Technical Report for the Joaquin Property, Santa Cruz, Argentina - Pre-feasibility Study

Effective date: November 30, 2017

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1 Summary

1.1 Introduction, property description, and ownership

This Technical Report refers to the Joaquin property (the "Property" or "Joaquin"), an advanced stage silver-gold project ("the Project") located in Santa Cruz province, Argentina. On February 10, 2017, Pan American Silver Corp. ("Pan American" or the "Company") acquired 100% of the Property from Coeur Mining Inc. ("Coeur"). The consideration for the acquisition was $25.0 million, comprised of $15.0 million in cash and $10.0 million of the Company's common shares valued as of January 13, 2017 (525,654 total common shares), plus a 2.0% net smelter return ("NSR") royalty on the Project.

This Technical Report has been prepared to disclose relevant information about the Property which has resulted from diamond drilling, mineral resource and mineral reserve estimates, and a pre-feasibility study of an underground silver-gold mine.

1.2 Geology and mineralization

The Property is located within the Deseado Massif geological province. Regional bedrock comprises ignimbrites and tuffs of the Chon Aike Formation, which hosts silver and gold mineralization on the Property within a northwest trending structure that dips 45° to the northeast and trends for 375 m, between 110 m and 310 m below surface. The majority of the mineralization is hosted within a silicified breccia. Silver is present as native silver, bromargyrite, and acanthite/argentite, with lesser stromeyerite, freibergite, and pyrargyrite/stephanite. The sulphide content is low and consists principally of pyrite and galena.

1.3 Status of exploration, development, and operations

In 2004, Mirasol Resources Ltd ("Mirasol"), which had a 100% interest in the Property, discovered mineralization in the Joaquin area, including the La Morocha, La Negra, Joaquin Main, and La Morena prospects. Coeur signed an option agreement with Mirasol in 2006 to earn an interest in the Project. Diamond drilling took place between 2007 and 2013, and Coeur disclosed the results of mineral resource estimates at the La Morocha and La Negra deposits in 2011, 2012, and 2013, using open pit mining and on-site agitated leach and heap leach processing assumptions. In 2012, Coeur acquired 100% ownership of the Property, but activity on the Property significantly decreased from 2014. There has been no production from the Property.

Following the acquisition of the Property in 2017, Pan American has undertaken diamond drilling, updated geological interpretations, mineral resource and mineral reserve estimates, and a pre-feasibility study for the La Morocha deposit disclosed in this Technical Report, which assumes underground mining and transport to and processing at Pan American's Manantial Espejo plant.

Additional potential exists at the La Negra deposit, where two steeply dipping trends of mineralization located 350 m apart along strike have been defined by wide spaced drilling, that is currently uneconomic by either open pit or underground methods, assuming transport to Manantial Espejo for processing. Pan American intends to continue infill drilling at the La Negra deposit to further assess its potential.

Based on the results of the pre-feasibility study, Pan American is proceeding with an approximately $37.8 million capital investment, excluding $3.6 million in recoverable value added tax ("VAT"), to construct an underground mine at La Morocha, with development of the underground access decline ramp scheduled to begin in the second quarter of 2018, with ore production occurring between late 2019 and the end of 2021.

Pan American holds the necessary environmental and operating permits for advanced exploration and the development of the mine portal and surface infrastructure including a camp near the portal. An explosives permit application and an environmental impact assessment ("EIA") and permit application for the operation of the Joaquin mine, including ore transport to Manantial Espejo for processing, are in preparation.

1.4 Mineral resource and mineral reserve estimates

Mineral resources for Joaquin effective November 30, 2017 are shown in Table 1.1. This tabulation includes in situ potentially economic indicated and inferred mineral resources, and constrained within diluted stope designs created using metal prices of $25.00 per ounce of silver and $1,400 per ounce of gold. There are no known mining, metallurgical, environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors or risks that could materially affect the potential development of the mineral resources. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

Table 1.1 Joaquin mineral resources effective November 30, 2017

Classification	Tonnes (t)	Ag ppm	Ag contained metal (Moz)	Au ppm	Au contained metal (koz)
Indicated	58,000	385	0.7	0.58	1.1
Inferred	6,000	389	0.1	1.29	0.2

Notes: Totals may not add up due to rounding. Mineral resource estimates were prepared under the supervision of or were reviewed by Christopher Emerson, FAusIMM, Vice President, Business Development and Geology of Pan American. Metal prices used for the mineral resource estimate were $25 per ounce of silver and $1,400 per ounce of gold. Mineral resources are in addition to mineral reserves. Mineral resources do not have demonstrated economic viability.

Mineral reserves for Joaquin effective November 30, 2017 are shown in Table 1.2. This tabulation includes in situ probable mineral reserves, and constrained within diluted stope designs created using metal prices of $18.50 per ounce of silver and $1,300 per ounce of gold. Mineral reserve estimates are based on assumptions that include mining, metallurgical, infrastructure, permitting, taxation, and economic parameters. Increasing costs and taxation and a fall in metal prices will have a negative impact on the estimation of mineral reserves. There are no known factors that may have a material impact on the mineral reserve estimate at Joaquin.

Table 1.2 Joaquin mineral reserves effective November 30, 2017

Classification	Tonnes (t)	Ag ppm	Ag contained metal (Moz)	Au ppm	Au contained metal (koz)
Probable	474,000	721	11.0	0.41	6.3

Notes: Totals may not add up due to rounding. Mineral reserve estimates were prepared under the supervision of or were reviewed by Martin Wafforn, P. Eng., Senior Vice President, Technical Services and Process Optimization of Pan American. Metal prices used for the mineral reserve estimate were $18.50 per ounce of silver and $1,300 per ounce of gold.

1.5 Mining

Mining will be undertaken using underground methods with ore hauled by diesel trucks from underground to surface stockpiles. The deposit dips from 40° to 45° and has widths of less than one metre up to 40 m. Three variants of underground cut and fill mining methods were selected to suit this geometry, including traditional cut and fill, drift and fill, and post pillar cut and fill, using mine development waste rock for backfill. Ore to be transported 145 km by road to the Manantial Espejo plant for processing is estimated to be 474,000 tonnes at 721 ppm Ag and 0.41 ppm Au. The life of mine is estimated at 43 months from development through to final mining of the

stopes, with site reclamation assumed to be completed in the final fifth year.

1.6 Infrastructure

Aside from a house and small office and accommodation facilities, no other infrastructure is yet in place. The planned surface infrastructure will include offices and workshops, two accommodation camps with capacity for 70 persons, change houses, warehouses, fuel and lubricant facilities, water and diesel tanks, surface electrical distribution, air compressors, explosive magazine, mine water settling ponds and piping, potable water and treatment plant, cemented backfill mixing area, surface ventilation fans, mine portal, run of mine ore stockpile, temporary mine waste rock storage facility, roads, surface grading and drainage, security gates and fencing, and satellite communication.

The ore from the underground mine will be stockpiled on the run of mine stockpile adjacent to the mine portal prior to trucking 145 km by road to Manantial Espejo. No other processing facilities will be present on site.

1.7 Mineral processing and recovery methods

Metallurgical test work has shown that the silver and gold in the La Morocha ore is recoverable by agitated cyanide leaching in tanks at the Manantial Espejo processing facilities. The metallurgical recovery of both gold and silver is estimated to average 81%, using 5 grams per litre of sodium cyanide and a retention time of 96 hours. An estimated mine production and ore transport rate of 600 tonnes per day ("tpd") is assumed during peak operations. The ore treatment rate is expected to be 2,160 tpd on a campaign basis of approximately 9 days per month. The life of mine recovered production is estimated at 8.9 million ounces of silver and 5,100 ounces of gold, over a 28 month period.

1.8 Costs and economic analyses

Over the life of mine, the estimated capital cost is $41.4 million, excluding Project acquisition costs. A $3.6 million component of the total is recoverable VAT payments that are paid using capital funds prior to the commencement of production. There is no estimated capital required for treating the Joaquin ore at the Manantial Espejo processing facilities. Sustaining capital is estimated at $0.7 million.

The total life of mine operating cost is estimated to be $96.2 million, which equates to $203 per tonne of ore mined, including all ore mining, haulage, and processing costs. The total life of mine operating cost of ore transport from the Property to the processing facilities at Manantial Espejo is estimated at $18.9 million, which equates to $39.9 per tonne of ore. The processing operating cost is estimated at $48.1 per tonne.

Excluding the purchase price, the estimated life of mine cash flow of the Project is $14.1 million. The Project payback is estimated to occur at the end of February 2021, 18 months after construction completion. The base case economic estimate for La Morocha is an after-tax net present value ("NPV") of $9.1 million, using a 5% discount rate, with an after-tax internal rate of return ("IRR") of 18%, at assumed metal prices of $18.50 per ounce of silver and $1,300 per ounce of gold. The development of the Joaquin mine is a low risk project that enhances the value of the Manantial Espejo processing facilities and infrastructure assets. The ore from La Morocha will supplement ore feed from the underground mine and stockpiles at Manantial Espejo, as well as the feed from Pan American's COSE project located 180 km to the northwest of Manantial Espejo. The combined production from these sources are expected to contribute approximately 21 million ounces of silver to Pan American's consolidated silver production over the 2018 to 2021 time period.

1.9 Environmental, social, and community impact

The Project is located more than 100 km from the closest community, Gobernador Gregores, and environmental baseline studies have been completed to Argentine and international standards. Those studies show that the areas potentially impacted by the mining project are relatively small in scale and hold environmental values that are well represented throughout the region. Work completed to date on the Property includes exploration diamond drilling, surface sampling, and the construction of camp facilities. There are no known significant environmental or social liabilities on or related to the site. There are no known environmental or social issues that could materially impact the Project's ability to extract the mineral reserves.

1.10 Conclusions and recommendations

Pan American intends to continue infill drilling at the La Negra deposit to further assess its potential.

The sample preparation, analytical, and security procedures followed for the samples are sufficient and reliable for the purposes of the mineral resource and mineral reserve estimates and the pre-feasibility study. For future drilling programs, increasing the submission frequency of blanks and field duplicates to 4% is recommended.

Additional bottle roll optimization and thickening tests for solid-liquid separation using new drillhole samples are recommended at an estimated cost of $100,000, which is included in the current capital cost estimate.

To refine the mining method and ground support allocations assumed for the pre-feasibility study, Pan American intends to conduct additional geotechnical studies as the underground development advances, at an estimated cost of $50,000, which is included in the current capital cost estimate. Also included in the capital cost estimate is an allowance of $270,000 for recommended underground grade control drilling.

Based on the results of the pre-feasibility study disclosed in this Technical Report, Pan American is proceeding with an approximately $37.8 million capital investment, excluding $3.6 million in recoverable VAT, to construct an underground mine at La Morocha, with development of the underground access decline ramp scheduled to begin in the second quarter of 2018, and with ore production occurring between late 2019 and the end of 2021.

2 Introduction

This Technical Report has been prepared by and for Pan American in compliance with the disclosure requirements of Canadian National Instrument 43-101 ("NI 43-101"), to disclose relevant information about the Joaquin Property. This information has resulted from mineral resource and mineral reserve estimates and a pre-feasibility study of an underground silver-gold mine at the Property.

The drillhole data cut-off date for the geological interpretation was November 2, 2017. The economic analysis to determine the appropriate parameters for reporting mineral resources and mineral reserves was complete by November 30, 2017. The effective date of this Technical Report is November 30, 2017. No new material information has become available between these dates and the signature date given on the certificate of the qualified persons ("Qualified Persons").

Pan American is a silver mining and exploration company listed on the Toronto and NASDAQ stock exchanges under the ticker "PAAS".

Unless otherwise stated, information, data, and illustrations contained in this report or used in its preparation have been prepared by Pan American for the purpose of this Technical Report. This Technical Report was prepared by Martin Wafforn, P. Eng., Senior Vice President, Technical Services and Process Optimization for Pan American, Christopher Emerson, FAusIMM, Vice President, Business Development and Geology for Pan American, and Americo Delgado, P. Eng., Director, Metallurgy for Pan American. Messrs. Wafforn, Emerson, and Delgado are Qualified Persons as defined by NI 43-101 and are not independent of Pan American. The responsibilities of each co-author are provided in Table 2.1.

Mr. Wafforn visited the Property on July 7, 2016 and February 26, 2017. During these visits, Mr. Wafforn reviewed the site layout and logistics for mining and processing, travelled the roads between the Project and the Manantial Espejo processing facility, reviewed selected diamond drill core to correlate his observations with the geotechnical engineer's report of expected ground conditions, discussed the local environmental conditions with the on site personnel, reviewed potential portal access locations, and reviewed the existing infrastructure for additional requirements. Mr. Wafforn visited the Manantial Espejo processing facility most recently on February 27, 2017 and October 17, 2017.

Mr. Emerson visited the Property on February 26, 2017 and September 5, 2017. During these visits, Mr. Emerson reviewed the exploration drilling, sampling, and sample security protocols, drill core and the core cutting and storage facilities, surface mapping, cross sections, mining leases, site access, and surface rights information. Mr. Emerson visited the Manantial Espejo processing facility from April 7 to 9, 2016, October 10 and 11, 2016, February 26 and 27, 2017, September 6, 2017, and October 17, 2017.

Mr. Delgado has not visited the Property as processing will not take place there. Mr. Delgado visited the processing facilities at Manantial Espejo from March 27 to 30, 2012. During his visit, Mr. Delgado reviewed the metallurgy, processing facilities, the flowsheet, processing parameters, and production results with the operation's personnel. There have been only minor changes to the flowsheet since 2012.

Table 2.1 Responsibilities of each Qualified Person

Qualified Person	Company	Responsible for sections
Martin Wafforn, P. Eng. Senior Vice President, Technical Services and Process Optimization	Pan American	1: Summary; 2: Introduction; 3: Reliance on Other Experts; 4: Property Description and Location; 5: Accessibility, Climate, Local Resources, Infrastructure and Physiography; 12: Data Verification; 15: Mineral Reserve Estimates; 16: Mining Methods; 19: Market Studies and Contracts; 20: Environmental Studies, Permitting and Social or Community Impact; 21: Capital and Operating Costs; 22: Economic Analysis; 24: Other relevant data and information; 25: Interpretation and Conclusions; 26: Recommendations; 27: References
Christopher Emerson, FAusIMM, Vice President, Business Development and Geology	Pan American	1: Summary; 2 :Introduction; 6: History; 7: Geological Setting and Mineralization; 8: Deposit Types, 9: Exploration; 10: Drilling; 11: Sample Preparation, Analyses and Security; 12: Data Verification: 14: Mineral Resource Estimates; 23: Adjacent Properties; 25: Interpretation and Conclusions; 26: Recommendations
Americo Delgado, P. Eng., Director, Metallurgy	Pan American	1: Summary; 2: Introduction; 12: Data Verification; 13:Mineral Processing and Metallurgical Testing; 17: Recovery Methods; 18: Project Infrastructure; 21: Capital and Operating Costs; 25: Interpretation and Conclusions; 26: Recommendations

Unless otherwise stated, all units are metric and currencies are expressed in United States dollars. Project data coordinates are a local coordinate based on a transformation relative to the Gauss Kruger Projection and Campo Inchauspe Faja 2 datum coordinate system.

3 Reliance on other experts

The Qualified Persons responsible for this Technical Report have not relied on the reports, opinions, and statements of other experts for the preparation of this Technical Report.

4 Property description and location

4.1 Location, issuer's interest, mineral tenure, and surface rights

Joaquin is located in Santa Cruz Province, approximately 100 km northeast of the town of Gobernador Gregores, at 49°03' South, 69°35' West. Pan American is the 100% owner of the Property through its wholly owned subsidiary, Minera Joaquin S. R. L.. A map of the Property location is shown in Figure 4.1.

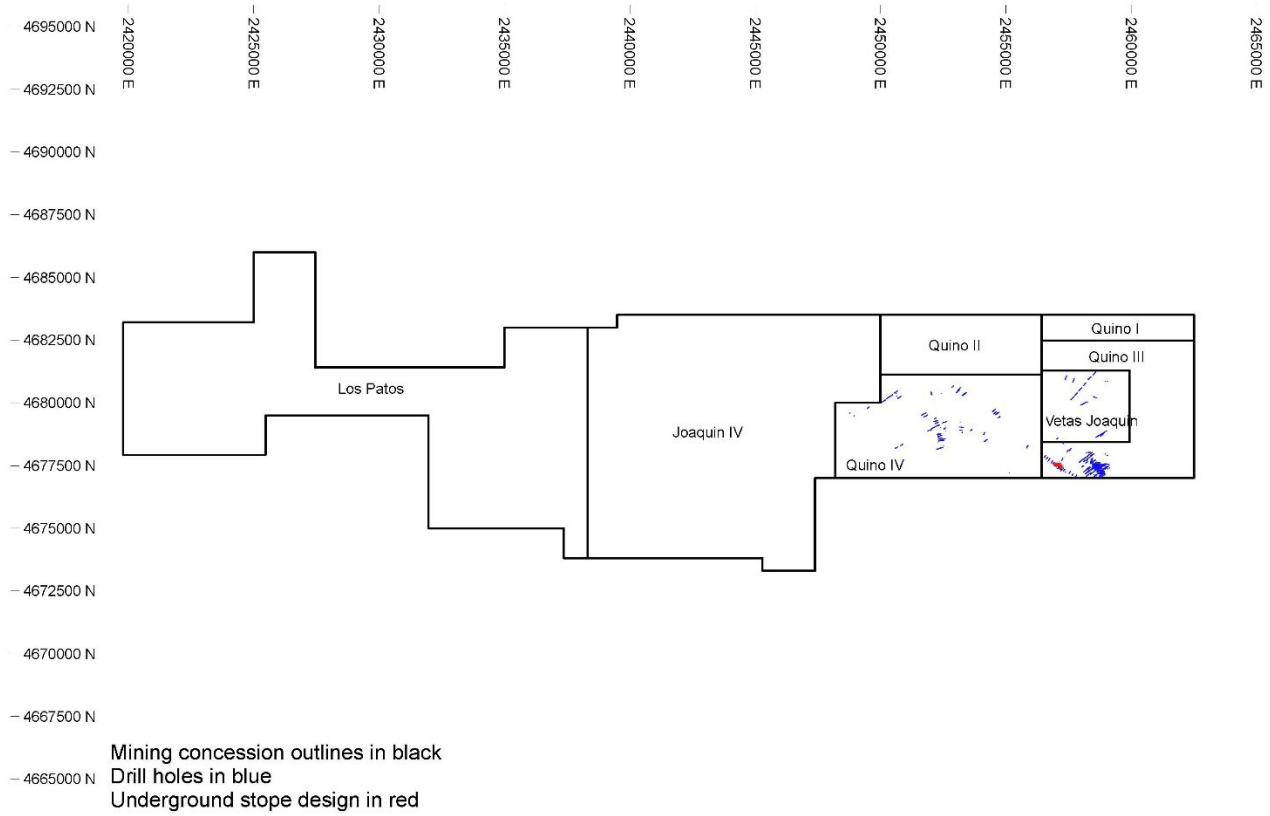
Figure 4.1 Property location map (Google Maps)

The Property mineral rights are held under seven contiguous concessions with a total area of 28,660 hectares covering the entire mineral resource and mineral reserve, and proposed underground mine and surface infrastructure. Pan American has acquired responsibility for the annual payments required to maintain the concessions and has agreements in place granting it surface rights and access to the Property, and to Pan American's knowledge, all obligations required for the conduct of activities at the Property are currently in good standing. Details of the concessions are shown in Table 4.1. A plan prepared by Pan American of the mining concessions relative to the drillholes and proposed underground workings is shown in Figure 4.2.

Table 4.1 Mining concession details

Claim name	Claim number	Claim type	Area (ha)
Los Patos	429.352/Coeur/09	Cateo	9,998
Joaquin IV	409.391/Mirasol/06	Cateo	9,993
Vetas Joaquin	409.303/Mirasol/06	MD	997
Quino I	413.854/Mirasol/06	MD	627
Quino II	413.855/Mirasol/06	MD	1,532
Quino III	400.272/Mirasol/07	MD	2,322
Quino IV	403.093/Mirasol/07	MD	3,191
Total			28,660

Figure 4.2 Mining concession plan



4.2 Royalties, back-in rights, payments, agreements, and encumbrances

As part of the Property purchase agreement, Pan American granted Coeur an NSR royalty of 2.0% on silver and gold production. Duties and royalties payable to the government include a Santa Cruz Provincial Royalty of 3% on margin offset by a 2.5% silver doré export credit. There are no other known back-in rights, payments, agreements, or encumbrances in place.

4.3 Environmental liabilities

Work completed to date on the Property includes exploration diamond drilling, surface sampling, and the construction of camp facilities. There are no known significant environmental liabilities on or related to the site. There are no known environmental or social issues that could materially impact the Project's ability to extract the mineral resources.

The surface disturbance and reclamation liabilities are addressed under Pan American's project reclamation and closure plan, which is discussed in Section 20.

4.4 Permits

Pan American holds the necessary environmental and operating permits for advanced exploration and the development of the mine portal and associated surface infrastructure including a camp near the portal. An explosives permit application and an EIA and permit application for the operation of the Joaquin mine, including ore transport to Manantial Espejo for processing, are in preparation.

4.5 Significant factors and risks

There are no known significant factors or risks that may affect access, title, or the right or ability to conduct mining and exploration at the Property.

5 Accessibility, climate, local resources, infrastructure, and physiography

5.1 Physiography and climate

The topography at the Property is formed by low hills and isolated plateaus vegetated with shrubs and grasses, at elevations between 860 m and 980 m above sea level. Average monthly minimum and maximum temperatures vary from -3°C and 6°C in winter to 9°C and 20°C in summer. Annual precipitation averages around 300 mm, including frequent snowfall between June and September. Winds greater than 40 km per hour occur year round but are typically strongest during spring and summer. Mining and exploration work may be carried out year round.

5.2 Accessibility, local resources, population centres, and transport

The Property is accessed from Provincial Route 25, either from Gobernador Gregores 40 km to the east or from Puerto San Julian 170 km to the west, and then via Provincial Route 12 leading north for 120 km to the Las Vallas estancia. From Las Vallas, the Project and camp are accessed by a local road leading west for 15 km. All of the roads are gravel. Commercial air services are available in El Calafate, Argentina, approximately 330 km to the southwest of Gobernador Gregores.

Gobernador Gregores is a town of 7,000 with few local experienced mine workers. The majority of the 120 person workforce is expected to be sourced from Manantial Espejo and other regions of Argentina.

5.3 Surface rights

Pan American has agreements in place granting it surface rights and access to the Property that provide sufficient access to the mining concessions.

5.4 Power and water

Power will be supplied to the underground mine from two diesel powered generators located on the surface. Water for development of the underground mine will be sourced from a spring and wells nearby that have been authorized for exploration drilling use. During the latter part of the ramp construction and the mine operation, water is expected to be supplemented by recycled mine dewatering.

5.5 Infrastructure

The planned surface infrastructure will include offices and workshops, two accommodation camps with capacity for 70 persons, change houses, warehouses, fuel and lubricant facilities, water and diesel tanks, surface electrical distribution, air compressors, explosive magazine, mine water settling ponds and piping, potable water and treatment plant, cemented backfill mixing area, surface ventilation fans, mine portal, run of mine ore stockpile, temporary mine waste rock storage facility, roads, surface grading and drainage, security gates and fencing, and satellite communication.

The ore from the underground mine will be stockpiled on the run of mine stockpile adjacent to the mine portal prior to trucking 145 km by road to Manantial Espejo. No other processing facilities will be present on site.

6 History

Mirasol, which had a 100% interest in the Property, discovered mineralization in the Joaquin area, including the La Morocha, La Negra, Joaquin Main, and La Morena prospects, during an evaluation of regional targets in 2004. Following reconnaissance work and sampling of the prospects in 2005, Mirasol and Coeur signed an agreement for the Project in November 2006, granting Coeur an option to earn up to a 71% managing interest in a joint venture, subject to certain conditions. The first diamond drilling programs on the Property began in late 2007 and continued annually until 2013. Coeur disclosed the results of mineral resource estimates at the La Morocha and La Negra deposits in 2011, 2012, and 2013, utilizing the additional drilling information available each year, using open pit mining and on-site agitated leach and heap leach processing assumptions. Additionally, Coeur carried out geological mapping, surface sampling, geophysical surveys, spectral studies, and metallurgical studies. On December 21, 2012, Coeur acquired 100% ownership of the Property through the acquisition of Mirasol's remaining 49% interest in the Property. Coeur's activity on the Property significantly decreased from 2014. On February 10, 2017, Pan American acquired 100% of the Property from Coeur. The consideration for the acquisition was $25.0 million, comprised of $15.0 million in cash and $10.0 million of the Company's common shares valued as of January 13, 2017 (525,654 total common shares), plus a 2.0% net smelter return royalty on the Project.

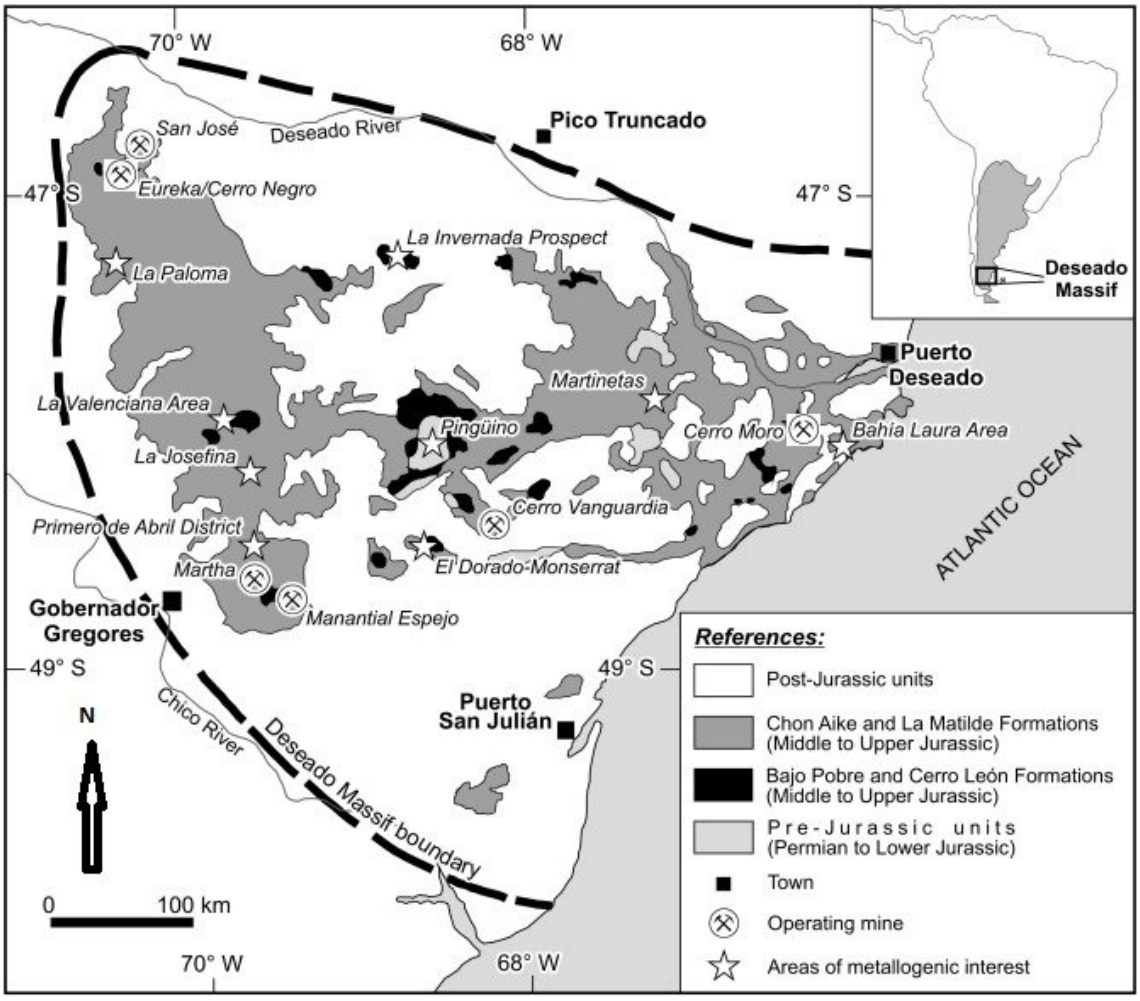
There has been no production from the Property.

7 Geological setting and mineralization

7.1 Regional geology

The Property is located within the Deseado Massif geological province in northern Santa Cruz. The regional setting of the Deseado Massif (Páez, et.al., 2010) is shown in Figure 7.1. Regional bedrock within the Property comprises a thick sequence of andesitic to rhyolitic ignimbrites and tuffs of the middle to late Jurassic aged Chon Aike Formation, with lesser flows and intrusions.

Figure 7.1 Regional geological setting plan (Páez, et al., 2010)



7.2 Local and Property geology

Within the Property, the Jurassic volcanic suite is comprised dominantly of the Bahia Laura Volcanic Complex. Widespread epithermal mineralization is hosted within the Chon Aike and La Matilde Formation volcanic suites. The geological terrane is characterized by the Jurassic volcanic rocks partially covered by Cretaceous volcaniclastic sediments, and by later Tertiary to Quaternary plateau basalts and fluvial-glacial sedimentary cover.

Northwest-southeast striking extensional faults active during the period of Jurassic volcanism formed grabens, half-grabens, and horst blocks. Since the Jurassic, the rocks have been cut by normal faulting. The Jurassic rocks have undergone only minor subsequent deformation and remain relatively flat to gently dipping, except on a local scale proximal to faults and sub-volcanic intrusions.

At the Property, the Chon Aike rocks comprise ignimbrite flows and locally interbedded tuffs covered by Tertiary plateau basalts. Mineralization is hosted in northwest trending structures that are vertically and left laterally displaced by north trending structures.

7.3 Mineralization

Silver and gold mineralization is hosted within a northwest trending structure that dips approximately 45° to the northeast. The majority of the mineralization is hosted within a silicified breccia, with lesser stockworks and veinlets. Silver is present as native silver, bromargyrite, and acanthite/argentite, with lesser stromeyerite, freibergite, and pyrargyrite/stephanite. The sulphide content is low and consists principally of pyrite and galena. Hematite, jarosite, and manganese oxides are commonly noted. The host minerals are dominated by quartz and feldspar. Hydrothermal alteration is weak to moderate and comprises fine grained replacement quartz and widespread illite and kaolinite alteration.

Mineralization within the economic mine plan is located between approximately 110 m and 310 m below surface and trends for 375 m along strike.

8 Deposit types

Exploration in the Property area was focussed principally on the discovery and delineation of low sulphidation, silver-gold epithermal mineralization of the type well documented throughout the Deseado Massif. Mineralization at Joaquin is classified as low sulphidation hydrothermal breccia.

9 Exploration

The first geological reconnaissance and geochemical sampling at the Project was undertaken by Mirasol during 2005 and 2006. Following the agreement between Coeur and Mirasol, exploration was undertaken in the form of geological mapping, rock chip geochemical sampling, ground and aerial geophysical surveys, clay studies, mineralogical studies (including thin and polished sections, X-ray diffraction tests, and quantitative evaluation of minerals by scanning electron microscopy), and diamond drilling. This work resulted in the identification of the La Morocha, La Negra, Joaquin Main, Joaquin Norte, and La Morena prospects within the Quino III, Quino IV, and Vetas Joaquin concessions. A program of geological mapping at 1:20,000 scale, ASTER alteration mapping, and structural interpretation was carried out over these prospects, as well as geological mapping and rock chip geochemical sampling over the majority of the concessions.

Three ground magnetic surveys undertaken in 2009 by Akubra S.A. of Mendoza, Argentina, showed a clear magnetic response at La Morocha and a low magnetic response at La Negra. In 2010, an airborne magnetic survey covering 3,420 line km over the Project area, in north-south lines spaced every 200 m, was carried out by Geodatos Limitada of Mendoza, Argentina, which produced magnetic lineaments over La Morocha and La Negra.

On the basis of the diamond drilling programs, Coeur disclosed the results of mineral resource estimates on the La Morocha and La Negra deposits in 2011, 2012, and 2013, using open pit mining and on-site agitated leach and heap leach processing assumptions. Coeur's activity on the Property significantly decreased from 2014. These estimates have been superseded by Pan American's drilling, updated geological interpretations, and mineral resource and mineral reserve estimates for the La Morocha deposit disclosed in this Technical Report, which assumes underground mining and transport to Manantial Espejo for processing.

Additional potential exists at the La Negra deposit, where two steeply dipping trends of mineralization located 350 m apart along strike have been defined by wide spaced drilling (60 m along strike) but is currently uneconomic by either open pit or underground methods, assuming transport to Manantial Espejo for processing. The northern zone is 170 m long and 20 m in depth, and defined by 16 drillhole intersections with average downhole widths of 5.2 m and average grades of 1,497 ppm Ag and 0.45 ppm Au. The southern zone is 300 m long and 125 m in depth, and defined by 24 drillhole intersections with average downhole intersection widths of 2.0 m and average grades of 454 ppm Ag and 1.06 ppm Au. Pan American intends to continue infill drilling along strike and down dip at the La Negra deposit to further assess its potential.

None of the sample assay data collected from the surface sampling campaigns has been used in the current mineral resource and mineral reserve estimates.

10 Drilling

10.1 Drilling summary

Diamond drilling on the Property was completed by Coeur with a program of 54,811 m in 348 holes between 2007 and 2013 and by Pan American with a program of 6,996 m in 51 holes during 2017. Pan American's drilling included 39 holes for 6,479.4 m at La Morocha and 12 holes at La Negra for 517 metres. Drillhole spacing at La Morocha is 25 m along strike and between 30 m and 60 m down dip. At La Negra, drillhole spacing is 60 m along strike. A summary of the drillholes by prospect is given in Table 10.1. Plans showing the location of the drillholes relative to the mineralized zones at La Morocha and La Negra are given in Figure 10.1.

Table 10.1 Drillhole summary

Prospect	Hole count	Hole metres
La Morocha	125	20,368
La Negra	198	28,297
La Morena	43	7,581
Other	36	5,578
Total	402	61,824

10.2 Drilling methods

All of Coeur's drilling was undertaken by Adviser Drilling Foraco (as of 2010, formerly Adviser Drilling) of Santiago, Chile, using HQ diameter diamond drillholes. All holes were surveyed down hole using a Reflex instrument. Approximately 20 of the earlier holes were surveyed on average every 30 m down hole, but the majority of the drillholes were surveyed every 6 m.

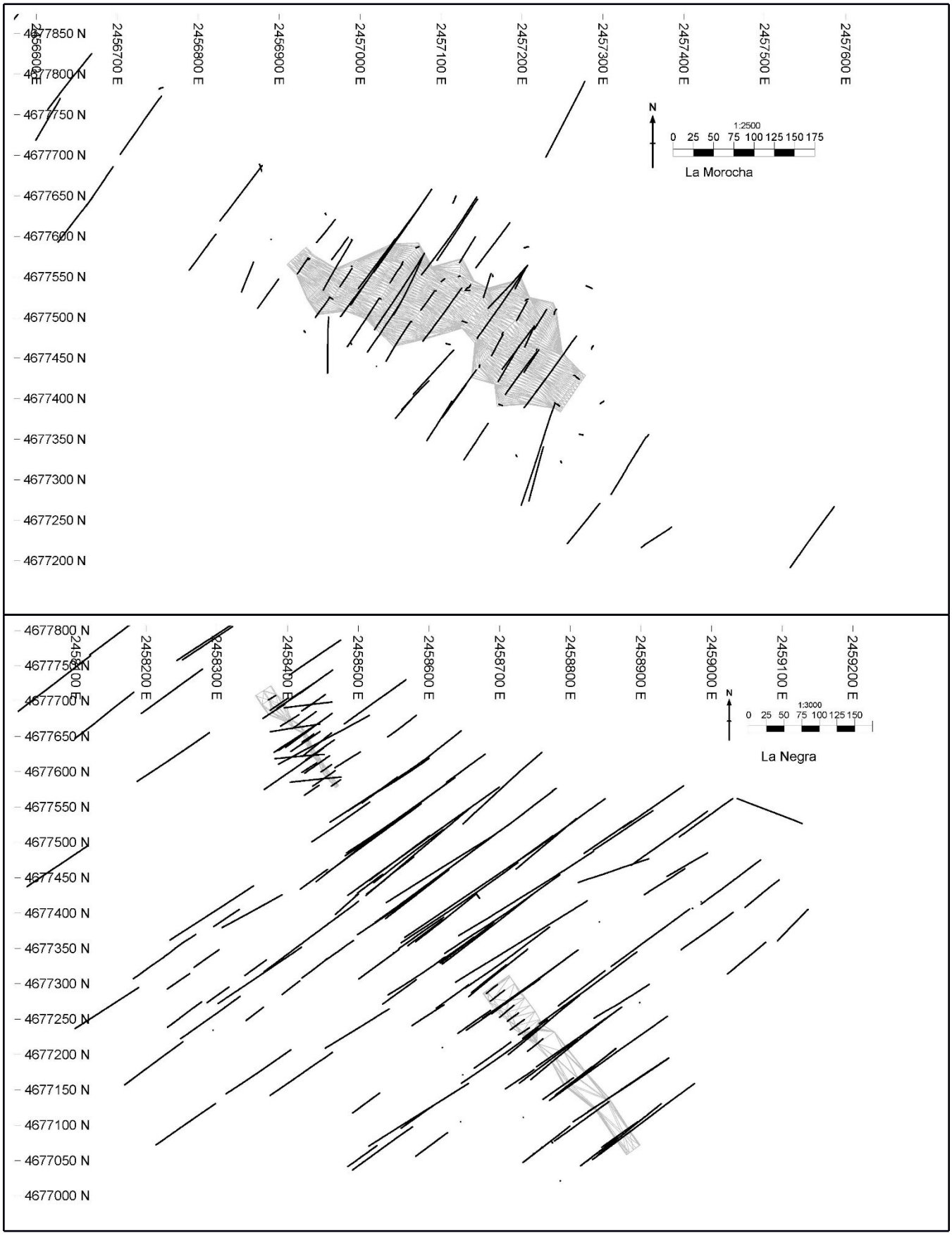
Pan American's drilling was undertaken by MD Perforaciones of Puerto San Julián in Santa Cruz, Argentina, utilizing two Sandvik DE 710 diamond drill rigs and HQ sized drill rods. Downhole surveys were taken every 6 m downhole utilizing a Reflex EZ-TRAC instrument.

Drillhole collars were marked after drilling with PVC tubing and the locations were surveyed by a professional independent surveyor using GPS methods.

10.3 Material impact on the accuracy and reliability of drilling results

There are no known drilling, sampling, or recovery factors that could materially impact the reliability of the drilling results.

Figure 10.1 Drillhole location plan



11 Sample preparation, analyses, and security

11.1 On-site sample preparation and security

All drill core on the Property was placed in boxes, delivered to the core shed, marked for downhole metre intervals, geologically logged, and photographed prior to splitting with a diamond saw for sampling by Coeur or Pan American geologists. Half of the drill core was placed in numbered plastic bags with a sample tag and stapled shut with a second sample tag on the outside of the bag. The second half of the drill core remains in the box for reference or further test work. Samples are transported to the laboratory using a third party commercial transportation company. The sample chain of custody follows standard industry practice.

11.2 Laboratory sample preparation and analytical methods

Coeur used Alex Stewart International "(Alex Stewart") laboratories in Mendoza, Argentina, as the primary laboratory from 2007 until the end of 2009, with another approximately 1,100 samples assayed at ALS Chemex ("ALS") in Lima, Peru. The laboratory was then switched to ALS, with sample preparation in Mendoza, Argentina and geochemical analysis in La Serena, Chile. Both laboratories are certified IS09001 and each served as the umpire laboratory when the other laboratory served as the primary laboratory. The samples were dried if necessary, then crushed in a jaw crusher, riffle split to obtain a 300 gram subsample, and pulverized to 75 microns. All samples were assayed for silver and gold using fire assay with gravimetric finish, using a 50 gram charge at Alex Stewart and a 30 gram charge at ALS.

Pan American used Alex Stewart laboratories in Mendoza, Argentina. The samples were dried, crushed to 80% passing #10 mesh, riffle split to obtain a 600 gram sub-sample, then pulverized to 95% passing #140 mesh. Samples were assayed for silver and gold using fire assay with atomic absorption finish with a 50 gram charge.

11.3 Quality assurance and quality control

Quality control measures implemented during Coeur's drilling programs included the submission of blanks, certified standards, and duplicate samples dispatched with the drill samples. The submission rates to the primary laboratory were 4% blanks, 4% certified standards, and 8% duplicates obtained from four pulp splits from two splits of the crushed second half of drill core. Additionally, 5% coarse reject duplicates, and 6% pulp duplicates were sent to the umpire laboratory.

Coeur inserted blanks approximately every 25 samples. Prior to 2011, blank sample material was sourced from local barren material at Coeur's Cerro Bayo mine in Chile, and from 2011 onwards, commercial pulp blanks were used. 276 blanks were submitted to Alex Stewart, with two failures for silver and one for gold. 1,313 blanks were submitted to ALS with no failures. The results of blank samples show no evidence of significant sample contamination.

Until the end of 2009, Coeur used standards prepared in-house at Coeur's Mina Martha and Cerro Bayo laboratories, and then switched to commercial standards. Relative to grades in the economic mine plan, the expected value of the standards vary over a range of silver grades while the expected gold values are either much lower or higher, and are therefore not appropriate for measuring the accuracy of gold grades. The results of the silver standards analyzed by Alex Stewart are slightly above the expected value for the commercial standards and slightly below expected values for in-house standards. The silver standards assayed by ALS were slightly lower than the expected values. For gold, the standards analyzed by Alex Stewart were generally poor, usually the expected result of standard grades near the detection limit, while the standards analysed by ALS had low differences.

The precision of duplicate silver grades of Coeur's coarse reject and pulp samples is reasonable, while the precision of silver field duplicate assays is poor, reflecting the inherent variability of sample grades. Insufficient samples with

grades above the detection limit of gold are present to make an assessment of gold precision.

In 2010, Coeur's umpire laboratory checks revealed gold contamination issues at the ALS Lima, Peru laboratory, resulting in Coeur changing the laboratory to ALS La Serena, Chile. Coeur had ALS re-assay 400 samples, with silver values performing well and within acceptable error limits, and so were kept in the database. It is not clear whether the gold samples were excluded from the dataset.

Pan American submitted 4% certified standards, consisting of one low grade and one high grade standard prepared by OREAS in Victoria, Australia and one low grade and one high grade standard prepared by SGS in Lima, Peru. The results of the standards prepared by OREAS show acceptable results with a consistently high bias for silver for both the high and low grade standard. The results of the standards prepared by SGS show acceptable results for both the high grade and low grade standard, with a generally low bias for silver and gold for the low grade standard and a consistently low bias for gold and silver for the high grade standard. Blanks comprising either barren quartz or rhyolite were submitted at a frequency of 3% with no failures. Field duplicates comprising the second half of the drill core were submitted at a frequency of 2% with good silver precision and reasonable gold precision.

11.4 Bulk density

Coeur measured the bulk density of 317 lacquer sealed drill core samples at Coeur's Mina Martha laboratory, using the weight in air, weight in water method, and at Alex Stewart using gas pycnometer. Pan American measured the bulk density of 339 lacquer sealed drill core samples using the weight in air, weight in water method, to obtain a full suite of spatially and geologically representative density measurements.

11.5 Material impact on the accuracy and reliability of sample data

The Qualified Person responsible for this section of the Technical Report is of the opinion that the preparation, analytical, and security procedures followed for the samples are sufficient and reliable for the purpose of the mineral resource and mineral reserve estimates. A recommendation is made to increase the submission frequency of Pan American's blanks and field duplicates to 4%.

12 Data verification

12.1 Geology data reviews

Geological data verification reviews included regional, local, and property geology, lithostratigraphy, structure, alteration, and mineralization types by reviewing mapping, core logs, and relogging existing drillholes. The results of all exploration work by Coeur and Pan American were reviewed, as well as diamond drilling methods, downhole surveys, drillhole collar coordinates, sampling, analyses, and QAQC data.

12.2 Mine engineering data reviews

Mine engineering data reviews included geotechnical and hydrological studies, waste disposal requirements, environmental and community factors, the development of the life of mine plan including production and recovery rates, capital and operating costs for the mine and processing facilities, transportation, logistics, power and water requirements, taxation and royalties, and the parameters and assumptions used in the economic model.

In the opinion of the Qualified Person, the data, assumptions, and parameters used to estimate mineral resource and mineral reserve estimates forming the basis of the pre-feasibility study disclosed in this Technical Report are sufficiently reliable for those purposes.

12.3 Metallurgy data reviews

Metallurgy data reviews were made of the test work conducted by Coeur, including cyanidation leaching, flotation, and sulphuric acid leaching followed by cyanide leaching, performed at SGS in Santiago, Chile (“SGS Chile”) and McClelland Laboratories in Reno, Nevada. The processing parameters and production results at the Manantial Espejo processing facility are also reviewed.

In the opinion of the Qualified Person, the data and assumptions used to estimate the metallurgical recovery model for the mineral resource and mineral reserve estimates forming the basis of the pre-feasibility study disclosed in this Technical Report are sufficiently reliable for those purposes.

12.4 Data adequacy

It is the opinion of the Qualified Persons responsible for the preparation of this Technical Report that the data used to support the conclusions presented here are adequate for the purposes of the mineral resource and reserve estimates, and the results of the pre-feasibility study disclosed in this Technical Report.

13 Mineral processing and metallurgical testing

13.1 Metallurgical test work

Between 2009 and early 2011, Coeur had eight metallurgical tests of cyanide leaching, flotation, and sulphuric acid leaching followed by cyanide leaching performed by SGS Chile on three samples from the La Morocha deposit. The results showed silver recoveries between 12% and 74% for cyanide leaching, 97% for rougher flotation, and between 9% and 88% for sulphuric acid leaching followed by cyanide leaching. Gold recoveries ranged from 81% to 94% for all three methods. The sample head grades, sample descriptions, and test conditions for these tests are unknown.

In 2012, Coeur had cyanide leaching and flotation tests performed by SGS Chile on five samples from La Morocha and La Negra. The cyanide leaching included bottle roll tests with particle size and cyanide concentration optimization. Bottle roll tests at a grind size of 75 microns show that a composite sample described as low grade oxide at 64 ppm Ag had a silver recovery of 52%, a composite described as oxide-sulphide at 70 ppm Ag had a silver recovery of 86%**,** and a composite described as average grade at 160 ppm Ag had a silver recovery of 82%. Gold recoveries at similar composite grades of 0.15 ppm Au ranged from 87% to 91%. Silver recovery increased with decreasing grind size from 80% passing 150 microns to 80% passing 106 microns, however, no major recovery improvement was observed at decreasing grind sizes at 106, 75, and 53 microns. Silver recovery is similar at a range of cyanide concentrations, but increases slightly at higher concentrations.

During 2013, Coeur had a more comprehensive bench scale testing program conducted on 56 sample composites from 876 drill core intervals at McClelland Laboratories in Reno, Nevada. The composites were ground to 80% passing 75 microns and bottle roll tests were conducted at 40% weight percent solids, 2 grams per litre sodium cyanide, and leached for 96 hours. The silver recovery results showed that low grade oxide composites averaged 21%, average grade oxide composites averaged 44%, low grade mixed oxide-sulphide composites averaged 44%, high grade oxide composites averaged 65%, average grade mixed oxide-sulphide composites averaged 71%, and high grade mixed oxide-sulphide composites averaged 81%.

In 2017, Pan American selected seven composites from the 2013 program for further optimization and mineral processing test work at McClelland Laboratories, including particle size and cyanide concentration optimization, ball Bond Work Index, SMC testing (a version of the JK Drop Weight Test for characterizing semi-autogenous grinding ("SAG") milling conditions), and thickening testing. The composite grades ranged from 241 ppm Ag to 2,520 ppm Ag, 0.07 ppm Au to 1.58 ppm Au, 258 ppm Cu to 2,910 ppm Au, and 315 ppm Mn to 28,400 ppm Mn.

Bottle roll optimization tests were run at 155 hour retention time and 45% solids. The results at 107 microns at 2.2 grams per litre sodium cyanide averaged 84% recovery for silver and 71% recovery for gold. At 63 microns at 2.2 grams per litre sodium cyanide, silver recovery averaged 84% and gold recovery averaged 78%. At 106 microns at 5.0 grams per litre sodium cyanide, silver recovery averaged 87% and gold recovery averaged 85% on six available samples tested of the seven original samples. At 63 microns, at 3.6 grams per litre sodium cyanide, silver recovery averaged 87% and gold recovery averaged 80% on six available samples tested of the seven original samples, while at 5.0 grams per litre sodium cyanide, silver recovery increased to 93% and gold recovery increased slightly to 81% on five available samples tested of the seven original samples. The results showed some sensitivity to cyanide concentration and only slight sensitivity to particle size. Kinetic curves show that maximum silver recoveries were achieved after 80 hours of leaching. Cyanide consumption increased with increasing composite copper grade, and no correlation was noted between composite manganese grade and silver recovery. All of the composites retested in 2017 at the optimized conditions showed improved silver recovery, with the exception of a sample with a lower head grade.

The comminution testing indicates that the ball Bond Work Index average is 14.1 kilowatt hours per tonne, ranging from 10.3 to 17.9, which is softer than the Manantial Espejo ore, which averages 17.6 kilowatt hours per tonne and ranges from 15.3 to 19.1. The SMC test results confirm the characteristics of the La Morocha ore.

13.2 Recovery model

The metallurgical samples used for the recovery model are composites made from drillhole intervals selected in 2012, and are representative of the ore in terms of oxidation, depth, copper and manganese values, and are located within or near the stopes to be mined. Silver recoveries were reviewed according to sample composite grade and spatial location, which showed a correlation between silver recovery and silver grade. The recovery model for silver is a logarithmic correlation between silver recovery and silver grade. At the average silver grade of the ore in the mine plan, the average silver recovery is estimated at 81%. The gold recovery model is the average gold recovery of the tests conducted in 2017, also estimated at 81%.

13.3 Material issues and deleterious elements

There are no known material issues or deleterious elements that could have a significant effect on the economic extraction of the Joaquin ore. The copper content of the ore is estimated between 160 ppm and 2,500 ppm, with an average of 786 ppm, and has a direct correlation with sodium cyanide consumption. The additional estimated cyanide consumption has been considered in the estimated ore processing costs.

13.4 Conclusions

Metallurgical test work has shown that the silver and gold in the La Morocha ore is recoverable by agitated cyanide leaching in tanks at the Manantial Espejo processing facilities. The metallurgical recovery of both gold and silver is estimated at 81%, using 5 grams per litre of sodium cyanide and a retention time of 96 hours.

13.5 Recommendations

Additional bottle roll optimization test work and thickening tests for solid-liquid separation using new drillhole samples are recommended at an estimated cost of 100,000.

14 Mineral resource estimates

14.1 Disclosure

The drillhole data cut-off date for the geological interpretation was November 2, 2017 and the effective date of the mineral resource estimate is November 30, 2017. No new material information has become available between November 30, 2017 and the signature date given on the certificates of the Qualified Persons. Mineral resources were prepared by Pan American staff under the supervision of and reviewed by Christopher Emerson, FAusIMM, Vice President, Business Development and Geology of Pan American Silver, who is a Qualified Person as that term is defined by NI 43-101.

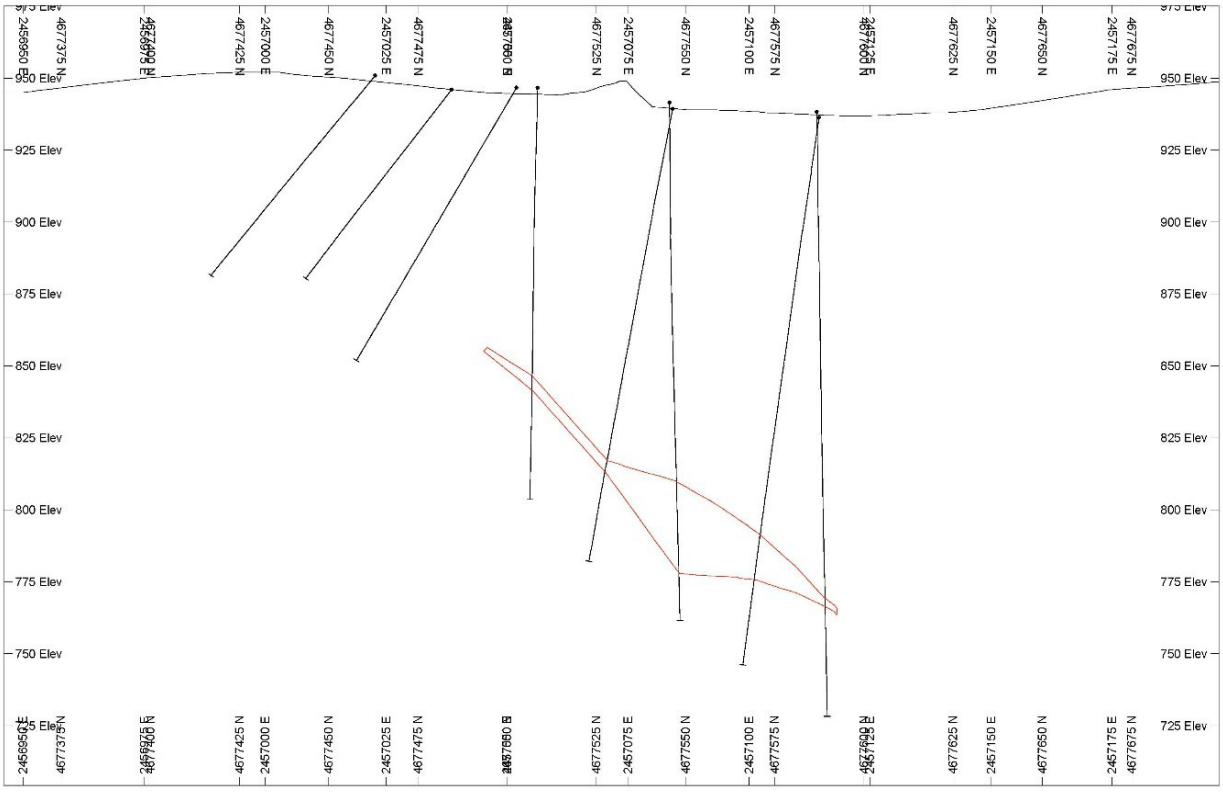
There are no known environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the potential development of the mineral resources. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

14.2 Available data, preparation, and validation

The available drillhole data comprising collar coordinates, downhole survey information, silver and gold assays, and codes for lithology, structural features, alteration, mineralization, and oxidation were imported into Datamine format and desurveyed into three dimensional drillhole traces, and then validated.

A typical cross section indicating the relative orientation and spacing of drillholes is shown in Figure 14.1.

Figure 14.1 Cross section showing mineralization interpretation and drillholes



14.3 Geological interpretation and modelling

Three dimensional interpretations were made of the drillhole geology and oxidation codes and used to code the block model, and three dimensional mineralization interpretations were made around a spatially continuous trend of samples with grades greater than 260 ppm Ag. The mineralized zone lies within a structural trend cross cutting the stratigraphy, located between 75 m and 120 m below the surface.

14.4 Geostatistics

The mineralized zone is intersected by 56 drillholes. All samples were composited to 2 m intervals to ensure equal weighting of grades during the grade estimate. Mean composited grades within the mineralized zone are 783 ppm Ag and 0.59 ppm Au. The coefficient of variation is relatively high at 2.4 for silver and 2.5 for gold.

Top cuts of extreme gold and silver grades were reviewed with respect to the log histogram, gold and silver scatter plots, and the spatial location of the extreme grades relative to neighbouring grades. Mean composite grades after top cuts were 765 ppm Ag and 0.54 ppm Au.

14.5 Variograms, grade interpolation, and block model

Experimental variograms aligned parallel to the dip and strike of mineralization were calculated for both the mineralized domain and the surrounding waste domain and applied to the ordinary kriging estimate. Two sample searches were applied using a minimum of eight and a maximum of 18 composites. The majority of the estimate was made within the first and second searches, using between 12 and 18 composites within distances of 50 m. Bulk density was estimated using a nearest neighbour method of density measurements of spatially and geologically representative drillhole core.

A block size of 12.5 m X × 12.5 m Y × 12.5 m Z was chosen with respect to the average drillhole spacing in the mineralization interpretation, using sub-cells to obtain a better volumetric fit within the wireframe.

14.6 Estimation validation and confidence classification

The estimate was validated by comparing global declustered mean composite grades with mean estimated grades, and by comparing local composite grade trends with estimated grade trends on slice plots and cross sections. These reviews show the estimated grades reasonably reflect the variability of the composite grades.

The estimate was classified into spatially continuous indicated and inferred categories by preparing three dimensional interpretation wireframes around the drillhole patterns and coding the estimate for classification category with the wireframes. Indicated mineral resources were assigned over the majority of the estimated volumes where drillhole centres are on average 25 m apart, surrounded by a small amount of inferred mineral resources where the spacing is wider than 25 m. The mineralization interpretation has minimal projection beyond data points.

14.7 Planned dilution and loss

A 3.5 m minimum mining width was assumed, and 0.7 m of dilution was applied to the hangingwall and 0.3 m of dilution was applied to the footwall of the mineralized zones, using the estimated grade of the waste material. No mining recovery was considered for the estimation of mineral resources.

14.8 Value estimates and mining constraints

For mineral resources, an NSR value was applied to each block based on grade, metallurgical recovery, mineral resource metal prices, and estimated costs. Potentially mineable stope shapes were generated around the diluted mineralized zones based on geometrical, geotechnical, and economic NSR cut-off value constraints. Metal prices used for the mineral resource estimate were $25 per ounce of silver and $1,400 per ounce of gold. The estimated metallurgical recovery and economic parameters are shown in Table 22.2, and the estimated cost parameters are shown in Table 21.2.

14.9 Mineral resource tabulation

Mineral resources for Joaquin effective November 30, 2017 are shown in Table 14.1. This tabulation includes in situ potentially economic mineral resources classified as indicated and inferred, and constrained within diluted stope designs created using metal prices of $25.00 per ounce of silver and $1,400 per ounce of gold. There are no known mining, metallurgical, environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors or risks that could materially affect the potential development of the mineral resources. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

Table 14.1 Joaquin mineral resources effective November 30, 2017

Classification	Tonnes (t)	Ag ppm	Ag contained metal (Moz)	Au ppm	Au contained metal (koz)
Indicated	58,000	385	0.7	0.58	1.1
Inferred	6,000	389	0.1	1.29	0.2

Notes: Totals may not add up due to rounding. Mineral resource estimates were prepared under the supervision of or were reviewed by Christopher Emerson, FAusIMM, Vice President, Business Development and Geology of Pan American. Metal prices used for the mineral resource estimate were $25 per ounce of silver and $1,400 per ounce of gold. Mineral resources are in addition to mineral reserves. Mineral resources do not have demonstrated economic viability.

15 Mineral reserve estimates

15.1 Disclosure

The effective date of the mineral reserve estimate is November 30, 2017. No new material information has become available between November 30, 2017 and the signature date given on the certificates of the Qualified Persons.

Mineral reserves were prepared by Pan American staff under the supervision of and reviewed by Martin Wafforn, P.Eng., Senior Vice President, Technical Services and Process Optimization of Pan American Silver, who is a Qualified Person as that term is defined by NI 43-101.

Mineral reserve estimates are based on assumptions that include mining, metallurgical, infrastructure, permitting, taxation, and economic parameters. Increasing costs and taxation and lower metal prices will have a negative impact on the quantity of estimated mineral reserves. There are no other known factors that may have a material impact on the mineral reserve estimate at Joaquin.

15.2 Planned dilution and loss

Planned dilution and loss was considered as described in section 14.7.

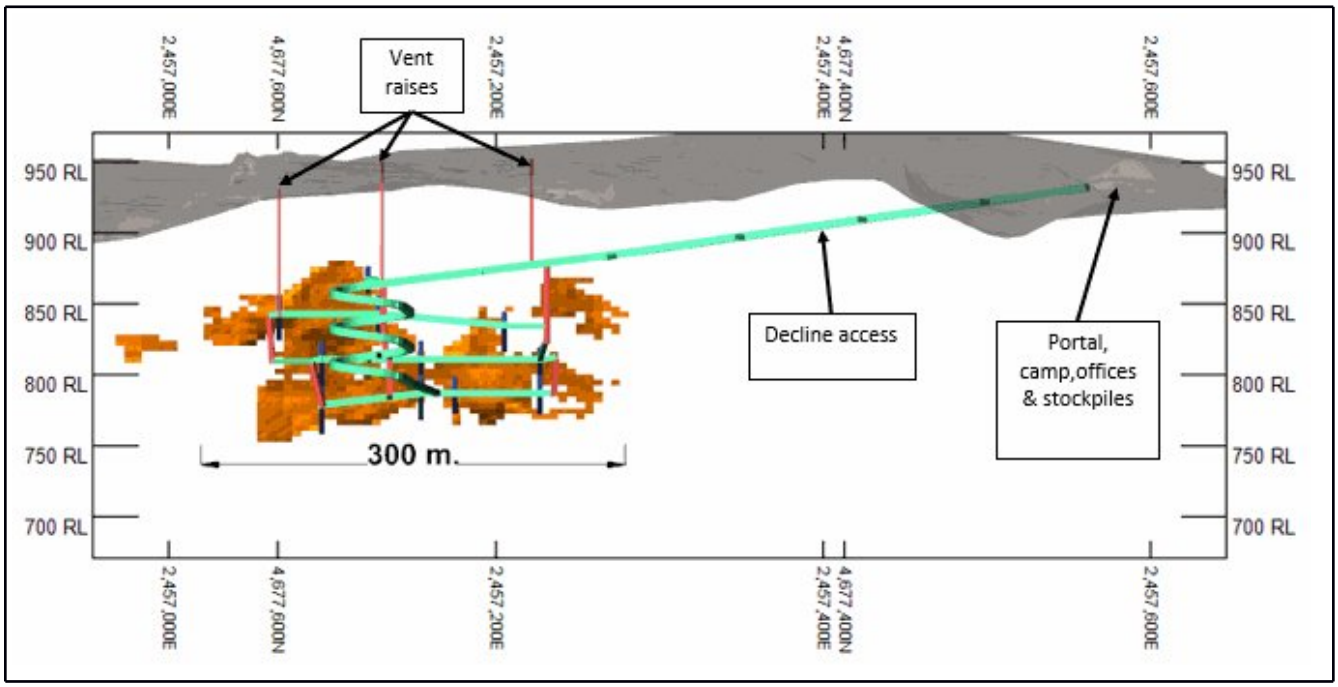
15.3 Value estimates and mining constraints

For mineral reserves, an NSR value was applied to each block based on grade, metallurgical recovery, mineral reserve metal prices, and estimated costs. The estimated metallurgical recovery and economic parameters are shown in Table 22.2 and the estimated cost parameters are shown in Table 21.2.

For the stope designs, a 3.5 m minimum mining width was assumed, and 0.7 m of dilution was applied to the hangingwall and 0.3 m was applied to the footwall of the mineralized zones, using the estimated grade of the waste material. Mining recovery of 81% was assumed to account for expected losses during mining in areas using post pillar cut and fill, to account for the 4 m by 4 m permanent pillars required for support. In the areas where drift and fill mining will take place, a mining recovery of 95% was assumed, and where cut and fill mining will take place, a mining recovery of 91% was assumed.

Stope designs were created around the diluted mineralized zones based on geometrical, geotechnical, and economic NSR cut-off value constraints. The inventory within these stopes was further refined to exclude material in pillars, in spatial outliers, within poor geometric stope shapes, and any other unmineable stopes. An oblique view of the underground development and stopes is shown in Figure 15.1.

Figure 15.1 Underground design oblique view towards hangingwall



15.4 Mineral reserve tabulation

Mineral reserves for Joaquin effective November 30, 2017 are shown in Table 15.1. This tabulation includes in situ mineral reserves classified as probable, and constrained within diluted stope designs created using metal prices of $18.50 per ounce of silver and $1,300 per ounce of gold.

Mineral reserve estimates are based on assumptions that include mining, metallurgical, infrastructure, permitting, taxation, and economic parameters. Increasing costs and taxation and a fall in metal prices will have a negative impact on the estimation of mineral reserves. There are no known factors that may have a material impact on the mineral reserve estimate at Joaquin.

Table 15.1 Joaquin mineral reserves effective November 30, 2017

Classification	Tonnes (t)	Ag ppm	Ag contained metal (Moz)	Au ppm	Au contained metal (koz)
Probable	474,000	721	11.0	0.41	6.3
Notes: Totals may not add up due to rounding. Mineral reserve estimates were prepared under the supervision of or were reviewed by Martin Wafforn, P. Eng., Senior Vice President, Technical Services and Process Optimization of Pan American. Metal prices used for the mineral reserve estimate were $18.50 per ounce of silver and $1,300 per ounce of gold.					

16 Mining methods

16.1 Mining methods

Mining will be undertaken using underground methods with ore hauled by diesel trucks from underground to surface stockpiles. The deposit dips from 40° to 45° and has widths of less than one metre up to 40 m. Three variants of underground cut and fill mining methods were selected to suit this geometry, including traditional cut and fill, drift and fill, and post pillar cut and fill, using the entire inventory of life of mine development waste rock for backfill. All mining is scheduled as a bottom up sequence to avoid leaving sill pillars and to maximize ore recovery.

Cut and fill mining will be utilized where the deposit is narrow and dips relatively steeper, to extract 16% of the total recovered stope inventory. A 3.5 m minimum mining width and 4.0 m height was applied, and mining recovery is estimated at 91%.

Drift and fill mining will be used where the deposit has shallower dips and is too wide for standard cut and fill mining, extracting 37% of the total recovered stope inventory. Drifts will be 5 m wide and 4 m high and will require cemented rock fill, batched either on surface or underground in stockpiles adjacent to the fill areas, to enable wider sections to be mined with a higher recovery, estimated at 95%.

Post pillar cut and fill mining with rooms 6 m wide and 4 m high will be used in the widest portions of the deposit, extracting 47% of the total recovered stope inventory. Mining recovery of 81% was assumed primarily to account for the loss of the 4 m by 4 m permanent pillars required for support.

A summary of the physicals developed from the life of mine ("LOM") plan is shown in Table 16.1.

Table 16.1 Underground life of mine mining physicals summary

Item	Units	2018	2019	2020	2021	LOM
Stope ore	kt		53	219	202	474
Lateral and ramp development	m	785	2,693	1,334	1,420	6,233
Vertical development	m	141	343			484

16.2 Geotechnical and hydrogeological parameters

Golder Associates of Lake Oswego, Oregon, USA, reviewed geological logs, rock quality descriptor ("RQD") logs, and core photographs, which indicate variable geotechnical conditions, particularly in the hangingwall, to make their recommendations for the selected mining methods (Golder, 2017).

Ground support for stoping is dependent on the stope spans and the duration of openings prior to backfilling. Decline development, intersections, and development open for the longer term will be supported by combinations of chemical anchor bolts and face plates, mesh, and Swellex type bolts, depending on the encountered ground conditions. Shotcrete will be applied in isolated areas of poor ground conditions and for permanent infrastructure. Cable bolts may be used in large spans and intersections where necessary. A ground control management plan will be developed to provide a set of standard ground support procedures for each typical geotechnical domain.

Operational experience in the region indicates that high water flows are generally not encountered and that ground water is not problematic. Annual rain and snowfall is relatively low in the region. No detailed information on the surface and underground hydrological conditions is currently available, and further studies will be undertaken prior to production to assess the best water management practices. Moderate underground water inflows are assumed and managed with a network of sumps, settling dams, and pumps.

16.3 Production rates and expected mine life

An underground mine schedule based on the underground mine plan has a life of mine of five years including development and site reclamation. A three month increase up to a final production rate of 600 tpd was assumed with production scheduled to commence in the final quarter of 2019. The schedule is based on producing 474,000 tonnes of ore over a 28 month period.

16.4 Mining fleet, equipment, and services

The planned fleet of diesel powered mobile equipment includes 1 S1D Jumbo face drilling rig, two 282 Boomer face drilling rigs, two Boltec S bolting machines, four MT2010 20 tonne capacity underground mine trucks, and four ST1030 scoop trams, as well as a grader, wheel loader, integrated tool carrier, scissor lift, light vehicles, fuel and water truck, ambulance, and maintenance vehicles. These models are similar to those utilized at the Manantial Espejo and COSE underground mines, which enables synergies between the three operations due to common spare parts, shared maintenance skills and tooling, and swapping of operators and equipment to maximize utilization at the Projects.

Standard mine services will be installed as mine development progresses, including compressed air, service water, electrical, communication, pump lines, and ventilation ducting. Hydrocarbon and water storage facilities, water treatment and waste disposal facilities, air compressors, and power distribution facilities will be located on surface.

The mine will be ventilated with a primary circuit using the ramp as the main fresh air intake and a central fresh air raise to link the surface to the main crosscuts on each level. Two return air raises will be established at the end of each level to provide primary ventilation to the main levels. Secondary ventilation will be provided by ventilation fans and ducting.

Refuge chambers will be installed at key locations through the mine as development and stoping proceeds. A stench gas system will be incorporated into the ventilation system to provide emergency evacuation warning.

16.5 Recommendations

To refine the mining method and ground support allocations presented in this Technical Report, Pan American intends to conduct additional geotechnical studies as the underground development advances, at an estimated cost of $50,000, which is included in the current capital cost estimate. Also included in the capital cost estimate is an allowance of $270,000 for recommended underground grade control diamond drilling.

17 Recovery methods

17.1 Flow sheet

As test results have shown that the Joaquin mineralization is amenable to cyanidation, the ore will be trucked to Manantial Espejo and processed at the existing cyanide leach plant on a campaign basis. The mined ore from Joaquin will be stockpiled on a pad at Manantial Espejo and fed with a front-end loader onto a vibratory feeder into the primary crusher. The primary crusher ore will be stored in the covered bin and withdrawn at a rate of approximately 2,160 tpd and ground in a combined SAG mill primary grinding circuit and a ball mill secondary grinding circuit.

The SAG mill operates in closed circuit with a single deck vibrating screen. A split of the SAG mill discharge screen undersize is pumped to the regrind circuit and the rest of the undersize is combined with the ball mill discharge. The screen oversize material will be transported by two conveyors to the pebble crushing system and the product returned to the SAG mill. The ball mill discharge combined with the rest of the SAG mill discharge screen undersize will be pumped to two hydro-cyclones with the oversize returned to the ball mill and the undersize feeding to the leaching circuit. The regrind circuit consists of a ball mill in a closed circuit with one hydrocylone. The product of the regrind circuit is leached in the concentrate leach circuit consisting of three 942 m^3 leach tanks.

The cyclone overflow as well as product from the concentrate leach circuit will feed the high rate pre-leach thickener ahead of conventional leaching. The thickener underflow will be cyanide leached in a series of five 2,263 m^3 leach tanks and the overflow will be stored in the process water tank where the solution is distributed to the grinding circuit as make up water.

Following leaching, the material will pass through a four stage counter current decantation process and then through a thickener. The thickened material will then pass through the neutralization plant comprising a 220 m^3 tank where SO_2 and air will be added. The neutralized tails will be pumped to the tailings storage facility. The pregnant leach solution from the counter current decantation thickeners containing the dissolved silver and gold will be pumped to the Merrill-Crowe plant where the solution will be clarified in two 1.82 m × 3.5 m filter clarifiers. The clarified solution will be de-aerated in a vacuum tower before the addition of zinc dust to trigger the precipitation of the silver and gold. The precipitate will be pressed in two 1.2 m × 1.2 m filter presses and dried in a retort. The dry precipitate will be mixed with borax, nitrate, fluorite, and soda ash and then melted in an induction furnace to form doré bars.

17.2 Treatment rate

The treatment rate is expected to be approximately 2,160 tonnes per day, on a campaign basis of approximately 9 days per month. Material will be leached at 45% solids and the retention time is expected to total 87 hours.

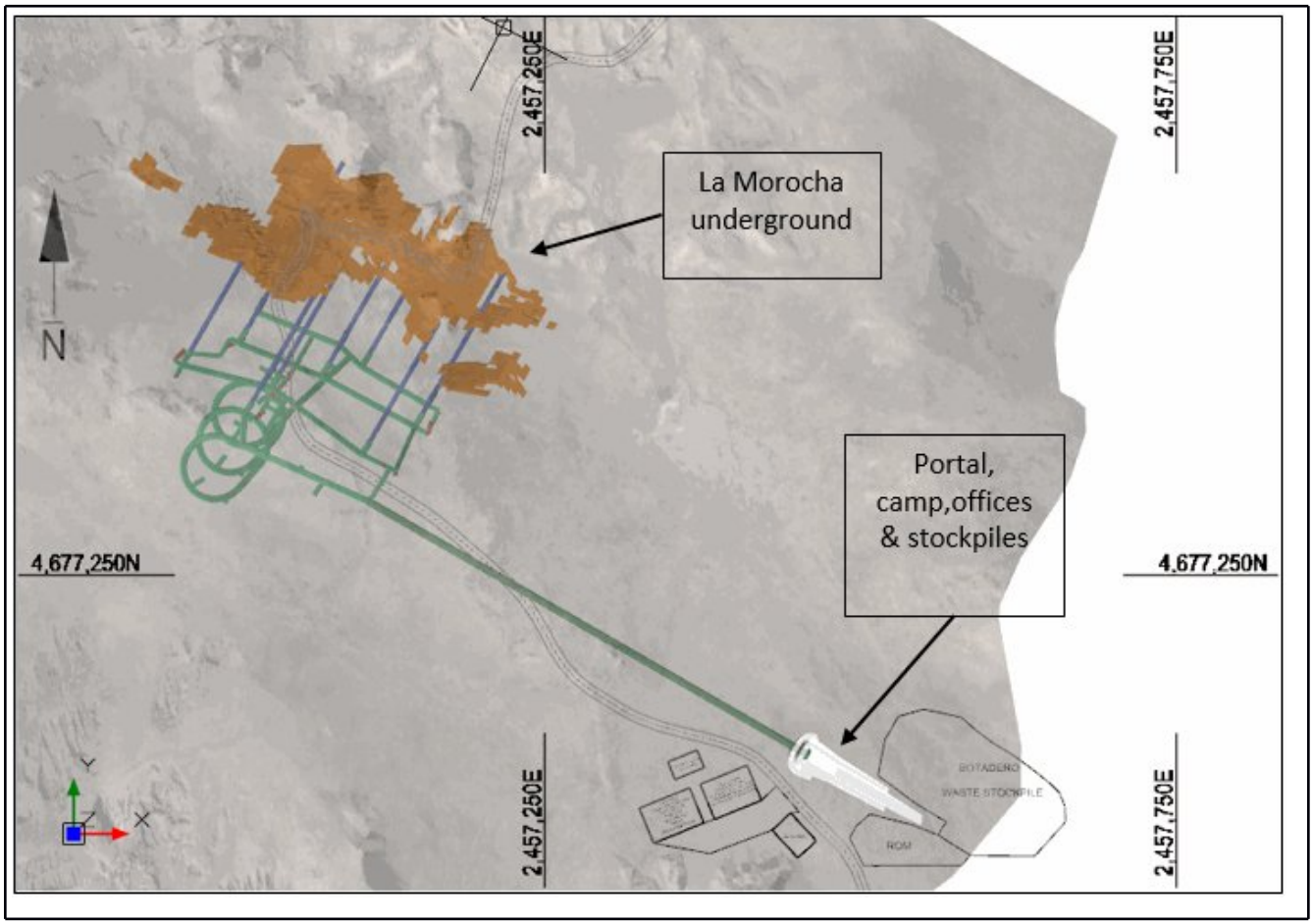
17.3 Power, water, and reagent requirements

Power will be supplied by generator sets and water will be sourced from the underground mine, tailings storage facility, and wells, all located at Manantial Espejo. Estimated reagent requirements for processing the Joaquin ore are 1.3 kg per tonne of lime and 4.2 kg per tonne of sodium cyanide.

18 Project infrastructure

A plan of the planned site facilities is shown in Figure 18.1.

Figure 18.1 Mine infrastructure plan



18.1 Logistics

The Property is accessed from Provincial Route 25, either from Gobernador Gregores 40 km to the east or from Puerto San Julian 170 km to the west, and then via Provincial Route 12 leading north for 120 km to the Las Vallas estancia. From Las Vallas, the Project and camp are accessed by a local road leading west for 15 km. All of the roads are gravel. Commercial air services are available in El Calafate, Argentina, approximately 330 km to the southwest of Gobernador Gregores.

18.2 Processing facilities and haulage

The ore from the underground mine will be stockpiled on the run of mine stockpile adjacent to the mine portal. No other processing facilities will be present on site. Road haulage trucks will transport the ore to the processing facilities at Manantial Espejo, located 145 km by gravel road to the south of the Property. A Google Earth map of the planned haulage route is shown in Figure 18.2.

Figure 18.2 Plan of haulage route between Joaquin and Manantial Espejo

18.3 Auxiliary facilities

Surface infrastructure will include office and workshop facilities, two accommodation camps with capacity for 70 persons, mine change houses, warehouses, fuel and lubricant facilities, surface civil works and office workshop, water and diesel tanks, surface electrical distribution, air compressors, explosive magazine, mine water settling ponds and piping, potable water and treatment plant, cemented backfill mixing area, surface ventilation fans, mine portal, run of mine ore stockpile, a mine waste rock storage facility, haul road connection to Route 12, surface grading and drainage, security gates and fencing, and satellite communication.

18.4 Waste storage and stockpile facilities

A temporary waste rock stockpile will be located near the portal in the initial development phase, prior to being returned underground for stope backfilling and at mine closure for filling the decline and ventilation raises.

The ore from the underground mine will be stockpiled on the run of mine stockpile adjacent to the mine portal prior to trucking 145 km by road to Manantial Espejo. No other processing facilities will be present on site.

19 Market studies and contracts

19.1 Contracts and marketing

Contracts and agreements are currently in place at Manantial Espejo for the supply of goods and services necessary for the mining operations. These include contracts for the supply of diesel for equipment operation and power generation, process reagents including sodium cyanide, camp services including catering, and maintenance agreements for the mining equipment. In most cases, where required similar contracts or agreements will be made for Joaquin. It is intended that a contract will be made with a third party for the provision of a trucking service for the transportation of ore between Joaquin and the Manantial Espejo processing facilities.

The doré produced from Joaquin ore at the Manantial Espejo processing facilities will be sold through Pan American's existing refining contracts in place for Manantial Espejo's doré. Those contracts are with Asahi Refining USA Inc. of Salt Lake City Utah, Aurubis AG of Hamburg, Germany, and with Republic Metals Corporation of Miami, Florida. The doré is transported to those facilities where it is refined to the London Good Delivery specification, which is defined as a minimum of 999.0 parts per thousand of silver and a minimum of 995.0 parts per thousand of fine gold. Once refined, the good delivery silver and gold is sold on the international market to bullion banks, financial institutions, and traders.

To date, no issues have been encountered in securing the sale of the doré produced at Manantial Espejo, and none are expected for Joaquin. No forward sales or hedging takes place at this time.

19.2 Review by the Qualified Person

Martin Wafforn, the Qualified Person responsible for this section of the Technical Report, has reviewed the contract terms, rates, and charges for the production and sale of the silver and gold produced from Joaquin, and consider them sufficient to support the assumptions made in the pre-feasibility study disclosed in this Technical Report.

20 Environmental studies, permitting, and social and community impact

20.1 Environmental factors

The Property is located in the cold, semi-arid ecoregion of the Patagonian Steppe, more than 100 km from the closest community, Gobernador Gregores, and environmental baseline studies have been completed to Argentine and international standards. Those studies show that the areas potentially impacted by the Project are relatively small in scale and hold environmental values that are well represented throughout the region. Work completed to date on the Property includes exploration diamond drilling, surface sampling, and the construction of camp facilities. There are no known significant environmental or social liabilities on or related to the Property. There are no known environmental or social issues that could materially impact the Project's ability to extract the mineral resources and mineral reserves.

20.2 Environmental studies

Coeur completed environmental and social baseline studies which were used in exploration EIAs and a draft EIA for a bulk metallurgical sample. Pan American updated that information for a new exploration permit that was approved by the Santa Cruz Mining Secretariat in 2017. Pan American is conducting additional monitoring to supplement the existing baseline data and plans to submit a new EIA for mine operation in early 2018.

20.3 Pan American's environmental policy

Pan American has committed to operate all mines and develop new projects in an environmentally responsible manner. The existing environmental conditions at each site are evaluated and Pan American strives to minimize and mitigate environmental impacts of mining and processing operations by applying prudent design and operating practices, and by educating employees and contractors who work at company facilities. Pan American has an environmental policy that all employees and contractors are required to follow.

20.4 Permitting factors

Pan American holds the necessary environmental and operating permits for advanced exploration and the development of the mine portal and associated surface infrastructure including a camp near the portal. An explosives permit application and an EIA and permit application for the operation of the Joaquin mine, including ore transport to Manantial Espejo for processing, are in preparation.

20.5 Mine waste disposal

Mined waste material will be stored in a waste storage facility located near the portal and then placed back underground following stope completion and mine closure. Tailings from processing will be stored in the existing tailing storage facility located at Manantial Espejo.

20.6 Water management

Water for the operations will be sourced from wells, a nearby spring, and dewatering of the underground ramp. Surface water and runoff will be managed by engineered drainage and runoff collection ponds. Potable water for the camp will be sourced from a nearby spring and treated.

20.7 Social and community factors

Pan American, through its Corporate Social Responsibility ("CSR") Policy, has committed to operating all of its mines in harmony with the communities where they are located, and to continually improve standards of social responsibility and to make a positive difference in the surrounding communities by fostering sustainable development. Pan American's existing CSR programs in nearby Gobernador Gregores will continue during the operation of the mine.

20.8 Project reclamation and closure

A closure cost estimate for Joaquin was prepared based on current costs at Manantial Espejo. This preliminary estimate includes consideration of all existing and future surface disturbance and reclamation liability at the site. The cost estimate includes demolition of all site infrastructure, surface contouring, and complete re-vegetation of the site. The undiscounted value of future reclamation costs for the Property are approximately $1.5 million.

20.9 Expected material environmental issues

There are no known environmental or social issues that could materially impact the mine's ability to extract the mineral resources and mineral reserves.

21 Capital and operating costs

21.1 Estimated capital costs

Capital costs were estimated using equipment quotations, recent purchases at Pan American's COSE and Manantial Espejo mines, and data from other underground mines and studies in Argentina and elsewhere. Over the life of mine, the estimated initial capital cost is $37.8 million, excluding Project acquisition costs. A $3.6 million allowance is estimated for recoverable VAT payments that are paid using capital funds prior to the commencement of production. As the mine is developed to the bottom and mined in a bottom up sequence, the majority of the accesses and levels are completed prior to production and are treated as capital costs. All primary access declines, ventilation raises and drifts, and footwall drives and cross cuts are capitalized until ore production commences, after which all development costs are treated as operating costs. There is no estimated capital required for treating the Joaquin ore at the Manantial Espejo processing facilities. $0.7 million of sustaining capital is estimated after production begins.

A summary of the estimated initial and sustaining capital costs is shown in Table 21.1.

Table 21.1 Estimated initial and sustaining capital costs

Item	2018 $M	2019 $M	2020 $M	Total $M
Mine development	3.9	8.1		12.0
Mine equipment	4.4	6.3		10.7
Infrastructure	4.1	0.6		4.7
Permitting and studies	1.6	1.4		3.0
General and Administrative ("G&A")	1.9	1.3		3.2
Contingency	2.3	2.0		4.3
Initial capital total[1]	**18.2**	**19.6**		**37.8**
Sustaining capital		**0.5**	**0.2**	**0.7**
Refundable VAT	1.8	1.7		3.6
Total including VAT[1]	**20.0**	**21.9**	**0.2**	**42.1**
Note[1] Totals may not add up due to rounding				

21.2 Estimated operating costs

The operating cost model was developed for the underground mine using fundamental productivity assumptions for the nominated equipment combined with physicals from the mine schedule to build up fleet size and fleet utilization values. This was combined with unit operating costs for the equipment, unit costs for material, and labour costs, which were derived from, in some cases, first principals, and in other cases, previous similar studies or operational experience at other mines. Key cost drivers include ore transport from La Morocha to Manantial Espejo, consumables such as fuel and cement, and labour and processing costs.

Based on the underground mine schedule, the total life of mine operating cost is estimated to be $96.2 million, which equates to $203 per tonne of ore mined, including all ore mining, transport, and processing costs. A summary of estimated operating costs is shown in Table 21.2.

Table 21.2 Estimated operating costs

Item	Total operating cost $M	$ per tonne of ore
Mine operating	38.9	81.9
G&A (mining, processing, and general)	15.7	33.0
Ore transport to Manantial Espejo	18.9	39.9
Processing		
Labour	4.7	9.9
Power	7.1	15.0
Reagents	6.9	14.6
Consumables	1.7	3.5
Maintenance and parts	2.4	5.1
Total processing	22.8	48.1
Total process + transportation	41.7	88.0
Total mine + G&A + process + transportation	96.2	202.9

The transport of the ore from the Property to the processing facilities at Manantial Espejo is assumed to be undertaken using third party trucks at a total operating cost over the life of mine of $18.9 million, which equates to $39.9 per tonne of ore.

For the estimate of operating costs for processing the Joaquin ore at the Manantial Espejo plant, Manantial Espejo unit costs were assumed for labor, power, maintenance, and parts. Consumables such as balls and liners were assumed proportionally to the expected Joaquin rock characteristics. Reagent consumption, specifically sodium cyanide and SO_2, were based on test results and estimates of the residual sodium cyanide concentration for treatment. The processing operating cost is estimated at $48.1 per tonne.

The assumptions for processing and G&A costs are dependent on synergies that exist between the Joaquin, Manantial, and COSE projects. Processing material from the three operations in the same plant allows the economies of scale necessary to achieve, for example, the estimated processing operating cost of $48.1 per tonne. The benefit that the development and operation of Joaquin provides, in terms of sharing fixed costs with Manantial Espejo and COSE, have not been quantified or included in the cost estimate and economic analysis.

22 Economic analysis

22.1 Estimated life of mine plan

The life of mine is 43 months from development to final mining of the stopes, with the decline commencing in May 2018. Stoping is expected to begin in September 2019 and finish in December 2021. Ore will be trucked by road from the mine to the plant at Manantial Espejo. The estimated annual production schedule and annual cash flow forecast for the life of mine, excluding the initial purchase payment, is shown in Table 22.1.

Table 22.1 Estimated annual production schedule and cash flow forecast

Item	Units	2018	2019	2020	2021	LOM[1]
Processed – tonnes	kt		53.5	219.0	201.9	474.4
Processed – Ag grade	ppm		600	748	723	721
Processed – Au grade	ppm		0.71	0.48	0.25	0.41
Recovered- Ag	Moz		0.8	4.3	3.8	8.9
Recovered – Au	koz		1.0	2.7	1.3	5.1
Revenue	$M		15.2	78.8	68.4	162.4
Operating cost	$M		11.8	43.0	41.4	96.2
Initial capital cost (including VAT)	$M	20.0	21.4	0.0	0.0	41.4
Sustaining capital	$M		0.5	0.2		0.7
Taxes and royalties	$M			2.6	7.1	9.7
Tax credit	$M			2.7	0.0	2.7
Closure cost	$M				3.0	3.0
Cash flow	$M	(20.0)	(18.5)	35.6	16.9	14.1
Note[1] Totals may not add due to rounding						

22.2 Estimated cash flow forecast

Excluding the purchase price, the estimated life of mine cash flow of the Project is $14.1 million. The Project payback is estimated to occur at the end of February 2021, 18 months after construction completion. The NPV at a 5% discount rate is $9.1 million and $5.1 million at a 10% discount rate. The IRR of the Project is 18%. The main driver of the economic result is the amount of capital required to provide equipment and underground development to access the stopes. Upside exists with any additional inventory that may be defined at La Morocha or at any other prospects on the Property.

22.3 Estimated taxes, duties, and royalties

Taxes, duties, and royalties payable to the government entities currently include a 35% Argentine corporate tax on taxable income, a Santa Cruz Provincial Royalty of 3% on margin, and a 2.5% silver doré export credit. Royalties payable to other parties include a 2% NSR royalty on silver and gold production payable to Coeur.

Legislation passed in late December 2017 reduced the corporate income tax rate from 35% to 30% starting in 2018 and to 25% for 2021 and later years. This recent change has not been used in the economic analysis.

22.4 Assumptions

Justification for mining and processing costs are given in Section 21. Estimates of the processing and selling costs associated with ore treatment are shown in Table 22.2.

Table 22.2 Processing and marketing parameters

Parameter	Units	Value
Process metal recovery – silver and gold	%	81
Processing costs	$ per tonne	48.1
Silver price	$ per ounce	18.50
Gold price	$ per ounce	1,300
Payable silver and gold	%	99.85
Refining charge silver	$ per ounce	0.627
Refining charge gold	$ per ounce	2.370
Transport	$ per ounce	0.37
Silver and gold Santa Cruz Provincial Royalty on margin	%	3.0
Silver doré export credit	%	(2.5)
Silver and gold royalty to Coeur	%	2.0

22.5 Sensitivity

The Project sensitivity to metal prices is shown in Table 22.3.

Table 22.3 NPV and IRR sensitivity analysis

	Gold price per ounce						
Silver price per ounce	$1,150	$1,200	$1,250	$1,300	$1,350	$1,400	$1,450
	Project standalone sensitivity $M NPV at 5% discount rate						
$16.50	-1.2	-1.0	-0.9	-0.8	-0.6	-0.5	-0.3
$17.50	3.8	3.9	4.1	4.2	4.3	4.5	4.6
$18.50	8.7	8.8	9.0	9.1	9.2	9.4	9.5
$19.50	13.6	13.7	13.9	14.0	14.2	14.3	14.4
$20.50	18.5	18.6	18.8	18.9	19.1	19.2	19.3
$21.50	23.4	23.5	23.7	23.8	24.0	24.1	24.3
	Project standalone sensitivity $M NPV at 10% discount rate						
$16.50	-4.0	-3.9	-3.7	-3.6	-3.5	-3.3	-3.2
$17.50	0.4	0.5	0.7	0.8	0.9	1.0	1.2
$18.50	4.7	4.8	5.0	5.1	5.2	5.4	5.5
$19.50	9.0	9.2	9.3	9.4	9.5	9.7	9.8
$20.50	13.4	13.5	13.6	13.7	13.9	14.0	14.1
$21.50	17.7	17.8	17.9	18.1	18.2	18.3	18.4
	Project standalone sensitivity % IRR						
$16.50	3	3	4	4	4	4	5
$17.50	11	11	11	11	12	12	12
$18.50	18	18	18	18	19	19	19
$19.50	25	25	25	25	25	26	26
$20.50	31	31	32	32	32	32	32
$21.50	37	38	38	38	38	38	39

23 Adjacent properties

There is no relevant information on adjacent properties to report.

24 Other relevant data and information

There is no additional information to report.

25 Interpretation and conclusions

Pan American acquired 100% of the Property from Coeur on February 10, 2017. The consideration for the acquisition was $25.0 million, comprised of $15.0 million in cash and $10.0 million of the Company's common shares valued as of January 13, 2017 (525,654 total common shares), plus a 2.0% net smelter return royalty on the Project.

This technical report demonstrates that the mineral reserves in the mine plan are economic with the forecast metal prices and other assumptions. Based on the current mineral inventory, the mine is projected to produce 8.9 million ounces of silver and 5,100 ounces of gold over a 28 month period from the fourth quarter of 2019 until the end of 2021. This projected mine life may increase if additional mineral resources are defined on the Property and can be converted to mineral reserves.

25.1 Mineral resource and mineral reserve estimates

There are no known drilling, sampling, or recovery factors that could materially impact the reliability of the drilling results used to estimate mineral resources and mineral reserves. There are no known significant risks and uncertainties that could reasonably be expected to affect the reliability or confidence in the mineral resource and mineral reserve estimates. Pan American intends to conduct reconciliation of the mineral reserve estimate to a grade control model and actual mine production.

25.2 Mineral processing, metallurgical testing, and recovery methods

Metallurgical test work conducted between 2009 and 2017 includes cyanide leaching, flotation, and sulphuric acid leaching followed by cyanide leaching in bottle roll tests, as well as comminution test work. The composite samples used for the recovery estimates are spatially and geologically representative of the ore scheduled to be mined. The test work has shown that the silver and gold in the La Morocha ore is recoverable by agitated cyanide leaching in tanks at the Manantial Espejo processing facilities. The metallurgical recovery of both gold and silver is estimated at 81%, using 5 grams per litre of sodium cyanide and a retention time of 96 hours. An estimated mine production and ore transport rate of 600 tpd is assumed during peak operations. The ore treatment rate is expected to be 2,160 tpd on a campaign basis of approximately 9 days per month.

25.3 Mining and financial

Mining will be undertaken using underground methods with ore hauled by diesel trucks from underground to surface stockpiles. Three variants of underground cut and fill mining methods were selected, including traditional cut and fill, drift and fill, and post pillar cut and fill, using mine development waste rock for backfill. Ore to be transported 145 km by road to the Manantial Espejo plant for processing is estimated to be 474,000 tonnes at 721 ppm Ag and 0.41 ppm Au. The life of mine is estimated at 43 months from development through to final mining of the stopes, with site reclamation assumed to be completed in the final fifth year.

Capital costs are associated only with infrastructure and mine development at the Property as the processing facilities at Manantial Espejo are in place. Over the life of mine, the estimated capital cost is $41.4 million, excluding Project acquisition costs. A $3.6 million component of the total is recoverable VAT payments that are paid using capital funds prior to the commencement of production. As the mine is developed to the bottom and mined in a bottom up sequence, the majority of the accesses and levels are completed prior to production and are treated as capital costs.

Total operating costs are estimated at $203 per tonne for mining, transport, and processing.

Excluding the cost of acquiring the Property, the estimated cash flow from the Project is $14.1 million. The Project payback is estimated to occur at the end of February 2021, 18 months after construction completion. The NPV at a 5% discount rate is $9.1 million and $5.1 million at a 10% discount rate. The IRR of the Project is 18%.

Based on the results of the pre-feasibility study disclosed in this Technical Report, Pan American is proceeding with an approximately $37.8 million capital investment, excluding $3.6 million in recoverable VAT, to construct an underground mine at La Morocha, with development of the underground access decline ramp scheduled to begin in the second quarter of 2018, and with ore production occurring between late 2019 and the end of 2021.

Pan American holds the necessary environmental and operating permits for advanced exploration and the development of the mine portal and associated surface infrastructure including a camp near the portal. An explosives permit application and an EIA and permit application for the operation of the Joaquin mine, including ore transport to Manantial Espejo for processing, are in preparation.

25.4 Environment and community

The Property is located in the cold, semi-arid ecoregion of the Patagonian Steppe, more than 100 km from the closest community, Gobernador Gregores, and environmental baseline studies have been completed to Argentine and international standards. Those studies show that the areas potentially impacted by the Project are relatively small in scale and hold environmental values that are well represented throughout the region. Work completed to date on the Property includes exploration diamond drilling, surface sampling, and the construction of camp facilities. There are no known significant environmental or social liabilities on or related to the Property. There are no known environmental or social issues that could materially impact the Project's ability to extract the mineral resources and mineral reserves.

26 Recommendations

Pan American intends to continue infill drilling at the La Negra deposit to further assess its potential.

For future drilling programs, increasing the submission frequency of blanks and field duplicates to 4% is recommended.

Additional bottle roll optimization test work and thickening tests for solid-liquid separation using new drillhole samples are recommended at an estimated cost of $100,000, which is included in the current capital cost estimate.

To refine the mining method and ground support allocations assumed for the pre-feasibility study, Pan American intends to conduct additional geotechnical studies as the underground development advances, at an estimated cost of $50,000, which is included in the current capital cost estimate. Also included in the capital cost estimate is an allowance of $270,000 for recommended underground grade control diamond drilling.

27 References

Author	Title
Golder Associates Inc., 2017	Review of geotechnical conditions, La Morocha Deposit, Argentina. Internal report prepared by Golder Associates for Pan American Silver, February 1, 2017.
Páez, G. N., Ruiz, R., Guido, D. M., Jovic, S. M., and Schalamuk, I. B., 2010	The effects of K-metasomatism in the Bahía Laura Volcanic Complex, Deseado Massif, Argentina: Petrologic and metallogenic consequences. Chemical Geology, 273, 300-313.

28 Date, signatures, and certificates

CERTIFICATE of QUALIFIED PERSON

I, Mr. Christopher Emerson, Vice President, Business Development and Geology of Pan American Silver Corp., 1500-625 Howe St, Vancouver, BC, V6C 2T6, Canada do hereby certify that:

a) I am the co-author of the technical report titled "Technical Report for the Joaquin Property, Santa Cruz, Argentina, Pre-feasibility Study", with an effective date of November 30, 2017 (the "Technical Report").

b) I graduated with a Bachelor of Engineering in Industrial Geology from Camborne School of Mines, Exeter University, England, in 1998 and earned my Master of Science in Mineral Exploration from Leicester University in 2000. I am a Fellow of the Australasian Institute of Mining and Metallurgy (FAusIMM) and a Fellow of the Geological Society of London (FGS). I have worked as a geologist in both mining and exploration for the past 17 years since my graduation from Leicester University.

c) I have read the definition of 'Qualified Person' set out in National Instrument 43 101 ("the "Instrument") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'Qualified Person' for the purposes of the Instrument.

d) I am responsible for the preparation of the sections of the Technical Report as detailed in Table 2.1 – Responsibilities of each Qualified Person.

e) I am currently employed as the Vice President, Business Development and Geology for Pan American Silver Corp., the owner of the Joaquin Property, and by reason of my employment, I am not considered independent of the issuer as described in Section 1.5 of the Instrument.

f) I have had prior involvement with the Joaquin Property that is the subject of the Technical Report; I am an employee of Pan American Silver Corp. and have conducted a site visit to the Joaquin Property, as described in Section 2 – Introduction of the Technical Report, most recently on September 5, 2017.

g) I have read the Instrument and Form 43 101F1, and the Technical Report has been prepared in compliance with the Instrument and that form.

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

Dated at Vancouver, British Columbia, this 31 day of January, 2018.

"Signed and sealed"

Christopher Emerson, FAusIMM

CERTIFICATE of QUALIFIED PERSON

I, Martin Wafforn, Senior Vice President, Technical Services and Process Optimization of Pan American Silver Corp., 1500-625 Howe St, Vancouver, BC, V6C 2T6, Canada do hereby certify that:

a) I am the co-author of the technical report titled "Technical Report for the Joaquin Property, Santa Cruz, Argentina, Pre-feasibility Study", with an effective date of November 30, 2017 (the "Technical Report").

b) I graduated with a Bachelor of Science in Mining degree from the Camborne School of Mines in Cornwall, England in 1980. I am a Professional Engineer in good standing with The Association of Professional Engineers and Geoscientists of the Province of British Columbia. I am also a Chartered Engineer in good standing in the United Kingdom. My experience is primarily in the areas of mining engineering and I have worked as an engineer in the mining industry for a total of 37 years since my graduation from the Camborne School of Mines.

c) I have read the definition of 'qualified person' set out in National Instrument 43 101 ("the "Instrument") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'qualified person' for the purposes of the Instrument.

d) I am responsible for the preparation of the sections of the Technical Report as detailed in Table 2.1 - Responsibilities of each Qualified Person.

e) I am currently employed as the Senior Vice President, Technical Services and Process Optimization for Pan American Silver Corp., the owner of the Joaquin Property, and by reason of my employment, I am not considered independent of the issuer as described in Section 1.5 of the Instrument.

f) I have had prior involvement with the Joaquin Property that is the subject of the Technical Report; I am an employee of Pan American Silver Corp. and have conducted two site visits to the Joaquin Property, including as described in Section 2 – Introduction of the Technical Report, most recently on February 26, 2017.

g) I have read the Instrument and Form 43 101F1, and the Technical Report has been prepared in compliance with the Instrument and that form.

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

Dated at Vancouver, British Columbia, this 31 day of January, 2018.

"Signed and sealed"

Martin Wafforn, P. Eng.

CERTIFICATE of QUALIFIED PERSON

I, Americo Delgado, Director, Metallurgy of Pan American Silver Corp., 1500-625 Howe St, Vancouver, BC, V6C 2T6, Canada, do hereby certify that:

a) I am the co-author of the technical report titled "Technical Report for the Joaquin Property, Santa Cruz, Argentina, Pre-feasibility Study", with an effective date of November 30, 2017 (the "Technical Report").

b) I graduated with a Master of Science in Metallurgical and Material Engineering from the Colorado School of Mines in Golden, Colorado, in 2007, and with a Bachelor of Science in Metallurgical Engineering degree from the Universidad Nacional de Ingenieria, Lima, Peru, in 2000. I am a Professional Engineer in good standing with the Association of Professional Engineers and Geoscientists of the Province of British Columbia. My experience is primarily in the areas of metallurgy and mineral processing engineering and I have worked as a metallurgist in the mining industry for a total of 17 years since my graduation from the Universidad Nacional de Ingenieria.

c) I have read the definition of 'qualified person' set out in National Instrument 43 101 ("the "Instrument") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements of a 'qualified person' for the purposes of the Instrument.

d) I am responsible for the preparation of the sections of the Technical Report as detailed in Table 2.1 - Responsibilities of each Qualified Person.

e) I am currently employed as the Director, Metallurgy for Pan American Silver Corp., the owner of the Joaquin Property, and by reason of my employment, I am not considered independent of the issuer as described in Section 1.5 of the Instrument.

f) I have had prior involvement with the Joaquin Property that is the subject of the Technical Report as I am an employee of Pan American Silver Corp. I have not conducted a site visit to the Joaquin Property.

g) I have read the Instrument and Form 43 101F1, and the Technical Report has been prepared in compliance with the Instrument and that form.

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

Dated at Vancouver, British Columbia, this 31 day of January, 2018.

"Signed and sealed"

Americo Delgado, P. Eng.