NI 43-101 Technical Report Palito Mining Complex Brazil

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Report Prepared for

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1 Summary

This report was prepared as a Canadian National Instrument 43-101 (NI 43-101) Technical Report (Technical Report) for Serabi Gold plc (Serabi or Company) by SRK Consulting (U.S.), Inc. (SRK) on the Palito Mining Complex, which consists of the Palito and São Chico gold deposits in Pará State in central north Brazil.

Serabi is a United Kingdom registered and domiciled gold mining and development company based in London, England. The Company's principal assets are its gold operations in the Tapajós region in the State of Para in Brazil, which it holds through its wholly owned subsidiaries Serabi Mineração S.A. and Gold Aura do Brasil Mineração Ltda (GOAB).

1.1 Property Description and Ownership

The Palito Mining Complex is comprised of the Palito and São Chico underground gold mines which are located in the Tapajós Mineral Province in the southeast part of the Itaituba Municipality in the west of Pará State in central north Brazil, near the eastern municipal boundary with the Novo Progresso Municipality. The Palito Mine lays some 4.5 km southwest of the village of Jardim do Ouro and approximately 15 km via road. The São Chico Mine lays some 30 km southwest of the Palito Mine. It is accessed by road from the Palito Mine along the Transgarimpeira Highway.

The Palito Mine is a high grade, narrow vein underground mining operation that uses the shrinkage stoping method to extract gold and copper bearing ore. During the first six months of 2017, Serabi mined 53,883 t of ore from Palito at an average grade of 8.29 g/t Au (~300 t/d).

The São Chico Mine is a 140 t/d high grade, narrow vein longhole stoping operation that mined 25,010 t of gold bearing ore during the first six months of 2017 at an average grade of 10.18 g/t Au (~140 t/d).

Serabi operates a 500 t/d plant to process ore from both the Palito and São Chico mines. Palito ore is processed through a flowsheet that includes crushing, grinding, copper flotation and carbon-in-pulp (CIP) cyanidation of gold and silver values from the copper flotation tailing. The São Chico ore is processed in a separate grinding circuit that includes gravity concentration and intensive cyanide leaching of the gravity concentrate. During the first six months of 2017, the plant processed 90,568 t of ore at an average head grade of 6.69 g/t Au (including surface ore stockpiles and 4,042 t of retreated flotation tailings).

The Palito Mining Complex is formed by 48,846 ha of tenements, including 1,150 ha of mining concession. In addition, there are 6,369 ha in mineral exploration license application and 1,416 ha in mining concession application resulting in a total area for this property of 56,631 ha. The mining concession and exploration licenses are issued to Serabi Mineração S.A., which is the wholly owned Brazilian subsidiary of Serabi Gold plc.

Serabi initially acquired the surface rights to the immediate Palito Mine area through a purchase agreement with the existing artisanal miners (garimpeiros) entered into in 2002 and since that time has acquired from other garimpeiros and/or farmers additional parcels of land.

In September 2010, Kenai Resources Ltd (Kenai) entered into an option agreement with Gold Anomaly Ltd (GOA) whereby Kenai had the option to purchase up to 75% of issued and outstanding shares of GOAB. GOA subsequently exercised this option. In December 2011, Kenai entered into a letter agreement with GOA to acquire GOAB and provide Kenai with full ownership of the São Chico project.

That transaction was completed, with GOAB becoming a wholly owned subsidiary of Kenai. In July 2013 Serabi completed the acquisition of the entire share capital of Kenai, with GOAB becoming a wholly owned subsidiary of Serabi.

1.2 Geology and Mineralization

The Palito and São Chico gold deposits are located within the northern portion of the Tapajós-Parima Orogenic Belt (TPOB), a constituent of the Ventauri-Tapajós province of the Guaporé Shield. Formed between 2.5 and 1.8 Ga, the TPOB is a northwest oriented magmatic arc bound to the north by the Amazonian Basin and to the south by the Cachimbo Graben. Within the TPOB, the Tapajós Gold Province hosts numerous primary gold deposits over an area of approximately 300 kilometers (km) by 350 km.

Mineralization at the Palito and São Chico deposits is hosted in granite and granodiorite of the Paráuari suite. Mineralization at the Palito Mine is hosted within three granitoids and is intimately associated with northwest-southeast vertical to sub-vertical mesothermal quartz-chalcopyrite-pyrite veins and pyrite disseminations filling the brittle-ductile fault sets. At Palito, the nature of sulfide mineralization varies along the strike and plunge extents of the deposit. Pyrite and chalcopyrite dominate in the granites, whereas pyrrhotite and pyrite with lesser chalcopyrite are found in the granodiorite. Within the granodiorites, the pyrrhotite-pyrite sulfides tend to be lower grade due to lower chalcopyrite content.

The Main Vein at São Chico strikes in a broadly west-northwest direction, dips steeply to the south, and ranges from approximately 1.0 to 3.9 meters (m) in apparent width. Mineralization extends approximately 140 m down dip and approximately 100 m along strike, and is open down dip and plunging to the west; to the east, mineralization is open for a minimum of 80 m along strike. The fault zone is variably mineralized, with both sinuous and regular quartz veining, pyrite, sphalerite, galena, chalcopyrite and electrum.

Deposit Types

Gold deposits in the Tapajós Gold Province can be broadly classified into three main types:

- Mesozonal deposits;
- Epizonal intrusion centered or intrusion related deposits; and
- Alluvial, colluvial and supergene enriched saprolitic deposits.

The mineralogy and textures of the deposits at the Palito Mining Complex is consistent with a model for an intrusion related mesothermal gold-copper mineralization. This relatively new classification of gold deposits is associated with granitic rocks and are best developed above and surrounding small, granitic intrusions. Mineralization styles can manifest as stockworks, breccia, skarns and lode style veins, and have a clear metal association zonation.

1.3 Exploration Status

Exploration work by Serabi on the Palito properties has been ongoing since 2003, with surface exploration, geological mapping, rock chip sampling, shallow auger drilling and diamond drilling programs completed. Since initial exploration, airborne, ground and downhole geophysical surveys have been executed to better constrain the known mineralization on the property and define new potential targets.

1.4 Mineral Processing and Metallurgical Testing

Extensive metallurgical studies have been conducted on Palito and São Chico ores by respected commercial metallurgical laboratories to evaluate process options that included gravity concentration, flotation and cyanidation. The following general observations can be made regarding the metallurgical programs that have been conducted:

- Both the Palito and São Chico ores are highly amenable to conventional processing techniques to recover the contained metal values;
- Palito ore is processed using a flowsheet that includes crushing, grinding, copper flotation and CIP cyanidation of the copper flotation tailings;
- São Chico ore is processed using a flowsheet that includes crushing, grinding, gravity concentration and cyanidation of both the gravity concentrate and the gravity tailing;
- Plant performance on both Palito and São Chico ores has been similar to the results predicted from the metallurgical test programs; and
- Serabi has tested and designed a new cyanide detoxification circuit to replace the existing circuit which has not performed as planned. It is expected that the new cyanide detoxification circuit using the industry-standard SO_2/Air process will be operational during 2018.

1.5 Mineral Resource Estimate

The Mineral Resource Statement presented herein represents the second and first mineral resource evaluation prepared for Serabi for the Palito and São Chico mines, respectively, in accordance with NI 43-101. The mineral resource estimate prepared by Serabi for the Palito Mine considers core drilling and underground chip sampling by Serabi generated during the period mid-2002 to May 2017. For the São Chico Mine, the mineral resource estimate, also prepared by Serabi, considers core drilling and chip sampling by Serabi and previous operators during the period September 2011 to March 2017.

The databases used to estimate mineral resources at Palito and São Chico were audited by SRK. SRK believes the current drilling information is sufficiently reliable to interpret with confidence the boundaries for gold mineralization and that the assay data are sufficiently reliable to support mineral resource estimation.

Serabi used a traditional polygonal estimation method in 2D sections to evaluate the mineral resources of both mines. AutoCAD® software was used to define the 2D longitudinal sections and the calculations were performed in Microsoft® Excel.

SRK generated parallel geostatistically-based three-dimensional mineral resource models in Datamine Studio, using an ordinary kriging estimator for the main mineralized structures of São Chico and the G3 vein at Palito for mineral resource validation purposes.

The polygonal quantities and grade estimates were reviewed by SRK to determine the portions of the Palito and São Chico mines having "reasonable prospects for eventual economic extraction" from an underground mine, based on a cut-off grade (CoG) of 3.10 g/t gold at the Palito Mine and 2.85 g/t gold at the São Chico Mine, assuming a gold price of US$1,500 per ounce (oz), and metallurgical gold recovery of 91% and 95% respectively. The reporting parameters were selected based on production experience on the project.

Condensed Mineral Resource Statements for the Palito and São Chico mines are tabulated in Table 1-1 and Table 1-2 below respectively.

Table 1-1: Condensed Mineral Resource Statement, Palito Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification	Vein Width (m)	Quantity (000's t)	Grade		Contained Metal	
			Au (g/t)	Cu (%)	Au (000's oz)	Cu (t)
Underground						
Measured	0.52	274	15.21	0.77	134	2,110
Indicated	0.57	371	10.91	0.57	130	2,115
Surface Stockpiles						
Measured	-	12	3.15	-	1	-
Tailings						
Measured	-	60	2.70	-	5	-
Combined						
Measured	-	346	12.62	0.61	140	2,110
Indicated	-	371	10.91	0.57	130	2,115
Measured and Indicated	-	717	11.74	0.59	271	4,225
Underground						
Inferred	0.77	784	7.02	0.20	177	1,568

- Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.
- Mineral Resources are reported inclusive of Mineral Reserves.
- Figures are rounded to reflect the relative accuracy of the estimates.
- Mineral Resources are reported within classification domains inclusive of in situ dilution at CoG of 3.10 g/t gold assuming an underground extraction scenario, a gold price of US$1,500/oz, and metallurgical recovery of 91%.
- Polygonal techniques were used for Resources estimates.

Table 1-2: Condensed Mineral Resource Statement, São Chico Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification	Thickness (m)	Quantity (000's t)	Grade Au (g/t)	Contained Metal Au (000's oz)
Measured	1.82	60	13.34	26
Indicated	1.79	22	14.70	10
Measured and Indicated	**1.81**	**82**	**13.70**	**36**
Inferred	1.80	123	13.77	54

- Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.
- Mineral Resources are reported inclusive of Mineral Reserves.
- Figures are rounded to reflect the relative accuracy of the estimates.
- Mineral Resources are reported within classification domains inclusive of in situ dilution at a CoG of 2.85 g/t gold assuming an underground extraction scenario, a gold price of US$1,500/oz, and metallurgical recovery of 95%.
- Polygonal techniques were used for Resources estimates.

1.6 Mineral Reserve Estimate

The Mineral Reserve Statement presented herein represents the first mineral reserve evaluation prepared for the Palito and São Chico mines, in accordance with NI 43-101. The mineral reserve estimates were prepared by Serabi and audited by SRK based on the Measured and Indicated mineral resource estimates presented in Section 1.5.

Mineral resources are converted to mineral reserves using the assumptions, parameters and methods discussed in this report. Proven mineral reserves are reported within the Measured classification domain, and Probable mineral reserves are reported within the Indicated classification domain.

Mineral reserves are reported for a total of 17 veins at the Palito Mine and one vein (the principal vein) at the São Chico Mine. Some Palito veins that contain Measured and Indicated mineral resources do not host mineral resource polygons that could be converted to mineral reserves. This is primarily because of the application of mining dilution and the use of a CoG for mineral reserves that is higher than the CoG used for mineral resources.

At the Palito Mine, underground Mineral Reserves are inclusive of planned and unplanned (external) mining dilution and mining recovery and are reported at a CoG of 3.70 g/t Au assuming a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 91%. Mineral Reserves for Palito surface stockpiles and flotation tailings are reported at a CoG of 1.95 g/t gold assuming a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 78%.

At the São Chico Mine, Mineral Reserves are reported at a CoG of 3.45 g/t gold assuming a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 95%.

Condensed Mineral Reserve Statements for the Palito and São Chico mines are tabulated in Table 1-3 and Table 1-4 below respectively.

Table 1-3: Mineral Reserves Statement, Palito Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

		Grade		Contained Metal	
Classification	**Quantity (000's t)**	**Au (g/t)**	**Cu (%)**	**Au (000's oz)**	**Cu (t)**
Underground					
Proven	265	9.77	0.46	83	1,219
Probable	276	7.64	0.39	68	1,076
Surface Stockpiles					
Proven	12	3.15		1	
Tailings					
Proven	60	2.70		5	
Combined					
Proven	337	8.28	0.36	90	1,219
Probable	276	7.64	0.39	68	1,076
Proven and Probable	**613**	**7.99**	**0.37**	**157**	**2,295**

- Mineral Reserves have been rounded to reflect the relative accuracy of the estimates. Proven underground Mineral Reserves are reported within the Measured classification domain, and Probable underground Mineral Reserves are reported within the Indicated classification domain. Proven and Probable underground Mineral Reserves are inclusive of external mining dilution and mining loss and are reported at a CoG of 3.70 g/t gold assuming an underground extraction scenario, a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 91%. Proven Mineral Reserves surface stockpiles and tailings are reported at a CoG of 1.95 g/t gold assuming a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 78%.
- Serabi is the operator and owns 100% of the Palito Mine such that gross and net attributable mineral reserves are the same. The mineral reserve estimate was prepared by the Company in accordance with the standard of CIM and NI 43-101, with an effective date of 30 June 2017, and audited and approved by Mr. Timothy Olson of SRK Consulting (US) Inc., who is a Qualified Person under NI 43-101.

Table 1-4: Mineral Reserves Statement, São Chico Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification	**Quantity (000's t)**	**Grade Au (g/t)**	**Contained Metal Au (000's oz)**
Underground			
Proven	65	8.15	17
Probable	25	9.15	7
Proven and Probable	**90**	**8.43**	**24**

- Mineral Reserves have been rounded to reflect the relative accuracy of the estimates. Proven underground Mineral Reserves are reported within the Measured classification domain, and Probable underground Mineral Reserves are reported within the Indicated classification domain. Proven and Probable underground Mineral Reserves are inclusive of external mining dilution and mining loss and are reported at a CoG of 3.45 g/t gold assuming an underground extraction scenario, a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 95%
- Serabi is the operator and owns 100% of the São Chico Mine such that gross and net attributable mineral reserves are the same. The mineral reserve estimate was prepared by the Company in accordance with the standard of CIM and NI 43-101, with an effective date of 30 June 2017, and audited and approved by Mr. Timothy Olson of SRK Consulting (US) Inc., who is a Qualified Person under NI 43-101.

1.7 Mining Methods

<u>Palito Mine</u>

Mining of the narrow, near-vertical gold veins at the Palito Mine is undertaken using the shrinkage stoping method. During the first six months of 2017, Serabi mined 53,883 t of ore from Palito at an average grade of 8.29 g/t Au (~300 t/d).

Shrinkage stoping blocks are defined on the lower level by horizontal development mining along the vein, and a vertical raise is then driven to the top of the stoping block and ladders are installed so that men and materials can access the stope on each subsequent lift as mining advances upward.

Shrinkage stope mining progresses vertically beginning with the drilling of sub-vertical holes using hand-held pneumatic drills (stopers). The drill holes are loaded with explosives and the blasted ore is left in the stope except to the extent it is necessary to draw down the rock to leave an adequate distance between the working floor and the back. The ore left in the stope supports the walls and no installed ground support is typically required. Serabi extracts the broken ore via a series of crosscuts that are driven in waste from a footwall access. After a stope is mined to its full height, load-haul-dump (LHD) units are used to muck the remaining ore from the stope. The LHD units load haul trucks, which then transport the broken ore to the surface.

São Chico Mine

The São Chico Mine is a 140 t/d high grade, narrow vein longhole stoping operation that mined 25,010 t of gold bearing ore during the first six months of 2017 at an average grade of 10.18 g/t Au. Mining of the steeply dipping vein is by longitudinal longhole stoping methods using sublevels that are spaced at a nominal 15 m. Because structural backfill is not available and because mining takes place on multiple adjacent levels, rib and sill pillars are used to separate the ore blocks and maintain geotechnical stability. The top and bottom of each stope block is mined with horizontal development using a drift cross-section of 3.5 m high by 3.5 m wide. Longholes are drilled between levels and blasthole rings are fired in the direction of a conventionally driven slot raise that is mined on one end of the stope. Ore is mucked from the longhole stopes using LHDs. The LHDs load haul trucks, which then transport the broken ore to the surface. Once the ore reaches the surface, it is transported by road (approximately 30 km) from the São Chico Mine to the processing plant at the Palito site.

Life of Mine Production Schedule

The life of mine (LoM) production schedule based on Mineral Reserves produces an average annual processing rate that ranges between 264 t/d and 569 t/d (LoM average is 436 t/d). LoM primary development in waste (ramps, footwall accesses and raises) is 9,616 m for the Palito Mine and 838 m for the São Chico Mine. Ore mining in the Palito Mine continues until November 2021 whereas mining in the São Chico Mine ends in June 2019.

Mine Equipment and Services

The underground equipment fleet, which is owned and operated by Serabi, comprises a mix of older and newer units that are appropriately sized for operation in the relatively narrow stope widths in Palito and São Chico. Haulage from Sao Chico to Palito is performed by a haulage contractor using equipment that is owned, operated and maintained by the contractor.

Mine dewatering is approximately 10 L/sec at the Palito Mine and approximately 17 L/sec at the São Chico Mine. At both mines, water is pumped through a system of staged centrifugal pumps to the portals at the top of the main ramp systems.

Total mine airflow is approximately 5,950 m^3 per minute (210,000 cfm) at the Palito Mine and approximately 1,060 m^3 per minute (63,400 cfm) at the São Chico Mine. At both mines, fresh air is drawn into the mine through the main ramp system and intake raises, distributed throughout the mine, and then exhausted through a series of ventilation raises and adits that connect to the surface.

1.8 Recovery Methods

Serabi operates a 500 t/d plant to process ore from both the Palito and São Chico mines. Palito ore is processed through a flowsheet that includes crushing, grinding, copper flotation and CIP cyanidation of gold and silver values from the copper flotation tailing. The São Chico ore is processed in a separate grinding circuit that includes gravity concentration and intensive cyanide leaching of the gravity concentrate. The São Chico gravity tailing is combined and processed with the Palito copper flotation tailing in the CIP cyanidation circuit. In addition to Palito and São Chico ore, old flotation tailing stockpiles, which contain about 2.6 to 3.6 g/t Au, are processed by direct feedi into the CIP circuit. Gold and silver values extracted in the CIP circuit are adsorbed onto activated carbon. The "loaded" carbon is then eluted to remove the adsorbed gold and silver values into an upgraded solution that flows through electrowinning cells to recover gold and silver as a cathodic precipitate, which is then fluxed and smelted to produce a final doré product.

A summary of Serabi process plant production for the period of 2015 – 2017 (Q1) is shown in Table 1-5. The following general observations can be made regarding plant production over this period:

- Average reconciled Palito ore grade has declined from 8.51 g/t Au in 2015 to 6.54 g/t Au in 2017 Q1;
- Average annual gold recovery from Palito ore has been consistent at about 91% during this period;
- Average reconciled São Chico ore grade has increased from 6.88 g/t Au in 2015 to 9.35 g/t Au in 2017 Q1;
- Average annual gold recovery from São Chico has increased from 87.1% in 2015 to 95.8% in 2017 Q1;
- In addition to Palito and São Chico ore, old flotation tailing stockpiles, which contain about 2.6 to 3.6 g/t Au, are processed by direct feed into the CIP circuit. Average annual gold recovery from the old flotation tailings has increased from 70.7% in 2015 to 84.4% in 2017 Q1.

Table 1-5: Summary of Serabi Process Plant Production (2015 – 2017 Q1)

Year	Ore Tonnes			Reconciled Grade (Au g/t)			Gold Recovery (%)		
	Palito	São Chico	Old Tailings	Palito	São Chico	Old Tailings	Palito	São Chico	Old Tailings
2015	113,935	16,363	18,356	8.51	6.88	2.60	90.6	87.1	70.7
2016	115,635	43,333	16,715	7.66	9.31	3.23	90.9	94.0	76.0
2017 (Q1)	27,390	14,331	4,941	6.54	9.35	3.61	91.1	95.8	84.4

Source: Serabi 2017

Generally, reconciliation with measured plant feed grades has been poor. Since the beginning of 2016 Palito reconciled gold grades have been consistently about 7% to 20% lower than the measured plant feed grades. During this same period, the São Chico reconciled ore grades have been about 2% to 18% higher. In SRK's opinion there appears to be a bias in the ore feed sampling and/or the allocation of production between Palito and São Chico ores.

1.9 Project Infrastructure

Property Access

The Palito Mine is 4.5 km southwest of the village of Jardim do Ouro and approximately 15 km via road. Jardim do Ouro lies on the unsealed Transgarimpeira Highway some 30 km west-southwest of the town of Moraes de Almeida, which is located on the junction of the Transgarimpeira Highway and the BR 163 or Cuiabá – Santarém Federal Highway. Moraes de Almeida is approximately 300 km south south-east by road of the municipal capital and similarly named city of Itaituba.

The São Chico Mine is 30 km southwest of the Palito Mine. It is accessed by road from the Palito Mine along the Transgarimpeira Highway.

An airstrip, suitable for light planes, is currently fully operative at the Palito site.

Underground Mine Access

A 4.5 m high x 4.5 m wide ramp system (-12% gradient) provides access to the underground portions of the Palito and São Chico mines. The portal at the Palito Mine is located at elevation 235 meters above sea level (masl), and the deepest level is -50 masl. At São Chico, the portal is located at elevation 224 masl, and the deepest level is currently 10 masl.

Palito Mine Camp

There are full mining camps at the Palito and São Chico mines that consist of accommodation for personnel, kitchen and dining facilities, offices, warehouses, maintenance facilities, and guard houses at the entrances to the sites. Serabi provides a daily bus service for employees and contractors living in Jardim do Ouro and Moraes de Almeida.

Fuel and Explosives Storage

At Palito, fuel is stored on site in storage tanks with a capacity of 75,000 L of diesel. At São Chico, fuel is stored on site in storage tanks with a capacity of 35,000 L of diesel. Fuel storage tanks are located in a contained fuel storage area. There are explosives storage facilities at both operational sites located away from the main offices and other installations.

Power

At Palito, electrical power is provided from the local power grid though a 34.5 kV overland power line and by diesel generators to deliver approximately 1 million kWh/month. Electrical power from the grid normally costs about R$0.34/kWh, but during peak demand periods (6:30 to 9:30 pm Monday to Friday) grid power costs R$120-130/kWh. During these peak periods Serabi operates its own diesel generators to generate 380 V electrical power at an average cost of R$0.70/kWh.

The power requirement at São Chico is approximately 594 kW (about 700 kVA), including the underground mine (437 kW), camp and village (94 kW) and surface support facilities (63 kW). The power is supplied by a diesel power house that includes three diesel gensets of 550 kVA (Maquigeral-SDMO/Scania 47N) that operate in parallel with one as standby.

Water

Water is an abundant resource in the area, and the current water supply system is not a limiting factor for operations at the Palito Mine or the São Chico Mine. The operation has a water supply system consisting of dams that contain water from underground workings, recycled process water after neutralization and decantation, and rain water.

Tailings Disposal

Mineral Reserves for both the Palito Mine and São Chico Mine will be processed by the Palito processing plant and tailings will be deposited into existing clay lined tailings disposal areas that are located adjacent to the processing plant. Tailings deposition will alternate between tailings disposal areas 16 and 17 from June 30, 2017 until the remaining capacity for those areas is exhausted. Thereafter, dry tailings will be removed from tailings disposal areas 16 and 17 and will be stacked on top of completed tailings disposal areas 14 and 15. Tailings disposal areas 16 and 17 will then be re-used for tailings deposition until the remaining Mineral Reserves are processed.

1.10 Environmental Studies and Permitting

The 2006 environmental impact assessment (*Estudo de Impacto Ambiental* or EIA) and its respective report of environmental impact (*Relatório de Impacto ao Meio Ambiente* or RIMA) concluded that negative impacts to the environment would occur to various resources during construction and operations, but that these impacts could be effectively mitigated through the implementation of environmental protection measures and through proper monitoring.

The Annual Environmental Information Reports (*Relatorio de informação Ambiental Anual* or RIAA) for the Palito and São Chico mines are presented each year to the Secretary of State for Environment and Sustainability (*Sectretaria de Estado de Meio Ambiente e Sustentabilidade* or SEMAS) with respect to the socio-environmental actions carried out during the previous year, and cover any specific commitments made to the environmental agency by the operator, as well as those agreements and obligations between the operator and other stakeholders in the project.

Documentation provided by Serabi and discussions during the site visit by SRK with site personnel indicate that groundwater and surface water quality (i.e., potential contamination by previous operators) may be an issue for consideration. The exact nature and source of these elevated concentrations is not currently known.

At this time, these known environmental issues are not expected to materially impact Serabi's ability to extract the mineral resources or mineral reserves at either Palito or São Chico.

Palito operates under a Plan of Environmental Control (*Plano de Controle Ambiental* or PCA) approved in 2008 by SEMAS. The PCA formalizes the environmental obligations of the operator that must be carried out in order to minimize impacts during operations. São Chico operates under a separate PCA.

The Serabi operations have been authorized under a series of licenses, as presented in Table 20-1. For each license, related conditions and/or obligations are also listed, along with the respective status. Generally, Serabi has acquired all of the necessary permits to continue with operations; however, at Palito, Serabi continues to wait for SEMAS to act on the installation and operational licenses/permits for Dam 16 and Dam 17. No cease and desist orders or notices of violation have been issued by

SEMAS for this situation, though Serabi indicates that the agency routinely visits the operation and is aware of the conditions and operations at the site.

Social and environmental programs have been developed in coordination with the communities deemed to be in the Directly Affected Area (ADA): Jardim do Ouro and São Chico; the Area of Direct Influence (AID), including the district of Moraes de Almeida; and the Area of Indirect Influence (AII), which includes the municipalities of Itaituba and Novo Progresso, from which Serabi obtains much of its labor, material supplies, and services. The programs have included: a dental clinic, improvements to local schools, provision of electricity and treated water, as well as planning for a new health clinic.

The most recent conceptual mine closure plans for Palito and São Chico were developed at the end of 2016. Because Palito is currently operated as an underground mine, only a small amount of surface disturbance exists which requires concurrent reclamation during operations. The former open pit area, Alvo Senna, is no longer in operation. Reclamation of those pits is currently being carried out by Serabi, and is partially completed. São Chico is strictly an underground mine, with ore being sent to Palito for processing. No concurrent reclamation is planned for this location, with the exception of some early artisanal mining areas within the concession.

Based on the current mine plans, Serabi estimates the reclamation and closure costs for the Palito Mine to be on the order of US$2,271,472, and for the São Chico Mine to be on the order of US$570,566. Given the size and extent of the facilities, the known environmental issues surrounding potential surface water and groundwater contamination, and the potential need for more robust engineered closure covers on the tailings impoundments and waste rock piles, it is SRK's opinion that the estimated closure costs are generally appropriate. However, the costs may be higher if there is a need for surface and groundwater remediation and compulsory post-closure monitoring ordered by SEMAS.

1.11 Capital and Operating Costs

Estimated LoM sustaining capital costs are presented in Table 1-6.

Table 1-6: Capital Costs

Capital Costs	Units	LoM Cost
Mine Development	R$	35,623,113
Mine Mobile Equipment	R$	7,328,750
Stopers and Other Mining Equipment	R$	1,190,000
Fans and Pumps	R$	1,350,000
Generators	R$	1,950,000
Light vehicles	R$	400,000
Other Support Equipment	R$	2,031,250
Tailings Disposal	R$	4,400,000
Total Capital Cost	R$	54,273,113
Total Capital Cost (US$:R$ exchange rate of 3.5:1.0)	**US$**	**15,506,604**

Source: Serabi, 2017

Historical operating costs for January 1, 2017 through June 30, 2017 were used as the basis for the CoG calculation that supports the Mineral Reserves. Refer to Table 1-7.

Table 1-7: Historical Operating Costs (Jan 1, 2017 – Jun 30, 2017)

Unit Operating Costs	Units	Palito	São Chico
Mining	R$/t-processed	259	248
Processing	R$/t-processed	164	162
Corporate Office Support to Site	R$/t-processed	33	39
Royalties, CFEM, Treatment, Shipping, and By-Product Credits	R$/t-processed	19	12
Total Unit Cost	R$/t-processed	474	460
Total Unit Cost (US$:R$ exchange rate of 3.5:1)	**US$/t-processed**	**135**	**132**

Source: Serabi, 2017

1.12 Economic Analysis

Under NI 43-101 rules, producing issuers may exclude the information required in Section 22 Economic Analysis on properties currently in production, unless the Technical Report includes a material expansion of current production. Serabi is a producing issuer, the Palito Mining Complex is currently in production, and a material expansion is not being planned. Serabi completed economic analysis for the Palito Mining Complex based on the Mineral Reserves stated herein. SRK reviewed Serabi's analysis and we have verified that the outcome is a positive cash flow that supports the statement of Mineral Reserves.

1.13 Conclusions and Recommendations

1.13.1 Geology and Mineral Resources

The mineralogy and textures of the deposits at the Palito Mining Complex are consistent with a model for an intrusion related mesothermal gold-copper mineralization. This relatively new classification of gold deposits is associated with granitic rocks and are best developed above and surrounding small, granitic intrusions. Mineralization styles can manifest as stockworks, breccia, skarns and lode style veins, and have a clear metal association zonation.

SRK is of the opinion that there is an opportunity to further improve the data collection, verification and mineral resource estimation methodologies at both the Palito and São Chico mines. Areas that could be reviewed include the following:

- Upgrade the analytical assay QA/QC protocols;
- Upgrade and maintain documented mine geological procedures for all mine geology tasks, to be consistently implemented;
- Introduce a three dimensional geostatistically-based mineral resource estimation methodology to the operations;
- Generate and maintain a three-dimensional lithology and structural model for both deposits based on surface drilling and underground mapping to facilitate mine planning and the identification of additional mineralization targets;
- Provide geology and resource estimation modeling training to the resource geology staff at both operations;

- The mine geology staff would benefit from training on relevant aspects of the NI 43-101 reporting guidelines;
- Develop an automated grade control modeling system to enable more accurate mine planning processes; and
- Implement a practical model to mine to mill reconciliation system.

There are several highly prospective exploration targets on the Palito property which require further drill testing. These targets could potentially add to the mineral resource inventory.

1.13.2 Mineral Processing and Metallurgical Testing

The following conclusions and recommendations are made regarding the metallurgical programs that have been conducted:

- Both the Palito and São Chico ores are highly amenable to conventional processing techniques to recover the contained metal values;
- Plant performance on both Palito and São Chico ores has been similar to results predicted from the metallurgical test programs. During the period 2015 - 2017 (Q1):
  - Average annual gold recovery from Palito ore has been consistent at about 91%;
  - Average annual gold recovery from São Chico has increased from 87.1% to 95.8%;
  - Average annual gold recovery from the old flotation tailings has increased from 70.7% to 84.4%;
- Reconciliation with measured plant feed grades has been poor. Since the beginning of 2016 Palito reconciled gold grades have been consistently about 7% to 20% lower than the measured plant feed grades. During this same period the São Chico reconciled ore grades have been about 2% to 18% higher. In SRK's opinion there appears to be a bias in the ore feed sampling and/or the allocation of production between Palito and São Chico ores.

1.13.3 Mining and Mineral Reserves

The following conclusions and recommendations are made regarding mining and mineral reserves:

- The Mineral Reserves have been estimated by Serabi personnel in a manner that is reasonable and appropriate for the narrow vein orebodies at the Palito and São Chico mines.
- The selected mining methods (shrinkage stoping at the Palito Mine and longhole stoping at the São Chico Mine) are appropriate.
- The Mineral Reserves conform to CIM definitions and comply with all disclosure requirements for Mineral Reserves set out in NI 43-101.
- Based on the current Mineral Reserves at the Palito Mine, a total of 541 kt grading 8.63 g/t Au will be mined over a mine life of approximately 4.5 years (July 2017 to November 2021).
- Based on the current Mineral Reserves at the São Chico Mine, a total of 90 kt grading 8.43 g/t Au will be mined over a mine life of approximately two years (July 2017 to June 2019).
- SRK recommends that Serabi investigate acquiring a cavity monitoring survey instrument to allow completed longhole stopes at São Chico to be accurately and safely surveyed. Accurate cavity surveys will allow Serabi to optimize drilling and blasting practices and will provide for a better understanding of overbreak/slough in the longhole stopes.

1.13.4 Environmental Studies and Permitting

São Chico has initiated the process for revalidation of the current Operational License, which expired on December 22, 2017. Serabi appear to be in possession of, and in compliance with all relevant installation and operational licenses and/or permits. At Palito, Serabi continues to wait for SEMAS to act on the installation and operational licenses/permits for Dam 16 and Dam 17. No cease and desist orders or notices of violation have been issued by SEMAS for this situation, though Serabi indicates that the agency routinely visits the operation and is aware of the conditions and operations at the site.

Potential environmental issues at the sites include:

- Unfortunately, the site lacks appropriate background monitoring data to determine if some of the current surface water and groundwater exceedances are the result of historic mining, prior operators of the site, or the current operations.
- The detection of cyanide in the downgradient monitoring well may suggest potential leakage from the clay-lined tailings impoundments, though Serabi is working toward improved groundwater sampling and analyses to increase their confidence in the previous results reported for the site. The installation of a cyanide destruction circuit will be complete in the first quarter of 2018 and is expected to mitigate this issue.
- The limited surface water monitoring data from São Chico suggests potential impacts to Igarapé São Chico Creek, most notably by the elevated concentration of zinc, lead and manganese as compared to upgradient samples.
- Neither Palito nor São Chico conducts geochemical characterization on tailings or waste rock materials which may be necessary to assess the current contamination issues as well as develop effective closure and potential remediation alternatives.

Based on the assessment carried out on the documentation provided by Serabi and the site visit, SRK recommends the following additional work programs:

- A more detailed surface water chemistry characterization and QA/QC implementation for both sites;
- A more detailed groundwater chemistry characterization and QA/QC implementation for the Palito site;
- Characterization of acid-rock drainage (ARD) potential and metal leaching (ML) potential for waste rock and tailings materials;
- Based on the ARD/ML analyses, conduct an assessment of the potential for the underground workings to flood and cause localized groundwater contamination post closure;
- Identify and sample suitable background study sites for both Palito and São Chico;
- Prepare a more comprehensive site-wide water balance for the site, coupled with a geochemical mass balance exercise to evaluate the need for possible water treatment and concentration objectives prior to effluent discharge; and
- Review and possibly update both Palito and São Chico mines closure plans and related costs (considering more robust cover systems and possible post-closure remediation requirements).

1.13.5 Operating and Capital Costs

The CoG calculation is based on recent actual operating costs and the calculated CoGs are reasonable and appropriate for both the Palito and São Chico mines. The sustaining capital costs as used in Serabi's economic analysis for the Mineral Reserves are appropriate for the remaining life of each mine. SRK reviewed Serabi's economic analysis and we have verified that the outcome is a positive cash flow that supports the statement of Mineral Reserves.

2 Introduction

2.1 Terms of Reference and Purpose of the Report

This report was prepared as an NI 43-101 Technical Report for Serabi by SRK on the Palito Mining Complex, which consists of the Palito and São Chico gold deposits in Pará State in central north Brazil.

The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in SRK's services, based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Serabi subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Serabi to file this report as a Technical Report with Canadian securities regulatory authority pursuant to NI 43-101, Standards of Disclosure for Mineral Projects. Except for the purposes legislated under provincial securities law, any other uses of this report by any third party is at that party's sole risk. The responsibility for this disclosure remains with Serabi. The user of this document should ensure that this is the most recent Technical Report for the property as it is not valid if a new Technical Report has been issued.

This report provides Mineral Resource and Mineral Reserve estimates, and a classification of resources and reserves prepared in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014 (CIM, 2014).

2.2 Qualifications of Consultants (SRK)

The Consultants preparing this Technical Report are specialists in the fields of geology, exploration, Mineral Resource and Mineral Reserve estimation and classification, underground mining, geotechnical, environmental, permitting, metallurgical testing, mineral processing, processing design, capital and operating cost estimation, and mineral economics.

None of the Consultants or any associates employed in the preparation of this report has any beneficial interest in Serabi. The Consultants are not insiders, associates, or affiliates of Serabi. The results of this Technical Report are not dependent upon any prior agreements concerning the conclusions to be reached, nor are there any undisclosed understandings concerning any future business dealings between Serabi and the Consultants. The Consultants are being paid a fee for their work in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience and professional association, are considered Qualified Persons (QP) as defined in the NI 43-101 standard, for this report, and are members in good standing of appropriate professional institutions. QP certificates of authors are provided in Appendix A. The QP's are responsible for specific sections as follows:

- Glen Cole is the QP responsible for Geology and Mineral Resources Sections 7 through 12,14, and portions of Sections 1, 24, 25 and 26 summarized therefrom, of this Technical Report;
- Eric Olin is the QP responsible for Processing and Recovery Sections 13 and 17 and portions of Sections 1, 24, 25 and 26 summarized therefrom, of this Technical Report;
- Tim Olson is the QP responsible for Mineral Reserves and Mining Sections 15 and 16 and portions of Sections 1, 24, 25 and 26 summarized therefrom, of this Technical Report. Mr.

Olson is also responsible for Sections 2 through 6, 18, 19, 21 through 23, 27 and 28 of this Technical Report; and

- Mark Willow is the QP responsible for Environmental Section 20 and portions of Sections 1, 24, 25, and 26 summarized therefrom, of this Technical Report.

2.3 Details of Inspection

Site visits made by the QP's are summarized in Table 2-1.

Table 2-1: Site Visit Participants

Personnel	Company	Expertise	Date(s) of Visit	Details of Inspection
Glen Cole	SRK	Geology/ Resources	May 12 – 15, 2017	Site tour including core logging facility, examination of core, and analytical laboratory.
Eric Olin	SRK	Processing/ Recovery	May 11 – 15, 2017	Site tour of current processing facilities, infrastructure, and analytical laboratory.
Tim Olson	SRK	Mining/Reserves/ Infrastructure	May 11 – 15, 2017	Site tour of current mining and infrastructure.

2.4 Sources of Information

This report is based in part on internal Company Technical Reports, previous studies, maps, published government reports, Company letters and memoranda, and public information as cited throughout this report and listed in the References Section 27.

2.5 Effective Date

The effective date of this report is June 30, 2017.

2.6 Units of Measure

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated. Serabi's operations incur most capital and operating costs in Brazilian Reals (R$) and, accordingly, R$ values are referenced throughout this report.

3 Reliance on Other Experts

The Consultant's opinion contained herein is based on information provided to the Consultants by Serabi throughout the course of the investigations. SRK has relied upon Serabi and the work of other consultants in the project areas in support of this Technical Report.

The Consultants used their experience to determine if the information from previous reports was suitable for inclusion in this Technical Report and adjusted information that required amending. This report includes technical information, which required subsequent calculations to derive subtotals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, the Consultants do not consider them to be material.

SRK has relied upon Serabi for information regarding the surface land ownership/agreements as well as the mineral titles and their validity. Land titles and mineral rights for the project have not been independently reviewed by SRK and SRK did not seek an independent legal opinion for these items.

4 Property Description and Location

4.1 Property Location

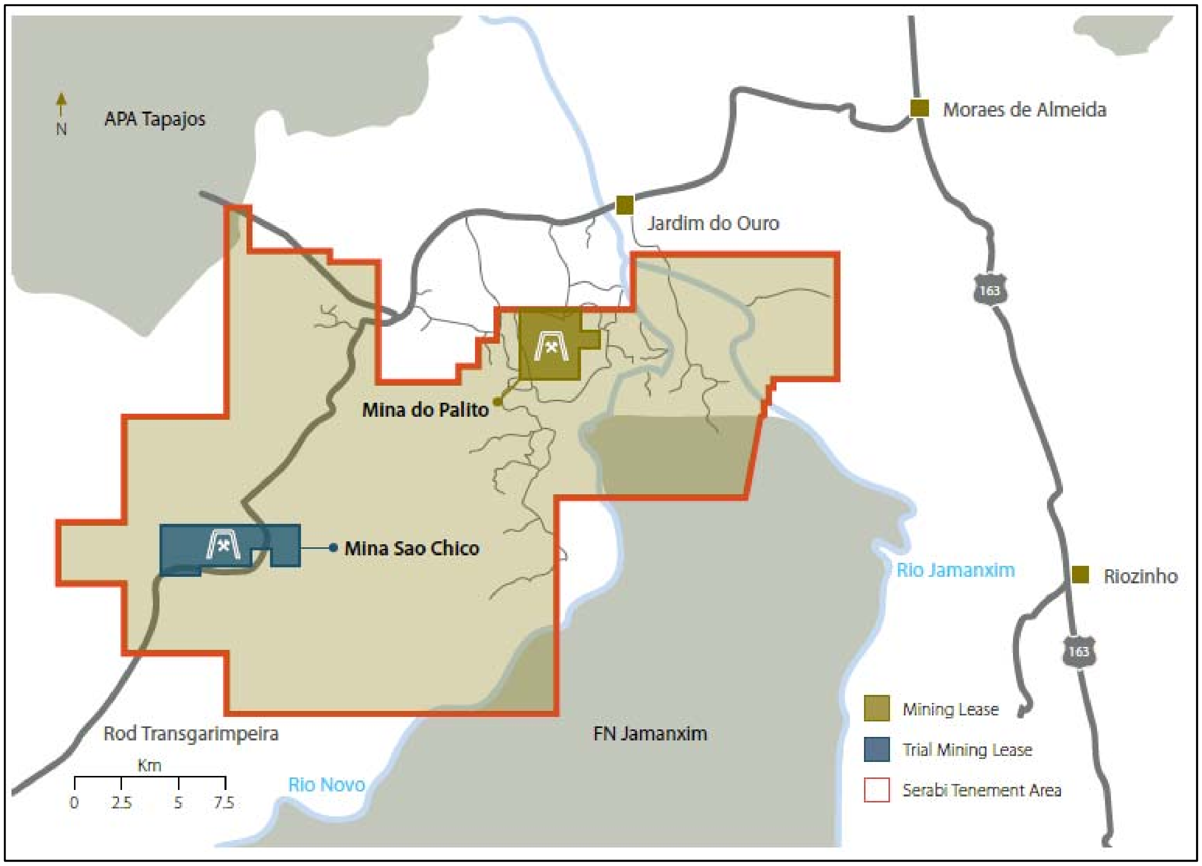
The Palito Mining Complex is comprised of the Palito and São Chico underground mines which are located in the Tapajós Mineral Province in the southeast part of the Itaituba Municipality in the west of Pará State in central north Brazil, near the eastern municipal boundary with the Novo Progresso Municipality (Figure 4-1).

Source: Serabi, 2017

Figure 4-1: Palito Mining Complex

The Palito underground mine is centered on latitude 6.31˚S and longitude 55.79˚W and includes the adjacent Palito Mineral processing plant. The Palito Mine lays some 4.5 km southwest of the village of Jardim do Ouro and approximately 15 km via road. Jardim do Ouro lies on the Transgarimpeira Highway some 30 km west-southwest of the town of Moraes de Almeida, which is located on the junction of the Transgarimpeira Highway and the BR 163 or Cuiabá – Santarém Federal Highway. Moraes de Almeida is approximately 300 km south south-east by road of the municipal capital and similarly named city of Itaituba.

The São Chico underground mine is centered on latitude 6.41˚S and longitude 55.94˚W and lays some 30 km southwest of the Palito Mine. It is accessed by road from the Palito Mine along the Transgarimpeira Highway. The location of the mines can be seen in Figure 4-2.



Source: Serabi, 2017

Figure 4-2: Palito and São Chico Underground Mines

4.2 Mineral Titles

The Palito Mining Complex is formed by 48,846 ha of tenements granted in the Tapajós Province, including 1,150 ha of mining concession. In addition, there are 6,369 ha in mineral exploration license application and 1,416 ha in mining concession application resulting in a total area for this property of 56,631 ha (Table 4-1 and Figure 4-3).

The mining concession and exploration licenses are issued to Serabi Mineração S.A., which is the wholly owned Brazilian subsidiary of Serabi Gold plc.

National Department of Mineral Production (*Departamento Nacional de Produção Mineral* or "DNPM") legislation allows for the extension of up to three years for exploration licenses beyond the initial period of validity, through a process of report presentation and application for an extension.

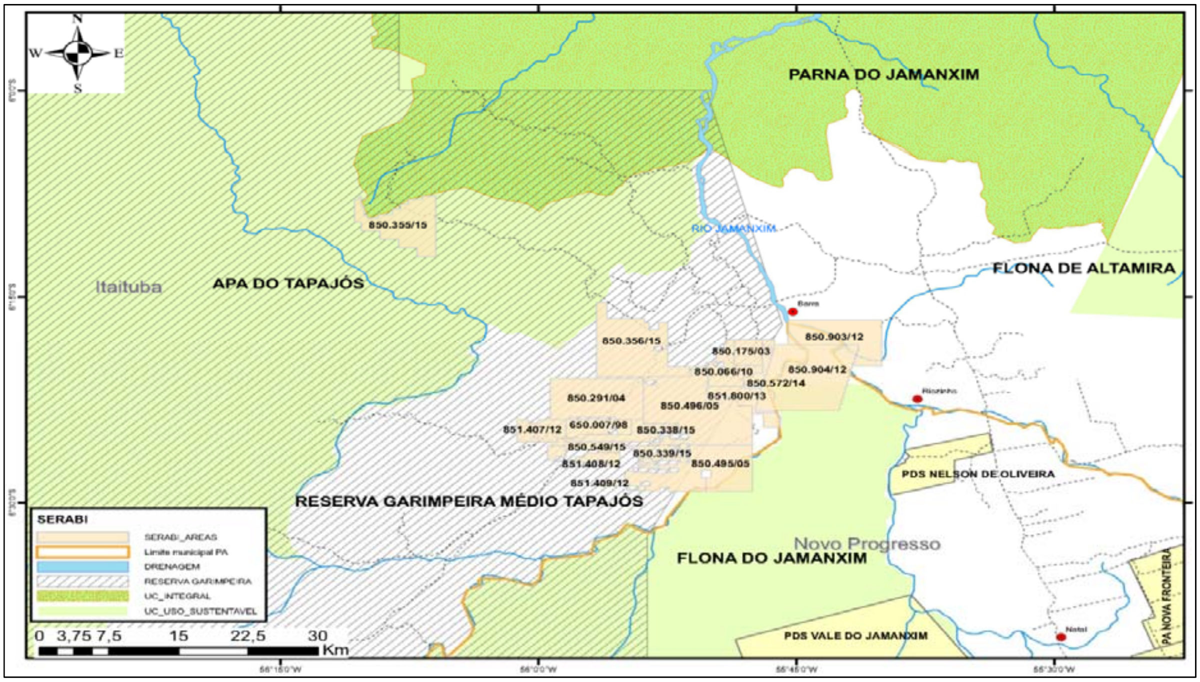
Exploration extension licenses cannot be renewed and must either be relinquished or can be upgraded to a mining concession through submission of an application including a mineral resource statement, economic assessment and mining plan and schedule. Mining concessions are valid until exhaustion of the resources or cessation of mining.

Table 4-1: Mining Concessions and Exploration Licenses for the Palito Mining Complex

Number	Type	Hectares	Current Annual Commitment	Potential Annual Commitment	Expiration Date
			R$	R$	
850.175/2003	Mining concession	1,150			None
650.007/1998	Mining concession application	1,416			03/14/2014 (1)
851.800/2013	Exploration license	1,380	4,224		11/12/2018
850.066/2010	Exploration license	1,811	5,541		28/08/2018
850.904/2012	Exploration license	7,920	24,236		07/04/2019
851.407/2012	Exploration license	1,461	4,470		29/06/2018
851.408/2012	Exploration license	1,051	3,216		29/06/2018
851.409/2012	Exploration license	491	1,503		29/06/2018
850.338/2015	Exploration license	1,898	5,807		29/06/2018
850.339/2015	Exploration license	1,540	4,714		29/06/2018
850.572/2014	Exploration license	670	2,050		23/03/2019
850.291/2004	Exploration license	5,405	16,538		04/03/2019
850.496/2005	Exploration license	8,580	26,255		19/09/2019
850.549/2015	Exploration license	833	2,550		04/10/2019
850.495/2005	Exploration license application	6,369		19,488	
850.356/2015	Exploration license	6,263	19,164		29/06/2018
850.355/2015	Exploration license	4,186	12,811		29/06/2018
850.903/2012	Exploration license	4,207			Expired (2)
Total		**56,631**	**133,079**	**19,488**	

(1) Exploration license No. 650.007/1998 expired March 14, 2014. A mining concession application is pending.
(2) Serabi has given notice of its relinquishment of Exploration License No 850.903/2012. Formal confirmation of relinquishment has not yet been received.

Source: Serabi, 2017



Source: Serabi, 2017

Figure 4-3: Map of Mining Concession and Exploration Licenses

Serabi holds two further tenements which do not form part of the Palito Mining Complex and are not considered in this report (Table 4-2).

Table 4-2: Exploration Licenses Not Included in the Palito Mining Complex

Number	Type	Hectares	Annual Commitment R$	Expiration Date
850.461/2004	Exploration license	2,971	9,092	14/09/2018
880.121/2007	Exploration license	4,733	21,915	17/08/2018
Total		**7,704**	**31,107**	

Source: Serabi, 2017

4.2.1 Surface Rights

Palito

Serabi initially acquired the surface rights to the immediate Palito Mine area through a purchase agreement with the existing "garimpeiros" (artisanal miners) entered into in 2002 and since that time has acquired from other garimpeiros and/or farmers additional parcels of land with the intention of securing the surface rights. It has also entered into agreements with other parties for access rights in return for making monthly rental payments in the amount of R$14,900.

In total, these surface rights cover a total area of approximately 865 ha out of the total tenement holding of 56,631 ha. Of these surface rights, 367 ha lie within the mining concession. Serabi holds the land possession rights over the remaining 783 ha of the mining concession.

São Chico

Waldimiro Martins (WM) originally owned 100% of the São Chico property and in 2006 he entered into an agreement with Ademir and Jandira (A&J), whereby A&J would acquire 100% of the São Chico project. The terms of the agreement are not known.

On November 13, 2006, Gold Anomaly Ltd (GOA) entered into an agreement with A&J whereby GOA could earn up to 60% of the São Chico property. GOA subsequently exercised this option.

In 2008, WM initiated court action against A&J to rescind his agreement with A&J on certain grounds.

On May 12, 2009 the Itaituba Court granted an injunction to suspend the agreement between WM and A&J. This injunction provisionally transferred total control of the São Chico property to WM.

Following the injunction granted May 12, 2009, GOA subsequently entered into an agreement with WM to protect GOA's 60% interest in the São Chico property. Under the terms of this agreement Gold Aura do Brasil Mineração Ltda (GOAB), a wholly owned subsidiary of GOA, would own 100% of the mining rights associated with the São Chico property.

In September 2010 Kenai Resources Ltd (Kenai) entered into an option agreement with GOA whereby Kenai had the option to purchase up to 75% of issued and outstanding shares of GOAB. In December 2011, Kenai entered into a letter agreement with GOA to acquire GOAB and provide Kenai with full ownership of the São Chico project. That transaction was completed, with GOAB becoming a wholly owned subsidiary of Kenai.

In July 2013 Serabi completed the acquisition of the entire share capital of Kenai, with GOAB becoming a wholly owned subsidiary of Serabi.

4.2.2 Royalties, Agreements and Encumbrances

CFEM Tax and Royalties

Financial Compensation for Exploration of Mineral Resources (CFEM) is a federal tax levied on production from mining operations and is applicable to the Palito Mining Complex. CFEM taxable basis is the gross revenue less, indirect tax costs associated with the sale of mineral resources. The CFEM rates for gold, silver and copper, the primary products of the Palito Mining Complex, are 1.5%, 2.0% and 2.0% respectively.

The São Chico property is subject to two royalty arrangements:

- A&J have a 3% Net Smelter Royalty (NSR) to a maximum of US$10 million; and
- WM has a royalty of US$3.75/oz of gold production.

Obligations Related to Exploration Licenses

To retain the exploration licenses for the Palito Mining Complex, Serabi will need to make annual payments to the DNPM, which are presently calculated as R$133,079 as shown in Table 4-1. Additionally, there is one pending application for an exploration license (No. 850.495.2005) which, if approved, will require an annual payment of R$19,488.

Obligations Related to Mining Licenses

To maintain a mining license, Serabi must comply with the conditions set out by the DNPM in respect to annual reporting and environmental compliances, but no taxes are owed, except those incurred on production.

4.3 Environmental Liabilities and Permitting

4.3.1 Environmental Liabilities

Environmental liabilities to which the property is subject include, but are not necessarily limited to:

- Closure and reclamation liabilities associated with the cessation of mining and decommissioning and dismantling of all surface and underground facilities;
- Serabi has not yet received the final approval/licensing from the regulatory agency for the current tailings dam facilities, although the application documentation has been submitted;
- Potential groundwater impacts and possible remediation requirements associated with the detection of cyanide in monitoring well PZ-01; and
- Potential surface water contamination from mining facilities as indicated by elevated constituent concentrations (exact sources currently unknown).

Additional discussion on these issues is provided in Section 20.

4.3.2 Required Permitting

This section discusses the general permits that must be acquired to conduct mining and processing at the Palito and São Chico mines. Additional information on the permits and licenses already obtained and their status is provided in Section 20.

Mining Titles

After the mining concession is granted by the National Department of Mineral Production (*Departamento Nacional de Produção Mineral* or DNPM), the holder must:

- Submit a report on all mining and processing activities (RAL or "Relatorio Anual de Lavra") for the previous year, including, but not limited to quantities of materials mined and processed; and
- Pay a monthly "royalty" on mining activities (*Compensação Financeira pela Exploração de Recursos Minerais* or CFEM) which is shared by federal, state, and municipal jurisdictions, depending on the mineral resource in the respective territory.

Any necessary modifications to the approved mine plan need to be submitted to the DNPM for approval.

Environmental Permitting

The Brazilian National Environmental Policy, established on the August 31, 1981 by Federal Law # 6.938, requires all potentially or effectively polluting activities to have an environmental license. Applicable rules regarding the licensing procedure were established by resolution #237 of the National Council of the Environment (*Conselho Nacional do Meio Ambiente* or CONAMA) on 19th December 1997. The licensing procedure allows the issuing agency to determine the conditions, limits and measures for the control and use of natural resources, and permits the installation and implementation of a project.

The license can be issued by either a federal, state or municipal agency. Authority to issue a license is based on the extent of likely impacts and generally follows the rules established by CONAMA's Resolution # 237/97 listed below:

- Federal entities are responsible for licensing activities that may cause national or regional environment impact (more than two federal States);
- State entities and the Federal District Entity (the area covered by the capital of Brazil, Brasilia) are responsible for activities that may cause State environment impact; and
- Municipal entities are responsible for licensing activities that may cause low local environment impact (within city limits).

During exploration, the Project proponent generally initiates the environmental licensing process, for which they must have the following:

- Vegetation Suppression (*supressão vegetal*); and
- Environmental Authorization (*autorização ambiental de funcionamento*).

These preliminary authorizations are issued by the Secretariat of the Environment and Sustainability in the State of Pará (*Secretaria de Estado de Meio Ambiente e Sustentabilidade* or SEMAS). The regulatory framework sets out a three-step environmental licensing process that is conceptually equivalent between SEMAS and the federal Institute of the Environment (*Instituto do Meio Ambiente* or IMA) (although having different names):

- **Preliminary License or *Licença Prévia* (LP)** – establishes the environmental feasibility and viability of the project, and approves the concept and location. In order to obtain this license, the regulatory authority must approve the baseline studies, environmental impact assessment (*Estudo de Impacto Ambiental* or EIA), and environmental impact report (*Relatório de Impacto Ambiental* or RIMA), and hold formal public hearing(s). The LP established the conditions and agreements for environmental management, mitigation, reclamation and compensation(s) for the project. Negative impacts identified in the EIA/RIMA, may require some form of compensation according to Brazilian Law #9.985/2000, which introduced the System of Conservation Units and determined environmental compensation standards;
- **Installation License or *Licença de Instalação* (LI)** – approves the basic engineering and authorizes the project proponent to implement the project (subject to compliance with specified conditions). In order to obtain this license, the regulatory authority must approve the Environmental Control Plan (*Plano de Controle Ambiental* or PCA). Requirements for reclamation and closure are also defined through the approval of the Reclamation Plan (*Plano de Recuperação de Áreas Degradadas* or PRAD). This license must be obtained prior to the commencement of construction activities. Also at this stage, the project proponent must identify required Legal Reserves. The size of the Legal Reserve depends on state regulation. Each Legal Reserve shall be validated by the Rural Environmental Cadastre (*Cadastro Ambiental Rural* or CAR) or at the Real Estate Notary Office as property of the entrepreneur, according to Federal Law #12.651/2012; and
- **Operations License or *Licença de Operação* (LO)** – confirms that the conditions stipulated in the LI have been met (including evidence that all the environmental programs and control

systems were duly installed), and authorizes the commencement of operations. The project proponent will be required to apply for the LO every four to eight years (COPAM 17 edit from 1996), although in practice the licensing body has discretion to invoke a more regular renewal regime At each renewal time, the operator must provide a detailed report on environmental performance, with particular attention to concurrent reclamation and implementation of the PRAD.

As noted above, for activities where the environmental impact may be considered significant, an environmental impact assessment (the EIA or RIMA in Brazil) must be undertaken and presented to the appropriate licensing agency (federal, state, or municipal). In addition, the applicable government agency and the project owner are required to publish all related information and provide for public hearings, if required, according to the regulation of each location. The content of EIA-RIMAs is similar to that required under the Equator Principles and the IFC Performance Standards, and is agreed by the relevant regulatory authorities prior to undertaking the work. Modification to the mine plan may require re-issuance of the LI and/or LO, depending on the magnitude of the proposed changes.

One of the remaining important authorizations issued to a mining operation by the Brazilian Institute of the Environment and Renewable Natural Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* or IBAMA), which is the Brazilian Ministry of the Environment's administrative arm, is the Authorization for Vegetation Suppression (*Autorização para Supressão Vegetal* or ASV), which enables the operator to remove vegetation and forest resources and alter the designated land uses in the area of the mine.

The responsibility to protect the environment is shared between the federal, state, and municipal authorities (Brazilian Federal Constitution - CF/1988, Article #24; Complementary Law #140/2011). Competence for environmental licensing could be delegated to municipalities through an agreement to impact local environmental activities.

The prescription for recovery of the impacted areas from mineral resource exploitation can be found in the Brazilian Constitution, 1988, Article #225, § 2, where recovery should be compatible with the technical solution required by the environmental agency.

The DNPM regulates the mine closure requirements by the Mining Regulation Standards (*Normas Reguladoras de Mineração* or NRM), including the environmental ones. Specifically, NRM #20 deals with mine closure.

4.3.3 Required Permits and Status

In Brazil, mineral resources are federal property, regulated by the DNPM. The DNPM grants both Utilization Guidelines and Mining Concessions. The first is temporary and only valid when coupled with an environmental license and also limits the amount of material that can be mined. DNPM issues Exploitation Permits based on technical criteria, which conditionally authorizes the extraction of minerals in a titled concession area. Serabi has been granted a Mining Concession for the exploitation of the Palito Mine (DNPM #850175/2003) and Utilization Guidelines for the exploration and limited exploitation of the São Chico Mine (DNPM #650007/1998).

Environmental considerations, however, may also be administered by state and local agencies in accordance with the prevailing interest, for example relating to specific environmental characteristics.

At the operational stage, the exploration license holders may require the following environmental permits:

- Vegetation Suppression;
- Surface Water Uptake Authorization;
- Groundwater Uptake Authorization;
- Environmental Authorization; and/or
- Operation License (granted after Preliminary and Installation Licenses).

The authorizing acts are detailed in Section 20.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Topography, Elevation and Vegetation

Palito Mine

The Palito Mine lies at an elevation of 260 masl. Local physiography consists of a rugged topography forming hills and steep sided valleys in the immediate area, and more subdued undulating hills and valleys in the surrounding region. There are numerous creeks (Igarapés) draining the incised topography in the area, all of which drain into the Rio Novo and Jamanxim Rivers.

The majority of the environment is covered by tropical forest typical of the Amazon region, however north and west of the Palito Mine; the forest has been felled to create pastures for the grazing of livestock along the Transgarimpeira Road.

Many of the drainages radiating away from the Palito Mine have been worked intensely in the 1980's by the *garimpeiros* resulting in manmade swamps, permanent wetlands and old forest destruction.

São Chico Mine

The São Chico property is characterized by low rolling hills with an average elevation of approximately 240 masl. Much of the area has been cleared for grazing of livestock, but the remainder is covered by dense tropical forest. São Chico is located in a shallow valley which broadens to the east.

5.2 Accessibility and Transportation to the Property

The Palito Mine lays some 4.5 km southwest of the village of Jardim do Ouro and approximately 15 km via unsealed road. Jardim do Ouro lies on the Transgarimpeira Highway some 30 km west-southwest of the town of Moraes de Almeida, which is located on the junction of the Transgarimpeira Highway and the BR 163 or Cuiabá – Santarém Federal Highway. Moraes de Almeida is approximately 300 km south south-east by road of the municipal capital and similarly named city of Itaituba.

The São Chico Mine lays some 30 km southwest of the Palito Mine. It is accessed by road from the Palito Mine along the Transgarimpeira Highway.

An airstrip suitable for light planes is currently fully operative at the Palito site.

5.3 Climate and Length of Operating Season

The local climate has two well defined seasons, the rainy season from December to June and the dry season from June to December. Regional rainfall averages around 1,400 mm/y although this now fluctuates greatly due to the deforestation effect of local farming.

The temperature does not vary significantly ranging between 24°C and 33°C, with an average of around 26°C. Relative humidity ranges from 70% to 80% depending on the season. Mining and processing operations are conducted year-round.

5.4 Sufficiency of Surface Rights

Surface rights are discussed in Section 4.2.1.

5.5 Infrastructure Availability and Sources

5.5.1 Power

Grid electricity is sourced from the neighboring municipality of Novo Progresso 135 km away, and brought to site via a spur line. Backup power and peaking power is supplied by a fleet of onsite diesel fired generators.

5.5.2 Water

Water is in abundance locally and is sourced from small reservoirs and dams constructed on site for industrial purposes and from water wells for potable water requirements.

5.5.3 Personnel

Labor employed by the project is preferentially sourced from the local towns and villages, within the state of Pará. Other more job specific professionals unavailable in Pará are sourced preferentially from within Brazil.

5.5.4 Tailings Disposal Areas

Ore from both the Palito and São Chico mines is processed by the Palito processing plant and tailings are deposited into existing clay lined tailings disposal areas that are located adjacent to the processing plant.

5.5.5 Waste Rock Disposal Areas

Waste rock from development mining at Palito and São Chico is stored underground as stope backfill or placed in waste rock storage facilities located adjacent to the mine portals.

5.5.6 Processing Plant Site

The processing plant is located at the Palito site as shown in Figure 5-1, which also shows the locations of the tailings and waste rock disposal areas.

Source: Serabi, 2017

Figure 5-1: Location of Processing Plant and Tailings and Waste Rock Disposal Areas

6 History

The Palito deposit is located in the eastern portion of the Tapajós Mineral Province where the presence of gold has been reported as early as 1747 from the Colonial Portuguese era. Gold production in the Tapajós commenced in the mid-20th century via artisanal miners (garimpeiros) reaching a peak in the 1970's and 1980's with estimated production of between 15 to 30 t/y, from over 500,000 garimpeiros.

Total historical production from the Tapajós is estimated at some 15 to 30 Moz as reported by the Serviço Geológico do Brasil (CPRM). However, accurate reports do not exist. Gold mining in the Palito Mining Complex area was initiated by garimpeiros during the 1970's, who typically worked alluvial and colluvial gold sources up stream until they came upon the residual source. Generally, the garimpeiros worked the residual mineralized saprolite profile containing free primary and secondary gold. In circumstances where extremely high grade was encountered in fresh rock, the garimpeiros sunk shafts and mined the vein underground by gallery development. The mining method employed traditionally was by hand and hydraulic mining in the saprolite, using basic gravity separation and occasionally mercury amalgamation. In the high grade, vein material extracted from fresh rock or deeper open casts, the material was crushed and then gravity separated and/or mercury amalgamated.

6.1 Prior Ownership and Ownership Changes

Palito Mine

Modern exploration was initiated in 1994 by RTDM, which conducted surface geochemical sampling, auger drilling, ground and airborne geophysics, and diamond drilling in the Palito Mine area.

The founders of Serabi commenced operating in Brazil in 1999, with the objective of acquiring, evaluating and mining hard rock gold deposits previously unknown or technically too difficult for the garimpeiros to exploit.

Having evaluated several opportunities, the group acquired the Palito Mine in 2001, forming the basis for Serabi. In 2002, Serabi purchased RTDM's historical Tapajós exploration database and negotiated access to RTDM's exploration drill core library, following RTDM's decision to withdraw from the Tapajós Province.

Serabi initially acquired the surface rights to the immediate Palito Mine area through a purchase agreement with the existing garimpeiros entered into in 2002 and since that time has acquired from other garimpeiros and/or farmers additional parcels of land with the intention of securing the surface rights. It has also entered into agreements with other parties for access rights in return for making monthly rental payments.

São Chico Mine

Waldimiro Martins (WM) originally owned 100% of the São Chico property and in 2006 he entered into an agreement with A&J, whereby A&J would acquire 100% of the São Chico project. The terms of the agreement are not known.

On November 13, 2006, GOA entered into an agreement with A&J whereby GOA could earn up to 60% of the São Chico property. GOA subsequently exercised this option.

In 2008, WM initiated court action against A&J to rescind his agreement with A&J on certain grounds.

On May 12, 2009 the Itaituba Court granted an injunction to suspend the agreement between WM and A&J. This injunction provisionally transferred total control of the São Chico property to WM.

Following the injunction granted May 12, 2009, GOA subsequently entered into an agreement with WM to protect GOA's 60% interest in the São Chico property. Under the terms of this agreement GOAB, a wholly owned subsidiary of GOA, would own 100% of the mining rights associated with the São Chico property.

In September 2010 Kenai entered into an option agreement with GOA whereby Kenai had the option to purchase up to 75% of issued and outstanding shares of GOAB. In December 2011, Kenai entered into a letter agreement with GOA to acquire GOAB and provide Kenai with full ownership of the São Chico project. That transaction was completed, with GOAB becoming a wholly owned subsidiary of Kenai.

In July 2013 Serabi completed the acquisition of the entire share capital of Kenai, with GOAB becoming a wholly owned subsidiary of Serabi.

6.2 Exploration and Development Results of Previous Owners

Exploration results, including the results of previous owners are described in Section 9 herein. Small scale artisanal miners have intermittently attempted to work the Palito and São Chico areas but are no longer active and no historical production figures are available. There was some re-working of tailings by villagers at São Chico but no records are known to exist.

6.3 Historic Mineral Resource and Reserve Estimates

SRK has not done sufficient work to classify the historical estimates for the Palito and São Chico mines as current Mineral Resource or Mineral Reserve estimates and Serabi is not treating historical estimates as current Mineral Resource or Mineral Reserve estimates.

6.4 Historic Production

Historic production for the Palito Mining Complex under Serabi's ownership is summarized in Table 6-1. There was no production during the 2011 – 2013 period because the operation was placed on care and maintenance.

Table 6-1: Historic Production for the Palito Mining Complex under Serabi's Ownership

Year	Processed (t)	Head Grade Au (g/t)	Production Au (oz)
2005	57,958	9.2	15,345
2006	117,618	9.4	32,498
2007	173,485	5.8	28,942
2008	130,792	4.6	17,003
2009	69,557	2.8	6,173
2010	18,094	1.8	1,020
2011	-	-	-
2012	-	-	-
2013	-	-	-
2014	85,987	8.8	18,452
2015	130,299	8.4	32,629
2016	158,966	8.1	39,390
2017 (Jan 1 - Jun 30)	90,568	6.7	18,009
Total	**1,033,324**	**7.0**	**209,461**

Source: Serabi (2005 – 2017)

7 Geological Setting and Mineralization

7.1 Regional Geology

Northern Brazil is dominated by the Precambrian Amazonian Craton, which is divided into the Guiana and Guaporé shields. The Amazon Basin separates the Guiana and Guaporé shields, while Neoproterozoic orogenic belts bound them. Orogenic movements that took place during the Trans Amazonian Orogeny between 2.2 and 1.9 billion years (Ga) are thought to have initiated the development of major northwest-southeast structures and crustal lineaments that acted as controls on mineralization until the Late Mesozoic. Following the break-up of Pangaea, Amazonia entered a prolonged period of quiescence and weathering, characterized by widespread laterite and saprolite development across much of the craton.

The Palito and São Chico gold deposits are located within the northern portion of the Tapajós-Parima Orogenic Belt (TPOB), a constituent of the Ventauri-Tapajós province of the Guaporé Shield. Formed between 2.5 and 1.8 Ga, the TPOB is a northwest oriented magmatic arc bound to the north by the Amazonian Basin and to the south by the Cachimbo Graben. Within the TPOB, the Tapajós Gold Province hosts numerous primary gold deposits over an area of approximately 300 km by 350 km.

The Tapajós Province represents a tectonically controlled geological evolution over 140 million years (Ma) during the Orosirian Period of the Paleoproterozoic Era, comprising four plutonic events (Coutinho et al., 2000). Two main units form the basement: the 2.4 to 2.0 Ga Paleoproterozoic Cuiú-Cuiú metamorphic suite and the >2.1 Ga Jacareacanga metamorphic suite. The Jacareacanga suite is a sedimentary-volcanic sequence, metamorphosed to a regional greenschist facies, with units of sericite and chlorite schists and rare banded iron formations. The Cuiú-Cuiú suite forms the basement for the Palito area and is comprised of orthogneisses of dioritic to granodioritic composition, locally mylonitized, deformed tonalitic granitoids, and enclaves or rafts of amphibolites. Both suites are intruded by monzogranites of the 2000 – 1900 Ma Paráuari suite, tonalites, diorites and granodiorites of the 1907 – 1898 Ma Tropas suite, and granites and granodiorites of the 1893 – 1853 Ma Creporizão suite. These three intrusive suites are considered to have calc-alkaline affiliations and may be considered remnants of a magmatic back arc system interpreted for the region.

Coeval ryolites, dacites and andesites of the 1900 – 1853 Ma Bom Jardim and Salustiano Formations and volcaniclastics of the 1893 – 1853 Ma Aruri Formation cut through all of the older units. The post-collisional 1882 – 1870 Ma Maloquinha Granite suite intrudes throughout the Tapajós Province and is associated with the strong extensional episode, pre-dating deposition of the Uatumã Volcanics (Iriri Group, Aruri Formation and Salustiano Formation). The Maloquinha Granites are considered to be the deeper intrusive phase of the Uatumã Volcanics and the source of gold mineralization in the Tapajós Province.

Younger sedimentary rocks cover the Maloquinha and Uatumã suites along a northwest-southeast trending feature in the central and western portions of the Tapajós Province.

Mineralization at the Palito and São Chico deposits is hosted in granite and granodiorite of the Paráuari suite (Figure 7-1).

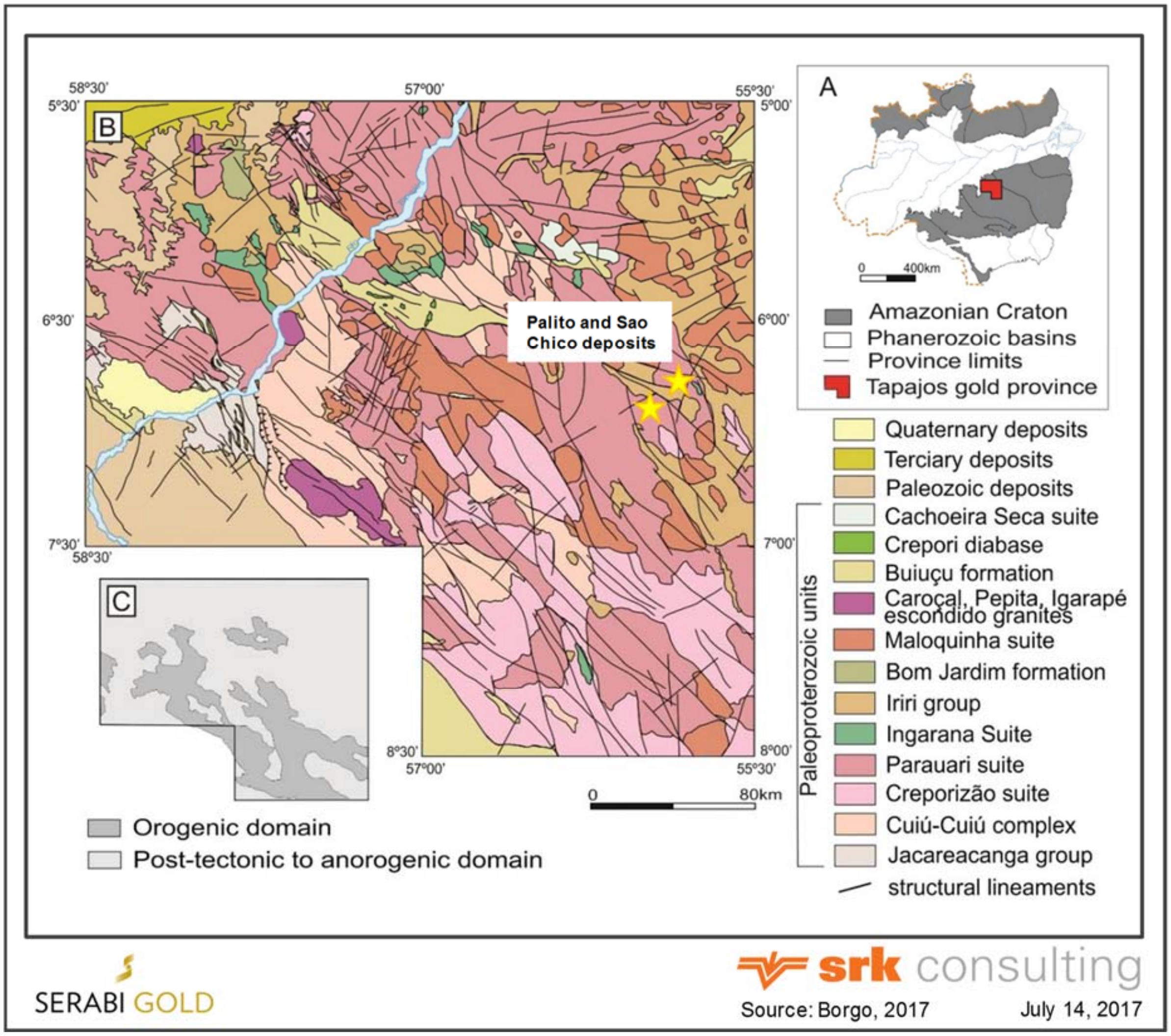


Figure 7-1: Regional Geology Setting with Palito and São Chico Deposits Hosted Within the Paleoproterozoic Paráuari Suite

Sources:
A: Localization of the Tapajos Gold Province (TGP) in the Amazonian Craton (Borgo, 2017)
B: Simplified map of the TGP (modified from Almeida et al. 2000 in Borgo 2017)
C: Distribution of orogenic and post-tectonic to anorogenic domains within the TGP (Klein and Vasquez, 2000)

7.2 Property Geology

7.2.1 Palito Mine

In the vicinity of the Palito Mine, three types of alkaline granitoids dominate; the Rio Novo Granite, the Palito Granite, and the Fofoquinha Granodiorite. The Rio Novo Granite is found to the east of the main Palito Mine area and forms a sharp contact against the Palito Granite on its western margin. To the west of the immediate Palito Mine area, the Palito Granite has a chilled contact with the Fofoquinha Granodiorite. Feldspar porphyritic dykes and sills of dacite composition intrude the granitoids, while gabbroic bodies termed the Rio Novo Gabbro are restricted to within the Fofoquinha unit.

The Rio Novo Granite is a medium grained, porphyritic quartz-plagioclase granite, varying in color from pink-orange to red-green depending on the degree of hydrothermal alteration. Granophyric textures are common along with lesser developed miarolitic cavities, silicified broken and brecciated zones which are more intensely hydrothermally and propilitically altered, giving the rock a grey to green coloration. Zones intensely broken by brittle faulting are also common, typically associated with breccia and chlorite and fluorite veins. Xenoliths of Fofoquinha Granite are found within the Rio Novo Granite, indicating it is a later phase. The unit cuts the older Paráuari suite and is overlain by volcanics of the Iriri Group.

The Palito Granite is medium grained, inequigranular, with local finer grained variations at contact zones with the surrounding granites. Potassic alteration is pervasive and the granite has an intense red coloration. Miarolitic cavities, crystalline quartz and poorly developed granophyric textures are occasionally present. In near surface exposures, the granite is strongly hydrothermalized and shows characteristics of differential weathering, reflecting features relating to phased emplacement or magmatic flow. The Palito Granite hosts the majority of mineralized structures within the Palito Mine.

The Fofoquinha Granodiorite is medium to coarse grained, inequigranular to porphyritic in texture, with 15% to 35% mafic mineral content of primarily amphibole and iron oxides. The granodiorite has been observed to be enriched in magnetite, which disappears when the rock shows evidence of potassic metasomatism and is likely related to the intrusion of the Rio Novo or Palito granites. The color of the granodiorite varies from grey to green-grey, and coarse plagioclase crystals show intense zonation.

The Rio Novo Gabbro occurs as rounded intrusions varying from 100 to 500 m in diameter. Local brecciation and xenoliths of the Fofoquinha Granodiorite within the unit indicates post emplacement of the gabbro. Brittle faulting and hydrothermal alteration are also observed to have affected the Rio Novo Gabbro.

Sub-volcanic dykes are granitic in composition, with porphyritic texture and a very fine to aphanitic matrix. Miarolitic cavities are common, with small concentrations of mafic minerals and sulfides. The dykes are grey-pink to light brown in color, and have been hydrothermally altered by potassic metasomatism, propylitization, sericitization and sulfidization. They are recognized as cutting all lithologies on the property and rarely exceed 1 m in width, but locally have been recorded up to 30 m wide.

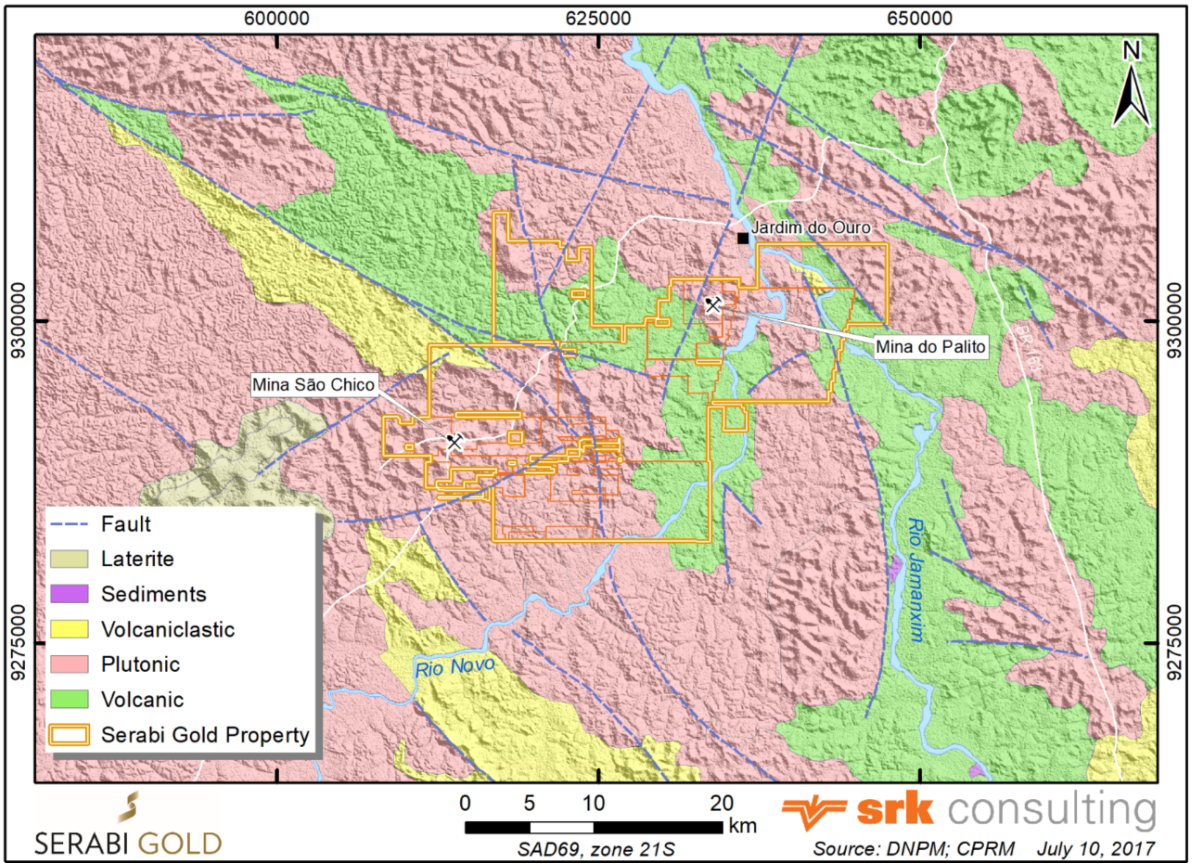
The mineralized structures at the Palito deposit are generally dark grey-green intensely sericite-silica-pyrite-chalcopyrite +/- chlorite, carbonate, pyrrhotite, sphalerite altered granite that are often unrecognizable as granitoid protoliths. The hydrothermal alteration forms the lower-grade mineralization selvedges and the host to the higher-grade quartz-sulfide and massive sulfide zones. Distal from the structures and intensely hydrothermally altered zones, the granite hosts display strong potassic alteration, grading into the regional scale background potassic alteration within 1 to 5 m of the mineralized structure. Alteration zones are found to range from decimeters to meters in width.

7.2.2 São Chico Mine

Outcrop at the São Chico deposit is poor due to widespread laterite development and alluvium, with the average depth to fresh bedrock approximately 10 to 20 m below the surface. The cover comprises a 1 to 3 m red, lateritic top soil, with a lower boundary marked by a pisolith of quartz fragments and ferruginous pebbles. Saprolitic bedrock underlies the laterite and gradually transitions to the fresh host rock.

Host rocks of gold mineralization at São Chico are composed of medium-grained, leucocratic, feldspar phyric granodiorite and diorite of the Paráuari suite. Mineralization is hosted in west-northwest trending, steeply south dipping fault zones with a shear component. The mineralized faults have been offset by north-northeast trending normal faults with a dextral lateral displacement.

The location of both the Palito and São Chico properties in relation to a simplified local geological plan is provided in Figure 7-2.



Source: SRK, 2017

Figure 7-2: Local Geology Setting of the Palito and São Chico Properties

7.3 Structural Setting

Regional structural analysis of the Tapajós Province has identified two compressive deformation regimes. The first compressive event, with peak deformation at approximately 1.96 Ga, resulted in the development of ductile and brittle-ductile regimes, while the second event at 1.88 Ga resulted in brittle deformation. Together, these events resulted in major north-south, northwest-southeast and east-west lineament sets. The geometry of the lineaments and structures are compatible with a combination of Riedel fracturing and strike-slip fault systems, where the principle vector of compression is oriented in an east-west and east northeast – west southwest direction. The Palito Mining Complex lies on the northwest-southeast trending Tocantinzinho Trend, which is the major controlling structural feature in the Tapajos region.

In October 2011, Serabi commissioned the services of Dr. Brett Davis of Olinda Gold to perform a structural review of the Palito Mining Complex. The following observations were made from his investigation:

- The project area is strongly dissected by several fault sets; prevalent faults strike subparallel to pervasively developed deformation fabrics. The pervasively developed fabrics are interpreted as forming coeval with similarly oriented faults, with northeast-southwest faults broadly parallel to northeast-southwest fabrics and northwest-southeast faults broadly parallel to northwest-southeast fabrics
- The northeast-southwest fault set is interpreted as forming synchronous with east-west striking fault sets. The east-west faults generally have a shorter strike length and terminate against the northeast-southwest fault, and are interpreted as strain accommodation features that link the northeast-southwest faults
- The northeast-southwest and east-west fault sets are interpreted as forming synchronous with granite emplacement; the event that produced the northeast-southwest structures is considered to be the main episode of deformation and pluton emplacement, and likely responsible for gold-bearing hydrothermal systems. The faults display curved geometries around the margins of the plutons and cut the intrusions
- Zones of contact metamorphism are spatially associated with all intrusions. The ovoid shape of the plutons is interpreted to be a product of emplacement at levels suitable for ductile fabric formation, with the long axes of the pluton conforming to northwest-southeast faults which represent long-lived basement structures. All fault and fabric populations cross-cut the plutons
- An area of potential exploration interest was found at the southern extent of one of the ovoid plutons. The area hosts a number of fault intersections and is interpreted as a zone of low mean stress that may have developed during deformation synchronous with gold deposition.

7.4 Significant Mineralized Zones

7.4.1 Palito Mine

The mineralization control found on the Palito property is related to the schematic mega-system of strike-slip faulting and Riedel fracture systems of the Tapajós Province as described by the CPRM (2008). The mineralized veins appear related to the intersection of “Y” and “P” and/or “R” (sinistral strike-slip) faulting on 305° and 315° and/or 295° orientations respectively within “R” 070° trending structural corridors.

Mineralization at the Palito Mine is hosted within all three granitoids encountered in the immediate vicinity and is intimately associated with northwest-southeast vertical to sub-vertical mesothermal quartz-chalcopyrite-pyrite veins and pyrite disseminations filling the brittle-ductile fault sets. The principle vein system has a strike length over 900 m, with mineralized veins typically averaging approximately 1 m in width with grades between 15 and 30 g/t. Grades in excess of this are associated with semi-massive chalcopyrite-pyrite blowouts within the quartz veins, typically on the intersections of “Y” or “P” and “R” veins.

Gold mineralization associated with quartz and hydrothermal alteration assemblages is reported in all fracture orientations of the Riedel system, and are dominated by fractures oblique to the principle strike-slip shear orientation.

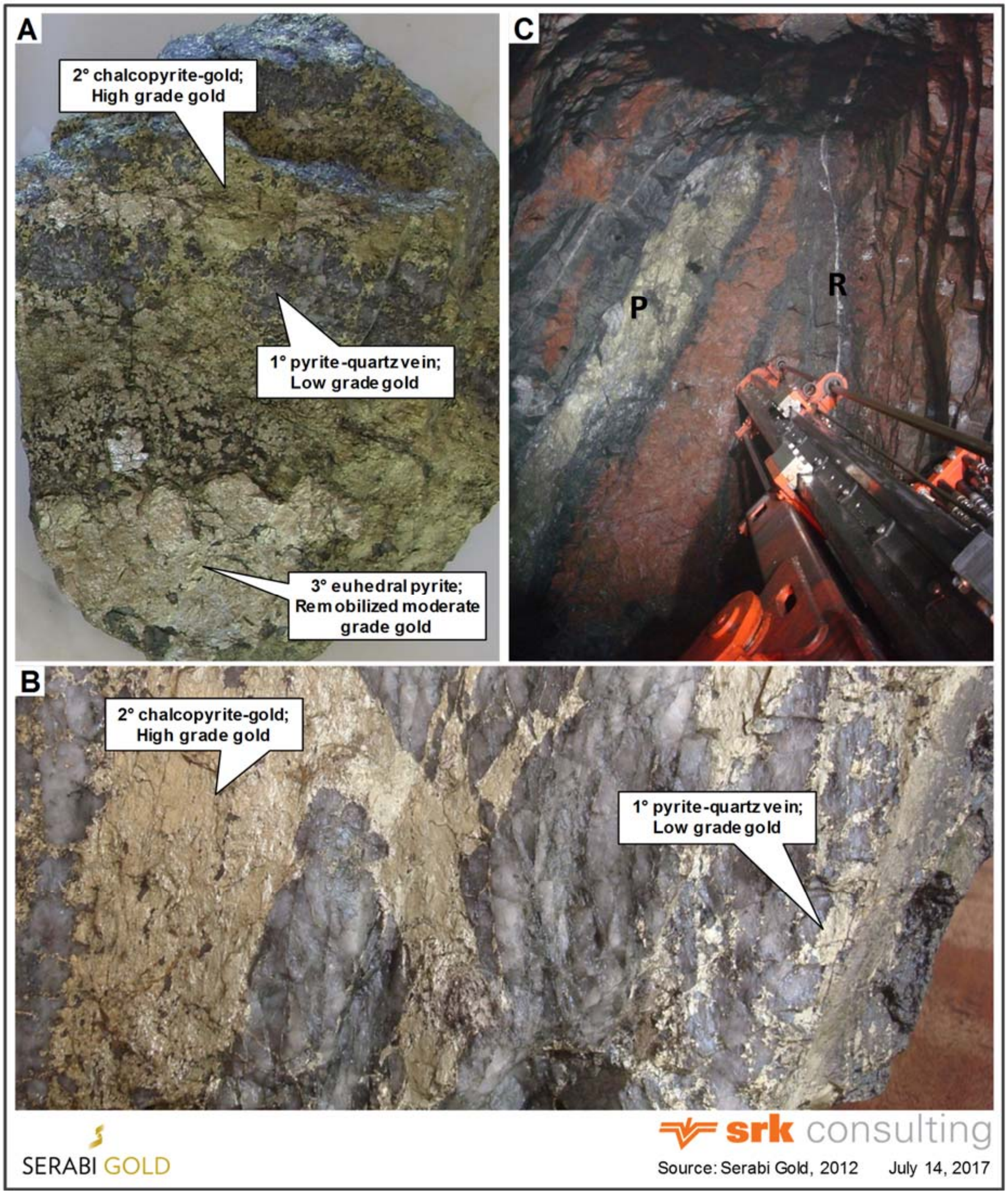
Gold mineralization occurs within pyrite and chalcopyrite (Figure 7-3) associated with sphalerite, argentite and tellurobismuthite/tetradymite. Gold occurs as fine grains of 10 to 15 microns in size, with the highest gold grade typically found in zones of hydraulic brecciation, where the alteration zone, sulfides and vein quartz show multiple stages of reactivation. In the granodiorite, the dominant sulfide is pyrrhotite with lesser pyrite and chalcopyrite compared to the granites, typically resulting in pyrrhotite-pyrite sulfides with lower gold grade. Sulfides occur as segregates in the quartz veins, as disseminations within the grey hydrothermal alteration selvedges, or as decimeter to meter wide massive sulfide veins.

The nature of sulfide mineralization varies along the strike and plunge extends of the deposit. Pyrite and chalcopyrite dominate in the granites, whereas pyrrhotite and pyrite with lesser chalcopyrite are found in the granodiorite. Within the granodiorites, the pyrrhotite-pyrite sulfides tend to be lower grade due to lower chalcopyrite content, and is likely a result of greater mafic mineral content in the granodiorite affecting the paragenesis of sulfide deposition.

The hydrothermal alteration of the host rocks is strongly alkaline and has resulted in potassification and ferruginization, accentuating the original alkaline character of the host rocks and resulting in intense silicification. Hydrothermal alteration associated with mineralization is intense sericitization and chloritization, where intense potassic alteration has resulted in the original lithotype no longer being compositionally or texturally identifiable. The alteration zone appears as a dark grey rock formed of relict quartz crystals of 0.5 to 1 mm in a groundmass of feldspar pseudomorphs of sericite, clay minerals and rare epidote and carbonate. Chlorite occurs as infill of shears and veinlets, as rare aggregated crystal masses, and occasionally intercalated with biotite with inclusions of zircon, apatite and prenhite.

Grey hydrothermal alteration is confined to the selvedge of the brittle fractures and rarely extends more than half a meter into the host granite. The alteration is generally present to some degree along the mineralized structures; however, the quartz-sulfide and sulfide veins are not always present. On occasion, the structure may appear as a sericite, chlorite, and ankerite vein only several centimeters wide before opening into a traditional hydrothermal selvedge.

Secondary gold deposits are encountered directly above the mineralized veins within the residual saprolite and laterite portions of the regolith profile. Free gold is contained within the oxidized sulfides in the vein material, and with secondary iron oxides along fractures and joint planes within the saprolite adjacent to the veins, and in pisolites and lateritic cements at the paleo-surface above the vein. The secondary deposits are generally not high tonnage, as the residual saprolite profile is only approximately 5 to 8 m depth underlying up to 5 m of barren transport cover. They can however be nearly 10 times broader than the source mineralized vein due to weathering dispersion of the gold.



Source: SRK, 2017

Figure 7-3: Examples of Common Mineralization Encountered at the Palito Mine (A and B) and Veins Oriented in the Riedel Scheme (C).

7.4.2 São Chico Mine

Mineralization is hosted in west-northwest striking, steeply south dipping quartz-sulfide veins at the São Chico Mine. Individual veins can range from under 0.2 to over 3 m in width, averaging roughly

0.8 m, and are observed over an area of approximately 1 km by 300 m in size. The shear zones hosting mineralization correspond to the “P” shear orientation in a pure east-west lateral Riedel system.

The Main Vein at São Chico strikes in a broadly west-northwest direction, dips steeply to the south, and ranges from approximately 1.0 to 3.9 m in apparent width. Mineralization extends approximately 140 m down dip and approximately 100 m along strike, and is open down dip and plunging to the west; to the east, mineralization is open for a minimum of 80 m along strike. The fault zone is variably mineralized, with both sinuous and regular quartz veining, pyrite, sphalerite, galena, chalcopyrite and electrum. Along the vein, high grade lodes are developed where a high degree of brecciation is observed, and are manifested as moderately east plunging shoots within the plane of the Main Vein. These lodes exhibit a higher chalcopyrite content than what is observed along the strike of the fault zone. The dip extent of mineralization remains open along the fault and within numerous higher-grade ore shoots.

The Western Zone is a sub-parallel fault zone developed in the footwall of the Main fault zone. The quartz veins display a similar alteration assemblage to the Main Vein, though a narrower width, less brecciation and less sulfide content is observed. The fault zone extends along strike for over 100 m to the northwest of the Main Vein.

The Highway Vein strikes roughly west-northwest, dips steeply to the south, and varies from 1.6 to 2.9 m in apparent width. The mineralized zone extends 75 m below the surface and remains open along strike and down dip. High gold grades are associated with brecciated granite supported by chlorite-sericite-quartz cement with blebby pyrite and galena.

The Parallel Vein is found 60 m south of the Main Vein fault, within the hanging wall. The vein averages 90 cm in width, and has been defined over a strike length of approximately 80 m to a depth of 75 m.

Mineralization comprises quartz-sulfide veins and breccias, with narrow chlorite-sericite-pyrite selvedges within a wider potassium-feldspar alteration halo. Although the mineralized interval may be 1 to 2 m in width, individual veins are often less than 30 cm wide with cross-cutting veins within the mineralized zone. Veins are composed of white to grey, fine-grained, massive to banded quartz with chlorite stylolites.

Sulfide mineralization is spatially related to chlorite-sericite alteration in the quartz vein selvedges, and the assemblage is dominated by pyrite with locally abundant sphalerite, chalcopyrite and galena phases.

8 Deposit Type

8.1 Mineral Deposit

Gold deposits in the Tapajós Gold Province can be broadly classified into three main types:

- Mesozonal deposits;
- Epizonal intrusion centered or intrusion related deposits; and
- Alluvial, colluvial and supergene enriched saprolitic deposits.

Tapajós deposits are structurally controlled, but host rock control is vital to understanding the metal precipitation process locally. Primary gold deposits occur as the first two categories of deposit types and are generally located in fractured and sheared host environments such as:

- Quartz and quartz sulfide stock work and associated alteration hosted disseminated sulfide;
- Quartz vein;
- Quartz sulfide veins +/- selvedge alteration hosted disseminated sulfide;
- Massive sulfide veins +/- selvedge alteration hosted disseminated sulfide; and
- Disseminated sulfide within alteration.

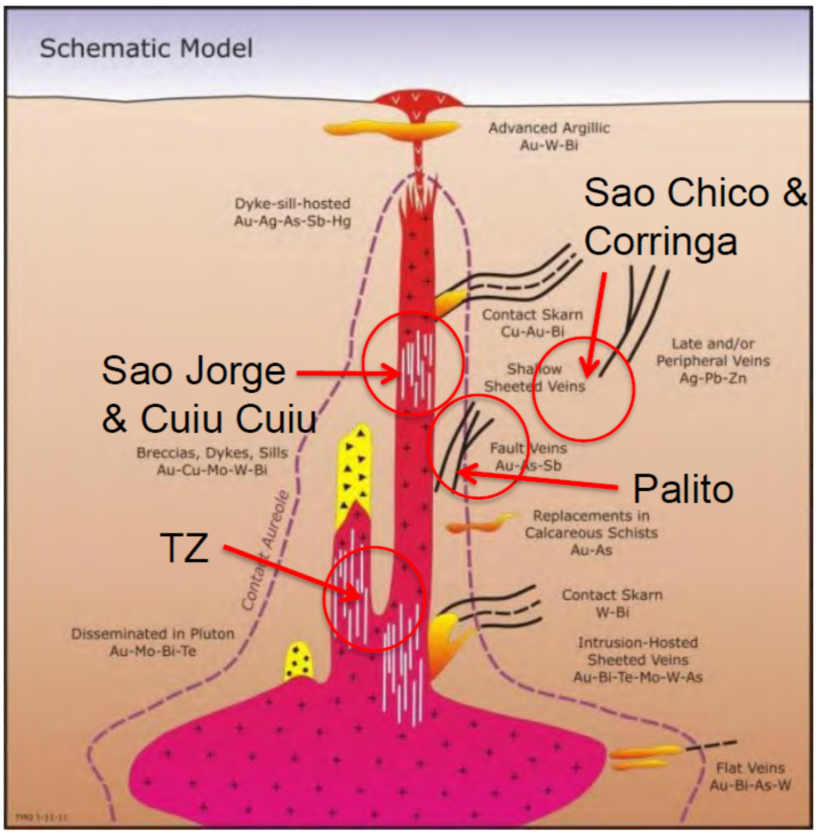
Historically in the Tapajós, the third category of deposit types has produced most of the gold in the region, with a significant contribution from supergene enriched laterite and saprolite deposits. A sizable percentage of the gold contained within this category is residual in nature, but physically concentrated along stone lines or weathering fronts, liberated from nearby auriferous quartz, quartz-sulfide or sulfide veins, and secondarily enriched by redox chemical processes.

Most of the primary gold sources known in the Tapajós are related to the quartz vein and quartz-sulfide vein deposits, as the extensive felsic to intermediate volcanics intruded by coeval granitic intrusives provide the conditions for formation of mesothermal and epizonal and/or epithermal deposits. The mesothermal granite-hosted systems are associated with a range of deposit types including porphyry, orogenic lode gold and intrusion related gold systems. These granite hosted systems share many characteristics, with distinction among the genetic models becoming difficult to strictly apply in the region.

Within the regional context of the Palito Mining Complex, significant granite hosted deposits have recently been discovered that share geological features with the Palito deposit. Examples including the Tocantinzinho and São Jorge gold deposits located approximately 70 km northwest and 45 km southeast of the Palito deposit, respectively, as well as a number of artisanal operations. Evidence suggests that the Palito deposit is not isolated, but is rather part of a series of deposits in a gold endowed district, and it is therefore considered that the potential for further discovery of primary gold deposits within the Palito Mining Complex is favorable.

The mineralogy and textures of the deposits at the Palito Mining Complex is consistent with a model for an intrusion related mesothermal gold-copper mineralization (Figure 8-1). This relatively new classification of gold deposits is associated with granitic rocks and are best developed above and surrounding small, granitic intrusions. Mineralization styles can manifest as stockworks, breccia, skarns and lode style veins, and have a clear metal association zonation.

A number of exploration methods have been useful in the identification and discovery of additional gold targets on the Palito Mining Complex. Surficial geochemistry has proven to be successful in areas of shallow saprolite weathering or where laterite horizons are developed at shallow depths, whereas chemical depletion in deeply developed profiles can mask mineralization. Magnetics is limited at the Palito Mine due to poor contrast between local host rocks, however it can be used to define additional regional scale features. Electromagnetics are limited to detecting only massive sulfide mineralization, but is useful in regional screening for initial exploration and targeting mineralized structures. Induced polarization methods are effective and have demonstrated the ability to map Palito style mineralization with a high degree of definition, ideal for drill targeting.



Source: Modified from Lang and Baker (2001)

Figure 8-1: Schematic Model of an Intrusion Related Gold System and Interpreted Environs

9 Exploration

9.1 Relevant Exploration Work

The presence of gold in the Tapajós region has been recorded as early as 1747 during the Colonial Portuguese era. Gold production began in the mid-twentieth century by garimpeiros who followed alluvial and colluvial sources up stream until discovering the primary source, mining the free gold from the saprolite material by hand and hydraulic methods using basic gravity separation.

Modern exploration on the Palito Mining Complex was initiated in 1994 by Rio Tinto Desenvolvimentos Minerais Ltda (RTDM) and continued until 1997. Early work focused on testing the depth potential of near surface garimpeiros workings in the primary sulfide zones. Soil, rock grab and rock chip samples were collected for surface geochemistry, preliminary geological mapping was executed, a broadly spaced (300 m line spacing) regional aeromagnetic survey was flow, and six diamond drill holes were completed in the area surrounding the Palito Mine.

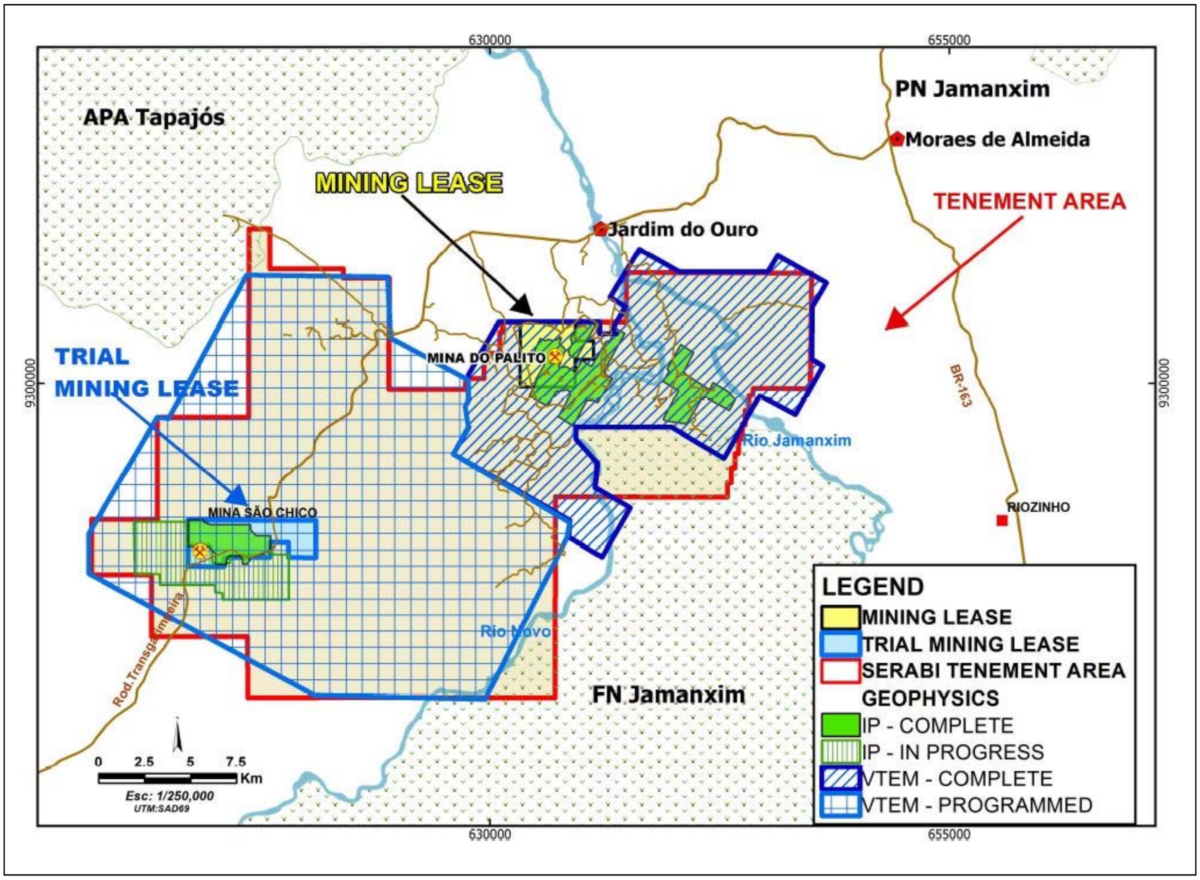
Exploration work by Serabi on the Palito property has been ongoing since 2003, with surface exploration, geological mapping, rock chip sampling, shallow auger drilling and diamond drilling programs completed. Since initial exploration, airborne, ground and downhole geophysical surveys have been executed to better constrain the known mineralization on the property and define new potential targets.

Table 9-1 summarizes the exploration work completed by Serabi on the property to date. The salient exploration work performed in the Palito and São Chico areas is described in greater detail in the subsections below.

Table 9-1: Exploration Work Performed by Serabi on the Palito Mining Complex

Year	Activity	Details
2003	Post-hole auger drilling	147 m
2003	Ground geophysical surveys	Magnetic and dipole-dipole IP
2004	Shallow auger drilling	11,116.78 m
2004	Ground geophysical surveys	Fixed-loop EM and IP
2005	Underground face and gallery channel sampling	1,368.47 m
2005	Rock chip sampling	18 samples collected
2006	Underground channel sampling	1,713 m
2006	Post-hole auger drilling	3,009.83 m
2006	Auger drilling and rock chip sampling	35 m with 69 samples collected; 43 rock chip samples
2007	Surface trenching	590.75 m
2007	Auger and rock chip sampling	756 m with 1,513 soil samples collected; 7 rock chip samples
2007	Ground geophysical survey	Magnetic
2007	Ground geophysical surveys	Fixed-loop EM and down hole EM
2008	Underground channel and gallery sampling	4,325.79 m
2008	Soil sampling	836 samples collected
2008	Deep auger drilling	1,244.6 m with 1,206 samples collected
2008	Heliborne geophysical survey	6,650 line-kilometers of VTEM, and magnetic and laser topography
2009	Surface trenching	413 m
2009	Channel sampling	977.18 m
2009	Auger sampling	835.3 m with 729 samples collected
2010	Ground geophysical surveys	45 line-kilometers of dipole-dipole IP
2010	Surface trenching	405 m
2010	Channel sampling	168 m
2011	Heliborne geophysical survey	1,221.28 line-kilometers of VTEM, and magnetic and laser topography; covering 8,000 hectares
2011	Ground geophysical survey	53.25 line-kilometers of IP on 200 m spaced traverses
2011	Trenching	771.5 m, sampling every 1 m
2011	Auger drilling	515 m on traverses at 5 m spacing
2011	Sampling	Prospective garimpo tailings areas in the Palito valley
2016	Ground geophysical surveys	Down hole EM across 21 holes in the Currutela, Piaui, Palito South and Copper Hill prospect areas

Source: Serabi, 2017



Source: Serabi, 2017

Table 9-1: Summary of Geophysical Programs Executed over the Palito Mining Complex

9.2 Exploration in the Palito Area

9.2.1 Surface Geochemical Sampling

Since commencing exploration work in 2002, Serabi's exploration department has conducted a number of regional and local soil geochemistry programs using manual and small motorized auger drills. Systematic sample intervals were established every 2.5 m on a 100 m x 50 m grid, with auger holes penetrating to either 2.5 m or 5 m depth. Geochemical analyses using a 100 ppb detection limit showed that the mineralized zones in the Palito Mine area were defined by a greater than 400 ppb gold result (Figure 9-1). Subsequent assessment and evaluation of the soil sample results in 2007 suggested that re-analyses using a 10 ppb detection limit could define more subtle footprints of undiscovered mineralization, and the available historic soil sample pulps were sent for analyses at SGS Geosol laboratories. This re-assessment did not significantly change the values for characterizing the known mineralization. H owever, confidence was gained from the results and improved definition of the mineralization was achieved.

In 2008, Serabi contracted Explorer Services to execute a program of deeper reconnaissance auger drilling. A total of 1,206 samples were collected from 1,244.6 m of material with the objective of confining the saprolite mineralization at the Bill's Pipe prospect northwest of the Palito Mine. Explorer

Services also completed a regional stream sediment geochemistry program in 2008. Under the direction of Serabi, Explorer Services collected a 200 g sample under 200 mesh and a 3 kg sample under 2 mm from sample sites across the entirety of the Palito Mining Complex area. A number of anomalous zones outside the immediate Palito Mine area were identified; however, these anomalies have to date not been followed up.

From January to February 2011, 771.5 m of surface trenches were excavated over the Piaui prospect area, with samples collected at 1 m intervals. This work program was followed up with diamond drilling in March 2011.

Auger drilling was planned over numerous target areas in 2011. Geochemical anomalies, IP anomalies, and trenches with anomalous results or those that did not reach the pisolith horizon were tested. Sampling was conducted using a Big Beaver motorized auger rig over 14 planned lines, with samples collected every 5 m.

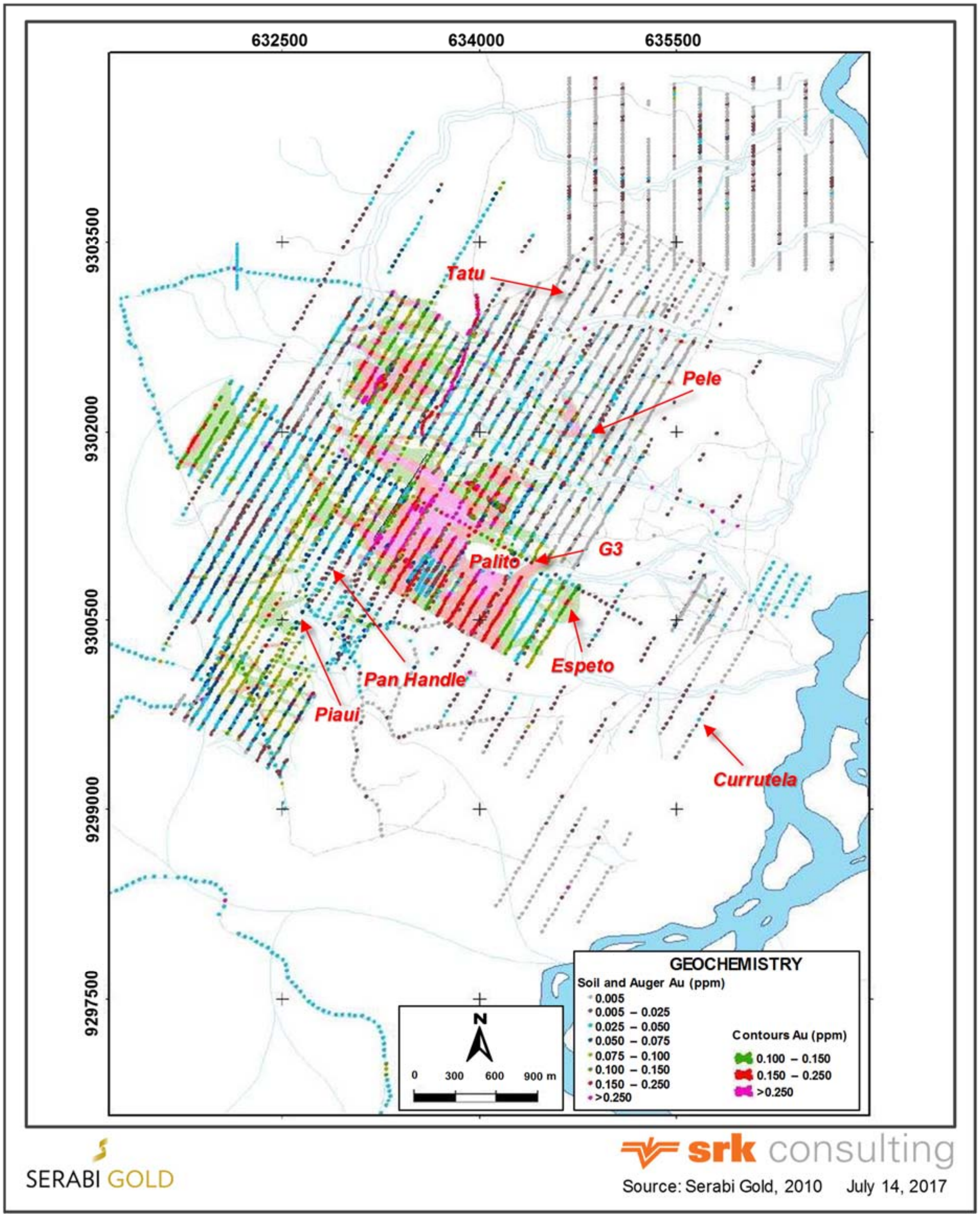


Figure 9-1: Gold in Geochemical Samples Collected by Serabi in the Vicinity of the Palito Mine

9.2.2 Geophysical Surveys

The Palito Mining Complex is partially covered by a broad 300 m line-spaced airborne magnetic and radiometric survey that was commissioned by RTDM in mid 1996. Several phases of geophysical surveys and a number of reviews have since been completed on the property under the ownership of Serabi.

In 2002, Serabi commissioned Fugro Ground Geophysics (Fugro) to conduct a ground based magnetic and dipole-dipole induced polarization (IP) survey over the northern portion of the Palito Mine area, and extending to the Copper Hill area. A total of 13 line-kilometers were completed over the survey area, the results from which defined the main mineralized zone at the Palito Mine and identified numerous anomalies. The additional anomalies that were identified were subsequently drill tested in the following years.

Fugro also completed a fixed loop time-domain electromagnetic (TEM) survey over two areas adjacent to the main mineralized zone and to supplement the previously executed ground magnetic program. The survey was initiated in November 2003 and completed in early 2004. Fugro was commissioned to execute further fixed-loop TEM surveys in late 2006 and early 2007 over the Chico da Santa prospect area, located adjacent to the Palito Mine and along the southern strike extension of the Palito mineralization. As part of the extended TEM survey, Fugro also conducted downhole electromagnetic surveys of 14 drill holes within the Palito Main Zone, and the Chico da Santa, Ruari's Ridge and Palito West prospects in early 2007.

Serabi conducted an in-house ground magnetic survey in April 2007 at the Tatu prospect area, located approximately 2 km northeast of the Palito Mine. The survey focused on targeting the magnetic quartz vein hosted mineralization apparent within the prospect.

In September 2007, Geotech Ltd (Geotech) was commissioned to complete a helicopter-borne vertical time domain electromagnetic (VTEM) survey. The survey covered 6,650 hectares from the Rio Novo prospect to an area some 1.5 km northwest of the Palito Mine. A total of 750 line-kilometers were flown, with survey lines spaced at 100 m intervals in a northeast-southwest line direction (perpendicular to the known mineralization trend). Results indicated that the Palito Mine corresponded with six discrete anomalies and two anomalous zones, as well as the Palito West and Ruari's Ridge prospects displaying associated EM anomalies. The survey was integrated with other geophysical and geological datasets, and defined a number of northwest-southeast oriented lineations containing multiple high priority VTEM target or target clusters corresponding to the P direction in the Riedel scheme. A number of target clusters also occurred on northeast-southwest trending zones corresponding with the R' orientation in the Riedel scheme. A total of 18 target areas were defined within a 7 km radius of the Palito Mine, including three high-priority drill ready targets.

In July 2008, reprocessing of the 2002 Fugro IP data using a Zonge Smooth Model Inversion was conducted. Pseudo section data was converted into resistivity and chargeability models reflecting the geometry and location of anomaly sources. Notably, modeling demonstrated that Palito style mineralization is a valuable technique in defining mineralized trends, and a number of untested features within the survey area were highlighted.

In March 2010, contractors from Fugro, LASA Prospecções S.A. (LASA), and Geomag S.A. Prospecções Geofisicas (Geomag) executed a 45 line-kilometer IP survey over three grid areas, based on the data integration and assessment previously completed by Serabi. The survey incorporated 13 of the 18 integrated targets, and modeling of the survey data defined nine priority drill targets.

Geotech commenced a further 8,000-hectare helicopter borne VTEM survey in January 2011 over areas of interest to the northeast and south of the 2008 survey area. Approximately 1,200 line-kilometers were flown along 100 m spaced lines perpendicular to the main geological trend, and an additional 47 anomalies were defined. The combined VTEM surveys cover approximately 15 km strike projection of the Palito host structure. Geoelectric model sections were generated via conductivity depth transform through Emax Air software. Model sections and raw data profiles were integrated to identify anomalies attributable to basement conductors, and in the Jardim do Ouro area, basement conductors were observed to appear as increased amplitude signatures in the moderate time channels. These signatures were identified as discrete profile anomalies and marked for investigation. In addition, a 3D resistivity/conductivity model of the sections was constructed, from which more conductive areas were identified where the subtle increased amplitude anomalies were not readily identifiable in the profiles.

Geomag was commissioned to complete three additional IP surveys over grid blocks in the Palito area in August 2011. The program involved surveying 11 line-kilometers that extended the 2010 survey grids to cover strike extents of the Piaui and Currutela prospect anomalies, 34 line-kilometers covering target zones in an area east of the Rio Novo river that were identified during the 2009 integration process, and 9 line-kilometers over the Jamanxim target derived from the 2011 VTEM program. A total of 53.25 line-kilometers was completed on 200 m spaced traverses across the three grid areas. The data was modeled using Zonge 2D Smooth Inversion modeling software to generate modeled sections and was merged with the modeled sections of the 2010 IP survey to generate a 3D model of the resistivity and chargeability. Several new anomalies were identified in the eastern survey block, in addition to extending the Currutela anomaly along both strike directions and extending the Piaui anomaly to the southeast.

Most recently, in August and September 2016, Serabi initiated a down-hole EM survey on boreholes drilled in the 2010 and 2011 exploration drilling program. A total of 21 drill holes were surveyed in the Currutela, Piaui, Palito South and Copper Hill prospect areas by Geomag. The objective of the survey was to better locate the position of geophysical anomalies to aid in better targeting for future drilling campaigns.

9.3 Exploration in the São Chico Area

Under previous ownership, exploration work on the São Chico property has included surface trenching, channel sampling, ground EM, and diamond drilling by Gold Aura do Brasil Mineração Ltda (GOAB), and diamond drilling, sampling, and ground IP and airborne EM geophysical surveys by Kenai Resources Ltd (Kenai). Since Serabi acquired the property in 2013, two surface diamond drilling programs have been executed, along with regional geophysical surveying.

9.3.1 Surface Geochemical Sampling

In 2011, Exploration Alliance Ltd. (EAL) collected rock chip samples from outcrop exposed by artisanal miners north of the São Chico Mine. A total of 13 samples were collected and each sample weighed approximately 2 to 3 kg. Results showed that elevated gold was related to 1 m wide quartz veins hosted in saprolitic granodiorite.

Further exploration work is warranted, as outcrop and vein structures are not exposed outside of artisanal workings.

9.3.2 Geophysical Surveys

In 2010, GOAB performed a ground EM survey in the São Chico area. Stations were established at 12.5 (m) intervals along 50 m spaced lines, totaling 2.7 line-kilometers. Results of the survey defined a zone of high chargeability to the immediate south of artisanal workings and an area previously trenched by GOAB. A linear east-southeast striking zone of low chargeability was interpreted to represent a fault zone hosting mineralization, and a subparallel linear zone of low chargeability located approximately 70 m north of historic artisanal workings remains untested.

Also in 2010, Kenai commissioned G3-JB Prado consultants and Geoprospector-Geophysical Solutions to perform a series of 38 dipole-dipole IP traverses. Dipoles were spaced at 5 m intervals along 100 to 200 m profiles, resulting total of 7,090 line-meters were completed across the area immediately south of the São Chico Mine corridor and areas considered prospective in the region. The survey reached a maximum penetration of approximately 35 m below the surface and was designed to locate shallow veins, however, was ultimately ineffective due to the saprolitic weathering profile and the presence of a conductive pisolite within parts of the survey area.

In 2013, in parallel with extensive drilling, Serabi commissioned Geomag to complete a 44.95 line-kilometer regional IP survey across the northern and eastern portion of the São Chico property. The survey was completed across 30 lines spaced 200 m apart using 25 m spaced receivers and 50 m spaced transmitter arrays.

Work began on a ground IP survey in late 2016 to test newly acquired exploration areas and the potential for strike extensions of mineralization to the east and west of the São Chico Mine. At the end of 2016, a total of 30 km of a planned 100 km of traverses had been completed. Work was subsequently suspended, but is expected to restart during 2018.

9.4 Exploration Strategy

Serabi has been exploring the Palito Mining Complex since 2003 and have acquired an appreciation of the geology, geochemistry and geophysical signatures and controls on the gold mineralization within the Palito Mine and throughout the Palito Mining Complex area.

Serabi have used the following process to facilitate exploration and the discovery of new deposits in the project area:

- Ground selection – northwest-southeast structural corridor, with northeast-southwest breaks;
- Remote sensing and remote geophysics, VTEM and magnetics;
- IP and EM ground geophysics, and shallow geochemical sampling and/or drilling using auger or RAB; and
- Diamond drilling based on integrated models and ranking.

Serabi believe that exploration should focus on structural corridors parallel to, or extensions of the Palito trend and specifically where Palito Central Fault analogies exist. Topographic highs on the flanks are considered more prospective due to silicification of the country rock, making them more resistant to weathering.

If funding permits, Serabi will undertake regional preliminary surface exploration activities where exploration data is limited on the Palito Mining Complex tenements to determine if target areas should continue to be held.

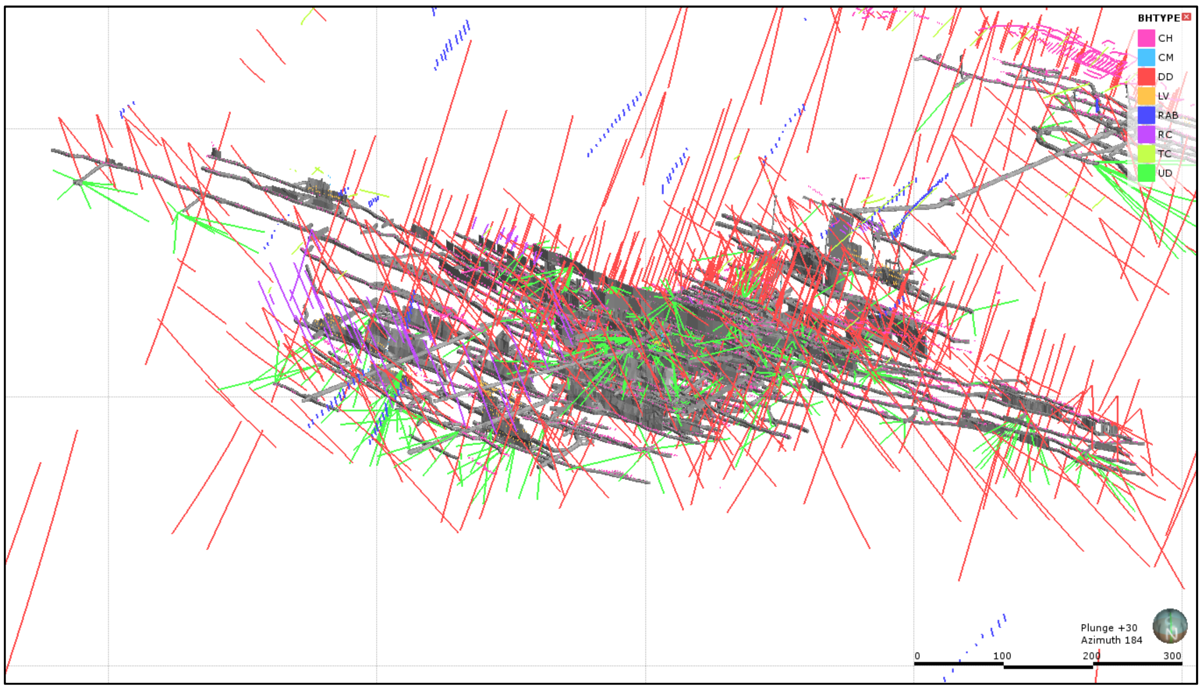
10 Drilling

10.1 Palito Mine

10.1.1 Introduction

Prior to Serabi's acquisition of the Palito Mining Complex, RTDM completed six boreholes in late 1996. The drilling totaled 1,610.06 m and successfully intersected gold mineralization within the Palito Main Zone. However, due to the narrow nature of the mineralized veins and lack of large tonnage, the low-grade potential did not allow for RTDM to move forward with development of the project. Serabi has since re-logged and re-sampled the core for confirmatory analysis and have incorporated this drilling into their database.

All the drilling available at the Palito Mine is illustrated in Figure 10-1.



Source: SRK, 2017
CH=channel samples, DD=Surface Diamond Drilling, RAB= Rotary Air Blast Drilling, RC=Reverse Circulation Surface Drilling, UD=Underground Drilling

Figure 10-1: Oblique View of Drilling at the Palito Mine, in Relation to Underground Infrastructure. Looking South

The total meters drilled on the Palito Mining Complex including both drilling for exploration and mineral resource analyses are summarized in Table 10-1.

Table 10-1: Drilling Summary

Sample Type	Number of Holes	Total Meters	Meters Sampled	Number of Assays
2011 Core - Surface	72	12,606	4,047.97	4,363
Core - Surface	510	85,744	20,133.63	23,183
Core - Underground	336	16,487	5,062.65	5,965
Reverse Circulation	74	4,410	4,260.20	4,036
RAB	320	4,239	4,198.50	1,810
Auger	4,472	16,353	16,262.11	7,497
Channel Samples	5,724	15,294	11,795.97	15,111
Total	**11,508**	**155,133**	**65,761.03**	**61,965**

Source: SRK, 2017

10.1.2 Core Drilling

A total of 18,235 m of core drilling from surface was completed by Serabi during 2005. The bulk of the work was undertaken on and around the Palito Main Zone, where step-out drilling resulted in the discovery of a series of high-grade gold veins (collectively termed the Compressor Lode) and illustrated the potential of additional satellite orebodies parallel to the Palito Main Zone. Evaluation of soil geochemistry results, geophysical surveys and geology lead to diamond drilling at the Palito West and Bill's Pipe targets in late 2005, where high-grade gold mineralization was intersected. Further drilling at Palito, totaling 7,705 m of surface drilling and 6,406 m of underground drilling, was completed during 2006. Additional drilling was undertaken at nearby satellite prospects, resulting in a total of 15,253 m drilled on the property in 2006.

The early months of 2007 focused on preliminary evaluation of properties adjacent to the Palito Main Zone. The presence of mineralization at Chico da Santa and Palito West had already been established, and limited drilling of both prospects indicated potential to become small satellite mining operations. There were also indications that a series of mineralized structures parallel to the Palito Main Zone might exist over a much wider area. Pursuing this and following up on a strong gold-in-soil geochemical anomaly in the Ruari's Ridge area, an area of mineralized weathered outcrop (gossan) was discovered. A trenching program followed, which identified the presence of a high-grade mineralized structure extending over 600 m strike at surface. Follow-up drilling confirmed additional sub-parallel zones of gold-copper mineralization. Simultaneous drilling in the Chico da Santa area successfully identified two additional vein structures. A total of 27,494 m of drilling were completed over the Palito Mine area in 2007.

Throughout the course of 2008, Serabi undertook an extensive drill program that was initiated in November 2007. Over 19,000 m of a planned 25,000 m was drilled prior to the program being suspended in the fourth quarter of 2008. During the first half of 2008, over 7,300 m of drilling were completed across the Palito Main Zone and Palito West deposits, targeting EM geophysical anomalies. Variable gold grades were encountered in massive sulfide and quartz vein-sulfide zones intersected during drilling. By the end of the program, five addition vein structures were identified at Palito West. At the Senna Zone (formerly known as Rauri's Ridge), drilling confirmed the presence of a significant and minable oxidized gold zone located immediately above the main Senna gold vein.

A discovery and follow-up diamond drill program was conducted by Serabi from December 2010 to November 2011. The drilling was designed to be completed in two phases; the first phase was directed at IP chargeability models with coincident resistivity or conductivity anomalies and additional geochemical, EM or structural interpretation support, and the second phase was aimed at infilling successful phase 1 targets and to further define existing intersections at Palito South. The Phase 1 program saw 36 exploration boreholes totaling 8,214 m drilled over nine targets in the vicinity of the Palito operation, of which gold mineralization was intersected in seven. The two most prospective targets, Piaui and Currutela, were followed up with an additional 43 boreholes totaling 4,392 m during the phase 2 program, targeting shallow near surface potential. Of the 43 boreholes, 20 were drilled between Currutela and Palito (referred to as Palito South) and encouraging results were recorded, with bonanza gold and high-grade copper results returned. Positive results were also returned from the Piaui prospect where the remaining 23 holes were drilled. The drilling was undertaken over two areas of 600 m and 350 m strike length and intersected broad zones of intense chlorite-silica-sulfide alteration zones in excess of 40 m.

In addition, an exploratory borehole intended to test the northwest continuity of the Palito Main zone inadvertently intersected gold mineralization at what is now known as the Espeto prospect. The bulk mineralized zone returned 17.06 m at 1.17 g/t gold from 84.25 m depth, including 0.88 m at 5.25 g/t gold and 0.61 m at 10.90 g/t gold. Multiple zones of hydrothermally altered granite, comparable to Palito and Currutela, were encountered and indicated potential strike extension of approximately 2 km between the Palito Mine and the southerly limit of the Currutela target.

In late 2011, 20 shallow boreholes totaling 1,632 m were drilled at the Palito South prospect, in the area between the Espito prospect and Palito Mine. High-grade intersections were encountered in a number of boreholes including 0.72 m at 8.91 g/t gold, 0.90 m at 21.60 g/t gold, 1.40 m at 43.20 g/t gold, 0.81 m at 8.79 g/t gold and 0.93 m at 34.75 g/t gold.

Exploration core drilling at Palito and the surrounding satellite prospects has been on hold since 2011.

10.1.3 Reverse Circulation Drilling

In 2006 and 2007, Serabi executed two RC drill programs with the intention of expediting the drill programs to provide a rapid turn-around for planning, and to assess the potential of the shallower saprolite and oxide mineralization in the near mine environment. Drilling services were provided by Wilemita Ltda in 2006 and by GeoLogica Sondagens 2007. The focus of the 2006 program was on the Bill’s Pipe, Chico da Santa and Ruari’s Ridge prospects, while the 2007 program was executed on the Chico da Santa prospect only. The use of the RC drilling method proved less effective than anticipated due to the depth of the regolith profile encountered and the abrasive nature of the granites.

From May to early June 2009, a program of 393.6 m of RC drilling was conducted using Serabi’s crawler underground drill rig to explore for shallow oxide mineralization in the vicinity of the existing Palito West and G3 south lodes.

10.1.4 Rotary Air Blast Drilling

Rotary air blast drilling (RAB) was contracted to Geologica Sondagens in 2009 to test a number of soil geochemistry anomalies in the Palito Mine area. The use of RAB drilling was again undertaken to expedite the assessment of soil geochemistry anomalies, however, it was limited by ground conditions and logistical issues and was a less effective and slower method than anticipated.

RAB drilling was used as an exploration tool only, and the results are not included in the resource estimation.

10.1.5 Underground Drilling

The utilization of a small underground drill rig for exploration drilling began in 2016 to assist in identifying additional resources at depth. This work is performed in addition to underground drilling that is performed on a month to month basis for mine planning purposes. A total of 3,740 m was drilled in 2016 for short term mine planning and an additional 1,868 m for longer term resource modeling and resource growth purposes. This drilling was performed primarily within the Senna sector of the Palito Mine.

10.1.6 Channel Sampling

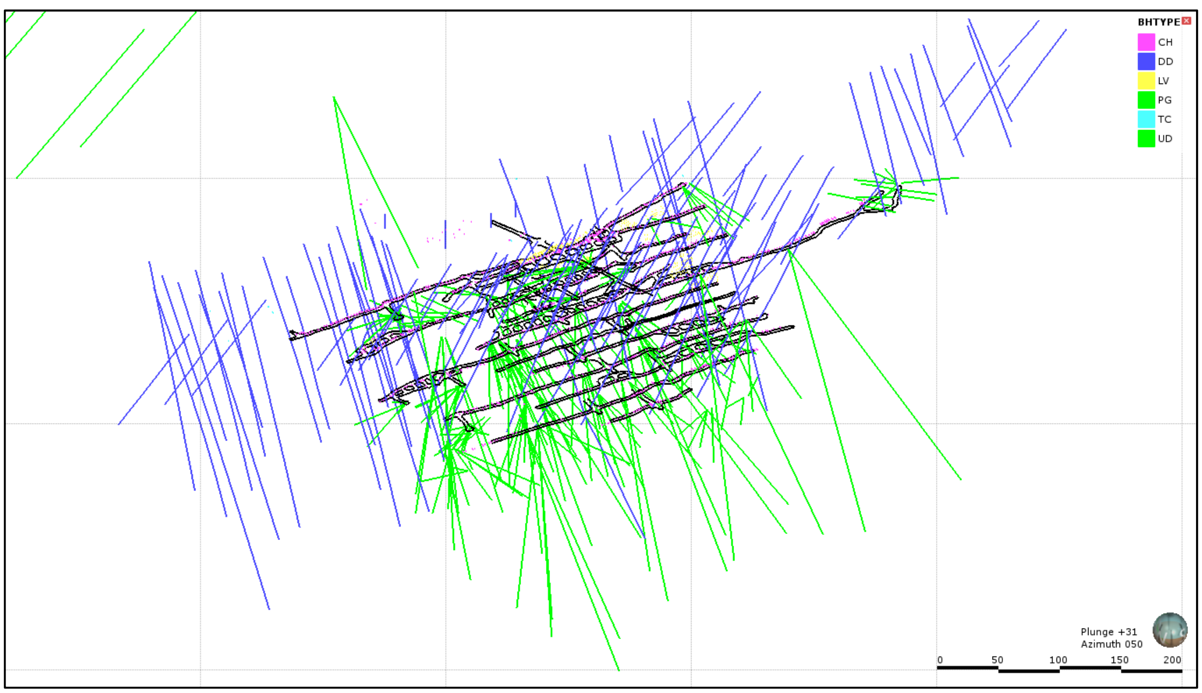
Face and back samples are routinely collected along development drives and mining fronts as grade control for the mining operation. Channel samples are marked by a geologist or mining technician and sampled in a continuous line using a hammer and chisel. Chips are transferred into a plastic bag and marked with the appropriate sample number and sealed.

10.2 São Chico Mine

10.2.1 Introduction

All the drilling available at the São Chico Mine is illustrated in Source: SRK, 2017

Figure 10-2.



CH=channel samples, DD=Surface Diamond Drilling, RAB= Rotary Air Blast Drilling, RC=Reverse Circulation Surface Drilling, UD=Underground Drilling
Source: SRK, 2017

Figure 10-2: Oblique View of Drilling at the São Chico Mine, in Relation to Underground Development Levels. Looking Northeast

10.2.2 Drilling

Prior to acquisition of the property by Serabi, Kenai completed 22 boreholes totaling 3,235 m at the São Chico deposit in 2011. Drilling was planned to target the known mineralization of the Main Vein and Highway Vein, and to explore the along strike and down dip extensions of these zones and the potential for buried, sub-parallel vein structures. The results of the drilling indicated that the mineralization at São Chico strikes west-northwest over 540 m and remains open along strike and at depth.

From May to October 2013, Serabi completed a diamond drilling campaign totaling 6,070 m over 38 boreholes. The program initially targeted the Main Vein, where 21 infill and step out drill holes totaling 4,950 m were completed. The program was supplemented by a ground geophysics IP survey, and the resulting anomalies were tested with 1,120 m of diamond drilling. A further five shallow boreholes totaling approximately 500 m was completed at the Highway Vein. Results from the 21 boreholes drilled into the Main Vein returned a series of high grade gold intersections including ten intercepts in excess of 100 g/t gold. The drilling intercepted a continuous zone of alteration and quartz sulfide veins beneath and along strike from the previous Kenai drilling campaign. Drilling at the Highway Vein resulted in four out of the five holes producing near surface mineralized intersections (less than 85 m down hole) in excess of 25 g/t gold.

In 2015, following development on the São Chico main lode, Serabi conducted a surface drilling program of 42 boreholes totaling 7,204 m. The drill holes were planned to better refine the geological understanding of the major mineralized zones and attempt to extend the mineralized lodes defined by previous drilling.

In late 2015, a small underground drilling rig was utilized for exploration drilling to better understand and evaluate the down dip continuation of the Main Vein. A total of 1,459 m was drilled in 2015 from 30 holes, and a further 5,560 m was drilled in 2016 from 53 holes.

10.2.3 Channel Sampling

Historically EAL collected 17 underground channel samples from the back of the São Chico drive at a spacing of 2 to 5 m. Channels were cut 5 cm wide and 2 cm deep using a handheld electric circular saw. Two to six samples were collected per channel based on lithological contacts and included both wall rock and vein material where possible. Results indicated that elevated gold grades between 10.79 and 254.50 g/t gold were consistently repeated over a strike length of 50 m over intervals of up to 1.5 m wide. High grade gold was spatially associated with the shallow angle intersection of two vein sets; at this intersection mineralization comprised of brecciated quartz veins and strong chlorite-sericite alteration with semi-massive pyrite-galena-sphalerite in the breccia matrix. Sheeted quartz veinlets and quartz lenses exploiting en-echelon tension gashes crosscut the breccia.

Following commencement of mine development on the São Chico main lode in 2015, channel samples were taken from both mine development drives and grade control within the stopes. As of March 2016, over 680 channel samples had been collected across five mine levels.

10.3 Drilling Procedures and Sampling Methodology

10.3.1 Palito Mine

At the Palito Mine, Serabi's survey department surveys surface and underground drill collar positions using total station and theodolite optical equipment. Down-hole surveys are performed using a Reflex E-Z shot tool that records azimuth and dip measurements at 30 m intervals down the hole. The surveys are recorded by the geology department and maintained in the Serabi database.

Exploration drill core is half core sampled; one half is retained for future reference, while the other half of the core is placed in a plastic sample bag, identified with the appropriate sample number and sealed. Samples are placed into a larger 50 L bag, which is marked and sealed prior to dispatch to the laboratory. All underground core is whole core sampled and undergoes the same evolution as the exploration drill core.

Drill core sampling is executed at the geological core logging facility at the Palito Mine site. All drill core is cut and sampled based on geological intervals that are no less than 0.5 m and no greater than 1.2 m. If the interval exceeds 1.2 m, it is divided equally into sample intervals covering the zone of interest to no less than 0.5 m. If the interval is less than 0.5 m, the sample is extended to incorporate country rock and/or gangue material.

Channel samples are collected using a similar protocol to diamond drill sampling, where a sample length between 0.5 and 1.2 m is achieved. Rock chips typically weighing 2 to 5 g are collected prior to being sent to the Palito Mine laboratory for preparation and analysis.

Reverse circulation drill sampling is typically conducted at 1 m intervals for the entire hole, with the exception of the 2009 reverse circulation program in which samples were collected using a 1.2 m interval.

10.3.2 São Chico Mine

At the São Chico project, drill collars are typically located using a handheld GPS device with 4 m accuracy, and down-hole surveys are performed using a Reflex E-Z shot tool.

Drill core is reconstructed and washed by the driller, and stored in wooden core boxes marked with the drillhole number, meterage and box number. Drill core is stored at the drill rig until mine staff transport it to the core logging facility at camp. Drill core undergoes geotechnical logging, meter marking, geological logging, and photographing prior to sampling.

The entire drill hole is sampled, with sample intervals of 2 m unless the sample crossed a lithological boundary or change in alteration or mineralization. In such cases, the sample interval is determined based on lithology or alteration and maintained a minimum length of 0.5 m in order to ensure a sufficient enough sample weight. Each sample interval was recorded on the core box. Core was cut in half using a circular rock saw and jig, with one half left in the core box for future reference and the other used for sampling purposes.

Since the acquisition of São Chico by Serabi, comparable drilling and sampling procedures to that at Palito are being undertaken at São Chico.

10.4 SRK Comments

SRK is of the opinion that the drilling and sampling procedures used by Serabi are generally consistent with industry best practices. The resultant drilling pattern is sufficiently dense to interpret the geometry and the boundaries of mineralized domains with confidence. Samples were collected by competent personnel and the process was undertaken and supervised by suitable qualified geologists. SRK believes the samples are representative of the source material and that there is no evidence that the sampling process has introduced a bias.

11 Sample Preparation, Analysis and Security

11.1 Sample Preparation and Analyses

11.1.1 Surface Geochemical Samples

Soil geochemistry from the 2003 exploration program was initially analyzed at Serabi's internal Palito laboratory using an aqua regia method and atomic absorption spectrometry finish to a detection limit of 100 ppb. Subsequent assessment and evaluation of the soil results in 2007 suggested that re-analyses using a 10 ppb detection limit could define more subtle footprints of undiscovered mineralization and the available historic soil sample pulps were sent for analyses at the SGS Geosol laboratory in Belo Horizonte. After 2007, all soil sampling conducted away from the immediate Palito Mine area was analyzed at external laboratories using a 10 ppb lower detection limit.

Samples collected during the 2008 stream sediment geochemistry program were also submitted to SGS Geosol of Belo Horizonte for analyses using a 10 ppb detection limit.

11.1.2 Core Samples

Palito Mine

Historically, underground core which had a shorter turn-over period than regular surface core holes, were prepared primarily at the Palito Mine laboratory. The remainder were sent to either ALS Chemex, with preparation at Goiás and assaying at Brisbane, Australia, or to the SGS Geosol laboratory with preparation at Itaituba and assaying at Belo Horizonte, Brazil. Both external laboratories used standard 30 g fire assay and aqua regia analysis for gold and copper and are certified commercial laboratories. Once an onsite analytical laboratory was established at the Palito Mine in 2005, samples of primarily quarter core were analysed via MIBK or DIBK for gold and aqua regia for copper.

In 2007, the process of quarter and half core preparation at the onsite laboratory was abandoned, as a core preparation facility was established in Itaituba by SGS Geosol. Due to the limited capacity of the Palito laboratory to process exploration drill samples as a result of the increase in mine production and mill samples assuming a higher priority, improved turnaround time on analyses could be achieved with the addition of the preparation facility at SGS Geosol. In October 2007, under advice received from NCL, Serabi began sample preparation of half core samples at the onsite laboratory, and dispatched prepared samples to SGS Geosol for analyses. This process continued until February 2008, when increased production of drill samples exceeded the preparation facilities of the Palito laboratory and all samples were again sent to SGS Geosol.

Serabi utilized the services of SGS Geosol until the end of 2010 for all drill core samples comprising the mineral resource at that time. Sample preparation was performed at SGS's facility in Itaituba, while analysis was performed at their Belo Horizonte laboratory. With regards to the 2010 to 2011 drilling campaign, sample preparation was performed by Serabi at the Palito Mine laboratory, while analyses took place at Eco Tech Laboratory and ALS Minerals located in British Columbia, Canada.

Sample preparation at the Palito Mine laboratory and SGS Geosol facility in Itaituba includes the following steps:

- Samples dried at 110° Celsius;
- Crushed to pass 2 mm screen;

- Riffle split; 1 kg split ground to a -150 mesh pulp; and
- Collect 125 g of homogenized fraction; 50 g for sample analyses, remaining stored in a marked envelope for future reference.

Samples which have been marked as having visible gold during the core logging stage follow slightly different sample preparation steps:

- Entire sample crushed and ground to -150 mesh;
- Sample passed through a 150 mesh screen;
- Undersized material weighed and treated in the same way as a normal sample;
- Oversized material weighed, pulverized, and treated as a separate sample; and
- Both sample analyses reported separately; laboratory calculates weighted average and the single value is ascribed to the sample interval.

At SGS, gold was assayed in 30 g aliquots by fire assay with atomic absorption spectroscopy (AAS) finish. The gold value was calculated by comparison with a set of known gold standards. At the Palito Mine laboratory, samples are analyzed by aqua regia with AAS finish.

São Chico Mine

Under the ownership of Kenai, drill core samples were prepared at ACME in Itaituba, Brazil, and analyzed by ACME in Santiago, Chile, using 50 g gold fire assay. Samples were prepared using ACME's preparation code R200-1000, which includes the following steps:

- Entire samples crushed to 80% passing 10 mesh;
- Riffle split; 250 g sub-sample produced; and
- Pulverized to 85% passing 200 mesh.

Samples were then transported from Santiago to ACME in Vancouver, Canada for analysis by aqua regia with inductively coupled plasma mass spectrometry (ICP-MS) finish.

11.1.3 Reverse Circulation Samples

At the Palito Mine site, reverse circulation drill samples were passed through a Jones Riffle Splitter, quartering the sample until a 2 kg sample was achieved. In cases where the sample was too moist to pass through the riffle splitter, it was sun or oven dried until it could be passed through the splitter. Samples were placed in plastic sample bags, identified with the appropriate sample number and sealed. They were then placed into larger 50 L bags, which were marked and sealed prior to dispatch to the laboratory.

Samples were prepared and assayed by SGS Laboratories by 30 g fire assay for gold and aqua regia for copper. Alternatively, samples underwent a combination of preparation and analysis at the Palito laboratory by aqua regia for gold and copper, with pulps submitted to SGS for analysis by 30 g fire assay and aqua regia.

11.1.4 Channel Samples

Palito Mine

At the Palito Mine, approximately two to 5 kg of chips from face and back channels is collected for sampling. The samples are delivered to the Palito laboratory where they are prepared and analyzed for gold and copper by aqua regia method.

São Chico Mine

Under the ownership of Kenai, rock chip and underground channel samples were prepared and assayed at SGS Geosol's laboratory in Vespasiano, Brazil using the following steps:

- Entire sample dried and crushed to 75% passing 2 mm screen; and
- 250 g sub-sample pulverized to 85% passing 200 mesh.

Samples were then submitted for 50 g fire assay with AAS finish (SGS Geosol code FAA505) and 34 element ICP-OES analysis following aqua regia digest (SGS Geosol code ICP12B).

11.2 Quality Assurance and Quality Control Programs

Quality assurance and quality control programs are typically set in place to ensure the reliability and trustworthiness of exploration data. They include written field procedures and independent verifications of aspects such as drilling, surveying, sampling and assaying, data management, and database integrity. Appropriate documentation of quality control measures and regular analysis of quality control data are important as a safeguard for project data and form the basis for the quality assurance program implemented during exploration.

Analytical control measures typically involve internal and external laboratory control measures implemented to monitor the precision and accuracy of the sampling, preparation, and assaying. They are also important to prevent sample mix-up and monitor the voluntary or inadvertent contamination of samples. Assaying protocols typically involve regular duplicate and replicate assays and insertion of quality control samples to monitor the reliability of assaying results throughout the sampling and assaying process. Check assaying is typically performed as an additional reliability test of assaying results. This typically involves re-assaying a set number of rejects and pulps at a second umpire laboratory.

11.2.1 Palito Mine

The analytical quality control program implemented at Palito includes the insertion of control samples within sample batches that are being submitted for assaying. Blanks and certified reference material are inserted alternately every 10 samples, and their results are monitored. The Palito and SGS Geosol laboratories report on their own internal standards and blanks by conducting duplicate pulp analyses.

Serabi's current quality control program uses reference materials produced by Rocklabs of Auckland, New Zealand. A number of standards covering a wide range of grades are incorporated into all sample batches.

Samples of pure quartz are used as blank samples in assay batches to monitor potential contamination during the sample preparation process. If the assay result of a blank sample returns a grade over the detection limit of 0.03 g/t gold, the entire batch is considered for re-analyses.

Approximately 10% of the samples submitted are for quality control purposes.

11.2.2 São Chico Mine

The analytical quality control program implemented at São Chico is similar to that at Palito. Control samples are inserted into all sample batches submitted for assaying from the São Chico Mine. Drill core samples are submitted in batches of 20 and each batch contained 16 drill core samples, one blank, one certified reference material, one crush duplicate and one pulp duplicate.

Blanks and certified reference material results, however, were not reported on and therefore cannot be verified by SRK.

11.3 SRK Comments

In the opinion of SRK, the sampling preparation, security and analytical procedures used by Serabi are consistent with generally accepted industry best practices and are, therefore, adequate.

12 Data Verification

12.1 Verifications by Serabi

Exploration and production work completed by Serabi is conducted using documented procedures and involves detailed verification and validation of data prior to being considered for geological modeling and mineral resource estimation. During drilling, experienced mine geologists implement best practices designed to ensure the reliability and trustworthiness of the exploration data.

As previously outlined, Serabi relies partly on the internal analytical quality control measures implemented by SGS and the Palito Mine laboratory, but also implement external analytical quality control measures comprising of inserting control samples in all sample batches submitted for assaying and requesting pulp and coarse reject duplicate samples. Quality control failures are investigated and appropriate actions are taken when necessary, including requesting re-assaying of certain batches of samples.

With the objective of assessing the quality of sample preparation and the analytical accuracy and precision of the Palito Mine laboratory, a group of sub-samples were chosen by NCL Ingeníearia y Contrucción Ltda in 2012 to submit for retesting by the SGS Belo Horizonte laboratory. A total of 99 coarse reject and 1,075 pulp reject sub-samples were collected. The conclusion of the study showed the Palito laboratory presented poor repeatability and demonstrated a moderate bias when compared with results from SGS for gold assays. The issue was found to be associated primarily with results below 0.7 g/t gold, related to a detection limit at the Palito laboratory being higher than expected. When values above this threshold were considered, the repeatability improved significantly and the bias was nearly eliminated. SRK understand that Serabi has implemented measures to remediate this issue.

12.2 Verifications by SRK

12.2.1 Site Visit

In accordance with NI 43-101 guidelines, SRK visited the Palito and São Chico operations from May 12 to 15, 2017, accompanied by representatives of Serabi. The SRK team of qualified persons comprised of Glen Cole, PGeo, Eric Olin, PEng and Tim Olson, FAusImm.

The site visit took place during active drilling and production activities. All aspects that could materially impact the integrity of the data informing the Mineral Resources (core logging, sampling, analytical results, and database management) were reviewed with Serabi staff. SRK interviewed mine staff to ascertain exploration and production procedures and protocols. SRK examined selected core and confirmed that the logging information accurately reflects actual core. The lithology contacts checked by SRK match that of the information reported in the core logs. SRK toured the underground operations and assessed the attributes of the vein mineralization.

12.2.2 Verifications of Analytical Quality Control Data

To assess the accuracy and precision of analytical quality control data, SRK routinely analyzes such data. Analytical quality control data typically comprises analyses from standard reference material, blank samples, and a variety of duplicate data. Analyses of data from standard reference material and blank samples typically involve time series plots to identify extreme values (outliers) or trends that may indicate issues with the overall data quality. To assess the repeatability of assay data, several tests can be performed, of which most rely on certain statistical tools. SRK routinely plots and assesses the following charts for duplicate data:

- Bias charts;
- Quantile-quantile (Q-Q) plot;
- Mean versus half relative deviation (HRD) plot;
- Mean versus half absolute relative deviation plot; and
- Ranked half absolute relative deviation (HARD) plot.

Discussion

SRK analyzed the available analytical quality control data of the Palito and São Chico operations to confirm that the analytical results are reliable for informing mineral resource estimates. Serabi provided analytical data as an Access database and as Microsoft Excel spreadsheets, and SRK aggregated the assay results for further analysis. Certified reference materials and blanks were summarized on time series plots to highlight the performance of the control samples, and duplicate assays were examined using bias charts, quantile-quantile, and relative precision plots.

Palito Mine

The pre-2016 database provided by Serabi for the Palito Mine contained standards with over 90 unique identification names. SRK investigated approximately one third of the standards, and only those which had a minimum of 10 associated assay results and accompanying certificates of analyses. SRK recommends that Serabi significantly reduce the number of reference materials in use, so that statistical analysis can be performed on sufficient populations of data to accurately assess laboratory performance over time.

The performance of the control samples inserted with samples submitted for assaying at the Palito Mine laboratory prior to 2016 is below expectation. Several the assay results of standards are outside ±2 times the standard deviation of the expected value (and often below two times the standard deviation), and can likely be attributed to applied analytical methods. The recommended values reported by Rocklabs is for samples analyzed by fire assay method, whereas the Palito laboratory uses aqua regia digestion. Samples sent to SGS Geosol underwent 30 g fire assay and show considerably improved results; examples of reference materials that have been compared by analytical method can be found in Appendix A. Control samples assessed from the 2016 dataset appear to demonstrate more consistent results, however, differences in analytical method is again likely contributing to the number of results outside ±2 times the standard deviation of the expected value. It is highly recommended that standards with certified values for the appropriate analytical method be used to properly monitor the performance of the Palito laboratory.

Concerns of possible contamination during the sample preparation process or mislabeling of blank samples is noted in the pre-2016 dataset, however, only approximately 1% of blank samples are observed to be above the warning limit (defined as ten times the lower detection limit). Improvements have been made, as no blank samples in the 2016 dataset are observed to be above the warning limit. Serabi should continue to incorporate blank samples and monitor their performance on a regular basis.

Duplicate assays of internal blanks and standards used by the analytical laboratories to which Serabi sent samples to in the pre-2016 dataset was also assessed. Rank half absolute difference (HARD) plots suggest that approximately 98% of the duplicate samples assayed for gold have HARD below 10% and approximately 92% of the duplicate samples assayed for copper have HARD below 10%, indicating extremely good repeatability of the sample results. No paired data was provided in the 2016 dataset, however, Serabi has informed SRK that duplicate samples for the mine are now being collected.

Serabi should continue to closely monitor the performance of the Palito Mine quality control samples and identify and investigate the cause of any significant outliers.

São Chico Mine

A number of paired data sets were provided to SRK by Serabi for São Chico samples assayed between 2011 and 2015. They include field duplicate samples, pulp duplicate samples, duplicate laboratory samples, and crushed duplicate samples assayed at the Palito Mine Laboratory and a number of External Laboratories including SGS Geosol, ALS Chemex and ACME Laboratory. Overall, the data sets indicate that paired data results could be reasonably reproduced for the type of deposit being investigated. The paired data set showing poor reproducibility is that of pulp samples originally assayed by aqua regia at the Palito Mine laboratory and re-assayed by SGS Geosol using 30 g fire assay. Rank half absolute difference plots suggest that approximately 17% of the pulp duplicates have HARD below 10%, however, this is attributed to the different analytical methods being used at the laboratories and the results are therefore considered negligible.

Blanks and reference material results were not reported, and therefore, no verification could be made on this dataset. SRK recommend that in future, Serabi ensures that results for all control samples be reported on to thoroughly monitor the performance of the Palito Mine laboratory.

13 Mineral Processing and Metallurgical Testing

13.1 Palito Ore Testing and Procedures

Metallurgical tests were carried out by AMMTEC Australia on behalf of Serabi Mining during the period from April 2004 through August 2005. The testwork conducted in 2004 was performed on three samples of Palito Mine ore that were identified as AmVeio 1, AmVeio 2, and AmVeio Oziel. Head analyses for these test samples are presented in Table 13-1 with gold grades ranging from 34.9 to 76.0 g/t Au and copper grades ranging from 0.30% to 1.11% Cu. It is noted that the gold head grades of the test composites are all significantly higher than the grades of actual mined ore which ranged from about 5 to 12 g/t during the period 2005 to 2007.

Table 13-1: Head Analyses for Palito Ore Test Samples

Sample Identity	Au (g/t)	Cu (%)	Ag (g/t)	Fe (%)	S (%)
Am Veio 1	34.9	0.30	8	12.7	12.6
Am Veio 2	76.0	0.85	17	13.0	14.3
Am Veio Oziel	74.5	1.11	27	11.7	11.3

Source: Preedy Metallurgical, 2008

13.1.1 Flotation and Cyanidation Testwork

Testwork on these samples included three approaches to flotation, including bulk sulfide flotation, selective copper flotation followed by bulk sulfide flotation, and straight selective copper flotation. The results of these tests are summarized in Table 13-2. The selective copper flotation test conducted on test sample Am Veio 1 (which represented a copper grade closer to the copper grades likely to be produced from the Palito Mine) resulted in the recovery of 93.3% of the copper and 67.5% of the gold into a copper flotation concentrate that contained 14.2% Cu and 1,119 g/t Au.

Cyanide leach testwork was conducted on the flotation tailings from the selective copper flotation tests (tests GS0114 to GS0116) and the results of these tests are summarized in Table 13-3. Cyanide leaching of the flotation tailing from the Am Veio 1 test sample resulted in the extraction of 61.6% of the gold contained in the flotation tailing. This represents an overall gold recovery from flotation followed by cyanide leaching of about 87.5%.

Table 13-2: Summary of Flotation Tests Conducted on Palito Ore Samples

Test No	Ore Type	Float Type	Grind P_{80} (µm)	Conc. Grade		Conc. Recovery		Float Tail	
				Cu (%)	Au (g/t)	Cu (%)	Au (%)	Cu (ppm)	Au (g/t)
GS0108	Am – 01	Bulk Sulfide	75	1.20	106	97.0	83.2	137	7.93
GS0109	Am – 02	Bulk Sulfide	75	2.56	208	98.5	92.4	172	7.70
GS0110	Am-Oziel	Bulk Sulfide	75	4.41	233	96.3	87.8	570	10.9
GS0111	Am – 01	Select Cu + Bulk	53	1.30	103	96.4	85.1	163	6.10
GS0112	Am – 02	Select Cu + Bulk	53	2.97	208	98.5	92.6	182	6.70
GS0113	Am-Oziel	Select Cu + Bulk	53	4.66	266	95.4	93.3	707	5.96
GS0114	Am – 01	Selective Cu	75	14.2	1119	93.3	67.5	211	11.5 (1)
GS0115	Am – 02	Selective Cu	75	17.1	1202	96.4	70.9	299	23.2
GS0116	Am-Oziel	Selective Cu	75	19.4	1168	87.6	78.0	1390	16.7

Source: Preedy Metallurgical, 2008

(1) SRK replaced the tabulated flotation tailing grade of 32.5 /g/t Au with the calculated grade of 11.5 g/t Au shown in Table 13-3.

Table 13-3: Summary of Cyanidation Tests Conducted on Copper Flotation Tailings

Ore	Calc'd Head (Float Tail)		Test No.	Lime (60% CaO) (kg/t)	NaCN Added (kg/t)	NaCN Used (kg/t)	Leach Residue (24 hr) Au (g/t)	Copper Extr'n (%) @ 48hrs	Gold Extr'n (%) @ 48hrs
	Au (g/t)	Cu (ppm)							
Am-01	11.50	257	GS0117	1.00	1.50	0.39	4.42	45.23	61.56
Am-02	22.63	360	GS0118	1.00	1.50	0.46	5.93	37.52	73.80
Am-Oziel	14.66	1740	GS0119	1.00	2.86	2.51	4.51	72.93	69.23

Source: Preedy Metallurgical, 2008

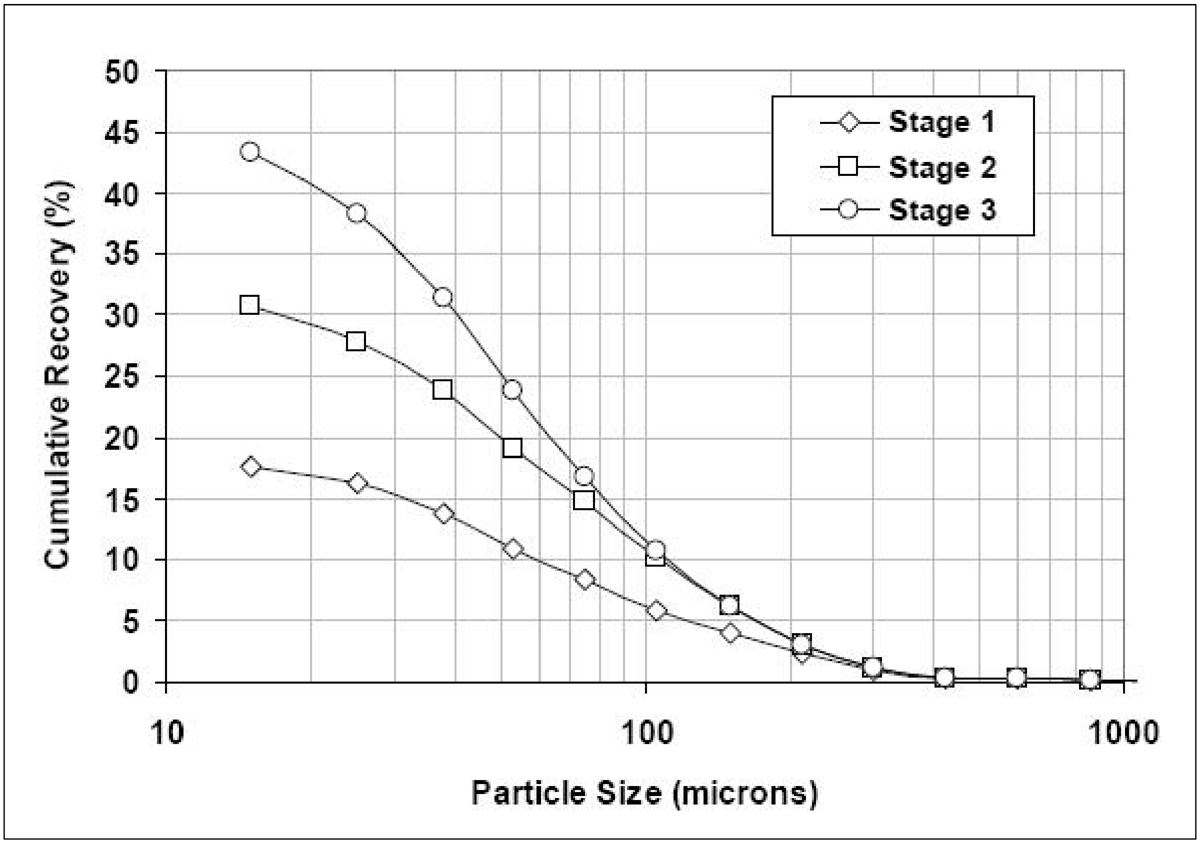
13.1.2 Gravity Concentration Testwork

Knelson Research and Technology Centre, Canada, conducted a gravity recoverable gold (GRG) test on a sample of Palito mill feed ore. The results of the GRG test are shown in Table 13-4. The overall gold recovery after three stages of grinding was 43.3%, produced in a concentrate mass of 1.4%. The calculated head grade of the sample was 5.0 g/t Au with a final gravity tail grade of 2.9 g/t Au. A plot of cumulative gold recovery for each stage versus particle size is shown in Figure 13-1. Although very encouraging results were achieved by this testwork, gravity recovery was not included in the process plant flowsheet, due to concerns regarding the effect on flotation concentrate gold grades, and concentrate sales.

Table 13-4: Gravity Recoverable Gold Test

Grind Size P_{80}	Product	Mass		Au	Au Distribution
		(g)	(%)	(g/t)	(%)
780 µm	Stage 1 Conc.	91.2	0.5	197	17.6
	Sampled Tails	308	1.5	4.2	1.3
232 µm	Stage 2 Conc.	94.3	0.5	140	13.0
	Sampled Tails	309	1.5	3.5	1.1
97 µm	Stage 3 Conc.	88.2	0.4	146	12.6
	Sampled Tails	19307	95.6	2.9	54.4
	Totals (Head)	**20,198**	**100**	**5.0**	**100**
	Knelson Conc.	**274**	**1.4**	**161**	**43.3**

Source: Preedy Metallurgical, 2008



Source: Preedy Metallurgical, 2008

Figure 13-1: Cumulative Au Recovery vs. Particle Size

13.1.3 Comminution Testing

In 2005 a Bond Mill Work Index (BWi) test was conducted on a sample of Palito ore. Results from this test are summarized in Table 13-5 and show that the Palito ore is moderately hard with a BWi of 17.0 kWh/t.

Table 13-5: Bond Ball Mill Work Index on Palito Ore Sample

Sample Identity	Micrometers		Grp (g/rev)	Test Aperture (µm)	BWi (kWh/t)
	F_{K80}	P_{K80}			
Serabi Ore	2,406	79.6	1.095	106	17.0

Source: Preedy Metallurgical, 2008

13.1.4 Historical Plant Production

The results of metallurgical studies on Palito ore were used as the basis for constructing a process plant that included crushing, grinding, copper flotation and carbon-in-pulp (CIP) cyanidation of the copper flotation tailings. Historical plant production results for the period 2005 to 2007 are shown in Table 13-6. Overall gold recoveries (flotation + CIP) of 90% to 92% were reported from Palito ore containing 5.0 to 12 g/t Au. Copper recoveries of 81% to 94% into copper flotation concentrates containing 21% to 29% Cu were reported.

Table 13-6: Historical Plant Production from Palito Ore (2005 – 2007)

Quarter	Tonnes Milled	Head Grade		Flotation				CIP	Plant Total		
		Au (g/t)	Cu (%)	Recovery		Conc. Grade		Recovery	Recovery	Production	
				Au (%)	Cu (%)	Au (g/t)	Cu (%)	Au (%)	Au (%)	Au (oz)	Cu (t)
2005 – Q1	8,222	9.33	0.30	61.9	89.4	354	16.7	58.6	84.2	2,077	22.4
2005 – Q2	14,006	8.63	0.33	66.0	82.8	445	21.3	65.3	88.2	3,427	38.2
2005 – Q3	14,315	12.06	0.68	66.3	83.7	646	27.1	70.8	90.2	5,005	81.0
2005 – Q4	21,415	7.65	0.42	65.9	82.3	404	27.9	75.9	91.8	4,837	74.7
2006 – Q1	25,514	9.31	0.47	64.3	81.5	460	29.6	77.3	91.9	7,017	98.0
2006 – Q2	29,851	9.73	0.43	62.8	85.1	471	28.0	76.6	91.3	8,527	107.1
2006 – Q3	29,462	9.20	0.51	70.6	92.6	391	28.4	70.6	91.4	7,974	139.2
2006 – Q4	32,760	9.37	0.73	75.5	94.3	298	28.9	63.4	91.0	8,980	224.6
2007 – Q1	42,705	6.52	0.31	73.9	94.3	468	28.5	61.1	89.8	8,044	125.6
2007 – Q2	45,245	5.95	0.30	76.2	93.9	412	25.5	62.5	91.1	7,888	127.0
2007 – Q3	45,054	5.36	0.23	75.8	93.4	448	23.6	60.5	90.0	7,021	96.2
2007 – Q4	40,481	5.06	0.29	72.2	93.8	337	24.9	63.6	89.9	5,989	110.4

Source: Preedy Metallurgical, 2008

13.2 São Chico Ore Testing and Procedures

Metallurgical studies were conducted by SGS Mineral Services- Lakefield (SGS) on samples of São Chico ore during 2012 and 2013. The results of these studies are fully documented in the following reports:

- "The Recovery of Gold from the São Chico Gold Project", SGS, April 4, 2012; and
- "The Recovery of Gold from the São Chico Gold Project", SGS, May 17, 2013.

13.2.1 2012 Metallurgical Program

The 2012 metallurgical program on São Chico ore was conducted to evaluate the processing characteristics of the São Chico ore and to develop a preliminary processing flowsheet. The program included ore characterization, as well as the evaluation of a number of processing options, including; gravity separation, flotation and cyanidation.

Sample Characterization

The metallurgical program was conducted on three metallurgical composites identified as N-1, N-2 and N-3, which were blended in equal proportions to formulate a Master composite. Gold head analyses for these test composites are shown in Table 13-7 and the results of multi-element analyses on each composite are shown in Table 13-8. The master composite contained 57.5 g/t Au, which are significantly higher than ore grades of 6 to 10 g/t Au that are typical from the São Chico Mine. As such, the master composite cannot be considered fully representative. It is also noted that in contrast to the Palito ore, São Chico ore contains very little copper.

Table 13-7: Gold Head Analyses on São Chico Test Composites

Composite	Calc. Head Au (g/t)	+150 Mesh		-150 Mesh			% Au Distribution	
		% Mass	Au (g/t)	% Mass	Au (g/t)		+150 Mesh	-150 Mesh
					a	b		
Master	57.5	2.64	862	97.4	37.3	34.0	39.6	60.4
Comp N-1	114	3.15	1,424	96.8	70.5	72.6	39.3	60.7
Comp N-2	11.8	3.38	108	96.6	9.00	7.86	31.0	69.0
Comp N-3	40.9	3.07	640	96.9	21.0	22.8	48.0	52.0

Source: SGS, 2012

Table 13-8: Multi-Element Analyses on São Chico Test Composites

Element	Master	Comp N-1	Comp N-2	Comp N-3
Quantitative Analyses				
S(T) (%)	4.92	6.54	2.73	4.92
$S^{=}$ (%)	4.47	6.39	2.62	4.62
SO_4 (%)	0.1	0.1	0.1	0.1
C(T) (%)	0.21	0.01	0.45	0.17
TOC	< 0.05	< 0.05	0.1	< 0.05
CO_2	0.35	< 0.05	1.21	0.33
Semi-Quantitative ICP Scan				
Ag (g/t)	25	49	3	12
Al (g/t)	46,100	42,400	49,600	42,800
As (g/t)	< 40	< 40	< 40	56
Ba (g/t)	358	177	461	449
Be (g/t)	1.84	1.76	2.12	1.7
Bi (g/t)	< 20	< 20	< 20	< 20
Cd (g/t)	7,010	1,150	13,900	5,410
Co (g/t)	70	126	23	64
Cr (g/t)	9	10	9	12
Cu (g/t)	91	77	88	98
Fe (g/t)	386	498	133	528
K (g/t)	48,000	59,700	31,200	48,600
Li (g/t)	25,100	21,900	27,400	21,200
Mg (g/t)	22	17	29	21
Mn (g/t)	4150	3270	5790	3830
Mo (g/t)	362	157	707	258
Na (g/t)	< 10	< 10	< 10	< 10
Ni (g/t)	1,550	432	2,200	2,150
P (g/t)	< 20	< 20	< 20	< 20
Pb (g/t)	232	230	273	228
Sb (g/t)	13,700	17,900	3,940	17,300
Se (g/t)	< 20	< 20	< 20	< 20
Sn (g/t)	< 30	< 30	< 30	< 30
Sr (g/t)	< 20	< 20	< 20	< 20
Ti (g/t)	16.7	6.74	27	13.2
Tl (g/t)	1,470	1,440	1,590	1,340
U (g/t)	< 30	< 30	< 30	< 30
V (g/t)	< 20	< 20	< 20	< 20
Y (g/t)	26	24	31	24
Zn (g/t)	8.9	7.6	12.6	7.9

Source: SGS, 2012

Comminution Study

A Bond ball mill work index (BWi) test was conducted on the master composite and the results are summarized in Table 13-9, where it is shown that a BWi of 15.5 KWh/t was determined. On this basis the São Chico ore is considered to be of moderate hardness.

Table 13-9: Bond Ball Mill Work Index on São Chico Master Composite

Feed (F_{80}) µm	Product (P_{80}) µm	Closing Screen (µm)	BWI (KWh/t)	
			Imperial	Metric
2,459	120	150	14.1	15.5

Source: SGS, 2012

Gravity Separation Testwork

The potential for gold recovery from the master composite by gravity concentration was evaluated at grind sizes of approximately 80% passing (P_{80}) 100 and 75 µm with a Knelson MD-3 centrifugal concentrator as the primary gravity gold unit. The gravity concentrate produced from the Knelson concentrator was further upgraded on a Mozley mineral separator targeting an overall mass pull of 0.1%. The results of the gravity concentration tests are presented in Table 13-10 where overall gravity gold recoveries of 21.6% to 28.4% into gravity concentrates containing 23,010 to 27,515 g/t Au are reported. The Knelson and Mozley tailings were combined for subsequent cyanidation testwork.

Table 13-10: Summary of Gravity Concentration Testwork on São Chico Master Composite

Test No.	Tests Completed on Gravity Tailing	Feed Size P_{80},(µm)	Product	Mass %	Assays g/t		% Distribution	
					Au	Ag	Au	Ag
G-1	CN-4 & F-1	150	Mozley Concentrate Knelson + Mozley Tailing	0.069 99.93	23,622 49.6	13,555 36.3	24.8 75.2	20.5 79.5
			Head (calculated)	100.0	65.9	45.6	100.0	100.0
G-2	CN-5 & F-2	106	Mozley Concentrate Knelson + Mozley Tailing	0.062 99.94	23,010 51.6	13,258 34.6	**21.6** 78.4	**19.1** 80.9
			Head (calculated)	100.0	65.8	42.8	100.0	100.0
G-3	CN-6 & F-3	75	Mozley Concentrate Knelson + Mozley Tailing	0.065 99.93	27,515 45.3	15,911 29.1	**28.4** 71.6	**26.3** 73.7
			Head (calculated)	100.0	63.3	39.5	100.0	100.0
			Head (Direct)		57.5	25.0		

Source: SGS 2012

Cyanidation Testwork

Cyanidation tests were conducted on master composite gravity tailing and whole-ore samples at grind sizes ranging from about P_{80} 75 to 150 µm. Standard bottle roll test conditions included:

- Slurry density: 40% solids (w/w);
- pH: 10.5 to 11.0 (maintained with lime);
- Cyanide Concentration: 0.5 g/L NaCN (maintained); and
- Retention Time: 48 hours (with subsamples at 6 and 24 hours).

The results of whole-ore cyanidation tests are summarized in Table 13-11 and the results of cyanidation tests on the gravity tailing are summarized in Table 13-12. Overall gold recoveries for both whole-ore cyanidation and gravity + cyanidation of the gravity tailing were similar at about 99%. Grind size, over the range tested, did not have an effect on overall recovery. Sodium cyanide consumption ranged from about 0.71 to 1.85 kg/t with a definite trend for increasing consumption as the grind size became finer.

Table 13-11: Summary of Whole-Ore Cyanidation Test Result on the São Chico Master Composite

Test No.	Feed Size P_{80} µm	Reagent Consumption kg/t of CN Feed		Au % Extraction			Residue Au (g/t)	Head Au (g/t)	
		NaCN	CaO	6 h	24 h	48 h		Calc	Direct
CN-1	137	0.94	0.29	60	87	98.8	0.68	55.7	
CN-2	105	0.98	0.24	76	96	99.0	0.50	52.3	57.5
CN-3	88	1.36	0.37	82	95	99.3	0.38	55.3	

Source: SGS, 2012

Table 13-12: Cyanidation Results on the Gravity Tailing from the São Chico Master Composite

Feed From Test	Test No.	Feed Size P_{80} µm	Reagent Consumption kg/t of CN Feed		Au% Extraction CN (Unit)			Overall Recovery		Residue Au (g/t)	Head Au (g/t)		
											Calculated		Direct
			NaCN	CaO	6 h	24 h	48 h	Gravity	Gravity +CN		CN Leach	Grav + CN	
G-1	CN-4	150	0.71	0.43	73	90	98.2	24.8	98.7	0.89	49.6	65.9	
G-2	CN-5	106	1.02	0.65	63	96	98.7	21.6	99.0	0.69	51.6	65.8	57.5
G-3	CN-6	75	1.85	0.70	44	93	98.9	28.4	99.2	0.51	45.3	63.3	

Source: SGS, 2012

Flotation Testwork

Flotation testwork conducted on the São Chico master composite is not presented since the São Chico ore is not being processed by flotation.

13.2.2 2013 Metallurgical Program

The metallurgical test program conducted by SGS in 2013 consisted of the following:

- Extended gravity recoverable gold (E-GRG) testing to generate parameters necessary for gravity circuit design;
- Gravity recovery testing using a Knelson centrifugal concentrator followed by upgrading on a Mozley table; and
- Flotation optimization testwork.

Subsequent to this test program, it was determined that the São Chico ore would be processed by a combination of gravity concentration and CIP cyanidation of the gravity tailings. As such, the extensive flotation testwork that was conducted is not considered relevant and is not presented.

Sample Characterization

The metallurgical test program was conducted on a single master composite that was formulated by blending 265 kg of sub-composite A with 65 kg of sub-composite B. Sub-composite A was created from three separate samples labeled N-4, N-5 and N-6, and sub-composite B was created from three separate samples labeled N-11.1, N-13.2 and N-14.2. Table 13-13 shows the gold head analyses for sub-composites A (8.59 g/t Au) and B (79.4 g/t Au), which were combined to formulate the master composite that contained 23.2 g/t Au and 30.8 g/t Ag. Table 13-14 shows the multi-element analyses for the master composite. This composite is distinctly different from the São Chico composite that was tested by SGS in 2012 in that it contains significantly higher lead (3.52% Pb) and zinc (0.86% Zn). The reason for this difference is not known.

Table 13-13: São Chico Test Composite Head Analyses

Unit	Au (g/t)	Composite Weight %	Ag (g/t)		Avg. Ag (g/t)
			a	b	
Comp A	8.59	79.3	16.6	14.7	15.7
Comp B	79.4	20.7	105	73.4	89.2
Master Comp (calc.)	23.2	100			30.8

Source: SGS, 2013

Table 13-14: São Chico Master Composite Multi-Element Analyses

Element	Master Composite
Quantitative Analyses	
As (%)	0.036
Cd (%)	0.012
Cu (%)	0.091
Cu (CN $_{sol}$) (%)	0.034
Fe (%)	5.69
Pb (%)	3.52
$S_{(T)}$ (%)	6.46
$S^{=}$ (%)	6.22
Zn (%)	0.86
Semi-Quantitative ICP Scan	
Ag (g/t)	36
Al (g/t)	43700
Ba (g/t)	654
Be (g/t)	2
Bi (g/t)	<20
Ca (g/t)	4080
Co (g/t)	12
Cr (g/t)	140
K (g/t)	18500
Li (g/t)	26
Mg (g/t)	4180
Mn (g/t)	334
Mo (g/t)	5
Na (g/t)	7580
Ni (g/t)	<20
P (g/t)	218
Sb (g/t)	10
Se (g/t)	<30
Sn (g/t)	<20
Sr (g/t)	44
Ti (g/t)	1260
Tl (g/t)	<30
U (g/t)	<20
V (g/t)	28
Y (g/t)	8

Source: SGS, 2013

Gravity Recoverable Gold Testwork

An extended gravity recoverable gold (E-GRG) test was conducted on the master composite to assess the amount of gravity recoverable gold in the sample and to generate data required for circuit modeling and design. The results of this test are summarized in Table 13-15 and show that the sample was highly amenable gold recovery by gravity concentration with a GRG value of 65.8.

Table 13-15: Summary of E-GRG Test on São Chico Master Composite

Grind Size	Product	Mass %	Au (g/t)	Units Au	Dist. %
P_{80} = 464 µm	Stage 1 Conc Sampled Tails	0.50 0.81	732 25.7	70,643 4,046	8.3 0.5
P_{80} = 147 µm	Stage 2 Conc Sampled Tails	0.56 0.95	2,618 28.0	285,856 5,187	33.4 0.6
P_{80} = 72 µm	Stage 3 Conc Final Tails	0.70 96.5	1,519 15.1	206,643 282,839	24.2 33.1
	Total (Head) Knelson Conc	100.0 1.76	43.9 1,648	855,214 563,142	100.0 65.8

GRG Number =65.8
Source: SGS, 2013

Gravity Concentration Testwork

A series of four 10 kg gravity concentration tests were run on the master composite. Each gravity concentration test was conducted at a grind size of P_{80} 243 µm with a Knelson MD-3 centrifugal concentrator followed by upgrading of the Knelson gravity concentrate on a Mozley table. The results of these tests are presented in Table 13-16 and show that 23.4% to 27.5% of the gold was recovered into gravity concentrates ranging from 7,505 to 14,121 g/t Au. This is very similar to the gravity concentration test results that were performed during SGS's 2012 test program where 24.8% to 28.4% of the gold was recovered into the gravity concentrate.

Table 13-16: Summary of Gravity Concentration Tests on São Chico Master Composite

Test No.	Tests Completed on Gravity Tailing	Feed Size P_{80} µm	Product	Mass %	Assays g/t Au	% Distribution Au
G-4	F-4 to F-8	243	Mozley Concentrate	0.121	8,357	25.1
			Knelson + Mozley Tailing	99.88	30.2	74.9
			Head (Calculated)	100.0	40.2	100.0
G-5	F-9 to F-13	243	Mozley Concentrate	0.068	14,121	24.3
			Knelson + Mozley Tailing	99.93	29.7	75.7
			Head (Calculated)	100.0	39.3	100.0
G-6	LCT-1	243	Mozley Concentrate	0.143	7,505	27.5
			Knelson + Mozley Tailing	99.86	28.2	72.5
			Head (Calculated)	100.0	38.9	100.0
G-7	LCT-1 & LCT-2	243	Mozley Concentrate	0.099	8,754	23.4
			Knelson + Mozley Tailing	99.9	25.2	76.6
			Head (Calculated)	100.0	36.8	100.0

Source: SGS 2013

13.3 Cyanide Detoxification

At the present time, Serabi's process plant does not effectively detoxify the cyanide leach residues, and has undertaken studies to design an effective detoxification circuit that will consistently detoxify leach residues to <5 ppm CN_{WAD} (weak acid dissociable cyanide). To this end, cyanide detoxification studies using the industry-standard SO_2/Air detoxification process were conducted on leach residues from Serabi's process plant by Testwork Desenevolvimento de Processo Ltda (Testwork), and the results are fully documented in their report, "Testes De Labortorio De Neutralizacao De Cianeto Utilzando Processo SO_2/O_2", October 12, 2015. The objective of the program was to define the process conditions required to reduce cyanide to <5 ppm CN_{WAD}. The results of this test program were provided to Gekko Systems (Gekko) for review and are summarized in Table 13-17 and fully documented in their report, "Palito Gold Mine Cyanide Destruction Circuit Design Review and Process Design Criteria", February 17, 2016.

Based on their review of Testwork's test results, Gekko concluded that tests T3 and T4 consistently achieved about 3 to 4 ppm $CN_{WAD,}$ in the detoxified leach residue indicating that the correct SO_2 addition is above 4.0 g SO_2/g CN and that a design allowing additions of up to 4.5 g SO_2/g CN is recommended to cope with natural variations. Based on their review, Gekko developed the process design criteria installation of an effective cyanide detoxification circuit at Serabi's process plant.

Table 13-17: Summary of Cyanide Detoxification test results on Leach Residue from Serabi's Process Plant

	LAB TEST		T1		T2	T3	T4
FEED	Start CNwad	mg/L	114		90	90	90
	Slurry Flow rate	mL/min	36.7	target	36.7	36.7	36.7
	solids	%	42.5		42.5	42.5	42.5
	slurry sg		1.330		1.330	1.330	1.330
	Solids Flow	**g/min**	**20.7**		**20.7**	**20.7**	**20.7**
	solution flow	**mL/min**	**28.1**		**28.1**	**28.1**	**28.1**
	CNwad	**mg/min**	**3.20**		**2.53**	**2.53**	**2.53**
PRODUCT	**CNwad**	**mg/L**	**3 - 10 erratic**		**1 - 5 rising**	**4 steady**	**3 steady**
		pH	**7.0 - 7.8**		**7.6 -7.9**	**7.7 - 7.9**	**7.8 steady**
SMBS		g/L stock	5		5	5	5
mw		mL/min	3.6		2.87	3	3.07
190.1		mg SMBS/min	18		14.35	15	15.35
		mg SO_2/min	12.13		9.67	10.11	10.34
		kg SMBS/t ore	**0.87**		**0.69**	**0.72**	**0.74**
		gSO_2/gCNwad	**3.79**	high	**3.83**	**4.00**	**4.10**
Copper	copper sulphate pentahydrate (mw 249.69)	g/L stock	1		1	1	1
		mL/min	5.67		4.67	0	0
	copper (mw 63.55)	g/L stock	0.255		0.255	0.255	0.255
		mg Cu/min	1.44		1.19	0.00	0.00
		mg Cu/L solution	**51**		**42**	**0**	**0**
$Ca(OH)_2$		g/L stock	1		1	1	1
mw		mL/min	4.20		1.73	2.7	3.28
74.1		mg $Ca(OH)_2$ /min	4.20		1.73	2.7	3.28
		kg $Ca(OH)_2$ / t solid	0.20		0.08	0.13	0.16
		g $Ca(OH)_2$ / g SO_2	**0.35**	low	**0.18**	**0.27**	**0.32**
		g $Ca(OH)_2$ / L solution	**0.15**		**0.06**	**0.10**	**0.12**
H_2SO_4		g/L stock	100		50	50	50
mw		mL/min	0.63		0.77	0.7	0.7
98.1		mg H_2SO_4 /min	63		38.5	35	35
		kg H_2SO_4 / t solid	3.0		1.9	1.7	1.7
		g H_2SO_4 / L solution	2.25		1.37	1.25	1.25
NET ACID REQUIREMENT AFTER SUBTRACTING ACID USED TO NEUTRAUSE LIME ADDITION							
	$H_2SO_4 + Ca(OH)_2 \Rightarrow CaSO_4 + 2 H_2O$	**mg H_2SO_4 / min**	**57.4**		**36.2**	**31.4**	**30.7**
	Net addition (H_2SO_4 - 98.1/74.1 x $Ca(OH)_2$)	**kg H_2SO_4 / t solids**	**2.77**		**1.75**	**1.52**	**1.48**
EQUIVALENT SMBS REQUIRED TO PROVIDE ACID FOR pH CONTROL			$Na_2S_2O_5 + O_2 + H_2O \Longrightarrow Na_2SO_4 + H_2SO_4$ OR				
			$2CN^- + Na_2S_2O_5 + 2O_2 + H_2O \Longrightarrow 2CNO^- + Na_2SO_4 + H_2SO_4$				
	Theoretical Acid produced from SMBS	g H_2SO_4 / g SMBS	0.52		0.52	0.52	0.52
	Equivalent extra addition of SMBS	mg SMBS / min	111.31		70.17	60.90	59.41
	Equivalent extra addition of SMBS	kg SMBS / t ore	5.37		3.38	2.94	2.86
	Total SMBS addition for pH control	**kg SMBS / t ore**	**6.23**		**4.08**	**3.66**	**3.60**
	Total SMBS addition for pH control	**gSO_2/g CNwad**	**27.24**		**22.55**	**20.25**	**19.95**

Source: Gekko Systems, 2016

13.4 Sample Representativeness

The samples of Palito and São Chico ore used for metallurgical testing and process development appear to have represented the mineral character of the ores, but the test samples tended to be much higher grade than the ore grades that would actually be mined. Additionally, the specific locations from where the samples used for metallurgical studies were taken were not identified in the documents reviewed by SRK. In spite of this issue, actual plant performance has been consistent with the results obtained from the metallurgical studies on the samples that were tested.

13.5 Significant Factors

The following significant factors have been identified:

- Both the Palito and São Chico ores are highly amenable to conventional processing techniques to recover the contained metal values;
- Palito ore is processed using a flowsheet that includes crushing, grinding, copper flotation and CIP cyanidation of the copper flotation tailings;
- São Chico ore is processed using a flowsheet that includes crushing, grinding, gravity concentration and cyanidation of both the gravity concentrate and the gravity tailing;
- Plant performance as presented in Section 17 is similar to the results predicted from the metallurgical test program, even though the metallurgical test samples cannot be considered fully representative of the ore actually fed to Serabi's process plant; and
- Serabi has tested and designed a new cyanide detoxification circuit to replace the existing circuit which has not performed as planned.

14 Mineral Resource Estimate

14.1 Introduction

The Mineral Resources for the Palito Mining Complex comprise the Palito Mine and the São Chico Mine, both mined by underground mining methods. The Mineral Resource Statement presented herein represents the second and first mineral resource evaluation prepared by Serabi for the Palito and São Chico mines, respectively, in accordance with NI 43-101. A previous NI 43-101 Technical Report that documented the mineral resources for the Palito Mine was prepared in 2012 by NCL Ingeniería y Construcción Ltda from Chile.

The mineral resource estimates prepared by Serabi for the Palito Mine considers core drilling and underground chip sampling by Serabi generated during the period mid-2002 to May 2017. For the São Chico Mine, the mineral resource estimates, also prepared by Serabi, considers core drilling and chip sampling by Serabi and previous operators during the period September 2011 to March 2017. The resource estimation work was completed by Serabi's mine geology department under the supervision of Mike Hodgson, CEO at Serabi and reviewed by Dr. David Machuca, Senior Consultant with SRK, and Glen Cole PGeo (APGO#1416), Principal Consultant with SRK. Mr. Cole is an appropriate independent Qualified Person as this term is defined in NI 43-101. The effective date of the Mineral Resource Statements is June 30, 2017.

This section describes the resource estimation methodology and summarizes the key assumptions considered by Serabi. In the opinion of SRK, the resource evaluation reported herein is a reasonable representation of the global gold mineral resources found at the Palito Mining Complex at the current level of sampling. The mineral resources have been estimated in conformity with generally accepted CIM Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines and are reported in accordance with NI 43-101. Mineral resources are not mineral reserves and have not demonstrated economic viability. There is no certainty that all or any part of the mineral resource will be converted into mineral reserve.

The databases used to estimate the Palito and São Chico mines mineral resources were audited by SRK. SRK believes the current drilling information is sufficiently reliable to interpret with confidence the boundaries for gold mineralization and that the assay data are sufficiently reliable to support mineral resource estimation.

Serabi used a traditional polygonal estimation method in 2D sections to evaluate the mineral resources of both mines. AutoCAD software was used to define the 2D longitudinal sections and the calculations were performed in Microsoft Excel.

SRK generated parallel geostatistically-based three-dimensional mineral resource models in Datamine Studio, using an ordinary kriging estimator for the main mineralized structures of São Chico and the G3 vein at Palito for mineral resource validation purposes.

14.2 Resource Estimation Procedures

The resource evaluation methodology involved the following procedures:

- Database compilation and verification;
- Design / update of polygons in the 2D sections for each vein;
- Data analysis and capping of grades;

- Identification of samples adjacent or within each polygon;
- Calculations of area, average thickness, average grades and tonnage of each polygon;
- Resource classification;
- Assessment of “reasonable prospects for eventual economic extraction” and selection of appropriate CoGs; and
- Preparation of the Mineral Resource Statement.

14.3 Resource Database

14.3.1 Palito Mine

The Palito database received on May 25, 2017 contains 582 surface drill holes (98,346.5 m, 27,763 samples), 458 underground drill holes (27,766 m, 7985 samples), 74 reverse circulation holes (4,406 m, 4,050 samples), 328 rotary air blast holes (4,327 m, 1,943 samples), 22,598 channel samples taken from underground developments, 315 channel samples taken from chimneys, 1,277 face samples taken from stopes for grade control purposes, and 2,452 surface trench samples. The database includes codes of 45 different sampled mineralized structures; however, the mineral resources estimation was completed only for 26 of them. The veins that were not considered in the current mineral resource estimates present low gold grades and are small, and poorly recognized.

Table 14-1 contains the summary gold and copper grade statistics per sample types for all veins combined. Table 14-2 contains comparable statistics to Table 14-1, but combining all different data types for each of the 26 vein structures that are reported in the mineral resources statement. Only the data that were considered in the mineral resource estimation were included for the statistics in these two tables. Samples with no vein code taken in barren rock and samples within non-estimated mineralized structures are not considered in either table.

Table 14-1: Summary Raw Statistics of the Palito Resource Database per Sampling Type and for All Veins

	Gold (g/t)					Copper (%)				
Sample Type	**No.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**No.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
DD	1,630	3.53	10.8	0.00	327.9	1,602	0.15	0.52	0.00	15.95
UD	526	6.06	21.4	0.00	486.0	526	0.23	0.76	0.00	9.54
RC	188	1.43	5.75	0.00	66.7	188	0.05	0.28	0.00	3.90
CH	14,409	8.79	32.3	0.00	1,713.8	14,366	0.45	1.52	0.00	25.66
CM	306	29.6	60.8	0.07	677.6	306	1.60	2.30	0.01	23.82
LV	1,269	28.1	65.0	0.07	1,275.2	1,269	0.98	2.12	0.00	24.66
TC	34	8.39	11.8	0.23	60.0	34	0.02	0.02	0.00	0.10
All Types	**18,362**	**9.40**	**35.1**	**0.00**	**1,713.8**	**18,291**	**0.46**	**1.44**	**0.00**	**25.66**

DD: Surface drill holes, UD: Underground drill holes, RC: Reverse circulation holes, CH: Channel samples in underground developments, CM: Channel samples in chimneys, LV: ore control face samples in stopes, TC: samples from surface trenches.
Source: SRK, 2017

Table 14-2: Summary Raw Statistics of the Palito Resource Database per Vein and for All Sampling Types

Vein	Gold (g/t)					Copper (%)				
	No.	Mean	Std. Dev.	Min.	Max.	No.	Mean	Std. Dev.	Min.	Max.
Angelim	20	4.20	7.6	0.01	44.0	18	0.11	0.13	0.00	0.62
Barrichelo	22	0.87	2.0	0.00	9.7	22	0.06	0.10	0.00	0.47
Caxias	41	5.38	11.7	0.01	59.1	41	0.04	0.02	0.00	0.08
Cedro	420	4.44	21.7	0.00	361.7	418	0.17	0.51	0.00	7.09
Compressor	513	6.80	31.6	0.00	487.2	490	0.20	0.92	0.00	21.97
Compressor Ramo	139	12.71	55.2	0.01	793.1	139	0.23	0.66	0.00	14.32
Farias	179	3.77	13.4	0.00	175.6	179	0.13	0.32	0.00	3.10
G 1	1,084	6.67	23.3	0.00	268.1	1,082	0.22	0.93	0.00	14.48
G 2	2,608	6.80	25.8	0.00	619.0	2,594	0.26	1.22	0.00	21.10
G 2.5	611	12.39	30.9	0.06	420.2	610	1.30	3.27	0.00	25.66
G 3	7,960	10.52	41.1	0.00	1713.8	7,944	0.53	1.71	0.00	23.84
Guaruba	47	1.26	5.9	0.00	73.0	46	0.03	0.03	0.00	0.33
Ipe	187	1.98	7.9	0.00	93.0	187	0.14	0.48	0.00	4.70
Jatobá	703	12.74	70.8	0.01	1275.2	703	1.10	2.47	0.00	24.66
Jatobá Ramo	51	11.79	22.2	0.06	82.6	51	0.30	0.73	0.02	5.09
Meireles	41	1.92	6.7	0.00	32.3	41	0.03	0.05	0.00	0.25
Mogno	288	6.77	21.0	0.00	208.4	288	0.48	1.00	0.00	11.43
Munguba	115	0.60	2.3	0.00	27.4	105	0.06	0.14	0.00	1.35
Piaui	9	6.08	6.3	1.02	22.9	9	0.10	0.12	0.02	0.43
Pipoca	1,516	14.25	40.0	0.00	677.6	1,516	0.50	1.34	0.00	19.02
Pipoca Ramo	188	18.50	43.3	0.00	257.4	188	0.45	0.96	0.00	9.80
Piquet	77	1.43	6.7	0.00	56.8	77	0.05	0.24	0.00	2.80
Senna	1,204	8.51	27.9	0.01	456.9	1,204	0.47	1.21	0.00	16.04
Uxi	100	1.42	5.7	0.00	43.2	100	0.05	0.20	0.00	1.40
Verde	79	1.21	7.5	0.00	123.9	79	0.06	0.12	0.00	4.17
Zonta	160	5.12	37.4	0.00	603.9	160	0.04	0.04	0.00	0.35
All Veins	18,362	9.40	35.1	0.00	1713.8	18,291	0.46	1.44	0.00	25.66

Source: SRK, 2017

14.3.2 São Chico Mine

The São Chico database received on May 24, 2017 contains 108 surface drill holes (16,747 m, 4,960 samples), 168 underground drill holes (8,870 m, 1,925 samples), 3,222 channel samples taken from underground developments, and 684 face samples taken from stopes. Table 14-3 shows the data used for mineral resource estimation of the São Chico Mine. The data comprises the samples within the principal shear zone as well within other three minor mineralized structures called Highway, Julia and Vania. Copper mineralization generally occurs at grades too low for economic interest, therefore Serabi decided not to estimate copper mineral resources for the São Chico Mine. SRK agrees with this decision.

Table 14-3: Summary Raw Statistics of the São Chico Resource Database per Vein and Sampling Types

Vein	Sample Type	Gold (g/t)					Copper (%)				
		No.	Mean	Std. Dev.	min.	max.	No.	Mean	Std. Dev.	min.	max.
Principal (Shear Zone)	DD	489	4.4	23.8	0	452.1	412	0.02	0.04	0	0.43
	UD	753	4.87	24.6	0.02	336.6	448	0.01	0.03	0	0.67
	CH	3222	9.12	39.8	0	1295.2	1162	0.02	0.03	0	0.33
	LV	684	15.85	112.4	0.03	2993.3	278	0.01	0.03	0	0.27
	All	5148	8.94	51.4	0	2993.3	2300	0.02	0.03	0	0.67
Highway	DD	19	11.43	14.9	0	189.6	10	0.01	0.01	0	0.04
Julia	DD	22	14.57	29.1	0.03	109.6	22	0.05	0.09	0	0.38
Vania	DD	6	15.05	13.7	0.08	241.1	6	0.01	0	0	0.01
All	All	47	13.36	21.39	0	241.1	38	0.03	0.05	0	0.38

DD: Surface drill holes, UD: Underground drill holes, CH: Channel samples in underground developments, LV: ore control face samples in stopes.
Source: SRK, 2017

14.4 Data Analysis and Evaluation of Outliers

SRK performed the capping analysis of raw gold assays within mineralized structures of both deposits per sample type. For Palito, each vein was analyzed separately, whereas for São Chico, only the samples within the principal shear zone were analyzed. Table 14-4 presents the summary capping statistics for all sample types combined within the different veins of Palito. Overall, 3% of samples were capped and the capping impact on the global gold mean is a reduction of around 23%. Copper grades in Palito, were capped in a block basis using the copper mean grade plus the standard as capping thresholds.

Table 14-4: Palito Summary Capping Statistics for Gold Grades

Vein	Gold Statistics After Capping				Capping Statistics		
	Mean (g/t)	Std. Dev.	Coeff. Of Var.	Maximum (Capping Threshold) Au (g/t)	Number of Capped Samples	Percentage of Samples Capped	Relative difference of the Mean after capping
Angelim	3.81	6.10	1.60	20.00	2	10%	-9%
Barrichelo	0.87	2.00	2.30	9.68	0	0%	0%
Caxias	3.73	4.19	1.12	20.00	2	5%	-31%
Cedro	2.62	7.49	2.86	35.00	16	4%	-41%
Compressor	4.77	13.59	2.85	70.00	24	5%	-30%
Compressor Ramo	7.68	15.44	2.01	60.00	10	7%	-40%
Farias	2.23	4.87	2.19	20.00	10	6%	-41%
G 1	5.49	15.37	2.80	80.00	22	2%	-18%
G 2	5.32	13.94	2.62	70.00	71	3%	-22%
G 2.5	10.54	22.03	2.09	90.00	30	5%	-15%
G 3	8.25	21.12	2.56	110.00	191	2%	-22%
Guaruba	0.82	1.77	2.15	10.00	3	6%	-35%
Ipe	1.36	3.54	2.60	20.00	4	2%	-31%
Jatobá	7.73	16.93	2.19	90.00	14	2%	-39%
Jatobá Ramo	9.14	15.54	1.70	45.00	5	10%	-22%
Meireles	1.43	4.71	3.29	20.00	2	5%	-25%
Mogno	5.07	12.32	2.43	50.00	17	6%	-25%
Munguba	0.49	1.45	2.96	10.00	3	3%	-18%
Piaui	4.96	3.58	0.72	12.50	1	11%	-18%
Pipoca	11.93	26.25	2.20	120.00	45	3%	-16%
Pipoca Ramo	10.35	14.80	1.43	45.00	16	9%	-44%
Piquet	0.66	1.72	2.61	10.00	2	3%	-54%
Senna	6.43	13.76	2.14	60.00	44	4%	-24%
Uxi	1.1	3.76	3.42	20.00	4	4%	-23%
Verde	0.87	2.91	3.36	20.00	2	3%	-28%
Zonta	2.56	6.24	2.44	40.00	3	2%	-50%
All Veins	7.27	17.8	2.45	120.00	543	3%	-23%

Source: SRK, 2017

Table 14-5 presents the summary capping statistics for São Chico. Only those samples within the principal shear zone were used in the capping analysis. The resulting capping thresholds, however, were applied to the gold grades of the minor structures. No capping analysis was performed for copper grades in São Chico.

Table 14-5: São Chico Summary Capping Statistics for Gold Grades

Data Type	Gold Statistics After Capping				Capping Statistics		
	Mean Au (g/t)	Std. Dev.	Coeff. Of Var.	Maximum (Capping threshold) Au (g/t)	Number of Capped Samples	Percentage of Samples Capped	Relative difference of the Mean after capping
DD	3.38	12.74	3.77	80.00	8	2%	-23%
UD	3.30	11.72	3.55	80.00	22	3%	-32%
CH	7.99	25.49	3.19	200.00	25	1%	-12%
LV	10.71	23.46	2.19	120.00	12	2%	-32%
All	**7.23**	**22.00**	**3.04**	**200.00**	**67**	**1%**	**-19%**

Source: SRK, 2017

Compositing was not required in the mineral resources estimation of neither mine since gold and copper sample grades were weighted by the sample length in the estimation of the polygons average grades.

14.5 Design of Polygons in 2D sections

Mineral resource polygons or blocks are defined as parallelograms in 2D vertical sections projected perpendicularly to the strike of each vein. The polygons height is usually defined by the vertical separation between existing or planned mine levels or sublevels. Mine levels are separated vertically by 30 m, approximately, and sublevels tend to be located 15 m above levels. Polygons located outside existing mine levels tend to be much taller. In Palito the maximum polygon height is 166 m, whereas in São Chico it is 129 m. The length of polygons located between existing mine levels in both mines is 30 m in average.

Outside existing mine levels, polygons can be up to 400 m in length in Palito and up to 156 m length in São Chico. As discussed in Section 14.8, the largest polygons in both mines are normally classified as inferred resources. Polygons outside existing mine levels cover areas of the veins intersected by bore holes.

The areas of individual polygons are corrected factors calculated as a function of the vein dip to account for the distortion resulting of the vertical projection of the vein plane. The dips of Palito veins vary from 76° to 90°, with an average of 86°. In São Chico, the average vein dip is 82°. Being that the veins in both deposits are almost vertical, the correction factors applied to the polygons areas results in an overall area increase of only 1%.

14.6 Tonnage and Grade Estimation

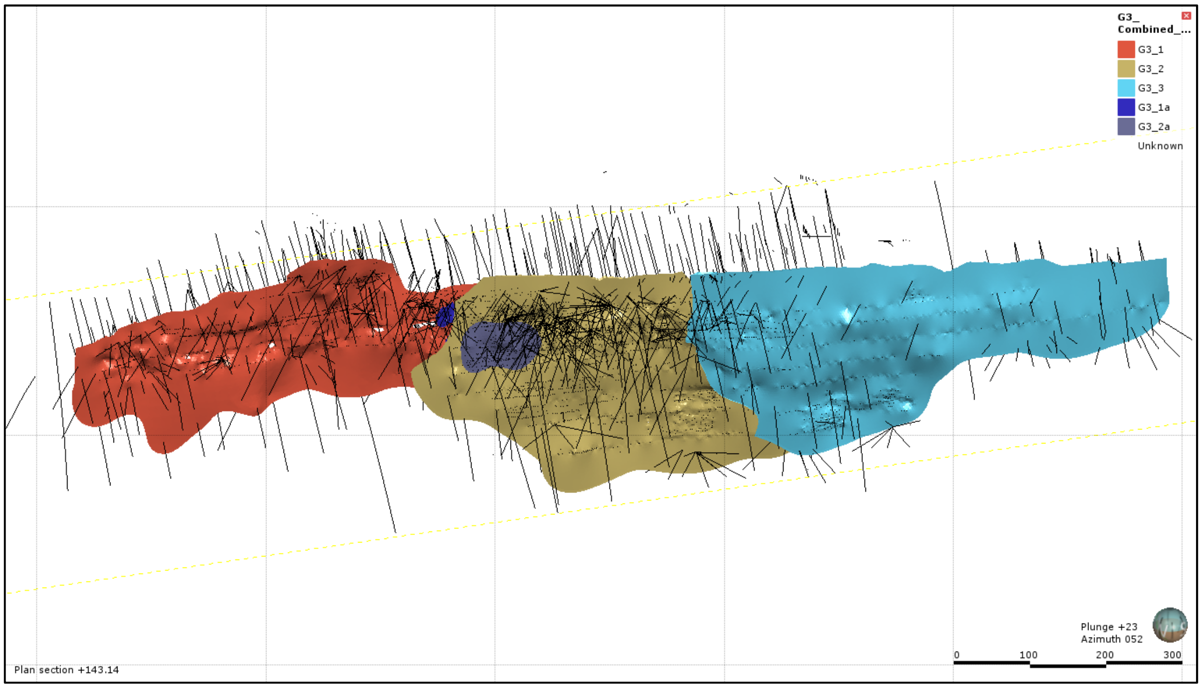
The corrected polygons areas are multiplied times average length of the channels and mineralized drillhole intersections to obtain the polygons volumes. The polygons tonnages are estimated using uniform density values of 2.70 and 2.71 for all polygons in the Palito and São Chico mines, respectively.

The estimated gold grades for each polygon is calculated as length-weighted averages of the capped grades of channel samples in limiting mine levels and stope crowns, of drillhole intersections and, in a few cases, of surface trenches. The weighting of grades does not distinguish between different sample types. Samples taken from rotary air blast drill holes are not considered in the mineral resource estimation. Polygon copper grades are estimated in a similar way as gold grades, but only for Palito Mine. No modifying factor is further applied to the estimated mineral resources grades and tonnages.

14.7 Model Validation

SRK audited the areas, volumes and estimated grades of the estimated polygons generated by Serabi for both the Palito and São Chico mines. In addition, as part of the auditing and validation process, SRK generated, in parallel, three -dimensional, geostatistically-based mineral resource models for G3 vein in Palito and for the São Chico structure for benchmarking purposes. The modeled validation models match within 5% of the estimated contained gold metal content for Measured mineral resources in both models.

An illustration of the modeled domains of the G3 Vein at Palito is shown in Figure 14-1, whereas an illustration of the modeled São Chico Mineralized structure is shown in Figure 14-2.

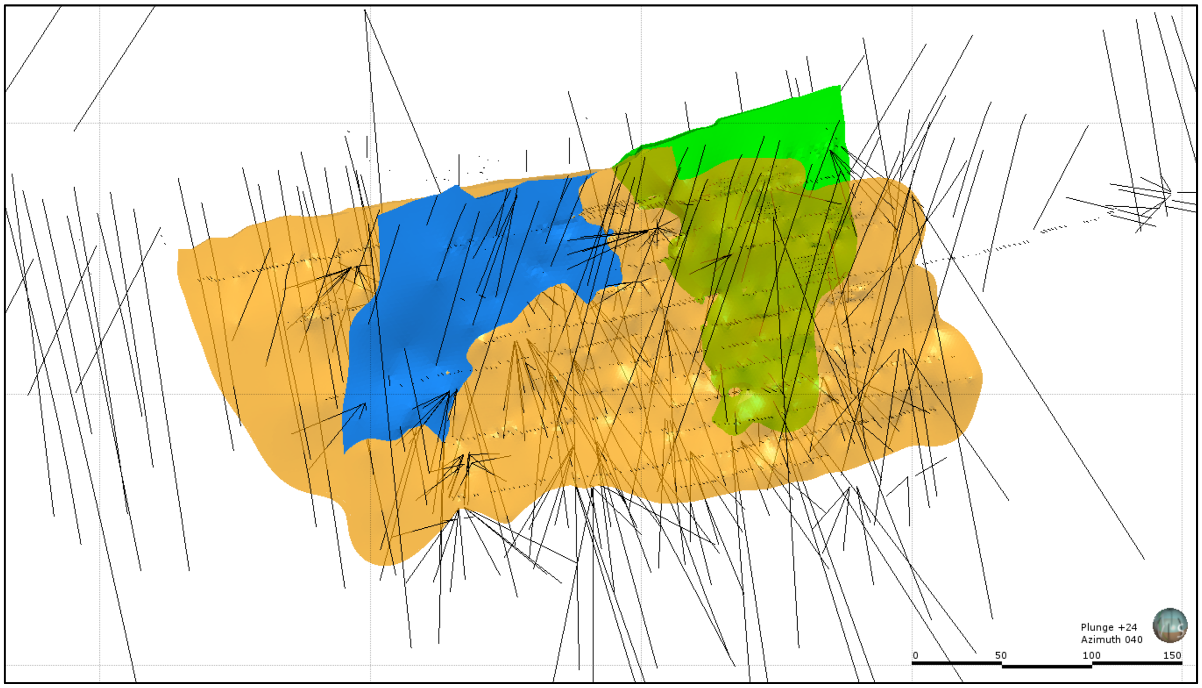


G3_1 – West Vein, G3_2 – Middle Vein, G3_3 – East Vein, G3_1a – West Lens, Gr_2a – East Lens

Figure 14-1: Three-Dimensional Oblique View of the G3 Vein at Palito Modeled by SRK, Showing informing Drilling. Looking Northeast

14.8 Mineral Resource Classification

Tonnage and grade estimates for the Palito and São Chico mines were classified by Mr. Renan Quintanilla and Mr. Juan Rojas, respectively, according to the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014). Mr. Quintanilla and Mr. Rojas are both Serabi Mine Geologists. The mineral resources estimation and classification was reviewed by Dr. David Machuca from SRK, under the supervision of Glen Cole PGeo (Principal Consultant APGO#1416), an appropriate independent Qualified Person for the purpose of NI 43-101.



Orange – Main Zone, Green – Northeast limb and Blue – Southwest limb

Figure 14-2: Three-Dimensional Oblique View of the São Chico Structure Modeled by SRK, Showing informing Drilling. Looking Northeast

Mineral resource classification is typically a subjective concept. Industry best practices suggest that resource classification should consider the confidence in the geological continuity of the mineralized structures, the quality and quantity of exploration data supporting the estimates, and the geostatistical confidence in the tonnage and grade estimates. Appropriate classification criteria should aim at integrating these concepts to delineate regular areas at similar resource classification.

Serabi is satisfied that the geological modelling honors the current geological information and knowledge. The location of the samples and the assay data are sufficiently reliable to support resource evaluation. The sampling information was acquired primarily by closely spaced channel samples taken from underground developments, and surface and underground core drilling and secondarily by reverse circulation drilling and surface trench samples.

Generally, polygons for which mineralization has been exposed and sampled in one or more of their sides along underground workings such as mining levels, stope crowns and raises, are classified in the Measured Category within the meaning of the CIM Definition Standards for Mineral Resources and Mineral Reserves. Polygons classified in the Indicated resources are next to Measured Mineral Resource polygons but their mineralization is defined by at least two borehole intersections spaced at 50 m or less (Table 14-6). In São Chico, these polygons extend up to 15 m from their contact with a Measured Resource polygon. In Palito, their vertical extent from the limit with a Measured Mineral Resource polygon is generally about 30 m. Sometimes the Indicated Mineral Resource polygons in Palito may have heights of up to 50 m, if they are intersected by several closely spaced boreholes spanning the polygon area. With the aim to avoid abrupt changes in the mineral resource confidence, Indicated Mineral resources polygons were located between Measured and Inferred resources polygons. Polygons classified as in the Inferred category contain borehole intersections than can be spaced by more than 50 m. Generally, their maximum extent is 60 m in the vertical and horizontal directions, but sometimes they can be larger if intersected by more than one borehole. The confidence in the estimates of these polygons is insufficient to allow for the meaningful application of technical and economic parameters or to enable an evaluation of economic viability.

Table 14-6: Classification Parameters for Underground Mineral Resource at Palito and São Chico Gold Operations

Classification		**Polygon Areas Limited by Underground Sampled Development**		
		Two or More Sides	**One Side**	**None**
Measured	Distance from sampled Development	1 or 2 sublevels spacing (~15 m to ~30 m)	Projected no more than the spacing of 2 sublevels (~30 m) in Palito and 1 sublevel (~15 m) in São Chico	-
	Drill Spacing	Can or cannot contain drillhole intersections within the area of the polygon.		-
Indicated	Distance from Limit with Measured Resource Polygon	-	-	Projected no more than the spacing of 4 sublevels in Palito and 2 sublevels in São Chico. Located usually between Measured and Inferred resources polygons.
	Drill Spacing	-		Drill spacing of ~<50 m
Inferred	Distance from Limit with Indicated Resource Polygon	-	-	Do not need to border with an Indicated Resources polygon.
	Drill Spacing	-		Closely spaced drilling on the same structure (~<75 m). Projected up to 30 m from each intersection in the vertical and horizontal directions.

Source: SRK, 2017

14.9 Mineral Resource Statement

CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) defines a mineral resource as:

> *"A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction.*
>
> *The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."*

The "reasonable prospects for eventual economic extraction" requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the mineral resources are reported at an appropriate CoG that considers extraction scenarios and processing recoveries. To meet this requirement, Serabi considers that major portions of the Palito and São Chico deposits are amenable for underground mining extraction.

The polygonal quantities and grade estimates were reviewed by SRK to determine the portions of the Palito and São Chico mines having “reasonable prospects for eventual economic extraction” from an underground mine, based on a CoG of 3.10 g/t gold at the Palito Mine and 2.85 g/t gold at the São Chico Mine, assuming a gold price of US$1,500/oz, and metallurgical gold recovery of 91% and 95% respectively. The reporting parameters were selected based on production experience on the project.

Serabi considers that the polygonal estimates show “reasonable prospects for eventual economic extraction” and can be reported as a Mineral Resource. Serabi is unaware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant issues that may materially affect the Mineral Resource. However, the Mineral Resource may be affected by further infill and exploration drilling that may result in increases or decreases in subsequent Mineral Resource estimates. The Mineral Resource Statement may also be affected by subsequent assessments of mining, environmental, processing, permitting, legal, title, taxation, socio-economic, and other factors. Condensed Mineral Resource Statements for the Palito and São Chico mines are tabulated in Table 14-7 and Table 14-8 respectively. A detailed Mineral Resource Statement for the underground mining components of the Palito and São Chico mines are tabulated in Table 14-9 and Table 14-10 respectively. The effective date of these Mineral Resource Statements is June 30, 2017.

Table 14-7: Condensed Mineral Resource Statement, Palito Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification	Vein Width (m)	Quantity (000’s t)	Grade		Contained Metal	
			Au (g/t)	Cu (%)	Au (000’s oz)	Cu (t)
Underground						
Measured	0.52	274	15.21	0.77	134	2,110
Indicated	0.57	371	10.91	0.57	130	2,115
Surface Stockpiles						
Measured	-	12	3.15	-	1	-
Tailings						
Measured	-	60	2.70	-	5	-
Combined						
Measured	-	346	12.62	0.61	140	2,110
Indicated	-	371	10.91	0.57	130	2,115
Measured and Indicated	-	717	11.74	0.59	271	4,225
Underground						
Inferred	0.77	784	7.02	0.20	177	1,568

- Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.
- Mineral Resources are reported inclusive of Mineral Reserves.
- Figures are rounded to reflect the relative accuracy of the estimates.
- Mineral Resources are reported within classification domains inclusive of in situ dilution at CoG of 3.10 g/t gold assuming an underground extraction scenario, a gold price of US$1,500/oz, and metallurgical recovery of 91%.
- Polygonal techniques were used for Resources estimates.

Source: SRK, 2017

Table 14-8: Condensed Mineral Resource Statement, São Chico Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification	Thickness (m)	Quantity (000's t)	Grade Au (g/t)	Contained Metal Au (000's oz)
Measured	1.82	60	13.34	26
Indicated	1.79	22	14.70	10
Measured and Indicated	**1.81**	**82**	**13.70**	**36**
Inferred	1.80	123	13.77	54

- Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.
- Mineral Resources are reported inclusive of Mineral Reserves. All figures are rounded to reflect the relative accuracy of the estimates.
- Mineral Resources are reported within classification domains inclusive of in situ dilution at a CoG of 2.85 g/t gold assuming an underground extraction scenario, a gold price of US$1,500/oz, and metallurgical recovery of 95%.
- Polygonal techniques were used for Resources estimates.

Source: SRK, 2017

Table 14-9: Detailed Mineral Resource Statement, Palito Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification/Area	Vein Width (m)	Quantity (Mt)	Grade Au (g/t)	Grade Cu (%)	Metal Au (000's oz)	Metal Cu (Mt)
Measured						
Angelim	-	-	-	-	-	-
Barrichelo	-	-	-	-	-	-
Caxias	-	-	-	-	-	-
Cedro	0.37	8	8.80	0.18	2	0.01
Compressor	0.39	13	14.82	0.46	6	0.06
Compressor Ramo	0.64	8	13.77	2.51	4	0.21
Farias	0.57	4	8.54	0.32	1	0.01
G 1	0.46	10	14.65	0.35	5	0.04
G 2	0.37	10	16.31	0.60	5	0.06
G 2.5	0.45	20	14.84	1.00	10	0.20
G 3	0.69	75	16.08	0.81	39	0.61
Guaruba	-	-	-	-	-	-
Ipe	-	-	-	-	-	-
Jatobá	0.49	17	10.76	0.95	6	0.16
Jatobá Ramo	0.43	7	13.29	0.52	3	0.03
Meireles	-	-	-	-	-	-
Mogno	0.45	18	23.83	1.08	14	0.20
Munguba	-	-	-	-	-	-
Piaui	-	-	-	-	-	-
Pipoca	0.45	33	18.42	0.62	20	0.21
Pipoca Ramo	0.54	16	17.73	0.69	9	0.11
Piquet	-	-	-	-	-	-
Senna	0.67	23	10.76	0.79	8	0.18
Uxi	-	-	-	-	-	-
Verde	-	-	-	-	-	-
Zonta	0.51	9	7.16	0.07	2	0.01
Stock Pile	-	1	5.92	0.24	0.2	0.00
Total Measured	**0.52**	**274**	**15.21**	**0.77**	**134**	**2.11**
Indicated						
Angelim	0.39	9	11.90	0.23	4	0.02
Barrichelo	-	-	-	-	-	-
Caxias	0.75	10	3.73	0.04	1	0.00
Cedro	0.72	31	6.07	0.11	6	0.04
Compressor	0.49	16	10.25	0.26	5	0.04
Compressor Ramo	0.57	15	14.59	0.67	7	0.10
Farias	0.32	14	10.59	0.37	5	0.05
G 1	0.45	8	7.59	1.20	2	0.09
G 2	0.42	6	11.70	0.15	2	0.01
G 2.5	0.44	7	16.76	2.33	4	0.15
G 3	0.68	39	13.07	0.53	16	0.21
Guaruba	-	-	-	-	-	-
Ipe	0.92	47	9.86	0.77	15	0.36
Jatobá	0.46	22	8.15	0.73	6	0.16

Classification/Area	Vein Width	Quantity	Grade		Metal	
			Au	Cu	Au	Cu
	(m)	(Mt)	(g/t)	(%)	(000's oz)	(Mt)
Jatobá Ramo	0.47	4	9.97	0.62	1	0.02
Meireles	-	-	-	-	-	-
Mogno	0.66	39	15.51	1.08	19	0.41
Munguba	0.58	29	5.58	0.24	5	0.07
Piaui	-	-	-	-	-	-
Pipoca	0.42	15	18.55	0.67	9	0.10
Pipoca Ramo	0.53	11	19.99	0.70	7	0.08
Piquet	-	-	-	-	-	-
Senna	0.67	15	7.78	0.45	4	0.07
Uxi	0.56	28	11.77	0.49	11	0.14
Verde	-	-	-	-	-	-
Zonta	0.42	6	6.26	0.06	1	0.00
Stock Pile	-	-	-	-	-	-
Total Indicated	**0.57**	**371**	**10.91**	**0.57**	**130**	**2.13**
Total M&I	**0.55**	**645**	**12.73**	**0.66**	**264**	**4.24**
Inferred						
Angelim	0.33	4	12.30	0.00	2	0.00
Barrichelo	1.17	11	6.49	0.09	2	0.01
Caxias	-	-	-	-	-	-
Cedro	0.46	17	5.01	0.17	3	0.03
Compressor	0.50	4	25.03	0.25	3	0.01
Compressor Ramo	0.52	6	8.57	0.91	2	0.05
Farias	0.43	36	14.66	0.22	17	0.08
G 1	0.40	5	5.01	0.38	1	0.02
G 2	0.37	5	23.60	0.34	4	0.02
G 2.5	1.19	55	10.63	0.19	19	0.11
G 3	0.83	37	8.38	0.30	10	0.11
Guaruba	0.34	6	6.26	0.02	1	0.00
Ipe	1.02	75	5.30	0.07	13	0.05
Jatobá	0.45	11	5.84	0.89	2	0.10
Jatobá Ramo	0.47	4	9.97	0.62	1	0.02
Meireles	0.51	15	3.97	0.11	2	0.02
Mogno	0.56	30	11.88	0.82	11	0.24
Munguba	-	-	-	-	-	-
Piaui	1.97	192	4.96	0.08	31	0.15
Pipoca	0.49	14	20.04	0.68	9	0.09
Pipoca Ramo	0.47	10	18.30	0.69	6	0.07
Piquet	0.55	51	4.60	0.22	8	0.11
Senna	0.77	114	4.45	0.16	16	0.19
Uxi	0.68	34	5.87	0.19	6	0.06
Verde	0.58	25	5.12	0.09	4	0.02
Zonta	0.53	23	6.38	0.06	5	0.01
Stock Pile	-	-	-	-	-	-
Total Inferred	**0.77**	**784**	**7.02**	**0.20**	**177**	**1.59**

- Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.
- Mineral Resources are reported inclusive of Mineral Reserves.
- All figures are rounded to reflect the relative accuracy of the estimates.
- Mineral Resources are reported within classification domains inclusive of in situ dilution at a CoG of 3.10 g/t gold assuming an underground extraction scenario, a gold price of US$1,500/oz, and metallurgical recovery of 91%.
- Polygonal techniques were used for Resources estimates.

Source: SRK, 2017

Table14-10: Detailed Mineral Resource Statement, São Chico Mine, Para State, Brazil, Serabi Gold plc, June 30, 2017

Classification/Area	Thickness (m)	Quantity (Mt)	Grade Au (g/t)	Metal Au (000's oz)
Measured				
Principal	1.82	60	13.34	26
Highway	-	-	-	-
Julia	-	-	-	-
Vania	-	-	-	-
Stock Piles	-	2	3.05	0.2
Total Measured	**1.76**	**62**	**13.05**	**26**
Indicated				
Principal	1.79	22	14.70	10
Highway	-	-	-	-
Julia	-	-	-	-
Vania	-	-	-	-
Stock Piles	-	-	-	-
Total Indicated	**1.79**	**22**	**14.70**	**10**
Total M&I	**1.77**	**83**	**13.48**	**36**
Inferred				
Principal	-	-	-	-
Highway	1.57	35	11.43	13
Julia	2.31	62	14.57	29
Vania	1.35	26	15.05	12
Stock Piles	-	-	-	-
Total Inferred	**1.80**	**123**	**13.77**	**54**

- Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.
- Mineral Resources are reported inclusive of Mineral Reserves.
- All figures are rounded to reflect the relative accuracy of the estimates.
- Mineral Resources are reported within classification domains inclusive of in situ dilution at a CoG of 2.85 g/t gold assuming an underground extraction scenario, a gold price of US$1,500/oz, and metallurgical recovery of 95%.
- Polygonal techniques were used for Resources estimates.

Source: SRK, 2017

14.10 Grade Sensitivity Analysis

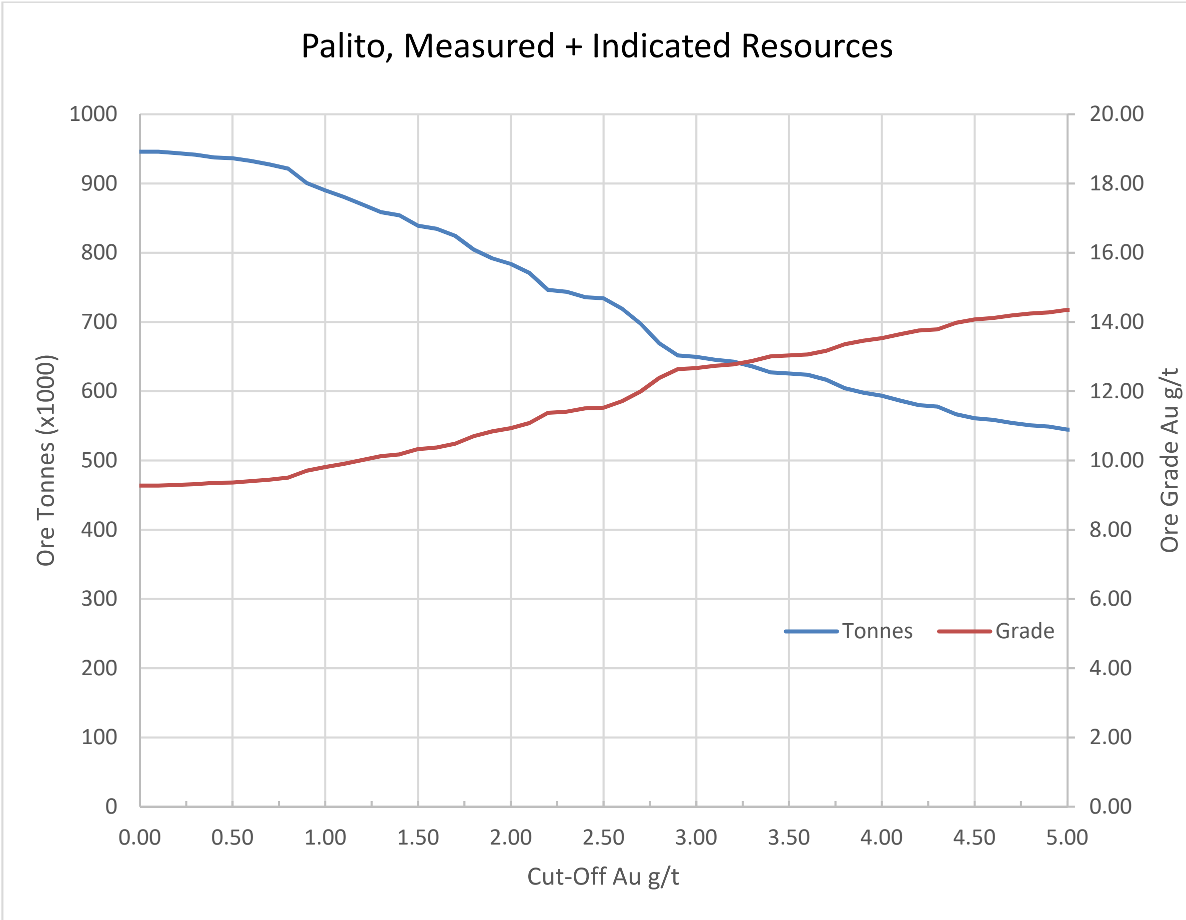
The mineral resources of the Palito and São Chico mines are sensitive to the selection of the reporting CoG. To illustrate this sensitivity, the measured plus indicated mineral resources quantities and grade estimates are presented at different CoGs in Table 14-10 and Table 14-11 for the Palito and São Chico mines, respectively. The reader is cautioned that the figures presented in Table 14-10 and Table 14-11 should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the polygonal estimates to the selection of CoG.

Figure 14-3 and Figure 14-4 present these sensitivities as grade tonnage curves for the Measured and Indicated portions of Palito and São Chico mines, respectively.

Table 14-10: Measured plus Indicated Polygonal Resource Quantities and Grade Estimates, Palito Mine at Various Cut-off Grades

CoG Ag (g/t)	Quantity (Mt)	Grade Ag (g/t)	Metal Content (oz)
0.10	946	9.27	282
0.50	937	9.36	282
1.00	890	9.81	281
2.00	784	10.93	275
2.10	771	11.08	275
2.20	746	11.38	273
2.30	744	11.41	273
2.40	736	11.51	272
2.50	734	11.53	272
2.60	719	11.71	271
2.70	697	12.00	269
2.80	669	12.38	266
2.90	652	12.64	265
3.00	650	12.67	265
3.10	**645**	**12.73**	**264**
3.20	643	12.77	264
3.30	636	12.87	263
3.40	627	13.01	262
3.50	626	13.03	262

The reader is cautioned that the figures in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the polygonal estimates to the selection of a CoG.
Source: SRK, 2017



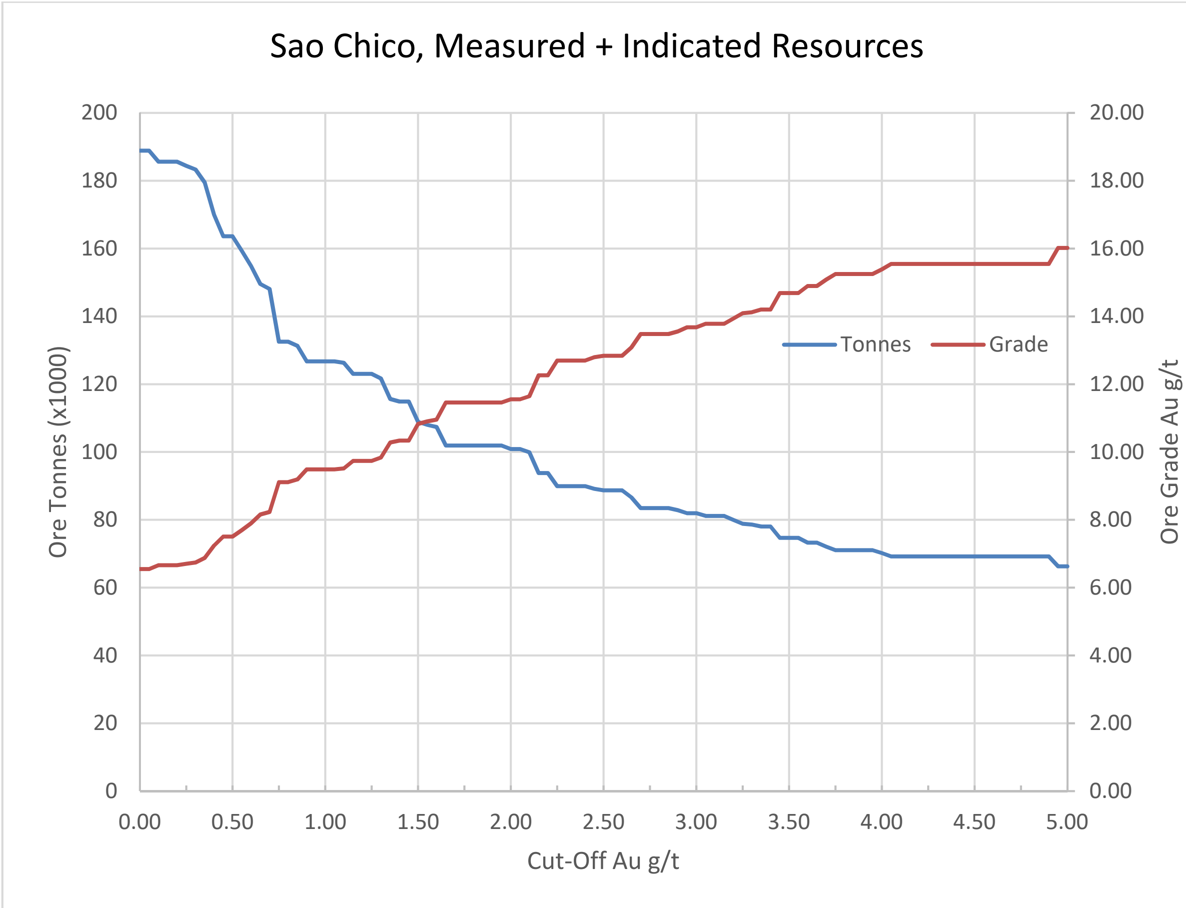
Source: SRK, 2017

Figure 14-3: Grade Tonnage Curves for the Measured and Indicated Mineral Resources of Palito Mine

Table 14-11: Measured and Indicated Polygonal Resources Quantities and Grade Estimates*, São Chico Mine at Various Cut-off Grades

CoG Gold (g/t)	Quantity (Mt)	Grade Gold (g/t)	Metal Content (oz)
0.10	186	6.66	40
0.50	164	7.51	39
1.00	127	9.49	39
1.50	109	10.83	38
2.00	101	11.55	37
2.10	100	11.64	37
2.20	94	12.26	37
2.30	90	12.70	37
2.40	90	12.70	37
2.50	89	12.84	37
2.60	89	12.84	37
2.70	83	13.48	36
2.80	83	13.48	36
2.85	**83**	**13.48**	**36**
2.90	83	13.55	36
3.00	82	13.68	36
3.10	81	13.78	36
3.20	80	13.94	36
3.30	79	14.12	36
3.40	78	14.20	36
3.50	75	14.69	35

The reader is cautioned that the figures in this table should not be misconstrued with a Mineral Resource Statement. The figures are only presented to show the sensitivity of the polygonal estimates to the selection of a CoG.



Source: SRK, 2017

Figure 14-4: Grade Tonnage Curves for the Measured and Indicated Mineral Resources of São Chico Mine

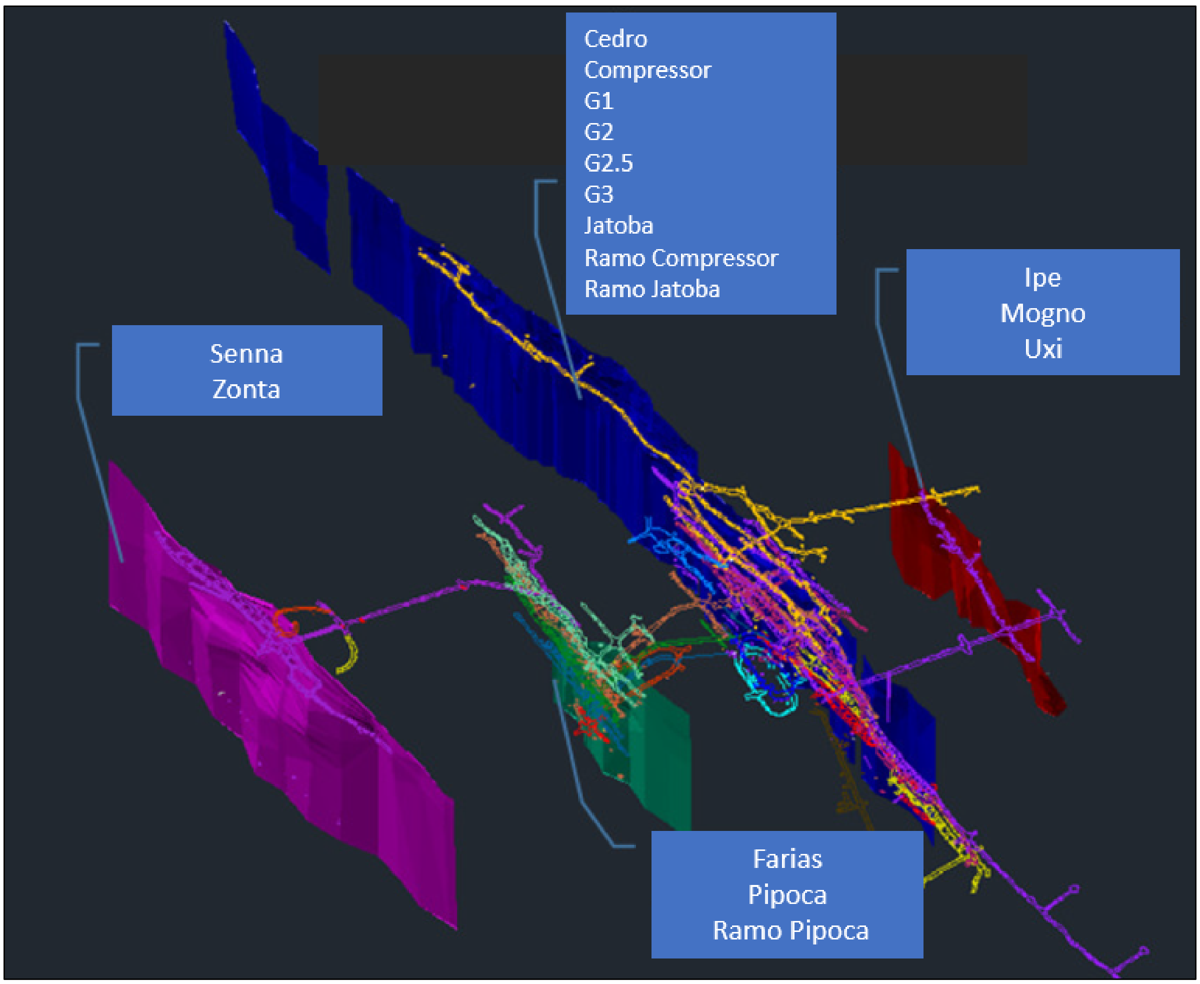
14.11 Relevant Factors

Other than the factors discussed herein, there are no additional environmental, permitting, legal, title, taxation marketing or other factors that could affect resources.

15 Mineral Reserve Estimate

15.1 Conversion Assumptions, Parameters and Methods

Mineral resources are converted to mineral reserves using the assumptions, parameters and methods discussed in the following subsections. Mineral reserves are reported for a total of 17 veins at the Palito Mine, the locations of which are shown in Figure 15-1. At the São Chico Mine, mineral reserves are reported from one vein (the principal São Chico vein).



Source: Serabi, 2017

Figure 15-1: Palito Mine Veins Included in Mineral Reserves

Some veins that contain Measured and Indicated mineral resources (refer to Table 14-9) do not host mineral resource polygons that could be converted to mineral reserves. This is primarily because of the application of mining dilution and the use of a CoG for mineral reserves that is higher than the CoG used for mineral resources. The CoG determination is discussed in Section 15.1.3.

15.1.1 Gold Price, Currency Exchange and Metallurgical Recovery Assumptions

The gold price, currency exchange and metallurgical recovery assumptions for mineral reserves are shown in Table 15-1. Gold price was guided by the June 2017 monthly average price and the 3-year trailing average as of June 2017. Currency exchange (Brazilian Reals to U.S. Dollars) is based on the three-year trailing average exchange rate as of June 2017. Metallurgical recovery is based on the six-month average plant recovery for January - June 2017.

Table 15-1: Gold Price, Currency Exchange and Metallurgical Recovery Assumptions

Input	Units	Palito	São Chico
Gold Price	US$/oz	1,250	1,250
R$/US$ Exchange Rate	R$/US$	3.50	3.50
Gold Price	R$/oz	4,375	4,375
Metallurgical Recovery	%	91%	95%

Source: Serabi, 2017

15.1.2 Mining Parameters

Palito Mine

The selectivity, minimum mining width, mining overbreak, and mining recovery parameters for the Palito Mine are shown in Table 15-2.

Table 15-2: Mining Parameters

Vein	Selectivity (resue blasting) (%)	Minimum Mining Width for Stoping (m)	Footwall and Hangingwall Overbreak (m)	Mining Recovery for Blocks < or = 15 m High (%)	Mining Recovery for Blocks > 15 m High (%)
Cedro	10%	0.9	0.1	95%	75%
Compressor	33%	0.9	0.1	95%	75%
Farias	25%	0.9	0.1	95%	75%
G1	35%	0.9	0.1	95%	75%
G2	31%	0.9	0.1	95%	75%
G2.5	39%	0.9	0.1	95%	75%
G3	29%	0.9	0.1	95%	75%
Ipe	30%	0.9	0.1	95%	75%
Jatoba	29%	0.9	0.1	95%	75%
Mogno	53%	0.9	0.1	95%	75%
Pipoca	60%	0.9	0.1	95%	75%
Ramo Compressor	35%	0.9	0.1	95%	75%
Ramo Jatoba	29%	0.9	0.1	95%	75%
Ramo Pipoca	55%	0.9	0.1	95%	75%
Senna	25%	0.9	0.1	95%	75%
Uxi	29%	0.9	0.1	95%	75%
Zonta	30%	0.9	0.1	95%	75%

Source: Serabi, 2017

Selectivity (i.e., resue blasting) is a technique whereby Serabi isolates and blasts waste rock in a development drift separately from the mineralized vein. This has the effect of excluding a portion of the waste from the mill feed. The selectivity percentages listed in Table 15-2 are based on Serabi's historic mining records.

The minimum mining width of 0.9 m is applied to Measured and Indicated resources that will be extracted by shrinkage stoping. The minimum mining width for development drifts in ore is 3.0 m wide by 3.0 m high. Dilution that is incorporated into the mineral reserves as a result of applying the minimum mining width criteria is referred to as planned dilution.

Unplanned (external) mining dilution in the shrinkage stopes is applied as 0.1 m of overbreak on the hanging wall and footwall. A grade of zero g/t Au has been applied to the overbreak material. The overbreak allowance is based on Serabi's survey measurements of actual shrinkage stope widths relative to in situ vein widths.

The resultant planned and unplanned mining dilution for each of the veins is shown in Table 15-3.

Table 15-3: Planned and Unplanned Mining Dilution by Vein

Vein	In Situ Vein Width (m)	Planned Dilution (minimum mining width) (%)	Unplanned Dilution (overbreak) (%)	Overall Dilution (%)
Cedro	0.79	39%	23%	62%
Compressor	0.39	164%	48%	212%
Farias	0.57	84%	32%	116%
G1	0.52	96%	35%	131%
G2	0.37	162%	51%	213%
G2.5	0.58	82%	31%	113%
G3	0.81	31%	23%	54%
Ipe	0.94	16%	19%	35%
Jatoba	0.71	32%	27%	59%
Mogno	0.62	69%	30%	99%
Pipoca	0.49	97%	38%	135%
Ramo Compressor	0.60	69%	31%	100%
Ramo Jatoba	0.44	120%	43%	163%
Ramo Pipoca	0.54	80%	35%	115%
Senna	0.80	35%	23%	58%
Uxi	0.56	76%	33%	109%
Zonta	0.43	137%	43%	180%

Source: Serabi, 2017

Mining recovery is accounted for initially by excluding the mineral resources that will not be mined because some material must be left in place as rib and sill pillars to maintain geotechnical stability around the shrinkage stopes. A further adjustment is applied to account for resources that will not be recovered for reasons that include under-blasting and failure of blasted ore to flow to the extraction level. In stopes that are less than 15 m high, a mining recovery of 95% is assumed. In stopes that are greater than 15 m high, mining recovery of 75% is assumed. Serabi's experience has been that shrinkage stopes greater than 15 m high experience challenges with ore flow and deteriorating ground conditions more frequently than stopes that are less than 15 m high.

São Chico Mine

At the São Chico Mine the following mining parameters were used to convert Measured and Indicated resources to mineral reserves:

- No selectivity (i.e., resue blasting) was assumed;
- The minimum mining width for both development mining in ore and longhole stoping is 3.5 m;
- An overbreak/slough allowance of 0.50 m is applied to both the footwall and hangingwall of longhole stopes;
- Mining recovery is accounted for initially by excluding the mineral resources that will not be mined because some material must be left in place as rib and sill pillars to maintain

geotechnical stability around the longhole stopes. A further adjustment (mining recovery of 95%) is applied to account for resources that will not be recovered for reasons that include under-blasting and failure of blasted ore to flow to the extraction level.

Based on the parameters listed above, the resultant average mining dilution is:

- Average planned mining dilution due to the application of minimum mining width = 79%;
- Average unplanned mining dilution due to overbreak/slough = 43%; and
- Overall average dilution (planned plus unplanned) = 123%.

15.1.3 CoG Calculation

The CoG calculation for mineral reserves takes into consideration the gold price, currency exchange rate, and metallurgical recovery inputs detailed in Table 15-1, along with the operating costs that are presented in Table 15-4.

Table 15-4: Operating Cost Basis for the CoG Calculation

Unit Operating Costs	Units	Palito	São Chico
Mining	R$/t-processed	259	248
Processing	R$/t-processed	164	162
Corporate Office Support to Site	R$/t-processed	33	39
Royalties, CFEM, Treatment, Shipping, and By-Product Credits	R$/t-processed	19	12
Total Unit Cost	R$/t-processed	474	460
Total Unit Cost (US$:R$ exchange rate of 3.5:1.0)	US$/t-processed	135	132

Source: Serabi, 2017

The operating costs presented in Table 15-4 are based on Serabi's actual reported costs for the period January 1, 2017 through June 30, 2017.

The CoGs for mineral reserves are therefore:

- Palito Mine mineral reserves CoG: 3.70 g/t Au; and
- São Chico Mine mineral reserves CoG: 3.45 g/t Au.

For the mineral resources CoGs, the gold price was increased to US$1,500/oz. No other changes were made for the mineral resources CoG calculation, resulting in the following CoGs for mineral resources:

- Palito Mine mineral resources CoG: 3.10 g/t Au; and
- São Chico Mine mineral resources CoG: 2.85 g/t Au.

15.1.4 Conversion Methodology

Measured and Indicated mineral resources polygons were evaluated for conversion to mineral reserves based on the parameters and assumptions described in Section 15.1 herein. Proven mineral reserves are reported within the Measured classification domain, and Probable mineral reserves are reported within the Indicated classification domain. The steps used to adjust the eligible polygons for mining dilution and mining recovery are:

(1) All Inferred polygons were excluded from consideration (i.e., only Measured and Indicated polygons were used);

(2) Rib and sill pillars were removed to maintain geotechnical stability around the planned stopes;

(3) Minimum mining width was applied to stopes and development in ore (this step incorporates planned dilution);

(4) Overbreak/slough was applied to the stopes (this step incorporates unplanned dilution);

(5) Selectivity (i.e., resue blasting) was applied to ore development (Palito Mine only); and

(6) Mining recovery was applied to the stopes.

The adjusted polygons were then filtered based on the mineral reserves CoGs as specified in Section 15.1.3. All polygons meeting or exceeding the mineral reserves CoG were evaluated for inclusion in the life-of-mine production schedule (Table 16-1). The scheduling evaluation included consideration of unique development requirements for each polygon (ramp access, footwall accesses, and ventilation infrastructure).

Serabi has a limited quantity of surface stockpiles and historic flotation tailings which have been included as Proven mineral reserves (Table 15-5). These Proven mineral reserves are reported at a CoG of 1.95 g/t gold assuming a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 78%.

The Palito and São Chico Mineral Reserves based on the mining and milling production schedule are presented in Table 15-5 and Table 15-6, respectively.

Under NI 43-101 rules, producing issuers may exclude the information required in Section 22 Economic Analysis on properties currently in production, unless the Technical Report includes a material expansion of current production. Serabi is a producing issuer, the Palito Mining Complex is currently in production, and a material expansion is not being planned. Serabi completed economic analysis for the Palito Mining Complex based on the Mineral Reserves stated herein. SRK reviewed Serabi's analysis and we have verified that the outcome is a positive cash flow that supports the statement of Mineral Reserves.

15.2 Reserve Estimate

The mineral reserve estimate for the Palito Mine is shown in Table 15-5 and the mineral reserve estimate for the São Chico Mine is shown in Table 15-6.

Table 15-5: Mineral Reserves Statement, Palito Mine, Para State, Brazil, as of June 30, 2017

Classification	Quantity (000's t)	Grade		Contained Metal	
		Au (g/t)	Cu (%)	Au (000's oz)	Cu (t)
Underground					
Proven	265	9.77	0.46	83	1,219
Probable	276	7.64	0.39	68	1,076
Surface Stockpiles					
Proven	12	3.15		1	
Tailings					
Proven	60	2.70		5	
Combined					
Proven	337	8.28	0.36	90	1,219
Probable	276	7.64	0.39	68	1,076
Proven and Probable	**613**	**7.99**	**0.37**	**157**	**2,295**

- Mineral Reserves have been rounded to reflect the relative accuracy of the estimates. Proven Underground Mineral Reserves are reported within the Measured classification domain, and Probable Underground Mineral Reserves are reported within the Indicated classification domain. Proven and Probable Underground Mineral Reserves are inclusive of external mining dilution and mining loss and are reported at a CoG of 3.70 g/t gold assuming an underground extraction scenario, a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 91%. Proven Mineral Reserves surface stockpiles and tailings are reported at a CoG of 1.95 g/t gold assuming a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 78%.
- Serabi is the operator and owns 100% of the Palito Mine such that gross and net attributable mineral reserves are the same. The mineral reserve estimate was prepared by the Company in accordance with the standard of CIM and NI 43-101, with an effective date of 30 June 2017, and audited and approved by Mr. Timothy Olson of SRK Consulting (US) Inc., who is a Qualified Person under NI 43-101.

Table 15-6: Mineral Reserves Statement, São Chico Mine, Para State, Brazil, as of June 30, 2017

Classification	Quantity (000's t)	Grade Au (g/t)	Contained Metal Au (000's oz)
Underground			
Proven	65	8.15	17
Probable	25	9.15	7
Proven and Probable	**90**	**8.43**	**24**

- Mineral Reserves have been rounded to reflect the relative accuracy of the estimates. Proven Underground Mineral Reserves are reported within the Measured classification domain, and Probable Underground Mineral Reserves are reported within the Indicated classification domain. Proven and Probable Underground Mineral Reserves are inclusive of external mining dilution and mining loss and are reported at a CoG of 3.45 g/t gold assuming an underground extraction scenario, a gold price of US$1,250/oz, a 3.5:1 Brazilian Real to U.S. Dollar exchange rate, and metallurgical recovery of 95%
- Serabi is the operator and owns 100% of the São Chico Mine such that gross and net attributable mineral reserves are the same. The mineral reserve estimate was prepared by the Company in accordance with the standard of CIM and NI 43-101, with an effective date of 30 June 2017, and audited and approved by Mr. Timothy Olson of SRK Consulting (US) Inc., who is a Qualified Person under NI 43-101.

Source: SRK, 2017

15.3 Relevant Factors

Other than the factors discussed herein, there are no additional mining, metallurgical, infrastructure, permitting or other factors that could affect reserves.

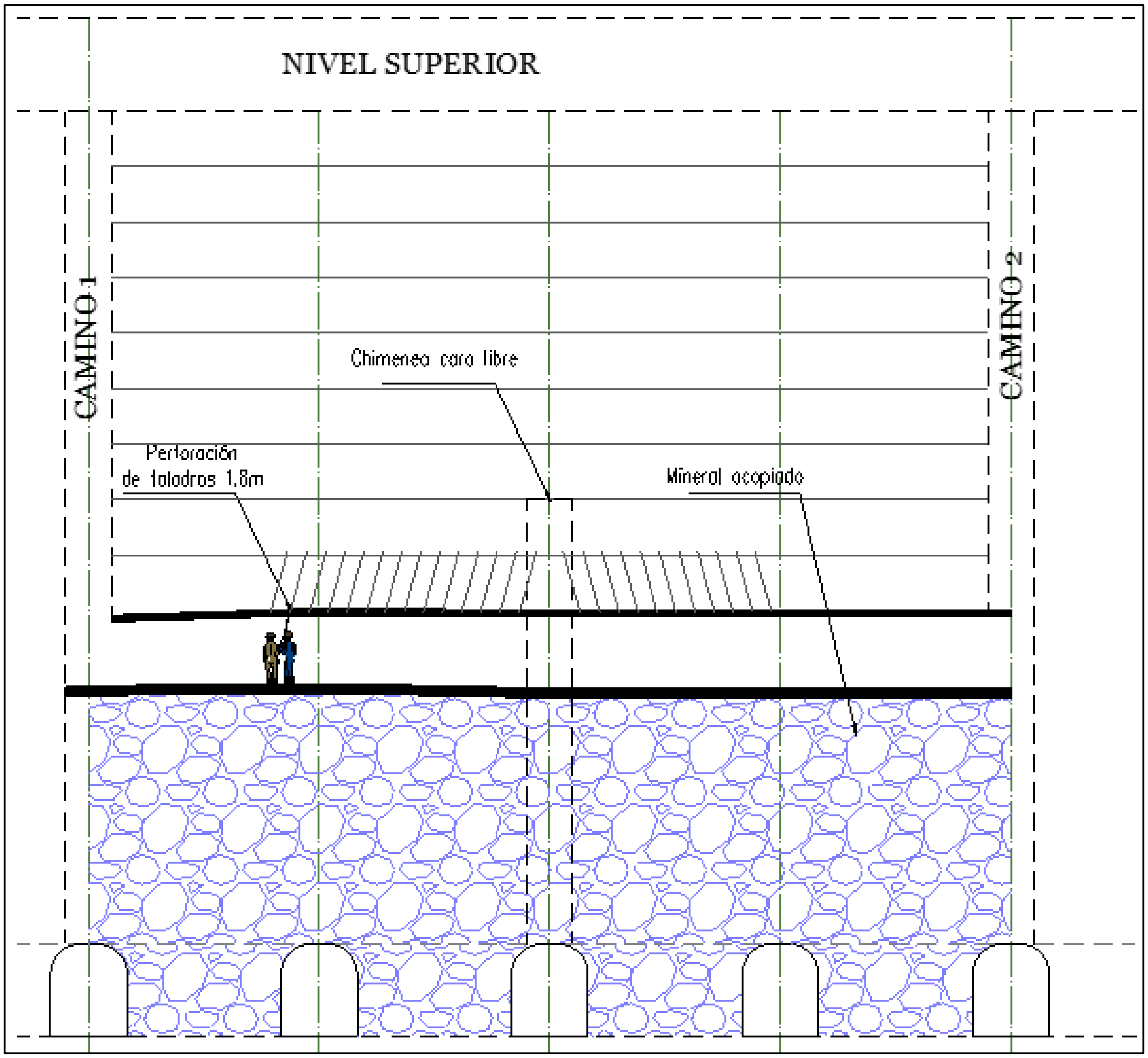
16 Mining Methods

16.1 Current Methods

Palito Mine

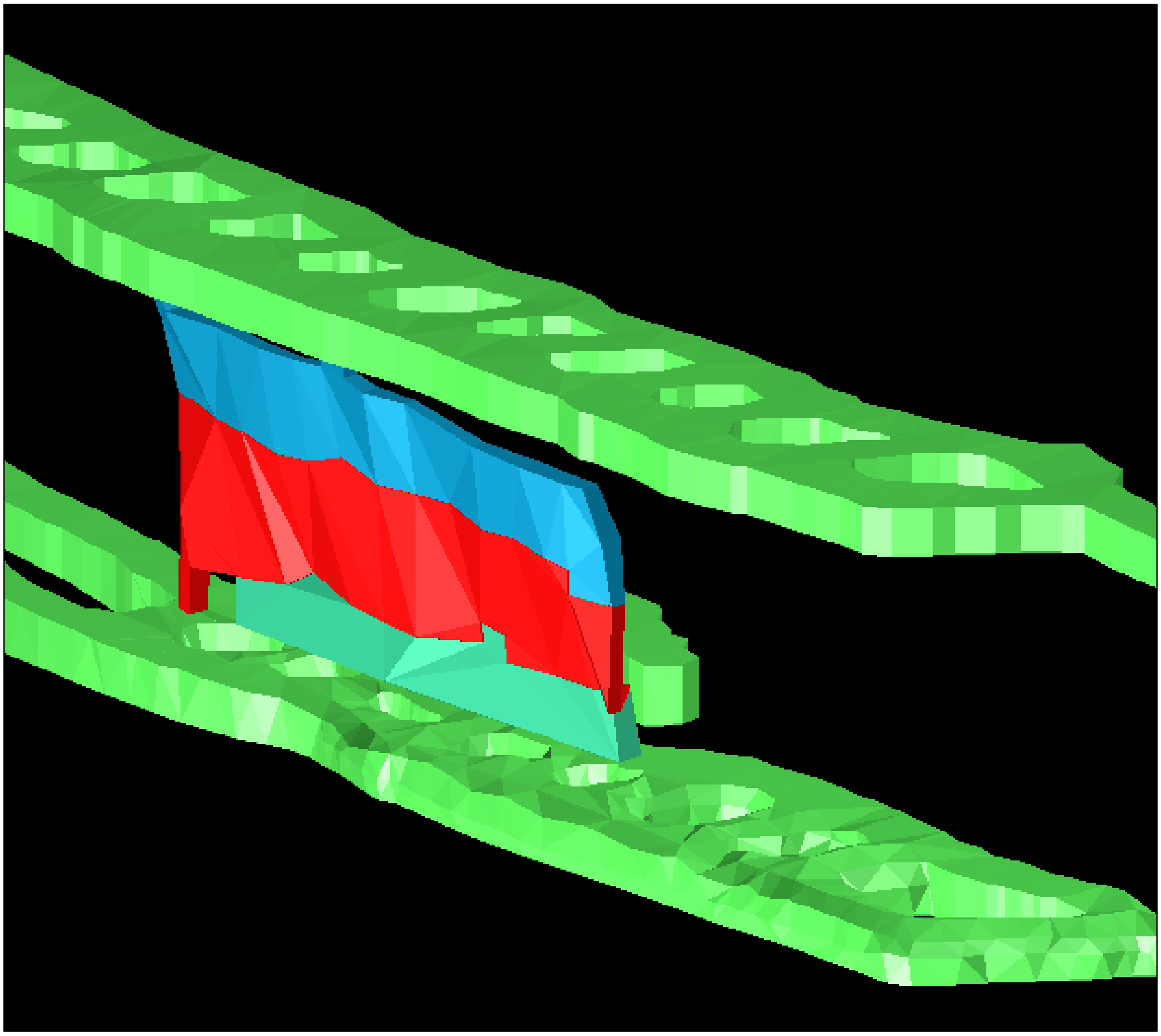
Mining of the narrow, near-vertical gold veins at the Palito Mine is undertaken using the shrinkage stoping method. Shrinkage stoping blocks (usually 30 m high) are defined on the bottom by horizontal development mining along the vein at a cross-sectional dimension of 3.0 m high by 3.0 m wide. A vertical raise is then driven to the top of the stoping block and ladders are installed so that men and materials can access the stope on each subsequent lift as mining advances upward.

Stope mining progresses vertically beginning with the drilling of 1.8 m sub-vertical holes using hand-held pneumatic drills (stopers). The drill holes are loaded with explosives and the blasted ore is left in the stope except to the extent it is necessary to draw down the rock to leave an adequate distance between the working floor and the back. The ore left in the stope supports the walls and no installed ground support is typically required. Serabi extracts the broken ore via a series of crosscuts that are driven in waste from a footwall access. After a stope is mined to its full height, LHD units are used to muck the remaining ore from the stope. The LHD units load 20 t haul trucks, which then transport the broken ore to the surface. Figure 16-1 and Figure 16-2 show the shrinkage stoping method as it is used at the Palito Mine.



Source: Serabi, 2017

Figure 16-1: Longsection View of Shrinkage Stoping



Source: Serabi, 2017

Figure 16-2: Isometric View of Shrinkage Stoping with Extraction Galleries

São Chico Mine

Mining of the steeply dipping vein at the São Chico Mine is by longitudinal longhole stoping methods using sublevels that are spaced at a nominal 15 m. Because structural backfill is not available and because mining takes place on multiple adjacent levels, rib and sill pillars are used to separate the ore blocks and maintain geotechnical stability. The top and bottom of each stope block is mined with horizontal development using a drift cross-section of 3.5 m high by 3.5 m wide. Longholes are drilled between levels and blasthole rings are fired in the direction of a conventionally driven slot raise that is mined on one end of the stope. Ore is mucked from the longhole stopes using LHD units. The LHD units load 20 t haul trucks, which then transport the broken ore to the surface. Once the ore reaches the surface, it is transported by road (approximately 30 km one way) from the São Chico Mine to the processing plant at the Palito site.

Although Serabi has used a minimum mining width of 3.5 m for the purposes of converting mineral resources to mineral reserves, the Company has demonstrated the ability to mine narrower than 3.5 m with the longhole stoping method.

Geotechnical

Stope widths at the Palito Mine are typically narrow (0.9 m to 1.5 m wide) and the shrinkage method provides support for the stope walls until the last lift of the stope is completed and the ore is drawn down. Ground conditions are generally very good and ground support typically is not required in the stopes. However, because Serabi concurrently mines on vertically adjacent levels, 3.0 m thick horizontal sill pillars are left at the crown of the shrink stoping blocks in some instances. Similarly, 3.0 m thick rib pillars are used to separate horizontally adjacent stopes. As discussed in Section 15, appropriate adjustments have been included in the resource to reserve conversion to account for Serabi's use of rib and sill pillars at the Palito Mine.

At the São Chico Mine, longhole stopes are typically 3.5 m wide. Ground conditions are generally good, but stoping results to date show the potential for blasting overbreak and hanging- and footwall slough. Accordingly, the mineral reserves include an allowance of 0.5 m of overbreak/slough for both the hangingwall and the footwall. Because structural backfill is not available and because mining takes place on horizontally and vertically adjacent blocks, rib and sill pillars (both 3.0 m thick) are used to separate the ore blocks and maintain geotechnical stability. As discussed in Section 15, appropriate adjustments have been included in the resource to reserve conversion to account for Serabi's use of rib and sill pillars at the São Chico Mine.

16.2 Mine Production Schedule

The LoM production schedule based on Mineral Reserves is presented in Table 16-1. The average annual processing rate ranges between 264 t/d and 569 t/d (LoM average is 436 t/d). LoM primary development in waste (e.g., ramps, footwall accesses and raises) is 9,616 m for the Palito Mine and 838 m for the São Chico Mine. Ore mining in the Palito Mine continues until November 2021 whereas mining in the São Chico Mine ends in June 2019.

Table 16-1: Life of Mine Production Schedule Based on Mineral Reserves

Source	Units	2017 (1)	2018	2019	2020	2021	Total
Palito Mine							
Mined/Processed	t	54,755	130,895	142,753	124,884	88,083	541,369
Head Grade	g/t Au	8.70	8.41	8.83	9.00	8.09	8.63
Recovery	%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%
Production	oz Au	13,936	32,216	36,874	32,867	20,837	136,730
Mine Development	m	2,197	2,900	2,548	1,265	706	9,616
São Chico Mine							
Mined/Processed	t	21,948	47,088	20,777	-	-	89,813
Head Grade	g/t Au	8.34	8.05	9.39	-	-	8.43
Recovery	%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Production	oz Au	5,594	11,581	5,960	-	-	23,135
Mine Development	m	724	114	-	-	-	838
Palito Tailings Retreatment							
Processed	t	18,400	29,820	11,780	-	-	60,000
Head Grade	g/t Au	2.70	2.70	2.70	-	-	2.70
Recovery	%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%
Production	oz Au	1,246	2,019	798	-	-	4,063
Palito Stockpiles							
Processed	t	-	-	544	11,456	-	12,000
Head Grade	g/t Au	-	-	3.15	3.15	-	3.15
Recovery	%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%
Production	oz Au	-	-	43	905	-	948
Total							
Mined/Processed	t	95,103	207,803	175,854	136,340	88,083	703,182
Head Grade	g/t Au	7.46	7.51	8.47	8.50	8.09	8.01
Average (blended) Recovery	%	91.1%	91.3%	91.2%	90.6%	91.0%	91.1%
Production	oz Au	20,776	45,816	43,675	33,772	20,837	164,876
Average Processing Rate	**t/d**	**517**	**569**	**482**	**374**	**264**	**436**

(1) Only considers Jul 1 - Dec 31, 2017
Source: Serabi, 2017

16.3 Mining Fleet

The major drilling and loading equipment owned and operated by Serabi and used in the Palito and São Chico mines is listed in Table 16-2. The equipment is a mix of older and newer units that are appropriately sized for operation in the relatively narrow stope widths in Palito and São Chico. Haulage of ore from São Chico to Palito is performed by a haulage contractor using equipment that is owned, operated and maintained by the contractor.

Table 16-2: Major Mining Equipment

Equipment No.	Type	Make	Model
Palito Mine			
JU 01	Drifting Jumbo	Atlas Copco	T1D
JU 05	Drifting Jumbo	Atlas Copco	T1D
JU 06	Drifting Jumbo	Atlas Copco	T1D
LHD 05	LHD	Atlas Copco	ST2G (3 t)
LHD 06	LHD	Atlas Copco	ST2G (3 t)
LHD 07	LHD	Atlas Copco	ST2G (3 t)
LHD 09	LHD	Atlas Copco	ST2G (3 t)
São Chico Mine			
JU 02	Drifting Jumbo	Atlas Copco	T1D
JU 03	Drifting Jumbo	Atlas Copco	281
SB 01	Longhole Drill	Resemin	MUKI LHBP
LHD 02	LHD	Atlas Copco	ST2G (3 t)
LHD 08	LHD	Atlas Copco	ST2G (3 t with remote control)
LHD 10	LHD	Atlas Copco	ST2G (3 t with remote control)

Source: Serabi, 2017

16.4 Manpower

The Palito Mining Complex manpower for 2017 is shown in Table 16-3. Approximately 70% of the total site manpower is dedicated to underground mining and the maintenance of mining equipment.

Table 16-3: Palito Mining Complex Manpower

Area	Number
Palito Mine	
Mine- Management	6
Mine - Serabi	104
Mine - Contractors	97
Mine - Maintenance	68
Plant	69
Admin - Office	31
HSE / Labor	8
Total Palito Mine	**383**
São Chico Mine	
Mine - Serabi	67
Mine - Contractors	19
Site Services	14
Tech Services	20
HSE / Labor	3
Total São Chico Mine	**123**
Administration Labor	19
Total Palito Mining Complex	**525**

Source: Serabi, 2017

16.5 Mine Dewatering

Mine dewatering is approximately 10 L/sec at the Palito Mine and approximately 17 L/sec at the São Chico Mine. At both mines, water is pumped through a system of staged centrifugal pumps to the portals at the top of the main ramp systems.

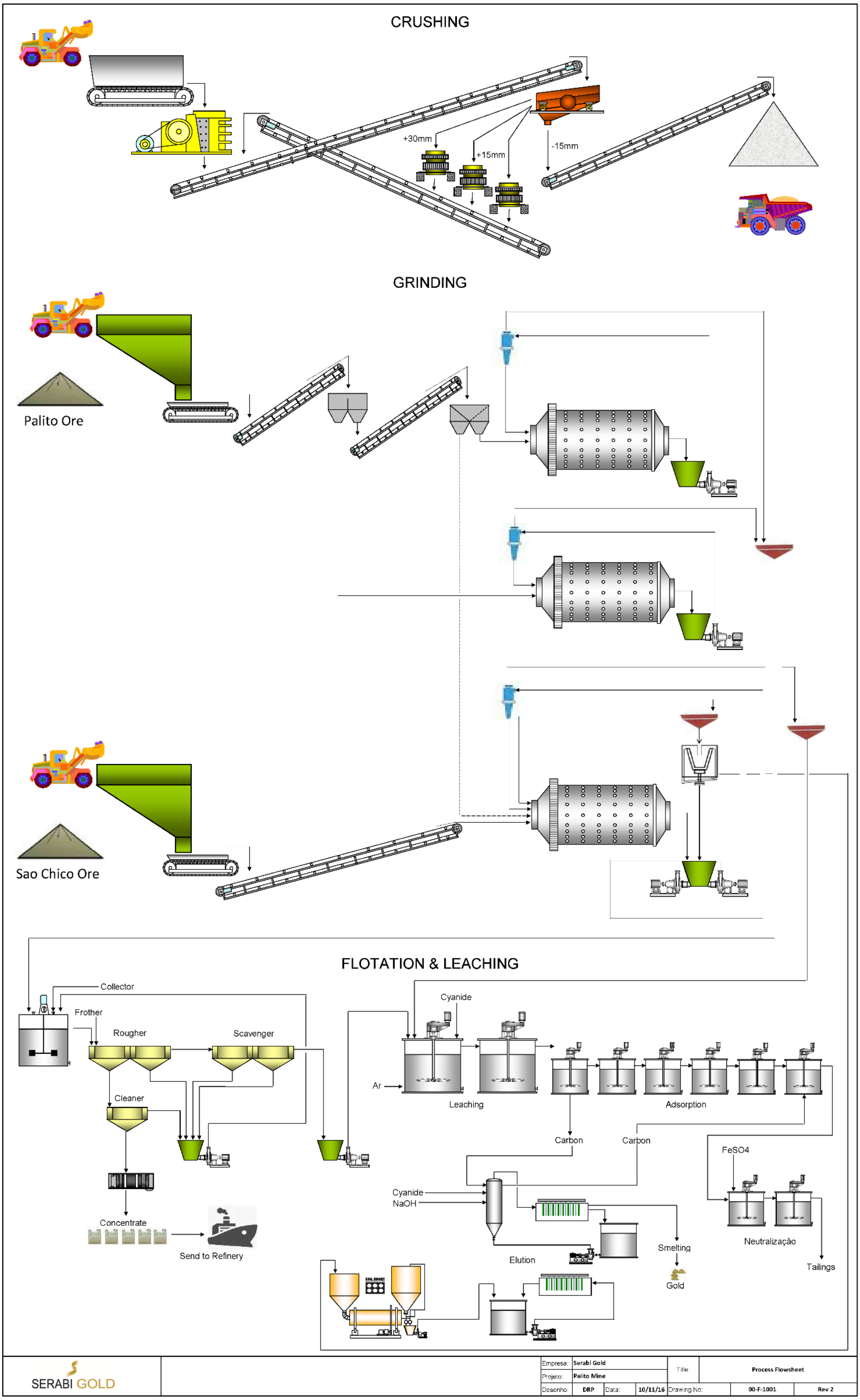
16.6 Mine Ventilation

Total mine airflow is approximately 5,950 m^3/min (210,000 cfm) at the Palito Mine and approximately 1,060 m^3 per minute (63,400 cfm) at the São Chico Mine. At both mines, fresh air is drawn into the main ramp system and intake raises, distributed throughout the mine, and then exhausted through a series of ventilation raises and adits that connect to the surface.

17 Recovery Methods

17.1 Processing Methods

Serabi operates a 500 t/d plant to process ore from both the Palito and São Chico mines. Palito ore is processed through a flowsheet that includes crushing, grinding, copper flotation and carbon-in-pulp (CIP) cyanidation of gold and silver values from the copper flotation tailing. The São Chico ore is processed in a separate grinding circuit that includes gravity concentration and intensive cyanide leaching of the gravity concentrate. The São Chico gravity tailing is combined and processed with the Palito copper flotation tailing in the CIP cyanidation circuit. In addition to Palito and São Chico ore, old flotation tailing stockpiles, which contain about 2.6 to 3.6 g/t Au, are processed by directly feeding this material into the CIP circuit. Gold and silver values extracted in the CIP circuit are adsorbed onto activated carbon. The “loaded” carbon is then eluted to remove the adsorbed gold and silver values into an upgraded solution that flows through electrowinning cells to recover gold and silver as a cathodic precipitate, which is then fluxed and smelted to produce a final doré product. A simplified process flowsheet is shown in Figure 17-1 and a list of major equipment is shown in Table 17-1.



Source: Serabi, 2017

Figure 17-1: Serabi Process Plant Flowsheet

Table 17-1: Major Equipment List - Serabi Process Plant

Process Area	Equipment	Quantity	Details	KW
Crusher	Vibrating Feeder	1	Metso MV-27070; 2.7 m x 0.7 m	20
	Primary Jaw Crusher	1	Metso 6240E; 620 mm x 400 mm	60
	Product Screen	1	Faco Inclined Double Deck Screen; 4.0 m x 1.5 m; Top Deck 30 mm; Bottom Deck 15 mm	25
	Secondary Cone Crusher	1	Faco 60S; CSS 13 mm	30
	Tertiary Cone Crusher	1	Faco 60TS; CSS 8 mm	30
	Tertiary Cone Crusher	1	Faco 60TF; CSS 8 mm	30
Grinding and Gravity	Silo	2	Capacity Silo 1: 105t Capacity Silo 2: 80t	
	Vibrating Feeders	2	Simplex SXCV-50; 1 m x 0.5 m	5
	Belt Samplers	2	CDC Linear Sampler AAL-L-1000	
	Weightometers	3	Magcon M-3000	
	Ball Mill 01	1	Humboldt Wedag 2.30 m dia x 3.1 m long	340
	Ball Mill 02	1	Zanini 2.10 m dia x 3.4 m long	275
	Ball Mill 03	1	Zanini 2.10 m dia x 3.4 m long	275
	Cyclone Feed Pumps	6	Warman 3/2 AH Reval 3/2 C-SHD	30
	Vibrating Screens	3	Simplex SXPH-3013; 3 m x 1.3 m; 0.8 mm PU panels Simplex SXPH-3010; 3 m x 1.0 m; 0.8 mm PU panels Simplex SXPH-3010; 3 m x 1.0 m; 2.0 mm PU panels	7.5
	Cyclones	3	Weir Cavex 250CVX; Vortex 80 mm; Apex 54 mm	
	Centrifugal Concentrator	1	Falcon SB-750B	10
	Process Water Pump	2	KSB Megabloc 50-200	30
	Sump Pump	1	Reval 3/2 C-SHD Vertical	30
Intensive Leach	ILR (pump/drum)	1	Gekko ILR150BA	12
	Pregnant Solution Pump	1	Scheneider ME-HI 5210	2
	Flocculant Tank	1	0.95 m dia x 1.3 m high	1
	Electrowinning Cell	1	Como 600x600x9 cathode	
	E/W Cell Rectifier	1	Tecnovolt NA1210C32 CR; 1,000A	5
Flotation	Conditioning Tank	1	Conditioning Tank; 1.8 m dia x 2.3 m high	7.5
	Flotation Cells	5	Emprotec Dual Cell; 2 m x 1.6 m	21
	Blower	1	Omel trilobular SRTEV/II-1027; Capacity 660 m^3/hr	30
	Flotation Recirculation Pump	1	Warman 2/1.5 AH	12.5
	Flotation Tails Pump	1	Warman 4/3 AH	30
	Compressor	1	PEG ACC40 - 200 PCM x 7 bar / 2014	40
	Diaphragm Pumps	2	Netzsch HDF 2.DN61	
	Fiter Press	2	Netzch/Andritz SH 500CD8; 20 un. 500x500 - 7,1 m^2	
CIP and DETOX	Leach Tanks	2	6.5 m dia x 6.5 m high	15
	Adsorption Tanks	6	4.6 m dia x 5.0 m high	10
	Cyanide Neutralization Tanks	2	4.6 m dia x 2.5 m high	12.5
	Compressor	1	PEG ACC60	60
	Blower	1	Omel trilobular SRTEV/II-1027; Capacity 660 m^3/hr	30
	Loaded Carbon Screen	1	Mineralmaq PVS-120 FF-1; 0.8 mm aperture	2
	Loaded Carbon Hopper	1	1.8 m dia x 2 m high	
	Eductor Water Pressure Pump	1	Thebe Multistage P-15/4-NFF-TRI; 18 m^3/h; edutor Jacoby-Tarbox TMLE 18 C	10
	Tails Pump	2	Reval 4/3 C-SHD Reval 3/2 C-SHD	50
Acid Wash / Elution /Goldroom	Eductor Water Pressure Pump	2	Thebe Multistage P-15/4-NFF-TRI; 18 m^3/h	10
	Acid Wash Column	1	1.3 m dia x 2.5 m high + 0.65 m high cone; Active Vol = 3.1 m^3	
	Acid Solution Tank	1	1.5 m dia x 1.48 m high; Active Vol = 2.3 m^3	
	Carbon Hopper	1	1.8 m dia x 2 m high + 1.4 m high cone; Active Vol = 6 m^3	
	Elution Column	1	0.986 m dia (int) x 4.2 m high + 0.5 m high cone; Active Vol = 3.0 m^3	
	Strip Solution Tank	1	2.4 m dia x 2.5 m high; Active Vol = 9 m^3	
	Strip Solution Pump	1	Scheneider ME-HI 5525	1
	Boiler	1	Auruterm CAD-300-HP; LPG Gas; 300 mcal/h	
	Electrowinning Cell	1	Kemix 1/3 size (6x7)	
	Rectifier	1	Kemix 500A	5
	Smelting Furnace	1	Grion 11 Litres; 1200ºC	2

Process Area	Equipment	Quantity	Details	KW
Carbon Regeneration	Dewatering Screen	1	Mineralmaq PVS-120 FF-1; 1.2 mm & 0.8 mm screens	2
	Kiln Feed Hopper	1	1.85 m dia x 1.35 m high + 1.1 m high cone	-
	Carbon Regeneration Kiln	1	Kemix 75 kg/hr	16
	Carbon Quench Tank	1	2.0 m dia x 1.55 m high	-
	Eductor Water Pressure Pump	1	Thebe Multistage P-15/4-NFF-TRI; 18 m^3/h	10
Reagent Preparation	Lime Tank	1	2.4 m dia x 2.5 m high	2
	Cyanide Tank	1	2.1 m dia x 2.2 m high	1
	Caustic Tank	1	1.8 m dia x 1.0 m high	1

Source: Serabi, 2017

17.2 Process Description

17.2.1 Crushing

Stockpiled run-of-mine (ROM) ore is fed to the crushing circuit at an average rate of 23 t/h using a front-end wheel loader. The ore is fed to a jaw crusher using a vibratory grizzly where it is crushed to a nominal size of 60 mm. A conveyor transports the primary crushed ore to a double-deck vibrating screen with a top deck screen size of 30 mm and a bottom deck screen size of 15 mm. The +30 mm material reports to the secondary crusher and the -30 mm+15 mm material reports to two tertiary crushers operating in parallel. The secondary and tertiary crushers are operated in closed circuit with the double-deck screen and are set to produce a product of less than 15 mm. The final minus 15 mm product is transported via a stacker conveyor to crushed ore stockpiles.

Due to the high variability of the Palito and São Chico ROM ore, material from each front and stope in both the mines is crushed separately on a batch basis and stockpiled individually. The crushed ore product from each batch is sampled as it falls onto the product conveyor. After analysis of each sample, the separate stockpiles are blended using a front-end wheel loader in such a way as to produce a consistent mill feed blend. The ore is blended as it is loaded into trucks, which are then weighed and transported to mill feed stockpiles

17.2.2 Grinding

Palito and São Chico ores are transported and loaded into separate 200 t fine ore bins at the process plant. Both Palito and São Chico ore are weighed as they are conveyed to the grinding circuit and sampled every 30 minutes with automatic cross-cut samplers. Palito ore is fed to two ball mills (2.3 m diameter x 3.1 m long and 2.1 m diameter x 3.4 m long) operating in parallel and in closed circuit with 250 mm diameter cyclones to produce a final ground product size of 80% passing (P_{80}) 120 µm which is then conditioned and fed to the copper flotation circuit. São Chico ore is fed to one ball mill (2.1 m diameter x 3.4 m long) operated in closed circuit with a Falcon SB-750B centrifugal concentrator and a 250 mm diameter cyclone to produce a final grind size of P_{80} 120 µm which is advanced directly to the CIP cyanidation circuit along with the Palito copper flotation tailing.

17.2.3 Intensive Leaching

The gravity concentrate produced from the São Chico ore with the Falcon centrifugal concentrator is discharged to a 4 t hopper and then leached in 800 kg batches in a Gekko In-line Leach Reactor (ILR150) for 24 hours. Leaching is accomplished in a cyanide solution that is maintained at a concentration 1.5% NaCN along with the addition 200 L of hydrogen peroxide per batch. The leach solution from the ILR is circulated through a separate electrowinning cell (Como 600 x 600 x 9 cathodes) located in the gold room to recover the contained gold as a cathodic precipitate. The doré produced from the São Chico gravity concentrate contains high levels of lead, which is the result of leaching oxidized lead minerals in the ILR. Although this has not been an issue with the refiner, Serabi is currently reviewing options for reducing the lead content of the doré produced from the São Chico gravity concentrate.

17.2.4 Flotation

The flotation circuit consists of two conditioning tanks followed by rougher, scavenger, and cleaner cells. A thionocarbamate collector (A3894) for selective copper flotation is added to the conditioner tank feed. Lime is added in the grinding circuit to maintain pH at 10 -11. Methyl isobutyl carbinol (MIBC) is added, as needed, as the frother.

The rougher-scavenger flotation circuit consists of two duplex cells, each with a capacity of 3.2 m^3, which provide a flotation retention time of 10 to 12 minutes. The product from the first rougher cell is regarded as the rougher flotation concentrate and is advanced to one stage of cleaner flotation. The product from the remaining rougher-scavenger cells is regarded as scavenger concentrate, which is recycled back to the conditioning tanks at the head of the circuit. Rougher flotation concentrate is upgraded in one stage of cleaner flotation to produce a copper concentrate containing greater than 20% copper and into which about 50% to 70% of the gold contained in the Palito ore is recovered. Scavenger tails are pumped to the CIP cyanidation circuit to recover the remaining gold values. The cleaner flotation concentrate is filtered in two Netzche filter presses, each with a capacity of 300 kg/hr. The filtered concentrate discharges directly from the filters into 1 t (wet) super-sacks. Typical moisture content of the concentrate is 7%. The bagged concentrate is shipped as 20 t lots for smelting.

17.2.5 CIP Cyanidation

The CIP cyanidation circuit consists of two 185 m^3 mechanically agitated leach tanks and six 74 m^3 mechanically agitated adsorption tanks, which provide a total retention time of about 20 hours at a slurry density of 40% solids. Cyanide concentration is maintained at 250 ppm NaCN in the leach tanks, which is allowed to attenuate to about 100 ppm NaCN at the discharge of the adsorption tanks. The pH of the leach slurry is maintained at 10.5 to 11.0 with lime. Carbon in the adsorption tanks is maintained at a concentration of 20 g/L except for the first tank, which is maintained at a carbon concentration of 40 g/L to ensure that the tank continues to have carbon in it after loaded carbon is removed.

Carbon is retained in adsorption tanks 1 to 6 by the use of inter-tank screens. Loaded carbon from adsorption tank 1 is removed every 12 hours and transferred to elution for removal of gold. After elution the barren carbon is returned to adsorption tank 6 and the carbon is advanced counter-currently to the pulp with the use of airlifts.

17.2.6 Elution and Gold Refining

Loaded carbon is passed over a screen and washed free of pulp with the pulp being returned to adsorption tank 1. The washed carbon is transferred to an acid wash column and washed with 2% hydrochloric acid solution. After acid washing the carbon is rinsed with water a number of times and then transferred to an elution column, with a nominal capacity of 1,500 kg. Elution is carried out by the Zadra process. Strip solution containing 2% caustic and 1% cyanide is heated to 130^0 C and pumped through the elution column, stripping the gold from the carbon. The pregnant solution then passes through an electrowinning cell where the gold precipitates onto steel wool cathodes. The barren solution from the electrowinning cell returns to a holding tank where it is recirculated back through the process until elution is complete. Each elution cycle is typically 24 hours. After elution the carbon is rinsed with water a number of times and then regenerated in a new carbon kiln.

17.2.7 Carbon Regeneration

A new 75 kg/hr Kemix carbon regeneration kiln was installed and made operational during December 2016. This was a very important addition to the process as the carbon was being fouled by the flotation reagents and was losing ability to adsorb gold and was resulting in high soluble gold losses. The kiln is operated at 750^0 C to ensure the complete removal of organic contaminants.

17.2.8 Cyanide Detoxification

Serabi has not been able to effectively detoxify the cyanide contained in the cyanide leach residue with the process that had originally been installed, and is currently designing a detoxification circuit based in the industry-standard SO_2/Air process to reduce cyanide levels to <5 ppm CN_{WAD}. The new cyanide detoxification circuit is expected to be operational by 2018 Q1.

17.3 Consumable Requirements

Process plant consumables are summarized in Table 17-2. The two major consumable items are sodium cyanide, representing almost 50% of the consumables cost, and grinding media, which represents about 20% of consumable cost. It should be noted that a carbon reactivation kiln was installed in December 2016 and that prior to this installation, carbon costs were relatively high due to excessive carbon fouling. During 2017, the process plant has been able to reactivate stockpiled carbon that had been fouled, and as such, new carbon has not been required during 2017.

Table 17-2: Serabi Process Plant Consumables

Item	2016					2017 (Jan - March)				
	Kg	Kg/t	R$/kg	R$/t	US$/t	Kg	Kg/t	R$/kg	R$/t	US$/t
Grinding Balls	141,600	0.89	3.89	3.47	1.10	43,800	1.05	3.72	3.91	1.24
Lime	625,011	3.93	0.32	1.26	0.40	130,060	3.12	0.33	1.03	0.33
Carbon	17,300	0.11	6.55	0.71	0.23	0	0	6.55	0	0
Sodium Cyanide	135,000	0.85	14.04	11.92	3.80	33,000	0.79	11.07	8.76	2.79
Flotation Collector	4,600	0.03	28.80	0.83	0.27	1,000	0.02	28.30	0.68	0.22
Frother	2,560	0.02	12.75	0.21	0.07	640	0.02	13.38	0.21	0.07
Sodium Hydroxide	21,200	0.13	3.84	0.51	0.16	7,675	0.18	3.87	0.71	0.23
Ferrous Sulfate	127,000	0.80	0.71	0.57	0.18	25,000	0.60	0.77	0.46	0.15
Gas (GLP)	64,845	0.41	5.77	2.35	0.75	17,100	0.41	6.25	2.56	0.82
Hydrogen Peroxide	13,000	0.08	2.53	0.21	0.07	4,400	0.11	2.42	0.26	0.08
	Quantity		**R$/unit**	**R$/t**	**US$/t**	**Quantity**		**R$/unit**	**R$/t**	**US$/t**
Concentrate Super Sacks	2,370		32.74	0.49	0.16	500		32.80	0.39	0.13
Tonnes Processed (1)	158,966					41,722				
Exchange Rate (R$:US$)	3.14					3.14				

(1) Does not include old flotation tailings that were processed
Source: Serabi, 2017

17.4 Operating Costs

Process plant operating costs are summarized in Table 17-3 for 2016 and 2017 (January to March). Total direct operating costs during 2016 were US$43.79/t, and during 2017 direct operating costs are US$39.03/t. Indirect costs for concentrate freight and refining add an additional US$17.05/t ore processed.

Table 17-3: Summary of Serabi Process Plant Operating Costs

	2017 (Jan - Mar)			2016		
	R$	**US$**	**US$/t**	**R$**	**US$**	**US$/t**
Labor						
Operations	1,081,253	344,348	8.25	4,211,406	1,341,212	8.44
Maintenance (1)	667,087	212,448	5.09	2,569,362	818,268	5.15
Labor Subtotal	**1,748,340**	**556,796**	**13.35**	**6,780,768**	**2,159,480**	13.58
Reagents						
Cyanide	364,854	116,196	2.78	1,765,325	562,205	3.54
Lime	39,830	12,685	0.30	210,319	66,981	0.42
Collector (AP3894)	28,200	8,981	0.22	137,387	43,754	0.28
Activated Carbon	0	0	0.00	196,374	62,539	0.39
Other	231,349	73,678	1.77	518,825	165,231	1.04
Reagents Subtotal	**664,233**	**211,539**	**5.07**	**2,828,230**	**900,710**	5.67
Wear Materials						
Mill Liners	144,883	46,141	1.11	308,932	98,386	0.62
Grinding Balls	162,823	51,854	1.24	808,187	257,384	1.62
Crusher Liners	17,305	5,511	0.13	59,668	19,003	0.12
Wear Materials Subtotal	**325,011**	**103,507**	**2.48**	**1,176,787**	**374,773**	2.36
Power						
Plant Electrical (Grid)	340,592	108,469	2.60	723,828	230,518	1.45
Site Electrical (Grid)	35,060	11,166	0.27	60,510	19,271	0.12
Plant Diesel (Generator)	941,456	299,827	7.19	5,921,116	1,885,706	11.86
Site Diesel (Generator)	58,106	18,505	0.44	120,000	38,217	0.24
Power Subtotal	**1,375,214**	**437,966**	**10.50**	**6,825,454**	**2,173,711**	13.67
Maintenance Supplies	651,393	207,450	4.97	2,861,031	911,156	5.73
Laboratory	107,406	34,206	0.82	350,093	111,495	0.70
Other (2)	242,203	77,135	1.85	1,033,761	329,223	2.07
Total Direct Process	**5,113,800**	1,628,599	39.03	**21,856,124**	6,960,549	43.79
Indirect Cost						
Concentrate Freight (3)	1,328,619	423,127	10.14			10.14
TCRC (3)	905,252	288,297	6.91			6.91
Concentrate Subtotal	**2,233,871**	**711,424**	**17.05**			17.05
Total Process Plant	**7,347,671**	**2,340,023**	**56.09**			60.84
Ore Tonnes (4)	41,722			158,966		
Exchange rate (R$:US$	3.14					

1. Includes 50% of mine maintenance labor
2. Includes travel, mobile equipment fuel and concentrate super sacks
3. Concentrate Freight and TCRC unit costs for 2016 based on 2017 actual as no 2016 data provided
4. Does not include old flotation tailings that were processed.

Source: Serabi, 2017

17.5 Operating Results

Serabi process plant production results for the period 2015 to 2017Q1 are presented in Table 17-4 through Table 17-6. The following general observations can be made regarding plant production over this period:

- Average reconciled Palito ore grade has declined from 8.514 g/t Au in 2015 to 6.54 g/t Au in 2017 Q1;

- Average annual gold recovery from Palito ore has been consistent at about 91% during this period;
- Average reconciled São Chico ore grade has increased from 6.88 g/t Au in 2015 to 9.35 g/t Au in 2017 Q1;
- Average annual gold recovery from São Chico has increased from 87.1% in 2015 to 95.8% in 2017 Q1;
- In addition to Palito and São Chico ore, old flotation tailing stockpiles, which contain about 2.6 to 3.6 g/t Au, are processed by directly feeding into the CIP circuit. Average annual gold recovery from the old flotation tailings has increased from 70.7% in 2015 to 84.4% in 2017 Q1.

Metallurgical accounting of production from Palito and São Chico ores and the old flotation tailings is complicated by the fact that they are commingled in the CIP circuit. The basic metallurgical accounting procedure developed by Serabi includes the following:

- Palito and São Chico ores are weighed separately by conveyor belt weightometers feeding the ball mills.
- Palito and São Chico ore feed are sampled with automatic cross-cut samplers that are timed to take sample of the ball mill feed every 30 minutes to obtain ore feed grades to the process plant. All other sampling throughout the plant is performed manually.
- Each ore source (Palito and São Chico) is processed through discrete parallel grinding circuits during which the tonnes of each source are recorded.
- The Palito ore circuit proceeds to flotation following grinding, where gold recovered into the flotation concentrate is accounted to the Palito sourced ore.
- The São Chico ore circuit includes a gravity gold recovery stage, where gold recovered by the gravity circuit is processed through an ILR (Inline Leach Reactor) and separate electrowinning cell and is accounted to the São Chico sourced ore.
- Each of these circuits combine into the CIP (Carbon-In-Pulp) circuit along with old flotation tailings. Gold recovered by the CIP circuit is apportioned to each ore source according to the ratio of the assayed gold balance (mass x assayed feed grade of each source), measured and recorded on a daily basis.
- Ore grades are reconciled based on actual gold production apportioned to each ore.

Table 17-4: Serabi Process Plant Production - 2015

	Ore Tonnes			Plant Grade (Au g/t)			Reconciled Grade (Au g/t)			Gold Production (Oz)			Au Recovery (%)		
Month	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**
January	9,573		1,282	7.07		2.31	6.17		1.48	1,649.0		35.2	86.8		57.7
February	10,414		1,487	9.29		3.63	9.12		3.63	2,736.3		129.0	89.6		74.3
March	10,397		3,594	9.41		2.06	9.55		2.11	2,857.7		165.5	89.5		67.9
April	9,746	1,572	2,190	7.68	5.27	1.98	7.48	5.90	2.00	2,068.4	264.8	89.4	88.2	88.8	63.5
May	9,015	1,618	2,128	9.41	6.75	2.36	8.89	7.85	2.35	2,354.5	363.8	118.9	91.4	89.1	74.0
June	10,382	944	1,525	9.42	5.96	2.36	8.91	5.59	2.31	2,703.7	150.8	78.1	90.9	88.9	69.0
July	9,357	1,272	1,447	9.74	7.64	2.96	10.05	6.31	2.96	2,768.9	225.7	100.9	91.6	87.5	73.3
August	8,069	2,553	526	11.37	7.01	2.51	11.27	7.20	2.52	2,743.3	503.7	29.1	93.8	85.2	68.3
September	8,191	2,347	842	9.78	8.26	3.44	9.09	7.41	3.46	2,183.2	477.1	66.9	91.2	85.3	71.4
October	10,514	1,750	1,214	7.14	7.37	2.44	6.57	7.12	2.38	2,000.2	334.3	65.4	90.1	83.4	70.4
November	9,377	2,001	1,139	7.66	6.48	3.27	6.25	4.62	3.26	1,668.2	253.3	84.4	88.5	85.2	70.7
December	8,900	2,306	982	9.97	11.70	4.82	9.45	8.63	4.83	2,501.6	579.7	122.8	92.5	90.6	80.5
Total	**113,935**	**16,363**	**18,356**	**8.94**	**7.62**	**2.65**	**8.51**	**6.88**	**2.60**	**28,235.0**	**3,153.2**	**1,085.6**	**90.6**	**87.1**	**70.7**

Source: Serabi, 2017

Table 17-5: Serabi Process Plant Production - 2016

	Ore Tonnes			Plant Grade (Au g/t)			Reconciled Grade (Au g/t)			Gold Production (Oz)			Au Recovery (%)		
Month	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**
January	9,767	2,509	1,478	10.39	9.34	3.27	8.34	9.78	3.02	2,412.6	746.2	96.9	92.1	94.6	67.5
February	7,919	3,338	2,019	11.12	8.89	2.92	9.11	8.82	2.73	2,198.2	901.2	132.3	94.8	95.2	74.7
March	10,319	2,763	1,202	9.60	9.00	3.08	7.82	9.37	3.06	2,400.8	790.5	92.2	92.5	95.0	78.0
April	8,940	3,449	1,689	9.62	8.77	2.93	7.71	8.99	2.93	1,982.2	941.3	127.4	89.4	94.4	80.1
May	10,001	3,562	2,151	9.68	8.97	2.59	7.53	9.97	2.61	2,186.8	1,080.8	134.9	90.3	94.7	74.7
June	10,219	3,232	2,514	10.79	8.65	2.92	8.58	7.31	2.90	2,559.5	706.4	176.2	90.8	93.0	75.2
July	10,131	3,903	1,189	8.49	7.97	4.20	7.87	9.46	4.07	2,287.3	1,123.1	115.0	89.2	94.6	73.9
August	10,919	3,564	804	9.04	7.36	4.65	8.41	6.69	4.43	2,669.4	702.3	88.3	90.4	91.6	77.1
September	9,674	4,273	630	8.04	10.06	4.31	7.23	10.13	4.05	1,989.0	1,280.1	56.9	88.4	92.0	69.4
October	9,638	4,390	865	7.67	8.40	4.29	6.55	8.32	4.29	1,821.8	1,089.4	91.7	89.8	92.8	76.9
November	9,026	4,310	944	9.30	10.33	3.23	6.72	10.78	3.01	1,745.1	1,398.9	68.3	89.5	93.6	74.8
December	9,082	4,040	1,230	6.29	10.75	4.11	6.00	11.45	4.10	1,628.3	1,429.6	139.7	92.9	96.1	86.2
Total	**115,635**	**43,333**	**16,715**	**9.16**	**9.07**	**3.32**	**7.66**	**9.31**	**3.23**	**25,881.0**	**12,189.8**	**1,319.8**	**90.9**	**94.0**	**76.0**

Source: Serabi, 2017

Table 17-6: Serabi Process Plant Production - 2017 Q1

	Ore Tonnes			Plant Grade (Au g/t)			Reconciled Grade (Au g/t)			Gold Production (Oz)			Au Recovery (%)		
Month	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**	**Palito**	**São Chico**	**Old Tailings**
January	8,560	5,695	1,935	6.60	10.72	3.27	5.73	9.53	3.22	1,465.6	1,643.2	165.8	92.9	94.2	82.8
February	9,055	4,748	1,119	8.10	9.07	4.12	6.78	9.43	4.14	1,764.6	1,394.7	125.4	89.4	96.9	84.2
March	9,775	3,888	1,887	8.83	6.73	3.68	7.04	8.99	3.70	2,017.6	1,091.1	192.7	91.2	97.1	85.8
Total	**27,390**	**14,331**	**4,941**	**7.89**	**8.23**	**3.62**	**6.54**	**9.35**	**3.61**	**5,247.8**	**4,129.0**	**483.9**	**91.1**	**95.8**	**84.4**

Source: Serabi, 2017

Table 17-7 shows a plant feed reconciliation analysis for the period from 2015 to 2017 Q1. Generally, reconciliation with measured plant feed grades has been poor. Since the beginning of 2016 Palito reconciled gold grades have been consistently about 7% to 20% lower than the measured plant feed grades. During this same period, the São Chico reconciled ore grades have been about 2% to 18% higher. In SRK's opinion there appears to be a bias in the ore feed sampling and/or the allocation of production between Palito and São Chico ores.

Table 17-7: Ore Grade Reconciliation Analyses

Year	Month	Plant Grade (Au g/t)			Reconciled Grade (Au g/t)			Palito Variance		São Chico Variance		Old Tailings Variance	
		Palito	São Chico	Old Tailings	Palito	São Chico	Old Tailings	Au (g/t)	%	Au (g/t)	%	Au (g/t)	%
2015	January	7.07		2.31	6.17		1.48	0.90	12.7			0.83	35.9
	February	9.29		3.63	9.12		3.63	0.17	1.8			0.00	0.0
	March	9.41		2.06	9.55		2.11	-0.14	-1.5			-0.05	-2.4
	April	7.68	5.27	1.98	7.48	5.90	2.00	0.20	2.6	-0.63	-12.0	-0.02	-1.0
	May	9.41	6.75	2.36	8.89	7.85	2.35	0.52	5.5	-1.10	-16.3	0.01	0.4
	June	9.42	5.96	2.36	8.91	5.59	2.31	0.51	5.4	0.37	6.2	0.05	2.1
	July	9.74	7.64	2.96	10.05	6.31	2.96	-0.31	-3.2	1.33	17.4	0.00	0.0
	August	11.37	7.01	2.51	11.27	7.20	2.52	0.10	0.9	-0.19	-2.7	-0.01	-0.4
	September	9.78	8.26	3.44	9.09	7.41	3.46	0.69	7.1	0.85	10.3	-0.02	-0.6
	October	7.14	7.37	2.44	6.57	7.12	2.38	0.57	8.0	0.25	3.4	0.06	2.5
	November	7.66	6.48	3.27	6.25	4.62	3.26	1.41	18.4	1.86	28.7	0.01	0.3
	December	9.97	11.70	4.82	9.45	8.63	4.83	0.52	5.2	3.07	26.2	-0.01	-0.2
2016	January	10.39	9.34	3.27	8.34	9.78	3.02	2.05	19.7	-0.44	-4.7	0.25	7.6
	February	11.12	8.89	2.92	9.11	8.82	2.73	2.01	18.1	0.07	0.8	0.19	6.5
	March	9.60	9.00	3.08	7.82	9.37	3.06	1.78	18.5	-0.37	-4.1	0.02	0.6
	April	9.62	8.77	2.93	7.71	8.99	2.93	1.91	19.9	-0.22	-2.5	0.00	0.0
	May	9.68	8.97	2.59	7.53	9.97	2.61	2.15	22.2	-1.00	-11.1	-0.02	-0.8
	June	10.79	8.65	2.92	8.58	7.31	2.90	2.21	20.5	1.34	15.5	0.02	0.7
	July	8.49	7.97	4.20	7.87	9.46	4.07	0.62	7.3	-1.49	-18.7	0.13	3.1
	August	9.04	7.36	4.65	8.41	6.69	4.43	0.63	7.0	0.67	9.1	0.22	4.7
	September	8.04	10.06	4.31	7.23	10.13	4.05	0.81	10.1	-0.07	-0.7	0.26	6.0
	October	7.67	8.40	4.29	6.55	8.32	4.29	1.12	14.6	0.08	1.0	0.00	0.0
	November	9.30	10.33	3.23	6.72	10.78	3.01	2.58	27.7	-0.45	-4.4	0.22	6.8
	December	6.29	10.75	4.11	6.00	11.45	4.10	0.29	4.6	-0.70	-6.5	0.01	0.2
2017	January	6.60	10.72	3.27	5.73	9.53	3.22	0.87	13.2	1.19	11.1	0.05	1.5
	February	8.10	9.07	4.12	6.78	9.43	4.14	1.32	16.3	-0.36	-4.0	-0.02	-0.5
	March	8.83	6.73	3.68	7.04	8.99	3.70	1.79	20.3	-2.26	-33.6	-0.02	-0.5

Source: Serabi, 2017

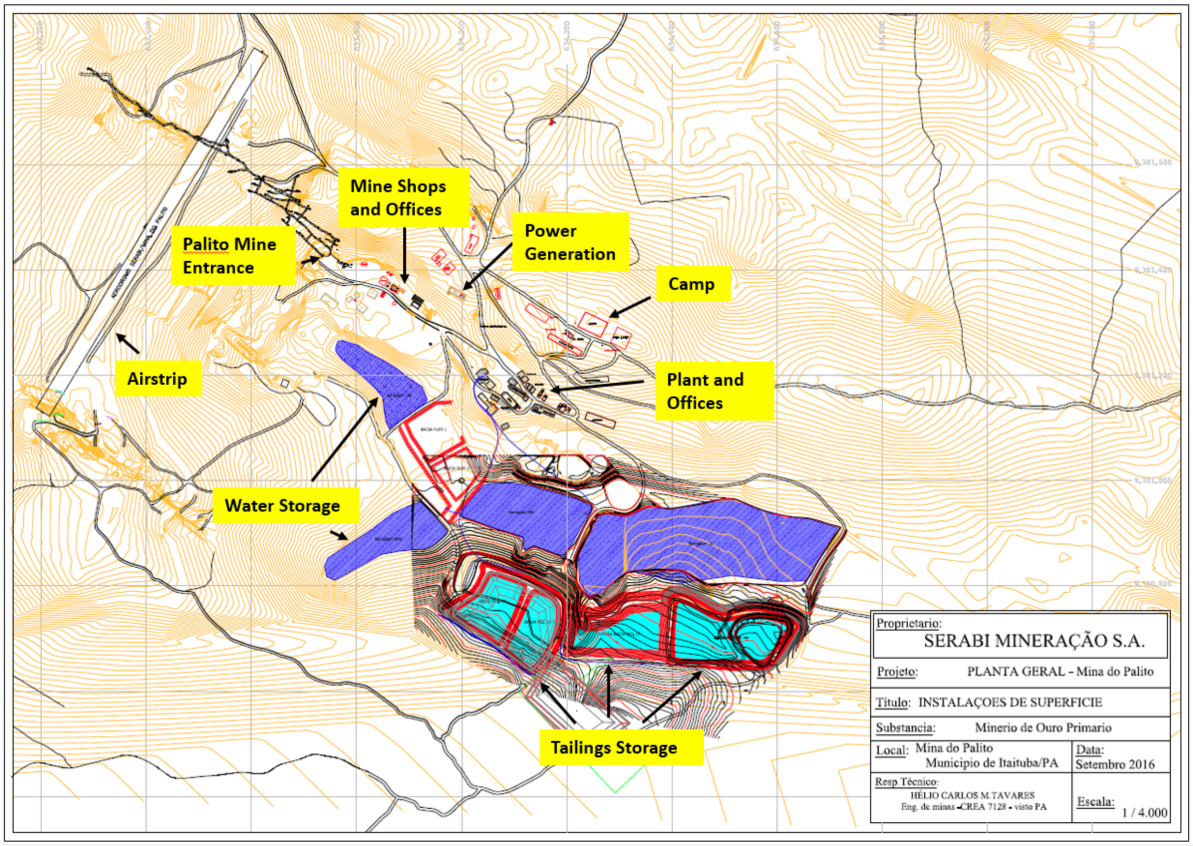
18 Project Infrastructure

18.1 General Infrastructure

The general onsite infrastructure includes:

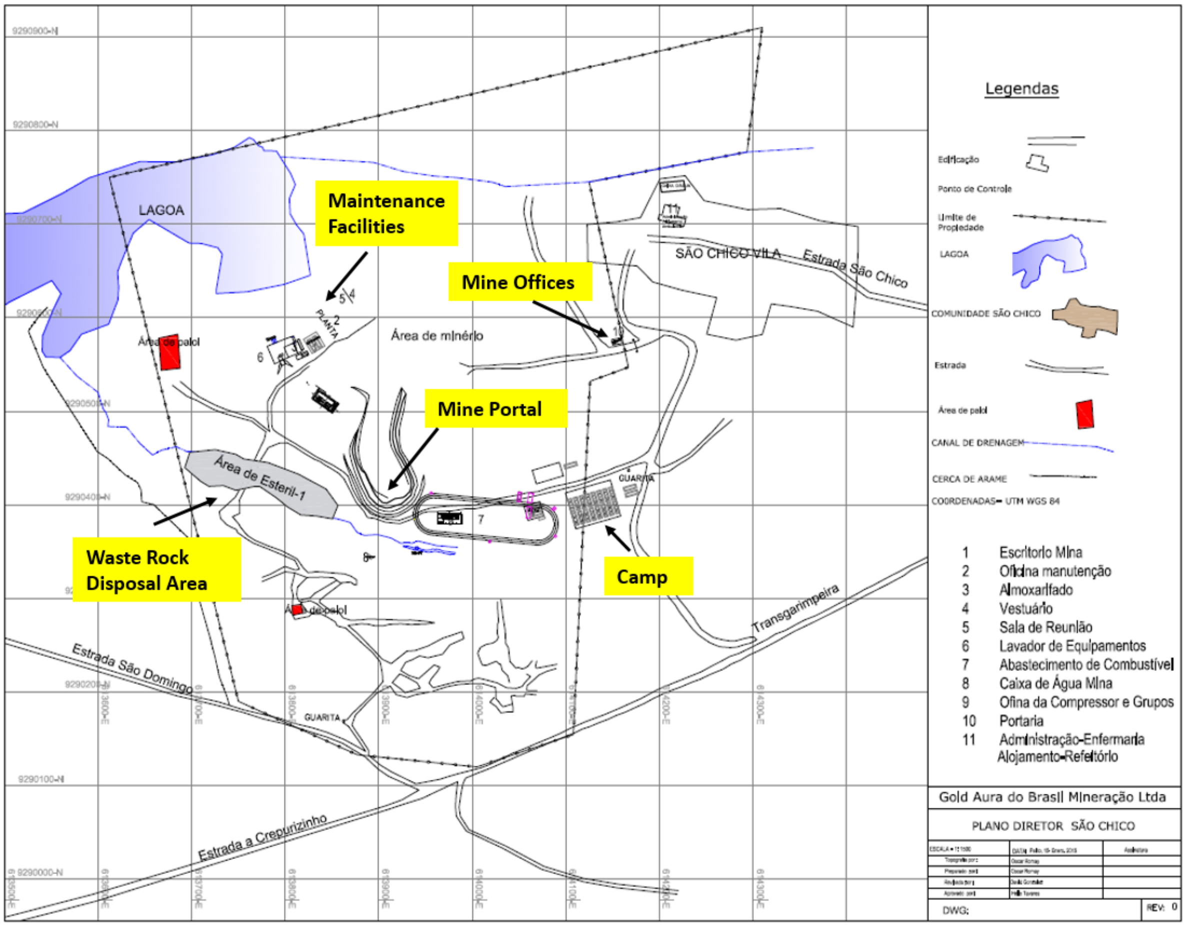
- The Palito underground mine;
- The São Chico underground mine;
- Ore processing facilities;
- Tailings disposal areas;
- Power supply;
- Water supply;
- Mine camp (accommodation, offices, workshops and warehouses); and
- Access roads and airstrip.

Figure 18-1 shows a general layout of the infrastructure at the Palito Mine and Figure 18-2 shows a general layout of the infrastructure at the São Chico Mine.



Source: Serabi, 2016

Figure 18-1: General Layout of the Palito Mine Site

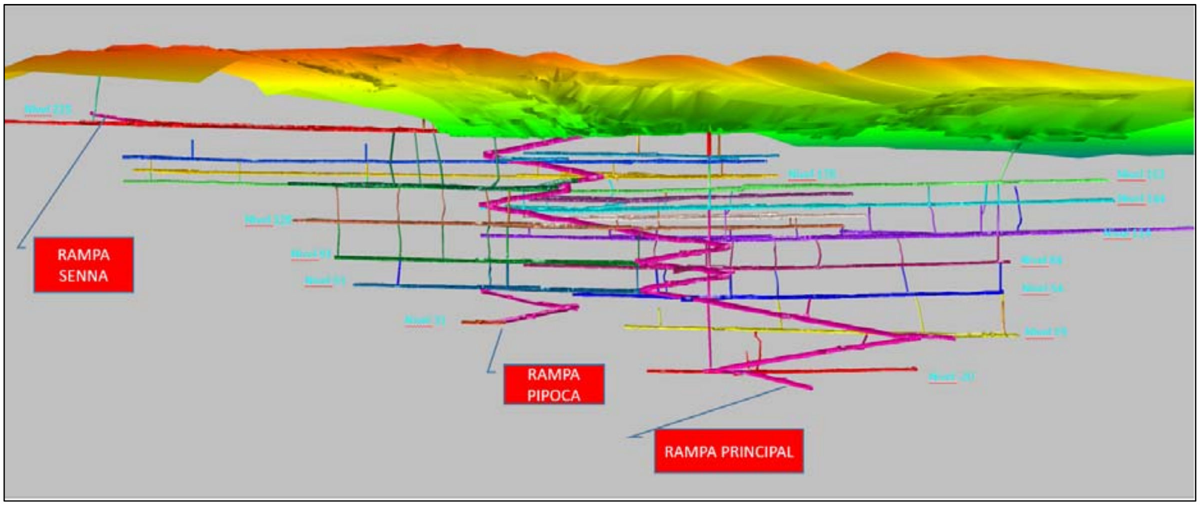


Source: Serabi, 2016

Figure 18-2: General Layout of the São Chico Mine Site

18.1.1 Palito Underground Mine Access

A 4.5 m high x 4.5 m wide ramp system (-12% gradient) provides access to the underground portion of the Palito Mine. The three ramps within the Palito Mine are Rampa Principal (main ramp), Rampa Pipoca, and Rampa Senna, as shown in Figure 18-3. The portal is located at elevation 235 masl, and deepest level is -50 masl.

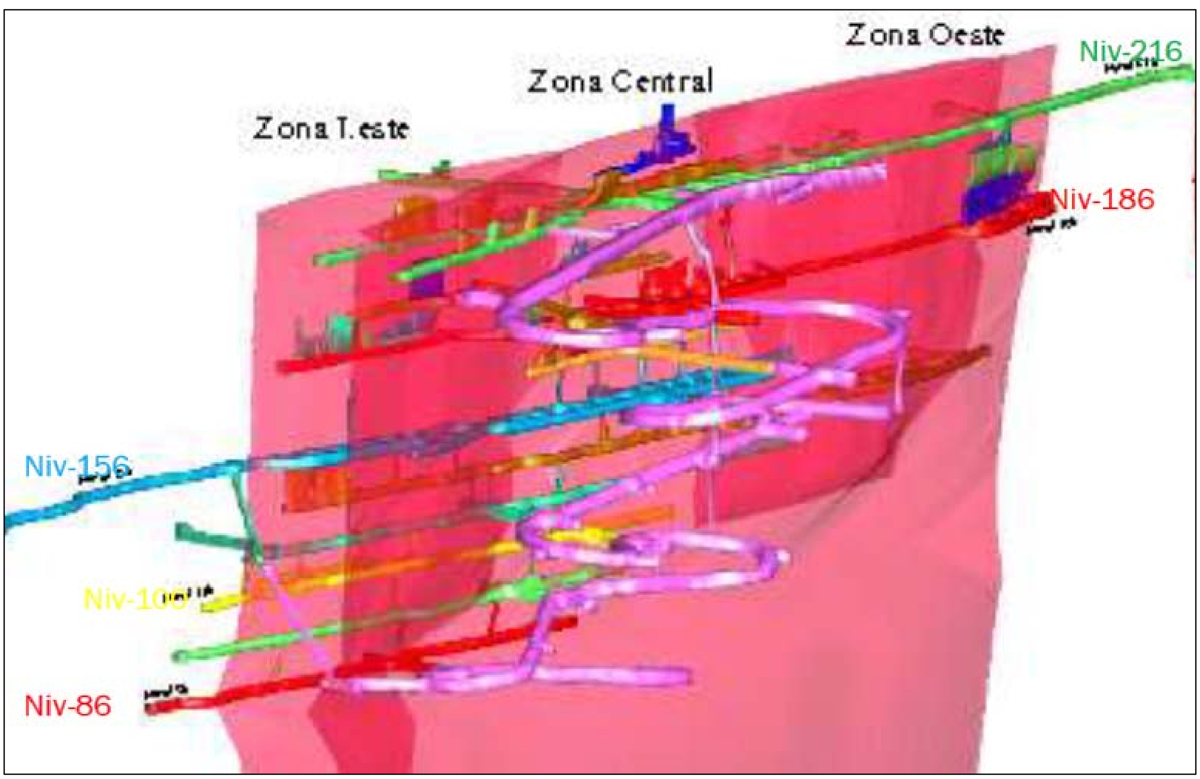


Source: Serabi, 2016

Figure 18-3: Palito Mine Ramp System

18.1.2 São Chico Underground Mine Access

A 4.5 m high x 4.5 m wide ramp system (-12% gradient) provides access to the underground portion of the São Chico Mine (Figure 18-4). The portal is located at elevation 224 masl, and deepest level is currently 10 masl.



Source: Serabi, 2017

Figure 18-4: São Chico Mine Ramp System

18.1.3 Process Support Facilities

Serabi operates a 500 t/d plant to process ore from both the Palito and São Chico mines. Palito ore is processed through a flowsheet that includes crushing, grinding, copper flotation and carbon-in-pulp (CIP) cyanidation of gold and silver values from the copper flotation tailing. The São Chico ore is processed in a separate grinding circuit that includes gravity concentration and intensive cyanide leaching of the gravity concentrate.

18.1.4 Camp

Palito Mine

There is full mining camp at the Palito Mine that consists of accommodation for 250 personnel, kitchen and dining facilities, offices, warehouses, maintenance facilities, and a guard house at the entrance to the site. Serabi provides a daily bus service for employees and contractors living in Jardim do Ouro and Moraes de Almeida.

Fuel is stored on site in storage tanks with a capacity of 75,000 L of diesel. Fuel storage tanks are located in a contained fuel storage area. There is an explosives storage facility located away from the main offices.

The mine has access to telephones, high speed broadband satellite internet, and radio communications. Serabi has built and operates a clinic and hospital at the Palito Mine.

São Chico Mine

There is full mining camp at the São Chico Mine that consists of accommodation for 100 personnel, kitchen and dining facilities, offices, warehouses, maintenance facilities, and a guard house at the entrance to the site. Serabi provides a daily bus service for employees and contractors living in Jardim do Ouro and Moraes de Almeida.

Fuel is stored on site in storage tanks with a capacity of 35,000 L of diesel. Fuel storage tanks are located in a contained fuel storage area. There is an explosives storage facility located away from the main offices.

The mine has access to telephones, high speed broadband satellite internet, and radio communications.

18.1.5 Power Supply and Distribution

Palito Mine

Electrical power is provided from the local power grid though a 34.5 kV overland power line and by diesel generators to deliver approximately 1 million kWh/month. Electrical power from the grid normally costs about R$0.34/kWh, but during peak demand periods (6:30 to 9:30 pm Monday to Friday) grid power costs R$120-130/kWh. During these peak periods Serabi operates its own diesel generators to generate 380 V electrical power at an average cost of R$0.70/kWh. Serabi's power generator station includes the following:

- Two Scania generators: 500 KVA each;
- Four Scania generators: 700 KVA each;
- Two Aggreko generators: 500 KVA each; and

- One Aggreko generator: 320 KVA.

Diesel is stored in a 10 m^3 diesel tank, which provides enough diesel for two days of continuous operation. Approximately 60% of Serabi's power needs are provided by on-site generators and 40% is provided from the grid.

São Chico Mine

The power requirement at São Chico is approximately 594 Kw (about 700 kVA), including the underground mine (437 kW), camp and village (94 kW) and surface support facilities (63 kW). The power is supplied by a diesel power house that includes three diesel gensets of 550 kVA (Maquigeral-SDMO/Scania 47N) that operate in parallel with one as standby.

18.1.6 Water Supply

Water is an abundant resource in the area, and the current water supply system is not a limiting factor for operations at the Palito Mine or the São Chico Mine.

The operation has a water supply system consisting of dams that contain water from the following sources:

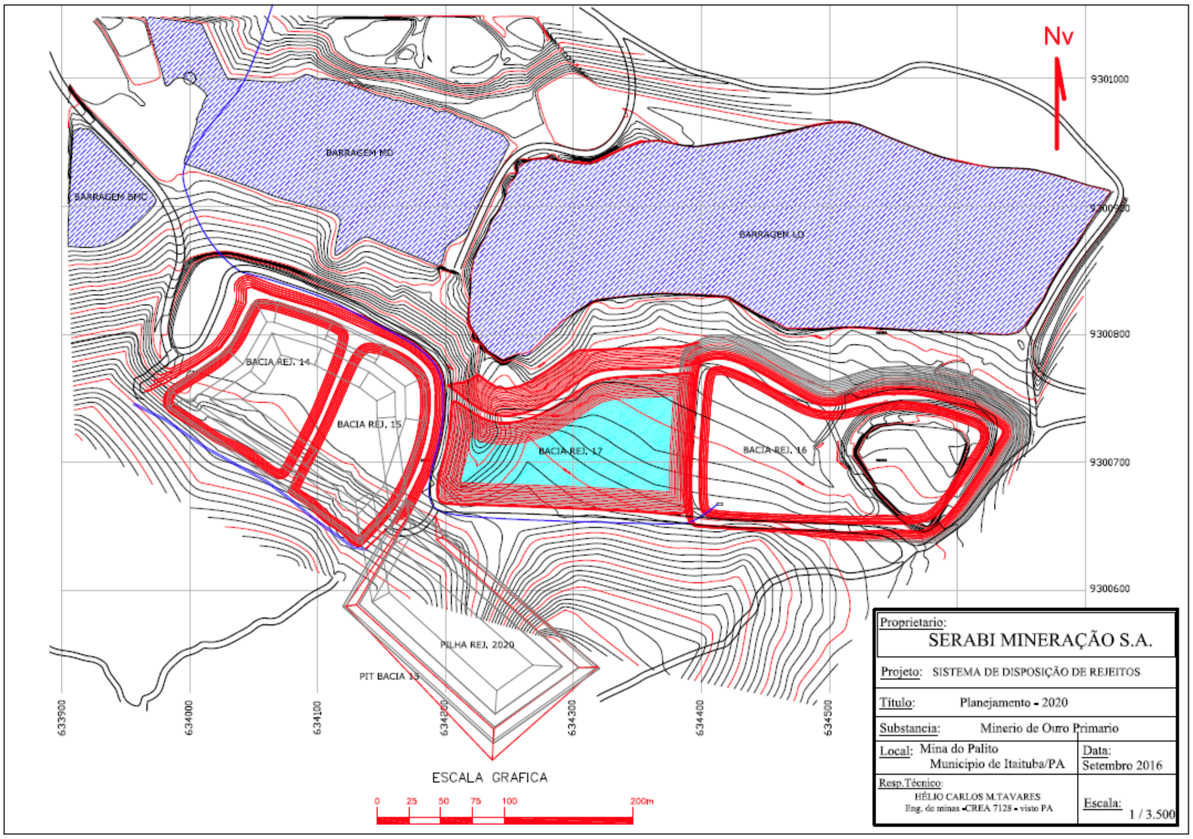
- Mine water that is pumped from the underground workings;
- Recycled process water after neutralization and decantation; and
- Rain water.

The total process water requirement is 40 m^3/hr, of which 80% is recycled from the tailings disposal areas (32 m^3/hr) and 20% is from the fresh water dam (8 m^3/hr).

Fresh drinkable water for use in the camp is supplied by conventional water wells. The total fresh water consumption is approximately 60 m^3/day.

18.2 Tailings Disposal Area

Mineral Reserves for both the Palito and São Chico mines will be processed by the Palito processing plant and tailings will be deposited into existing clay lined tailings disposal areas that are located adjacent to the processing plant. Figure 18-5 shows tailings disposal areas 14, 15, 16 and 17 (*Bacia Rej.* 14-17). Tailings deposition will alternate between tailings disposal areas 16 and 17 from June 30, 2017 until the remaining capacity for those areas is exhausted. Thereafter, dry tailings will be removed from tailings disposal areas 16 and 17 and will be stacked on top of completed tailings disposal areas 14 and 15. Tailings disposal areas 16 and 17 will then be re-used for tailings deposition until the remaining Mineral Reserves are processed.



Source: Serabi, 2016

Figure 18-5: Tailings Disposal Areas

18.3 Access Roads and Airstrip

The Palito Mine is 4.5 km southwest of the village of Jardim do Ouro and approximately 15 km via road. Jardim do Ouro lies on the unsealed Transgarimpeira Highway some 30 km west-southwest of the town of Moraes de Almeida, which is located on the junction of the Transgarimpeira Highway and the BR 163 or Cuiabá – Santarém Federal Highway. Moraes de Almeida is approximately 300 km south south-east by road of the municipal capital and similarly named city of Itaituba.

The São Chico Mine is 30 km southwest of the Palito Mine. It is accessed by road from the Palito Mine along the Transgarimpeira Highway.

An airstrip, suitable for light planes, is currently fully operative and located at Palito Mine Site.

19 Market Studies and Contracts

The gold price and currency exchange assumptions for mineral reserves are shown in Table 19-1. Gold price was guided by the June 2017 monthly average price and the 3-year trailing average as of June 2017. Currency exchange (Brazilian Reals to U.S. Dollars) is based on the three-year trailing average exchange rate as of June 2017.

Table 19-1: Gold Price and Currency Exchange Assumptions

Input	Units	Palito	São Chico
Gold Price	US$/oz	1,250	1,250
R$/US$ Exchange Rate	R$/US$	3.50	3.50
Gold Price	R$/oz	4,375	4,375

Source: Serabi, 2017

19.1 Contracts and Status

Serabi has in place arrangements with a number of suppliers and customers to support its production operations and the sale of its gold. Of these most may be terminated at relatively short notice, the only exception being arrangements for the sale of copper /gold concentrate produced which is currently sold under a contract for a two-year period which commenced at the start of January 2018.

Serabi sells its copper/gold concentrate to a trading group that operates with selected refineries. The Company is currently obliged to sell 100% of its production to this trading group for a two year period which commenced in January 2018. Shipments are made monthly. Prior to entering into this current arrangement Serabi undertook a process of requesting bids and made its selection based on past experience and pricing. Terms are in line with market norms. The shipment and logistics for delivery of copper/gold concentrate to Serabi customers selected refineries is managed by Axis Shipping who manage the inland road, river transport and arrange packing, export documentation and ocean freight.

Serabi generally sells its gold doré to a Brazilian trading group with no long-term contract or obligation. Under the arrangements the gold is sold as an exported product and pricing is negotiated for each delivery of bullion based on prevailing spot prices. The trader handles the logistics of collection from the mine site, delivery to the refinery and final exportation, but the Company also has arrangements in place with Brinks for secure collection from the mine site and delivery to other customers when and if required.

Serabi has sold gold doré to parties outside of Brazil and has a number of other customers keen to enter into arrangements to acquire the bullion produced by Serabi. The Company is therefore able to negotiate competitive terms with potential purchasers. Currently Serabi has a contract with Umicore, in São Paulo, an internationally recognized refinery, to undertake the refining of gold doré prior to exportation.

Serabi currently has no hedging arrangements in place although as an arrangement fee with its lender Sprott Resource Lending Partnership ("Sprott"), it agreed in June 2017 to grant to Sprott call options over 6,109 oz exercisable at a price of US$1,320/oz up until December 31, 2019.

Some of the mining operations undertaken by Serabi are specialized, particularly the highly selective stope mining activities at the Palito Mine. This is not a mining style that is widely deployed in Brazil and as a result there is a limited pool of skilled and experienced personnel in the country able to undertake this work. The Company has an agreement in place with GAC Mining of Peru to source and supply suitably qualified and experienced stope mining personnel on a contract basis, to supplement the Brazilian workforce that undertake the same work and who are directly employed by Serabi. Serabi may vary with each roster period, the number and exact skills of the people that GAC are required to provide for that roster period.

Serabi sources goods and services from a number of parties but in the region that it operates there can be limited suppliers available. Electricity is provided by CELPA a privately-owned company that is essentially a monopoly supplier in the region. Contracts terms are in place for the purchase of electricity with the last price adjustment agreed in 2015.

Security services for both the Palito and São Chico sites are provided by Fortesan Vigilancia e Seguranca Ltda, a private contractor supplying both static and patrolling security staff.

While many other supplies such as those for fuel, explosives, chemicals and other key materials may be sourced from a single supplier, Serabi has no other material long term contracts and regularly reviews its arrangements, product quality and pricing with suppliers.

20 Environmental Studies, Permitting and Social or Community Impact

20.1 Environmental Study Results

In 2006, an environmental impact assessment (*Estudo de Impacto Ambiental* or EIA) and its respective report of environmental impact (*Relatório de Impacto ao Meio Ambiente* or RIMA) were completed for the Serabi operations. These documents covered the environmental impacts, proposed measures of compensation, mitigation and control of the expansion of the Palito Mine production.

The EIA included the following elements:

- General project information (project description);
- Characterization of the enterprise (project technical studies and information);
- Environmental diagnosis (baseline conditions and characterization);
- Evaluation of environmental impacts (impact assessment);
- Environmental control plans (mitigation, monitoring and environmental controls); and
- Conclusions.

Environmental studies presented in the EIA included:

- Biological studies, including fauna (mammalian, ichthyofauna (fish), avifauna (birds), herpetofauna (reptiles and amphibians), and chelonians) and flora (Dryland Forest and Riparian Forest);
- Abiotic, physical and socioeconomics studies during the periods of construction, operation and closure of the project;
- Management plans for: Water Resources, Recovery of Degraded Areas (PRAD), Promotion of Local Development, Solid Waste, Environmental Emergency; and
- Conceptual Mine Closure Plan.

The EIA concluded that negative impacts to the environment would occur to various resources during construction and operations, but that these impacts could be effectively mitigated through the implementation of environmental protection measures and through proper monitoring.

The Annual Environmental Information Reports (*Relatorio de informação Ambiental Anual* or RIAA) for Palito and São Chico mines are presented each year to the Secretary of State for Environment and Sustainability (*Sectretaria de Estado de Meio Ambiente e Sustentabilidade* or SEMAS) with respect to the socio-environmental actions carried out during the previous year, and cover any specific commitments made to the environmental agency by the operator, as well as those agreements and obligations between the operator and other stakeholders in the project. Serabi provided SRK the RIAAs for years 2014, 2015 and 2016, which included:

- Monitoring of water resources and air quality;
- Programs related to the biotic environment;
- Social and environmental schedule and actions;
- Environmental performance and objectives to be pursued the following year; and
- Proof of reporting protocols submitted to the environmental agency throughout the year.

São Chico Mine operates under a Utilization Guide (*Guia de Utilização*) authorization. This allows the mineral exploration operation with underground experimental mining, with exploitation of up to 50,000 t/year. For this type of activity, a formal EIA is not required. Nevertheless, Serabi intends to obtain an Exploitation Permit for São Chico. As such, in December 2016, Serabi filed a Consultation Letter with SEMAS in order to request information and guidance on the required environmental studies necessary to obtain this Exploitation Permit for São Chico Mine, which will be authorized through a simplified EIA-RIMA process. As of the date of this report, SEMAS has not formally responded to this request with details on the required activities.

20.2 Known Environmental Issues

Documentation provided by Serabi and discussions during the site visit by SRK with site personnel indicate that groundwater and surface water quality (i.e., potential contamination by previous operators) may be an issue for consideration. Palito Mine site monitoring results include concentrations above Brazilian regulatory limits for copper, lead, nickel and manganese in Igarapé Palito creek, which is the monitoring point downstream of the mine site. São Chico Mine site surface water monitoring indicates similar levels of concentration exceedances in Igarapé São Chico creek for zinc, lead and manganese. The exact nature and source of these elevated concentrations is not currently known.

The Palito Mine utilizes clay-lined tailings impoundments. Monthly groundwater monitoring data from the Palito Mine downgradient of the tailings impoundments have shown elevated concentrations of metals and the presence of cyanide (CN), potentially above regulatory limits. Current on-site analytical methods have difficulty achieving the detection limits needed for assessment against the regulatory limit, and Serabi has expressed a lack of confidence in the construction and development of the monitoring wells installed by the previous operator. As such, they have implemented a program to install new wells and refurbish the old wells, as well as new equipment and methodologies on site to more accurately and precisely analyze for cyanide in groundwater around the tailings impoundments.

While the precise source of the groundwater impacts is not currently known, it could be an indication of potential seepage/leakage from the older tailings impoundments. In an effort to reduce CN concentrations within the tailings, Serabi has constructed an INCO SO_2/Air Process Cyanide Destruction Plant which will be commissioned during the first quarter of 2018. This action is expected to result in commensurate reductions in CN concentrations in the underlying groundwater.

Within the project boundary are areas of historical artisanal mining, which were known to employ mercury amalgamation as a beneficiation method. To date, no systematic characterization program or confirmatory sampling has been conducted in order to assess the potential for residual mercury contamination. Many of these former artisanal sites have been inundated by runoff and are currently underwater.

At this time, these known environmental issues are not expected to materially impact Serabi's ability to extract the mineral resources or mineral reserves at either Palito or São Chico, though Serabi has not yet received the final approval/licensing from the regulatory agency for the current tailings dam facilities, although the application documentation has been submitted.

20.3 Operating and Post-Closure Requirements and Plans

Palito operates under a Plan of Environmental Control (*Plano de Controle Ambiental* or PCA) approved in 2008 by SEMAS. The PCA formalizes the environmental obligations of the operator that must be carried out in order to minimize impacts during operations. Environmental control activities include described in the Palito PCA include:

- Residues inventory and correct final disposal according to Residue Management Program;
- Water resources management program;
- Surface and ground water quality monitoring program;
- Air quality monitoring program;
- Effluents monitoring program; and
- Climate and hydrological monitoring program.

As noted above, the results of the prescribed monitoring programs are reported to the government in the annual RIAA. The mine appears to be fulfilling these requirements accordingly.

São Chico operates under a separate PCA, which includes:

- Reclamation of areas for erosion and sediment loading control;
- Water resources management program;
- Surface water quality monitoring program; and
- Air quality monitoring program.

According to the conceptual mine closure plan developed in late 2015, the post-closure requirements are planned for years 2025-2027, and include:

- Monitoring of revegetation success;
- Surface and groundwater quality monitoring; and
- Slope stability and erosion monitoring.

Serabi will be required to maintain a minimum staff (including site security personnel) for up to the fourth year after closure.

20.4 Project Permitting Requirements

The general framework for mine permitting and licensing in Brazil is presented and discussed in Section 4.3, and it not reiterated herein.

The Serabi operations have been authorized under a series of licenses, as presented in Table 20-1. For each license, related conditions and/or obligations are also listed, along with the respective status.

In September 2016, Serabi filed an application with SEMAS for an Operation License for both Dams 16 and 17. SEMAS subsequently advised Serabi to present separate applications for these facilities. For Dam 16 (which was a raise modification to dams 12 and 13), the agency agreed that a modification to the existing LO should be sufficient. However, for Dam 17 (which is an entirely new structure), the agency requested that Serabi initiate an Installation License (LI) rather than an LO, thus requiring more and lengthier review.

Serabi resubmitted both revised applications in accordance with SEMAS recommendations. According to information provided to SRK by Serabi in August 2017, the formal agency review of the revised permit applications is still ongoing, even though the capacity of Dam 16 was reached and the facility closed at the end of June 2017. Unable to wait for formal authorization on the Dam 17 revised application, Serabi proceeded with construction and has initiated disposal of tailings in this impoundment, as the agency completes its review of the application. According to Serabi, SEMAS has inspected the operations on several occasions during this period, and is aware of the status of tailings disposal. To date, no formal notices of violation or cease and desist orders have been issued by the agency for either Dam 16 or Dam 17.

Table 20-1: Summary of Major Permits and Authorizations

License/ Authorization	Activities Subject to Licensing	Validity	Conditions Status	Observations
LO #9685/2015	Palito Processing Plant for metallic and gold ore. 450 t/day ROM.	09/12/2017	Accomplished	Renew request submitted. Protocol #2017/25166
LO #9686/2015	Palito Mine. Exploration of metallic and gold ore. 250 t/day	09/12/2017	Accomplished	Renew request submitted. Protocol #2017/25162
LO #9533/2015	São Chico Mine Exploration. 50,000 t/year.	22/12/2017	Accomplished	Renew request submitted. Protocol #2017/25160
GU #002/2017	Utilization Guidelines for São Chico Mine. Gold ore. 50,000 t/year	22/12/2017	N/A	None
Water Grant #1703/2015	Groundwater uptake from 10 m deep well for human supply. Rate: 7,9 m^3/h and 4h/day	01/03/2019	Accomplished	None
Water Grant #2005/2015	Surface water uptake from Igarapé Palito creek for mine operations use. Rate: 192.58 m^3/h	22/06/2019	Accomplished	None
Water Grant #953/2013	Palito Mine site water dam for plant process water supply. No limited uptake.	05/06/2017	Accomplished	Renew request submitted. Protocol #2017/6463
Water Grant #2668/2016	Surface water uptake from Rio Novo River for mine operations. 300 m^3/day.	02/11/2026	Partially accomplished. Fully accomplished in end of 2017	None

Source: Serabi, 2017

20.5 Post-Performance or Reclamations Bonds

Brazil currently has legal requirements for closure and reclamation of mining projects, but does not have any requirements for the operator to provide a financial surety (e.g., trust fund, bond, letter of credit, insurance, etc.) for that reclamation. As opposed to a mine reclamation financial surety and/or bond, potentially polluting activities are obligated to register before the National Registry of Pollutant Activities, and consequently have to pay an environmental tax (*Taxa de Fiscalização do IBAMA*), which may vary in accordance with the potential of pollution. In the end, the company and it officers can be held criminally responsible for failure to adequately reclaim and remediate a mine site.

As both Palito and São Chico Mine sites closure plans are only at a conceptual level, limited information regarding post-closure performance and reclamation activities is available.

Post-performance for Palito will be based on periodical monitoring reports regarding revegetation and erosion control, water quality and slope stability, which shall be presented in a half-yearly basis according to the conceptual closure plan.

According to the conceptual closure plan, areas that require reclamation include:

- Palito Creek;
- Senna Target Pits;
- Waste Rock Piles;
- Tailings and Water Dams; and
- Landfill and Landing Strip.

Post-performance for São Chico mine site will be based on periodical monitoring reports regarding revegetation and erosion control, water quality and slope stability, which shall be presented in a half-yearly basis according to the conceptual closure plan.

According to the conceptual closure plan, areas that require reclamation include:

- Waste Rock Piles; and
- Areas used in the past for livestock pasture (*campos sujos*).

20.6 Social and Community

Since 2014, Serabi has developed and supported projects aimed at social promotion, economic development, citizenship recovery, protection of the environment, and expansion of access to various cultural and artistic manifestations, as well as programs for occupational health and safety of workers.

Social and environmental programs have been developed in coordination with the communities deemed to be in the Directly Affected Area (ADA): Jardim do Ouro and São Chico; the Area of Direct Influence (AID), including the district of Moraes Almeida; and the Area of Indirect Influence (AII), which includes the municipalities of Itaituba, where the company is inserted, and Novo Progresso, from which Serabi obtains much of its labor, material supplies, and services. The programs have included: a dental clinic, improvements to local schools, provision of electricity and treated water, as well as planning for a new health clinic.

In accordance with requirements established by the Ministry of Labor, Serabi annually updates and modifies its health and safety programs with new measures to prevent accidents and injuries, including employee awareness programs to promote safer operations. Serabi also has an active stakeholder engagement program. The following programs are currently maintained and developed by Serabi:

- Prioritization in Hiring Labor and Local Suppliers;
- Health and Safety of Employees;
- Medical Control and Occupational Health Program – PCMSO;
- Risk Management Program – PGR;
- Promotion to Health and Social Welfare;
- Sociocultural Initiatives;
- Environmental Education for Communities; and
- Improvements of Local Infrastructure.

20.7 Mine Closure

The most recent mine closure plans for Palito and São Chico were developed at the end of 2016. These are conceptual closure plans which assume that all facilities will be closed and all areas impacted by the enterprise activities will be reclaimed. The work breakdown for site closure includes three phases: (i) pre-closure, (ii) closure, and (iii) post-closure. Planned closure activities of each phase at both sites are presented in the Table 20-2 and Table 20-3.

Table 20-2: Closure Phases Activities for Palito Mine Site

Pre-Closure (2022)	Closure (2023-2024)	Post-Closure (2025-2027)
1. Environmental Studies: • Hydrogeological model for pit infill • Soils contamination assessment • Waste rock piles drainage system and cover designs • Underground Pit spillway design • Revegetation study for reclaimed areas • Sampling for tailings and waste rock characterization **2. Closure Communication** • Social communication program activities • Start of work force demission **3. Pits of Senna target infill with waste rock**	**1. Demobilization and Decommissioning** • Pit • Plant • Dams **2. Demolition of Administrative Buildings** • Sheds • Manufactory • Administrative • Accommodation • Refectory **3. Waste Rock Pile Cover** **4. Palito creek channel reclamation** **5. Pit and dams final spillways construction** **6. Waste rock piles and dams revegetation** **7. Landing strip and landfill reclamation**	**1. Monitoring of water quality, slope stability and vegetation** **Year 1:** Revegetation monitoring; surface and ground water sampling; slope stability and erosion events assessment (half-yearly basis) **Year 2:** Revegetation monitoring; surface and ground water sampling; slope stability and erosion events assessment (half-yearly basis) **Year 3:** Revegetation monitoring; surface and ground water sampling; slope stability and erosion events assessment (yearly basis)

Source: *Plano Conceitual de Fechamento de Mina Mina do Palito* (Serabi Gold, Dec. 2016)

Table 20-3: Closure Phases Activities for São Chico Mine Site

Pre-Closure (2022)	Closure (2023-2024)	Post-Closure (2025-2027)
1. Environmental Studies: • Hydrogeological model for pit infill • Soils contamination assessment • Waste rock piles drainage system and cover designs • Underground Pit spillway design • Revegetation study for reclaimed areas • Sampling for tailings and waste rock characterization **2. Closure Communication** • Social communication program activities • Start of work force demission	**1. Demobilization and Decommissioning** • Pit **2. Demolition of Administrative Buildings** • Sheds • Manufactory • Administrative • Accommodation • Refectory **3. Waste Rock Pile Cover** **4. Underground Pit Final Spillways Construction** **5. Waste Rock Piles and Dams Revegetation** **6. Impacted Areas Reclamation (*campos sujos*)**	**1. Monitoring of water quality, slope stability and vegetation** **Year 1:** Revegetation monitoring; surface and ground water sampling; slope stability and erosion events assessment (half-yearly basis) **Year 2:** Revegetation monitoring; surface and ground water sampling; slope stability and erosion events assessment (half-yearly basis) **Year 3:** Revegetation monitoring; surface and ground water sampling; slope stability and erosion events assessment (yearly basis)

Source: *Plano Conceitual de Fechamento de Mina São Chico* (Serabi Gold, Dec. 2016)

As a condition for the issuance of the LO, SEMAS required the reclamation of the Alvo Senna pit area. Serabi had been depositing inert ramp development rock from the Palito Mine in these former open pit areas. Figure 20-1 shows the area at Alvo Senna undergoing reclamation (north side). Figure 20-2 shows the partially reclaimed south end of Alvo Senna.

Source: SRK, 2017

Figure 20-1: Alvo Senna Area During Backfilling

Source: SRK, 2017

Figure 20-2: Reclaimed Area at Alvo Senna

Reclamation of Alvo Senna using waste rock is a slow process since the bulk of the waste materials generated from the underground mine workings are used as underground backfill, so only limited quantities can be used for surface backfilling. Based on its granitic composition, the waste rock used for surface backfilling is considered to be non-reactive (inert), though no geochemical characterization of the waste rock has been completed. Importantly, no evidence of reactivity was observed during SRK's site visit.

20.7.1 Reclamation Measures during Operations and Project Closure

Because Palito is currently operated as an underground mine, only a small amount of surface disturbance exists which requires concurrent reclamation during operations. The former open pit area, Alvo Senna, is no longer in operation. Reclamation of those pits is currently being carried out by Serabi, and is partially completed. Alvo Senna is being backfilled with inert ramp development rock from the underground mining operation; once full, it will be covered with soil and revegetated.

São Chico is strictly an underground mine, with ore being sent to Palito for processing. No concurrent reclamation is planned for this location, with the exception of some early artisanal mining areas within the concession.

20.7.2 Closure Monitoring

For both Palito and São Chico, the conceptual closure plans do not specifically address monitoring during closure activities (which Serabi intends to continue from operations); rather, only post-closure monitoring is explicitly discussed.

20.7.3 Reclamation and Closure Cost Estimate

Based on the conceptual closure plans from 2016, Serabi estimates the reclamation and closure costs for the Palito Mine to be on the order of US$2,271,472 (Table 20-4).

Table 20-4: Estimate Costs for Closure of Palito Mine Site

Facility/Activity	Estimated Cost
Pre-Closure Environmental Studies	R$467,580
Underground Mine	R$486,765
Waste Rock Pile	R$110,240
Tailings Dam	R$280,330
Upper Dam	R$101,676
BMC Dam	R$18,220
Middle Dam	R$138,030
Lower Dam	R$39,445
Plant	R$1,963,630
Administrative Buildings	R$907,824
Impacted Areas	R$19,323
Alvo Senna	R$364,585
Management and Administrative Staff	R$2,711,703
Post-Closure Monitoring	R$340,800
Total (R$)	**R$7,950,152**
Total (US$)	**US$2,271,472**
Exchange Rate	3.5

Source: *Plano Conceitual de Fechamento de Mina Mina do Palito* (Serabi Gold, Dec. 2016)

Based on the conceptual closure plan from 2016, Serabi estimates the reclamation and closure costs for the São Chico Mine to be on the order of US$570,566 (Table 20-5).

Table 20-5: Estimate Costs for Closure of São Chico Mine Site

Facility/Activity	Estimated Cost
Pre-Closure Environmental Studies	R$173,850
Underground Mine	R$243,382
Waste Rock Pile	R$96,864
Administrative Buildings	R$85,000
Impacted Areas	R$95,565
Management and Administrative Staff	R$1,024,721
Post-Closure Monitoring	R$277,599
Total (R$)	**R$1,996,981**
Total (US$)	**US$570,566**
Exchange Rate	3.5

Source: *Plano Conceitual de Fechamento de Mina Mina São Chico* (Serabi Gold, Dec. 2016)

Given the size and extent of the facilities, the known environmental issues surrounding potential surface water and groundwater contamination, and the potential need for more robust engineered closure covers on the tailings impoundments and waste rock piles, it is SRK's opinion that the estimated closure costs are generally appropriate. However, the costs may be higher if there is a need for surface and groundwater remediation and compulsory post-closure monitoring ordered by SEMAS.

21 Capital and Operating Costs

21.1 Capital Cost Estimates

Estimated LoM sustaining capital costs are presented in Table 1-61.

Table 221-1: Capital Costs

Capital Costs	Units	LoM Cost
Mine Development	R$	35,623,113
Mine Mobile Equipment	R$	7,328,750
Stopers and Other Mining Equipment	R$	1,190,000
Fans and Pumps	R$	1,350,000
Generators	R$	1,950,000
Light vehicles	R$	400,000
Other Support Equipment	R$	2,031,250
Tailings Disposal	R$	4,400,000
Total Capital Cost	R$	54,273,113
Total Capital Cost (US$:R$ exchange rate of 3.5:1.0)	**US$**	**15,506,604**

Source: Serabi, 2017

21.2 Operating Costs

Historical operating costs for January 1, 2017 through June 30, 2017 were used as the basis for the CoG calculation that supports the Mineral Reserves (Table 21-1).

Table 21-1: Historical Operating Costs (Jan 1, 2017 – Jun 30, 2017)

Unit Operating Costs	Units	Palito	São Chico
Mining	R$/t-processed	259	248
Processing	R$/t-processed	164	162
Corporate Office Support to Site	R$/t-processed	33	39
Royalties, CFEM, Treatment, Shipping, and By-Product Credits	R$/t-processed	19	12
Total Unit Cost	R$/t-processed	474	460
Total Unit Cost (US$:R$ exchange rate of 3.5:1)	**US$/t-processed**	**135**	**132**

Source: Serabi, 2017

22 Economic Analysis

Under NI 43-101 rules, producing issuers may exclude the information required in Section 22 Economic Analysis on properties currently in production, unless the Technical Report includes a material expansion of current production. Serabi is a producing issuer, the Palito Mining Complex is currently in production, and a material expansion is not being planned. Serabi completed economic analysis for the Palito Mining Complex based on the Mineral Reserves stated herein. SRK reviewed Serabi’s analysis and we have verified that the outcome is a positive cash flow that supports the statement of Mineral Reserves.

23 Adjacent Properties

There are no operating mines immediately adjacent to the Palito Mining Complex other than small scale artisanal mining operations.

24 Other Relevant Data and Information

There is no other relevant data or information pertaining to the estimation of the mineral resources and reserves at the Palito Mining Complex.

25 Interpretation and Conclusions

25.1 Geology and Mineralization

Gold deposits in the Tapajós Gold Province can be broadly classified into three main types:

- Mesozonal deposits;
- Epizonal intrusion centered or intrusion related deposits; and
- Alluvial, colluvial and supergene enriched saprolitic deposits.

Tapajós deposits are structurally controlled, but host rock control is vital to understanding the metal precipitation process locally. Primary gold deposits occur as the first two categories of deposit types and are generally located in fractured and sheared host environments such as:

- Quartz and quartz sulfide stock work and associated alteration hosted disseminated sulfide;
- Quartz vein;
- Quartz sulfide veins +/- selvedge alteration hosted disseminated sulfide;
- Massive sulfide veins +/- selvedge alteration hosted disseminated sulfide; and
- Disseminated sulfide within alteration.

The mineralogy and textures of the deposits at the Palito Mining Complex are consistent with a model for an intrusion related mesothermal gold-copper mineralization. This relatively new classification of gold deposits is associated with granitic rocks and are best developed above and surrounding small, granitic intrusions. Mineralization styles can manifest as stockworks, breccia, skarns and lode style veins, and have a clear metal association zonation.

25.2 Exploration Status

Serabi has been exploring the Palito Mining Complex since 2003 and have acquired an appreciation of the geology, geochemistry and geophysical signatures and controls on the gold mineralization within the Palito Mine and throughout the Palito Mining Complex area.

Serabi have used the following process to facilitate exploration and the discovery of new deposits in the project area:

- Ground selection – northwest-southeast structural corridor, with northeast-southwest breaks;
- Remote sensing and remote geophysics, VTEM and magnetics;
- IP and EM ground geophysics, and shallow geochemical sampling and/or drilling using auger or RAB; and
- Diamond drilling based on integrated models and ranking.

Serabi believe that exploration should focus on structural corridors parallel to, or extensions of the Palito trend and specifically where Palito Central Fault analogies exist. Topographic highs on the flanks are considered more prospective due to silicification of the country rock, making them more resistant to weathering.

25.3 Mineral Processing and Metallurgical Testing

Both the Palito and São Chico ores are highly amenable to conventional processing techniques to recover the contained metal values, and plant performance on both Palito and São Chico ores has been similar to results predicted from the metallurgical test programs. During the period 2015 - 2017 (Q1):

- Average annual gold recovery from Palito ore has been consistent at about 91%;
- Average annual gold recovery from São Chico has increased from 87.1% to 95.8%; and
- Average annual gold recovery from the old flotation tailings has increased from 70.7% to 84.4%.

25.4 Mineral Resource Estimate

- The mineral resource estimates prepared by Serabi for the Palito Mine considers core drilling and underground chip sampling by Serabi generated during the period mid-2002 to May 2017.
- The São Chico Mine mineral resource estimates, prepared by Serabi, considers core drilling and underground chip sampling by Serabi and previous operators during the period of September 2011 to March 2017.
- The databases used to estimate mineral resources at Palito and São Chico were audited by SRK.
- SRK believes the current drilling information is sufficiently reliable to interpret with confidence the boundaries for gold mineralization and that the assay data are sufficiently reliable to support mineral resource estimation.
- Serabi used a traditional polygonal estimation method in 2D sections to evaluate the mineral resources of both mines. AutoCAD® software was used to define the 2D longitudinal sections and the calculations were performed in Microsoft® Excel.
- The polygonal quantities and grade estimates were reviewed by SRK to determine the portions of the Palito and São Chico mines having “reasonable prospects for eventual economic extraction” from an underground mine, based on a CoG of 3.10 g/t gold at the Palito Mine and 2.85 g/t gold at the São Chico Mine, assuming a gold price of US$1,500/oz, and metallurgical gold recovery of 91% and 95% respectively.

25.5 Mineral Reserve Estimate and Mining Methods

- The Mineral Reserves have been estimated by Serabi personnel in a manner that is reasonable and appropriate for the narrow vein orebodies at the Palito and São Chico mines.
- The selected mining methods (shrinkage stoping at the Palito Mine and longhole stoping at the São Chico Mine) are appropriate.
- The Mineral Reserves conform to CIM definitions and comply with all disclosure requirements for Mineral Reserves set out in NI 43-101.
- Based on the current Mineral Reserves at the Palito Mine, a total of 541 kt grading 8.63 g/t Au will be mined over a mine life of approximately 4.5 years (July 2017 to November 2021).
- Based on the current Mineral Reserves at the São Chico Mine, a total of 90 kt grading 8.43 g/t Au will be mined over a mine life of approximately two years (July 2017 to June 2019).

25.6 Recovery Methods

Reconciliation of Palito and São Chico ore grades with measured plant feed grades has been poor. Since the beginning of 2016 Palito reconciled gold grades have been consistently about 7% to 20% lower than the measured plant feed grades. During this same period the São Chico reconciled ore grades have been about 2% to 18% higher. In SRK's opinion there appears to be a bias in the ore feed sampling and/or the allocation of production between Palito and São Chico ores.

25.7 Project Infrastructure

The Palito Mining Complex has well-developed site infrastructure that is adequate for the continuation of mining and processing operations in accordance with the LoM plan.

25.8 Environmental Studies and Permitting

Permitting and Regulation

São Chico has initiated the process for revalidation of current Operational License, which expired on December 22, 2017. Serabi appears to be in possession of, and in compliance with all relevant installation and operational licenses and/or permits, though SRK did not conduct a detailed regulatory compliance audit as part of this review. The site has also started the process to modify operations from a trial mining to a regular mining (exploitation) as part of the revalidation of the existing LO. Those issues are minor with a low risk. São Chico is currently operating under Utilization Guidelines (*Guia de Utilização* - GU) which limits its ore exploitation to 50,000 t/year. Serabi shall obtain the mining concession for São Chico Mine and go through the regularization process (LP + LI + LO).

At Palito, Serabi continues to wait for SEMAS to act on the installation and operational licenses/permits for Dam 16 and Dam 17. No cease and desist orders or notices of violation have been issued by SEMAS for this situation, though Serabi indicates that the agency routinely visits the operation and is aware of the conditions and operations at the site. In September 2016, Serabi initiated the licensing process to obtain operational licenses for both dams, and presented the required technical documentation; however, no response from SEMAS was received. Serabi has sought legal advice/assistance with respect to this issue and the lack of action by the regulatory agency.

Potential Environmental Issues

- The monitoring program at Palito is modified from time to time. It is SRK's opinion that the current plan may not be effectively characterizing the waters through the site-wide water balance (mine system).
- Unfortunately, the site lacks appropriate background monitoring data to determine if some of the current surface water and groundwater exceedances are the result of historic artisanal mining, prior operators of the site, or the current operations.
- The detection of cyanide in the downgradient monitoring well may suggest potential leakage from the clay-lined tailings impoundments, though Serabi is working toward improved groundwater sampling and analyses to increase their confidence in earlier results reported for the site. The installation of a cyanide destruction circuit will be complete in the first quarter of 2018 and is expected to mitigate this issue.
- The limited surface water monitoring data from São Chico suggests potential impacts to Igarapé São Chico Creek, most notably by the elevated concentration of zinc, lead and manganese as compared to upgradient samples.
- Neither Palito or São Chico conducts geochemical characterization on tailings or waste rock materials which may be necessary to assess the current contamination issues as well as develop effective closure and potential remediation alternatives.

Mine Closure

With respect to the conceptual closure plans, Serabi may want to consider the possibility of more robust and expensive engineered cover systems for the tailings (due to possible seepage to underlying groundwater) and waste rock piles, or the potential need for groundwater remediation. As such, the closure costs may be underestimated.

25.9 Capital and Operating Costs

The CoG calculation is based on recent actual operating costs and the calculated CoGs are reasonable and appropriate for both the Palito and São Chico mines. The sustaining capital costs as used in Serabi's economic analysis for the Mineral Reserves are appropriate for the remaining life of each mine.

25.10 Economic Analysis

SRK reviewed Serabi's economic analysis and we have verified that the outcome is a positive cash flow that supports the statement of Mineral Reserves.

26 Recommendations

26.1 Recommended Work Programs

26.1.1 Mineral Processing and Metallurgical Testing

SRK recommends that Serabi continue to investigate metallurgical sampling and accounting procedures in an effort to improve the variance between measured and reconciled ore grades.

26.1.2 Mineral Resource Estimate

SRK is of the opinion that there is an opportunity to further improve the data collection, verification and mineral resource estimation methodologies at both the both Palito and São Chico mines. Areas that could be reviewed include the following:

- Upgrade the analytical assays QA/QC protocols
- Upgrade and maintain documented mine geological procedure guidelines for all mine geology tasks, to be consistently implemented
- Introduce a three dimensional geostatistically-based mineral resource estimation methodology to the operations
- Provide geology and resource estimation modeling training to the resource geology staff at both operations.
- The mine geology staff would benefit from training on relevant aspects of the National Instrument 43-101 reporting guidelines
- Develop an automated grade control modeling system to enable more accurate mine planning processes and
- Implement a practical model to mine to mill reconciliation system.

There are several highly prospective exploration targets on the Palito property which require further drill testing. This could potentially add to the mineral resource inventory.

26.1.3 Mineral Reserve Estimate and Mining

- SRK recommends that Serabi investigate acquiring a cavity monitoring survey instrument to allow completed longhole stopes at São Chico to be accurately and safely surveyed. Accurate cavity surveys will allow Serabi to optimize drilling and blasting practices and will provide for a better understanding of overbreak/slough in the longhole stopes.

26.1.4 Environmental Studies and Permitting

Based on the assessment carried out on the documentation provided by Serabi and the site visit, SRK recommends the following additional work programs:

- A more detailed surface water chemistry characterization and QA/QC implementation for both sites;
- A more detailed groundwater chemistry characterization and QA/QC implementation for Palito site;
- Characterization of acid-rock drainage (ARD) potential and metal leaching (ML) potential for waste rock and tailings materials;

- Based on the ARD/ML analyses, conduct an assessment of the potential for the underground workings to flood and cause localized groundwater contamination post closure;
- Identify and sample suitable background study sites for both Palito and São Chico;
- Prepare a more comprehensive site-wide water balance for the site, coupled with a geochemical mass balance exercise to evaluate the need for possible water treatment and concentration objectives prior to effluent discharge; and
- Review and possibly update both Palito and São Chico mines closure plans and related costs (considering more robust cover systems and possible post-closure remediation requirements).

26.2 Recommended Work Program Costs

Table 26-1 summarizes the costs for recommended work programs.

Table 26-1: Summary of Costs for Recommended Work

Discipline	Program Description	Cost (US$)
Mineral Processing and Metallurgical Testing	SRK recommends that Serabi continue to investigate metallurgical sampling and accounting procedures in an effort to improve the variance between measured and reconciled ore grades.	$0
Mineral Resource Estimate	• Geology modeling and resource estimation training • 3D geology and mineral resource modeling software • Upgrade analytical assay QA/QC program	$
Mineral Reserve Estimate	SRK recommends that Serabi investigate acquiring a cavity monitoring survey instrument to allow completed longhole stopes at São Chico to be accurately and safely surveyed.	$100,000
Environmental Studies and Permitting	• Upgrade surface water characterization and QA/QC program for both sites. ($0) • Upgrade groundwater characterization and QA/QC program at Palito site. ($0) • Initiate characterization of acid-rock drainage (ARD) potential and metal leaching (ML) potential for waste rock and tailings materials. ($75,000) • Assess potential for the underground workings to flood and cause localized groundwater contamination post closure. ($50,000) • Prepare a more comprehensive site-wide water balance. ($25,000) • Third-party specialist review and update mine closure plans and costs. ($25,000)	$175,000
Total US$		**$275,000**

Source: SRK, 2017

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28 Glossary

The Mineral Resources and Mineral Reserves have been classified according to CIM (CIM, 2014). Accordingly, the Resources have been classified as Measured, Indicated or Inferred, the Reserves have been classified as Proven, and Probable based on the Measured and Indicated Resources as defined below.

28.1 Mineral Resources

A **Mineral Resource** is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

28.2 Mineral Reserves

A **Mineral Reserve** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported. The public disclosure of a Mineral Reserve must be demonstrated by a Pre-Feasibility Study or Feasibility Study.

A **Probable Mineral Reserve** is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

A **Proven Mineral Reserve** is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.

28.3 Definition of Terms

The following general mining terms may be used in this report.

Table 28-1: Definition of Terms

Term	Definition
Assay	The chemical analysis of mineral samples to determine the metal content.
Capital Expenditure	All other expenditures not classified as operating costs.
Composite	Combining more than one sample result to give an average result over a larger distance.
Concentrate	A metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore.
Crushing	Initial process of reducing ore particle size to render it more amenable for further processing.
CoG (CoG)	The grade of mineralized rock, which determines as to whether or not it is economic to recover its gold content by further concentration.
Dilution	Waste, which is unavoidably mined with ore.
Dip	Angle of inclination of a geological feature/rock from the horizontal.
Fault	The surface of a fracture along which movement has occurred.
Footwall	The underlying side of an orebody or stope.
Gangue	Non-valuable components of the ore.
Grade	The measure of concentration of gold within mineralized rock.
Hangingwall	The overlying side of an orebody or slope.
Haulage	A horizontal underground excavation which is used to transport mined ore.
Hydrocyclone	A process whereby material is graded according to size by exploiting centrifugal forces of particulate materials.
Igneous	Primary crystalline rock formed by the solidification of magma.
Kriging	An interpolation method of assigning values from samples to blocks that minimizes the estimation error.
Level	Horizontal tunnel the primary purpose is the transportation of personnel and materials.
Lithological	Geological description pertaining to different rock types.
LoM Plans	Life-of-Mine plans.
LRP	Long Range Plan.
Material Properties	Mine properties.
Milling	A general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product.
Mineral/Mining Lease	A lease area for which mineral rights are held.
Mining Assets	The Material Properties and Significant Exploration Properties.
Ongoing Capital	Capital estimates of a routine nature, which is necessary for sustaining operations.
Ore Reserve	See Mineral Reserve.

Term	Definition
Pillar	Rock left behind to help support the excavations in an underground mine.
RoM	Run-of-Mine.
Sedimentary	Pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks.
Shaft	An opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste.
Sill	A thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness.
Smelting	A high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or doré phase and separated from the gangue components that accumulate in a less dense molten slag phase.
Stope	Underground void created by mining.
Stratigraphy	The study of stratified rocks in terms of time and space.
Strike	Direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip direction.
Sulfide	A sulfur bearing mineral.
Tailings	Finely ground waste rock from which valuable minerals or metals have been extracted.
Thickening	The process of concentrating solid particles in suspension.
Total Expenditure	All expenditures including those of an operating and capital nature.
Variogram	A statistical representation of the characteristics (usually grade).

28.4 Abbreviations

The following abbreviations may be used in this report.

Table 28-2: Abbreviations

Abbreviation	Unit or Term
A	ampere
AA	atomic absorption
A/m^2	amperes per square meter
ANFO	ammonium nitrate fuel oil
Ag	silver
Au	gold
AuEq	gold equivalent grade
°C	degrees Centigrade
CCD	counter-current decantation
CIL	carbon-in-leach
CoG	CoG
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
cfm	cubic feet per minute
ConfC	confidence code
CRec	core recovery
CSS	closed-side setting
CTW	calculated true width
°	degree (degrees)
dia.	diameter
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
FA	fire assay
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram

Abbreviation	Unit or Term
gal	gallon
g/L	gram per liter
g-mol	gram-mole
gpm	gallons per minute
g/t	grams per tonne
ha	hectares
HDPE	Height Density Polyethylene
hp	horsepower
HTW	horizontal true width
ICP	induced couple plasma
ID2	inverse-distance squared
ID3	inverse-distance cubed
IFC	International Finance Corporation
ILS	Intermediate Leach Solution
kA	kiloamperes
kg	kilograms
km	kilometer
km^2	square kilometer
koz	thousand troy ounce
kt	thousand tonnes
kt/d	thousand tonnes per day
kt/y	thousand tonnes per year
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
kWh/t	kilowatt-hour per metric tonne
L	liter
L/sec	liters per second
L/sec/m	liters per second per meter
lb	pound
LHD	Long-Haul Dump truck
LLDDP	Linear Low Density Polyethylene Plastic
LOI	Loss On Ignition
LoM	Life-of-Mine
m	meter
m^2	square meter
m^3	cubic meter
masl	meters above sea level
MARN	Ministry of the Environment and Natural Resources
MDA	Mine Development Associates
mg/L	milligrams/liter
mm	millimeter
mm^2	square millimeter
mm^3	cubic millimeter
MME	Mine & Mill Engineering
Moz	million troy ounces
Mt	million tonnes
MTW	measured true width
MW	million watts
m.y.	million years
NGO	non-governmental organization
NI 43-101	Canadian National Instrument 43-101
OSC	Ontario Securities Commission
oz	troy ounce
%	percent
PLC	Programmable Logic Controller
PLS	Pregnant Leach Solution
PMF	probable maximum flood
ppb	parts per billion

Abbreviation	Unit or Term
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RC	rotary circulation drilling
RoM	Run-of-Mine
RQD	Rock Quality Description
SEC	U.S. Securities & Exchange Commission
sec	second
SG	specific gravity
SPT	standard penetration testing
st	short ton (2,000 pounds)
t	tonne (metric ton) (2,204.6 pounds)
t/h	tonnes per hour
t/d	tonnes per day
t/y	tonnes per year
TSF	tailings storage facility
TSP	total suspended particulates
µm	micron or microns
V	volts
VFD	variable frequency drive
W	watt
XRD	x-ray diffraction
y	year

Appendices

Appendix A: Analytical Quality Control Data and Relative Precision Charts

Time Series Plots for Certified Reference Material Samples Assayed by the Palito Mine Laboratory and SGS prior to 2016 with examples of comparisons between different analytical methods.

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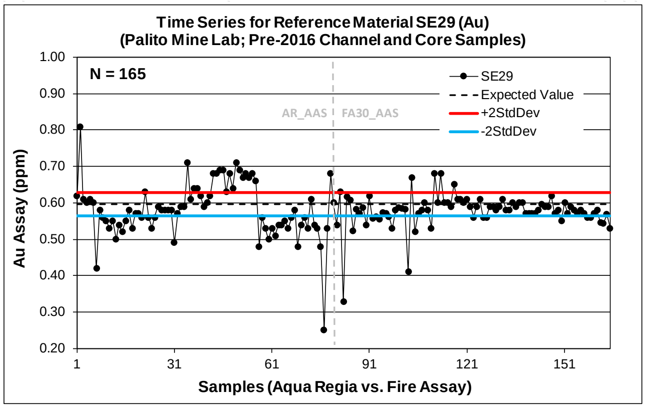
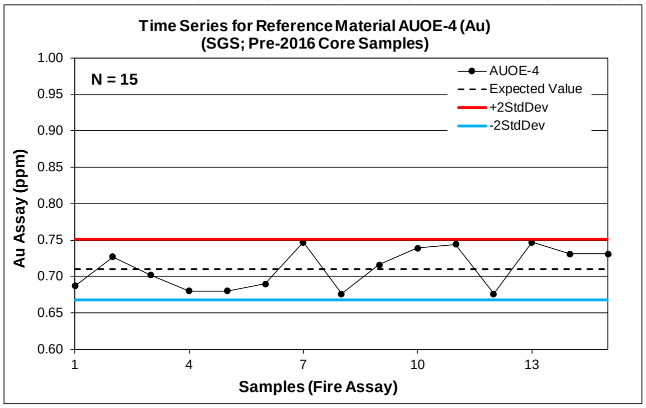
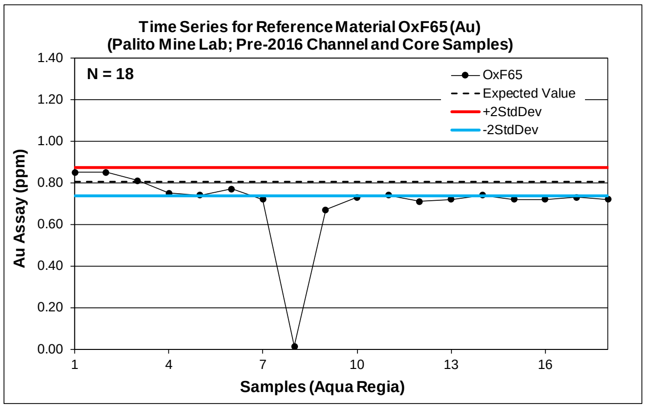
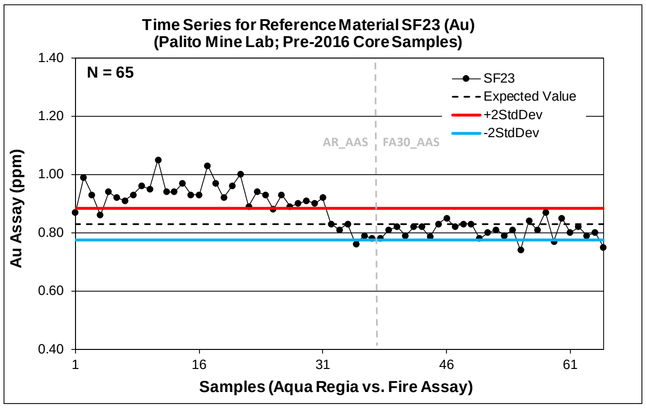
Project	Serabi Palito Mine
Data Series	Pre-2016 Standards
Data Type	Channel and Core Samples
Commodity	Au
Laboratory	Palito Mine Lab/SGS
Analytical Method	Aqua Regia and 30g Fire Assay
Detection Limit	Various

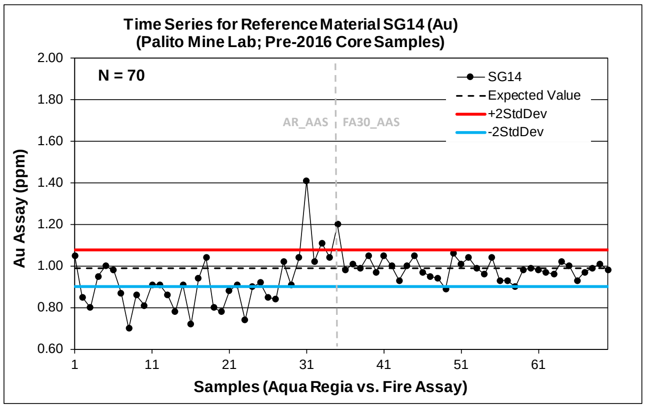
Statistics	**SE29**	**AU OE-4**	**OxF 65**	**SF23**	**SG14**	**OxG 60**
Sample Count	165	15	18	65	70	23
Expected Value	0.597	0.710	0.805	0.831	0.989	1.025
Standard Deviation	0.016	0.021	0.034	0.027	0.044	0.028
Data Mean	0.580	0.712	0.706	0.868	0.953	1.033
Outside 2StdDev	49%	0%	56%	49%	30%	0%
Below 2StdDev	56	0	10	4	18	0
Above 2StdDev	25	0	0	28	3	0

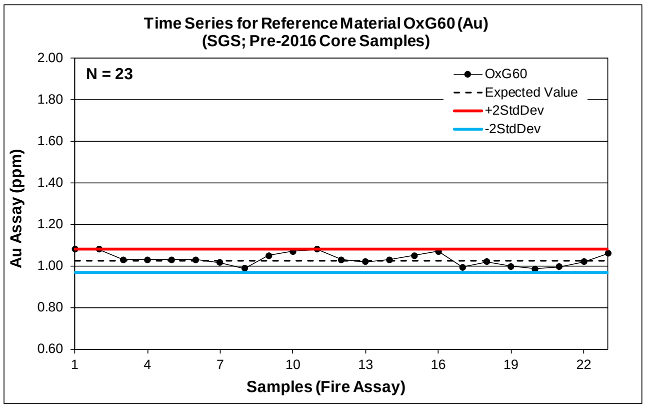












Time Series Plots for Blank and Certified Reference Material Samples Assayed by the Palito Mine Laboratory during 2016.

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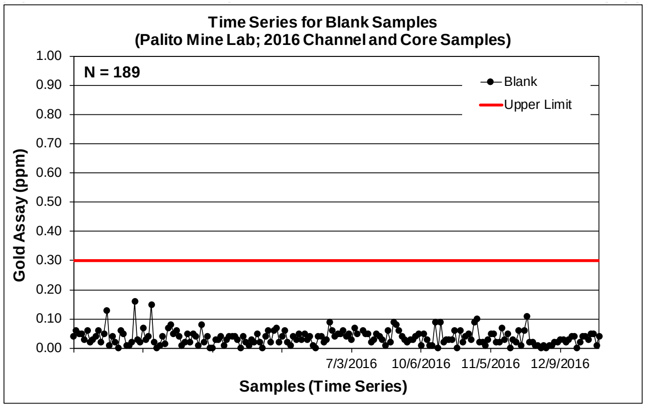
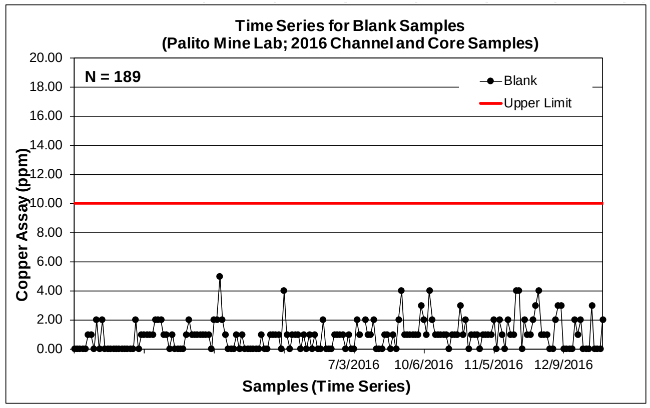
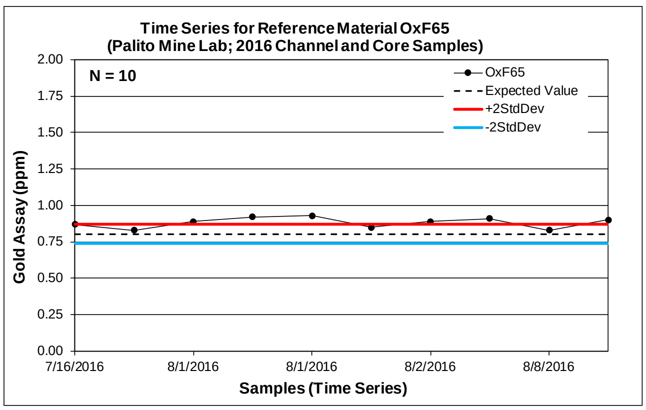
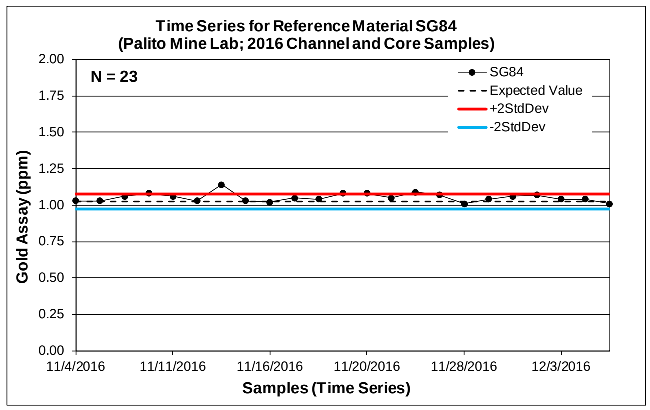
Project	Serabi - Palito Mine
Data Series	2016 Blanks and Standards
Data Type	Channel and Core Samples
Commodity	Au, Cu
Laboratory	Palito Mine Lab
Analytical Method	Aqua Regia - AAS finish
Detection Limit	0.03 ppm (Au), 1.00 ppm (Cu)

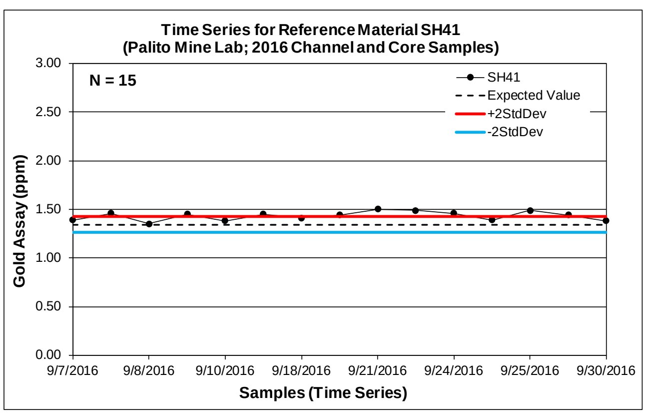
Statistics	**Blank**	**Blank**	**OxF 65**	**SG84**	**SH41**	**OxJ 120**
Sample Count	189	189	10	23	15	24
Expected Value	0.030	1.000	0.805	1.026	1.344	2.365
Standard Deviation	-	-	0.034	0.025	0.041	0.063
Data Mean	0.037	0.937	0.882	1.053	1.432	2.431
Outside 2StdDev/UL	0%	0%	60%	22%	60%	8%
Below 2StdDev	-	-	0	0	0	0
Above 2StdDev	-	-	6	5	9	2

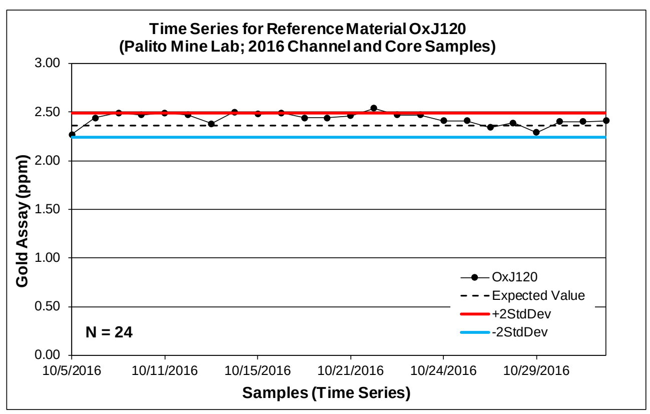












Time Series Plots for Certified Reference Material Samples Assayed by the Palito Mine Laboratory during 2016.

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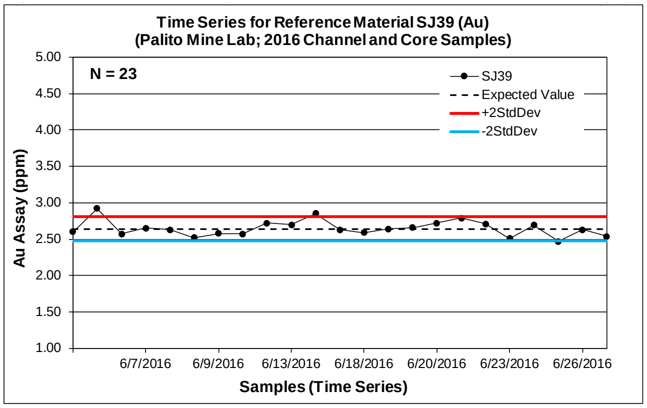
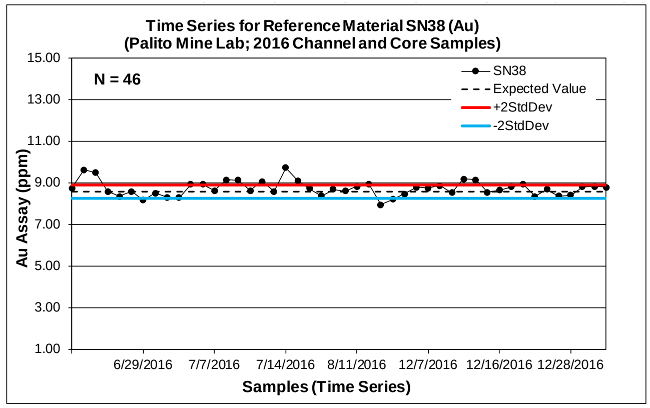
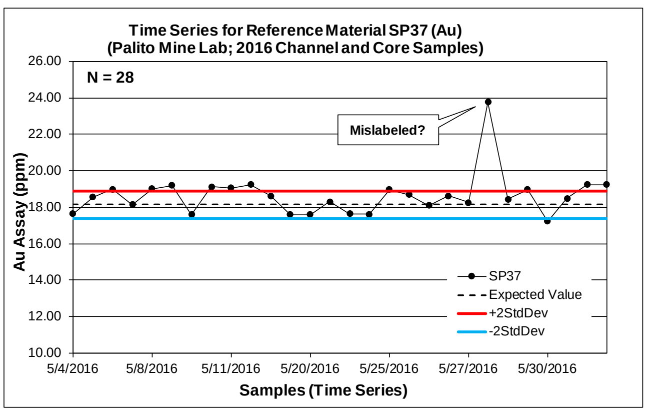
Project	Serabi - Palito Mine
Data Series	2016 Standards
Data Type	Channel and Core Samples
Commodity	Au
Laboratory	Palito Mine Lab
Analytical Method	Aqua Regia - AAS finish
Detection Limit	0.03 ppm (Au)

Statistics	**SJ39**	**SN38**	**SP37**
Sample Count	23	46	28
Expected Value	2.641	8.573	18.14
Standard Deviation	0.083	0.158	0.380
Data Mean	2.647	8.732	18.65
Outside 2StdDev	13%	35%	43%
Below 2StdDev	1	3	1
Above 2StdDev	2	13	11



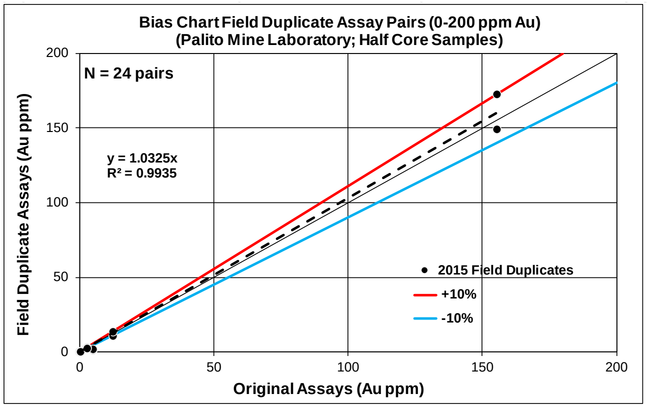


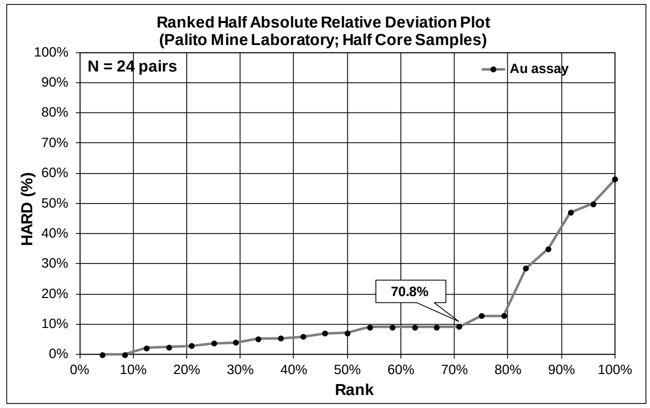


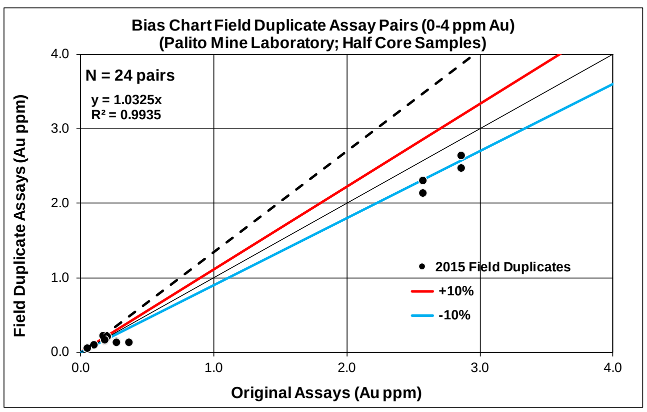
Bias Charts and Precision Plots for Half Core Field Duplicates Assayed at the Palito Mine Laboratory for the Sao Chico Deposit (gold).

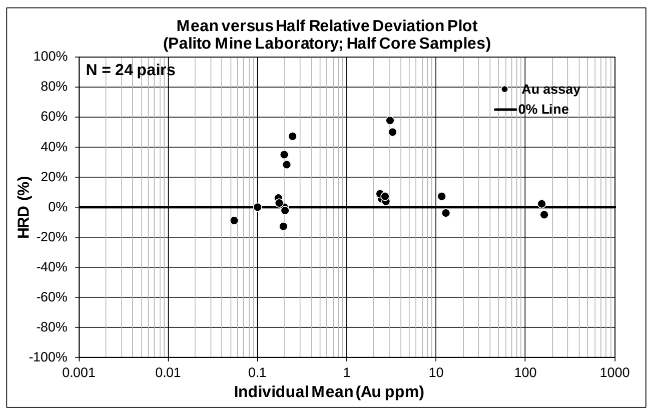
Project	Serabi - Sao Chico
Data Series	2015 Field Duplicates
Data Type	Half Core Samples
Commodity	Au in ppm
Analytical Method	Aqua Regia - AAS Finish
Detection Limit	0.03 ppm Au
Original Dataset	Original Assays
Paired Dataset	Field Duplicate Assays

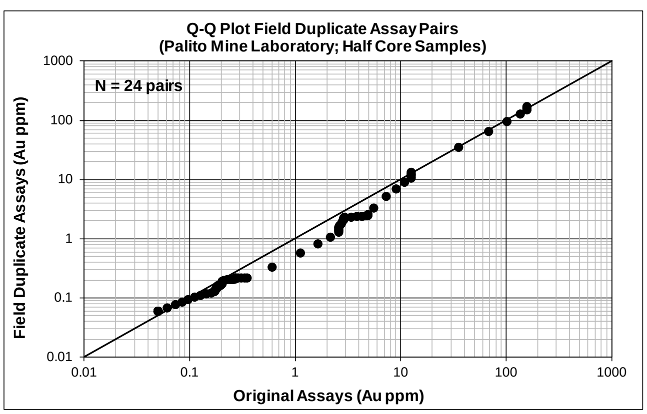
Statistics	**Original**	**Duplicate**
Sample Count	24	24
Minimum Value	0.050	0.060
Maximum Value	155.37	172.30
Mean	14.941	14.997
Median	0.270	0.215
Standard Error	8.858	9.207
Standard Deviation	43.395	45.104
Correlation Coefficient	0.9968	
Pairs ≤ 10% HARD	70.8%	

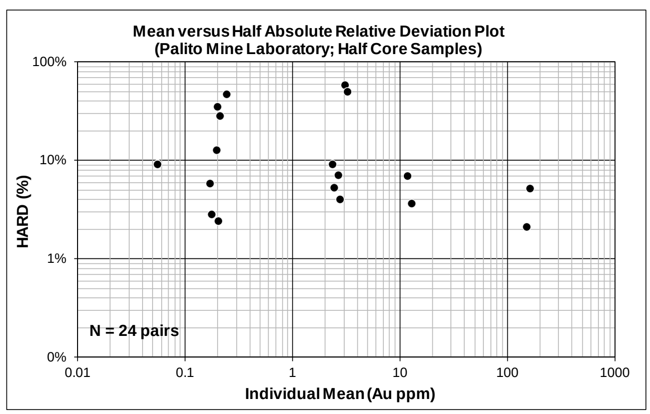








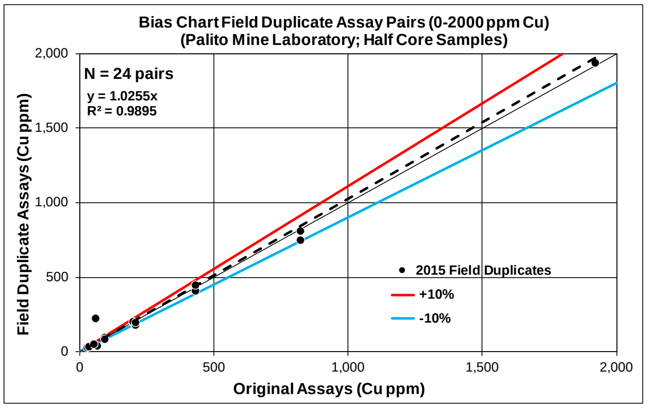


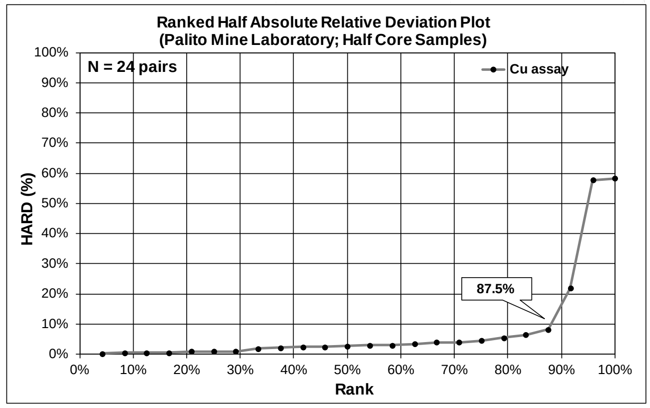


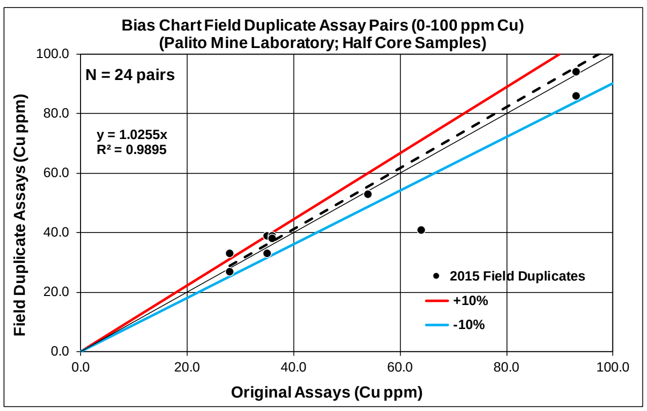
Bias Charts and Precision Plots for Half Core Field Duplicates Assayed at the Palito Mine Laboratory for the Sao Chico Deposit (copper).

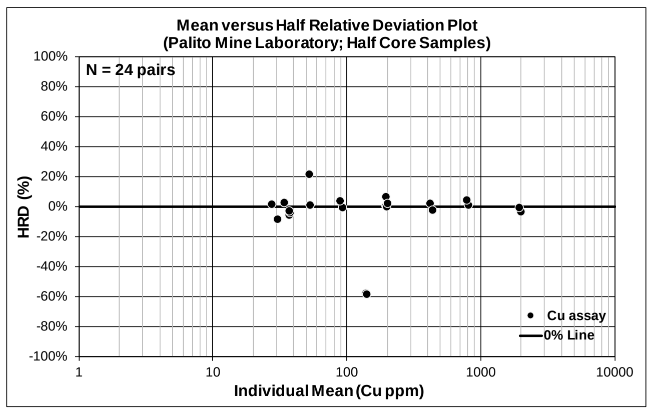
Project	Serabi - Sao Chico
Data Series	2015 Field Duplicates
Data Type	Half Core Samples
Commodity	Cu in ppm
Analytical Method	Aqua Regia - AAS Finish
Detection Limit	1 ppm Cu
Original Dataset	Original Assays
Paired Dataset	Field Duplicate Assays

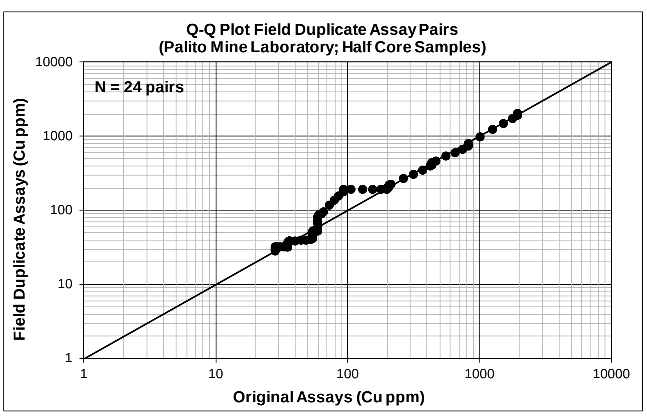
Statistics	**Original**	**Duplicate**
Sample Count	24	24
Minimum Value	28.000	27.000
Maximum Value	1,922.00	2,060.00
Mean	327.708	341.708
Median	78.500	138.000
Standard Error	110.457	113.125
Standard Deviation	541.124	554.199
Correlation Coefficient	0.9948	
Pairs ≤ 10% HARD	87.5%	

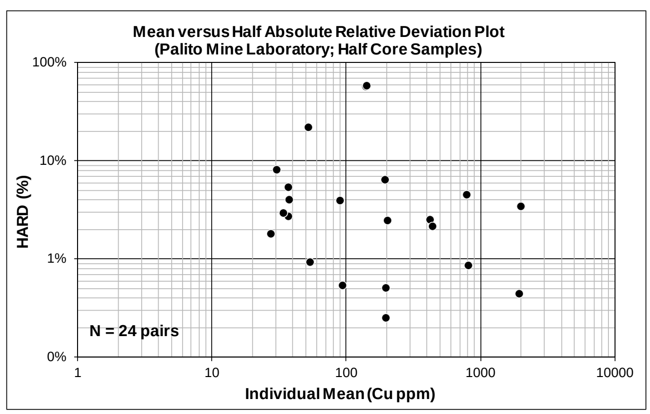












Appendix B: Certificates of Qualified Persons

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F: 303.985.9947

denver@srk.com
www.srk.com

CERTIFICATE OF QUALIFIED PERSON

I, Eric Olin, MSc, MBA, RM-SME do hereby certify that:

1. I am a Principal Process Metallurgist of SRK Consulting (U.S.), Inc., 1125 Seventeenth Street, Suite 600, Denver, CO, USA, 80202.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report, Palito Mining Complex, Brazil" with an Effective Date of June 30, 2017 (the "Technical Report").
3. I graduated with a Master of Science degree in Metallurgical Engineering from the Colorado School of Mines in 1976. I am a Registered Member of The Society for Mining, Metallurgy and Exploration, Inc. I have worked as a Metallurgist for a total of 40 years since my graduation from the Colorado School of Mines. My relevant experience includes extensive consulting, plant operations, process development, project management and research & development experience with base metals, precious metals, ferrous metals and industrial minerals. I have served as the plant superintendent for several gold and base metal mining operations. Additionally, I have been involved with numerous third-party due diligence audits, and preparation of project conceptual, pre-feasibility and full-feasibility studies.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited the Palito Mining Complex property on May 12-15, 2017.
6. I am responsible for the preparation of Processing and Recovery Sections 13 and 17 and portions of Sections 1, 24, 25 and 26 summarized therefrom, of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 25th Day of January 2018.

"Signed" "Sealed"

Eric Olin, MSc, MBA, RM-SME

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Ontario, M5H 3B7

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CERTIFICATE OF QUALIFIED PERSON

I, Glen Cole, MSc, MEng, BCom, PGeo, PrSciNat, do hereby certify that:

1. I am Principal Consultant (Resource Geology) of SRK Consulting (Canada) Inc. with an office at Suite 1500, 155 University Avenue, Toronto, Ontario, M5H 3B7.
2. This certificate applies to the technical report titled “NI 43-101 Technical Report, Palito Mining Complex, Brazil” with an Effective Date of June 30, 2017 (the “Technical Report”).
3. I am a graduate of the University of Cape Town in South Africa with a BSc (Hons) in Geology in 1983; I obtained a MSc (Geology) from the University of Johannesburg in South Africa in 1995 and a MEng in Mineral Economics from the University of the Witwatersrand in South Africa in 1999. I have practiced my profession continuously since 1986. Between 1986 and 1989 I worked as a staff geologist on various Anglo-American mines. Between 1989 and 2005 I worked at several exploration projects, underground and open pit mining operations in Africa and held various senior positions, with the responsibility for estimation of Mineral Resources and Mineral Reserves for development projects and operating mines. Since 2006, I have estimated and audited Mineral Resources for a variety of early and advanced international base and precious metals projects.

   I am a Professional Geoscientist registered with the Association of Professional Geoscientists of the Province of Ontario (APGO#1416), the Association of Professional Engineers and Geoscientists of the Province of Saskatchewan (PEGS#26003) and am also registered as a Professional Natural Scientist with the South African Council for Scientific Professions (Reg#400070/02);
4. I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
5. I visited the Palito Mining Complex property on May 12-15, 2017.
6. I am responsible for Geology and Mineral Resources Sections 7 through 12, and 14, and portions of Sections 1, 24, 25 and 26 summarized therefrom, of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 25th Day of January 2018.

“Signed” “Sealed”

____

Glen Cole, MSc, MEng, BCom, PGeo, PrSciNat

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CERTIFICATE OF QUALIFIED PERSON

I, Mark Willow, CEM do hereby certify that:

1. I am Practice Leader of SRK Consulting (U.S.), Inc., 5250 Neil Road, Reno, Nevada 89511.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report, Palito Mining Complex, Brazil" with an Effective Date of June 30, 2017 (the "Technical Report").
3. I graduated with Bachelor's degree in Fisheries and Wildlife Management from the University of Missouri in 1987 and a Master's degree in Environmental Science and Engineering from the Colorado School of Mines in 1995. I have worked as Biologist/Environmental Scientist for a total of 22 years since my graduation from university. My relevant experience includes environmental due diligence/competent persons evaluations of developmental phase and operational phase mines through the world, including small gold mining projects in Panama, Senegal, Peru and Colombia; open pit and underground coal mines in Russia; several large copper mines and processing facilities in Mexico; and a mine/coking operation in China. My Project Manager experience includes several site characterization and mine closure projects. I work closely with the U.S. Forest Service and U.S. Bureau of Land Management on several permitting and mine closure projects to develop uniquely successful and cost-effective closure alternatives for the abandoned mining operations. Finally, I draw upon this diverse background for knowledge and experience as a human health and ecological risk assessor with respect to potential environmental impacts associated with operating and closing mining properties, and have experienced in the development of Preliminary Remediation Goals and hazard/risk calculations for site remedial action plans under CERCLA activities according to current U.S. EPA risk assessment guidance. I am a Certified Environmental Manager (CEM) in the State of Nevada (#1832) in accordance with Nevada Administrative Code NAC 459.970 through 459.9729.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I did not visit the Palito property.
6. I am responsible for the preparation of Environmental Section 20 and portions of Sections 1, 24, 25, and 26 summarized therefrom, of this Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have not had prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 25th Day of January 2018.

"Signed" "Sealed"

Mark Willow, CEM

U.S. Offices:		Canadian Offices:		Group Offices:
Anchorage	907.677.3520	Saskatoon	306.955.4778	Africa
Clovis	559.452.0182	Sudbury	705.682.3270	Asia
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Elko	775.753.4151	Vancouver	604.681.4196	Europe
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Reno	775.828.6800			South America
Tucson	520.544.3688			

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CERTIFICATE OF QUALIFIED PERSON

I, Timothy R. Olson, B.Sc. Mining, J.D., FAusIMM, do hereby certify that:

1. I am a Principal Consultant (Mining) of SRK Consulting (U.S.), Inc., 1125 Seventeenth Street, Suite 600, Denver, CO, USA, 80202.
2. This certificate applies to the technical report titled "NI 43-101 Technical Report Palito Mining Complex Brazil" with an Effective Date of June 30, 2017 (the "Technical Report").
3. I graduated with a degree in Mining Engineering from South Dakota School of Mines and Technology in 1991. In addition, I have obtained a Juris Doctor from the University of Utah in 2004. I am a Fellow of the AusIMM. I have worked as a Mining Engineer for a total of 24 years since my graduation from university. In addition to consulting, my relevant experience includes engineering and operations roles in both open pit and underground mines.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited the Palito Mining Complex property on May 11, 2017 for 5 days.
6. I am responsible for Mineral Reserves and Mining Sections 15 and 16, and portions of Sections 1, 24, 25 and 26 summarized therefrom. I am also responsible for Sections 2 through 6, 18, 19, 21 through 23, 27 and 28 of the Technical Report.
7. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
8. I have had prior involvement with the property that is the subject of the Technical Report. The nature of my prior involvement was performing a due diligence review for a third-party client during 2015.
9. I have read NI 43-101 and Form 43-101F1 and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.
10. As of the aforementioned Effective Date, to the best of my knowledge, information and belief, the sections of the Technical Report I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 25th Day of January 2018.

"Signed" "Sealed"

Timothy R. Olson, B.Sc. Mining, J.D., FAusIMM FAusIMM No. 310856