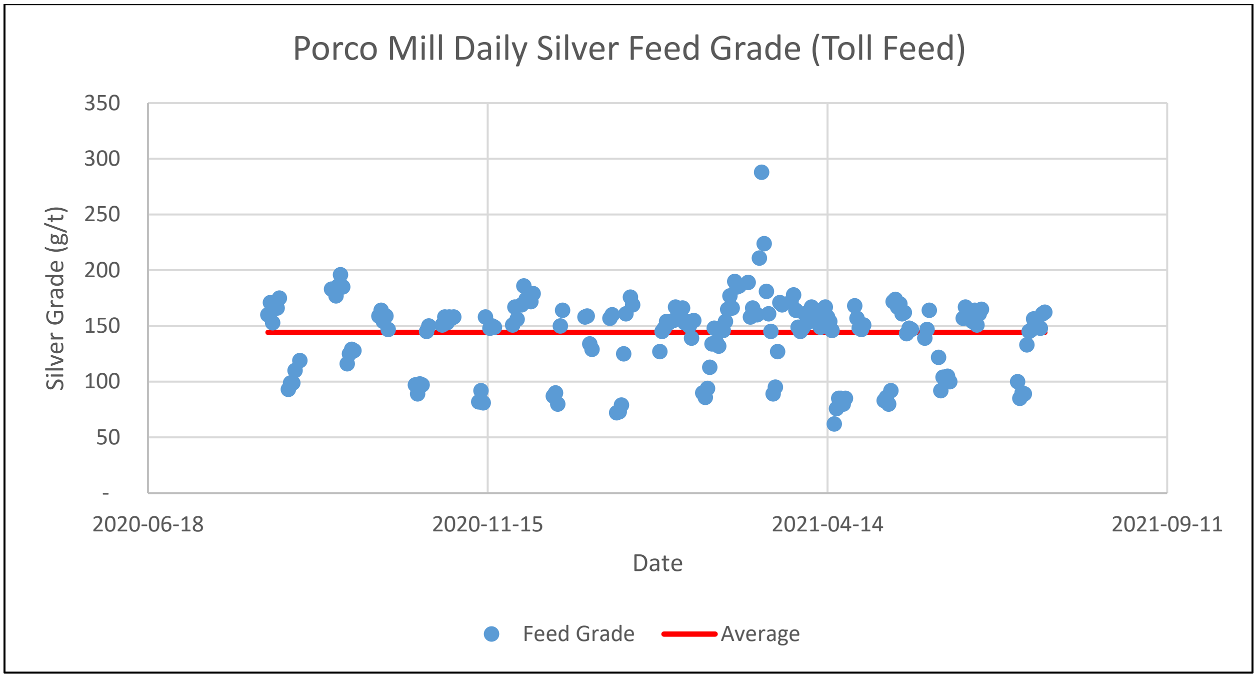


Figure 6-19: Toll Feed Silver Grade 2020/2021



The toll feed head grades were measured in the same location as the company feed.

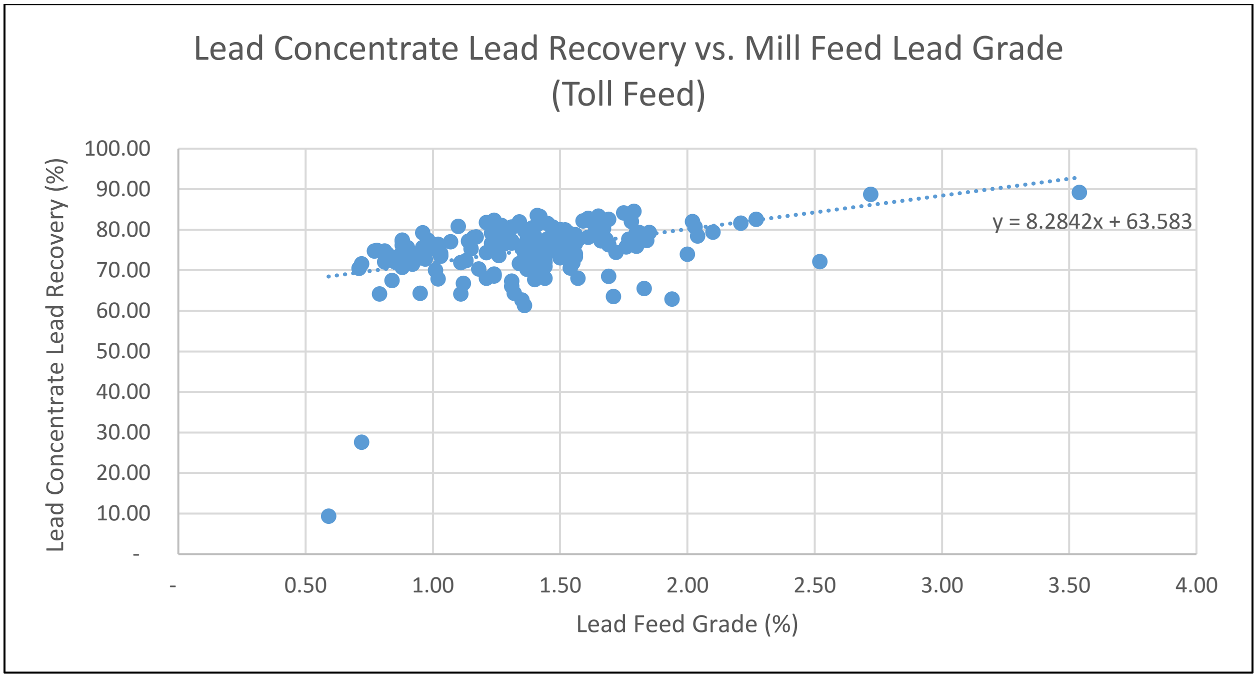
6.3.2.3 Lead Production

The toll feed utilizes the same reagents as the company feed, in similar dosages. The lead concentrate produced during evaluated period measured 2,912 t which represents 1.89% of the feed to the plant.

The average grade of the lead concentrate was 56.37% lead, 12.54% zinc, and 2,902 g/t silver. The recoveries to the lead concentrate were 75.4%, 37.82%, and 1.95% for lead, silver, and zinc respectively.

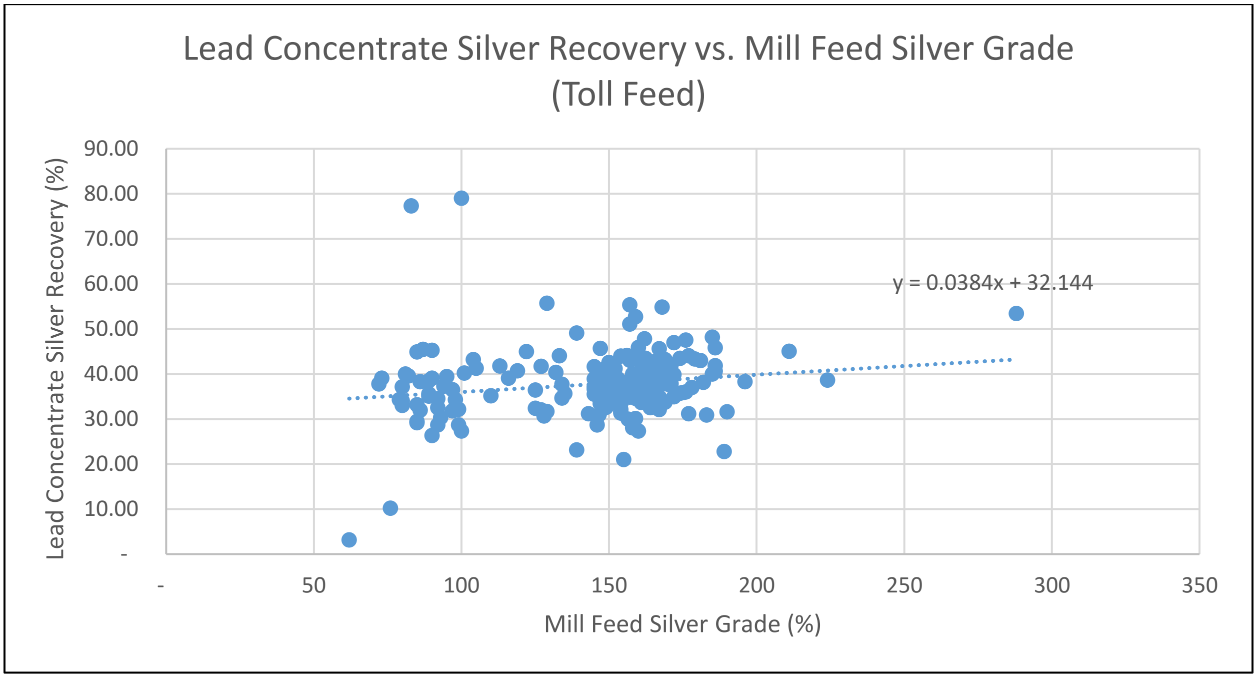
The relationship between the lead feed grade and the lead recovery to the lead concentrate can be seen in Figure 6-20. The recovery relationship for lead to the lead concentrate was determined to be: 8.28*(Lead feed grade %) + 63.58.

Figure 6-20: Mill Lead Concentrate Recovery vs. Lead Feed Grade



The silver recovery to both the lead and zinc concentrates is a byproduct of the flotation process; the silver is associated with the lead and zinc minerals and follows them into the concentrates. The recovery of silver to the lead concentrate can be seen in Figure 6-21, In this case the silver recovery appears to be uncorrelated to the silver grade in the toll feed and therefore a silver recovery of 32, which is the average of the toll feed silver recovery to the lead concentrate, will be used.

Figure 6-21: Silver Recovery to the Lead Concentrate vs. Mill Feed Silver Grade

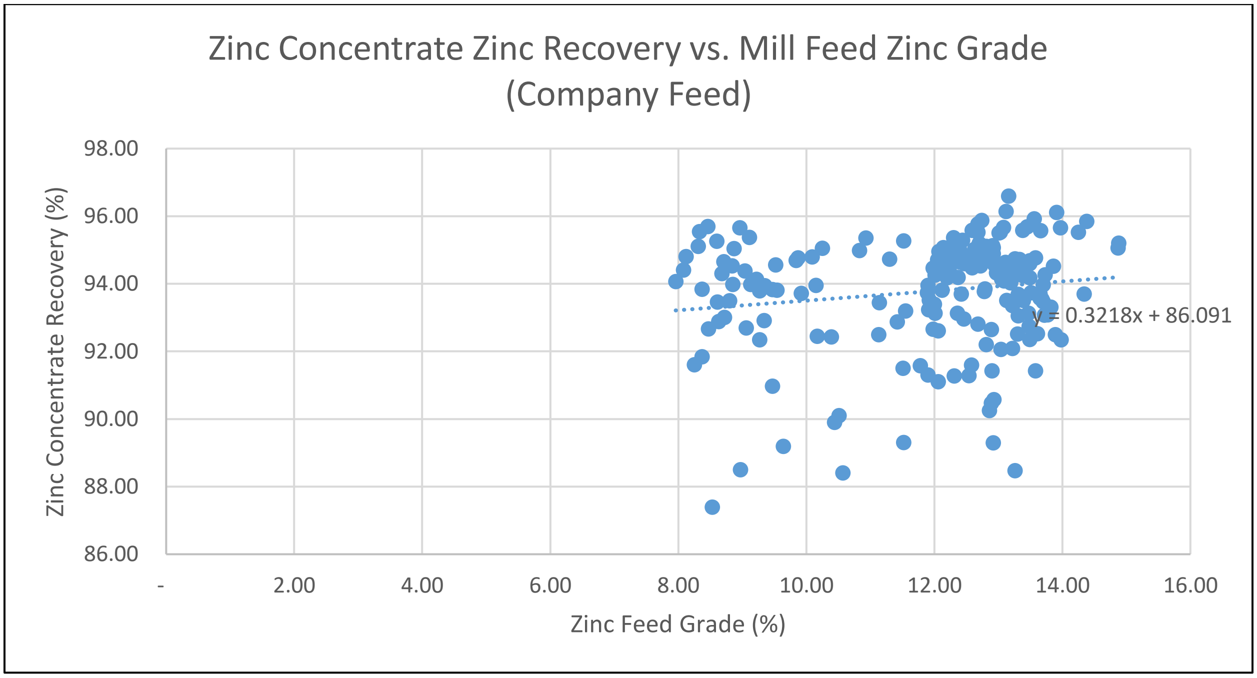


6.3.2.4 Zinc Production

Over the period analyzed, the unreconciled zinc concentrate production was 33,898 t with average grades of 50.73% zinc, 0.56% lead, and 311 g/t silver. The recoveries to the zinc concentrate were 93.79%, 47.68%, and 8.96% for zinc, silver, and lead respectively. The higher lead in the zinc concentrate is due to the low recovery of lead to the lead concentrate.

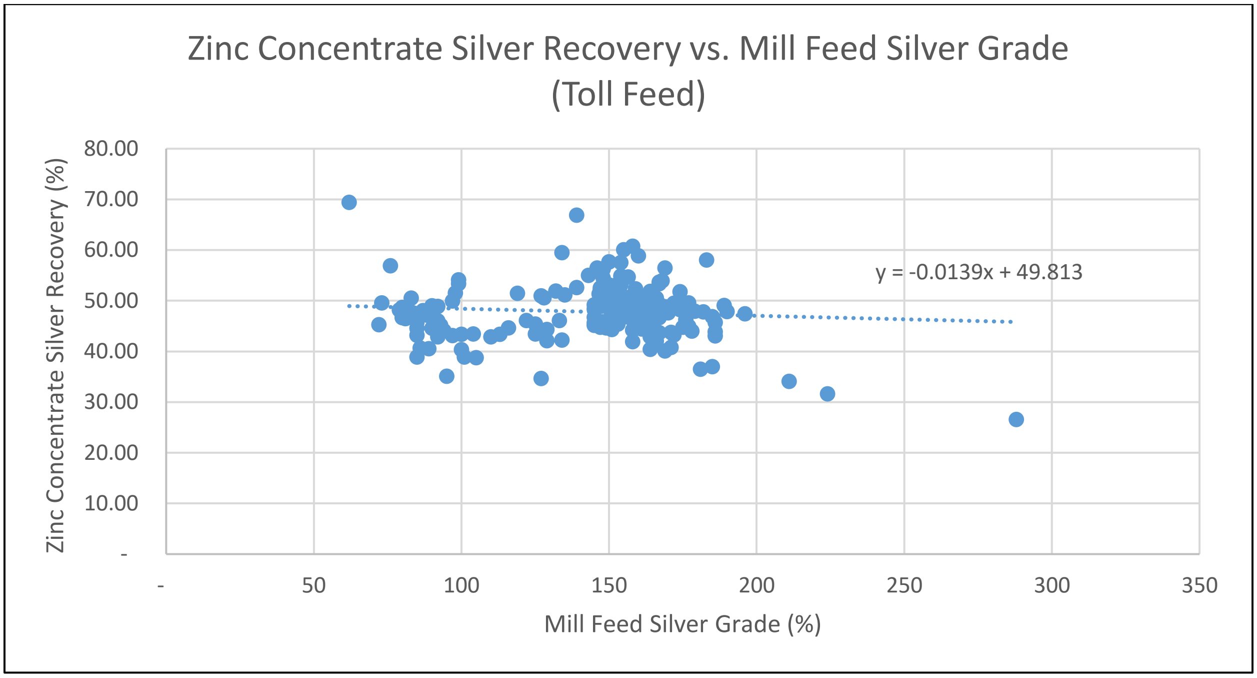
The zinc recovery as a function of the feed grade was examined and found to be similarly poor for determining expected zinc recovery to the zinc concentrate as with the company feed. This relationship can be seen in Figure 6-22. The relationship used for the purposes of this report for the zinc recovery to the zinc concentrate is 86.0.

Figure 6-22: Zinc Recovery to the Zinc Concentrate vs. Mill Feed Zinc Grade



The average silver recovery to the zinc concentrate is approximately recovery of 47.68%. The recovery of silver to the zinc concentrate, with the stated adjustments, can be seen in Figure 6-23, As with the lead concentrate, the silver recovery to the zinc concentrate appears to have a poor correlation to the silver grade in the toll feed. A silver recovery of 50% to the zinc concentrate, which was the average for the data, was chosen for this report.

Figure 6-23: Silver Recovery to the Zinc Concentrate vs. Mill Feed Silver Grade

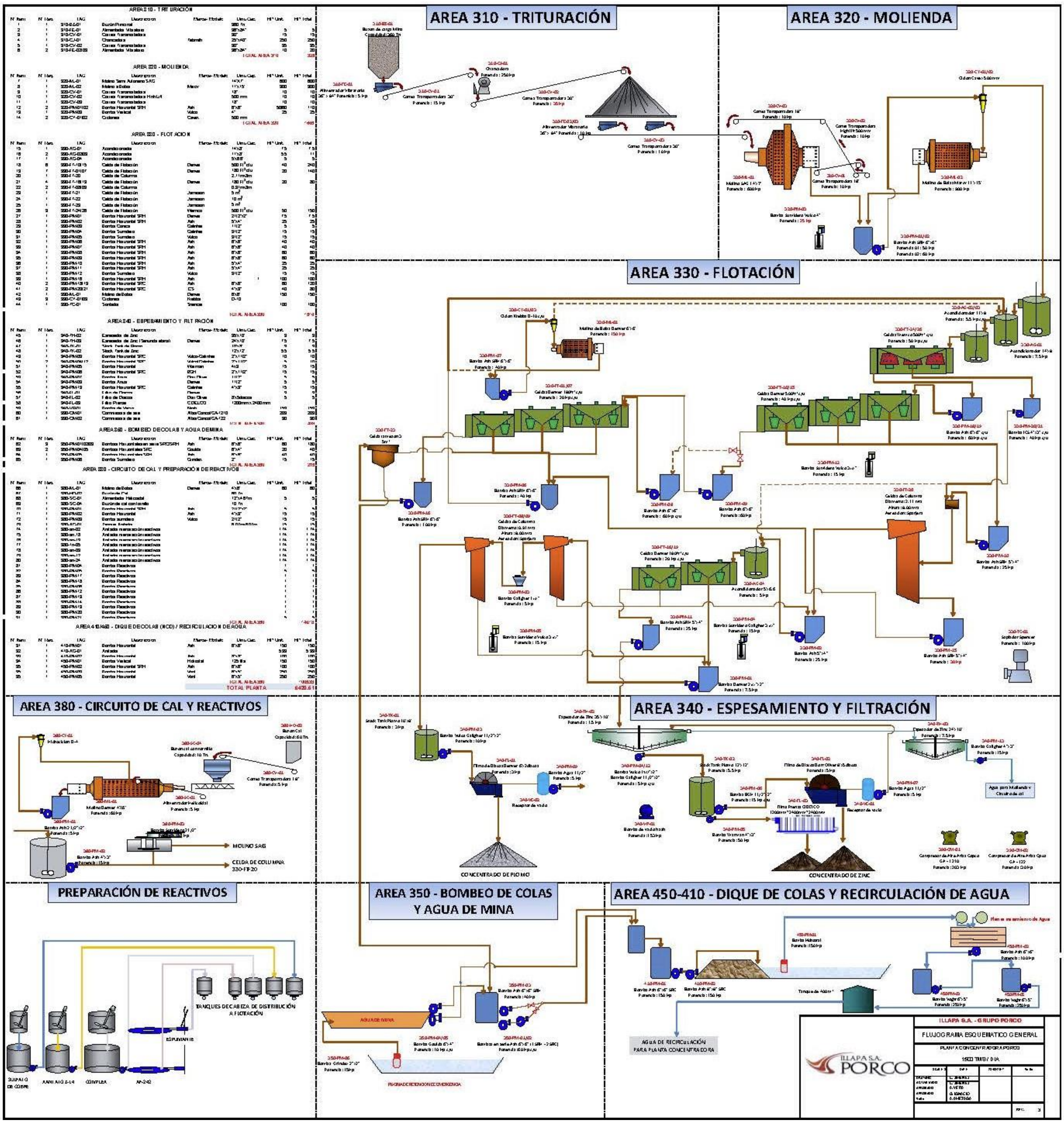


6.3.3 Plant Flowsheet

The plant flowsheet for the Porco mill is a typical differential flotation circuit for lead and zinc. The ore is crushed in preparation for feed to the grinding circuit. The grinding circuit utilizes a SAG/Ball mill combination to produce a product size of 100 µm for the flotation circuit.

The flotation circuit recovers both lead and zinc to a bulk concentrate. The bulk concentrate then undergoes cleaner flotation to remove a lead concentrate. The tailings from the lead cleaning circuit becomes the zinc concentrate. Both of the concentrates are filtered for shipping to the smelter. The lead concentrate is bagged for shipping, while the zinc concentrate is shipped bulk in trucks.

Figure 6-24: Porco Mill Flowsheet



Source: Glencore (2021)

The process plant is in good condition as can be seen in Figure 6-25 and Figure 6-26. Figure 6-25 shows the grinding circuit of the Porco mill and Figure 6-26 shows a section of the lead flotation circuit.

Figure 6-25: Porco Mill Grinding Circuit

Figure 6-26: Porco Mill Lead Flotation

There are a total of 9 tailings dams at the Porco mine. Eight of the tailings dams have been decommissioned. The operational tailings dam received an increase in capacity in January. The current tailings pond capacity is designed to allow production to be stored until the end of 2023. All of the tailings dams are inspected regularly and maintained to the standards set out by the Canadian Dam Association guidelines. Both dams are under the supervision of engineers from AMEC (now Wood Engineering) and recently an external audit was conducted by Knight Piésold Consulting.

The concentrates produced at the Porco Mine are sold to the Glencore refinery in Antafagasta, Chile. The zinc concentrate is shipped as a bulk product. The lead concentrate, due to local laws, is bagged prior to shipping.

6.4 Metallurgical Assumptions

The metallurgical assumptions for recoveries and concentrate grades can be found in Table 6-2.

Table 6-2: Recovery and Concentrate Grade Estimates

Parameter	Unit	Concentrates			
		Lead Concentrate		Zinc Concentrate	
		Company Feed	Toll Feed	Company Feed	Toll Feed
Zn Recovery	%	N/A	N/A	93	86
Pb Recovery	%	12.46*(Lead feed grade %) + 68.98	8.28*(Lead feed grade %) + 63.58	N/A	N/A
Ag Recovery	%	0.919 x (Silver Feed Grade) + 37.743	32	-0.0957 x (Silver Feed Grade) + 47.874	50
Concentrate Grade					
Zn	%	12	12	50	50
Pb	%	51	56	0.39	0.55
Ag	g/t	6,480	2,900	273	310

6.5 Historical Resource Estimates

Glencore's Resources & Reserves report as of December 31, 2020 disclosed Porco, Bolivar and Caballo Blanco mineral resource statements as well as mineral reserve estimates as of December 31, 2020, which remain current for Glencore as of the date hereof. As the mineral resource and mineral reserve estimates pre-date Santacruz's agreement to acquire the Assets, Santacruz is treating them as "historical estimates" under National Instrument 43-101 - Standards of Disclosure for Mineral Projects (NI 43-101), but they remain relevant as the most recent mineral resource and reserves estimates for Bolivar, Porco and Caballo Blanco. Given the source of the estimates, Santacruz considers them reliable and relevant for the further development of the Project; and accordingly, they should be relied upon only as a historical resource and reserve estimate of Glencore, which pre-dates Santacruz's agreement to acquire the Assets however, the Company is not treating the historical estimates as current Mineral Resources or Mineral Reserves.

A "Qualified Person" as per NI 43-101 has not done sufficient work to classify the historical estimate as current Mineral Resources or Mineral Reserves and Santacruz is not treating the historical estimate as current Mineral Resources or Mineral Reserves. Further drilling and resource modelling would be required to upgrade or verify these historical estimates as current mineral resources or reserves for the respective assets.

The resources have been reported for Porco as of December 31, 2020 at a Zinc Equivalent (ZnEq) cut-off grade 2% as follows in Table 6-3.

Table 6-3: Historic Mineral Resource Estimate

Category	Tonnes (Mt)	Zinc (%)	Lead (%)	Silver (g/t)
Measured Mineral Resources	0.7	10.68	0.63	83
Indicated Mineral Resources	0.4	10.86	0.77	114
Measured + Indicated Mineral Resources	1.1	10.74	0.68	93
Inferred Mineral Resources	2.2	11.78	0.84	98

Source: Glencore (2020)

Notes:

1. The Mineral Resources have been calculated in accordance with definitions in accordance with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code), the 2016 edition of the South African Code for Reporting of Mineral Resources and Mineral Reserves (SAMREC) and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standards on Mineral Resources and Reserves (2014).
2. The ZnEq = (Zn% + (Pb% * 0.73) + (Ag g/t * 0.019290448)).
3. The Mineral Resources have been calculated in accordance with definitions adopted by the Canadian Institute of Mining, Metallurgy and Petroleum. Employees of Glencore have prepared these calculations.
4. Mineral resources are not mineral reserves until they have demonstrated economic viability. Mineral resource estimates do not account for a resource's mineability, selectivity, mining loss, or dilution.
5. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.
6. All figures are rounded to reflect the relative accuracy of the estimate and therefore numbers may not appear to add precisely.
7. Reported in-situ Mineral Resources do not consider mineral availability by underground mining methods.
8. Historical Mineral Reserves and Resources are inclusive of Mineral Reserves shown at 100% ownership.

For comparison, Table 6-4 shows the Measured and Indicated Resources for 2018 and 2019, respectively which reflects mining depletion and changes in classification due to additional drilling and sampling during operations. The Indicated and Inferred Resources are reported at a 2% ZnEq cut-off grade.

Table 6-4: Historic Mineral Resource Estimate for 2018 and 2019

	Measured		Indicated		Measured + Indicated		Inferred	
	2019	2018	2019	2018	2019	2018	2019	2018
Ore (Mt)	0.8	1.2	0.3	0.7	1.2	1.9	1.8	2.2
Zinc (%)	10.7	11.3	9.7	10.4	10.4	10.8	10	11
Lead (%)	0.6	0.7	0.6	0.7	0.6	0.9	1	1
Silver (g/t)	76	106	87	102	79	108	87	102

Source: Glencore (2020)

Glencore reports resources and reserves in accordance with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code), the 2016 edition of the South African Code for Reporting of Mineral Resources and Mineral Reserves (SAMREC) and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standards on Mineral Resources and Reserves (2014 edition). The term 'Ore Reserves', as defined in Clause 28 of the JORC Code, has the same meaning as 'Mineral Reserves' as defined in the CIM Definition Standards for Mineral Resources and Mineral Reserves. All tonnage information has been rounded to reflect the relative uncertainty in the estimates; there may therefore be small differences in the totals. The Measured and Indicated resources are reported inclusive of those resources modified to produce reserves, unless otherwise noted. Commodity prices and exchange rates used to establish the economic viability of reserves are based on long-term forecasts applied at the time the reserve was estimated.

The parameters and methodology for each step of the resource estimation and manipulation were reviewed by the Qualified Person and are detailed as follows:

- Thirty separate veins were modelled in the resource estimate, form sets of sets of sub-parallel, north- to north-east trending and moderate- to steeply dipping mineralized zones which are between 110 m and 1,800 m, extending greater than 600 m in depth and still open;

- A total of 142 drillholes and 26,245 channel samples were used in the estimations into 2,615,745 m^3 of vein domain solids;

- The estimate was carried out using separate block models for each of the veins constrained by 3D wireframes of the individual mineralized zones. The block model is comprised of an array of blocks measuring 5 m x 5 m x 5 m unrotated, which are sub-blocked to 5 m x 1.25 m x 1.25 m, with grades for Ag, Pb and Zn interpolated using either Inverse Distance Weighting or Ordinary Kriging depending on the data density within each of the veins. Zinc equivalent values were subsequently calculated from the interpolated block grades;

- Bulk densities at Porco were based on density sample interval measurements taken by Glencore while SG estimates are based on a multilinear regression formula as follows:

$$\text{Density} = 2.821 * \text{Exp}\ (0.0077 * (\text{Zn\%} + \text{Pb\%}))$$

- Silver, zinc and lead composite values have been capped in order to remove the effects of potential overestimation due to statistical outliers. The threshold chosen was dependent upon the individual vein as shown in Table 6-5;

Table 6-5: Composite Statistics and Cut-off Criteria

#Code	Code	Vein Name	# Samples	CAP_ZN%	CAP_AG g/t	CAP_PB%
2000	AC	CAMILA	271	42	600	2
2001	RCA	CAMILA BRANCH	46	32	186	1
2010	C2	RED	381	36	1155	9
2011	KA	KARLITE	122	36	1596	6
2020	CU	COLORADA_UNO	2260	45	825	19
2021	CUII	COLORADA_II	206	45	868	19
2030	EP	EP	296	43	800	9
2040	H	SINKING	3816	39	2779	6
2050	CF	CALIFORNIA	2174	38	1185	10
2060	H6	H-6	576	22	609	6
2061	H6_M	H-6_M	85	22	609	6
2064	H6_H	H-6_H	79	44	2579	8
2070	RH6	RAMO_H6	332	44	2579	8
2075	CR22	CRUCERA_22	115	19	480	4
2077	CR2	2077_CR2_DOS	48	44	2579	8
2080	PA	PAMELA_1	583	41	761	4
2082	L	LONG	1135	45	550	8
2085	PR3	POBRE_RICO_3	748	33	15	2
2086	SAP1	SAP1	53	22	684	2
2088	CD	PICTURE	386	28	400	5
2090	SAP	SAN ANTONIO MAIN	2499	49	1558	8
2095	AU	AURORA	695	40	405	5
2101	SAP_N	SAP_N	5	49	1558	8
2110	R1S	PICTURE	1384	47	640	7
2120	CB	SAP_N	448	26	217	2
2140	THE	COLORADA_UNO	1289	50	306	4
2141	REL	RAMO_ELENA	477	47	268	6
2142	ROS	ROSARY	459	50	632	5

#Code	Code	Vein Name	# Samples	CAP_ZN%	CAP_AG g/t	CAP_PB%
2143	CE	CECILIA	82	51	172	4
2145	CAR	CARLA	263	50	306	4

Source: Glencore (2020)

- The interpolation was carried out in three passes using the ellipse ranges that are based on multiples of the variogram ranges as described in Table 6-6;

Table 6-6: Estimation Parameters

Vein	Range 1 (m)	Range 2 (m)	Range 3 (m)	Min # of Samples	Max # Samples
2000	28	30	20	5	20
2001	20	20	10	5	15
2010	25	20	10	8	30
2011	25	25	20	8	20
2020	45	43.7	36.25	12	30
2021	37.5	42.5	37.5	11	26
2030	23	21	20	9	20
2040	40	44	33.3	10	30
2050	30	30.7	21.6	8	15
2060	34	33	18	5	35
2061	34	33	18	5	35
2064	25	25	25	5	24
2070	25	25	25	5	24
2075	26	26	20	4	22
2077	25	25	25	5	24
2080	25	25	20	6	20
2082	41	41	20	4	22
2085	39	38	20	5	30
2086	25	25	20	2	20
2088	32	31	17	4	22
2090	42	40	30	5	20
2095	30	30	20	8	30
2101	35	40	30	7	20

Vein	Range 1 (m)	Range 2 (m)	Range 3 (m)	Min # of Samples	Max # Samples
2110	44	40	20	8	30
2120	30	30	20	5	30
2140	50	29	18	5	30
2141	25	30	20	4	20
2142	30	15	15	5	20
2143	25	25	15	5	20
2145	50	29	18	5	30

Source: Glencore (2020)

- The mineralized wire frames were defined using a combination of geological constraints and grade boundaries with no minimum mining thickness applied; and
- For all veins, the resource classification criteria are determined according to the variography, and it has been established using the methodology as follows:
  - Measured Resources: variogram range of 2/3 of the variogram range with a minimum of 5 samples being informed per block;
  - Indicated resources: to the full variogram range with a minimum of 4 samples being informed per block;
  - Inferred resources: extended to two and a half times the variogram range with a minimum of 3 samples being informed per block; and
  - However, an interpreted boundary is the final determination of indicated and inferred resources in order to remove outlier blocks and the “spotted dog” effect.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. Inferred Resources are considered too speculative geologically to have economic considerations applied to them that would enable them to be classified as Mineral Reserves. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

7.1.1 Eastern Cordillera Introduction

The Bolivar, Porco and Caballo Blanco deposits are located in the central part of the Eastern Cordillera, a thick sequence of Paleozoic marine siliciclastic and argillaceous sedimentary rocks deposited on the western margin of Gondwana and deformed in a fold-thrust belt. There were two major tectonic cycles in the Paleozoic: The Lower Paleozoic Famatinian cycle (the Tacsarian and Cordilleran cycles of Bolivia), and the Upper Paleozoic Gondwana cycle (Subandean cycle of Bolivia).

The late Precambrian supercontinent broke up with the opening of the southern Iapetus Ocean and the spreading of Laurentia away from Gondwana in the latest Precambrian or early Cambrian (Figure 7-1, Figure 7-2 and Figure 7-3). Ocean closure and collision of Laurentia and the South American segment of Gondwana during the Ordovician formed the Famatinian orogenic belt of NW Argentina (Dalla Salda et al., 1992a) which has been correlated with its probable Laurentian equivalent, the Taconic event of the Appalachian orogen (Dalla Salda et al., 1992b). The Famatinian belt records extension in the latest Precambrian with establishment of subduction during the Cambrian and closure of the ocean basin and continent-continent collision in the Ordovician (480-460 Ma) (Figure 7-4). The Precordillera Terrane carbonate platform of western Argentina, which has faunal similarities with eastern North America, may be a sliver of eastern Laurentia detached in the late Ordovician when Laurentia separated from Gondwana again (Dalla Salda et al., 1992a; b) (Figure 7-5 and Figure 7-6).

Figure 7-1: Plate Tectonic Reconstructions of the Neoproterozoic Subcontinent and the Late Precambrian Supercontinent after the Opening of the Southern Iapetus Ocean

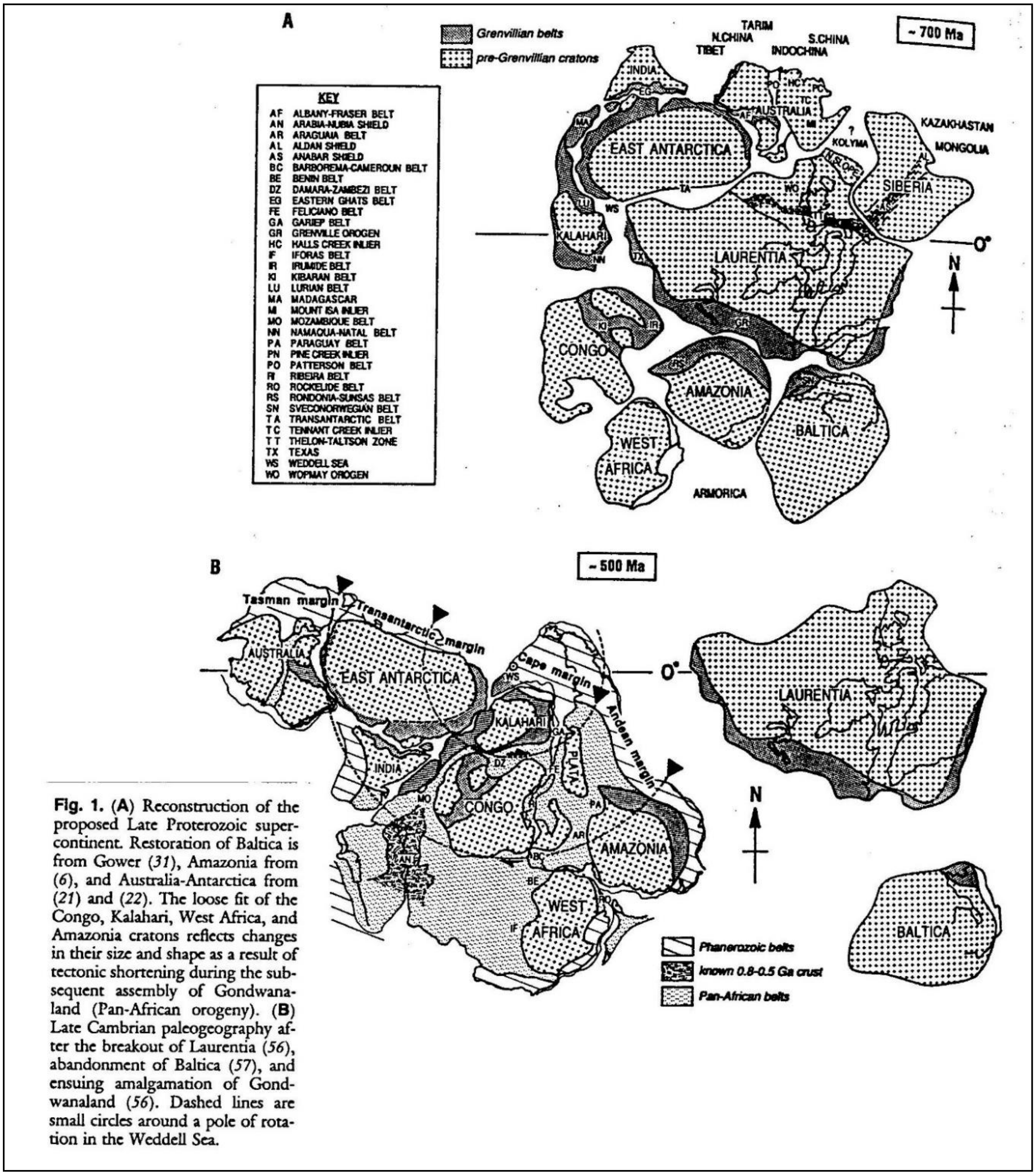


Fig. 1. (**A**) Reconstruction of the proposed Late Proterozoic supercontinent. Restoration of Baltica is from Gower (*31*), Amazonia from (*6*), and Australia-Antarctica from (*21*) and (*22*). The loose fit of the Congo, Kalahari, West Africa, and Amazonia cratons reflects changes in their size and shape as a result of tectonic shortening during the subsequent assembly of Gondwanaland (Pan-African orogeny). (**B**) Late Cambrian paleogeography after the breakout of Laurentia (*56*), abandonment of Baltica (*57*), and ensuing amalgamation of Gondwanaland (*56*). Dashed lines are small circles around a pole of rotation in the Weddell Sea.

Source: Hoffman (1991)

Figure 7-2: Plate Tectonic Reconstructions of the Neoproterozoic and Late Precambrian Subcontinents

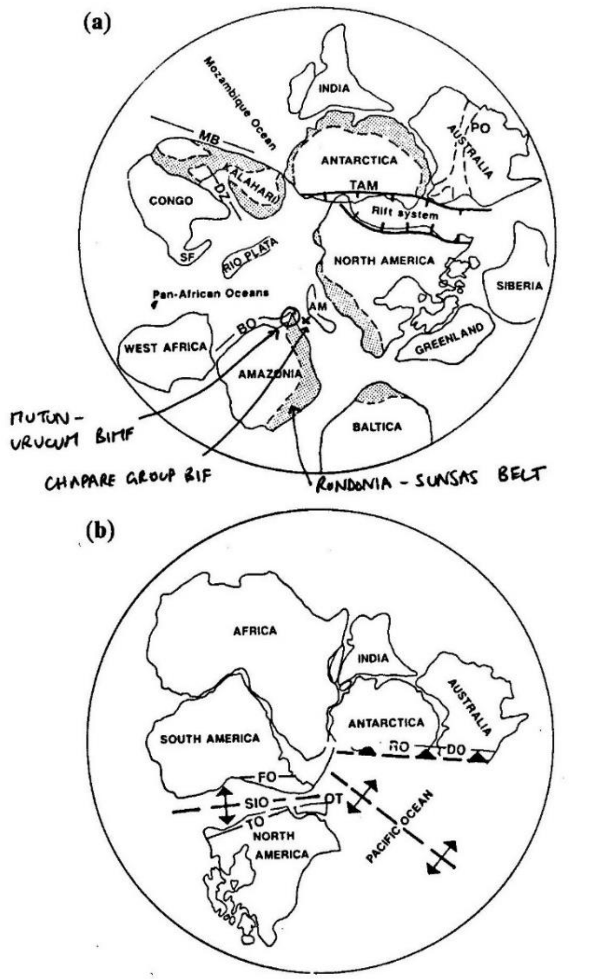


Fig. 3. (**a**) A Neoproterozoic reconstruction (*c*.750 Ma) based on the ideas of Moores (1991), Dalziel (1991, 1992*a*, *b*) and Hoffman (1991). It illustrates a single Neoproterozoic supercontinent just prior to rifting and a loose collage of African and South American cratonic blocks separated by oceanic crust. Variations in the position of the cratonic blocks can be seen in Hoffman (1991) and Dalziel (1992*a*, *b*). The supercontinent incorporates the SWEAT hypothesis of Moores (1991) linking the Transantarctic Mountains margin of East Antarctica to the western Cordilleran margin of Laurentia. The Grenville belt is shown as a stipple. AM, Arequipa Massif: BO, Brasiliano orogen; DZ, Damara -Zambezi belt; MB, Mozambique belt; PO, Patterson orogen; SF, São Francisco craton; TAM, Transantarctic Mountains. (**b**) Reconstruction of a late Precambrian to early Cambrian supercontinent following opening of the Pacific Ocean and amalgamation of Gondwana during Pan-African collisional events (Dalziel 1992), and at the time of opening of the southern Iapetus ocean (SIO) between North and South America. DO, Delamerian orogen; FO, Famatinian orogen; OT, Occidentalia terrane; RO, Ross orogen; TO, Taconic orogen.

Source: Story (1993)

Figure 7-3: Paleogeography of SW Gondwana Margin in the Early Ordovician

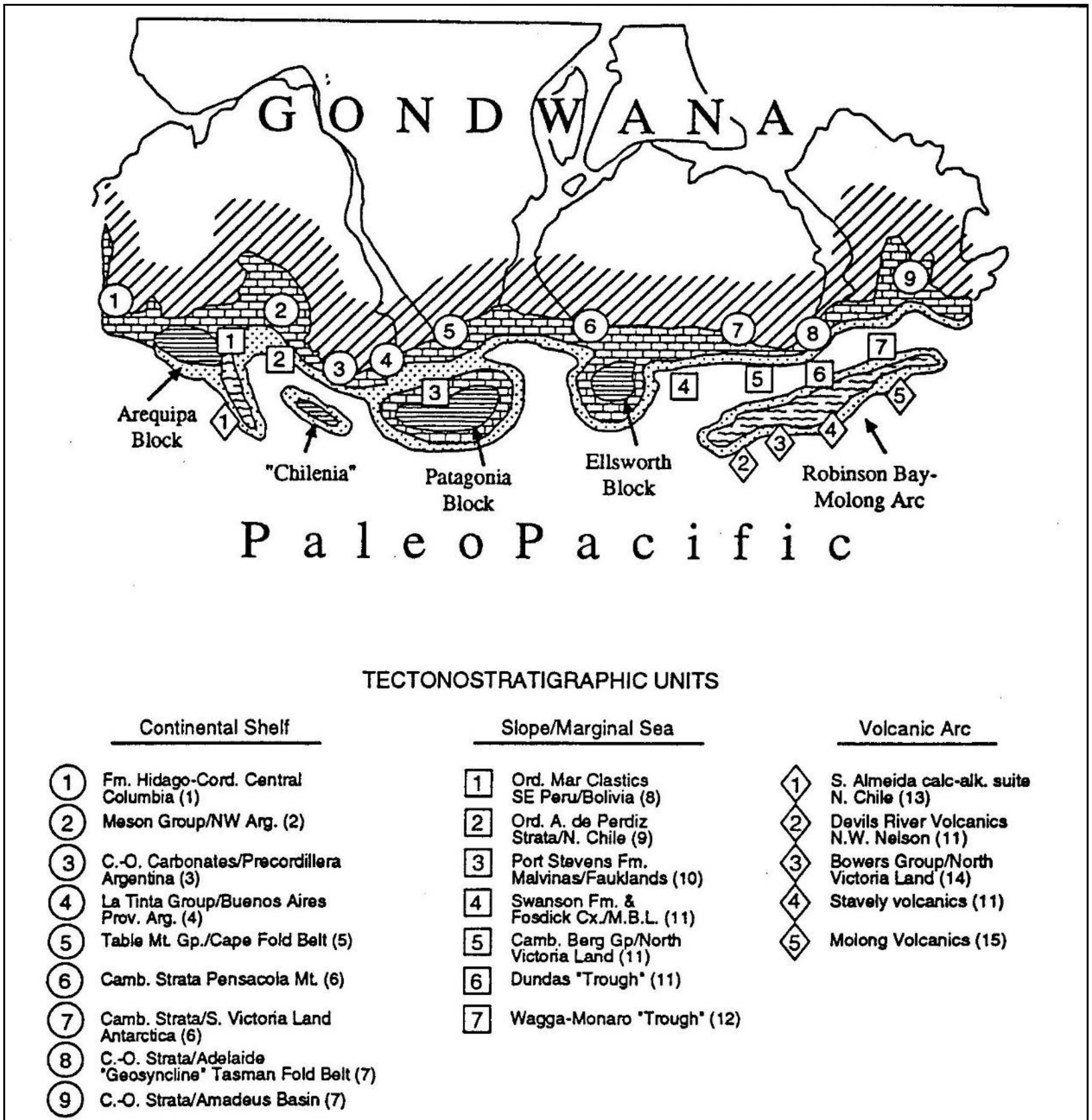


Fig. 12. Paleogeographic model for the SW margin in Gondwana in the Early Ordovician. Brick pattern outlines the marginal shelves and the stable Proterozoic platforms of Gondwana, in stipple are slope and outer basin floor clastic deposits, in horizontal ruling, possible platform and/or microplate regions of discontinous lower Paleozoic deposition, and in v symbols, theallocthonous volcanic arc components. References are: (1) Mojica et al. [1988], (2) Turner [1970, 1972], (3) Borrello [1969], Baldis and Bordonaro [1985], (4) Baldis et al. [1985], (5) Rust [1973], Tankard and Hobday [1979], (6) Laird and Bradshaw [1982], (7) Veevers et al. [1982], (8) Martinez [1980], Acenolaza [1976], Dalmayrac et al. [1980], (9) Garcia [1976], (10) Borrello [1972], (11) Findley [1987], (12) Pachman [1987], (13) Mpodozis et al. [1983], (14) Gibson and Wright [1985], and (15) Leitch and Scheibner [1987].

Source: Forsythe et al, (1993)

Figure 7-4: The Famatinian – Taconic Orogen in the Middle Ordovician

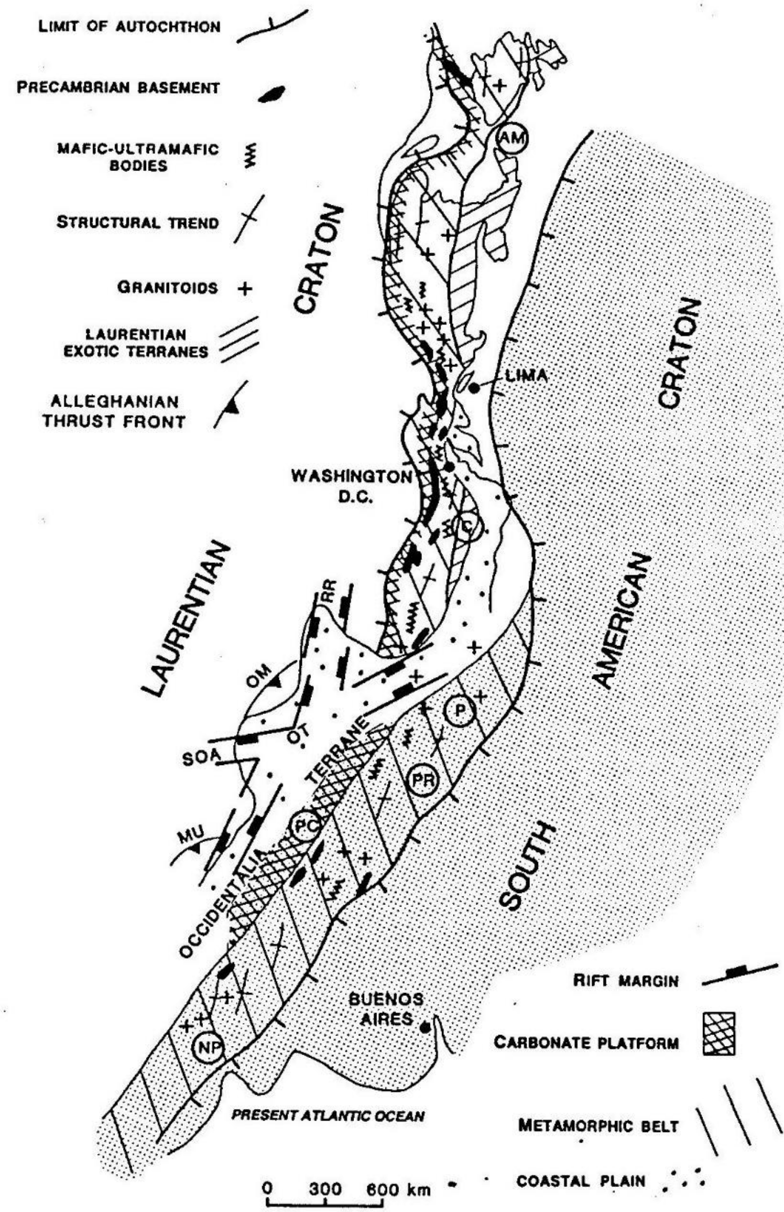


Figure 3. Reconstruction of Taconic-Famatinian orogenic belt as proposed for Middle Ordovician. Laurentia: AM—Avalon-Meguma terrane; C—Carolina terrane; MU—Marathon uplift; OM—Ouachita fold belt; OT—Ouachita trough; RR—Reelfoot rift; SOA—South Oklahoma aulacogen. South America: NP—North Patagonia massif; P—Puna; PC—Precordilleran belt; PR—Pampean Ranges.

Source: Dalla Salda et al, (1992b)

Figure 7-5: The Ordovician of the Central Andes

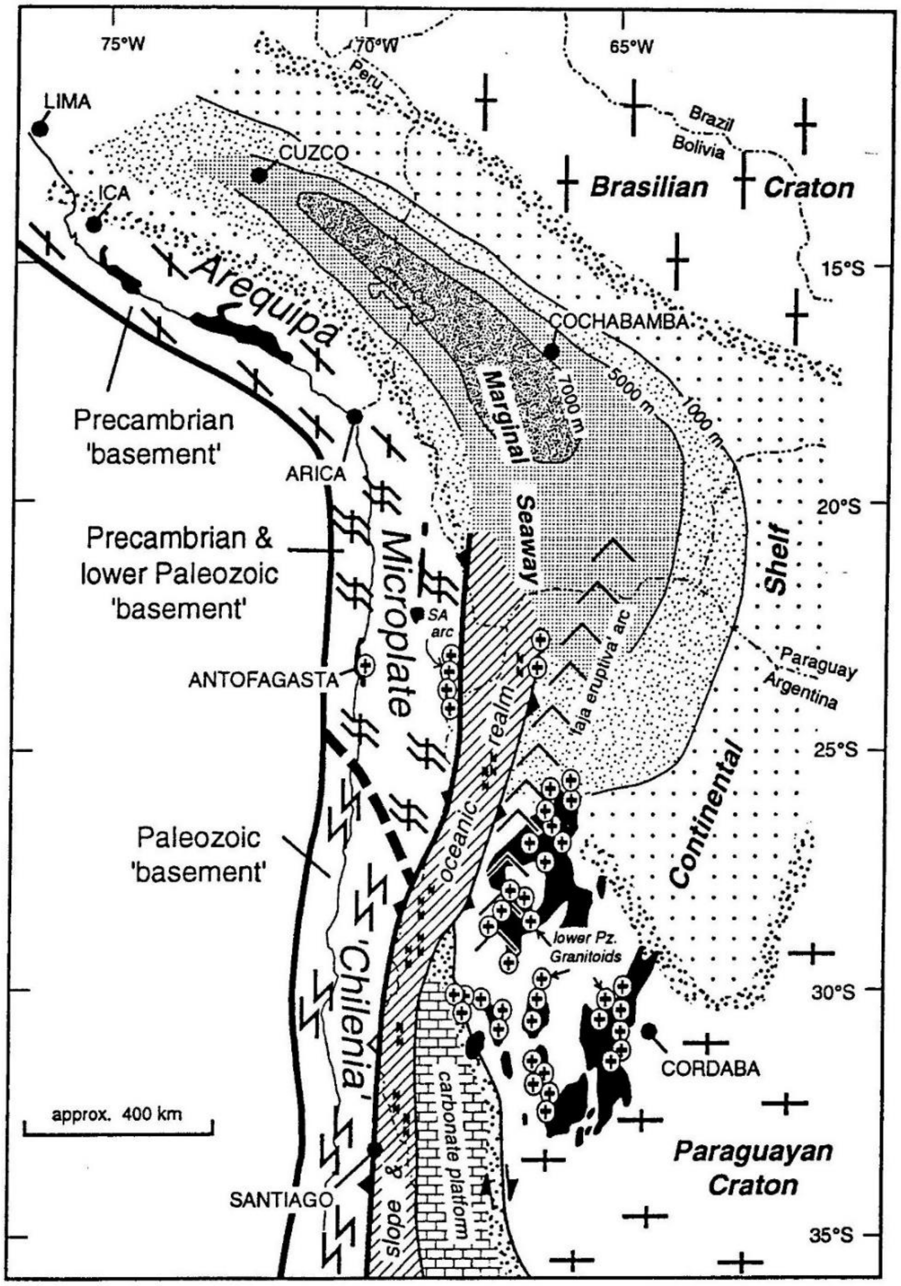


Fig. 1. Tectonostratigraphic map of the Central Andes. Modified from Delmarac et al. [1980], Martinez [1980], Dalziel and Forsythe [1985], Coira et al. [1982], and Ramos et al. [1986]. Contours indicate approximated thicknesses of Ordovician strata, and blackened areas are the principal outcrop areas of Precambrian and lower Paleozoic metamorphic basement rocks. Small pluses and inverted v symbols are lower to middle Paleozoic calcalkaline magmatic suites. Study area is the "SA arc" just to the east of Antofagasta.

Source: Forsythe et al, (1993)

7.1.2 Tacsarian Cycle (Upper Cambrian to Ordovician)

During the Upper Cambrian to Caradoc Tacsarian Cycle a broad marine back-arc rift basin existed in Bolivia-Peru with its axis in the Eastern Cordillera. There was oceanic spreading in the southern part of the basin, the Puna Straits in NW Argentina, preserved as ophiolites, with intrusion of basic dikes and sills further north in the Bolivian basin. A possible magmatic arc on the Arequipa Terrane to the west, represented by calc-alkaline plutonic and volcanic rocks dated at 487-429 Ma (Mpodozis & Ramos, 1989), separated the back arc basin from a forearc. The Arequipa microplate swung about a hinge to the NW to form the Puna Straits and Bolivia-Peru back arc basin, in a Gulf of California-type basin (Sempere, 1991) or Japan-type basin (Forsythe et al., 1993). This was bordered to the east by another subduction-related magmatic arc in western Argentina, the Puna arc and its southward continuation, the Sierras Pampeanas magmatic arc represented by a granitoid belt (Mpodozis & Ramos, 1989). The Ocloyic Orogeny closed the Puna Straits Ocean basin during the Llanvirn-Caradoc, with granitic magmatism.

In SW Bolivia the sedimentary sequence begins with shallow marine clastic sediments of the basal Tremadoc transgression, which grade upwards into open marine thick graptolitic shales intercalated with subordinate turbidites and slumps of late Cambrian – Llanvirn age. The base of this supersequence outcrops in several localities along the Cochabamba-Chapare Road (central part of the Eastern Cordillera), which were described as part of the Limbo Group and of other Cambrian formations (Castaños & Rodrigo, 1978). In most of the outcrops, thick and monotonous Lower to Middle Ordovician shale beds, with subordinate siltstones and sandstones are part of the Cochabamba Group, which from base to top includes the Capinota, Anzaldo, and San Benito Formations. In the southern part of Tarija, the sequence base includes shallow marine clastic rocks. These grade upward to thick, marine graptolitic shales with subordinate Cambrian turbidites of the Condado, Torohuayco, and Sama Formations (Castaños & Rodrigo, 1978).

Further north the sequence is of thick graptolitic and cephalopodic shales: these acted as the main decollement during the Neogene, hence older rocks are rarely exposed in the Bolivian Andes. In southern Bolivia these sediments were affected by the Ocloyic deformation with development of folding, cleavage and schistosity. The effects of this orogeny diminished to the east and north, and are unknown north of 20°S. Here the basin then functioned as the marine foreland basin of this deformation with deposition of a thick, monotonous sequence of shallowing upward, shallow marine siliciclastic interbedded sandstone and shale in the Middle to Late Ordovician (Llanvirn - Caradoc) (Sempere, 1990a, b, 1991, 1993).

7.1.3 The Cordilleran Cycle (Late Ordovician to Late Devonian)

During the Late Ordovician to Late Devonian Cordilleran Cycle (Chuquisaca Supersequence), the Bolivia-Peru basin occupied a back-arc setting, then from the late Llandovery formed a marine foreland basin. This lay east of the Puna arc on the Arequipa block, which continued south as the Sierra Pampeanas magmatic arc granitoid belt until the Early Carboniferous. These arcs were related to an eastward-dipping subduction regime east of the Precordillera. The cratonic Chilenia Terrane of the Cordillera Frontal collided with the continental margin in the latest Devonian to early Carboniferous, causing intense deformation in the western Precordillera. (Mpodozis & Ramos, 1989; Ramos et al., 1986; Ramos, 1988; Sempere, 1993).

The cycle began in Bolivia with rapid deepening of the basin as a back-arc with black pyritic-shale deposition (Tokochi Formation) followed by resedimented glacial-marine diamictites sediments in the Ashgill (Cancañiri Formation) with rare thin fossiliferous limestones. These are overlain by thickly bedded, thinning-upward turbidites (Llallagua Formation) and/or dark shales with minor turbidites (Uncía/Kirusillas Formation) from late Llandovery to Ludlow. Deposition in the basin was controlled by active normal faulting with facies succession induced by a major glacio-eustatic sea level low (the Ashgillian ice age) which developed between two maximum flooding episodes. The Uncía/Kirusillas Formation was the first of three main shallowing-up megasequences, which began with thick dark shales and ended with sandstone dominated units, of late Llandovery - Lochkovian, Pragian - early Giventian and late Giventian - middle Famennian ages. These were deposited in a large subsident marine foreland basin covering the Bolivian Andes, Subandean zone and Chaco-Beni plains, reaching as far as the SW edge of the craton where they onlap the Chiquitos Supergroup (Litherland et al., 1986). This interval was a time of onlap towards the northeast and of deposition of major hydrocarbon source rocks in Bolivia. (Sempere, 1990a; b;1991; 1993).

The Cordilleran Cycle is generally considered to have been terminated by the Late Devonian to Early Carboniferous Hercynian Orogeny, which is defined in Perú where the effects are much stronger. The presence of Hercynian orogenesis in Bolivia has been questioned however, due to Late Triassic age dates (U-Pb zircon 225 Ma, Farrar et al., 1990) for both foliated and weakly foliated facies of the Zongo-Yani granite, and by implication its wide metamorphic aureole, which was assigned an "Eohercynian" age by Bard et al. (1974).

7.1.4 Subandean (Gondwana) Cycle (Upper Paleozoic)

The Upper Paleozoic Gondwana Cycle was characterized by establishment of eastward subduction along the new Pacific margin west of Chilenia (Cordillera Frontal) and development of a broad forearc accretionary prism, which includes blue schists and ocean floor fragments. A magmatic arc lay to the east of the subduction zone. This cycle was terminated by deformation during the lower Triassic Gondwanide orogeny, the effects of which increase to the south. (Mpodozis & Ramos, 1989; Ramos et al., 1986; Ramos, 1988).

In Bolivia the Upper Paleozoic Subandean Cycle is characterized by a complete change in the type of sedimentation. The Late Devonian (Late Famennian) - Early Carboniferous (Mississippian) Villamontes Supersequence, deposited in the Subandean zone, Chaco and Titicaca basin, is mainly marine and comprises mudstone, black shale, sandstone, coal, glacial-marine sediments, diamictites and slumps, the stratigraphy of which is conflictive due to rapid facies variations (Sempere, 1993). The Eastern Cordillera was emergent. This was a period of high epeirogenic activity and synsedimentary tectonic instability coeval with the Hercynian deformation in Peru. Sempere (1993) considers the Mississippian sedimentation to have been the culmination of the Silurian - Devonian evolution.

The Late Carboniferous (Pennsylvanian) - Early Triassic Cueva Supersequence was a period of low subsidence and subtropical climate. In western Bolivia there was a shallow carbonate platform in the Titicaca Basin (Copacabana Formation) with deposition of white littoral-fluvial-eolian sands and evaporites on the eastern platform in the Subandean zone. The compressional Gondwana (Late Hercynian) deformation in the middle Permian of the Eastern Cordillera of Peru had weak effects in the Eastern Cordillera of Bolivia. This was accompanied by transgression of the marine carbonate platform to the east. Post-orogenic calc-alkaline magmatism in the Early - Middle Triassic evolved in the late Middle Triassic toward continental tholeiitic compositions, reflecting the extension which initiated the Andean Cycle (Sempere, 1990a; b; 1993; Soler & Sempere, 1993).

7.1.5 The Mesozoic to Cenozoic Andean Cycle: The Serere, Puca and Corcoro Supersequences

The Andes developed during the Mesozoic to Cenozoic Andean Orogenic Cycle. Distension in the Middle to Upper Triassic related to the initial break up of Gondwana marked the start of the Andean Cycle. In the first part of the cycle, from Triassic to mid Cretaceous, an eastward dipping subduction zone existed along the length of the Pacific margin of Peru and Chile with a magmatic arc and back-arc basin, which in some segments had oceanic crust. In Chile the arc was superimposed on the Late Paleozoic accretionary prism and an eastward younging coastal batholith was intruded. (Cobbing, 1985; Dalziel, 1986; Mpodozis & Ramos, 1989).

During the Middle Triassic - Middle? Jurassic, the Andean region of Bolivia lay within the stable cratonic regime. An initial rifting process of late Middle Triassic age developed in several areas, and numerous narrow grabens were filled by fluvio-lacustrine red beds and evaporites, accompanied by tholeiitic to transitional basalts (Sempere, 1990a; 1993; Soler & Sempere, 1993). Abortion of rifting in Bolivia was probably a consequence of a regional tectonic reorganization at about 220 Ma, which probably marked the resumption of subduction along the Pacific margin. The subsequent Late Triassic - Middle? Jurassic onlapping sedimentation of fluvial and eolian sands was probably controlled by post-rift thermal subsidence. The environment was of sandy deserts on the craton, akin to the Arabian Shield (Sempere, 1990a; 1993). These deposits of the Serere Supersequence occur in the Eastern Cordillera and Subandean Zone.

Since the Late Jurassic, Bolivia has been part of the Pacific subduction regime. This was marked by a Kimmeridgian rifting event in Bolivia, the "Araucana Phase", with extrusion of alkaline basalts which initiated the Puna Supersequence (Sempere et al., 1989; Sempere, 1993; Soler & Sempere, 1993). Bolivia lay in a back arc setting to the east of the Pacific margin arc and back-arc basin, with deposition of coarse clastic continental sediments and alkali basalts in the Potosí and Titicaca basins in a distensive regime related to a transtensional continental margin until the Aptian (Sempere et al., 1989).

The Upper Cretaceous and Cenozoic of Perú - Chile was characterized by a subduction-related continental magmatic arc with no back-arc basin. In Peru the Coastal Batholith was emplaced into the Jurassic - Early Cretaceous back-arc basin volcanic pile between the Mochica and Incaic 1-fold phases between 110 - 60 Ma (Pitcher et al., 1985). In the Central Andes the magmatic arc migrated eastwards. Large parts of the forearc zone and Mesozoic arc were removed during the Cretaceous and Tertiary, either by subduction erosion or by longitudinal strike-slip faults such as the Atacama Fault (Mpodozis & Ramos, 1989).

The mid Cretaceous compressive event inverted the Tarapacá back-arc basin of north Chile (Late Triassic - Early Cretaceous) to form the proto-Domeyko Cordillera fold-thrust belt (Mpodozis & Ramos, 1989). In Bolivia sedimentation of the Puca Supergroup continued in a distal external foreland basin, with deposition controlled by rifting and eustatic marine transgressions from the NW. The sequence is transgressive with successively younger units covering greater areas and reaching a total thickness of up to 5,600 m in the Sevaruyo area. The strata consist of fine red-bed sediments, evaporites and alkali basalts, with marine red shales in the Aptian and marine carbonates in the Cenomanian, Campanian and Maastrichtian. (Riccardi, 1988; Sempere et al., 1989; Soler & Sempere, 1993). The end of the Puca Supersequence is marked by an important unconformity at the end of the Paleocene, followed by deposition of thick red beds in the Altiplano and Eastern Cordillera in an external continental foreland basin during the Eocene and Oligocene (53 - 27 Ma; Sempere 1990a).

The Cenozoic evolution of Bolivia was dominated by considerable horizontal shortening (Sempere, 1990). Cenozoic basins of the Corocoro Supersequence developed in the Cordillera and in the plains in that time are related to the uplift of the Andes.

During the Lower Paleocene-Lower Oligocene, a foreland basin formed east of the Andes. A thickening of the crust enabled the accumulation of 2.5 km of red beds in the Altiplano and Eastern Cordillera (Sempere, 1995).

7.1.6 The Andean Orogeny

The first major deformation in the Andean Cycle in Bolivia occurred during the Late Oligocene to Early Miocene (27-19 Ma) when the orogenic front jumped from west of Bolivia to the Eastern Cordillera, and the Bolivian Andes started to develop as a mountain belt. Major crustal shortening by thrusting occurred in the Eastern Cordillera, and deformation of the Subandean Zone also began. Since the Late Oligocene, the Altiplano has functioned as an intermontane foreland basin with deposition of thick continental sediments, with smaller intermontane basins in the Eastern Cordillera.

The external foreland basin moved east to the Subandean - Llanura (Beni-Chaco) Basin. The second major period of thrusting occurred between 11-5 Ma. Thrusting is mainly eastward-verging towards the foreland, with an important west-verging back-thrust belt in the eastern Altiplano and western side of the Eastern Cordillera.

7.1.7 Mesozoic to Cenozoic Magmatism

Rift-related granites were intruded in the Cordillera Real in the Triassic–Jurassic (227-180 Ma) (Everden et al., 1977; McBride, 1977; Grant et al., 1979; Farrar et al., 1990).

Alkaline volcanic activity was initiated in the Late Oligocene (28-21 Ma) in the Western Cordillera and western Altiplano, coincident with the first major period of deformation. At the same time granitoid plutons were intruded in the southern part of the Cordillera Real (Illimani, Quimsa Chata, Santa Vera Cruz) with related tin-tungsten-silver-lead-zinc-polymetallic mineralization (28-20 Ma). Similar deposits to the south as far as Potosi, such as Colquiri and Chicote Grande, are hosted by Paleozoic sediments and related to buried plutons of this age. The main period of magmatism was the Middle Miocene (17-12 Ma) with an eastward "breakout" of magmatism in an unusually broad arc across the Western Cordillera, Altiplano and Eastern Cordillera, generally forming small extrusive (domes) and intrusive (stocks, sills) bodies. Further magmatism occurred across this wide arc during the Late Miocene (10-5 Ma) during the second main period of crustal shortening. This was characterized by stratovolcanoes, ash-flow calderas, and major ignimbrite shields such as Los Frailes and Morococala in the Eastern Cordillera. (Baker, 1981; Baker & Francis, 1978; Evernden et al., 1977; Grant et al., 1979; McBride et al., 1983; Redwood, 1987; Redwood & Macintyre, 1989; Soler & Jimenez, 1993; Thorpe et al., 1982.)

7.2 Local Geology

The Porco silver-zinc-tin deposit is located 35 km southwest of the Cerro Rico de Potosí deposit on the southeastern edge of the Los Frailes volcanic field. It was the first silver deposit discovered in Bolivia, with exploitation dating to pre-colonial times. The geology has been described by Sugaki et al. (1983), Cunningham et al. (1993, 1994a, b) and Jiménez et al. (1998).

The deposit is hosted by a north-south-elongated caldera that is 5.0 km x 3.0 km and formed at 12.0 ± 0.4 Ma with the eruption of the crystal-rich dacitic Porco Tuff. Well defined topographic walls of the caldera cut Ordovician phyllites and Cretaceous sandstones. The 12.1 ± 0.4 Ma Apo Porco stock (4,886 masl) occurs on the southern margin of the caldera. Mineralization is associated with the younger 8.6 ± 0.3 Ma Huayna Porco stock (4,528 masl) in the center of the caldera. Radial dykes, alteration and metals are zoned around the stock. To the north, the Porco Tuff is overlain by the ignimbrites of the Los Frailes Formation dated at 6 to 9 Ma.

Mineralization occurs in NNE to NE-trending veins that cut the Porco Tuff about 1 km east of the Huayna Porco stock. The deposit is zoned around the stock with cassiterite proximal to the stock and base metals, mainly sphalerite and galena, further away. The upper parts of the veins are silver-rich with pyrargyrite, acanthite and stephanite. The main structure is the San Antonio vein which strikes N10º - 30ºE and dips between 70º and 85º to the east. It is 300 m in vertical extent and 1.2 m to 2.0 m in width. To the south, the vein branches into the Oriente, Misericordia, and Santos veins, whose lengths vary between 500 m to 1,500 m. The main ore minerals are pyrite, sphalerite, galena, argentiferous galena, native silver, chalcopyrite, and arsenopyrite in a gangue of quartz. Other important structures are the Muestra Grande vein on Huayna Porco Hill, where the grade reached 2,300 g/t Ag (Sugaki et al., 1983), and the Rajo Zúñiga vein, which strikes N30ºE and dips 75º-80ºE. The latter vein, with widths between 1.0 m and 1.5 m, was exploited in a 100 m x 20 m open pit. This altered dacite-hosted vein is accompanied by associated veinlets and disseminations in the wall rock and consists of cassiterite, wolframite, galena, silver sulphosalts, and pyrite.

Figure 7-6: Geological Map of the Porco Caldera (Cunningham et al., 1994b)

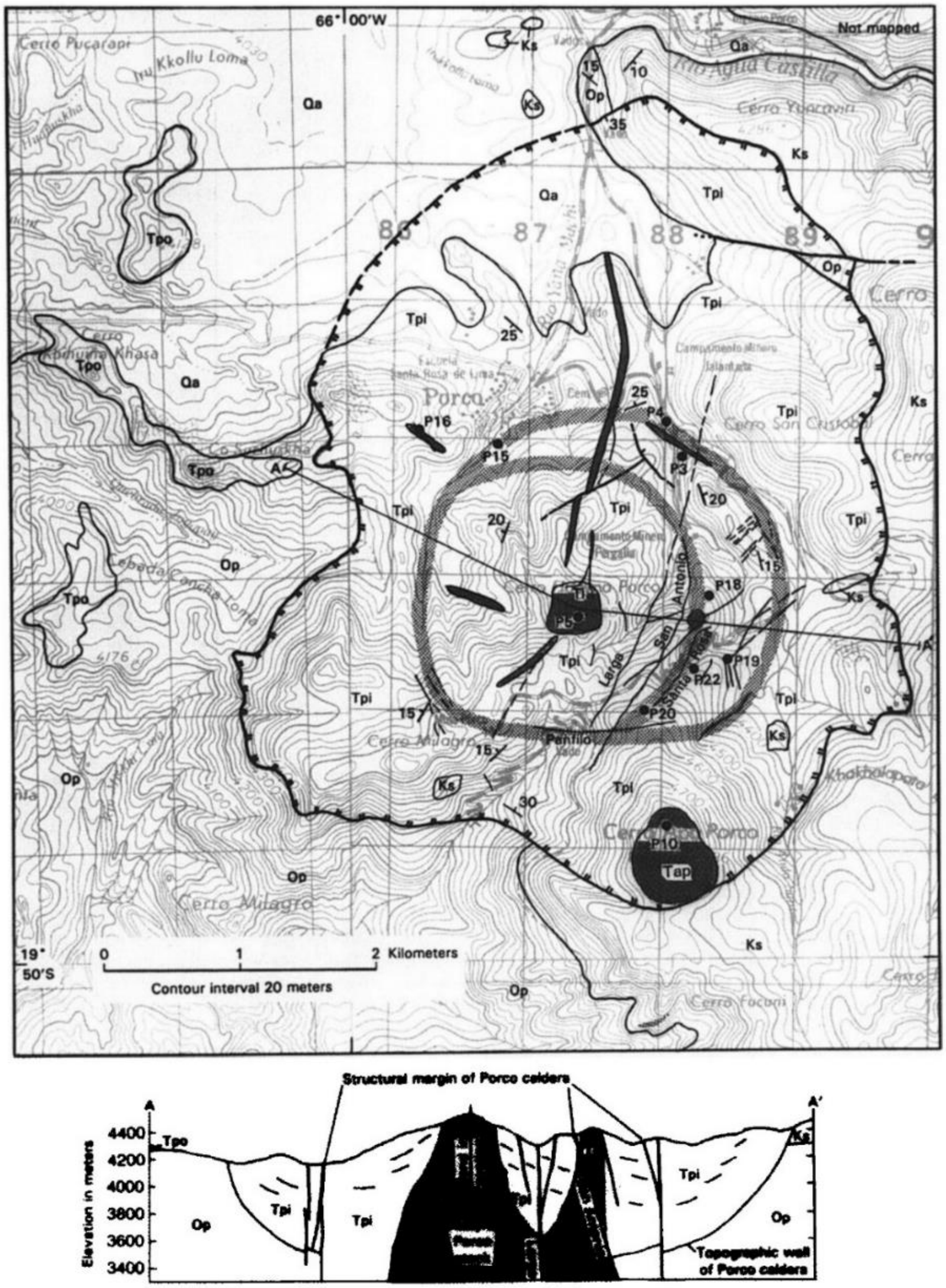


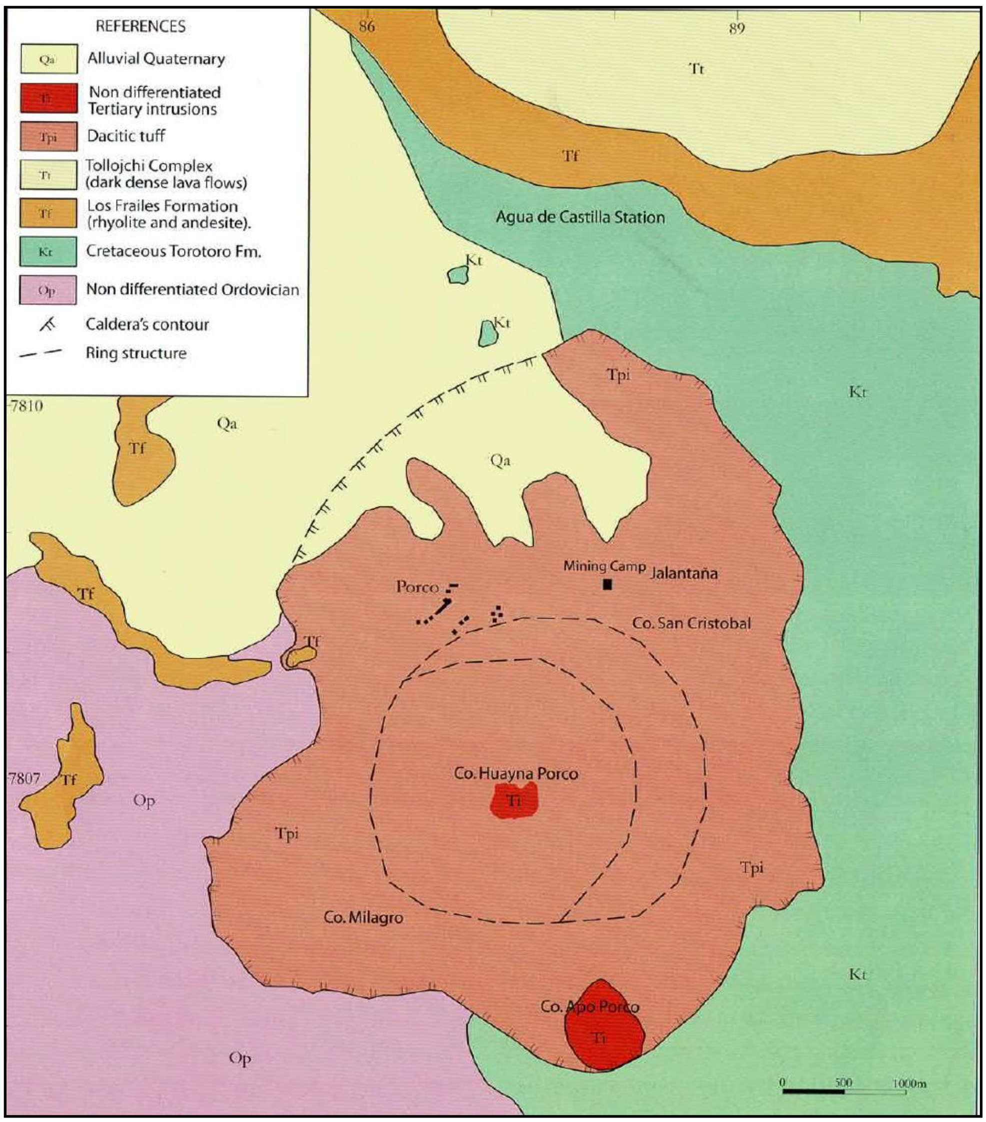
FIG. 3. Geologic map and cross section of the Porco caldera.

Source: Cunningham et al, (1994)

7.3 Property Geology

A definitive reference for the Porco deposit is that of Arce-Burgoa, 2009 which states “the deposit is hosted by a north south trending collapsed caldera that is 5 km by 3.5 km. The caldera is composed of Tertiary nested domes and acidic to dacitic tuffs of the Aqua Dulce and Nesteria formations (Mendieta et al, 1963). In addition, two younger dacitic stocks are exposed in Cerro Huayna Porco and Cerro Apa Porco (Figure 7-7). The sedimentary basement consists of Ordovician phylites that discordantly underlay Cretaceous sandstones (Jiminez et al, 1998).

Figure 7-7: Simplified Geologic Map of the Porco Deposit (modified from Jiminez et al, 1998)



Source: Arce-Burgoa (2009)

Mineralized flows and tufts in the northeast are partially covered by flows of that Tollojchi Complex, which were dated at 10.5 +/- 0.3 Ma and 11.5 +/- 0.42 Ma (Schneider and Halls, 1985). To the northwest, the tufts and the Paleozoic and Mesozoic rocks are overlain by the ignimbrites of the Los Friales formation which have reported ages of 12.0 +/- 0.4 Ma. Sanidine from the Huayna Porco stock shown in Figure 7-7 is dated at 8.6 +/- 0.3 Ma.

The igneous complex hosts numerous mineralized structures developed in both the dacites and altered tuffs. The main structure hosts the San Antonio vein which strikes N 10º 230ºE and dips between 70º and 85º to the east, it is 300 m in vertical extent, and 1.2 to 2.0 m in width. To the South, the vein branches into the Orient, Misericordia and Santos veins, whose lengths vary between 50 to 1,500 m. The main minerals are pyrite sphalerite, galena, argentiferous galena, native silver, chalcopyrite, and arsenopyrite in a dominant gangue of quartz.

Other important structures in the deposit host the Muesta Grande vein located at Cerro Huayna Porco (Sugaki et al, 1993), and the Rajo Zuniga vein, which strikes N 30º East and dips 75 to 80ºE. The latter vein, with widths between 1.0 m and 1.5 m, which was exploited in a 100 m by 20 m open pit. This altered dacite hosted vein is accompanied by associated veinlets and disseminations in the wall rock and consists of cassiderite, wolframite, galena, silver sulfosalts, and pyrite. Fluid inclusion data collected from several zones of the deposit show some important variations with respect to the homogenization temperatures and salinities (Table 7-1), (Sugaki et al, 1981).

Table 7-1: Fluid Inclusion Results

Zone	Homogenization Temperatures (degrees)	Salinities (wt.% NaCl eq.)
Sn-Py	210-360	11.5 - 30.4
Sn-Ag	150-287	10.4 - 20.2
Ag	150-258	2.2 - 8.9

Source: Sugaki et al, (1991)

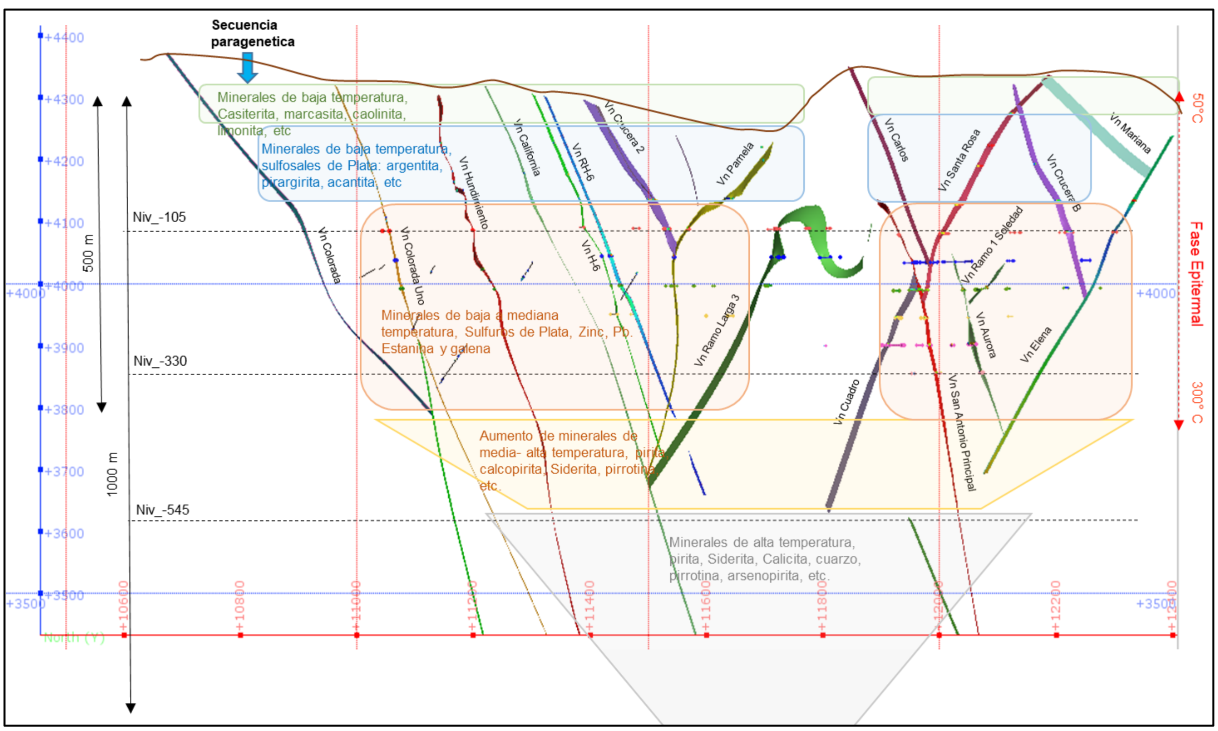
7.4 Mineralization

The characterization of the mineralization at the Porco site as theorized in Figure 7-8 may be summarized as follows:

- Hydrothermal reservoir;
- Epithermal phase, which allows the uptake of base metals (Zn, Pb, Cu) and (Au-Ag) of low sulphidation;
- Vein type;

- Temperature range, 50°C - 300°C;
- Deposit depth, between 50 m-500 m depth from the surface;
- Mineralization can be internally heterogeneous, with low to high-strength sectors and sterile sectors;
- Filled in fractures or zones of weakness;
- Vein systems can be parallel, reticular, convergent and or conjugate;
- Plutonic rocks of intermediate to acidic composition are favorable;
- Epithermal deposits are generally associated with Tertiary volcanism and very few older deposits;
- Alteration is predominantly sericitization, hydration, carbonatization, pyritization and propylitization; and
- The Porco deposit is typical Philonian type deposit, the mineralization to refill the fractures within the superjacent Ordovician slate north of the deposit.

Figure 7-8: Conceptual Model of the Mineralogical Genesis of the Porco Deposit



Source: Glencore (2020)

The mineralized zones or veins are polymetallic, monoclinal banded structures but may also be crustiform or in geodes presenting in rosary form. Thicknesses range from between 0.01 m to 4.0 m but can reach widths of ~10.0 m usually in rameada form interspersed with country rock or mineral gangue.

7.4.1 Veta San Antonio Principal

The San Antonio structure is located in the main corridor striking N 10° - 30°E with dips ranging between 60°-75° and is developed from the Santacruz level to the -330 level.

The mineralogy of the San Antonio Principal vein, located in the central sector of the deposit), consists of sphalerite, pyrite, galena, marcasite, which correspond to the intermediate phase of the mineralization this is changing towards depth enriching in marmatite, pyrite.

7.4.2 Elena Vein

The structure is located in a fault oriented N 10° - 50°E and dipping between 40°-62° which is developed from the San Cayetano level to the -330 level.

The mineralogy of the vein consists of sphalerite, pyrite, galena, siderite kaolin, which corresponds to the intermediate phase of the mineralization this changing at depth enriching in marmatite and pyrite.

7.4.3 Vein Ramo Elena

The structure is located between the main San Antonio and Elena veins in direction and diving ranging from N 70° - 80°W/50°-75° in vertical longitude is developed from level 105 to level -195.

The mineralogy of the vein consists of marmatite pyrite galena, and they correspond to the late phase of mineralization.

7.4.4 Vein Rosario

The Rosario structure is located between the Elena and Ramo Elena veins oriented N 10° - 30° W and dipping 55°-65° which developed from level 60 to level -195.

The mineralogy of the vein consists of sphalerite, pyrite, galena, siderite kaolin, which corresponds to the intermediate phase of mineralization.

7.4.5 Vein RH6

The RH6 structure is located at the intersection of the Huayna Porco stock and Apo Porco becoming part of the Pamela, Crucera II, Larga 3, Crucera IV, Crucera Pamela, Ramo Pamela and H-6 vein system. This corridor has high concentrations of silver sulfosalts compared to the rest of the corridors.

All the structures that are contained in this vein system oriented N 10°W - N 40°E and dipping 60°SW- 70°SE which has been developed from the Huayna Porco level to the -240 level.

The mineralogy of the vein consists of sphalerite, marmatite, pyrite, galena, sulfosalts, siderite, and that correspond to the intermediate phase of the mineralization.

7.4.6 Veta Colorada Uno

The Veta Colorada Uno is located along a corridor north of the Huayna Porco stock that emerges from the main Hundimiento vein, with an orientation of N 5°E.

Located in Tertiary age dacitic rocks the vein has approximate length of 500 m in length with thicknesses that average 2 m and occur in the form of massive veins.

The mineralogical content consists of ~70% sphalerite, ~10% pyrite, ~10% galena and ~10% marmatite. However, at deeper levels the percentages are reversed reducing to 45% sphalerite and 5% galena, with the marmatite and pyrite proportionally increases at depth.

7.4.7 Veta Hundimiento

The Hundimiento zone corridor intersects the Huayna Porco stock at an orientation of N 15°E.

It is hosted in Tertiary age dacitic rocks extending ~1,000 m in length with average widths of 3 m in the form of massive veins.

The mineralogical content consists of ~30% sphalerite, ~50% pyrite, ~10% galena, ~5% marmatite and ~5% siderite. However, the percentages are decrease at depth to ~25% sphalerite and ~2% galena; while pyrite proportionally increases at depth but marmatite and siderite remain at depth.

7.4.8 Vein California

Veta California is located in the Hundimiento zone corridor where it intersects the Huayna Porco stock parallel to the Hundimiento vein at an orientation of N 15-20° E.

Veta California is hosted in Tertiary age dacitic rocks extending approximately 1,000 m with average widths of 1.5 m in the form of gaped veins.

The mineralogical content consists of ~60% sphalerite, ~10% pyrite, ~5% galena and ~25% marmatite. However, as the vein deepens the percentages decrease to ~45% sphalerite and ~20% marmatite; while pyrite increases proportionally, and siderite begins to appear.

8 DEPOSIT TYPES

The most important ore deposits of the Eastern Cordillera are polymetallic hydrothermal deposits mined principally for Sn, W, Ag and Zn, with sub-product Pb, Cu, Bi, Au and Sb. They are related to stocks, domes and volcanic rocks of Middle and Late Miocene age (22 to 4 Ma). Mineralization occurs in veins, fracture swarms, disseminations and breccias. The deposits of the Eastern Cordillera are epithermal vein and disseminated systems of Au, Ag, Pb, Sb, as that have been telescoped on to higher temperature mesothermal Sn-W veins and, in some cases, porphyry Sn deposits. The telescoping is a characteristic of these deposits and is the result of collapse of the hydrothermal systems, with lower temperature fluids overprinting higher temperature mineralization. The systems show a fluid evolution from a high temperature, low sulfidation state to intermediate sulfidation epithermal and high sulfidation epithermal.

A typical example is the Cerro Rico where high temperature veins at depth, with a low sulfidation assemblage of cassiterite, wolframite, pyrite, arsenopyrite, bismuthinite and minor pyrrhotite (the main tin-tungsten ore stage), are overprinted at higher levels by an intermediate sulfidation epithermal assemblage of Ag-Pb-Sb sulfosalts (the main silver ore stage), with disseminated high sulfidation epithermal silver mineralization in the upper part of the system (a major silver resource).

These polymetallic deposits have been described as Bolivian Polymetallic Vein Deposits by the U.S. Geological Survey (Ludington et al., 1992). The characteristics of this type of deposit are as follows (Ludington et al., 1992; Redwood, 1993; Sillitoe et al., 1975):

1. **Lithological Control**. Paleozoic, Mesozoic and Cenozoic sedimentary rocks and metsediments;

2. **Structural Control**. Hinge zones of regional anticlines;

3. **Subvolcanic Intrusions**. Spatially and genetically related to stocks and volcanic rocks with 60-70 % SiO2, clusters of dikes and/or porphyritic domes of rhyolite, dacite, rhyodacite, or quartz latitite composition with alkaline tendencies. The mineralization can occur within the stocks and domes, in volcanic rocks (e.g., Porco, Caballo Blanco), or in sedimentary rocks distal to stocks (e.g., Bolivar) or inferred to be related to buried stocks (e.g., Huanuni);

4. **Style of Mineralization**. Parallel veins, veinlets, fracture swarms, breccias, and disseminations;

5. **Ore Minerals**. Pyrite, marcasite, pyrrhotite, sphalerite, galena, cassiterite, arsenopyrite, chalcopyrite, stibnite, stannite, teallite, tetrahedrite, tennantite, wolframite, bismuth, bismuthinite, argentite, gold, and Ag-Sb-sulphosalts (freibergite, andorite), Pb-Sb-sulfosalts (zinkenite, boulangerite, jamesonite), Pb-Sn-Sb-sulfosalts (franckeite, cylindrite), and Bi sulfosalts. Telescoping of intermediate sulphidation epithermal mineralization of Au, Ag, Pb, Sb, As, etc. on to higher temperature mesotherma, low sulphidation Sn-W mineralization is characteristic;

6. **Gangue Minerals**. Quartz, barite, and Mn carbonate. There is a transition upward from massive sulfides, to quartz, quartz-barite, and barite-chalcedony towards the upper parts of the deposits; and

7. **Hydrothermal Alteration**. Sericitic (sericite-quartz-pyrite) often with tourmaline in the central part and zoned outward to argillic and propylitic alteration. The upper zones have advanced argillic lithocaps with alunite, residual vuggy silica and silicification. Breccias are common.

9 EXPLORATION

No exploration has been carried out on behalf of Santacruz.

10 DRILLING

No drilling has been performed on behalf of Santacruz.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

No sampling has been performed on behalf of Santacruz.

12 DATA VERIFICATION

12.1 Verifications by the Authors of this Technical Report

The following details the data verification performed by the Qualified Persons for the completion of this Technical Report.

12.2 Geology and Resources

Garth Kirkham, P. Geo., visited the property between August 10 through August 13, 2021. The site visit included an inspection of the property, offices, underground operations, core storage facilities, and tours of major centres and surrounding villages most likely to be affected by any potential mining operation.

The tour of the property showed a clean, well-organized, professional environment. On-site staff led the author through the methods used at each stage of the resource estimation process. All methods and processes are up to industry standards and reflect best practices, and no issues were identified.

A visit to the underground operations showed that extensive, on-going mining operations.

Based on the site visit and an inspection of all aspects of the project, the author is confident that the data and results are valid, including all methods and procedures. It is the opinion of the independent author that all work, procedures, and results have adhered to best practices and industry standards required by NI 43-101. No duplicate samples were taken to verify assay results, but the author believes that the work is being performed by a well-respected, large, multi-national company that employs competent professionals that adhere to industry best practices and standards.

The core is accessible, and the core is stored in covered racks. However, going forward it is recommended that the company refurbish some of the core facilities. In addition, it would be recommended that the core be re-arranged for easier access and analysis along with creating a core map.

The author is confident that the data and results are valid based on the site visit and inspection of all aspects of the project, including methods and procedures used. It is the opinion of the independent author that all work, procedures, and results have adhered to best practices and industry standards required by NI 43-101. No duplicate samples were taken during the April 2015 site visit to verify assay results and the author was satisfied with the results from previous verification sampling. In addition, there were no limitations with respect to validating the physical data or computer-based data. The author is of the opinion that the work was being performed by a well-respected, large, multi-national company that employs competent professionals that adhere to industry best practices and standards.

12.3 Metallurgy

The metallurgical data used in this report is taken from operating information. The reconciled data was compared to the daily sampling data, which was used for this report, to check that the daily data is within a reasonable range compared to the reconciled data.

The reconciled data is based on the sale of concentrates to a smelter. The concentrates are weighed and sampled by a third party whose function is to act without bias to determine the metal received at the smelter in order to determine the correct payment for the concentrates.

12.4 Site Visit for Mining, Infrastructure and Environment & Permitting

The description of mining processes, methods and production rates used in this report is based on mine surface and underground visits to representative work areas on August 11, 2021, and production reports subsequently provided by Glencore. The author's analysis and reconciliation of the data shows that it accurately describes the operation at the time of the visit. Mine and plant Infrastructure, including tailing facilities and water treatment plants was also observed to be as described in provided information as described herein.

Technical software and methods are modern and professionally applied. The author is confident that the property is described accurately to the level of detail required for this stage of report.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

There is no metallurgical testing performed on behalf of Santacruz.

14 MINERAL RESOURCE ESTIMATE

There is no current mineral resource estimate performed on behalf of Santacruz.

15 MINERAL RESERVE ESTIMATE

There is no current mineral reserve estimate performed on behalf of Santacruz.

16 MINING METHODS

There are no current mining methods for the property.

17 PROCESS DESCRIPTION / RECOVERY METHODS

There are no current process description / recovery methods for the property.

18 PROJECT INFRASTRUCTURE AND SERVICES

There are no current project infrastructure and services for the property.

19 MARKET STUDIES AND CONTRACTS

There are no current market studies and contracts performed on behalf of the issuer.

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACTS

There are no current environmental studies, permitting and social or community impacts performed on behalf of Santacruz.

21 CAPITAL COST ESTIMATE

There is no current capital cost estimate performed on behalf of the issuer.

22 OPERATING COST ESTIMATE

There is no current operating cost estimate performed on behalf of the issuer.

23 ECONOMIC ANALYSIS

There is no current economic analysis performed on behalf of the issuer.

24 ADJACENT PROPERTIES

There are no adjacent properties.

25 OTHER RELEVANT DATA AND INFORMATION

Additional properties under Glencore management and ownership that contribute to the Glencore Bolivian metal production are Bolivar and Caballo Blanco. Resources for all these properties including Porco, which is the subject of this report, are tabulated in Table 25-1.

Table 25-1: Glencore Resource Estimates for Bolivian Properties

Property	Commodity	Resource			
		Measured	Indicated	Measured and Indicated	Inferred
Bolivar	Mineralized Material (MM tonnes)	1.4	1	2.4	5.4
	Zinc (%)	12.7	12.2	12.5	9
	Lead (%)	1.4	1.3	1.4	0.9
	Silver (g/t)	308	283	297	350
Porco	Mineralized Material (MM tonnes)	0.7	0.4	1.1	2.2
	Zinc (%)	10.7	10.9	10.8	11.8
	Lead (%)	0.6	0.8	0.7	0.8
	Silver (g/t)	83	114	93	98
Caballo Blanco	Mineralized Material (MM tonnes)	0.9	0.6	1.6	2.3
	Zinc (%)	13.7	13.1	13.5	12.2
	Lead (%)	3.7	3.2	3.5	2.4
	Silver (g/t)	364	318	346	241

Source: Glencore (2020)

Glencore's Resources & Reserves report as of December 31, 2020 disclosed Porco, Bolivar, Porco and Caballo Blanco mineral resource statements as well as mineral reserve estimates as of December 31, 2020, which remain current for Glencore as of the date hereof. As the mineral resource and mineral reserve estimates pre-date Santacruz's agreement to acquire the Assets, Santacruz is treating them as "historical estimates" under National Instrument 43-101 - Standards of Disclosure for Mineral Projects (NI 43-101), but they remain relevant as the most recent mineral resource and reserves estimates for Bolivar, Porco and Caballo Blanco. Given the source of the estimates, Santacruz considers them reliable and relevant for the further development of the Project; and accordingly, they should be relied upon only as a historical resource and reserve estimate of Glencore, which pre-dates Santacruz's agreement to acquire the assets, however, the company is not treating the historical estimates as current Mineral Resources or Mineral Reserves.

A “Qualified Person” as per NI 43-101 has not done sufficient work to classify the historical estimate as current Mineral Resources or Mineral Reserves and Santacruz is not treating the historical estimate as current Mineral Resources or Mineral Reserves. Further drilling and resource modelling would be required to upgrade or verify these historical estimates as current mineral resources or reserves for the respective assets.

The resources have been reported as of December 31, 2020 at a Zinc Equivalent (ZnEq) cut-off grade 2%:

1. The Mineral Resources have been calculated in accordance with definitions in accordance with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code), the 2016 edition of the South African Code for Reporting of Mineral Resources and Mineral Reserves (SAMREC) and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standards on Mineral Resources and Reserves (2014);

2. The ZnEq = (Zn% + (Pb% * 0.73) + (Ag g/t * 0.019290448));

3. The Mineral Resources have been calculated in accordance with definitions adopted by the Canadian Institute of Mining, Metallurgy and Petroleum. Employees of Glencore have prepared these calculations;

4. Mineral resources are not mineral reserves until they have demonstrated economic viability. Mineral resource estimates do not account for a resource’s mineability, selectivity, mining loss, or dilution;

5. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration;

6. All figures are rounded to reflect the relative accuracy of the estimate and therefore numbers may not appear to add precisely;

7. Reported in-situ Mineral Resources do not consider mineral availability by underground mining methods; and

8. Historical Mineral Reserves and Resources are inclusive of Mineral Reserves shown at 100% ownership.

26 INTERPRETATIONS AND CONCLUSIONS

The Porco mine has been active for nearly 500 years and is currently producing Zinc/Silver and Lead/Silver concentrates. The complex consists of an underground mine, concentrator plant, maintenance workshop, tailing storage facility, water treatment plant, supplies warehouse, main office, two hospitals and Yancaviri Camp.

On October 11, 2021, Santacruz entered into a definitive share purchase agreement (the "Definitive Agreement") with Glencore whereby Santacruz agreed to acquire a portfolio of Bolivian silver assets (the "Assets") from Glencore (the "Transaction"). The Assets include: (a) Glencore's 45% interest in the Bolivar Mine and the Porco Mine, held through an unincorporated joint venture between Glencore's wholly-owned subsidiary Sociedad Minera Illapa C.V. ("Illapa") and Corporación Minera de Bolivia ("COMIBOL"), a Bolivian state-owned entity; (b) a 100% interest in the Sinchi Wayra business, which includes the producing Caballo Blanco mining complex; (c) the Soracaya exploration project; and (d) the San Lucas ore sourcing and trading business. JDS Energy & Mining Inc. (JDS) was commissioned by Santacruz Silver Mining Ltd. (Santacruz) to prepare this Technical Report to support the disclosure of the acquisition for the Bolivar Project by Santacruz pursuant to the Transaction.

The mine is currently divided into three sections one section which mines remnants and extensions of existing veins by conventional methods and antiquated infrastructure, a second section which is separate and amenable to more modern techniques and trackless equipment, and a third in the upper levels which is mined by the Cooperatives by agreement. Glencore has embarked on a program of modernizing the mine taking advantage of advances in mining equipment and methods where possible:

- Safety is of paramount importance at the mine and concerns have been successfully addressed with the establishment of training programs, systems, and the incorporation of a safety culture into mine operations;

- Glencore production trends call for reduction of production rates at Porco. The mine is quite spread out and covers a large area relative to production rate. Thus, the mine has a very high fixed cost component due to support services and infrastructure;

- Illegal mining is an issue, and control of unauthorized personnel into the mine is a challenge for the owners. Unauthorized access and mining raise the potential for safety risks as well as impact to the resource itself, mine production and productivity;

- Planned future development mostly follows the current resource down dip which will not only incur higher haulage, ventilation, and water handling costs with depth, but considerable capital investment for development and shaft sinking. Full understanding and definition of the resource would help to better plan development, slow vertical decent, and get the most value from current development; and

- Historic processing at the Bolivar mill demonstrates the metallurgy of the material mined at Bolivar. The operational data is validated by the monthly reconciliation based on the concentrate shipped to the smelter and the final reconciliation between the smelter and the mine.

Many risks exist which are common to most mining projects including operating and capital cost escalation, permitting and environmental compliance, unforeseen schedule delays, changes in regulatory requirements, ability to raise financing and metal price. Many of these ever-present risks can be mitigated with adequate engineering, planning and pro-active management. The most significant risks to this project and its continued development are related socio-economic and geo-political factors:

- Areas surrounding and adjacent to Porco are being actively mined by mining cooperatives which are organized independent mining bodies. They are an influential population recognized by the government as a valid economic entity for local development and conduct their activities on separate claims, in abandoned mines, or granted areas adjacent to existing operations *(as is the case with Porco, where the upper levels of the mine are mined by cooperatives)*. They are an important group with which to work for good community stability, and rogue operators within this group can pose specific risks related to ownership and safety; and

- The Porco Mine, along with the other Glencore operations have established mechanisms for purchase and processing of mineralized material from these operations and have established strong mutually beneficial working relationships with many of the local mining Cooperatives. Currently an environment of good business and good community relations exists.

Current operation of the Porco Mine is subject to a joint venture agreement with the Bolivian government ("COMIBOL") which has been in effect since 2014. Continued operation under this agreement is reliant upon a stable political and socio-economic climate. Impacts of government instability are difficult to predict and preempt:

- Historic political instability in Bolivia has cost Glencore dearly in nationalized assets. The current JV structure with COMIBOL seems to be a reasonable response to minimize this risk, but not eliminate it completely.

27 RECOMMENDATIONS

The Porco complex has been in operation for centuries and continued operation under new ownership is expected to continue under similar operating parameters. Therefore, the recommended work program is focused on immediate validation and verification of the historic resource in compliance with NI 43-101, followed by or concurrent with, an operational focus on technical evaluation of production methods to identify areas to increase profitability.

The QPs recommend verification and delineation of the Historic Resource which is the subject of this report. Total cost of the program is estimated at US $ 147k (Table 27-1) and consists of:

- Review and revise resource classification criteria to insure NI 43-101 compliance; and
- Validate and verify the historic resource and complete a technical report in order that the resource be considered current and may be relied upon.

Table 27-1: 2022 Recommended Work Program and Budget

Description	#	Unit	$/Unit	Total $ (000's)
Data Compilation, Model Update including QA/QC	100	hrs	250	25
Validate and Verify Historic Resources	180	hrs	250	45
Review and Revise Resource Classification	80	hrs	250	20
Reporting	150	hrs	250	38
Sub total				**128**
Contingency	15	%		19
Total				**147**

As well, other potential areas of opportunity were observed by the QPs during the site visit and data analysis stages of this report. It is suggested that in addition to routine continuous improvement programs, project management consider focusing technical and production resources in the following areas:

- A detailed life of mine plan and economic evaluation based on the updated resource should be done to justify required capital investment for continued production. Reduction in the number of work areas may allow for profitable mining at lower production rates. Fixed costs resulting from support services and infrastructure could then be reduced;

- Good work is being done to identify and quantify specific stope dilution. Analysis and incorporation of findings into mining method selection, stope planning and mine operations is an opportunity to increase project value;

- Effective barriers to unauthorized mine entry, both physical and economic, especially into active mine areas must be established. For example, intensively exploiting fewer mineralized zones may further separate company mine production from that of the Cooperatives and illegal miners and prove effective in minimizing the impact of unauthorized mining on safety and production;

- Investigate opportunities to raise Process Plant throughput and reduce downtime to improve project economics; and

- Metallurgical testwork to investigate opportunities to increase recoveries through grinding, reagent dosage or newer flotation technologies.

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In Annex F (separate document), *the technical engineering report for the construction of Phase VI*

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29 UNITS OF MEASURE, ABBREVIATIONS AND ACRONYMS

Symbol / Abbreviation	Description
°	degree
°C	degrees Celsius
3D	three-dimensions
A	ampere
a	annum (year)
ac	acre
Acfm	actual cubic feet per minute
ACK	apparent coherent kimberlite
ALT	active layer thickness
ALT	active layer thickness
amsl	above mean sea level
AN	ammonium nitrate
ARD	acid rock drainage
Au	gold
AWR	all-weather road
B	billion
BD	bulk density
Bt	billion tonnes
BTU	British thermal unit
BV/h	bed volumes per hour
bya	billion years ago
C$	dollar (Canadian)
Ca	calcium
cfm	cubic feet per minute
CHP	combined heat and power plant
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
cm	centimetre
cm^2	square centimetre
cm^3	cubic centimetre
Cu	copper
d	day
d/a	days per year (annum)
d/wk	days per week

Symbol / Abbreviation	Description
dB	decibel
dBa	decibel adjusted
DGPS	differential global positioning system
DMS	dense media separation
dmt	dry metric ton
DWT	dead weight tonnes
EA	environmental assessment
EIS	environmental impact statement
ERD	explosives regulatory division
EWR	enhanced winter road
FEL	front-end loader
ft	foot
ft^2	square foot
ft^3	cubic foot
ft^3/s	cubic feet per second
g	gram
G&A	general and administrative
g/cm^3	grams per cubic metre
g/L	grams per litre
g/t	grams per tonne
h	hour
h/a	hours per year
h/d	hours per day
h/wk	hours per week
ha	hectare (10,000 m^2)
ha	hectare
HK	hypabyssal kimberlite
hp	horsepower
HPGR	high-pressure grinding rolls
HQ	drill core diameter of 63.5 mm
Hz	hertz
ICP-MS	inductively coupled plasma mass spectrometry
in	inch
in^2	square inch
in^3	cubic inch
IOL	Inuit owned land
IRR	internal rate of return

Symbol / Abbreviation	Description
JDS	JDS Energy & Mining Inc.
K	hydraulic conductivity
k	kilo (thousand)
kg	kilogram
kg	kilogram
kg/h	kilograms per hour
kg/m^2	kilograms per square metre
kg/m^3	kilograms per cubic metre
km	kilometre
km/h	kilometres per hour
km^2	square kilometre
kPa	kilopascal
kt	kilotonne
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
kWh	kilowatt hour
kWh/a	kilowatt hours per year
kWh/t	kilowatt hours per tonne
L	litre
L/min	litres per minute
L/s	litres per second
LDD	large-diameter drill
LG	low grade
LGM	last glacial maximum
LHD	load haul dump
LOM	life of mine
m	metre
M	million
m/min	metres per minute
m/s	metres per second
m^2	square metre
m^3	cubic metre
m^3/h	cubic metres per hour
m^3/s	cubic metres per second
Ma	million years
MAAT	mean annual air temperature

Symbol / Abbreviation	Description
MAE	mean annual evaporation
MAGT	mean annual ground temperature
mamsl	metres above mean sea level
masl	metres above sea level
MAP	mean annual precipitation
Mb/s	megabytes per second
mbgs	metres below ground surface
Mbm^3	million bank cubic metres
Mbm^3/a	million bank cubic metres per annum
MBP	melt-bearing pyroclasts
mbs	metres below surface
mbsl	metres below sea level
Mct	million carats
mg	milligram
mg/L	milligrams per litre
MIDA	microdiamond
min	minute (time)
mL	millilitre
mm	millimetre
Mm^3	million cubic metres
mo	month
MPa	megapascal
Mt	million metric tonnes
MVA	megavolt-ampere
MW	megawatt
NG	normal grade
Ni	nickel
NI 43-101	National Instrument 43-101
Nm^3/h	normal cubic metres per hour
NQ	drill core diameter of 47.6 mm
OP	open pit
OSA	overall slope angles
oz	troy ounce
Pa	Pascal
PAG	potentially acid generating
PEA	preliminary economic assessment
PFK	processed fine kimberlite

Symbol / Abbreviation	Description
PFS	preliminary feasibility study
ppm	parts per million
psi	pounds per square inch
QA/QC	quality assurance/quality control
QP	qualified person
RC	reverse circulation
RMR	rock mass rating
ROM	run of mine
rpm	revolutions per minute
RQD	rock quality designation
RVK	resedimented volcaniclastic kimberlite
s	second (time)
S.G.	specific gravity
Scfm	standard cubic feet per minute
SEDEX	sedimentary exhalative
SFD	size frequency distribution
SFD	size frequency distribution
SG	specific gravity
t	tonne (1,000 kg) (metric ton)
t	metric tonne
t/a	tonnes per year
t/d	tonnes per day
t/h	tonnes per hour
TCR	total core recovery
TMF	tailings management facility
tph	tonnes per hour
ts/hm^3	tonnes seconds per hour metre cubed
US$	dollar (American)
UTM	universal transverse mercator
V	volt
w/w	weight/weight
wk	week
wmt	wet metric ton
WRSF	waste rock storage facility
WRSF	waste rock storage facility

Scientific Notation	Number Equivalent
1.0E+00	1
1.0E+01	10
1.0E+02	100
1.0E+03	1,000
1.0E+04	10,000
1.0E+05	100,000
1.0E+06	1,000,000
1.0E+07	10,000,000
1.0E+09	1,000,000,000
1.0E+10	10,000,000,000

30 CERTIFICATES

CERTIFICATE OF QUALIFIED PERSON

WAYNE CORSO, P.E.

I, Wayne Corso, P.E., do hereby certify that:

1. This certificate applies to the Technical Report entitled "NI 43-101 Technical Report, Porco Project, Potosi, Bolivia", with an effective date of 21 December 2021, (the "Technical Report") prepared for Santacruz Silver Mining, Ltd.;

2. I am currently employed as Project Manager with JDS Energy & Mining Inc. with an office at Suite 900 – 999 West Hastings Street, Vancouver, British Columbia, V6C 2W2;

3. I am a graduate of the Colorado School of Mines. I have practiced my profession continuously since 1984. I have worked in technical, operations and management positions at mines in the United States and Canada. I have been an independent consultant for over thirteen years and have performed mine design, mine planning, cost estimation, operations & construction management, technical due diligence reviews and technical report writing for mining projects worldwide;
4. I am a Professional Mining Engineer (P.E. #58884) registered with the Arizona Board of Technical Registration. I am a member of the Society for Mining Metallurgy and Exploration;

5. I have read the definition of "qualified person" set out in National Instrument 43-101 and certify that by reason of education, experience, independence and affiliation with a professional association, I fulfil the requirements of a Qualified Person as defined in National Instrument 43-101;
6. I have visited the property on August 11, 2021;

7. I am responsible for Sections 1, 2, 3, 4, 5, 6.1, 6.2,12.4, 25, 26, 27, 28 and 29 of this Technical Report;

8. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101;

9. I have had no prior involvement with the property that is the subject of this Technical Report;

10. I am not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the Technical Report and that this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading; and

11. I have read National Instrument 43-101, Standards for Disclosure of Mineral Properties and Form 43-101F1. This technical report has been prepared in compliance with that instrument and form.

Effective Date: 21 December 2021
Signed Date: 21 December 2021

(Original signed and sealed) "Wayne Corso, P.E."

Wayne Corso, P.E.

CERTIFICATE OF AUTHOR

GARTH DAVID KIRKHAM, P.GEO.

I, Garth David Kirkham, P.Geo., do hereby certify that:

1. I am a consulting geoscientist and Principal of Kirkham Geosystems Ltd. since 1987 with an office at 6331 Palace Place, Burnaby, British Columbia;
2. This certificate applies to the Technical Report entitled "NI 43-101 Technical Report, Porco Project, Potosi, Bolivia", with an effective date of 21 December 2021, (the "Technical Report") prepared for Santacruz Silver Mining, Ltd.;
3. I am a graduate of the University of Alberta in 1983 with a B. Sc. I have continuously practiced my profession since 1988. I have authored many resource estimations and NI 43-101 technical reports including Cerro Blanco Epithermal Au-Ag, Cerro Las Minitas Ag-Zn-Pb-Au-Cu, Avino Ag-Zn-Pb and Debarwa, and Kutcho Creek poly-metallic deposits;
4. I am a member in good standing of the Engineers and Geoscientists of British Columbia;
5. I have visited the property on August 11, 2021;
6. In the independent report entitled "NI 43-101 Technical Report, Porco Project, Potosi, Bolivia" with effective date 21 December 2021, I am responsible for Sections for Sections 1, 6.5, 7, 8, 9, 10, 11, 12.1, 12.2, 25, 26, 27 and 28;
7. I have not had prior involvement with the company nor the property that is the subject of this Technical Report;
8. I am independent of Santacruz Silver Mining, Ltd. as defined in Section 1.5 of National Instrument 43-101;
9. I have read the definition of "qualified person" set out in National Instrument 43-101 and certify that by reason of education, experience, independence and affiliation with a professional association, I fulfil the requirements of a Qualified Person as defined in National Instrument 43-101;
10. I am not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the Technical Report and that this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading; and
11. I have read National Instrument 43-101, Standards for Disclosure of Mineral Properties and Form 43-101F1. This technical report has been prepared in compliance with that instrument and form.

Effective Date: 21 December 2021
Signed Date: 21 December 2021

(Original signed and sealed) "Garth Kirkham, P.Geo."

Garth Kirkham, P.Geo.
Kirkham Geosystems Ltd.

CERTIFICATE OF QUALIFIED PERSON

Shane Tad Crowie, P. ENG.

I, Shane Tad Crowie, P. Eng., do hereby certify that:

1. This certificate applies to the Technical Report entitled "NI 43-101 Technical Report, Porco Project, Potosi, Bolivia", with an effective date of 21 December 2021, (the "Technical Report") prepared for Santacruz Silver Mining, Ltd.;
2. I am currently employed as Sr. Metallurgist with JDS Energy & Mining Inc. with an office at Suite 900 – 999 West Hastings Street, Vancouver, British Columbia, V6C 2W2;
3. I am a graduate of the University of British Columbia with a B.A.Sc. in Mining and Mineral Process Engineering, 2001. I have practiced my profession continuously since 2001. I have worked in technical, operations and management positions at mines in Canada. I have been responsible for recovery optimization projects, capital improvement projects, budgeting, planning, and pilot plant operations;
4. I am a Registered Professional Mining Engineer in British Columbia (#34052);
5. I have read the definition of "qualified person" set out in National Instrument 43-101 and certify that by reason of education, experience, independence and affiliation with a professional association, I fulfil the requirements of a Qualified Person as defined in National Instrument 43-101;
6.
7. I have visited the property on August 11, 2021;
8. I am responsible for Sections 1, 6.3, 6.4, 12.3, 26, 27 and 28 of this Technical Report;
9. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the NI 43-101;
10. I have had no prior involvement with the property that is the subject of this Technical Report;
11. I am not aware of any material fact or material change with respect to the subject matter of the technical report that is not reflected in the Technical Report and that this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading; and
12. I have read National Instrument 43-101, Standards for Disclosure of Mineral Properties and Form 43-101F1. This technical report has been prepared in compliance with that instrument and form.

Effective Date: 21 December 2021
Signed Date: 21 December 2021

(Original signed and sealed) "Shane Tad Crowie, P. Eng."

Shane Tad Crowie, P. Eng.