TAHOE
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Technical Report on the Shahuindo Mine
Cajabamba, Peru

Prepared by:

Carl E. Defilippi, SME Registered Member – Kappes, Cassiday & Associates

Charles V. Muerhoff, SME Registered Member – Tahoe Resources Inc.

Tim Williams, FAusIMM – Tahoe Resources Inc.

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DATE AND SIGNATURE PAGE

The authors of this report, *Technical Report on the Shahuindo Mine, Cajabamba, Peru*, are Qualified Persons as defined by Canadian National Instrument 43-101. The effective date of this report is 01 January 2016. The effective date of the Mineral Resource estimate is 15 April 2015. The effective date of the Mineral Reserve estimate is 01 November 2015. The report was completed and signed on 25 January 2016.

Signed this 25th day of January, 2016

/s/ Carl E. Defilippi

Carl E. Defilippi, M.Sc., C.E.M.
SME Registered Member 775870RM
Project Manager
Kappes, Cassiday & Associates

/s/ Charles V. Muerhoff

Charles V. Muerhoff, B.Sc.
SME Registered Member 4182272RM
Vice President Technical Services
Tahoe Resources Inc.

/s/ Tim Williams

Tim Williams, M.Sc.
FAusIMM
Vice President Operations & Peru Country Manager
Tahoe Resources Inc.

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1.0　EXECUTIVE SUMMARY

1.1　Introduction

Tahoe Resources Inc. (Tahoe or Company), whose common shares are listed for trading on the Toronto Stock Exchange (TSX:THO), New York Stock Exchange (NYSE:TAHO) and Bolsa de Valores: Peru (BVL:THO), has prepared this Technical Report in accordance with Canadian National Instrument 43-101 (NI 43-101) for the Shahuindo mine, Cajabamba, Peru. This technical report summarizes the prefeasibility study of the technical and economic viability of the Shahuindo mine.

The following events triggered an updated NI 43-101 report for the Shahuindo mine:

- On 09 February 2015, Tahoe and Rio Alto Gold (Rio Alto) entered into a definitive agreement to combine their respective businesses and finalized the transaction on 01 April 2015. Through this merger, Tahoe Resources acquired 100% ownership of the mining assets of Rio Alto which included the Shahuindo project.

- The Mineral Resources and Mineral Reserves estimates have been updated as the result of data obtained from drilling and additional engineering studies conducted in 2014 and 2015. Mining studies incorporate updated cost estimates and financial analyses.

- Tahoe has revised the mining strategy for the Shahuindo mine.

- Tahoe has conducted further metallurgical testing on the ore at Shahuindo and has revised the metallurgical assumptions and flowsheet for the project.

This report has been completed having an effective date of 01 January 2016. The effective dates of the Mineral Resources estimate and Mineral Reserves estimate are 15 April 2015 and 01 November 2015, respectively. Unless otherwise noted, monetary values are expressed in United States dollars ($) and units are metric.

1.2　Principal Findings

Tahoe, through its wholly owned subsidiary, Shahuindo SAC, owns and operates the Shahuindo mine in Peru. The Shahuindo deposit is an intermediate-sulfidation sediment-hosted epithermal gold-silver deposit which the Company has initiated open pit mining and heap leaching of oxide ore. Metal recovery is by carbon-in-column adsorption-desorption-refining (ADR) processes which produces a gold-rich doré for sale to international refineries.

Construction of the Shahuindo mine commenced in mid-2014, with commissioning of the mine and processing facilities in the fourth quarter of 2015. The Company anticipates achieving commercial production at Shahuindo in the second quarter of 2016.

Production at Shahuindo is scheduled in two phases: Phase I processes coarse-grain run-of-mine (ROM, i.e., no crushing required) material at an initial rate of 10,000 tonnes of ore per day (tpd) in 2016; a second adsorption column circuit will be installed in mid-2016 to increase the plant processing capacity to accommodate increased mining rates. Phase 2 begins in 2018 and continues through the end of the current mine life with the plant capacity increased to 36,000 tpd to process mixed coarse- and fine-grain ore that requires crushing and agglomeration prior to leaching. The phased approach enables gold production as soon as possible with minimal capital expenditure, thus generating cash flow early in the project.

Throughout this report, references made to Phase 1 and Phase 2 production rates refer to process plant capacity rather than mining rates, though plant capacity and mining rates (ore placed on leach pads) do coincide later in the mine life. An ore stockpile will be utilized to store mine production in excess of plant capacity, with stockpiled ore incrementally added to the leach pads over the life of mine.

The prefeasibility study supports the declaration of Proven and Probable Mineral Reserves. The study provides economic parameters for the Shahuindo mine from 01 January 2016 forward.

Highlights of the study include:

- Measured and Indicated Mineral Resources of 143.1 million tonnes and 2.28 million oxide gold ounces at an average gold grade of 0.50 gram per tonne (g/t).

- Proven and Probable Mineral Reserves of 111.9 million tonnes at an average gold grade of 0.53 g/t, containing 1.91 million ounces of gold.

- Average annual gold production (i.e., gold in doré) of 78,000 ounces in the first two years of production (Phase 1) and 169,000 ounces in years three through ten (Phase 2). Total gold produced in doré over the LOM is estimated to be 1.504 million ounces.

- As of 01 January 2016, capital costs are estimated at $179.6 million for project (construction) capital and $140.7 million for sustaining capital over the LOM.

- After tax net present value at a 5% discount rate (NPV$_5$) of $318.9 million and an internal rate of return (IRR) of 40.6% with a payback period of 4.1 years at the base case metal prices.

- Exploration conducted by previous owners and by Tahoe demonstrates considerable potential to add additional gold ounces to the production profile at Shahuindo and has identified multiple exploration prospects in the district.

Mineral Resources and Mineral Resources are reported using metal prices of $1,200/oz Au and $15/oz Ag. Mineral Resources are reported within a $1,400/oz Au pit shell at a gold-equivalent (AuEq) cut-off grade of 0.14 g/t. The financial analysis uses escalating metal prices over the LOM beginning with $1,100/oz Au in 2016 and increasing in $100/oz increments annually to $1,400/oz Au in 2019 where it

remains constant through the end of the mine life. Likewise, silver prices used are $14.75/oz in 2016, $17.25/oz in 2017, $20.00/oz in 2018, and $23.50/oz in 2019 and forward to the end of the mine life. Silver has a negligible contribution to the mine economics.

1.3 Property Description and Location

The Shahuindo mine is located in the district of Cachachi, province of Cajabamba, department and region of Cajamarca, Peru. It is situated approximately 59 kilometers southeast of the town of Cajamarca and 14 kilometers west of the town of Cajabamba. The project can be accessed from Cajabamba via a combination of asphalt, gravel and dirt roads. Access can be gained all year round.

The local climate consists of two major seasons; a cold and dry "dry season" between the months of May to September, and a humid "wet season" between the months of October to April. The average annual precipitation is 999.7mm a year, with an average temperature of 15.7°C.

1.4 Mineral Tenure

The Shahuindo property comprises one mineral concession, Acumulacion Shahuindo, which includes 26 mineral titles with an approximate area of 7,339 hectares. The concession is 100% controlled by Tahoe's wholly owned subsidiary, Shahuindo SAC. The mining rights and surface rights are registered under the name of Shahuindo SAC in the government title registry office. All claims are in good standing as of the effective date of this report.

Shahuindo SAC has acquired 381 surface rights within the Shahuindo project area to date, covering a total area of about 2,559 hectares. Some of these surface rights were used to relocate local land owners into new areas.

1.5 Permits

The Shahuindo mine operates under an initial Environmental Impact Statement (EIA, Estudio de Impacto Ambiental) approved in 2013. The EIA was prepared according to the Ministry of Energy and Mines (MEM) requirements and complies with Peruvian regulations.

As of the effective date of this report, most required permits have been obtained, with the remaining permits being in the final stages of approval. The following list describes the status of the required permits for operations as of 01 January 2016:

- Certificate for the inexistence of Archaeological Remains – Approval granted.
- Environmental Impact Assessment (EIA) - Approval granted. Expansion EIA in process.
- Mine Closure Plan – Approval granted

- Beneficiation Concession – Approval granted.

- Water usage permit – Approval granted.

- Mining Plan – Final stage of evaluation with Ministry of Energy and Mines.

- Operations Permits – In process; approvals expected in January 2016.

All permits and any new permits will be renewed or obtained as required. It is expected that all remaining permits required for full operations will be obtained in January 2016.

1.6   Environment

The operating plan will adhere to Tahoe's mandate that the Shahuindo Project meet or exceed the standards of sustainability and environmental management based on North American practice and regulation.   The Company has implemented a comprehensive environmental management plan to regularly and systematically monitor air quality, surface water and groundwater quality, stream sediment geochemistry, blast vibration, noise levels, waste rock geochemistry (ARD monitoring), waste disposal practices, reagent handling and storage, and reclamation and reforestation progress.

1.7   History

Modern exploration activities have been conducted on the Shahuindo property since 1945 by Minera Algamarca SA (1945-1989), Alta Tecnología e Inversión Minera y Metalúrgica S.A. (Atimmsa, 1990), Asarco LLC (Asarco, 1994-1996), Southern Peru Copper Corporation (Southern Peru, 1997-1998) and Sulliden Gold Corporation (Sulliden, 2002-2012).   Rio Alto initiated infill drilling of the resource upon their acquisition of Sulliden in 2014 and Tahoe has continued infill and exploration drilling in the district.

1.8   Geology and Mineralization

The Shahuindo deposit is located on the eastern flank of the Andean Western Cordillera in northern Peru, within a regional fold and thrust belt of predominantly sedimentary rocks.   The region is particularly well-endowed with mineral occurrences varying from low-to-high sulfidation systems and from porphyry through polymetallic to epithermal deposits.

Mineralization at Shahuindo is best described as an intermediate-sulfidation epithermal system, though high-sulfidation mineralization occurs at depth and in the core of hydrothermal breccias.   Oxidation of mineralization extends to a depth of 150m below surface. In the weathered oxide facies, gold and silver are associated with the presence of jarosite and hematite.   In the underlying fresh sulfide facies, gold is typically extremely fine grained with the related mineral species not yet identified.

The principal zone of mineralization in the Shahuindo district occurs in a belt between two large-amplitude regional-scale folds, the Algamarca anticline and the San Jose Anticline.   The Algamarca

anticline is upright and symmetrical with amplitude of at least 400m, whereas the San Jose fold is an asymmetric, overturned, northeast-vergent fold with a shallowly dipping axial surface and amplitude of at least 300m.   Important structural elements include fold limbs and fold axial surfaces, fold-related fractures, faults and related extension fractures, breccia dikes and irregular bodies, and igneous intrusive contacts.

Both structure and lithology control the location, shape, and orientation of the mineralization. The mineralization is hosted within the siliciclastic sandstone-dominant Farrat Formation and the underlying sedimentary Carhuaz formation. These sedimentary rocks have been intruded by at least three felsic stocks which tend to be located along faults and cores of anticlinal structures. In addition, the metallurgical recovery of gold is affected by lithology with the identification of five primary geometallurgical domains based on the relationship between lithology and grain size and gold recovery. Modelling the distribution and occurrence of lithologic units / geometallurgical domains is critical to mine planning.

1.9   Drilling

Mineral Resources were estimated using data from 1,039 diamond core and reverse circulation (RC) drill holes, totaling 164,015 meters, from drilling conducted by Atimmsa, Asarco, Southern Peru, Sulliden and Rio Alto. The cut-off date for drill data inclusion in the mineral resource model was 15 April 2015.

Prior to the acquisition by Tahoe in April 2015, Rio Alto drilled predominantly RC holes in the oxide portion of the deposit to bring the drill density to a nominal 25m x 25m spacing. Tahoe has continued drilling diamond core and RC for infill, step-out, geotechnical, hydrology, and condemnation purposes.

1.10   Sample Preparation and Analysis

Tahoe has limited information about sample preparation and analyses for the drill programs prior to the major drill programs by Sulliden beginning in 2003.   The drilling prior to Sulliden's work is considered to be a minimal risk to the estimate of Mineral Resources, as this dataset accounts for only 15% of the data used in the estimate and many of the holes drilled prior to Sulliden have been twinned or offset with new drill holes.

From 2003 to 2012, Sulliden's sampling and sample dispatch for the Shahuindo project were carried out under the supervision of Sulliden staff. Samples were sent to ALS Minerals (ALS, formerly known as ALS Chemex) in Lima for sample preparation and analysis. Samples were prepared and analyzed using industry-standard practices, including the use of quality assurance and quality control (QA/QC) duplicates, blanks, and assay standards.   The ALS laboratory in Lima is ISO 9001:2008 and ISO 17025:2005 certified.

Samples from Rio Alto's 2014-2015 drill programs were analyzed by CERTIMIN (Lima). Gold was assayed with a 50-gram fire assay using an atomic adsorption finish. Fire assays were repeated using with a gravimetric finish for samples whose initial fire assay results were greater than 10 g/t Au. Rio Alto employed a QA/QC program of field duplicates, blanks and assay standards. The CERTIMIN laboratory is ISO 9001 certified for geochemical, metallurgical and environmental sample analyses. Tahoe continues to use the CERTIMIN laboratory in Lima as its primary assay lab for its continued drilling at the Shahuindo project.

Drill core and RC sampling procedures, sample analyses, QAQC procedures and sample security employed at Shahuindo are of sufficient quality for use in the resource estimate.

1.11 Data Verification

The drill hole database has been the subject of three major audits between 2003 and 2012 by independent consulting firms and one audit by Tahoe in 2015. The results of these audits, including the 2015 Tahoe audit, found the database integrity and QAQC results sufficient to ensure the dataset used is reliable for resource estimation purposes. Some discrepancies with silver standards used by Rio Alto and Tahoe in 2015 were identified, though this is not considered material due to the minimal contribution of silver to the value of the project.

The result of the verification programs support the estimation of the Shahuindo Mineral Resources and the assignment of Measured, Indicated and Inferred resource classifications.

1.12 Mineral Processing and Metallurgical Testing

The mineral processing and metallurgical testing that included cyanidation and flotation testing programs have been conducted on composite samples from the Shahuindo project by various companies starting in 1996. These companies include Asarco, Compania Minera Algamarca, Sulliden, Rio Alto and Tahoe, with test work conducted at Dawson Metallurgical Laboratories, Kappes, Cassiday & Associates (KCA), Heap Leach Consultants (HLC), SGS and Tahoe's La Arena laboratory.

Results from the cyanidation tests conducted by KCA from 2009 to 2012 and in 2014, and by Tahoe (Rio Alto) in 2014 and 2015 on core drill hole and surface composites were used in the development of the recovery and leach design parameters for use in the prefeasibility study. The results of the testing program indicate excellent gold recoveries at both run-of-mine (ROM) and coarse crush sizes with low to moderate reagent requirements, implying amenability to heap leaching. Silver recoveries were generally low.

Compacted permeability tests on -25mm crushed samples were conducted, both with and without cement. The results are variable with one-third of the tests conducted in 2015 failing. The results from

KCA's compacted permeability tests on -32mm composites conducted in 2012 indicated that mixing of the more weathered samples with competent material would be required to maintain permeability at 6 kg of cement per tonne of ore. Two of the three KCA tests passed the compacted permeability tests at a simulated heap height of approximately 110 meters.

Table 1.12-1 includes the field gold and silver recoveries, reagent consumptions, and leach times on oxide material, based on the available test work results from both ROM and single-stage crushing tests.

Table 1.12-1   Metallurgical Test Results

Parameter	ROM	Crush
% Au Recovery	73%	80%
% Ag Recovery	7%	12%
NaCN Consumption	0.2 kg/t	0.3 kg/t
Cement	0	6 kg/t*
Lime	2 kg/t	1 kg/t
Leach Time	80 days	70 days
Size, p80	~150mm	60 to 85mm

*Cement addition based on screened minus 75mm material

Maintaining heap permeability and minimizing channeling at higher heap heights constitutes a risk to the project, as additional agglomeration and compacted permeability testing is required. Tahoe will conduct further test work on the agglomeration circuit before operations in 2018 (Phase 2). This will include further work on maximizing recovery and determining the maximum leach pad height.

1.13   Mineral Resource and Mineral Reserve Estimates

The Mineral Resource estimate has been classified as Measured, Indicated and Inferred based on the confidence of the input data, geological interpretation and grade estimation parameters. The Mineral Reserve estimate has been classified as Proven and Probable, applying applicable mining, metallurgical, economic, permitting, and other relevant factors to the Measured and Indicated Mineral Resources. The Mineral Resource and Mineral Reserve estimates have been prepared and reported in accordance with Canadian National Instrument 43-101 (NI 43-101), Standards of Disclosure for Mineral Projects, and classifications adopted by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Council.

Tahoe is not aware of any specific metallurgical, infrastructural, environmental, legal, title, political, taxation, socio-economic or marketing issues that would impact the Mineral Reserve Estimate as presented.

1.13.1 Mineral Resources

The Mineral Resource estimate for the Shahuindo deposit contains Measured and Indicated Mineral Resources (oxide) of 143.1 million tonnes at average grades of 0.50 g/t Au and 6.7 g/t Ag, containing 2.28 million ounces of gold and 30.7 million ounces of silver. Inferred Mineral Resources (oxide) total 2.6 million tonnes at average grades of 0.42 g/t Au and 7.4 g/t Ag; containing 36,000 ounces of gold and 626,000 ounces of silver. Sulfide resources total 87.7 million tonnes at average grades of 0.71 g/t Au and 21.1 g/t Au; containing 2.0 million ounces of gold and 59.4 million ounces of silver. All sulfide resources are classified as Inferred Mineral Resources. The effective date of the Shahuindo Mineral Resource estimate is 15 April 2015.

Table 1.13-1 is a summary of the Shahuindo Mineral Resources, at cut-off grades for oxide material of 0.14 g/t AuEq and sulfide material of 0.50 g/t AuEq.

Table 1.13-1   Shahuindo Mineral Resources

Material Type	Resource Classification	Tonnes (M)	Au (g/t)	Ag (g/t)	Au Ounces (koz)	Ag Ounces (koz)
Oxide	Measured	96.5	0.50	6.7	1,546	20,901
	Indicated	46.6	0.49	6.5	736	9,778
	Measured and Indicated	**143.1**	**0.50**	**6.7**	**2,282**	**30,679**
	Inferred	2.6	0.42	7.4	36	626
Sulfide	Inferred	87.7	0.71	21.1	2,002	59,441

Numbers may not add due to rounding

Oxide resources are reported within a $1,400/oz Au optimized open pit shell. Gold-equivalent grades were calculated in the Shahuindo resource block model using the individual gold and silver grades for each block and metal prices of $1,200/oz Au and $15/oz Ag using the formula:

AuEq g/t = Au g/t + (Ag g/t x 15/1200)

The sulfide Mineral Resources at Shahuindo are classified entirely as Inferred due to limited metallurgical characterization and wider drill spacing than in the oxide portion of the deposit. There have been no economic or mining studies of the sulfide portion of the Shahuindo deposit completed to date; the Inferred sulfide resource is reported at a 0.5 AuEq g/t cut-off using the same metal prices as used for calculating the oxide gold-equivalent values.

The drill data used for the estimate of Mineral Resources includes data from all drilling completed through April 2015. The drill hole information includes collar location, downhole survey, assay, lithology and oxidation data.

Lithological, oxidation and structural models were created to model the distribution of mineralization to the pertinent geologic domains. Gold mineralization domains were created using a 0.1 g/t Au cut-off; these domains were used as hard boundaries to constrain the grade estimate. Silver values have been estimated inside the gold domains. A suite of other elements were also modeled and estimated into the block model, including sulfur, copper, lead, zinc, arsenic, molybdenum, calcium, total iron, sodium and manganese. The economic contribution of these elements is not material to the project.

1.13.2 Mineral Reserve Estimate

The Shahuindo Proven and Probable Mineral Reserves total 111.9 million tonnes of oxide material at average grades of 0.53 g/t Au and 6.8 g/t silver; containing 1.91 million ounces of gold and 24.5 million ounces of silver at a cut-off grade of 0.18 g/t Au. Mineral Reserves are inclusive of Mineral Resources. There are no sulfide Mineral Reserves reported. The effective date of the Shahuindo Mineral Reserve is 01 November 2015.

The Shahuindo Mineral Reserve estimate is summarized in Table 1.13-2.

Table 1.13-2   Shahuindo Mineral Reserve

Reserve Classification	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
Proven	82.7	0.54	6.92	1,424	18,400
Probable	29.2	0.51	6.54	483	6,142
Proven & Probable	**111.9**	**0.53**	**6.82**	**1,906**	**24,541**

Numbers may not add due to rounding

Metal prices used for reporting Mineral Reserves are $1,200 per ounce gold and $15.00 per ounce silver. The Mineral Reserve estimate does not include process recovery factors or plant losses.

The cut-off grade for the Mineral Reserve was calculated from operating costs experienced at Tahoe's La Arena mine, the estimated metallurgical performance sourced from test work and engineering first principles. Proven and Probable reserves include five percent dilution at zero grade and mining losses of two percent. Resources within the mine plan classified as Inferred were considered to have no economic value and have been classified as waste in the mining schedule.

1.14   Mining Method and Mine Production Schedule

The Shahuindo mine is an open pit heap leach operation. The mining method used is a conventional drill/blast, shovel and dump truck operation. The mining will be executed under an alliance style contract similar to the mining operation at the Company's La Arena mine.

The mining schedule at Shahuindo consists of two phases. Phase 1 entails mining higher grade starter pits providing ROM material to the Phase 1 leach pads in 2016 and 2017; the average mining rates in 2016 and 2017 are approximately 15,800 tonnes of ore per day and 15,300 tonnes of ore per day, respectively. Phase 2, beginning in 2018, includes the addition of a crushing and agglomeration facility, increased plant capacity and an additional leach pad. The mining rate in Phase 2 increases production to meet the Phase 2 plant capacity of 36,000 tonnes of ore per day, which will require an upgraded mining fleet.

The LOM production schedule as of 01 January 2016 forecasts the Shahuindo mine to produce and deliver to the processing facilities a total of 110.9 million tonnes of ore at an average gold grade of 0.53 g/t, and average silver grade of 6.86 g/t. The LOM plan is summarized in Table 1.14-1.

Table 1.14-1   Life of Mine Mining Schedule

	Unit	2016	2017	2018	2019	2020	2021
Ore Tonnes	k tonnes	5,756	5,602	10,289	13,412	13,039	12,352
Au Grade	g/t	0.68	0.54	0.64	0.48	0.48	0.51
Ag Grade	g/t	5.95	5.73	7.24	6.45	7.05	6.47
Waste Tonnes	k tonnes	4,954	4,113	21,835	18,895	19,246	19,893
Strip Ratio	waste:ore	0.86	0.73	2.12	1.41	1.48	1.61
Total Tonnes	**k tonnes**	**10,710**	**9,715**	**32,124**	**32,306**	**32,285**	**32,245**
Au Mined	k oz	126	97	212	206	200	201
Ag Mined	k oz	905	1,090	2,524	2,741	2,954	2,568

	Unit	2022	2023	2024	2025	Total
Ore Tonnes	k tonnes	16,066	14,405	12,732	7,236	**110,890**
Au Grade	g/t	0.50	0.59	0.52	0.49	**0.53**
Ag Grade	g/t	7.79	7.16	6.36	7.30	**6.86**
Waste Tonnes	k tonnes	16,395	15,922	17,497	11,106	**149,855**
Strip Ratio	waste:ore	1.02	1.11	1.37	1.53	**1.35**
Total Tonnes	**k tonnes**	**32,461**	**30,327**	**30,230**	**18,342**	**260,485**
Au Mined	k oz	258	273	215	113	**1,900**
Ag Mined	k oz	3,599	3,143	2,663	2,246	**24,470**

1.15   Processing

Gold from the Shahuindo mine will be extracted from the ore via heap leach and then processed by carbon-in-column, adsorption-desorption-refining (ADR) operations. The civil and geotechnical design of the leach pads were engineered by Anddes Asociados SAC; the process plant was engineered by Heap Leaching Consulting SAC, both of Lima, Peru.

The start-up production plan for the processing of Shahuindo ore is 10,000 tpd (Phase 1) with processing capacity expanded early in the second half of 2016. Average processing rates in 2016 and 2017 are about 12,200 tonnes of ore per day and 16,500 tonnes of ore per day, respectively. The process plant facilities will be further expanded in Phase 2 to 36,000 tonnes per day. The Phase 2 expansion to be implemented in 2018 will include a crushing and agglomeration circuit that includes a single-stage crusher and screen, cement and lime addition to the fines, agglomeration in belt conveyors and stacking system to place ore onto the leach pad.

The processing parameters are shown in Table 1.15-1.

Table 1.15-1   Processing Design Parameters

Parameter	Phase 1	Phase 2
Leach Pad Area	41 Ha	153
Dry Tonnes of Ore/Day	10,000	36,000
Head Grade	0.64 g/t Au	0.52 g/t Au
Average Flow Rates	400 m³/H	1600-1800 m³/H
Leach Time	80-90 days	75-85 days
Lift Height	8 meters	8-16 meters
Material Size	100% minus 300mm	100% minus 75mm
NaCN Consumption	0.2 kg/tonne of ore	0.3 kg/tonne of ore
Lime Consumption	no addition	1.0 kg/tonne of ore
Cement Consumption	n/a	4-6 kg/tonne
Average Au Recovery	73%	80%

The Shahuindo mine is scheduled to produce a total of 1.504 million ounces of gold and 2.8 million ounces of silver in doré over a 10 year period. Table 1.15-2 summarizes the life of mine process plant throughput schedule and ounce production.

Table 1.15-2   Life of Mine Process Plant Throughput

	Unit	2016	2017	2018	2019	2020	2021
Heap Leach Process Tonnes	k tonnes	4,446	6,022	11,179	13,000	13,039	12,352
Process Au Head Grade	g/t	0.79	0.52	0.60	0.48	0.48	0.51
Process Ag Head Grade	g/t	6.59	5.63	6.84	6.56	7.05	6.47
Au ounces recovered	**k oz**	**82.6**	**74.1**	**172.9**	**161.8**	**160.0**	**160.8**
Ag ounces recovered	**k oz**	**65.9**	**76.3**	**294.9**	**328.9**	**354.5**	**308.2**

	Unit	2022	2023	2024	2025	Total
Heap Leach Process Tonnes	k tonnes	13,140	13,140	13,140	11,431	110,890
Process Au Head Grade	g/t	0.55	0.62	0.52	0.41	0.53
Process Ag Head Grade	g/t	8.52	7.44	6.30	6.28	6.86
Au ounces recovered	**k oz**	**186.5**	**209.5**	**174.5**	**120.8**	**1,503.7**
Ag ounces recovered	**k oz**	**431.9**	**377.2**	**319.6**	**276.9**	**2,834.2**

1.16   Infrastructure

The Shahuindo mine is approximately 25 kilometers by road from the town of Cajabamba and 130 kilometers by road from the town of Cajamarca. Access from Cajamarca is via asphalt-paved highway and gravel and dirt roads.

During Phase 1 operations, power at the site will be provided by on-site diesel generation capable of sustaining 1.2 MW of power. In 2018, power will be provided via the National Commercial Grid. The long term power requirement for the Shahuindo mine is 7.4MW.

All process and domestic water for the operation will be supplied from an 18,000 cubic meter rainwater run-off collection pond, a water well located 300m west of the Shahuindo open pit, and from pit dewatering which will be pumped at the beginning of the second year of operation. Hydrogeological studies indicate sufficient water will be available to supply process and potable water requirements for the life of the mine.

At the effective date of this report, buildings required for the initial start-up are in place and are tailored for Phase 1 production. Some of the infrastructure from Phase 1 will be upgraded before Phase 2 production commences.

1.17   Mine Closure

The entire facility was designed with closure in mind to the greatest extent practicable. The facilities are designed and operated to minimize the footprints and areas of disturbance and utilize the most advanced planning and reclamation techniques available. The disturbance footprint of Shahuindo mine site is

approximately 1,348 Ha. Reclamation will commence as soon as practical during operations by placing salvaged topsoil on outer slopes and encouraging vegetation.

1.18 Capital and Operating Costs

1.18.1 Operating Costs

The operating costs for the Shahuindo mine were calculated for each year during the life of mine using the forecasted annual production tonnages. The mining, processing and site general and administration (G&A) costs were derived from first principals, or based on operating costs experienced at Tahoe's La Arena mine which is comparable to the Shahuindo mine.

Table 1.18-1 includes the summary of the anticipated life-of-mine costs.

Table 1.18-1   Operating Cost Summary

Operating Cost	Value
Mining Cost ($/tonne mined)	$1.91
Mining Cost ($/ore tonne mined)	$4.50
Process Plant Operating Cost ($/tonne processed)	$2.55
General Administration ($/tonne processed)	$2.23

*includes $1.42/tonne ore for crushing and agglomeration beginning in 2018

1.18.2 Capital Costs

The capital expenditure requirement for the Shahuindo mine is $320.3 million dollars beginning on 01 January 2016. This includes construction capital of $179.6 million and $140.7 million in sustaining capital. Capital expenditures incurred prior to 01 January 2016 are considered as 'sunk' costs.

The project capital is summarized in Table 1.18-2. The total project capital carried in the financial model for new construction is expended over a three year period.

Table 1.18-2   Project Capital

Project Capital	$ (millions)
Mining	$27.5
Process Plant	$105.6
Other	$46.6
Total	**$179.6**

1.18.3 Financial Analysis

The Shahuindo mine economic analysis indicates that the project has an Internal Rate of Return (IRR) of 40.6% with a payback period of 4.1 years after taxes and an after-tax Net Present Value using a five percent discount rate (NPV$_5$) of $318.9 M after taxes.

Sensitivity analyses were conducted using changes in metal prices, operating cost, initial capital, and recovery; the results of which are summarized in Table 1.18-3. Changes to metal prices have the greatest impact on the NPV and IRR of the project.

Table 1.18-3   Sensitivity Analysis – NPV and IRR after Taxes

Variable	Change	NPV @ 0%	NPV @ 5%	NPV @ 10%	IRR%	Payback
Change in Metal Prices	+20%	$723,045	$508,619	$362,690	67.7%	3.3
	+10%	$597,309	$413,960	$289,289	53.1%	3.6
	Base Case	$471,200	$318,863	$215,413	40.6%	4.1
	-10%	$342,701	$221,333	$139,143	29.0%	4.8
	-20%	$202,022	$113,741	$54,457	17.1%	6.1
Change in Operating Cost	+20%	$348,725	$225,158	$141,508	29.0%	4.9
	+10%	$411,022	$273,026	$179,417	34.8%	4.4
	Base Case	$471,200	$318,863	$215,413	40.6%	4.1
	-10%	$530,361	$363,820	$250,632	46.7%	3.8
	-20%	$588,728	$407,955	$285,031	53.1%	3.6
Change in Total Capital	+20%	$409,200	$263,661	$165,625	29.1%	4.8
	+10%	$440,142	$291,213	$190,477	34.2%	4.5
	Base Case	$471,200	$318,863	$215,413	40.6%	4.1
	-10%	$502,354	$346,596	$240,419	49.0%	3.7
	-20%	$533,592	$374,233	$265,224	60.2%	3.4
Change in Metal Recovery	2%	$508,599	$347,156	$237,466	44.2%	3.9
	1%	$489,905	$333,014	$226,443	42.4%	4.0
	Base Case	$471,200	$318,863	$215,413	40.6%	4.1
	-1%	$452,456	$304,682	$204,358	38.9%	4.2
	-2%	$433,662	$290,459	$193,265	37.2%	4.3

1.19   Exploration Status

Numerous oxide and sulfide exploration targets that have considerable potential to increase the resource and reserve base at Shahuindo have been identified through surface mapping, rock-chip and soil sampling surveys, geophysical surveys and drilling conducted by previous owners of the Shahuindo property and by drilling conducted by Tahoe subsequent to its merger with Rio Alto in April 2015.

Drilling around the periphery of the currently-designed pit limits in the second half of 2015 successfully identified mineralization outside of the northeast and southwest margins of the Phase 2 pit shell that will be incorporated into future mine plans. Likewise, condemnation drilling in the planned waste dump area identified shallow mineralization that represents an extension to the known resource; a portion of which will be mined and delivered to the leach pad or stockpile prior to construction of the waste dump foundation.

Other drilling in 2015 identified metal grades and mineralogy similar to Shahuindo at the San Lorenzo, Choloque and La Chilca prospects proximal to the Shahuindo pit. These targets represent near-term opportunities to increase the resource base as Shahuindo.

1.20   Conclusions and Recommendations

The results of this study demonstrate that:

1. The Shahuindo mine is economically viable from 01 January 2016 through to the end of the estimated mine life, supporting the declaration of Proven and Probable Mineral Reserves.

2. The Shahuindo mining strategy consists of two phases. The first phase will process ROM ore at an initial rate of 10,000 tonnes of ore per day, ramping up to an average of 12,200 tonnes of ore per day in 2016 and 16,500 tonnes of ore per day in 2017; the second phase will include a crushing and agglomeration circuit that will increase production to 36,000 tonnes per day. The phased approach enables gold production as soon as possible with minimal capital expenditure, generating cash flow early in the project.

3. The results of laboratory testing program indicate excellent gold recoveries at both ROM and moderate crush sizes with low to moderate reagent requirements, implying amenability to heap leaching. Silver recoveries are generally low.

4. The Shahuindo district holds excellent opportunities for further discovery and definition of additional oxide and sulfide mineralized bodies that have potential to increase the resource base at Shahuindo.

The authors of this report recommend the Company to:

1. Initiate field and laboratory studies investigate the potential to reduce capital and operating costs related to the Phase 2 crushing and agglomeration scheme. Conduct pilot scale heap leach tests

on the current ROM leach pad to investigate field-scale performance on composites with varying degrees of coarse-to-fines ratios. The metallurgical facilities at the Company's La Arena mine should be utilized to conduct further permeability and compaction tests.

2. Investigate the ability of the siltstones and breccia with high fines content to percolate in the ROM leach pad.

3. Conduct additional metallurgical testing on drill samples.

4. Improve the geometallurgical model. Further refinement of the geologic model at Shahuindo will greatly aid in mine planning and scheduling, and increase confidence in the material types scheduled for delivery to the leach pad to optimize material blending schemes.

5. Aggressively explore the Shahuindo district and accelerate district exploration with the goal of discovering additional resources amenable to the Shahuindo processing facility.

6. Evaluate the mineralized zones on the periphery of the Shahuindo deposit to expand the resource and incorporate these extensions into a new pit design.

7. Improve the QA/QC procedures by including a wider-range of certified assay standards, particularly assay standards at or near the operational gold cut-off grade. Create assay blanks from coarse RC drilling rejects. Utilize a second commercial laboratory or the La Arena laboratory for check assays of exploration samples.

8. Update and refine the resource estimate as additional drill hole information becomes available.

9. Evaluate the economic potential of the sulfide mineralization below the Shahuindo pit.

After reaching commercial production, the authors recommend the Company systematically evaluate mining, processing and other surface operations to optimize processes and procedures and reduce capital and operating costs. Examples include the following trade-off studies to evaluate:

a) the potential to reduce or eliminate the requirement for the crushing and or agglomeration circuit, and the impact to metal recoveries;

b) the economic benefit of implementing a secondary crushing circuit to increase recovery;

c) the potential to increase the overall slope angle of the pit to increase the NPV of the project through further geotechnical and hydrogeological analyses; and

d) the potential to reduce operating costs by evaluating the suitability by backfilling mined waste rock into the pit.

2.0   INTRODUCTION

2.1   Purpose and Basis of Report

Tahoe Resources Inc. (Tahoe or Company), whose common shares are listed for trading on the Toronto Stock Exchange (TSX:THO), New York Stock Exchange (NYSE:TAHO) and Bolsa de Valores: Peru (BVL:THO), has prepared an updated Technical Report (the Report) for the Company's Shahuindo mine in Peru. This report presents the results of a prefeasibility study of the technical and economic viability of the Shahuindo mine.

The following events have triggered an updated NI 43-101 Technical Report for the Shahuindo mine:

- On 09 February 2015, Tahoe and Rio Alto Gold (Rio Alto) entered into a definitive agreement to combine their respective businesses and finalized the transaction on 01 April 2015. Through this merger, Tahoe Resources acquired 100% ownership of the mining assets of Rio Alto which included the Shahuindo project.

- The Mineral Resources and Mineral Reserves estimates have been updated as the result of data obtained from drilling and additional engineering studies conducted in 2014 and 2015. Mining studies incorporate updated cost estimates and financial analyses.

- Tahoe has revised the mining strategy for the Shahuindo mine.

- Tahoe has conducted further metallurgical testing on the ore at Shahuindo and has revised the metallurgical assumptions and flowsheet for the project.

This report has been completed in accordance with the disclosure and reporting requirements set forth in the Toronto Stock Exchange Manual, National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101), Companion Policy 43-101CP to NI 43-101, and Form 43-101F1 of NI 43-101.

2.2   Sources of Information

Information contained in this Report was obtained from prior Technical Reports and from work completed by independent consultants on behalf, and under the direction, of Rio Alto and Tahoe, and by work completed by Rio Alto and Tahoe personnel under the guidance of the authors. Information included herein derived from this work is cited in the text of this Report, with references listed in Section 27.0. The authors have made all reasonable effort to establish the completeness and authenticity of the information provided in this Report.

Prior Technical Reports filed on the Shahuindo project include:

- *Resources Estimation, Shahuindo Project, Peru* (Saucier and Poulin, 2004)

- *Resources Estimation, Shahuindo Project, Peru* (Saucier and Buchanan, 2005)

- *Shahuindo Gold Project, Cajabamba Province, Peru, NI 43-101 Technical Report on Preliminary Assessment* (Wright et al., 2010a)

- *Shahuindo Gold Project, Cajabamba Province, Peru, NI 43-101 Technical Report on Preliminary Assessment* (Wright et al., 2010b)

- *Technical Report on the Shahuindo Project, Cajabamba, Peru* (Tietz and Kappes, 2011)

- *Updated Technical Report on the Shahuindo Project, Cajabamba, Peru* (Tietz and Defilippi, 2012)

- *Technical Report on the Shahuindo Heap Leach Project* (Defilippi, *et. al.*, 2012)

2.3   Qualified Persons and Site Visits

Mr. Tim Williams, Tahoe's Vice President Operations and Peru Country Manager, Mr. Charles V. Muerhoff, Tahoe's Vice President Technical Services and Mr. Carl E. Defilippi of Kappes, Cassiday & Associates prepared this Technical Report. Each is a Qualified Person (QP) by NI 43-101 definitions.

Dates of site visits and specific sections of the Report that the Qualified Persons are responsible for are listed in Table 2.3-1.

Table 2.3-1   Qualified Persons – Site Visits and Report Responsibilities

QP Author	Company	Designation	Site Visit	Section Responsibility
Tim Williams	Tahoe Resources Inc.	FAusIMM	Multiple Site Visits 2014 & 2015	Sections 4, 15, 16, 18, 20 and corresponding items in Sections 1, 25, 26
Charles V. Muerhoff	Tahoe Resources Inc.	SME Registered Member	May 19-20, 2015 November 13-14, 2015	Sections 2, 3, 5 through 12, 14, 19, 21 through 24 and corresponding items in Sections 1, 25, 26
Carl E. Defilippi	Kappes, Cassiday & Associates	SME Registered Member	May 4-7, 2010 April 6-8, 2010 September 2-3, 2015	Sections 13, 17 and corresponding items in Sections 1, 25, 26

2.4   Effective Dates

The effective date of this Technical Report is 01 January 2016. The effective date of the Shahuindo Mineral Resource estimate is the 15 April 2015. The effective date of the Shahuindo Mineral Reserve Estimate is 01 November 2015.

2.5 Units of Measurements

Unless otherwise specified, all monetary dollars expressed in this Report are in United States dollars ($). Metal grades are expressed in grams per metric tonne (g/t) and metal content is expressed in troy ounces. All units of measure, unless otherwise specified, are metric.

2.6 Abbreviations and Acronyms

A list of abbreviations and acronyms commonly used in this report is provided in Table 2.6-1.

Table 2.6-1   List of Abbreviations

Abbr.	Description	Abbr.	Description
$	United States of America dollars	m	meters
µ	microns	m²	square meters
ADR	adsorption-desorption-refining	m³	cubic meters
Ag	silver	MCE	maximum considered earthquake
ARD	acid rock drainage	MEM	Ministry of Energy and Mines
Au	gold	mm	millimeters
AuEq	gold-equivalent	MMR	Minimum Mining Royalty
bcm	bank cubic meters	Moz	million troy ounces
CAPEX	capital expenditure	MPa	million Pascal
CIM	Canadian Institute of Mining, Metallurgy and Petroleum	Mt	millions of dry metric tonnes
CIRA	Certificate for the Inexistence of Archaeological Remains	Mt/y	million tonnes per year
CN	cyanide	MW	megawatt
dmt	dry metric tonne	NAG	non acid generating
DSHA	deterministic seismic hazard assessment	NI 43-101	Canadian National Instrument 43-101
EIA	Estudio de Impacto Ambiental (environmental impact study)	NPV	net present value
GEU	Geo Environmental Unit	NSR	net smelter return
g/t	grams per metric tonne	oz	troy ounce
in	inches	PAG	potentially acid generating
ha	hectare	PGA	peak ground acceleration
HDPE	high-density polyethylene	PLS	pregnant leach solution
hp	horsepower	ppm	parts per million
IBC	International Building Code	PSAD	Peru Central Zone
IGV	impuesto general a las ventas	PSHA	probabilistic seismic hazard assessment
IP	induced polarization	QA/QC	quality assurance and quality control
IRR	internal rate of return	QP	Qualified Person
k	thousand	RC	reverse circulation
Koz	thousands of troy ounces	RMR	rock mass rating
kPA	kilopascal	ROM	run-of-mine
kt	thousand tonnes	SENACE	National Environmental Certification Service
ktpd	thousand tonnes per day	SERNANP	National Service of Natural Protected Areas of the State
kV	kilovolt	SMT	Special Mining Tax
kW	kilowatt	t	dry metric tonne
lb	pound (weight)	tpd	tonnes per day
L/s	liters per second	t/y	tonnes per year
kt	thousand tonnes	UCS	unconfined compressive strength
ktpd	thousand tonnes per day	UIT	tax unit
kV	kilovolt	V	volt
L/hr/m²	liters per hour per square meter	WGS	World Geodetic System
LOM	life of mine		

3.0 RELIANCE ON OTHER EXPERTS

This report has been prepared by Tahoe based on a high level assessment conducted on the Shahuindo mine in Peru. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to Tahoe at the time of preparation of this report;

- Assumptions, conditions, and qualifications as set forth in this report; and

- Data, reports, and other information supplied by third parties under the direction of Tahoe.

The QPs as authors of this Report state that they are Qualified Persons for the Report as identified in the "Certificate of Qualified Person" for each author included in Section 28.0. Results and opinions included in this Report that are dependent on information provided by persons outside the employ of Tahoe are assumed to be current, accurate and complete as of the effective date of this Report. The preceding notwithstanding, the QPs assume responsibility for the information and conclusions contained in each of the QPs respective sections of this Report.

Reports received from other experts have been reviewed for factual errors by Tahoe. Any changes made as a result of these reviews did not involve any alteration to the conclusions made. Hence, the statements and opinions expressed in these documents are given in good faith and in the belief that such statements and opinions are not false and misleading at the effective date of this Report.

None of the authors of this Report are experts in verifying the legal status or ownership of mining concessions and surface lands in Peru. As such, the authors have relied on outside independent Peruvian legal counsel to verify the validity of Shahuindo SAC's mining concessions and surface land ownership. The following title opinions were prepared on behalf of the Company:

- *Title Opinion on the Shahuindo Mining Concessions*, prepared by Pickmann and Ruiz (2015) for Tahoe Resources Inc. (unpublished)

- *Title Opinion on the Shahuindo Surface Lands*, prepared by Pickmann and Ruiz (2015) for Tahoe Resources Inc. (unpublished)

References to technical reports and data generated by prior owners of the Shahuindo property and by consultants in the employ of Rio Alto or Tahoe used in the compilation of this Technical Report are included in Section 27.0.

4.0   PROPERTY DESCRIPTION AND LOCATION

4.1   Location

The Shahuindo Project is located in the district of Cachachi, province of Cajabamba, department and region of Cajamarca, Peru.   It is situated approximately 59 kilometers southeast of the town of Cajamarca and 14 kilometers west of the town of Cajabamba.   The project is located at latitude 7 degrees 25 minutes south, longitude 78 degrees 25 minutes west or Universal Transverse Mercator (UTM) coordinates 9,158,000-North and 807,000-East, Zone 17S.   The location of the project site is illustrated in Figure 4.1-1.
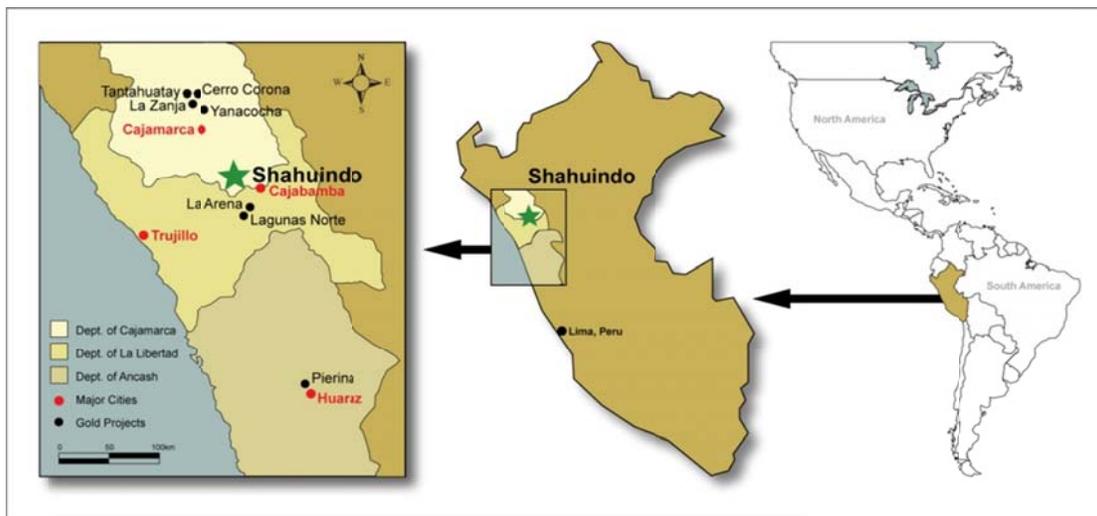
Figure 4.1-1   Shahuindo Project Location Map

4.2   Mineral Tenure and Title

The Shahuindo project comprises one mineral right, Acumulacion Shahuindo, which includes 26 mineral titles[1] 100% controlled by Tahoe's wholly owned subsidiary, Shahuindo SAC, and has an approximate area of 7,338.91 hectares.   Table 4.2-1 summarizes Shahuindo SAC's mineral claims that are included in Acumulacion Shahuindo. The mineral claims are illustrated in Figure 4.2-1.

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[1] In accordance with Supreme Decree 014-92-EM, the Accumulation is a procedure approved by INGEMMET (a State-owned company focused on the exploration, development and management of properties and mining companies in Peru) where mineral concessions can be accumulated into one group only when these mineral concessions are adjacent to one another and owned by the same owner. The Accumulation which in this case is called "Acumulacion Shahuindo" is the newly created concession which includes the 26 original mining concessions.

Table 4.2-1   Mineral Title Summary

Concession	Application Area (hectares)	Actual Size (hectares)	Application Method	Date of Grant
San Jose	2.83	2.83	Stake-based	July 2, 1917
Puma Shahuindo	2.33	2.33	Stake-based	July 5, 1917
Pilacones 8	601.59	58.66	Grid-based	January 29, 1998
Pilacones 7	300.8	3.45	Grid-based	November 18, 1996
Pilacones 6	1002.62	401.38	Grid-based	April 9, 1999
Pilacones 5	701.82	492.35	Grid-based	April 21, 2003
Pilacones 4	100.26	20.93	Grid-based	April 1, 1996
Pilacones 3	902.36	571.15	Grid-based	August 31, 1997
Pilacones 2	701.85	246.85	Grid-based	December 30, 1997
Perdida 3	601.96	548.65	Stake-based	November 30, 1994
Perdida 2	391.11	357.92	Stake-based	August 24, 1995
Perdida 1	601.72	570	Stake-based	November 30, 1994
Nltrogeno	2	2	Stake-based	August 7, 1922
Moyan 3	280.78	280.78	Stake-based	November 30, 1994
Moyan 2	201.36	201.36	Stake-based	November 30, 1994
Moyan 1	541.48	541.48	Stake-based	February 16, 1995
Malvas	250.68	250.68	Stake-based	September 26, 1959
Malvas 92	701.904	295.07	Stake-based	August 6, 1999
Descubridora	4.25	4.25	Stake-based	June 19, 1917
Antimonlo	2	2	Stake-based	June 2, 1921
Algamarca 4	993.17	980	Stake-based	March 8, 1991
Algamarca 2B	20.33	20.34	Stake-based	February 16, 1995
Algamarca 2	200.56	200.56	Stake-based	October 31, 1994
Algamarca 1	501.35	501.35	Stake-based	April 23, 1991
Acumulaclon	802.15	797.9	Stake-based	March 31, 1987
Algamarca Selenlo	4.01	4.01	Stake-based	August 22, 1981
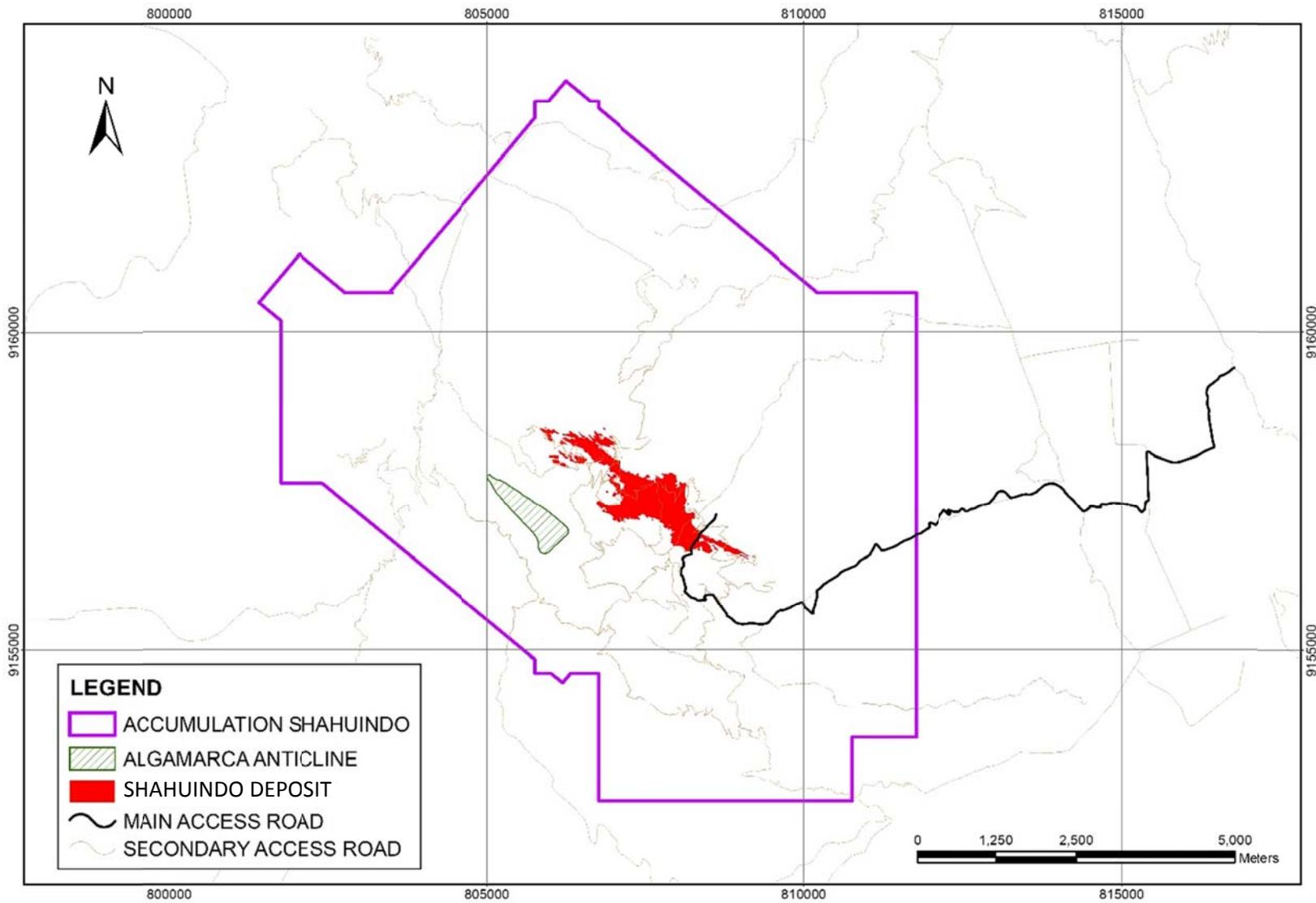
Figure 4.2-1   Mineral Claim Location Map

The mining rights and surface rights are registered under the name of Shahuindo SAC in the government title registry office of La Superintendencia Nacional de los Registros Públicos (SUNARP). The mining claims have no expiry date. All concessions are subject to an annual payment of $3 per hectare to the Peruvian government. A Peruvian law firm, Gallo Barrios Pickmann, issued a legal opinion to Tahoe in 2015 verifying the Company's title to the concessions within Acumulacion Shahuindo (Pickmann and Ruiz, 2015). All claims are in good standing as of the effective date of this Report.

4.3   Surface Rights

Shahuindo SAC has acquired 381 surface rights within the Shahuindo Project area to date, covering a total area of approximately 2,559 hectares. Some of these surface rights were used to relocate local land owners into new areas. Shahuindo SAC also acquired additional surface rights outside the mining concessions for the same process of relocating land owners. Shahuindo SAC and Desarrollo Agricola Del Norte (DAN) entered into a service agreement for this process; whereas DAN acquired the land outside the mining concessions and will transfer the properties to Shahuindo SAC to be swapped with land inside the concessions. A legal title opinion by Gallo Barrios Pickmann confirms the land ownership by Shahuindo SAC and DAN (Pickmann and Ruiz, 2015). The Company controls sufficient surface lands to accommodate the infrastructure necessary to operate the Shahuindo mining project as envisioned in this study.

4.4   Informal Mining Activity

There is a small group of informal miners within the project area who are exploiting narrow veins on the west side of the Algamarca anticline. Shahuindo SAC is promoting and participating in a round table discussion with the Algamarca informal miners to update the environmental, social and economic baseline and to work on a sustainable solution to stop all informal mining activity and replace it with other economic alternatives.

Since 2004, Shahuindo SAC has submitted formal reports to the Ministry of Energy and Mines (MEM) regarding the informal mining activities in the mining concessions. The informal mining activities in the Algamarca area are outside the project area approved in the Environmental Impact Statement for Shahuindo.

Until recently, a second group of informal miners were active in the northern portion of the Shahuindo project, known locally as the La Chilca area. In August 2015, Shahuindo SAC recovered the La Chilca area from the informal miners and the area is now in possession of Shahuindo SAC.

4.5   Environmental Considerations

4.5.1   Environmental Regulations

The General Mining Law of Peru is the primary body of law with regard to environmental regulation of exploration and mining activities.   The General Mining Law is administered by the MEM.   A detailed description of Peru's environmental regulations is found on the MEM website at www.minem.gob.pe. Depending on the level of project development, MEM requires exploration and mining companies to prepare an Environmental Impact Statement (EIA) Category I, Environmental Impact Study Semi Detailed (EIAsd) Category II, Environmental Impact Study Detailed (EIAd) Category III (see Table 4.5-1), an Environmental Impact Assessment, a Program for Environmental Management and Adjustment, and a mine closure plan.   Mining companies are also subject to annual environmental audits of operations by the Organismo de Evaluación y Fiscalización Ambiental (OEFA).

The environmental and legal framework for the specific case of the Shahuindo project is detailed in Section 20.0 of this technical report.

According to Peruvian regulations D.S. 020-2008-EM and R.M. 167-2008-MEM-DM, a DIA–Category I covers drilling from less than 20 drill platforms within a 10 hectare area.   An EIAsd–Category II is applicable to mining and exploration programs with either more than 20 drill platforms, exploration areas greater than 10 hectares, or construction of more than 50 meters of underground development. An EIAd is necessary for mining operations.   All classifications require the development of a community involvement processes.

A new Environmental Impact Study must be developed when additional, previously undisturbed areas are proposed to be added to an operation per Peruvian regulations DS 016-93-EM, D.S. 028-2008-EM and R.M. 304-2008-MEM-DM, review articles 15 and 16, and must include preparation of an executive summary and scheduling of public workshops and community participation.

The Environmental Impact Study must incorporate planned expenditure on environmental programs at a rate that is no less than one percent of the value of annual production of the planned operation.   MEM is required to review and render a decision on the project within 120 days, including initial notification, and the initial stage of the public consultation process.   Formal project approval may take from 8 to 12 months.   Within this period, the applying company must organize public hearings and workshops to present project data and coordinate the dates and locations of such hearings with the MEM.

Table 4.5-1 **Summary of Environmental Requirements for Mining Exploration Programs**

Classification	Description	Application Requirements
Category I Environmental Impact Statement (EIA)	Mineral exploration with less than 20 drill platforms within a 10 ha area.	Required information as shown in Article 5 of Environmental Regulations for Mining Exploration.
Category II Environmental Impact Study Semi-Detailed (EIAsd)	Mineral exploration with more than 20 drill platforms, exploration areas greater than 10 ha and/or construction of more than 50m of underground development.	Prepare an Environmental Evaluation (EA) report as per the Environmental Regulations for Mining Exploration.
Category III Environmental Impact Study Detailed (EIAd)	Projects whose characteristics, size and/or location have the potential to produce significant (quantitative or qualitative) negative environmental impacts.	Requires a thorough analysis to review impacts and propose corresponding environmental management strategy.

A company must also prepare and submit a closure plan (Plan de Cierre de Minas) for each component of its operation. The closure plan must outline what concurrent, closure, and post-closure measures will be taken to protect the environment from impacts of the mining operation. The closure plan includes a detailed cost estimate and schedule of expenditures.

The General Mining Law of Peru has in place a system of sanctions or financial penalties that can be levied against a mining company which is not in compliance with the environmental regulations.

4.6   Permits

Exploration, construction and commissioning operations conducted to date have been performed under the relevant local and national permits. All permits and licenses to conduct operations at Shahuindo either have been received or are in the process of finalization. The Company does not anticipate delays to the production schedule presented in this Technical Report due to the timing of receipt of necessary permits and licenses. Key permits required for mine operations are summarized in Table 4.6-1; the status of each relevant permit as it relates specifically to the Shahuindo operations is discussed in Section 20.0.0 of this Report.

Table 4.6-1   List of Permits and Status

Permit	Status	Date of Approval	Approved By	Government Department	Comments
Certificate for the Inexistence of Archaeological Remains (CIRA)	In Process			Ministry of Culture	Currently undertaking Archaeological Evaluation (PEA in the Spanish acronym) for this permit
	Approved	11-Jul-13	CIRA No 173-2013	Ministry of Culture	Certificate for the Inexistence of Archaeological Remains
	Approved	15-Sep-15	CIRA No 232-2015	Ministry of Culture	Certificate for the Inexistence of Archaeological Remains - Four Rescued Areas
	Approved	29-May-15	R.D. No 125-2015-DDCCAJ/MC	Ministry of Culture	Archaeological Monitoring Plan (PMA)
Environmental Impact Assessment	Approved	10-Sep-15	R.D. 339-2013-MEM/AAM	Ministry of Energy and Mines	Environmental Impact Assessment
	Approved	18-Dec-14	R.D. 613-2014-MEM-DGAAM	Ministry of Energy and Mines	First Technical Sustentatory report of Environmental Impact Assessment (ITS-1-EIA)
	Approved	07-Jul-15	R.D. 265-2015-MEM-DGAAM	Ministry of Energy and Mines	Second Technical Sustentatory report of Environmental Impact Assessment (ITS-2-EIA)
	In Process			Ministry of Energy and Mines	EIA modification (MEIA)- For Phase 2 Expansion
Mine Closure Plan	Approved	10-Mar-15	R.D No 132-2015-MEM-DGAAM	Ministry of Energy and Mines	
Beneficiation Concession	Approved	14-Apr-15	Resolution No. 145-2015-MEM/DGM/V	Ministry of Energy and Mines	Construction of the components of beneficiation to the Shahuindo Project of 10,000 TMD
	Approved	25-Nov-15	R.D No. 2468-2015-MEM/DGM	Ministry of Energy and Mines	License to Operate Processing Plant
Permanent Power Concession	Not required				Not required at start-up due to first two year of power supplied by generators. Will apply when required.
Water usage permits	Approved	16-Jul-15	Resolution No. R.D No 655.2015-ANA-AAA.M	National Water Authority	
Water License	Approved	12-Nov-15	R.D No 1157-2015-ANA-AAA.M	National Water Authority	
Easements and rights-of-way	Not required				Not required at start-up due to first two year of power supplied by generators. Will apply when required.
District and Provincial municipality licenses	In Process	Various			In process and obtained when required.
Mining Plan	In Process	27-Nov-15	Resolution No 0587-2015-MEM-DGM/V	Ministry of Energy and Mines	Authorization for Construction, awaiting Mining Plan.
Operations Permits	In Process	Various			In process and obtained when required.

4.6.1 Environmental Laws

Under Legislative Decree 1013, approved on 14 May 2008, the government created the Ministry of the Environment to coordinate all environmental matters at the executive level. Currently, the Ministry of the Environment is charged with the implementation of the National Environmental Policy and direction of the environmental control regime, among other responsibilities.

The Ministry of the Environment works in coordination with different appointments to the ministry such as the National Service of Natural Protected Areas of the State (SERNANP) and the National Environmental Certification Service (SENACE) for the purposes of implementing sustainable investment and responsibilities for review and approval of detailed Environmental Impact Studies (EIA-d).

4.6.1.1 Environmental Legal Framework Applied to Mining Activities

The *Environmental Regulations for the Activities of Exploitation, Processing, Transport, Auxiliary Works and Development of Mining and Metallurgic Activities* are the controlling regulatory acts that establish, among others, the environmental requirements necessary conduct mining activities within the Peruvian territory.

Under this legal framework, the General Bureau of Environmental Affairs (DGAAM) of the Ministry of Energy and Mines (MEM) is the responsible governmental agency to approve the environmental studies required to undertake mining activities in Peru, while the Environmental Inspections and Auditing Bureau (OEFA) of the Ministry of the Environment is currently the agency responsible for the inspection and auditing of mining projects and operations in order to confirm compliance with environmental obligations and related commitments.

4.6.1.2 Exploration Activities

Environmental aspects specifically related to exploration projects are governed by the Regulations on Environmental Protection for the Development of Mining Exploration Activities under Supreme Decree 020-2008-EM. Pursuant to these regulations, depending on the scale and impact of the exploration activities to be conducted, exploration projects are classified into the following two categories:

- Category I: Before conducting exploration activities under this category, title holders are required to submit a DIA and have it approved by the DGAAM.

- Category II: In order to conduct exploration activities under this category, title holders are required to have an EIAsd approved by the DGAAM.

The approval of the corresponding environmental certificate does not grant the titleholder the right to start conducting exploration activities, given that titleholders of mining concessions are also required to

obtain all governmental consents and permits legally required and access and usage rights granted by the landowner to use the surface lands.

4.6.2 Mine Development, Exploitation and Processing Activities

Pursuant to the *Environmental Regulations for the activities of Exploitation, Processing, Transport, Auxiliary Works and Development of Mining and Metallurgic Activities*, prior to conducting mining and processing activities, titleholders of mining concessions must have an EIA approved.

4.6.3 Mine Closure and Site Remediation

4.6.3.1 Exploration Activities

Regarding environmental remediation of areas affected by mining exploration activities, the *Regulations on Environmental Protection for the Development of Mining Exploration Activities* requires titleholders of mining exploration projects to conduct 'progressive closure', 'final closure' and 'post closure' programs as outlined in the corresponding environmental study. Any amendment of the closure measures or its terms requires the prior approval of the DGAAM.

4.6.3.2 Mining Development, Exploitation and Processing

Prior to the start-up of mining activities, including mine development, exploitation and processing, titleholders are required to have a Mine Closure Plan, duly approved by the DGAAM prior to carrying out activities.

Peruvian legal framework covering Mine Closure Plans includes a number of financial and legal requirements intended to ensure the completion of the closure obligations by the titleholders of mining projects. In case of non-compliance, these financial and legal requirements allow the mining authority to seize the financial guarantees from titleholders and complete the Mine Closure Plans as approved.

4.6.4 Existing Environmental Conditions

There are surface disturbances associated with informal mining activity within the project area, primarily in the Algamarca anticline and La Chilca areas. The Company is currently conducting environmental field studies as there is an expectation that some level of environmental contamination may be associated with these sites.

4.7 Royalties, Taxes and Fees

4.7.1 Maintenance Fees

Pursuant to article 39 of the General Mining Law, titleholders of mining concessions pay an annual Maintenance Fee (Derecho de Vigencia) of $3.00 per hectare. The maintenance fee is due by 30 June

and is effective for the following year. Failure to make payments for two consecutive years causes the termination (caducidad) of the mining concession. However, according to article 59 of the General Mining Law, the payment for one year may be delayed with penalty and the mining concessions remain in good standing. The outstanding payment for the past year can be paid on the following June 30 along with the future year. Maintenance fees for concessions held in Acumulacion Shahuindo are current.

4.7.2 Minimum Production Obligation

Legislative Decree 1010, dated 09 May 2008 and Legislative Decree 1054, dated 27 June 2008 amended several articles of the General Mining Law regarding the Minimum Production Obligation, establishing a new regime for compliance (New MPO Regime).

According to the New MPO Regime, titleholders of metallic mining concessions must reach a minimum level of annual production (Minimum Production) of at least one Tax Unit[2] or "UIT" (S/. 3,850 per hectare) and three UITs within a period of ten years. The ten year period begins on January 1st of the year following granting of the concession.

In the case of mining concessions that were granted on or before 10 October 2008 until the ten year term for reaching Minimum Production established by the New MPO Regime elapses on 01 January 2019, these mining concessions will be subject to the former provisions of the General Mining Law. Failure to comply with the minimum production requirements of the New MPO Regime obligates the concession holder to pay a penalty and may result in the termination of the concessions.

4.7.3 Royalties, OSINERGMIN Contribution and OEFA Contribution

4.7.3.1 Royalties

In June 2004, Peru's Congress authorized a royalty payment structure pertaining to mining operations. Congress further modified the royalty regime under Law No. 29788 which went into effect on 01 October 2011 (Modified Mining Royalty or MMR). The MMR is applied to quarterly operational profit (*i.e.*, operating margin), calculated by dividing the quarterly operating profit by the income generated from the quarterly sales of the mining product. The amount to be paid in royalties is the greater of the quarterly operation profit rate, which ranges from one percent to 12%, or one percent of the revenues generated by quarterly sales. In the case of the small scale mining titleholders, the mining royalty is set to zero. The payment of the mining royalty is considered an expense when determining corporate income tax in Peru.

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[2] Pursuant to Supreme Decree 304-2013-EF, dated 11 December 2013, the Tax Unit was set at S/.3,850 (approximately $1,360)

4.7.3.2   OSINERGMIN Contribution

El Organismo Supervisor de la Inversión en Energía y Minería (OSINERGMIN) is Peru's state energy and mines investment regulator which has the mission to regulate, supervise and oversee national compliance with legal and technical dispositions related to activities in the electricity, hydrocarbon and mining industry sectors, as well as compliance with legal and technical requirements concerning environmental conservation and protection in the development of these activities. OSINERGMIN is the government agency of record to inspect and audit compliance with safety, job-related health and mine development matters.

Supreme Decree 128-2013-EF, published on 19 December 2013 established the rate applicable for the OSINERGMIN contribution. This payment is made by all large and medium scale mining titleholders and is calculated on the value of the monthly operating costs, corresponding to the activities directly related to OSINERGMIN minus the Valued Added Tax and the Municipal Promotion Tax.

OSINERGMIN rates by year: 2014: 0.21%

2015: 0.19%

2016: 0.16%

4.7.3.3   OEFA Contribution

El Organismo de Evaluación y Fiscalización Ambiental (OEFA) is the government agency of record that inspects and audits mining projects operations in order to secure compliance with environmental obligations and related commitments.

The Supreme Decree 130-2013-EF, published on December 19, 2013, established the rate applicable for the OEFA Contribution. This payment is made by all large and medium scale mining titleholders and is calculated on the value of the monthly costs corresponding to all activities directly related to OEFA minus the Valued Added Tax and the Municipal Promotion Tax. The OEFA rate is currently set at 0.13% for 2016.

4.7.4   Ownership of Mining Rights

Pursuant to the General Mining Law, mining rights may be forfeited only due to a number of enumerated circumstances provided by law (*i.e.*, non-payment of maintenance fees and/or noncompliance with the Minimum Production Obligation). The right of concession holders to sell mine production freely in world markets is established. Peru is party to agreements with the World Bank Multilateral Investment Guarantee Agency and with the Overseas Private Investment Corporation.

4.7.5   Taxation and Foreign Exchange Controls

A recent modification of the tax law approved by the government reduced corporate taxes beginning in year 2015. The law progressively decreases the tax from 30% (applied in 2014) to 26% (2019 onward). The new law reduces the rate of corporate income tax and increases the tax rate on dividends as summarized in the following schedule in Table 4.7-1.

Table 4.7-1   Corporate Income Tax

Fiscal Years	Corporate Income Tax	Dividends
2015 – 2016	28%	6.8%
2017 – 2018	27%	8.0%
2019 – forward	26%	9.3%

There are currently no restrictions on the ability of a company operating in Peru to transfer dividends, interest, royalties or foreign currency in or out of Peru or to convert Peruvian currency into foreign currency.

Congress has approved a Temporary Net Assets Tax, which applies to companies subject to the General Income Tax Regime. Net assets are taxed at a rate of 0.4% on the value exceeding one million Peruvian soles (approximately $345,000). Taxpayers must file a tax return during the first 12 days of April and the amounts paid can be used as a credit against Income Tax. Mining companies which have not started production and those in their first year of operation are exempt from the tax.

The Company is also subject to a Special Mining Tax (SMT) which is applied to operating income based on a sliding scale with progressive marginal rates ranging from 2% to 8.4%. The SMT has been considered as an income tax for the purposes of this study.

The Tax Administration Superintendent is the entity empowered under the Peruvian Tax Code to collect federal government taxes. The Tax Administration Superintendent can enforce tax sanctions, which can result in fines, the confiscation of goods and vehicles, and the closing of a taxpayer's offices.

4.7.6   Worker Participation

Under Peruvian law, every company that generates income and has more than twenty employees on its payroll is obligated to grant a share of its profits to its workers. For mining companies, the percentage of this profit-sharing benefit is eight percent of taxable income. The profit-sharing amount made available to each worker is limited to 18 times the worker's monthly salary, based upon their salary at the close of the previous tax year.

4.7.7 Regulatory and Supervisory Bodies

The five primary agencies in Peru that regulate and supervise mining companies are:

1. Ministry of Energy and Mines (MEM),
2. National Institute of Concessions and Mining Cadastral (INGEMMET),
3. Supervisory Entity for the Investment in Energy and Mining (OSINERGMIN),
4. Labour Ministry (MINTRA) and
5. Environmental Inspections and Auditing Bureau (OEFA) of the Ministry of the Environment.

The MEM promotes the integral and sustainable development of mining activities, as well as regulates all the activities in the Energy and Mines sector.

The INGEMMET is the Government Entity in charge of granting mining concessions, which entitles the concession holder the right to explore and exploit the area in which boundaries such concessions are located.

OSINERGMIN and MINTRA oversee regulatory compliance with safety, job-related health, contractors, and mine development matters, while OEFA oversees regulatory compliance with environmental regulation, investigating and sanctioning the breach of any environmental obligation.

4.8 Risks that may affect Access, Title, or the Right or Ability to Perform Work

Natural resources exploration, development, production and processing involves a number of risks, many of which are beyond the Company's control. Project and business risk factors and discussion on these are included in the Company's quarterly Management Discussion and Analysis and the Annual Information Forms filed on SEDAR. Such risks include the following:

- Changes in the market price for mineral products.
- Community groups or non-governmental organizations that may initiate or undertake actions that could delay or interrupt the Company's activities at Shahuindo.
- Although the Company believes it has a good understanding of the Shahuindo deposit and is successfully operating the nearby La Arena mine, the Company has no operating history at Shahuindo.
- Future construction and operating costs may differ from those costs projected in the financial study for Shahuindo.

- While the Company considers the regulatory environment in Peru to be very stable, the Company's activities are subject to environmental laws and regulations that may change over time.

- The Company requires numerous permits in order to conduct exploration, development and mining activities at Shahuindo. Delays in obtaining the final permits and licenses necessary for sustained operations or failure to comply with the terms of any such permits and licenses could have a material adverse effect on the Shahuindo project.

- Title to the Company's mineral properties at Shahuindo may be subject to prior unregistered agreements, transfers or claims or defects.

- Changes in taxation legislation or regulations in Peru.

The foregoing notwithstanding, the Company believes that there are no significant risks to the Shahuindo project in regards to surface and concession title, the ability to access the project, the receipt of the remaining permits and licenses, or the Company's ability to perform the work as described in this technical report.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The Shahuindo Project is located in northern Peru approximately 970 kilometers by road north-northwest of Lima. The project site can be accessed from Lima by traveling north on Highway 1 (Pan-American Highway) to Ciudad de Dios, then east on Highway 8 to Cajamarca. The site is approximately 130 kilometers from Cajamarca via asphalt-paved highway (100 kilometers on Highway 3N), and gravel and dirt roads. The route from Cajamarca to Shahuindo is shown in Figure 5.1-1.

Figure 5.1-1   Shahuindo Road Route from Cajamarca

There are several seaports available to the Company for equipment import – the Port of Callao in Lima, Port of Paita (northern Peru) and Port Salaverry at Trujillo. There are daily flights between Lima and Cajamarca on Peruvian national airlines.

5.2   Climate

Climate in the area is typical of the sierra region. It is cold and dry during the dry season and humid during the rainy season. Rainfall typically occurs between October and April (wet season), with occasional sporadic showers in the other months. The average annual rainfall is about 1000mm with an extreme wet year having a rainfall of 1,550mm and an extreme dry year receiving 449mm. The dry season months are May through September.

The average daily temperature is 15.7°C, reaching 23.1°C during the day and decreasing to 7.5°C in the night. The average minimum temperature is 9.7°C and the average maximum temperature is 22.3°C.

The prevailing wind direction is east-northeast with speeds ranging from 0 to 3.1 m/s.

Exploration and mining can be conducted year round with minimal impacts from the weather, though plastic overliners (raincoats) will be used to limit infiltration of precipitation into the leach pads during the wet season.

5.3   Local Resources & Infrastructure

Manning requirements for the project are sourced according to the company's employment policy, with priority given to the local area, then expanding to the surrounding communities, including Cajabamba, whenever possible. More experienced and technical personnel have been recruited from Cajamarca and from throughout Peru. The project currently employs 1,310 people, with 73% of employees from within Cajamarca province.

Power for the operations will initially be from diesel generators located on site. As the mine ramps up production, the site will be connected to the trans-national 220 kV transmission line which was recently completed and passes within 3 kilometers of the site. It is currently planned to connect to line power in the second half of 2017, via a substation partially built by Sulliden which will require upgrading. From 2018 while processing 36 ktpd, the project will consume up to a maximum of approximately 45 million kWh of power per year. Maximum total demand power for the project is approximately 7.4MW. When the substation is completed, it will have an installed capacity of 40 MW.

The Shahuindo heap leach project will require a water supply for mining; processing, camp and other support facilities. Water demand will be highest during the dry season. During an average dry season,

Anddes predicted the maximum water requirement to be up to 12.7 liters per second (L/s) in the dry season for the initial phase of operations (Anddes, 2015j). From January 2018, when the project ramps up to 36 ktpd and the primary leach pad is commissioned (Pad 2B), the operating flow for leaching activities is estimated to be as high as 39.9 L/s (Anddes, 2015c). Most of this water will be recycled through the closed circuit leach pad - pregnant solution pond - adsorption circuit - barren solution pond - leach pad.

The make-up water required by the heap leach system during the dry season, particularly during abnormally dry years, will be met from three sources:

1. A 12-inch diameter water well with capacity of 15 L/s,

2. Fresh water from a year-round spring with flows of four to six L/s, and

3. Water stored in reservoirs which accumulate rainfall during the wet season.

5.4   Physiography

The Shahuindo property is located on the west side of the Condebamba River valley. The topography varies from rolling hillsides to steep ravines. Elevation across the project area varies from 2,400m to 3,000m above sea level.

The project area is classified as neo-tropical Peruvian "Yungas" by the World Wildlife Fund and includes sub-zones such as:

- Very humid tropical mountain forest. May be present in isolated inaccessible areas, but original vegetation has currently not been identified. The sub-zone is characterized by secondary successive-stage colonist species that have replaced the original forest.

- Humid tropical mountain forest. Covers 60 percent of the project area. Original vegetation is remnant and confined to ravines and steep hillsides. The majority of the sub-zone has been cleared for cultivation of potatoes, oca, mashua, tarwi, barley, broad beans, and green beans, and for cattle grazing.

- Low, dry, tropical mountain forest. Covers 40 percent of the project area, the majority of which falls within the lower part of the Shahuindo gorges, in the area near the Condebamba River. The areas are typically cultivated using irrigation. Crops include corn, potatoes, broad beans, wheat, green beans, vegetables and fruits.

Valley inhabitants anecdotally report the presence of deer, foxes, rabbits, vizcachas (rodents), and skunks.

5.5   Seismology

Peru is an area with high seismic and tectonic activity with earthquakes being more intense near the coastal regions and decreasing gradually towards the mountains and jungle regions.

According to the seismic zoning map of Peru's National Building Regulations, the Shahuindo mine is located in Zone 3 which corresponds to moderately high seismic activity. Anddes SAC has estimated a peak ground acceleration (PGA) of 0.251g for this particular zone, based on the probabilistic seismic hazard assessment (PSHA) developed by Anddes (2015g, 2015i) for Shahuindo mine, when considering a 50 year useful life with a return period of 475 years and 10% of overage. The classification of the ground at the foundation level is of Type B (rock) according to the standards of the International Building Code (IBC) (International Code Council, 2012). Furthermore, there are additional PGA values estimated by Anddes for return periods of 100, 200, 475, 975 and 2475 years, as summarized in Table 5.5-1, which are the recommended design parameters to be utilized for the seismic design of structures.

Table 5.5-1   Summary of PGA Values for Different Return Periods

Geographical Coordinates		Return Period (years)				
Longitude	Latitude	100	200	475	975	2475
-78,187	-7,615	PGA 0.143	PGA 0.184	PGA 0.251	PGA 0.320	PGA 0.425

According to the deterministic seismic hazard assessment (DSHA) developed by Anddes (2015i) for the Shahuindo mine, Anddes estimates a PGA of 0.286g generated by the intraslab subduction activity between the Nazca and Continental plates. This value is higher than the probabilistic PGA for a 475 year return period; however, it is important to note that estimating a return period for a deterministic analysis is unknown. For a conservative assumption, a value of 0.286g can be used as PGA with a return period of 475 years or lower.

The Maximum Considered Earthquake (MCE) estimated from the PSHA for a return period of 2475 years is 0.425g, which is consistent with the Maximum Credible Earthquake (MCE) estimated from the DSHA which indicates a PGA of 0.429g. For critical analysis, the International Commission on Large Dams (ICOLD, 2010) and National Earthquake Hazard Reduction Program (FEMA, 2009) criteria recommend using the MCE estimated from the DSHA calculated for the 84th percentile; in this case, it results in a PGA of 0.578g. All values are calculated for a class B site (rock) according to IBC.

5.6   Population Centers

According to Peru´s National Institute of Statistics and Information (Census 2007), Shahuindo's Direct Area of Influence (DAI) has 3,954 inhabitants, distributed in 14 towns. An analysis of the population

structure by age reveals a significant majority of people under 25 years old, which increases the proportion of persons of working age. The distribution by sex shows a slight prevalence of male population.

On average, 80% of households are dedicated to agricultural subsistence activities that are complemented with livestock and mining.

Low wages and lack of opportunity in the countryside are determinants of emigration towards main cities such as Cajamarca, Trujillo or Lima. Young people move temporarily in search of quality educational services. Conversely, immigration is low, though people from nearby towns do come to the area in search of temporary jobs.

5.7   Local Infrastructure and Services

All the support infrastructure is either built or in process of construction to support the oxide gold mining and extraction activities at Shahuindo. All working areas of the mine are accessible by well-maintained dual lane gravel roads.

The site will be connected to the Peru power grid in mid-2017, before production increases to 36 ktpd. The energy demand for the first two years of production does not warrant the use of line power and all facilities will be connected to the internal 22.9 kV power network supplied from a substation powered by generators located near the process plant.

The project is considering three leach pads (1A, 2A and 2B). The initial dump leach pad construction is currently ongoing, with Pad 1A complete and construction started on Pad 2A to receive ore from mining in 2017.   Pad 2B construction has been initiated using mine waste to construct the stability platform and solution ponds.

An independent analytical and assay laboratory and metallurgical laboratory located at the La Arena mine will be used to process all mining and metallurgical samples.

Two industrial water purification plants have been installed to treat 105 m³/hour to a suitable quality for discharge to the environment, one at the plant site (25 m³/hr) and a second at the camp (80 m³/hr). Other associated facilities in the process of construction are a reagent warehouse, workshop and offices.

Other site infrastructure constructed to date includes an explosives magazine, a temporary workshop and security guard camp. A new mine camp is currently under construction with facilities to house 200 people and a kitchen/mess hall that can cater for 750 people. The camp will be expanded to 500 beds in

2017. Office buildings and training infrastructure are also currently under construction with an estimated completion date of January 2016.

The temporary offices currently in use (former Sulliden exploration camp) all have phone and data connection via microwave link to a Peruvian telephone network with a total available bandwidth of 12 Mb/sec. A 3G cellular phone service has been installed under contract with a major Peruvian service provider and 3G signal is available across the site. These systems will be transferred to the new offices in early 2016.

A water well has been installed for the camps, processing plant, workshop and other facilities. The 12-inch diameter well is 300m deep and located approximately 500m above an 18 m^3 water storage pond at the foot of the Algamarca anticline. The well has a nominal continuous flow capacity of 15 L/s.

Sewage and waste water management facilities have been installed.

The location of waste dumps, tailings storage, leach pads, processing plant and other infrastructure are discussed further in Section 18.0.

6.0 HISTORY

Mining in the Shahuindo area has occurred intermittently over the past few centuries, with the first mining activities conducted by the Spanish after their conquest of the Inca Empire in the 1530s. It was not until 1945 that modern mining exploration was conducted in the area.

6.1 Ownership History

Legal rights to the mineral leases of Shahuindo were in dispute between 1996 and 2009. A number of Peruvian, Mexican and Canadian companies have been involved in numerous legal processes that were eventually settled in 2009 with 100% ownership being legally registered to Shahuindo SAC (previously Sulliden Shahuindo SAC).

Sulliden Shahuindo SAC entered into a Transfer of Mineral Rights and Properties Contract, named *Contrato de Transferencia de Propiedades Mineras* (the Definitive Agreement), with Compañia Minera Algamarca S.A. and Exploraciones Algamarca S.A covering 26 mineral claims and 41 surface rights, which was formalized by public deed dated 11 November 2002.

Subsequently, the vendors (Compañia Minera Algamarca SA and Exploraciones Algamarca SA), controlled by new stockholders and other companies of the same group, challenged the Definitive Agreement and launched a number of judicial proceedings against Sulliden Shahuindo SAC. Sulliden Shahuindo SAC also commenced legal proceedings to confirm their rights under the Definitive Agreement and a number of other judicial proceedings to protect its title to the Shahuindo property. In 2009, Sulliden Shahuindo SAC prevailed and maintained 100% of the mineral claims and surface rights.

In August 2014, Rio Alto Mining Ltd. acquired all of the outstanding shares of Sulliden Gold Ltd. and became the owner of Shahuindo mineral claims and surface rights under their Peruvian subsidiary, Shahuindo SAC.

In April 2015, Tahoe completed an acquisition of Rio Alto Mining Ltd., acquiring control of Shahuindo SAC and the Shahuindo mineral claims and surface rights. Shahuindo SAC remains as Tahoe's wholly owned operating company for the Shahuindo project.

6.2 Exploration History

Exploration and mining activities have been conducted on the Shahuindo leases since 1945. These exploration activities are summarized in Table 6.2-1.

Table 6.2-1   Summary of Prior Exploration Activities on the Shahuindo Property

Period	Operator	Activities
1945 – 1989	Minera Algamarca SA	Exploration leading to the discovery and operation of an underground Cu-Ag-(Au) mine consisting of 5 adits at Algamarca. Limited small-scale mining (Au) in the Shahuindo and San José communities. No public records of exploration activities.
Circa 1990	Atimmsa	Geologic mapping, 11 reverse circulation and 6 diamond drill holes. Assays and drill logs available for the reverse circulation program.
1994 – 1996	Asarco LLC	Detailed and regional mapping, soil and rock geochemical sampling, 31 reverse circulation and 58 diamond drill holes, initial metallurgical testing. Drill exploration data available.
1997 – 1998	Southern Peru Copper Corporation	Limited surface sampling, 18 diamond drill holes, 80 reverse circulation holes, initial economic evaluation of the property. Drill exploration data available.
2002 – 2012	Sulliden Gold Corporation	Large surface drilling campaign totaling 642 holes; both diamond core and RC. Majority of the deposit within the 2012 resource outline drilled to a nominal 50m x 50m spacing.
2014-2015	Rio Alto Gold	Extensive surface drilling program of 234 RC holes, the majority of which to decrease the nominal drill spacing in the Shahuindo deposit to approximately 25m x 25m and expand the resource. An additional 12 diamond core holes were drilled for geotechnical purposes.

Compañia Minera Algamarca S.A. and Exploraciones Algamarca S.A. (Algamarca) commenced exploitation of the Algamarca mine in the 1940s and continued mining and exploration work on the Shahuindo property until 1989. Algamarca's exploration activities during the 1980s led to the discovery of mineralization and mining of the San José and Shahuindo mines. Most of the Cu-Ag-(Au) vein deposits exploited by Algamarca were on the southwestern limb of the Algamarca anticline (the Algamarca mine), but several small veins and breccia zones on the northeast limb of the Algamarca anticline were also explored and mined by Algamarca (the San José and Shahuindo small-scale gold mines).

From about 1990 to 1998, three companies explored the Shahuindo Project area – Alta Tecnología e Inversión Minera y Metalúrgica S.A. (Atimmsa), Asarco LLC (Asarco), and Southern Peru Copper Corporation (Southern Peru). Atimmsa, Asarco, and Southern Peru completed geological mapping; soil, outcrop, and rock chip sampling; and RC and core drilling. Work by Asarco and Southern Peru led to the identification of four major low-grade gold-silver zones at Shahuindo – San José, Porphyry, South Contact, and East Zone. Southern Peru stopped work on the property in 1998 when its parent company, Asarco, merged with Grupo Mexico (Saucier and Poulin, 2004) and the property reverted to Algamarca in 1999 (Wright *et al.*, 2010b).

Sulliden acquired the property and commenced exploration activity in 2002. Sulliden's work was the most comprehensive on the project and is summarized in Table 6.2-2.

Table 6.2-2   Summary of Sulliden Exploration Activities

Year	Description of Activities
2002	Preliminary geophysical surveys (magnetometer and induced polarization), re-survey of previous drill collars
2003	27 diamond drill holes. Geologic mapping and trenching, soil survey, surface rock sampling, geophysical surveys (magnetometer and induced polarization), preliminary metallurgical testing, re-survey of previous drill collars
2004	56 diamond drill holes. Geological mapping, soil survey, trenching, surface rock sampling, adit sampling, magnetometer survey
2007	14 diamond drill holes on targets outside of the main mineralized area. Re-establishment of grid, magnetometer surveys, soil sampling
2009	12 diamond drill holes and 25 reverse circulation holes. Acquisition of digital 2m topography, location of previous hole collars, trenching, drill-hole re-sampling program, soil sampling (mobile metal ion survey), metallurgical test work, preliminary economic assessment
2010	79 diamond drill holes, 82 reverse circulation holes. Mapping, rock sampling, soil sampling, geophysical surveys (magnetometer, induced polarization, down-hole IP), metallurgical test work, geotechnical evaluation
2011	162 exploration diamond drill holes and 145 reverse circulation holes. Geotechnical drilling and evaluation .Mapping, rock sampling, soil sampling. Resource estimation.
2012	13 exploration diamond drill holes (not included in the 2012 resource estimate. Geotechnical drilling and evaluation. Mapping, rock sampling, soil sampling. Geophysical surveys (magnetometer, induced polarization, down-hole IP)

From their acquisition of Sulliden in August 2014 to their merger with Tahoe in April 2015, Rio Alto completed 234 reverse circulation (RC) drill holes and 12 diamond drill core holes totaling 24,522 meters in and around the Shahuindo deposit. The majority of these holes were drilled as infill holes to pre-existing drill holes, with some 'step-out' drilling to expand the resource. Rio Alto also drilled several holes for metallurgical, geotechnical and hydrological investigation.

6.3   Historical Mineral Resource and Mineral Reserve Estimates

6.3.1   Pre-NI 43-101 Mineral Resource Estimates

Two historic resource estimates that predate the implementation of NI 43-101 were prepared for the Shahuindo deposit. In 1996, Asarco completed an unclassified resource estimate within 0.3 g/t gold envelopes interpreted and estimated on cross section and using a specific gravity of 2.5 for the tonnage

estimate. Southern Peru completed a second resource estimate in 1998 using the same methodology and parameters as the Asarco estimate, with the addition of 98 drill holes completed by Southern Peru.

The 1996 and 1998 resource estimates are not NI 43-101 compliant as a Qualified Person has not done sufficient work to verify or classify these historical estimates. Tahoe does not consider these historical estimates relevant (other than historical relevance) to the current status of the project and has not attempted to evaluate the reliability of the estimates.

A summary of the pre-NI 43-101 historical resource estimates are shown in Table 6.3-1.

<div align="center">

Table 6.3-1   Pre-NI 43-101 Mineral Resource Estimates

Year	Company	Tonnes	Au Grade (g/t)
1996	Asarco	17,706,000	1.14
1998	Southern Peru	29,410,000	0.88

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6.3.2   Prior NI 43-101 Mineral Resource Estimates

Five NI 43-101 resource estimates were previously completed on the Shahuindo deposit for Sulliden, as broadly summarized in Table 6.3-2.

<div align="center">

Table 6.3-2   Prior NI 43-101 Mineral Resource Estimate Summary

Year	Company	Consultant	Drill Holes	Method	Grade Estimation
2004	Sulliden	Met-Chem	223	67 x 50m spaced sections	ID^2
2005	Sulliden	Met-Chem	279	67 x 50m spaced sections	ID^2
2009	Sulliden	AMEC	320	67 x 50m spaced sections	ID^4
2011	Sulliden	Mine Development Associates	570	83 x 50m spaced sections; 8m plan interpretations	ID^3
2012	Sulliden	Mine Development Associates	826	83 x 50m spaced sections; 8m plan interpretations	ID^3

</div>

In 2004, Met-Chem Canada Inc. (Met-Chem) completed a resource estimate for the Shahuindo project based on Sulliden's 2003 drilling program as well as data from Asarco and Southern Peru's exploration programs. A total of 67 cross sections, spaced 50 meters apart, were used to interpret the deposit. A three-dimensional block model was constructed using block sizes of 10m north-south by 10m east-west by 5m elevation. The estimate used data from 223 drill holes spaced from 25m to 100m apart. Grade interpolation was done using inverse distance squared (ID^2). Tonnage calculations were based on specific gravity values for each area included in the estimate: San Jose (2.21), Porphyry (1.86), East Zone

(2.38), and South Contact (2.40). The mineral resource estimate included in the 2004 Technical Report, *Resources Estimation, Shahuindo Project, Peru* (Saucier and Poulin, 2004) prepared by Met-Chem on behalf of Sulliden, is summarized in Table 6.3-3.

Table 6.3-3   2004 Mineral Resource Estimate
(Saucier and Poulin, 2004; cut-off grade 0.3 g/t Au)

Classification	Tonnes	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces	Ag Ounces
Indicated	25,817,075	1.07	23.97	890,240	19,898,241
Inferred	8,569,150	0.92	22.54	253,836	6,210,567

Met-Chem updated their resource estimate in 2005 to include data from an additional 56 core holes drilled by Sulliden in 2004. The database for resource estimation included a total of 279 holes drilled by Asarco, Southern Peru, and Sulliden, spaced from 25m to 100m apart. Auriferous zones were delineated on 50m spaced cross sections using envelopes of 0.3 g/t Au. Block model parameters and grade interpolation method were the same as in Met-Chem's 2004 estimate. Met-Chem used different search ellipsoids for each zone and sub-zone to reflect variations in data density and geometric configuration. The mineral resource estimate was included in the 2005 Technical Report, *Resources Estimation, Shahuindo Project, Peru* (Saucier and Buchanan, 2005) prepared by Met-Chem on behalf of Sulliden, and is summarized in Table 6.3-4.

Table 6.3-4   2005 Mineral Resource Estimate
(Saucier and Buchanan, 2005; cut-off grade 0.3 g/t Au)

Classification	Tonnes	Au Grade (g/t)	Ag Grade (g/t)
Indicated	38,009,500	0.95	22.99
Inferred	17,159,200	0.62	12.83

AMEC Americas Inc. (AMEC) updated Met-Chem's mineral resource estimate in October and November 2009 as part of a Preliminary Assessment. This estimate was based on assays from 320 drill holes and used a block model with 10m by 10m by 5m blocks with the model dimensions oriented horizontally at azimuth 125°. The gold model was estimated using two passes of inverse anisotropic distance weighting to the fourth power (ID4), and a model for silver was estimated using the same composite search strategy and interpolation power as for the gold model. AMEC estimated resources within a pit shell using a cut-off grade of 0.23 g/t AuEq, with a marginal cut-off grade of 0.17 g/t AuEq, for oxide mineralization and a cut-off grade of 0.63 g/t AuEq, with a marginal cut-off grade of 0.57 g/t AuEq, for mixed and sulfide mineralization. Metal prices of $890 per ounce gold and $13.25 per ounce silver were used in the estimate with variable metallurgical recoveries ranging from 80% to 85% for gold and

15% to 70% for silver. The mineral resource estimate was included in the 2010 Technical Reports, *Shahuindo Gold Project, Cajabamba Province, Peru, Technical Report on Preliminary Assessment* (Wright et al., 2010a) and *Shahuindo Gold Project, Cajabamba Province, Peru, Preliminary Assessment* (Wright et al., 2010b), both prepared by AMEC on behalf of Sulliden; the results of which are summarized in Table 6.3-5.

Table 6.3-5   2009 Mineral Resource Estimate
(Wright *et al.,* 2010a, 2010b)

Classification	Tonnes (kt)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces	Ag Ounces (koz)
Indicated	51,800	0.63	17.9	1,050	29,800
Inferred	18,000	0.50	6.1	290	3,500

Mine Development Associates (MDA) completed an updated mineral resource estimate in 2011 which included only Indicated and Inferred Mineral Resources. There were no Measured Mineral Resources classified due to limited density and QA/QC data, uncertainty in localized metal grades due to moderate core recovery, and uncertainty with regards to localized metallurgical characteristics. Sulfide resources were restricted to Inferred classification due to limited metallurgical characterization and some spatial and geologic uncertainty in the model. The mineralized overburden was restricted to Inferred due to the uncertainties in grade continuity.

The stated resource was fully diluted to 8m by 8m by 4m blocks and tabulated on gold-equivalent grade cut-offs that MDA considered reasonable for deposits of this nature and for the expected mining conditions and methods. The AuEq grade was calculated using individual gold and silver grades of each block using a gold price of $1,200 per ounce and a silver price of $18.75 per ounce. For the oxide and mixed resource estimates, the AuEq grade calculation included a 5:1 difference in gold versus silver recovery in the proposed heap leach processing scenario. The formulas used to calculate the AuEq grade were:

Oxide and Mixed Material: AuEq g/t = Au g/t + (Ag g/t x 0.003125)

Sulfide Material: AuEq g/t = Au g/t + (Ag g/t x 0.015625)

The gold and silver resources reported by MDA in the 2011 *Technical Report on the Shahuindo Gold Project, Cajabamba, Peru* (Tietz and Kappes, 2011) are shown in Table 6.3-6. At the reported cut-off grades, approximately 58 percent of the total resource was classified as Indicated. Approximately 89 percent of the oxide and mixed resource considered for potential open pit heap leach mining was classified as Indicated.

Table 6.3-6   2011 Mineral Resource Estimate
(Tietz and Kappes, 2011)

Classification	Cut-off (g AuEq/t)	Tonnes (000's)	AuEq Grade (g/t)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000's)	Ag Ounces (000's)
Indicated–Oxide	0.20	111,430	0.514	0.496	6.0	1,776	21,350
Indicated–Mixed	0.35	7,750	0.864	0.781	26.6	195	6,630
Total Indicated	Variable	119,180	0.537	0.515	7.3	1,971	27,980
Inferred–Oxide	0.20	19,390	0.377	0.365	3.6	228	2,270
Inferred–Mixed	0.35	710	0.719	0.685	10.7	16	240
Inferred-Sulfide	0.50	42,730	1.278	0.868	26.3	1,192	36,070
Total Inferred	Variable	62,830	0.994	0.711	19.1	1,436	38,580

MDA updated their resource estimate in July 2012 based on additional drilling completed by Sulliden through May 2012. The 2012 Mineral Resource estimate by MDA followed the same modelling and estimation methodology as their 2011 estimate and assumed a gold price of $1300 per ounce and a silver price of $25 per ounce. For the oxide and mixed resource estimates, the AuEq grade calculation included a 5:1 difference in gold versus silver recovery in the proposed heap-leach processing scenario. Formulas used to calculate the AuEq grade were:

Oxide Material: AuEq g/t = AuEq g/t + (Ag g/t x 0.003846)

Mixed Material: AuEq g/t = AuEq g/t+ (Ag g/t x 0.006410)

Sulfide Material: AuEq g/t = AuEq g/t+ (Ag g/t x 0.019231)

MDA did not constrain the resource within a potentially economic open pit shell due to the proximity of the deposit to the current topographic surface.

The gold and silver resources reported by MDA in the 2012 Technical Report on the Shahuindo Heap Leach Project, Cajabamba, Peru (Defilippi, et al., 2012) are shown in Table 6.3-7.

Table 6.3-7   2012 Mineral Resource Estimate
(Defilippi, *et. al.*, 2012)

Classification	Cut-off (g/AuEq/t)	Tonnes (000's)	AuEq Grade (g/t)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000's)	Ag Ounces (000's)
Measured-Oxide	0.20	40,500	0.619	0.588	8.1	766	10,530
Measured-Mixed	0.35	780	0.964	0.748	33.7	19	850
Total Measured	variable	41,280	0.626	0.591	8.6	785	11,380
Indicated-Oxide	0.20	104,840	0.506	0.482	6.3	1,624	21,080
Indicated-Mixed	0.35	1,190	0.919	0.766	23.8	29	910
Total Indicated	variable	106,030	0.511	0.485	6.5	1,653	21,990
Total Meas. + Ind.	**variable**	**147,310**	**0.543**	**0.515**	**7.1**	**2,438**	**33,370**
Inferred-Oxide	0.20	9,570	0.419	0.402	4.3	124	1,330
Inferred-Mixed	0.35	20	0.762	0.684	12.2	-	10
Inferred-Sulfide	0.50	61,410	1.202	0.762	22.9	1,504	45,220
Total Inferred	variable	71,000	1.096	0.713	20.4	1,628	46,560

Tahoe has not attempted to validate the prior NI 43-101 Mineral Resource estimates and does not consider any of these estimates as the current Mineral Resources for the Shahuindo project.

6.3.3   Prior NI 43-101 Mineral Reserve Estimates

Mineral Reserve estimates for the Shahuindo project were reported in the 2012 *Technical Report on the Shahuindo Heap Leach Project, Cajabamba, Peru* prepared for Sulliden Gold Corporation, Ltd. by Kappes, Cassiday & Associates and Mine Development Associates (Defilippi *et. al.*, 2012). The Technical Report had an effective date of September 26, 2012. No Minerals Reserves were published prior to the 2012 Mineral Reserve estimate.

MDA estimated the oxide and sulfide Mineral Reserves within a pit design based on a pit optimization of the Measured and Indicated mineral resources. The economic assumptions and other parameters used by MDA to undertake the pit optimization for the Shahuindo deposit are presented in Table 6.3-8 .

Table 6.3-8   2012 Pit Optimization Parameters
(Defilippi, *et. al.*, 2012)

Pit Optimization Parameters 2012	
Market Conditions	
Gold price per ounce	$1,300
Silver price per ounce	$25
Payable proportion of gold and silver produced	99.50%
Minimum government royalty	NA
Mill Recovery	
Gold recovery - Oxide	86%
Gold recovery - Mix	50
Silver recovery - Oxide	15%
Silver recovery - Mix	15%
Costs	
Mining cost	1.99
Process Cost	4.45
Incremental Cost Ore	NA
TPD	10,000
TPY	3,650
G&A Cost	1.73
Gold Refining	5.50
Silver Refining	0.57
Mining Parameters	
Slope Angle	27 - 41 degrees

The breakeven cut-off grades were calculated to be 0.23 g/t Au for oxide and 0.39 g/t Au for mixed material. The 2012 Mineral Reserve estimate is summarized in Table 6.3-9.

Table 6.3-9   2012 Mineral Reserve Estimate
(Defilippi, *et. al.*, 2012)

	Proven			Probable			Proven and Probable		
	Oxide	**Mixed**	**Total**	**Oxide**	**Mixed**	**Total**	**Oxide**	**Mixed**	**Total**
Tonnes (000's)	14,994	165	15,159	22,595	93	22,688	37,589	258	37,847
AuEq Grade (g/t)	0.91	0.72	0.91	0.81	0.89	0.81	0.85	0.78	0.85
Au Grade (g/t)	0.90	0.71	0.90	0.80	0.87	0.80	0.84	0.76	0.84
Ag Grade (g/t)	10.4	17.6	10.5	8.8	21.3	8.9	9.4	18.9	9.5
AuEq Ounces (000's)	438	4	442	588	3	591	1,026	6	1,032
Au Ounces (000's)	434	4	437	582	3	585	1,015	6	1,022
Ag Ounces (000's)	5,008	93	5,102	6,396	64	6,459	11,404	157	11,561

6.4   Historical Production

The following information regarding historical production from the Shahuindo district is presented verbatim from Sulliden's 2012 Technical Report on the Shahuindo Heap Leach Project (Defilippi et al, 2012).

The Algamarca mine, located on the southwest side of the Algamarca anticline, produced approximately 1.5 million tonnes grading 2.0% Cu, 680 g/t Ag, and "some gold" over a period of 45 years; the underground operations closed in 1989 (Saucier and Poulin, 2004; Wright *et al.*, 2010a, 2010b). Compania Minera Algamarca SAC was the operator.

On the northeast limits of the Algamarca anticline, Algamarca mined 8,000 tonnes of gold-silver ore from three adits in the Cuerpo San José area in 1988 (Saucier and Poulin, 2004; Saucier and Buchanan, 2005; Wright *et al.*, 2010a, citing Fletcher, 1997). Algamarca also exploited narrow gold-silver veins producing 12,000 tonnes at the Shahuindo mine from 1987 to 1989 (Saucier and Poulin, 2004; Saucier and Buchanan, 2005; Wright *et al.*, 2010a, citing Fletcher, 1997). AMEC's Technical Reports (Wright *et al.*, 2010a, 2010b, citing Montoya *et al.*, 1995) also reference production from underground stopes and a small open pit totaling 70,000 tonnes at an unknown grade from San José and Shahuindo in the 1980s or 1990s. Although this appears to be the same mining described in the Met-Chem reports (Saucier and Poulin, 2004; Saucier and Buchanan, 2005), Tahoe cannot account for the difference in tonnages.

Small scale underground mining is currently being undertaken by informal miners in the Algamarca anticline area, about 1,000 meters west of Tahoe's planned open pit operations.

7.0   GEOLOGICAL SETTING AND MINERALIZATION

7.1   Regional Geology

The Shahuindo Deposit is located on the eastern flank of the Andean Western Cordillera in northern Peru, approximately 35 kilometers north-northwest of Tahoe's La Arena mine. The area is underlain by sediments of the Mesozoic West Peruvian Basin which were folded and faulted during the Cenozoic deformation.

The regional stratigraphy is dominated by the folded Upper Jurassic Chicama Formation to the Lower to Middle Cretaceous Goyllarisquizga Group, which are mainly siliciclastic sediments, with younger Lower- to Upper-Cretaceous carbonate sediments occupying the cores of synclines. The regional stratigraphical column is summarized in Table 7.1-1; a plan map and example cross section of the regional geology are illustrated in Figure 7.1-1 and Figure 7.1-2, respectively.

Table 7.1-1   Shahuindo Regional Stratigraphic Column

Era	System	Series	Group	Formation	Gold Mineralization
Cenozoic	Quaternary	Recent		Alluvial, Fluvial	
		Pleistocene		Glacial, Lacustrine	
	Neogene		Calipuy		AC
	Paleogene				
Mesozoic	Cretaceous	Upper		Yumagual	
		Lower		Pariatambo	
				Chulec	
				Inca	
			Goyllarisquizga	Farrat	**SHA**
				Carhuaz	**SHA**
				Santa	
				Chimu	AC, ET, LA, LV, SR
				Oyón	
	Jurassic	Upper		Chicama	

after Reyes R. L, 1980 and Navarro *et. al.*, 2010
gold occurrences: AC: Lagunas Norte, ET: El Toro, LA: La Arena, LV: La Virgen, **SHA: Shahuindo**, SR: Santa Rosa

From oldest to youngest, the regional stratigraphy is described as follows:

Paleozoic (and Precambrian): Basement rocks to the east of Shahuindo along the River Marañon and the Eastern Cordillera. They are not exposed at Shahuindo or in the immediately surrounding area.

Mesozoic: The oldest outcropping rocks in the region belong to the Upper Jurassic Chicama Formation and consist of soft, laminated marine black shales with thin sandstone intercalations.

The Chimu Formation constitutes the principal host rock for gold mineralization at Lagunas Norte, El Toro, La Arena, La Virgin and Santa Rosa deposits and the Algamarca vein system. The upper member of the Goyllarisquisga Group consists of the Santa, Carhuaz and Farrat Formations. These formations consist of generally finer-grained siliciclastic units with minor interbedded carbonates in the lower portion and thick beds of sandstone in the upper portion of the formation. The Carhuaz and Farrat formations are the hosts for gold and silver mineralization at Shahuindo.

Overlying the Goyllarisquisga Group sediments are Lower Cretaceous shallow marine carbonates of the Inca, Chulec and Pariatambo formations and the Upper Cretaceous Yumagual Formation.

The Mesozoic sediments were folded and faulted towards the end of the Cretaceous by the early stages of the developing Andean Orogeny.

Cenozoic: The Calipuy Group cordilleran arc volcanics unconformably overly the folded and faulted Mesozoic strata south-west of Shahuindo. These sub-aerial volcanics are associated with Upper Miocene sub-volcanic intrusive bodies of andesitic to dacitic composition. The Calipuy volcanics are mainly tuffs interbedded with andesitic lavas with agglomerate horizons at the base at the base formation.

Cenozoic intrusive rocks including andesite, dacite and quartz–feldspar porphyries that intruded as isolated stocks into the Mesozoic sedimentary sequence. The age of these intrusions vary from c.a. 16 to 26 Ma. (Bussey and Nelson 2011). One of these intrusions is interpreted to be the source of the gold and silver mineralization at Shahuindo.

The main structural features of the region are associated with the Jurassic-Cretaceous sedimentary sequence and consist of a series of folds, reverse faults and over-thrusts trending generally NW-SE (Figure 7.1-2). Individual folds range up to 80 kilometers in length and 5 kilometers in width, and display various degrees of deformation depending on the relative competency of the various stratigraphic levels. The highly competent sections of the Chimu Formation, for example, form structurally complex cores to the main anticlines, which have resisted erosion better than the enclosing strata.

The region is particularly well-endowed with mines and mineral occurrences varying from low-to-high sulfidation systems and from porphyry through polymetallic to epithermal deposits. Currently operating mines in the area include Quiruvilca polymetallic Cu-Zn-Pb-Ag mine and the La Arena, Lagunas Norte, La Virgen and Santa Rosa high-sulfidation epithermal gold mines, with many other gold-silver prospects in the region.
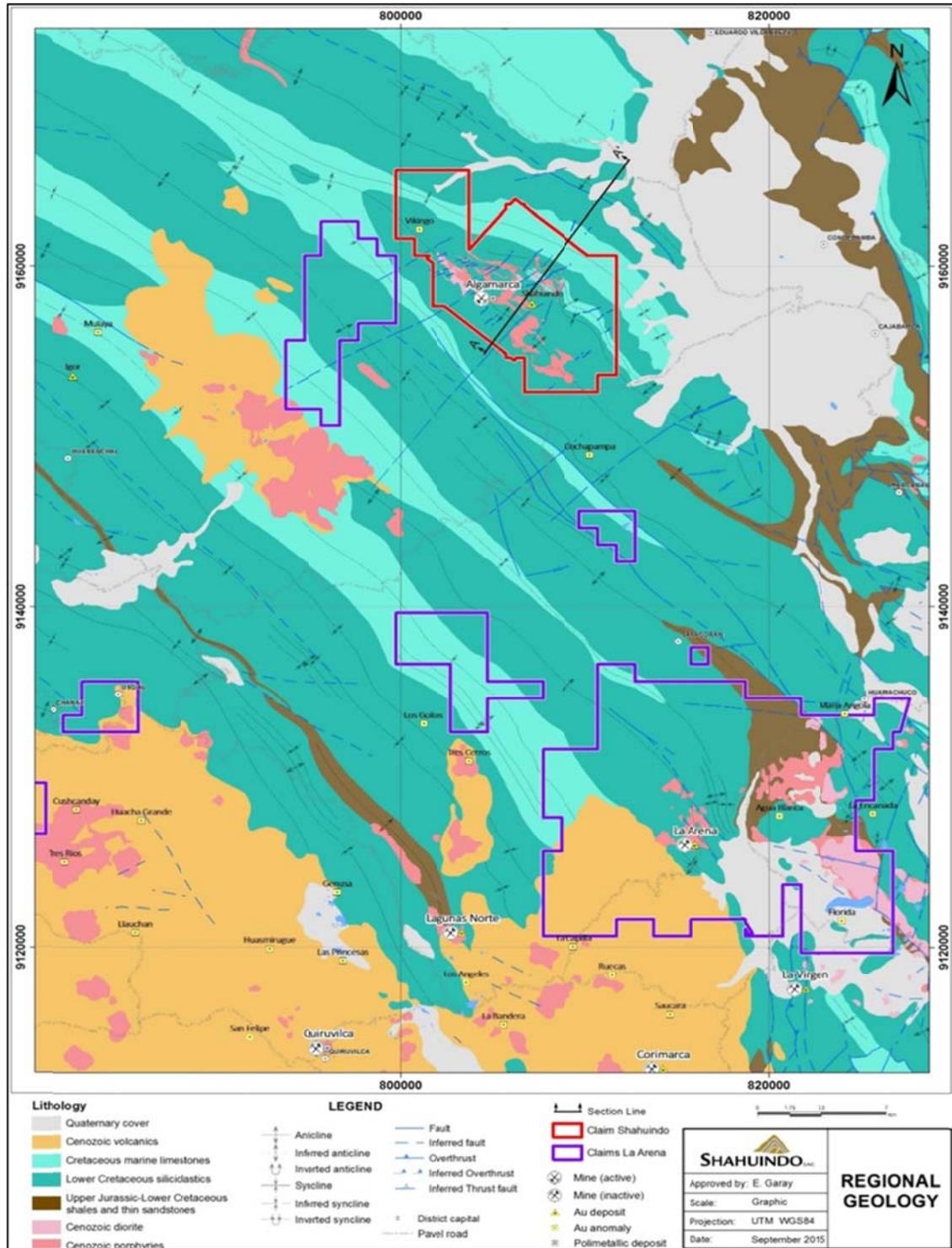
Figure 7.1-1   Shahuindo Regional Geology
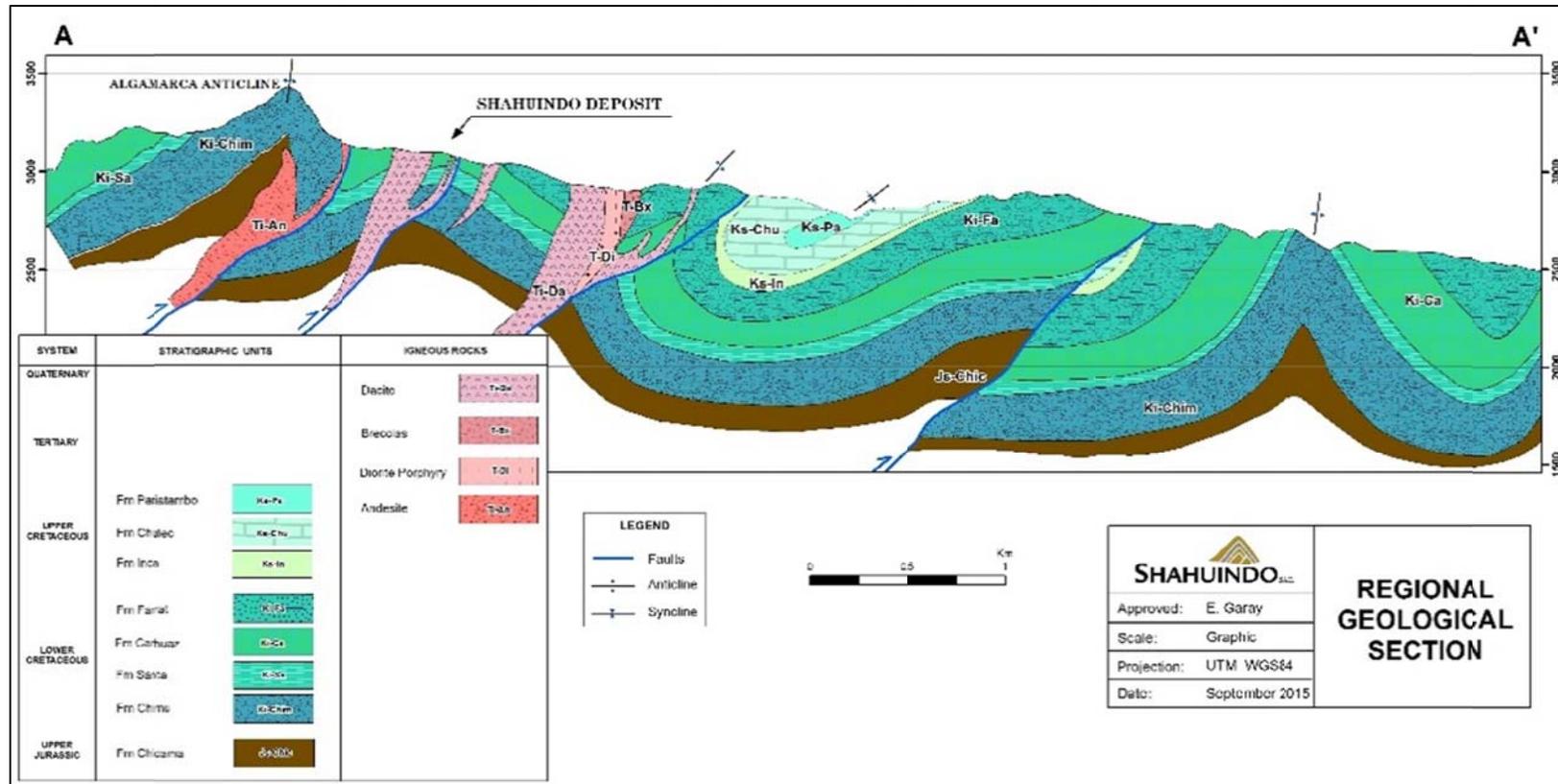
Figure 7.1-2   Shahuindo Regional Cross Section

Mesozoic sediments affected by folds and reverse faults. Miocene intrusives emplaced in the fold axes.

7.2 Project Geology

The Shahuindo Project is located within a regional fold and thrust belt of predominantly Mesozoic sedimentary rocks. Sedimentary rocks in the project area have been intruded by at least three felsic stocks which tend to be located along faults and cores of anticlinal structures as shown previously in Figure 7.1-2.

Sedimentary rocks across the Shahuindo Project area consist of a lower, shallow marine-to-deltaic siliciclastic sequence and an upper sequence of finer grained siliciclastic units with minor interbedded carbonates in the lower portion and thick beds of sandstone the upper portion, all of Lower Cretaceous age.

The oldest rocks exposed at the bottom of the valleys and in the cores of anticlines are thinly bedded and laminated mudstones, minor siltstones and fine grained sandstones with occasional coal seams of the basal Lower Cretaceous Chicama Formation.

Overlying the Chicama Formation is the Goyllarisquizga Group which, from oldest to youngest, is comprised of the Chimu Formation, Santa Formation, Carhuaz Formation, and Farrat Formation.

Overlying the Chimu Formation is the Santa Formation which consists of mudstone with intercalations of limestone. It is exposed on the flanks of the Algamarca anticline. Overlying the Santa Formation is the Carhuaz Formation, consisting of interbedded sandstone, siltstone, and mudstone, with many sandstones displaying cross bedding and amalgamated wedge-shaped sandstone beds. The Farrat Formation consists of cliff-forming siliciclastic strata dominated by sandstone. The Farrat Formation is the dominant host of gold and silver mineralization in the northern part of the Shahuindo deposit. The Carhuaz and Farrat formations are the principal hosts for gold and silver mineralization in the central and southern portions of the deposit, as illustrated in Figure 7.2-2.

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Figure 7.2-1   Shahuindo Local Geology

AGE	PERIOD	EPOCH	LITHOSTRATIGRAPHIC UNIT		THICKNESS (m)	GRAPHIC LITHOLOGY	MINERAL DEPOSIT	INTRUSIVES	DESCRIPTION
CENOZOIC	QUATERNARY	RECENT	ALLUVIAL DEPOSITS						Gravels, sands and silts.
		PLEIS-TOCENE	CONDEBAMBA FORMATION		50				Intercalations of coarse sandstones with red clays and conglomerate.
MESOZOIC	CRETACEOUS	UPPER	PARIATAMBO FORMATION		>200			Breccias Intrusive	It consists of thin layers of shales and bituminous limestone, abundance of ammonites.
			CHULEC FORMATION		400-500			Dacite porphyry	Marine carbonate sequence outcropping north of the Shahuindo mine.
			INCA FORMATION		100-200			Diorite porphyry	The unit consists of pyritic black shale with minor siltstones and sandstones, occasionally with a calcareous matrix.
		LOWER	GOYLLARISQUIZGA GROUP	FARRAT FORMATION	500-700		EL ALIZAR SHAHUINDO		Sandstones and quartzite, typically clean and yellow-white in color, with minor interbeds of lenticular siltstones, are characteristic of the formation.
				CARHUAZ FORMATION	300-500				The unit dominantly comprises grey siltstones, lesser amounts of impure white to cream-colored sandstones that have a fine-grained to sugary texture, and minor grey shale. The formation is highly lenticular. Beds are massive and are 0.1 m to one meter thick with little internal structure.
				SANTA FORMATION	50-200				Dominant pyritic black to grey shale, minor lenticular siltstones, and a calcareous matrix at the base comprise the formation. It contains one to ten percent pyrite regionally.
				CHIMU FORMATION	500-700		LA VIRGEN ALGAMARCA COMARSA LA ARENA LAGUNAS NORTE		The unit consists of white orthoquartzite with intercalations of carbonaceous shale in exposures in the Algamarca anticline.
	JURASSIC	UPPER	CHICAMA FORMATION		>1000				This unit contains a high proportion of black shales with pyrite cores with interbedded of light brown sandstones.

Figure 7.2-2   Local Stratigraphic Column for the Carhuaz/Farrat Formations

Multiple intrusions of dacitic and andesitic feldspar stocks have intruded the Cretaceous sedimentary sequence at Shahuindo (Figure 7.2-3 and Figure 7.2-4). Intrusions recognized by previous mapping in the Shahuindo area include rocks described as andesite, dacite porphyry, and intrusion breccia. There is an opportunity to improve the geologic understanding of the district by carefully mapping the distribution of these intrusive phases and separating lithology from alteration.

The five non-breccia intrusive phases were recognized as diorite porphyry (known as "andesite" in the district), dacite porphyry, fine-grained dacite porphyry, quartz diorite porphyry, and foliated quartz diorite porphyry. The distribution of the five intrusion types is based on field observations. The three intrusive breccia phases are heterolithic breccia with biotite diorite matrix, heterolithic breccia with fine-grained dacite matrix, and heterolithic megabreccia with foliated quartz-biotite dacite matrix.

Diorite porphyry (andesite) was observed in the southeast part of the main Shahuindo corridor and is inferred to be present on the northeast side of the Algamarca anticline and east of the current resource outline. The mapped pattern of the intrusion indicates emplacement mostly as sills in the Goyllarisquizga Group units. It is characterized by large (8mm diameter) biotite phenocrysts, a lack of quartz, and no evidence of hydrothermal alteration where seen in the field, although it is deeply weathered. An isotopic age determination is reported to have been made (thought to be zircon U-Pb) on this intrusion and yielded an age of ~26 Ma. (Bussey and Nelson 2011).

The dacite porphyry is characterized by one cm bipyramidal quartz phenocrysts, with biotite and plagioclase phenocrysts in an aphanitic groundmass. It is the most widespread intrusion in the Shahuindo district and is argillically altered wherever observed. The mapped distribution indicates that much of the dacite porphyry was emplaced as sills concordant to bedding in the Goyllarisquizga Group. Nonetheless, the principal intrusion along the main Shahuindo corridor is a composite dike-like body with relatively steep discordant contacts, as is the dacite porphyry intrusion on the southwest limb of the Algamarca anticline (see Figure 7.2-6). The large dacite porphyry body in the north part of the main corridor splays to the southeast into a series of dikes that narrow and disappear beneath cover in the central area of the Shahuindo deposit. An isotopic age determination (zircon U-Pb) on this intrusion yielded an age of ~16 Ma (Bussey and Nelson 2011).

Three intrusive breccia phases are recognized on the property and include; (1) heterolithic biotite diorite breccia, (2) heterolithic fine-grained dacite breccia, and (3) heterolithic megabreccia (Figure 7.2-7).

Heterolithic fine-grained dacite breccia was recognized during mapping in the main Shahuindo corridor. It occurs as narrow dike-like bodies, no more than three meters in width, with rounded to subangular clasts up to 10 cm in diameter of sandstone, siltstone, dacite porphyry, and rare shale, in a matrix of

fine-grained lithic clasts and clay with 1-3mm quartz, biotite, and plagioclase crystals. Most of the locations are in the north-western area of the resource, with two sites in the central area of the resource. This breccia also was noted in drill core from the central zone where heterolithic fine-grained dacite breccia contains fragments of sedimentary rock mineralized with pyrite, sphalerite, quartz, and white clay, indicating that the breccia is associated with the mineralization.
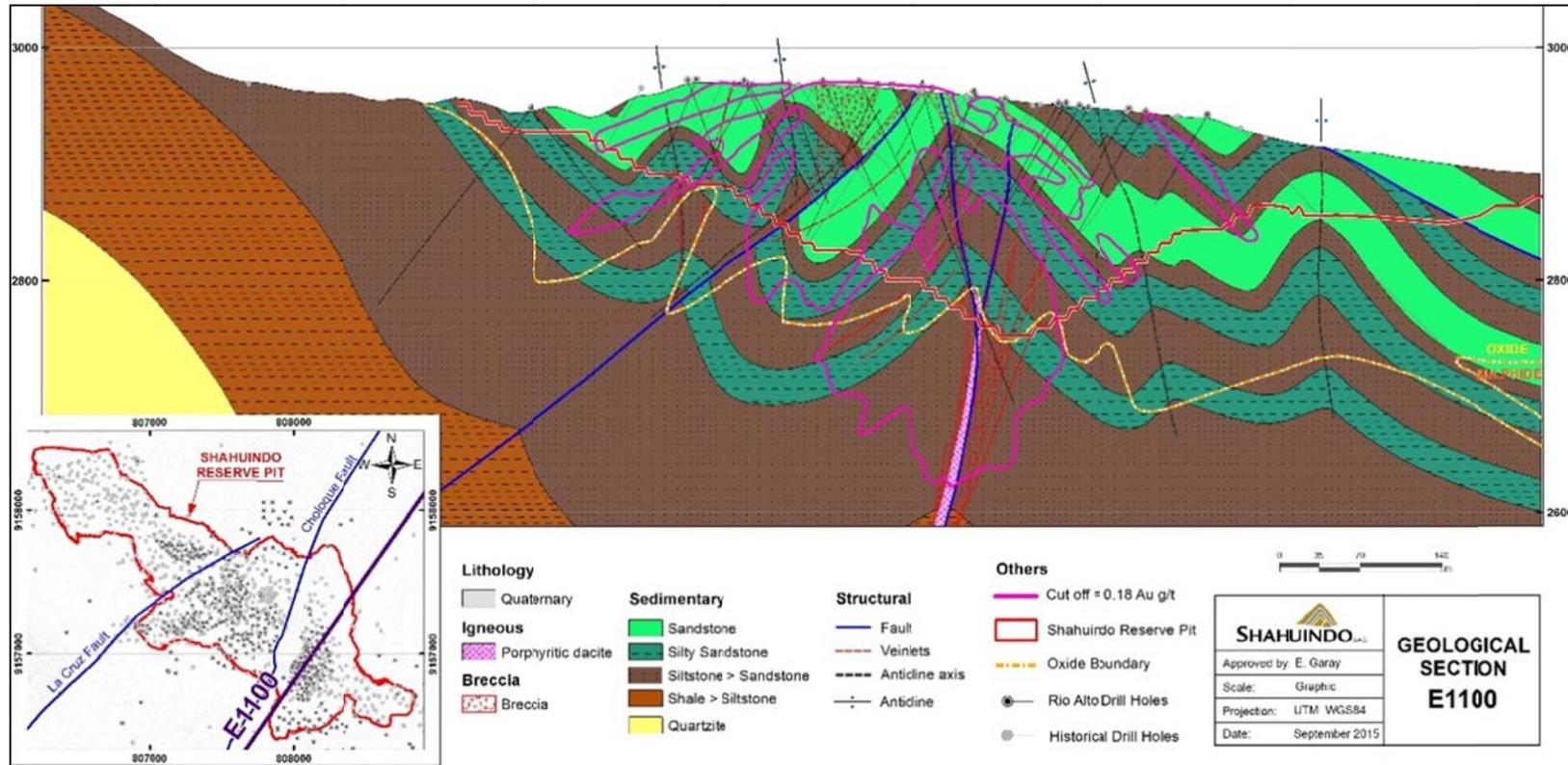
Figure 7.2-3   Multiphase Intrusion Crosscutting Sedimentary Rocks (Section E1100)
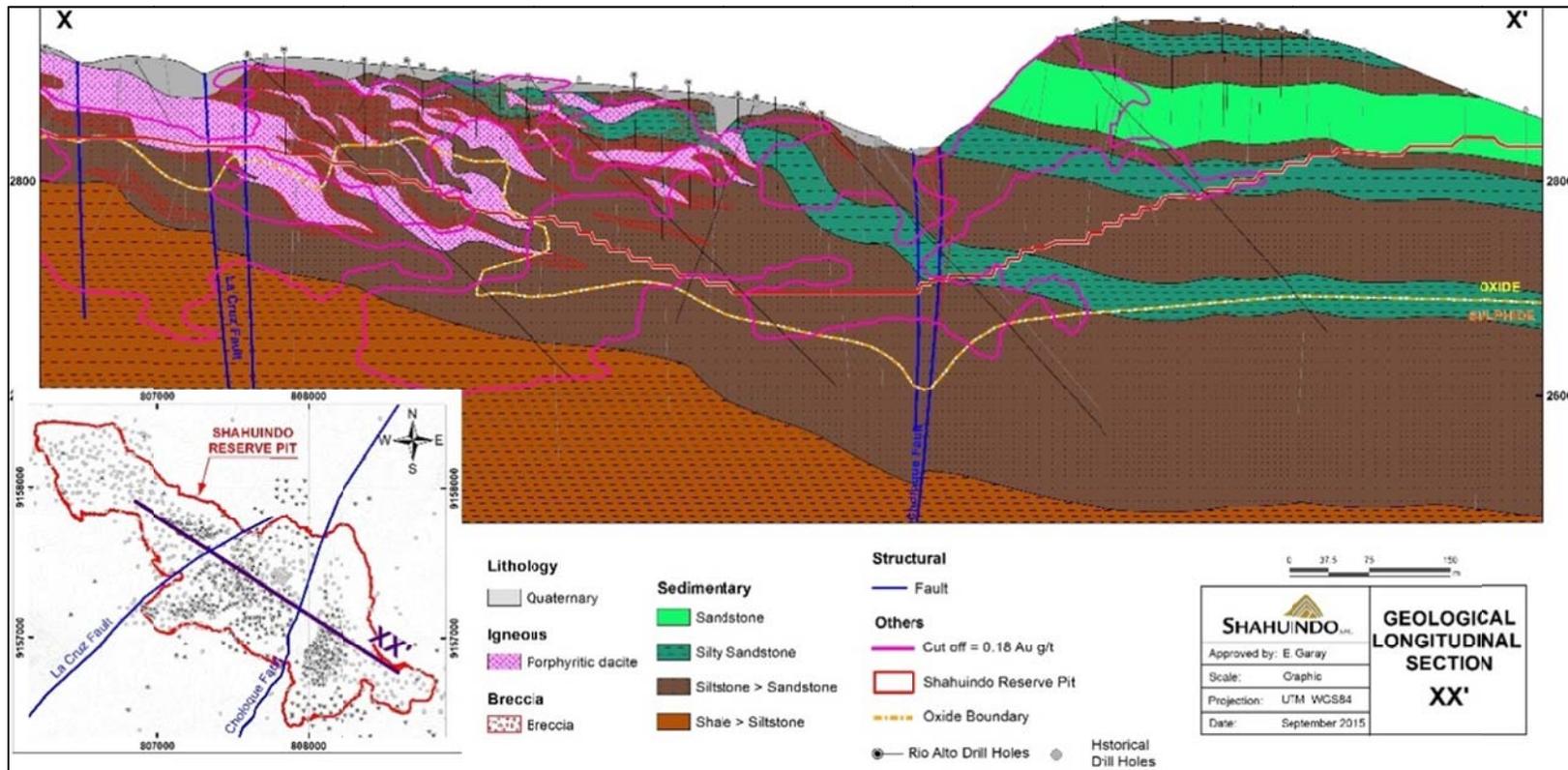
Figure 7.2-4   Multiphase Intrusion Crosscutting the Sedimentary Rocks (Section X-X')

Figure 7.2-5   Sedimentological Features for Determining Stratigraphic Sequencing

A - Tangential (at base) cross bedding

B - Load casts or channels on base of sandstone bed

C-D - Channel in overturned fold limb

E - Load casts

Figure 7.2-6   Intrusive Relationships

Andesite (red pattern) intruding core of a fold and cut by altered dacite dike (yellow outline) in the northern Shahuindo area
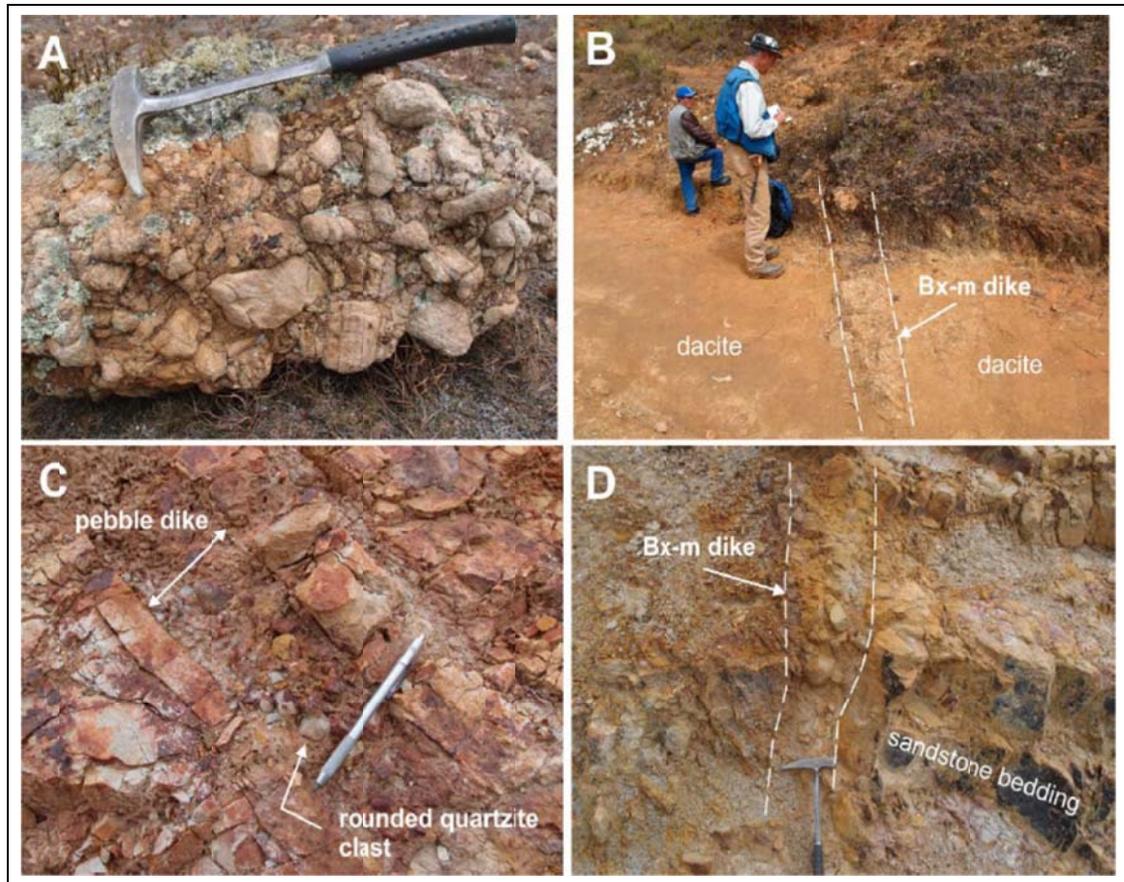
Figure 7.2-7   Monolithic-Clast Breccia

A - Sub-angular quartzite-clast breccia, matrix supported

B - Sedimentary-clast breccia cutting dacite

C - Pebble dike (sill) with rounded quartzite clasts

D - Sub-rounded sandstone-clast breccia

7.3   Mineralization

Mineralization at Shahuindo has been identified over an area approximately 3.7 kilometers southeast to northwest and 0.5 kilometer southwest to northeast. Oxidation of mineralization extends to a depth of 150m below surface. Sulfide mineralization has been identified by surface drilling to 700m depth.

Mineralization at Shahuindo can best be described as an intermediate-sulfidation epithermal system, though high-sulfidation mineralization occurs at depth and in the core of hydrothermal breccias. The high-sulfidation mineralization was pervasively overprinted by intermediate-sulfidation mineralization (pyrite, galena, sphalerite, Ag sulfosalts), which occurs at shallow levels and in 'feeder structures'. Mineralization occurs on fracture surfaces, in breccia matrix, and as disseminations within the sediment packages.

The host rocks at Shahuindo are the Carhuaz and Farat sedimentary formations which are folded and locally fault offset, and cut by porphyritic dikes and stocks. Sandstone tends to be a better host to higher grades of gold and silver compared to siltstone. Brecciated structures with polylithic fragments consist of wall rock clasts, locally clasts of residual quartz (the vuggy texture indicating rock dissolution), as well as juvenile clasts of dike rock, the latter evidence of a syn-hydrothermal timing of dike emplacement.

In the oxide facies, which is interpreted to be the result of weathering processes, gold and silver are associated with the presence of jarosite and hematite. In the sulfide facies, gold is typically extremely fine grained; the mineral species has not been identified. Fine-grained pyrite forms a close association with gold mineralization and occurs as disseminations, veinlets, and semi-massive replacement bodies.

Tetrahedrite, sphalerite, galena, arsenopyrite, stibnite, and covellite have also been reported as minute blebs adhering to zoned pyrite. Although native silver has been identified at San José and in the historic Shahuindo mine, silver is usually found in sulfosalts at Shahuindo.

7.4   Structural Geology

The Shahuindo district occurs within the Eocene fold-thrust belt of northern Peru (Montoya *et. al.*, 1995). Although most structural elements of the fold-thrust belt formed during the Incaic II orogeny at ~43 Ma, geochronological data and field relationships suggest that mineralization commenced around16 Ma (Miocene). The Shahuindo district occurs along a localized belt of intrusive rocks that is mostly parallel to the dominant structural fabric of the fold-thrust belt. Pre-mineralization magmatism at ~26 Ma produced quartz diorite porphyry intrusions (mapped as andesite) and mineralization appears to have formed in association with dacitic to rhyolitic magmatism and associated brecciation, probably related to high-energy diatreme activity.

Although fold-thrust belt structures developed approximately 27 million years prior to mineralization, fold-thrust belt structural elements controlled much of the mineralization. NW-trending Miocene dikes, diatremes, and mineralized breccias parallel the regional strike of fold-thrust structures and were probably emplaced along reactivated fold-thrust belt structural elements and/or basement structures.

Field evidence indicates that both structure and lithology exert important controls on the location, shape, and orientation of mineralized rock. Important structural elements include fold limbs and fold axial surfaces, fold-related fractures, faults and related extension fractures, breccia dikes and irregular bodies, and igneous intrusive contacts. These structural elements are described below and their geometry and spatial relation to mineralized zones have been used to construct the structural model for the Shahuindo district.

The principal zone of mineralization in the Shahuindo district occurs in a belt between two large-amplitude regional-scale folds, the Algamarca anticline and the San Jose Anticline (Figure 7.4-1). The Algamarca anticline has amplitude of at least 400m and is upright and symmetrical. The San Jose fold has an amplitude of at least 300m and is an asymmetric, overturned, northeast-vergent fold with a low-angle dip (15°-20°) axial surface (i.e., resembling a recumbent style fold).

The Chimú-cored Algamarca anticline is interpreted as either an allochthonous fault-bend fold in the hanging wall of a duplex roof thrust, or as an anticlinal stack of folded strata and folded thrust faults above the postulated sub-horizontal roof thrust below the base of the Algamarca anticline exposure. Analysis of old mine workings in the Algamarca mine suggest that the southern limb of the Algamarca anticline continues to at least the 2,690m elevation. However, geometric features of the Algamarca anticline (symmetrical, upright, box shape) indicate that it is probably a detachment fold, not a fault-bend fold.

The strain in fold-thrusts belts is typically partitioned or compartmentalized along strike by transverse accommodation faults (also known as tear faults). The existence of tear faults in the Shahuindo district was noted by Hodder (2010b) and Hodder et al. (2010a); such faults include the Choloque, La Cruz, and Los Alisos faults. Although these faults likely exist (the evidence is mostly from topographic lineament mapping), they display a combination of kinematics and strong displacement gradients. Although not well-exposed at surface, the faults are thought to be steeply dipping. The La Cruz Fault, although it terminates the Algamarca anticline where it accommodated much vertical displacement, cannot be traced north of the main Shahuindo corridor and terminates before reaching the Pampa de Arena anticline. The Los Alisos Fault, inferred to be present based on a topographic lineament and alignment of intrusive bodies, shows no displacement of units and does not correlate with transverse veins in the Algamarca district. However, the Los Alisos Fault appears to terminate the main Shahuindo mineralized corridor to the northwest.
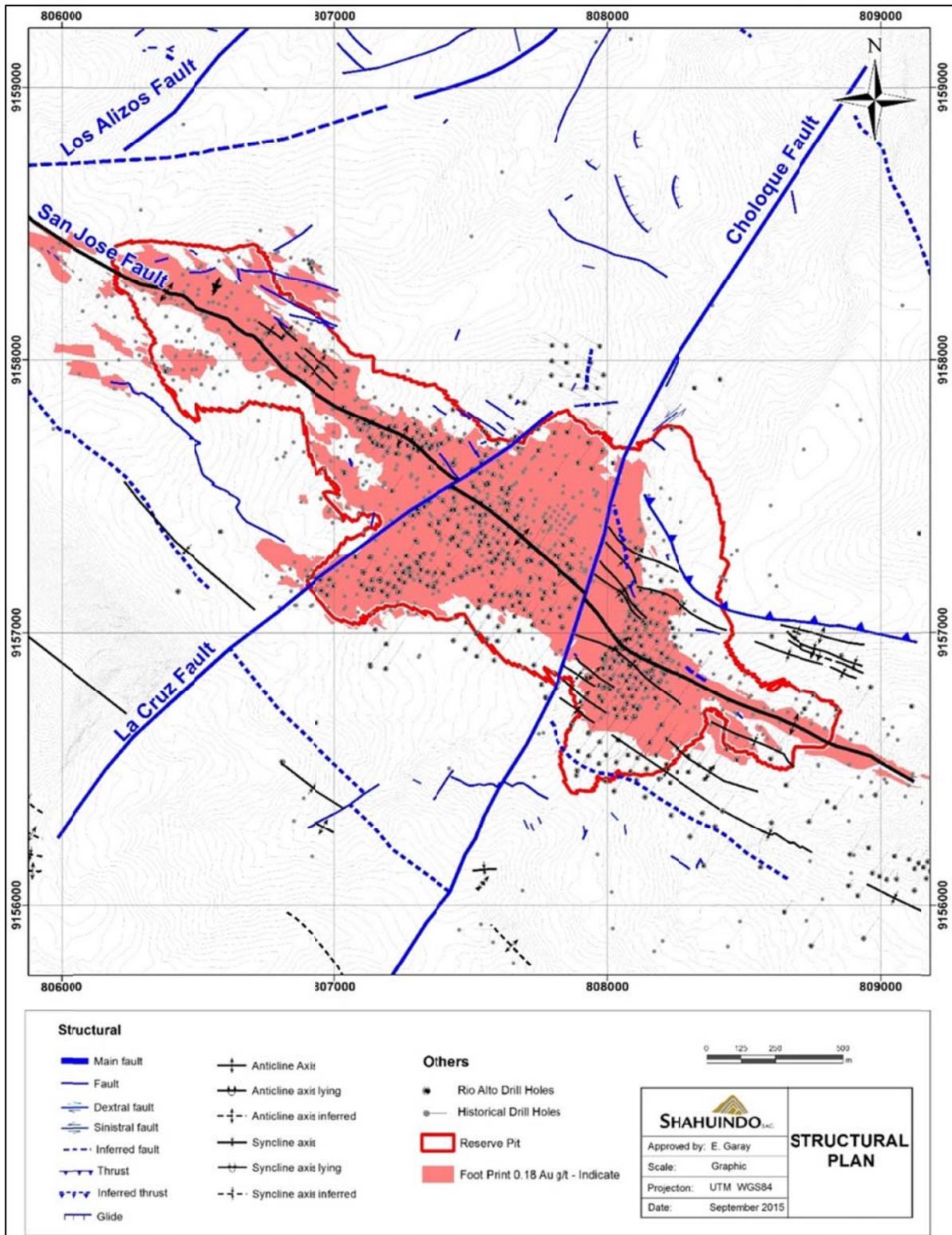
Figure 7.4-1   Combined Structure and Mineralization Map - Shahuindo Project

7.5   Hydrothermal Alteration

Visual evidence of mineralization in oxidized and weathered rocks at surface includes the presence of voids and crystal molds after pyrite and other sulfides, iron oxide in boxwork textures after sulfides, limonitic or gossanous coatings, fine-grained euhedral quartz druse as veinlets and vugs in brecciated zones, crystalline white clay or sericite, and alunite, jarosite, or scorodite in veins and veinlets.

Studies of hydrothermal clay-like alteration minerals have also been conducted on the project. A petrographic description followed by Terraspec® survey was completed by Rio Alto geologists on 50% of the core and chips samples from the project. This study defined deep occurrences of dickite, pyrophyllite, and alunite, particularly along fractures and dikes that may define feeder zones and shallow outflow of an initially reactive fluid. There is a broad zone of sericite (illite?) at shallower depth that may be associated with a white mica-stable mineralizing fluid (Hedenquist, *et. al.*, 2015).

Trending from southeast to northwest through the deposit, there is an alteration vector of the following assemblages in the sediment package: silica-pyrophyllite, silica-paragonite, and illite-muscovite-paragonite. These assemblages are indicative of a general trend of lesser temperature and higher pH from southeast to northwest. A trend of lesser temperature and higher pH from the core of mineralization outward exists in the southeast part of the deposit.

Jarosite forms in acidic environments usually due to oxidation of pyrite-rich rocks in the near surface environment (Figure 7.5-1). Mesozoic sediments are affected by folds and reverse faults with Miocene intrusives emplaced in the fold axes.

At Shahuindo, jarosite occurs in veins and as breccia matrix. Because jarosite is precipitated from iron-rich acidic surface water, it often forms some distance away from the weathering pyrite-rich rock from which it is derived. Nonetheless, its presence in outcrop is a good indicator that pyrite-rich rocks are or were nearby.

Scorodite (iron-arsenic oxide) often forms with jarosite during weathering of rocks that contained arsenic-bearing sulfides in addition to significant pyrite, and is an important mineral to map in the field. Scorodite was noted at two sites in the eastern area of the resource. Its presence is an indication that arsenic-bearing sulfides were oxidized along with pyrite.

Figure 7.5-2 and Figure 7.5-3 are cross sections depicting the distribution of hydrothermal alteration intensities in the Shahuindo deposit.
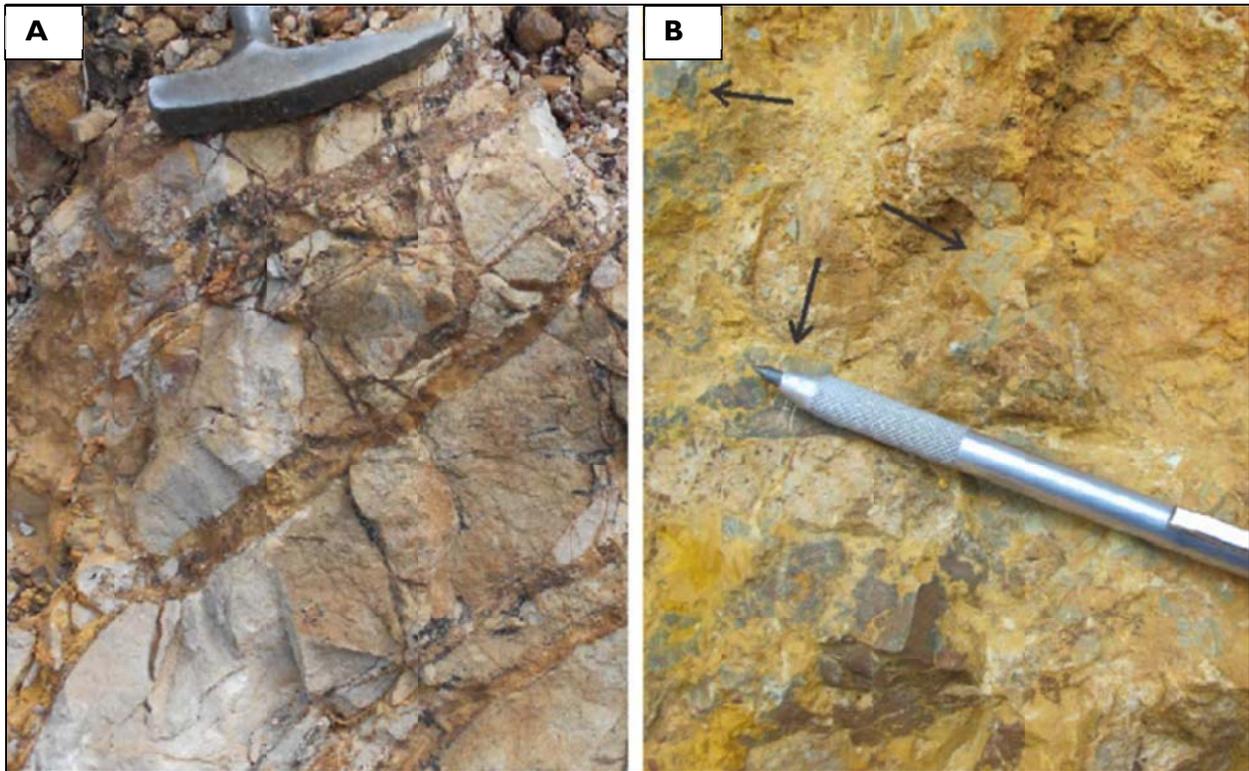
Figure 7.5-1   Jarosite in Outcrop.

A - Brown jarosite veins in sandstone (eastern Shahuindo)

B - Jarosite and grey-green scorodite (arrows) in breccia matrix exposed in road cut (central Shahuindo)
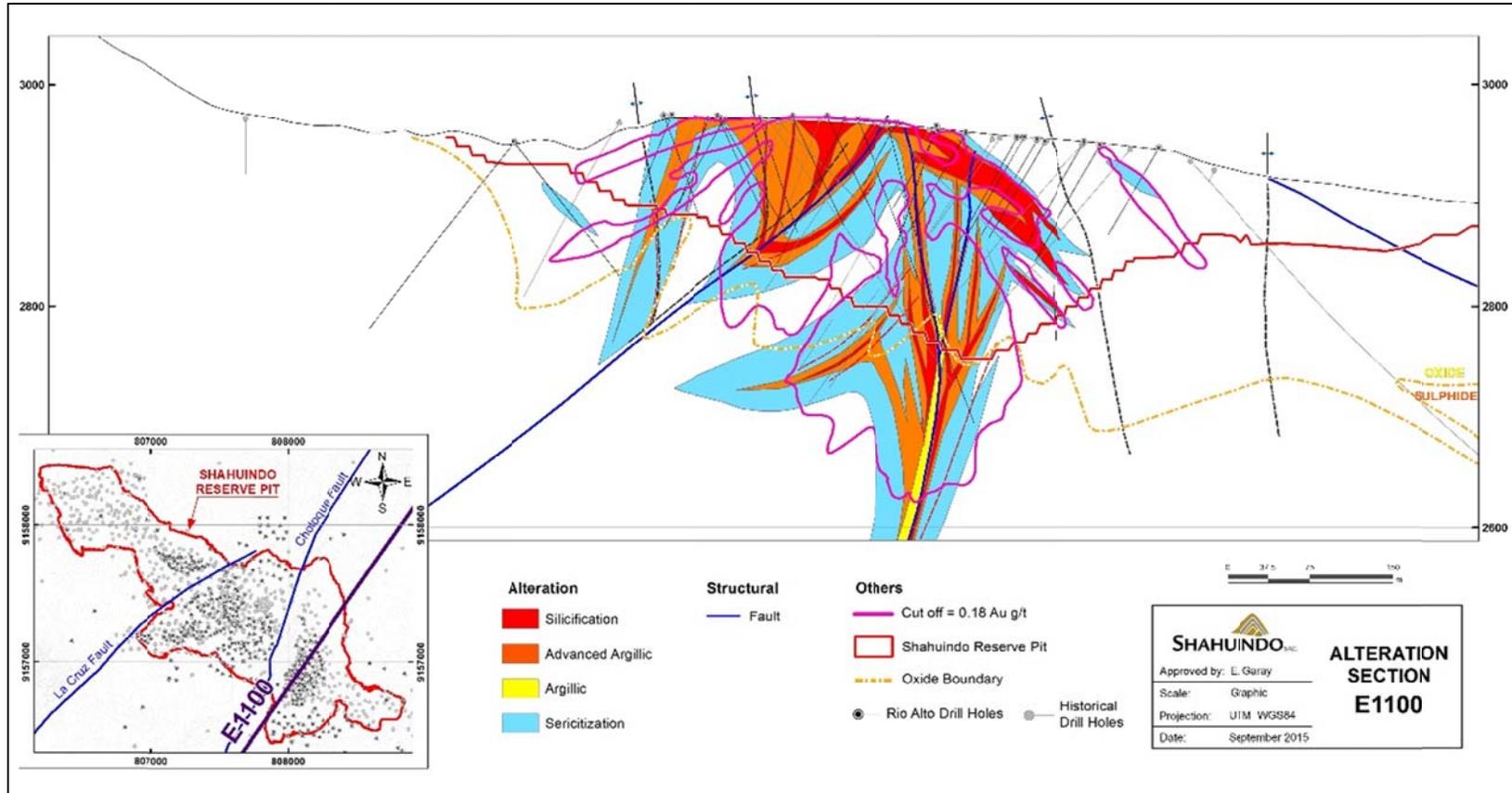
Figure 7.5-2   Hydrothermal Alteration Section – Shahuindo Project (Section E1100)
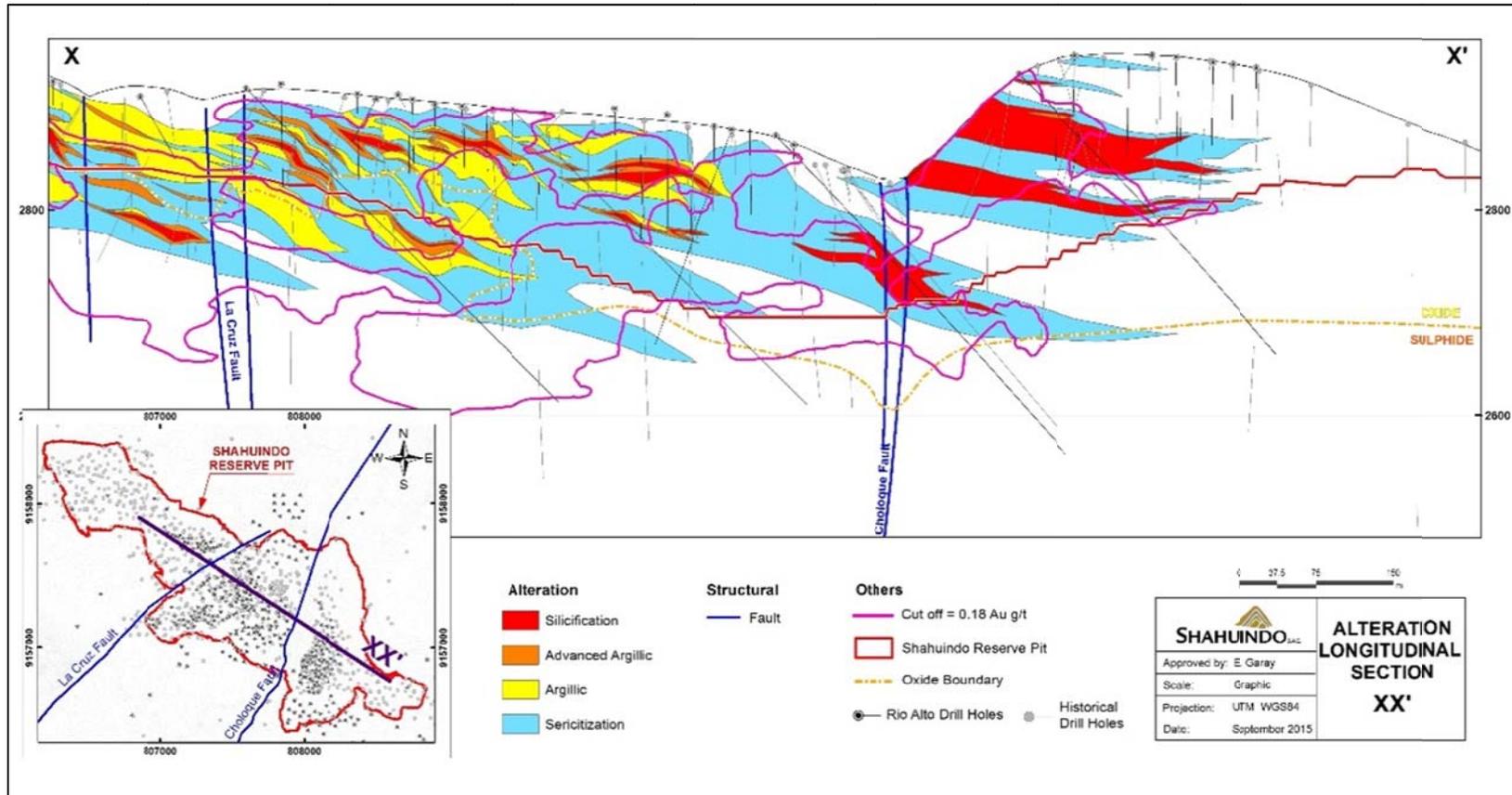
Figure 7.5-3   Hydrothermal Alteration Section – Shahuindo Project (Section XX')

7.6   Geometallurgy

Metallurgical recovery of gold from the Shahuindo deposit is affected by lithology (discussed in detail in Section 13 – Mineral Processing and Metallurgical Testing). Five primary geometallurgical domains (with additional subdomains) have been determined based on the relationship between lithology and grain size and gold recovery. The domains used for geometallurgical classification are:

- Sandstone
    - low fines content (<5% fines)
    - high fines content (5%-20% fines)
- Siltstone
- Breccia
    - clast-supported (<20% fines)
    - matrix-supported (>20% fines)
- Mixed sandstone and siltstone
- Colluvium

There is a high degree of lateral and vertical lithologic variability at Shahuindo, particularly in the northern half of the deposit. Modelling the distribution and occurrence of lithologic units / geometallurgical domains is critical to mine planning. Additional detailed study and modelling of lithology, geochemistry and alteration from drill core and open pit mapping is needed to refine the distribution of lithologic units and create a more comprehensive geometallurgical domain model for planning purposes.

8.0   DEPOSIT TYPES

8.1   Deposit Types

The Shahuindo deposit formed in a predominantly intermediate-sulfidation epithermal system (Figure 8.1-1) of probable Miocene age. Distinguishing characteristics of an intermediate-sulfidation environment include mineral assemblages indicating a sulfidation state between those of high and low sulfidation types, relatively high total sulfide content of five to 10 percent in the sulfide environment, presence of silver sulfosalts, and association with andesitic to dacitic volcanics. Magmatic associated fluids are implied. There is no evidence of adularia at Shahuindo, thus ruling out a low-sulfidation environment. There are some observances of enargite at depth, suggesting a mixed intermediate- to high-sulfidation system.

Epithermal deposits form as high-temperature mineralizing fluids rise along structural pathways and deposit quartz and precious and base-metal minerals in open spaces in response to boiling, which is usually coincident to a release of pressure within the hydrothermal system. This quartz and metal deposition, followed by resealing of the system, is repeated over the life of the hydrothermal system resulting in crosscutting and overprinted breccia and vein textures. Typically, the larger and higher grade deposits are associated with long-lived hydrothermal systems marked by complex overlapping veins.

These deposits are strongly structurally controlled. Mineralizing fluids are directed along structural pathways with high grade 'ore shoots' typically concentrated in open dilatant zones. These dilatant zones commonly form where inflections occur vertically and laterally along the deposit. Metal deposition and zoning in epithermal deposits are related to the level of boiling. Typically, precious metals deposit at or near the boiling level while base metals precipitate below. Boiling may occur at different levels as the hydrothermal system evolves producing an overprint of various episodes.
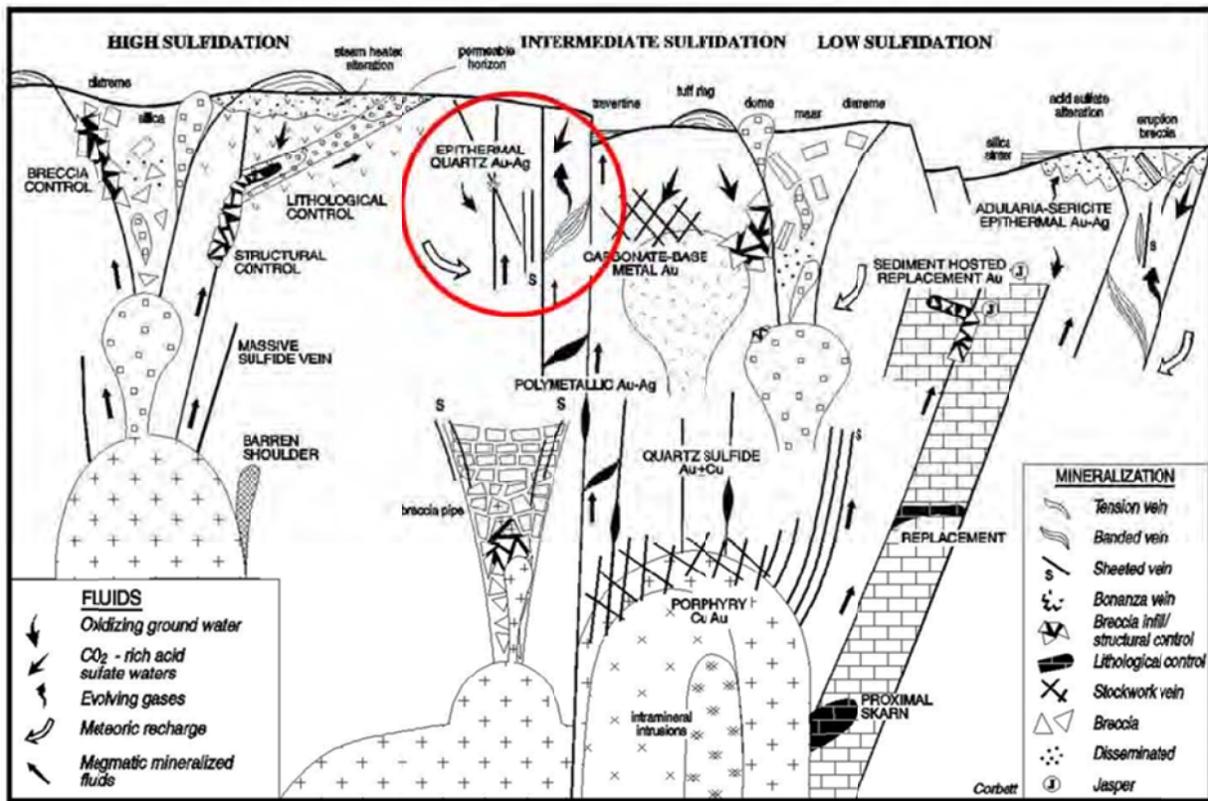
Figure 8.1-1   Spatial Relationship of Intermediate Sulfidation Deposits
(after Corbett, 2002)

9.0   EXPLORATION

9.1   Exploration Strategy

The exploration strategy at Shahuindo utilizes relatively standard exploration techniques that include detailed surface geologic mapping, surface geochemical sampling, and drill testing. The most effective exploration tool at Shahuindo has been core and RC drilling, the results of which are discussed in Section 10 – Drilling. Samples have also been collected from underground workings in the northern portion of the project area which has seen exploitation by informal miners.

Several targets proximal to the Shahuindo deposit have been identified in the district from geophysical surveys, prior informal mining operations, surface mapping and geochemical sampling, and drilling. Information regarding specific exploration targets is presented in Section 24.2 – Exploration Potential.

The focus on the 2014-2015 work plan was to infill drill the existing resource/reserve; hence only a small amount of exploration work has been carried out on other exploration targets outside the planned pit limits during this period.

9.2   Geophysical Surveys

Val Dór Geofisica Peru conducted magnetic and induced polarization (IP) geophysical surveys between 2002 and 2012 on behalf of the prior owners of Shahuindo. There have been no additional geophysical surveys completed on the concession since the acquisition of the deposit by Rio Alto in 2014.

The magnetic surveys covered most of the concession and comprise about 550 line-kilometers of data. Gaps in the image are due to areas that could not be accessed. The surveys clearly suggest a major intrusive body, as indicated by a prominent magnetic high, extends from the center of the Shahuindo deposit to the project boundary in the northwestern area of the concession package. Another magnetic anomaly that may reflect an additional porphyry body is apparent to the northwest of Shahuindo (Azules exploration target). Results of the magnetic surveys are illustrated in Figure 9.2-1.

Over 160 line-kilometers of various pole-dipole IP surveys were conducted over prospective areas on the Shahuindo concession The IP surveys highlighted anomalies which have subsequently been successfully drill tested since 2002 on the deposit. There are large tracts of ground that have not been traversed with IP surveys and present some longer term exploration opportunities (Figure 9.2-2).
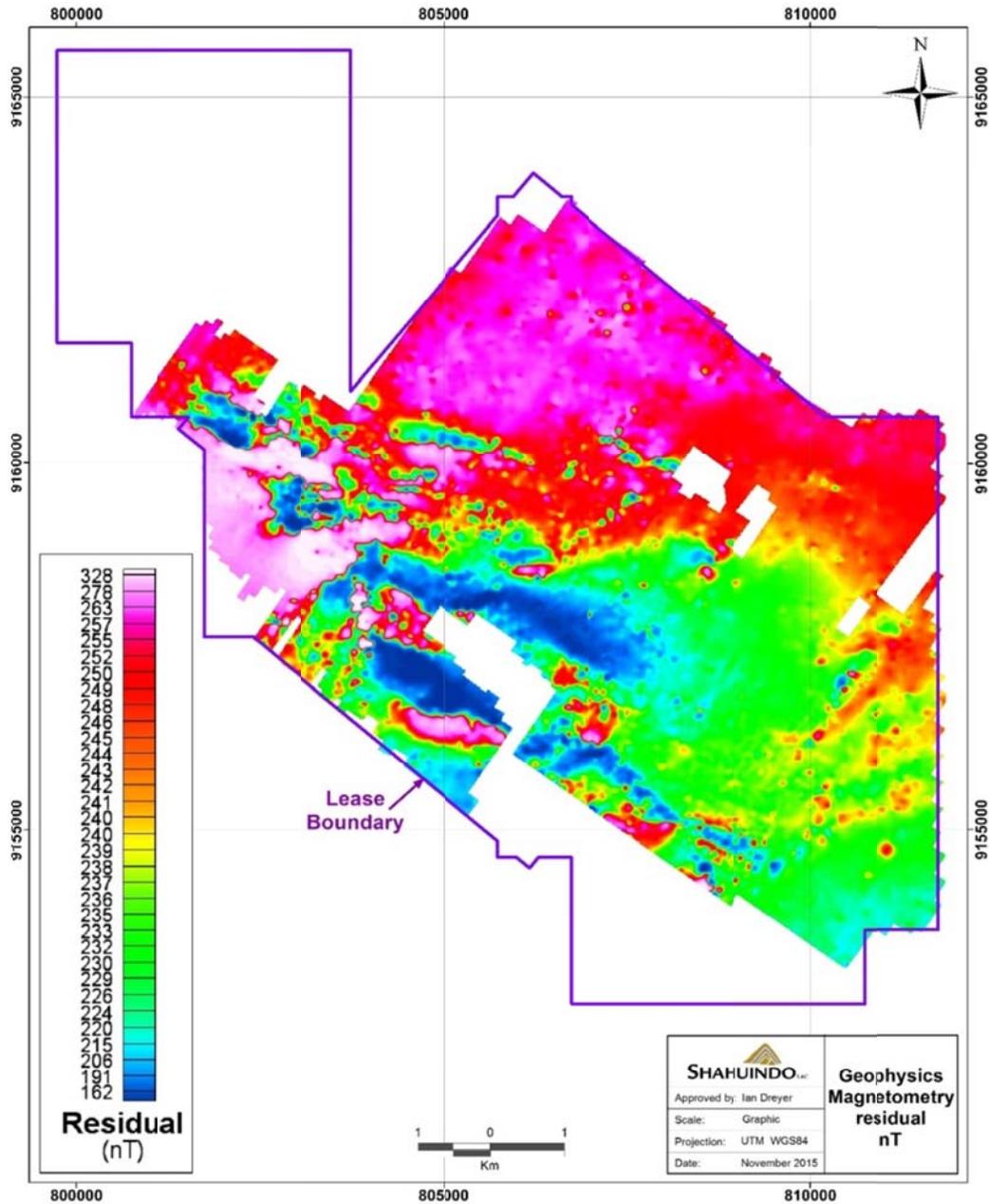
Figure 9.2-1   Shahuindo – Magnetic Survey Results
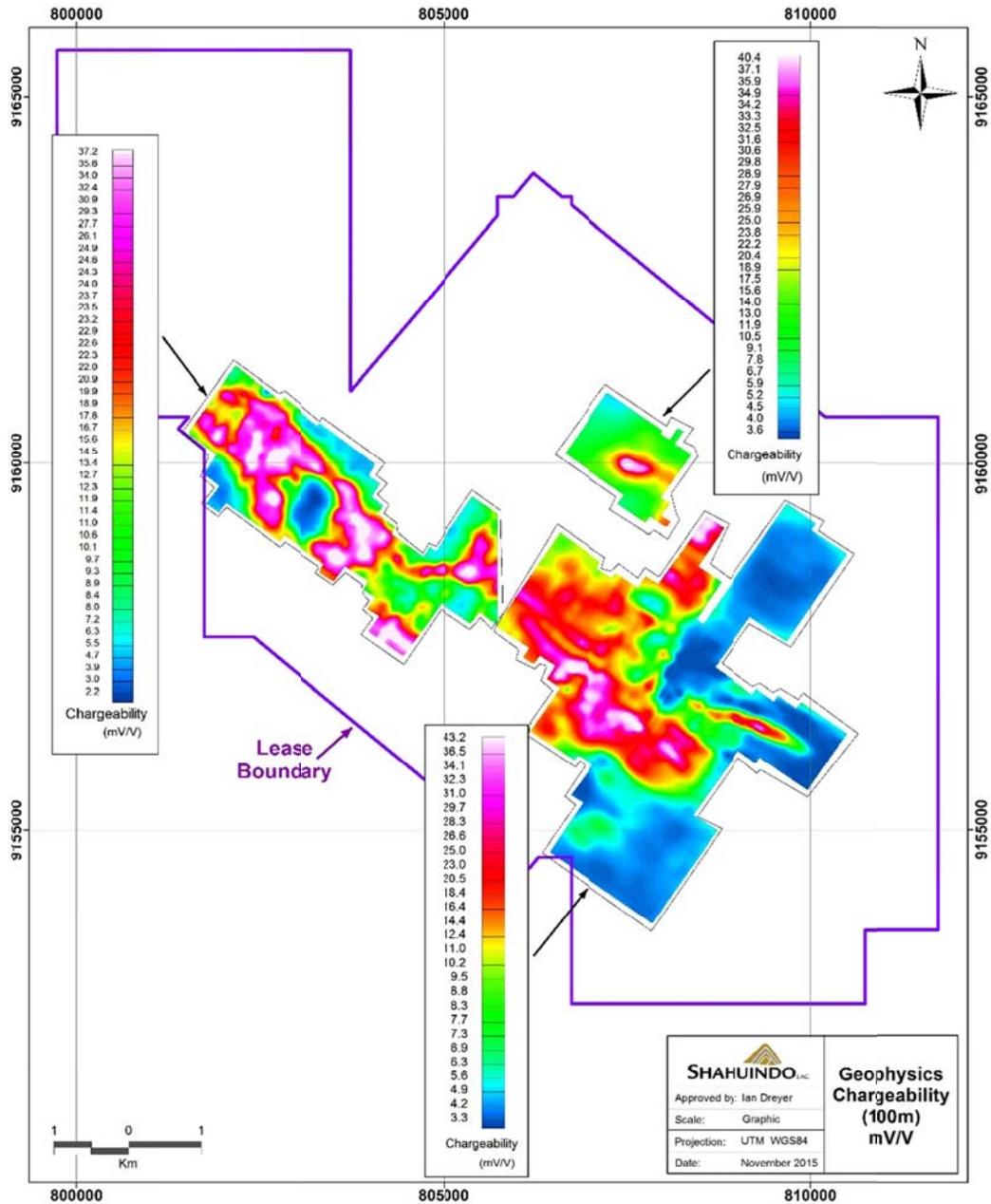
Figure 9.2-2   Shahuindo – IP Survey Results

9.3   Geochemistry

Mineralization outcrops or subcrops in numerous locations on the concession. A large database of soil, channel sample, and rock sampling results has been accumulated since 2002. Geochemistry is generally a reliable tool to assist in the identification and evaluation of precious and base metal mineralization potential and for the generation of drill targets. A compilation of rock chip gold geochemistry results are displayed in Figure 9.3-1.
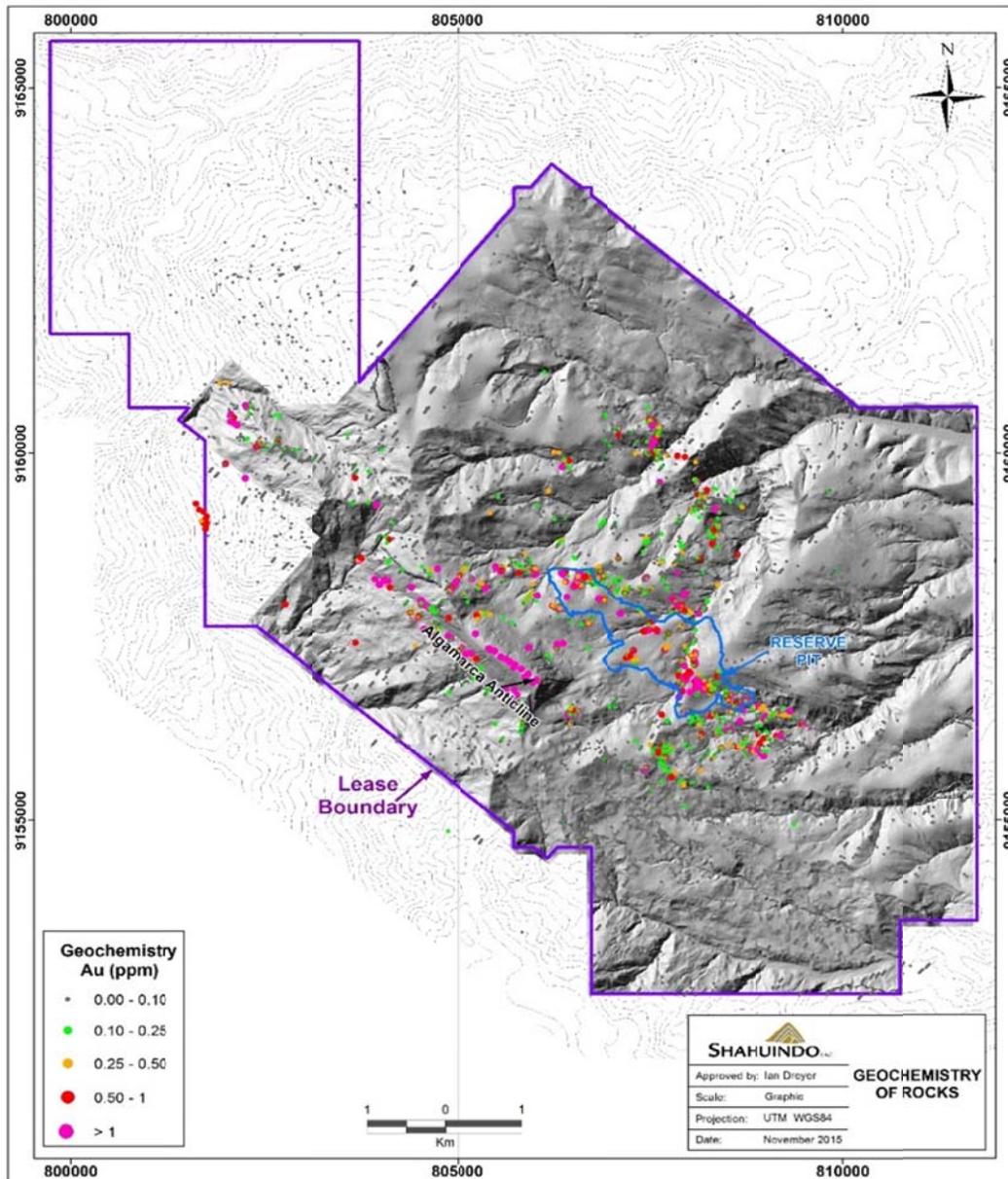
Figure 9.3-1   Shahuindo – Rock Geochemistry

The Shahuindo surface sample database contains a total of 12,070 rock samples and 11,680 soil samples. Surface samples consist of trench, grab and rock chip samples. Trench samples were generally excavated to bedrock, or to a maximum depth of 1.8 meters. Trenches were sampled either horizontally or vertically, depending on trench geology. Horizontal channel samples were typically located at the base of the trench wall. Where bedding was horizontal, vertical channel samples were taken from the top to the base of the wall. Sample lengths are variable depending on geology.

Most of the accessible underground adits located on the concession were sampled prior to 2012. Where possible, samples were taken from the adit portal and along the accessible portion of the tunnel. Most samples were vertical and non-continuous. Approximately 140 small adits were sampled.

Detailed soil sampling completed by Sulliden between 2003 and 2012 revealed a series of continuous, parallel gold anomalies in the central and northern areas of the concession. Base metal anomalies were found to the northwest and to the southeast of the concession.

Geologic mapping and rock chip sampling programs are ongoing, with an emphasis of delineating mineralized sandstone to assist in drill targeting for ROM material or material to be used for blending with siltstone on the leach pad.

No analytical data from surface rock samples or soil samples were used in the mineral resource estimate.

10.0 DRILLING

10.1 Introduction

A total of 1,039 holes drilled by Atimmsa, Asarco, Southern Peru, Sulliden and Tahoe have been used to model and estimate the resource at Shahuindo. Reverse circulation (RC) (604 holes) and diamond drilling (435 holes) have both been carried out on the property. The cut-off date for drill data inclusion in the resource model is 15 April 2015. Table 10.1-1 is a summary of the drilling included in the resource model.

Table 10.1-1   Shahuindo Drilling Summary

Company	Year	Diamond Core		Reverse Circulation		Total Drill Holes	Total Meters
		Number	Meters	Number	Meters		
Attimsa	1992	-	-	11	744	11	744
Asarco	1994-1996	55	8,105	31	3,681	86	11,786
Southern Peru	1997-1998	16	1,818	80	9,755	96	11,573
Sulliden	2003-2012	352	72,913	248	42,477	600	115,389
Rio Alto	2014-2015	12	1,258	234	23,264	246	24,522
Total	**1992-2015**	**435**	**84,094**	**604**	**79,921**	**1,039**	**164,015**

The majority of the RC drilling completed by Rio Alto in 2014 and 2015 was within the current resource. The database also includes twelve diamond core holes that were drilled for geotechnical purposes and subsequently sampled for analyses. The majority of the drilling in the oxide domain within the resource is on a nominal 25m x 25m spacing due to the extensive RC infill programs conducted in 2014 and 2015. A drill hole location map showing all holes used for the resource estimate is shown in Figure 10.1-1.

Drill holes in the resource area have been collared at azimuths around 35 degrees or 215 degrees to intersect the main structural trend of the deposit at a high angle. In some areas of the resource, and in other exploration targets away from the main mineralized zone, holes are drilled at a variety of azimuths to attempt to intersect local structural features at high angles or due to topographic restrictions on drill site locations.

The Company notes that there are minor differences in the number of drill holes and meters drilled from programs conducted prior to and including 2012 when comparing the database acquired from Rio Alto in 2015 to the drill totals reported in Sulliden's 2012 technical report. These differences are not material to the project.
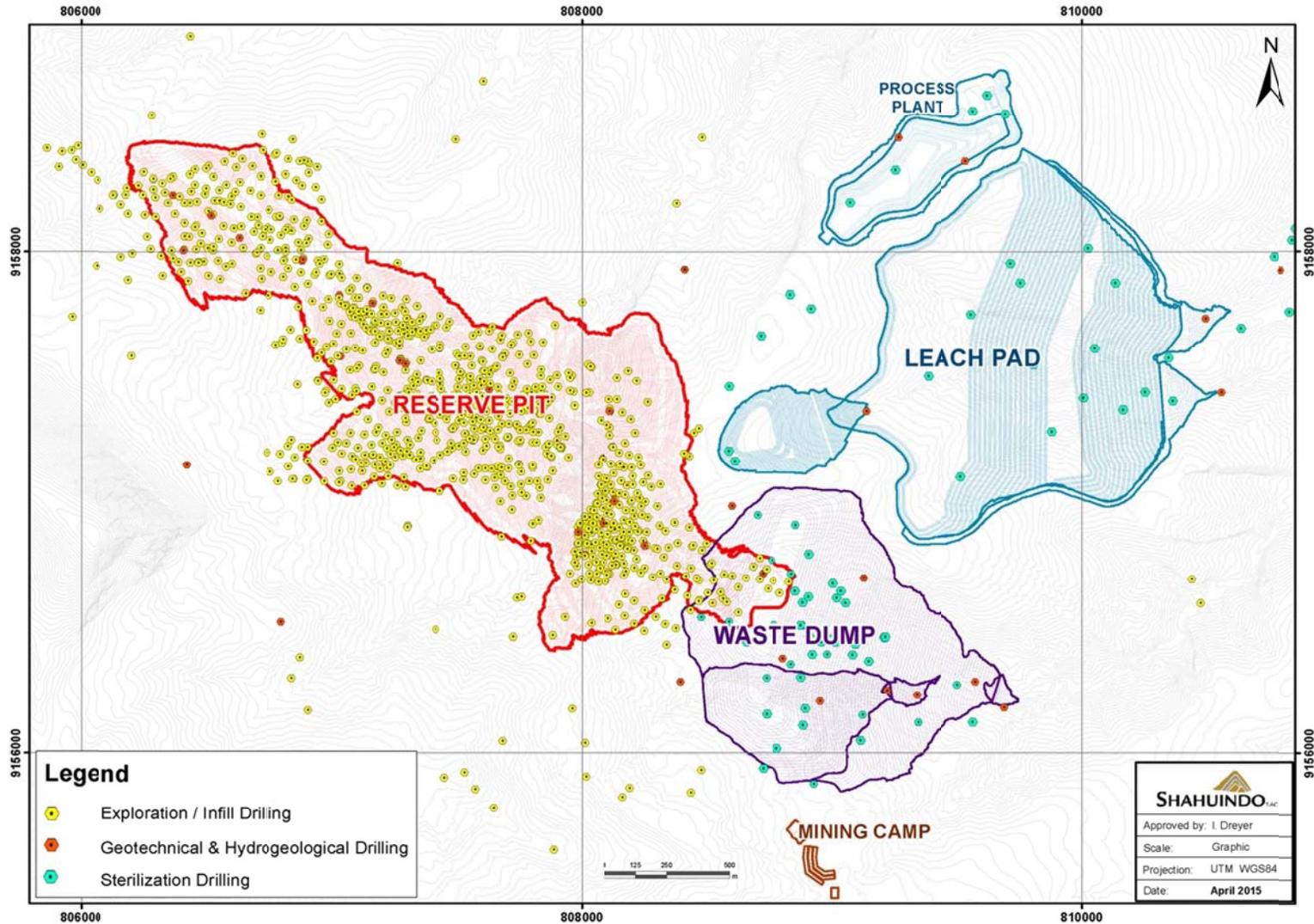
Figure 10.1-1   Shahuindo Drill Hole Location Map

Upon its acquisition of Rio Alto in April 2015, Tahoe has continued drilling diamond core and RC for infill, step-out, geotechnical, hydrology, and condemnation purposes.

10.2 Drilling Methods and Equipment

The following descriptions of drilling equipment and procedures for exploration programs prior to Rio Alto's 2014 drill program are summarized from Defilippi, *et. al.* (2012).

Tahoe has no information regarding Atimmsa's drill contractor or the type of equipment used in the 1992 drill campaign in which they drilled 11 RC holes (744 meters). Review of the data on cross section and comparing it to Sulliden's and Tahoe's proximal drill data suggests the Atimmsa data to be sufficiently reliable for inclusion in the resource model database.

Asarco retained Geotec S.A. (Geotec) for their diamond drill programs in 1994 through 1996. Geotec used a Longyear wireline diamond drill, drilling HQ (63.5 millimeter core diameter) and NQ (47.6 millimeter) core. Core recovery was reported to be consistently better than 90% (Fletcher, 1997, cited by Saucier and Poulin, 2004). Asarco's RC drill holes were generally drilled dry with good sample recovery (Saucier and Poulin, 2004); Tahoe has no information on Asarco's RC drill contractor or the type of drill rig used.

Southern Peru used Andes Drilling and Podiur as their RC and diamond drill contractors, respectively, in 1997 and 1998. Southern Peru drilled HQ core in 1997, reducing to NQ in 1998. Tahoe has no information on the type of drill rigs used.

Forage Orbit S.A. drilled for Sulliden in 2003 and 2004, using a skid-mounted drill rig. In 2007, Sulliden's drill contractor was MDH Bradley SAC (MDH Bradley), who employed a skid-mounted rig. From 2009 to the end of 2011, MDH Bradley and AK Drilling International (AK Drilling) were the drill contractors for the Shahuindo Project. MDH Bradley conducted all the diamond drilling, using a variety of skid and track-mounted electric-hydraulic diamond drill rigs (mostly LF70 rigs). AK Drilling used a Foremost Prospector 750 Buggy with auxiliary booster and compressor to complete the RC drill program.

Sulliden's core holes were generally drilled using HQ tools. However due to ground conditions, some 2003 and 2004 holes were drilled using NQ tools. In 2010 and 2011, limited PQ drilling (85.5 millimeters) was done for metallurgical and twinning purposes.

Sulliden used a variety of RC hammers that ranged from 4½ inches to 5½ inches in diameter. Dry samples were preferred over wet samples, and generally a frontal hammer was used to retrieve dry samples. Conventional hammers were used for wet samples; a tricone was sometimes necessary when ground condition were very poor.

Operators prior to Sulliden placed core into corrugated plastic core trays with depth markers to denote each drill run. Sulliden's HQ and NQ core was placed into wooden boxes with wooden blocks to denote each drill run. Between 2007 and 2012, a liner was fitted into the wooden boxes to help retain all the material produced by drilling. PQ core was placed into plastic boxes with plastic separators. Boxes contain either three meters of HQ core, four meters of NQ core, or two meters of PQ core. Core boxes were securely sealed and delivered once a day, by truck, to core-logging facilities at the exploration camp in San José.

Asarco and Southern Peru bagged RC cuttings in the field, and a reference chip tray was collected, at two meter intervals. Sulliden's RC cuttings were sampled on 1.5 meter intervals. Thirty percent of the cuttings of each individual sample were bagged and sent to the laboratory for analyses. The remaining 70 percent of the sample cuttings were bagged and kept as rejects. Two reference chip trays, one with a complete sample and the other with a sieved sample (one millimeter mesh), were collected at the same 1.5 meter interval.

Rio Alto's 2014-2015 drill program was executed by Explomin del Peru (RC and diamond core). Diamond core was generally HQ and to a lesser degree NQ size, depending upon ground conditions. Average core recovery was 95%. Reverse circulation drilling utilized 5¼-inch (133mm) diameter face sample hammers and achieved an average recovery of 90%. Rio Alto followed the same RC and core sampling and handling procedures as Sulliden.

10.3   Collar Surveys

Drill collar northing and easting coordinates are located in relation to the UTM WGS84 coordinate grid. In 2002 and 2003, Val d'Or Geofisica del Peru (VDG) established the exploration coordinate grid with a differential GPS with stations located on the cross-lines at 50 meter intervals. In addition to establishing the exploration grid, VDG also relocated and resurveyed drill-collar locations from historic campaigns. Upon completion of Sulliden's 2003 through August 2010 drilling, drill hole collars were surveyed by VDG using differential GPS. In 2009, Horizon South America S.A.C (Horizon) was contracted by Sulliden to perform an aerial survey of the Shahuindo property and create a two meter contour map. Beginning in September 2010 and through 2015, drill hole collars were located using a total station utilizing the aerial survey points established by Horizon as control points.

The collar elevations of all pre-2009 drill holes were back-interpolated (i.e., "pressed") to the two meter contour topographic map created by Horizon in 2009.

10.4   Downhole Surveys

Downhole survey data are available for 589 core and RC holes, corresponding to approximately 56 percent of the number of drill holes in the database used for the resource estimate.

Survey data are not available for the 193 drill holes completed by Attimsa, Asarco, and Southern Peru between 1992 and 1998 and for 53 of the 600 drill holes completed by Sulliden from 2003 to 2012. The unsurveyed drill holes are relatively shallow (average depth of about 125 meters), and therefore any downhole deviation is considered minor and not likely to cause any appreciable uncertainty in the position of data points along the drill hole trace.

Prior to 2009, Sulliden's downhole surveys consisted mostly of acid tests with minor use of Tropari and Sperry Sun single-shot tools. From 2009 to 2012, downhole surveying was primarily done using Flex-it multi-shot survey tools, with lesser use of Reflex Easy-Shot and Maxibore II tools. Downhole survey readings were taken at approximately 65 meter drill depth intervals, with the first reading within 20 meters of the collar. Sulliden's core holes generally have two to three downhole survey readings per hole with the bottom readings usually within 50 meters of the final drill depth. The depth intervals between survey readings are variable, depending on the total depth of the core hole; the maximum interval between survey readings is 100 meters. Nearly all of the Sulliden RC holes have two survey readings at regular 15 meters and 75 meters drill depths. The RC holes have an average drill depth of 180 meters with a maximum depth of 309 meters so, for most RC holes, the bottom 100 to 200 meters were unsurveyed.

AMEC reported (Wright *et al.*, 2010b) that a deflection study was carried out based on Flexit, Reflex, and Maxibore II data from 28 core and 10 RC drill holes drilled in the 2003, 2007, and 2009 campaigns. The average deflection of the diamond drill holes was 1.8 meters of deflection per 100 meters downhole, and the average deflection of the RC holes was 4.8 meters deflection per 100 meters downhole. A more comprehensive deflection study completed by MDA (Defilippi, *et.al.*, 2012) on all 2009 through May 2011 drill holes indicated an average deflection for every 100 meters down hole of 2.9 meters and 9.4 meters for the core and RC holes, respectively. As the RC deflection analysis is based on two readings per hole spaced at a regular 60 meter downhole interval, the 9.4 meter deflection is an extrapolated value that may not be indicative of the true deflection at greater drill depths.

Rio Alto did not perform downhole surveys during their 2014-2015 drill campaign. The average depth of Rio Alto's drill holes was about 100 meters, so downhole deviation that occurred is considered to be minor and not likely to cause uncertainty in the position of drill hole. Tahoe initiated downhole surveys of all drill holes upon the acquisition of Rio Alto in April 2015.

10.5   Drill Logging

To standardize the various geologic logging nomenclature from Atimmsa, Asarco, and Southern Peru drill data, Sulliden relogged the majority of the core and RC chips from holes drilled by the previous operators and checked the pre-existing database against the original assay certificates.

Between 2003 and 2010, Sulliden logged sample intervals, alteration, mineralization, and rock type data in digital spreadsheet forms.   Drill logs recorded lithology, fracture orientation, oxidation, sulfide mineralization types and intensities, and alteration type and intensity.   Sample recovery percentages and Rock Quality Designation (RQD) were also recorded.   In 2010, Sulliden introduced the use of logging software (GEOTIC) to record geologic and geotechnical data.   Logging by Rio Alto geologists in 2014 and 2015 used a similar nomenclature to the Sulliden system, using the GMAPPER recording system. Tahoe has continued with the logging procedures and nomenclature established by Sulliden and refined by Rio Alto.

Rio Alto undertook a major relogging program of existing drill core on 100m centers in 2015 using APT geological consultants, a local Peruvian geological consultancy.   The purpose was to normalize the lithology data in the database for use in building a more robust geology model in preparation for an updated resource model and estimate using grouped siltstone-, sandstone-, mixed sandstone/siltstone-, breccia-, intrusive-, and colluvium-dominant rock packages that correspond to the geometallurgical domains.   All other drill holes in the database that were not relogged were recoded into the above lithologic categories.

All drill core beginning with the 2003 Sulliden drill campaign through 2015 has been photographed.

10.6   Drill Database

The database used by Tahoe for the current resource estimation was finalized on 15 April 2015 and includes all drill data up through RC hole SHA-R15-234 and core hole SHA-D15-002. The project database has a total of 103,378 gold assays, 102,140 silver assays and 84,466 total sulfur analyses. The database also includes a 31-element suite of trace element analyses for most holes drilled from 2007 to the present.

Tahoe considers the database to be of sufficient quality for use in resource estimation (see Section 12 – Data Verification).

10.7   Core Recovery

In the 2012 NI 43-101 technical report prepared on behalf of Sulliden, MDA reported the results of their examination of the relationship between core recoveries to gold grade, particularly evaluating the

possible grade loss due to loss of fines in the drilling process. MDA concluded "the data suggests that, if present, this grade loss is limited to a small sample population and would not have a significant impact on the resource estimate" (Defilippi, *et. al.*, 2012).

Tahoe has not performed any further study on the relationship between core loss and gold grade since the vast majority of drilling completed for the resource model and estimate since Rio Alto's acquisition of Sulliden has been RC (234 holes) rather than core (12 holes).

10.8   Comparison of Core and Reverse Circulation Drilling

In 2010, AMEC examined the relationship of gold values between RC and diamond drilling by comparing paired-sample plots for RC and diamond drill sample pairs that were within 5 meters and 10 meters apart. AMEC reported that there was no statistically significant sampling bias between RC drilling and diamond drilling (Wright *et. al.*, 2010b).

MDA completed an analysis of the RC and core gold assay data using the 2012 drill database and came to a similar conclusion as the AMEC study (Defilippi, *et. al.*, 2012). Both the comparative statistics (Table 10.8-1) and the quantile-quantile distribution plot (Figure 10.8-1) of drill data from within the mineral resource boundary indicated little to no global difference between the core and RC data. While the average gold values for each drill type are very similar, there was slightly more variation within the core versus the RC data, as indicated by the higher standard deviation and coefficient of variation values.

Table 10.8-1   Core and RC Gold Analyses
(Defilippi, *et. al.*, 2012)

Drill Type	Number Samples	Mean	Median	Min	Max	Std Dev	CV
Core	28,521	0.492	0.225	0	59.9	1.241	2.535
RC	19,790	0.46	0.235	0	44.3	1.04	2.261
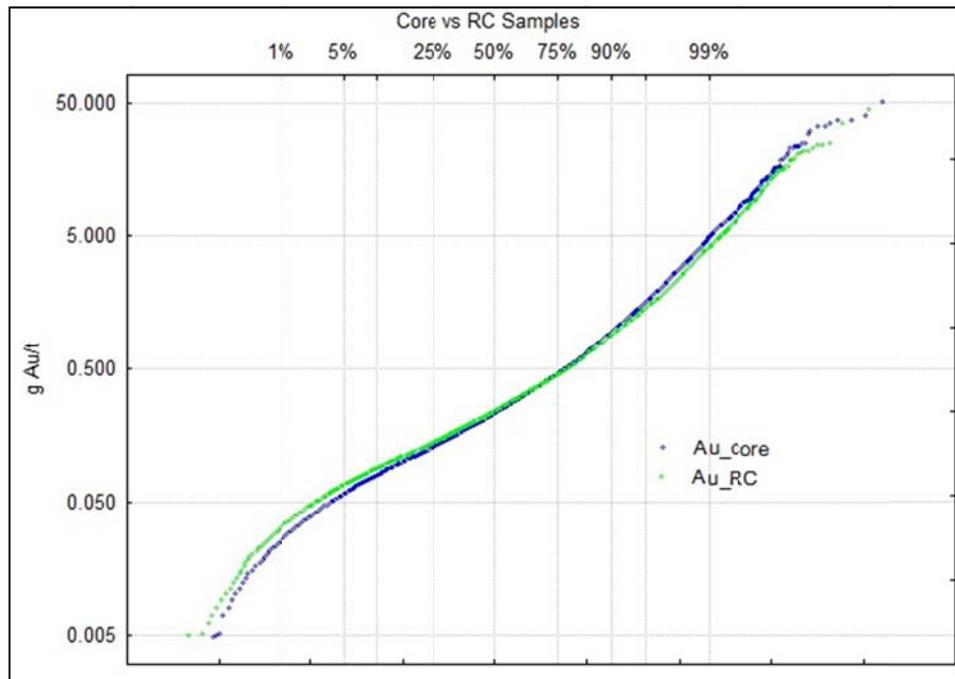
Figure 10.8-1   Comparative Plot of Core and RC Gold Assays
(Defilippi, *et. al.*, 2012)

To further investigate potential differences between RC and core drill data, Tahoe modelled estimates based on RC data only and RC + diamond core data in the area south of the Choloque fault. The RC drilling in this area is generally 25m x 25m spaced and the diamond core is generally 50m x 50m spaced. The same geologic model and estimation parameters were used for both estimates with the results constrained within a $1,400/oz Au pit shell. The results shown in Figure 10.8-2 demonstrate there is no appreciable difference between the gold estimates based on the RC only and the RC+DDH datasets.
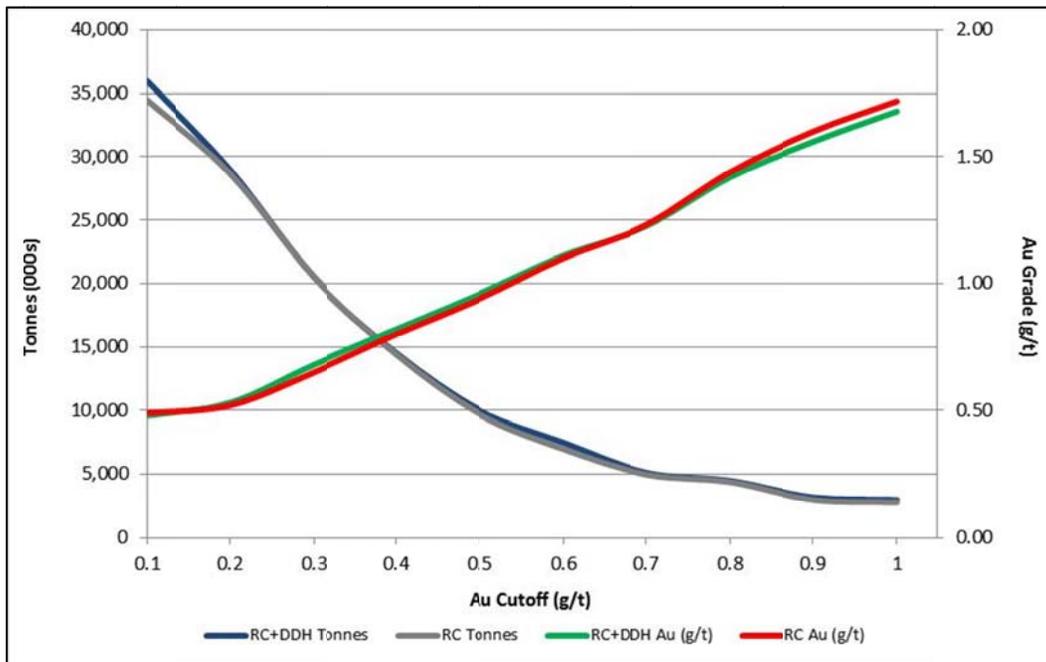
Figure 10.8-2   Comparison of RC to RC+DDH Model Estimates
(resource area south of Choloque fault)

10.9   Tahoe 2015 Drill Program

From 15 April 2015 (the cut-off date for inclusion of drill data in the resource estimate) through 31 December 2015, Tahoe continued infill drilling within the current resource and pit shell, step-out drilling to expand the resource, geotechnical, metallurgical and condemnation drilling in support of operations, and exploration drilling at the proximal San Lorenzo, La Chilca, and Choloque targets. Post-resource drilling completed by Tahoe in 2015 includes 180 core and RC holes totaling 32,717 meters, as summarized in Table 10.9-1 and shown in Figure 10.9-1.

Table 10.9-1   Post-Resource Drilling

Purpose / Area	Core Drilling		RC Drilling		Totals	
	No. Drill Holes	Meters Drilled	No. Drill Holes	Meters Drilled	No. Drill Holes	Meters Drilled
Infill	6	3,090.8	19	2,716.0	**25**	**5,806.8**
Step-out	10	2,856.4	40	9,186.0	**50**	**12,042.4**
Geotechnical	16	946.5	0	0.0	**16**	**946.5**
Metallurgical	8	1,262.8	0	0.0	**8**	**1,262.8**
Condemnation	19	3,630.8	28	2,814.0	**47**	**6,444.8**
San Lorenzo	2	422.1	24	4,076.0	**26**	**4,498.1**
Choloque	1	300.0	4	1066.0	**5**	**1,366.0**
La Chilca	3	350.0	0	0.0	**3**	**250.0**
Totals	**65**	**12,859.4**	**115**	**19,858.0**	**180**	**32,717.4**
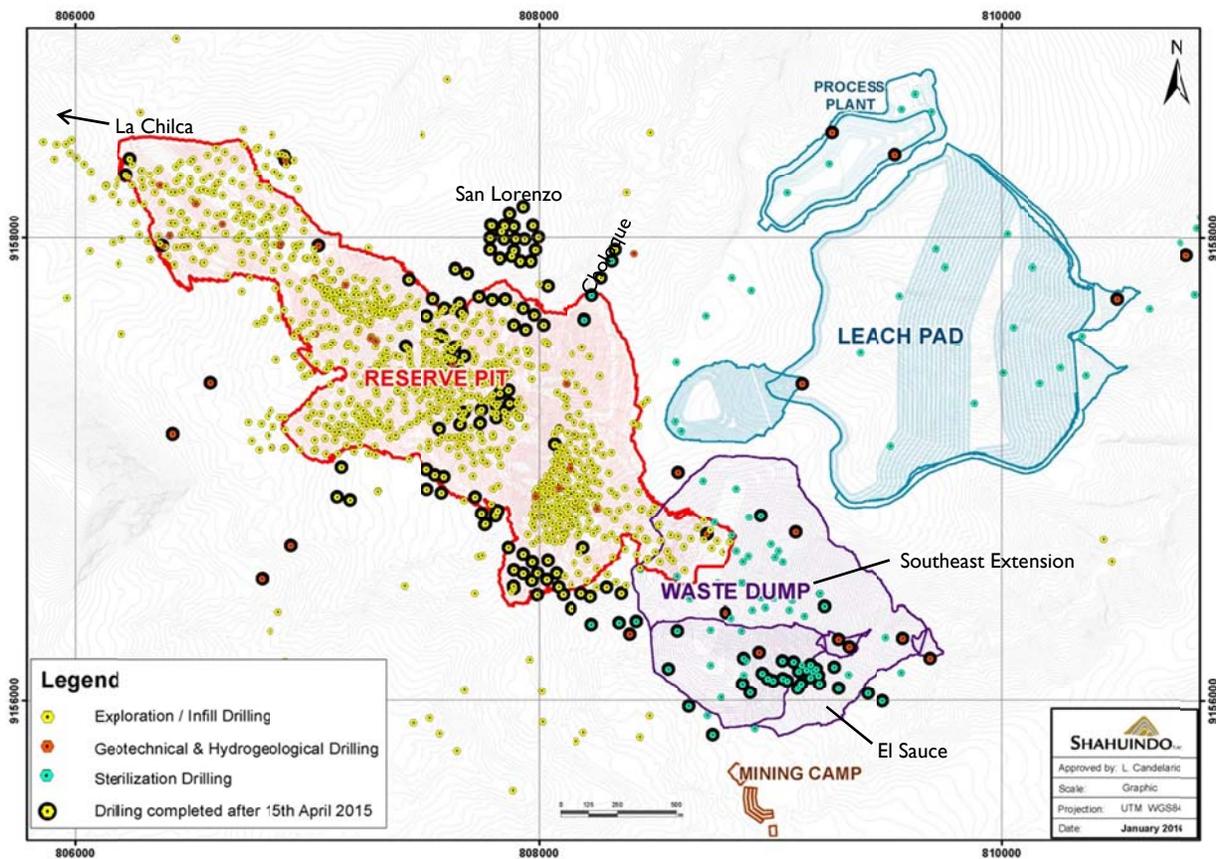
Figure 10.9-1   Post-Resource Drilling

10.9.1 Infill Drilling

Six core holes and 19 RC holes totaling 5,807 meters were collared inside of the current resource boundary and pit shell to aid in geologic interpretation and confirm grade estimates in areas of wider drill spacing. The six core holes were extended to target sulfide mineralization underlying the oxide resource.

10.9.2 Step-Out Drilling

Ten core holes and 40 RC holes totaling 12,042 meters were drilled around the periphery of the pit boundary to test for the continuation of mineralization beyond the currently defined pit extents. The drilling successfully identified mineralization outside of the northeast and southwest margins of the pit shell that will be incorporated into mine plan. Significant intercepts from the step-out drilling are tabulated in the Appendix – Post-Resource Drill Intercepts.

10.9.3 Exploration

Thirty-four drill holes (six core and 28 RC) totaling 6,114 meters were completed on the San Lorenzo, Choloque and La Chilca targets proximal to the Shahuindo resource. The San Lorenzo and La Chilca zones are associated with northeast-trending structures that cross the northwest-trending San Jose anticline, which is the dominant control of mineralization at Shahuindo. The northeasterly structural controls appear similar to the structural trends associated with gold-bearing veins in the nearby Algamarca district and likely represent a secondary structural control at Shahuindo. Three core holes were drilled at La Chilca to test oxidation levels and the continuity of mineralization along this northwest-trending structure northwest of the current Shahuindo resource. The results of this drilling are discussed in Section 24.2 - Exploration Potential; significant drill hole intercepts are tabulated in the Appendix.

10.9.4 Other Drilling

Geotechnical Drilling – Geotechnical drilling, consisting of 16 core holes totaling 947 meters, was completed in and around the proposed pit shell to validate and augment the results from prior geotechnical characterization studies.

Metallurgical Drilling – Eight core holes totaling 1,263 meters were drilled to obtain samples for additional metallurgical test work conducted by Tahoe (discussed further in Section 13.0 - Mineral Processing and Metallurgical Testing). The drill holes were designed to collect representative samples of the primary lithologic host rocks at Shahuindo.

Condemnation Drilling – Condemnation drilling (i.e., sterilization drilling) was focused primarily at the proposed waste dump, leach pad and crushing/agglomeration infrastructure sites and included 19 core

holes and 32 RC holes totaling 7,549 meters. The condemnation drilling in the waste dump area identified shallow ore grade mineralization in colluvium and bedrock sediments outside of the current resource boundary. This material is not included in the current mineral resource estimate, but a portion will be mined and delivered to the leach pad prior to construction of the waste dump foundation. Significant intercepts returned from the condemnation drilling are discussed further in Section 24.2 - Exploration Potential and tabulated in the Appendix (Post-Resource Drill Intercepts).

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

The information presented in this section regarding pre-2010 sampling, analyses, and security has been largely based on the 2010 Shahuindo PEA authored by AMEC (Wright *et al.*, 2010b), with additional information from the 2012 Shahuindo technical report authored by Kappes, Cassiday & Associates and Mine Development Associates (Defilippi, *et. al.*, 2012), and updated with Rio Alto and Tahoe drilling information.

11.1 Drill Sampling

11.1.1 Diamond Drill Core Sampling

Asarco, Southern Peru, Sulliden, Rio Alto, and Tahoe have conducted diamond drilling operations at Shahuindo.

Asarco drilled 55 diamond core holes at Shahuindo in 1994 and 1995. Core samples were split lengthwise using a standard manual Longyear-type splitter. Tahoe has no further information on Asarco's sampling procedures. Southern Peru drilled 16 core holes in 1997 and 1998. Tahoe has no details about their sampling procedures. The lack of information regarding diamond drill core sampling procedures by Asarco and Southern Peru is not considered material, as it accounts for only 12 percent of the total meters drilled by diamond drilling methods and the analytical values obtained from this drilling have been corroborated by subsequent drilling done by Sulliden and Rio Alto.

Between 2003 and 2012, Sulliden drilled 352 diamond core holes and generally sampled the drill core over the entire length of the drill hole. Competent core was split lengthwise with a diamond-blade rotary saw; disaggregated core was sampled using a spatula to take half of the sample. Sample lengths were typically 1.5 meters but were reduced to break samples at lithologic contacts or changes in oxidation state. Where core was completely disaggregated, sample lengths were changed to coincide with drill runs to minimize mixing between samples of differing core recoveries.

Post-2012 up to 15 April 2015, Rio Alto drilled 12 core holes and used the same procedures as Sulliden. However, sample lengths are typically two meters where not reduced to break samples at lithologic contacts or changes in oxidation state. Tahoe is continuing with these core sampling procedures.

11.1.2 Reverse Circulation Chip Sampling

Attimsa, Asarco, Southern Peru, Sulliden, Rio Alto, and Tahoe have conducted RC drilling operations at Shahuindo.

Attimsa drilled 11 RC holes in 1992. Tahoe has no information on the sampling procedures used by Attimsa. The data from these RC holes is being used in the resource estimate, but contributes only 0.5% of the total data used for the estimate.

Asarco drilled 31 RC holes during their exploration campaign at Shahuindo. Fletcher (1997) reports that during the Asarco RC drill campaigns, drilling was mostly dry with good sample recovery. RC samples were collected and bagged on-site with samples split through a standard Jones-type riffle splitter multiple times to reduce the sample to three to four kilograms for shipment to the assay laboratory.

In 1997 and 1998, Southern Peru drilled 80 RC holes at Shahuindo, with standardized sample lengths of two meters. Tahoe has no other details regarding Southern Peru's sampling procedures. The Southern Peru data accounts for 7.1% of the total data used in the resource estimate.

Sulliden completed 248 RC holes in 2009, 2010, and 2011, with standardized sample intervals of 1.5 meters. Different drilling and sampling procedures were used for dry versus wet ground as described below. Over 80% of the meterage completed was drilled dry. The following drilling and sampling descriptions are taken verbatim from the 2012 Shahuindo technical report (Defilippi, *et. al.*, 2012):

> *Drilling in dry ground*. In most cases, a 5¼-inch frontal recuperation hammer drill was used with pressurized air. In exceptional cases, a conventional 5¼-inch hammer was used based on ground conditions. Samples were reduced using a riffle splitter. The reject (70%) was retained for check-assay sampling. Samples were collected in polyethylene bags and were identified with the corresponding sample number. Each sample was sealed after inserting the laboratory tag number.

> *Drilling in wet ground*. When intersecting ground water, argillaceous material in contact with water, or heavily fractured ground, pressurized air with minimal water was used with a conventional 5¼-inch SD5 hammer. Alternatively, a tricone bit was used where the recovery of cuttings was poor. A gyratory splitter was used to reduce sample size to a 30/70 split. Samples were collected with filter bags in truncated buckets in order to avoid spills or contamination.

A double-bagging system was incorporated for samples to be forwarded to the lab. A cloth bag with low filtration capacity was used inside a micro-porous cloth bag with high filtration capacity. If the bags were filled to capacity, both were tied-off separately, tagged, left for filtering, and dried prior to transportation to the primary assay laboratory. The rejects were received in a cloth bag and left for filtering and drying prior to being bagged in a polyethylene bag, tagged, and stored. Where reject samples were too large for a single bag, more than one sample was often obtained. The resulting additional bags filled with the corresponding samples and water from the same drilled interval were filtered and dried before being combined in one polyethylene bag, which was then identified and stored.

Post-2012, Rio Alto and Tahoe have used the same procedures as Sulliden; however sample lengths have been increased to 2 meters due to sampling practicalities and better sample length accuracy when physically taking the sample.

11.1.3 Sample Storage

Sulliden created two secure core-storage facilities in the city of Cajamarca. Work to centralize the storage of all existing core at the facilities in Cajamarca was completed in 2009. Since 2009, all exploration core generated on the project has been being sent to Cajamarca for storage.

Archived drill core is stored in wooden and corrugated plastic boxes under cover at the core-storage facilities. Core boxes are in racks and stacked by hole number.

RC and laboratory coarse rejects and pulps are stored at the project site in a secure metal building. Coarse rejects are stored in labelled plastic bags and organized by hole and campaign. Pulps are stored in envelopes in cardboard boxes.

Stored coarse rejects and pulps are in varying condition. Some materials from previous operators were reorganized and transferred to new plastic bags by Sulliden to prolong their useful life and make locating individual samples more convenient. An inventory of project materials including certificates, core, coarse rejects, and pulps was compiled in 2009; Rio Alto, and now Tahoe, has maintained the drill sample inventory records.

11.2   Sample Preparation and Analysis

Tahoe has limited information about sample preparation and analyses for the drill programs prior to the drill programs completed by Sulliden.

11.2.1 Atimmsa

Atimmsa used SGS del Peru S.A.C. (SGS) as the primary laboratory for their 1992 drilling. Tahoe has no further details and does not consider the lack of information to be material to the resource estimate due to the low percentage of data from this data set (0.4%) when compared to the overall drill database. Tahoe does not have information regarding SGS's laboratory certification at the time of Atimmsa's drilling program.

11.2.2 Asarco

During Asarco's drill programs, all drill-hole samples were analyzed for gold and silver by one-assay-ton fire assay. Asarco used SGS to analyze their 1994 samples. For their 1995 drilling, Asarco used Skyline Laboratories, Inc., SGS, CIMM Peru S.A., and Actlabs, Inc. For Asarco's 1996 drilling, SGS was the

primary lab. SGS, Skyline and Actlabs are currently ISO/IEC 17025 certified, but Tahoe has not determined laboratory certifications at the time of Asarco's work.

11.2.3 Southern Peru

Tahoe has no details regarding sample preparation or analysis for Southern Peru's drilling. Tahoe considers the risk to be minimal to the estimate as this data set accounts for only 7.1% of the data used in the estimate. Assay certificates from the 1997 and 1998 campaigns show that samples were analyzed by CIMM in Lima for gold and silver plus copper, lead, zinc, molybdenum, arsenic, bismuth, antimony, and mercury (Wright et al., 2010b). Southern Peru also re-assayed five drill holes from Asarco's 1994 drilling at CIMM in Lima.

11.2.4 Sulliden

Between 2003 and 2012, Sulliden's sampling and sample dispatch for the Shahuindo Project were carried out under the supervision of Sulliden staff. Samples are sent to ALS Minerals (ALS, formerly known as ALS Chemex) in Lima for sample preparation and analysis. Certificates were issued by ALS digitally and on paper. The ALS laboratory in Lima is ISO 9001:2008 and ISO 17025:2005 certified.

Samples were received at ALS, entered into the laboratory information management system, and weighed. Samples were dried and crushed to 70 percent passing plus two millimeters. Crushed samples were split with a riffle splitter to obtain 250-gram sub-samples, with the sub-samples pulverized using a ring mill to 85 percent passing 75 micrometers.

Between 2003 and 2012, gold was assayed with a 50-gram fire assay (FA) with atomic absorption (AA) finish. For samples with greater than 10 g/t Au in the initial FA-AA assay, the fire assay was repeated using a gravimetric finish.

In 2003 and 2004, silver was assayed from a 5-gram split, which was digested by aqua regia and read by AA (ALS method AA47); ALS method AA46 was used for samples with assay values exceeding 100 g/t Ag (Saucier and Poulin, 2004; Saucier and Buchanan, 2005). Between 2007 and 2012, a separate split was taken and digested in aqua regia for analysis with inductively coupled plasma atomic emission spectroscopy (ICP-AES) to determine 31 major and trace elements including silver, copper, arsenic, bismuth, and antimony (Wright et al., 2010b). For samples having greater than 100 Ag g/t, a silver assay was carried out from another 5-gram split, which was digested in aqua regia and read by AA. For samples having greater than 1,000 Ag g/t, silver was assayed by a 50-gram fire assay and a gravimetric finish. Mercury was analyzed with the cold vapor/AA method.

For the 2003 drilling, a total of 2,435 samples were assayed for gold, and pulps for each gold sample above 0.3 g/t Au in mineralized zones were re-assayed for silver (Saucier and Poulin, 2004). Starting with the 2004 drilling, silver was assayed for all mineralized intersections (Saucier and Buchanan, 2005).

11.2.5 Rio Alto

Reverse circulation and core samples from Rio Alto's 2014-2015 drill program were analyzed by CERTIMIN laboratory in Lima. Gold was assayed using a 50-gram fire assay with an atomic absorption finish (CERTIMIN method IC-EF-01). When the result was greater than 10 g/t Au in the initial fire assay, the fire assay was repeated using a gravimetric finish (CERTIMIN method IC-EF-10). The procedure for silver analysis used by CERTIMIN is the same as the ALS method used by Sulliden, but did not include FA/Gravimetric analysis for samples having results greater than 1,000 g/t Ag. The CERTIMIN laboratory is ISO 9001 certified for geochemical, metallurgical and environmental sample analyses.

Tahoe continues to use the CERTIMIN laboratory in Lima as its primary assay lab for its continued drilling at the Shahuindo project.

11.3 Bulk Density Determinations

The Shahuindo Project database contains 1,411 specific gravity measurements. The measurements were taken during various drill campaigns on drill core from throughout the deposit. Samples for measurement have been collected from all significant rock types along the extent of the deposit.

In 2004 and 2005, a total of 89 drill core samples were collected and sent to ALS in Lima for specific gravity determination (Saucier and Poulin, 2004; Saucier and Buchanan, 2005). The analyses were completed on drill core from 49 core holes from the 1998, 2003, and 2004 drill campaigns. Tahoe has no information on the methods used to determine specific gravity by ALS. The current database includes 87 of these determinations due to incomplete information on two samples.

In 2010, an additional 353 core samples were sent to Kappes, Cassiday & Associates (KCA) in Reno, Nevada for specific gravity measurements. Samples sent to KCA for measurements were from 12 core holes from Sulliden's 2009 and 2010 drill campaigns.

In 2011 and 2012, Sulliden submitted 971 core samples from all core drilling campaigns executed on the project for density determination. Laboratories selected were KCA and ACME Labs in 2011 (580 samples) and ACME and SGS in 2012 (391 samples). The ACME and SGS laboratories are both located in Lima, Peru. Drill core specific gravity measurements conducted by KCA, ACME, and SGS used the coated immersion/water displacement method.

Tahoe has not conducted further bulk density determinations.

11.4   Sample Security

From 2003 through 2009, all drill samples collected on the Shahuindo Project were under direct supervision of Sulliden's staff up to the moment they were shipped by bus from Cajamarca to the ALS sample preparation facility. Between 2010 and 2012, samples were shipped directly from the camp to the laboratory facilities. Rio Alto and Tahoe have since changed the primary laboratory to Certimin in Lima. Samples were driven by Rio Alto employees directly to the Certimin laboratory in Lima.

Chain of custody procedures consist of filling out sample submittal forms that are physically handed to the laboratory with sample shipments to make certain that all samples are received by the laboratory.

11.5   Quality Assurance/Quality Control

11.5.1 Asarco

According to Saucier and Poulin (2004), Asarco included standards prepared internally by them with every batch of drill samples for most of their drilling, and the standards had highly reproducible gold and silver values. Tahoe has no details on those standards. According to Fletcher (1997, cited by Saucier and Poulin, 2004), "[The laboratory] generally has very good precision…in their assays, but their results are typically 5-7% low for gold, and 11-15% low for silver relative to the standards. This discrepancy is probably due to matrix effects in the standards which have carbonate content, versus the routine drill samples which have none."

A total of 1,835 duplicate samples were prepared and sent to a separate laboratory as a check assay. According to Fletcher (1997, cited by Saucier and Poulin, 2004), in general, the check assays validated the original assay values.

Tahoe has no reason to doubt Fletcher's (1997) analysis and conclusions about Asarco's assay data, but cannot confirm the work as Tahoe has no record of the results for Asarco's standards or check assays.

11.5.2 Other Drilling Programs Prior to Sulliden

Tahoe has no information on quality control or quality assurance (QA/QC) that may have been used by Atimmsa or Southern Peru. This is considered to be of minimal risk to Tahoe given the small amount of samples involved when compared to the total database.

11.5.3 Sulliden

For Sulliden's 2003 drilling, no blanks, duplicates, or standards were used to check the original assay results. However, 200 pulps taken randomly within the mineralized intervals were sent to SGS for re-assay for gold. These pulps were assayed for gold by fire assay with AA finish, with gravimetric finish for

gold grades over 5 g/t. Silver was assayed by multi-acid digestion with an AA finish. Saucier and Poulin (2004) reported that there was a "good correlation" between the original and check assays.

No blanks, site duplicates, or standards were used to check the results of Sulliden's original assays from their 2004 drill program (Saucier and Buchanan, 2005). However, 355 pulps were randomly selected from within mineralized intervals by Sulliden's geologists and sent to Actlabs in Lima for check assaying for gold and silver. Saucier and Buchanan (2005) reported that "a fairly good correlation could be found between the original values and the reanalysis."

AMEC reported that except for the reject check program in 2003 and 2004, Sulliden did not apply QA/QC procedures until their 2009 drill program (Wright et al., 2010b). In 2009, Sulliden instituted analysis of commercially prepared standard reference materials, fine blanks, field duplicates for RC drilling, core duplicates for diamond drilling, and coarse-crush reject and pulp duplicates. The following information for Sulliden's 2009-2010 drilling programs is summarized from the 2010 AMEC report (Wright et al., 2010b), to which the reader is referred for additional detail.

> For the first stage of their 2009-2010 core and RC drill programs, Sulliden analyzed 110 RC field duplicates, 38 core duplicates, 99 coarse-crush reject duplicates, and 99 check assays performed at SGS in Lima, in addition to fine blanks and four commercial standards included with sample batches. AMEC concluded that based on analysis of the results of standards and check assays, the accuracy of the gold assays was "excellent," whereas based on analysis of the check assays, the accuracy of silver assays was not as good as the accuracy of the gold assays (Wright et al., 2010b).

Based on analysis of RC and core field duplicates, AMEC concluded that the sampling precision for gold was acceptable for the resource estimate used for feasibility-level analysis (Wright et al., 2010b). Silver grades were not analyzed for the core and RC field duplicates. Analysis of the gold results of coarse-crush duplicates indicated that sub-sampling precision was better than generally accepted limits. Silver grades of coarse reject duplicates were not assayed.

Analytical precision is generally established by the analysis of pulp duplicates, two splits of the same pulp analyzed during the same time period, with the same analysis method at the same laboratory. No pulp duplicates were analyzed as part of the 2009 Sulliden drill program.

Analysis of 80 blank samples found only two minor issues above "a practical detection limit" of 0.02 Au g/t, and a plot of grade of blanks versus previous sample grade showed no correlation (Wright et al., 2010b).

Sulliden completed a comprehensive QA/QC testing program in 2011 and 2012, which included the analysis of commercially prepared standard reference materials, fine blanks, field duplicates for RC drilling, core duplicates for diamond drilling, and coarse-crush reject and pulp duplicates. The laboratory

analyses for the standards, fine blanks, RC field duplicates and core duplicates were completed at ALS while the analysis of the pulp duplicates were completed at SGS. The MDA review of standards suggested that "overall the analyses of standards suggest that Sulliden's gold analyses may be, in aggregate, very slightly conservative" (Defilippi, *et. al.*, 2012). There were 1,843 analyses of blank material, with only two counting as failures at a nominal 0.01 g/t failure line.

11.5.4 Rio Alto

Rio Alto completed a large RC and diamond core infill drill program in late 2014 and early 2015. The primary laboratory was changed from ALS to CERTIMIN on the basis of high quality QA/QC and good turnaround experienced at the La Arena operations.

Blanks, standards and field duplicates were inserted into the sample stream to check the QA/QC process both in the field and at the CERTIMIN laboratory in Lima. Blanks showed no evidence of contamination. Field duplicates show good repeatability, although the rate of insertion is low and needs to be increased. Review of the standards results shows CERTIMIN is assaying low in the lower grade ranges for silver and, to a lesser extent, gold There appears to be a consistent low bias at the CERTIMIN laboratory, mainly affecting silver assays.

Tahoe believes the rate of insertion of control samples is acceptable for blanks and standards, although low for RC field duplicates (Table 11.5-1). Tahoe has since increased the insertion rate for RC field duplicates.

Table 11.5-1   Summary of QAQC Program Applicable for 2015 Resource Estimate

Type	DDH Samples	RC Samples	Duplicates	Duplicates (%)	Blanks	Blanks (%)	Standards	Standards (%)
Geotechnical	586		27	4.6%	32	5.5%	31	5.3%
RC		11,631	166	1.4%	600	5.2%	587	5.0%
DDH	373		17	4.6%	18	4.8%	20	5.4%
Total	**959**	**11,631**	**210**	**1.7%**	**650**	**5.2%**	**638**	**5.1%**

11.5.5 Blanks

Certified fine blanks were purchased from SGS and inserted into the sample stream. The average grade of the blanks is 0.006 g/t Au and 0.3 ppm Ag. Blanks are usually inserted every 50m downhole in RC holes and at or near the end of runs of mineralization in the diamond core. No failures are observed when using nominal 0.012 g/t Au and 0.6 ppm Ag upper acceptable limits of tolerance; well below a limit that would affect the resource estimate for either element. There is no evidence of any extra contamination after higher grades are encountered in the sample prior to the blank, although high grade

samples are somewhat rare in this new dataset. An example of the blank control plots is shown in Figure 11.5-1.

The use of fine blanks makes it easy for the laboratory to identify the control sample. At this stage in the project life for Shahuindo, it is recommended that coarse blanks be collected from coarse RC reject material if it is demonstrated that homogenous samples can be prepared. The insertion of coarse RC reject material as blanks would make it much more difficult for the laboratory to identify the blank control samples.
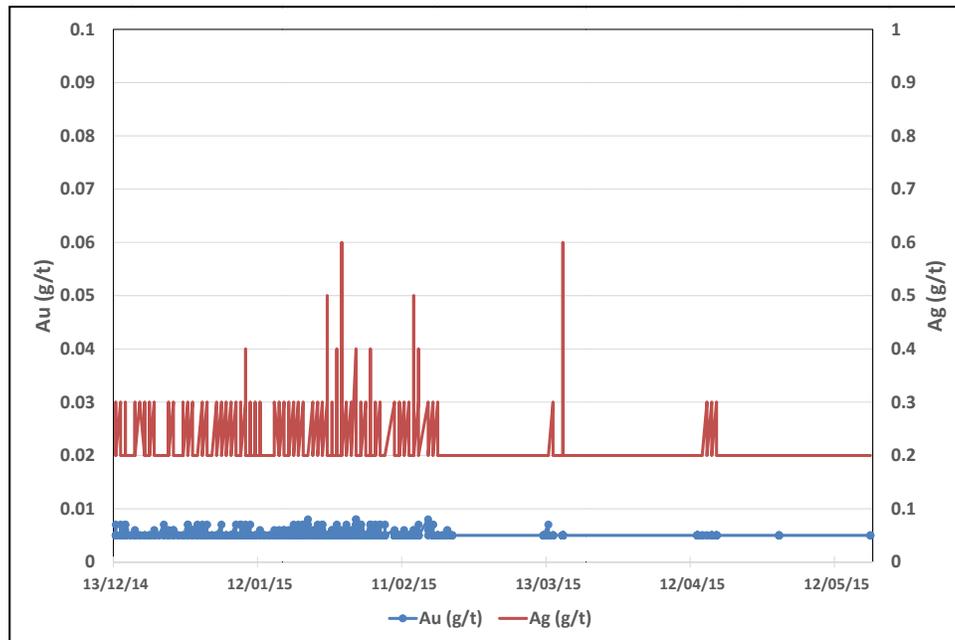
Figure 11.5-1   Blank Analyses 2015 Drill Program

11.5.6 Field Duplicates

Field duplicate samples from RC data only have been analyzed as there is not a statistically valid number of diamond core samples for analysis (27 core samples). Although the insertion rate of RC field duplicates is low, they generally display good to very good repeatability in most grade ranges for both gold and silver (Figure 11.5-2 and Figure 11.5-3). The outliers are rare and not extreme, particularly given the observed nugget variance in the variography. The repeatability of sampling at lower gold grades close to the anticipated cut-off grade is acceptable (Figure 11.5-4).
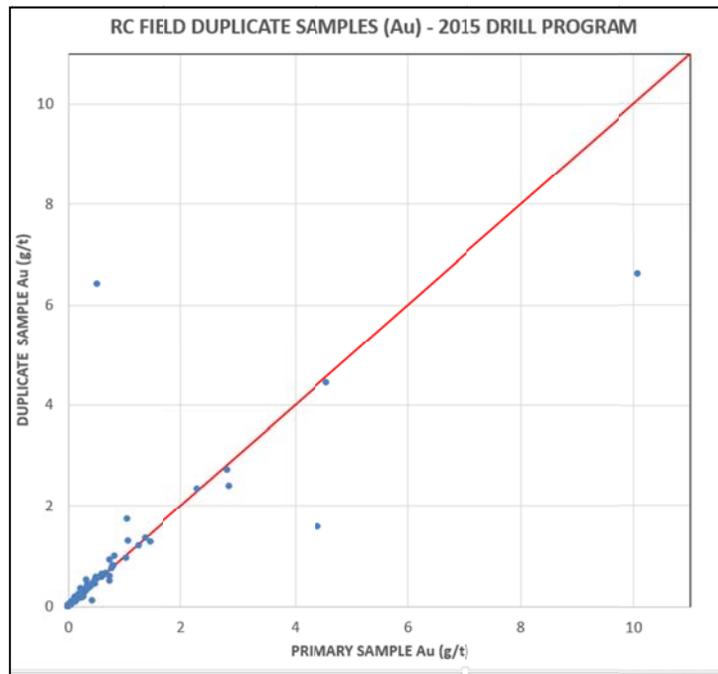
Figure 11.5-2   Field Duplicates 2015 RC Drill Program - All Au Grade Ranges
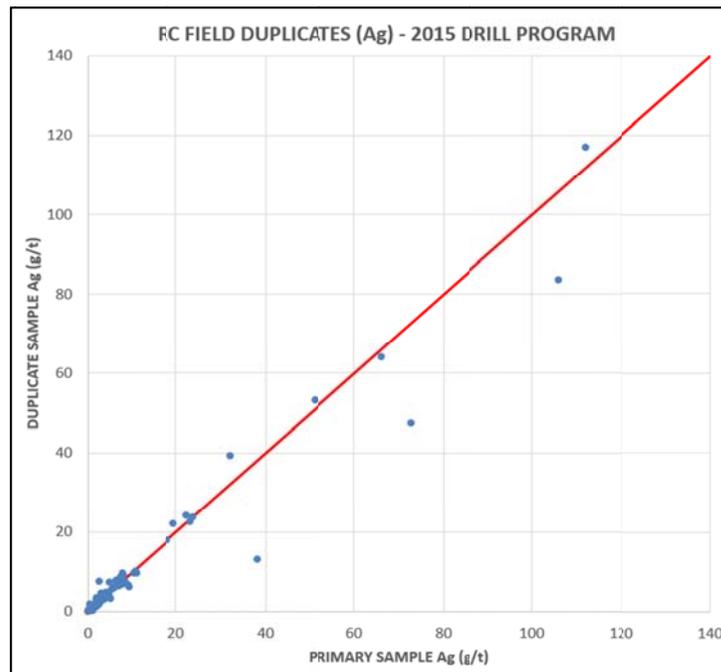
Figure 11.5-3   Field Duplicates 2015 RC Drill Program - All Ag Grade Ranges
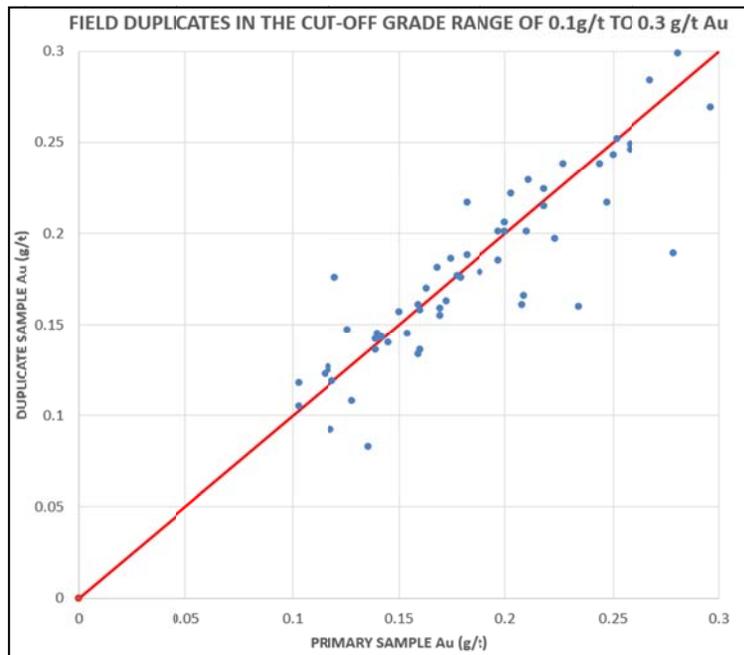
Figure 11.5-4 Field Duplicates 2015 RC Drill Program - Au Grade Range 0.1g/t to 0.3g/t

11.5.7 Standards

Four commercially prepared standards from SGS (Lima) were reviewed. The standards are ST05, ST06, ST54 and ST50. The three lower grade standards within this group have gold results that are biased slightly low. All silver results are biased low (Table 11.5-2), with the lower grade silver standards showing the most bias. These results suggest a calibration error at the CERTIMIN Lima laboratory. The bias is systematic and follow up work is required.

Table 11.5-2 Summary of Analysis of Standards Used in 2015 Drill Program

STANDARD	No. of Control Samples	Certified Mean Au (g/t)	Control Sample Mean Au (g/t)	Bias for Au (%)	Certified Mean Ag (g/t)	Control Sample Mean Ag (g/t)	Bias for Ag (%)
ST05	75	0.485	0.456	-6%	14.8	12.63	-15%
ST06	47	0.530	0.513	-3%	8.4	6.44	-23%
ST54	242	0.794	0.763	-4%	17.7	16.49	-7%
ST50	235	0.871	0.869	0%	23.4	22.51	-4%

Sample control sample charts are provided to display the systematic bias of the results for the standards (Figure 11.5-5 to Figure 11.5-8).
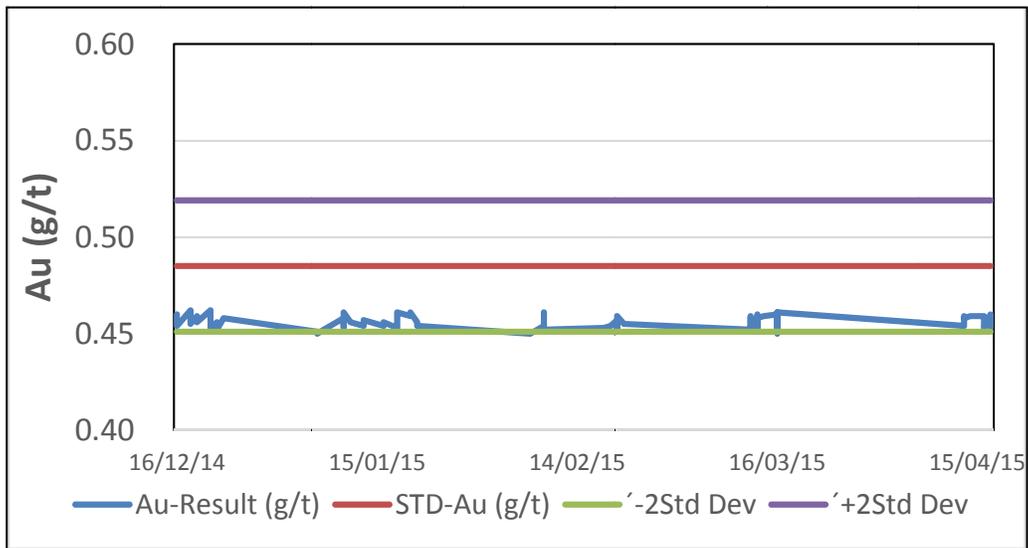
Figure 11.5-5   Chart of Au Analyses of Standard 05
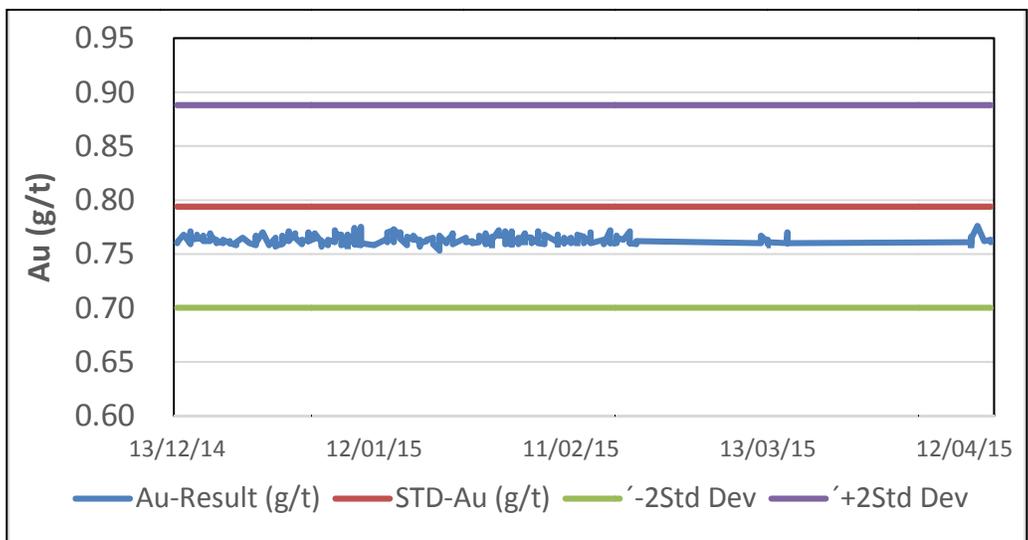
Figure 11.5-6   Chart of Au Analyses of Standard 54
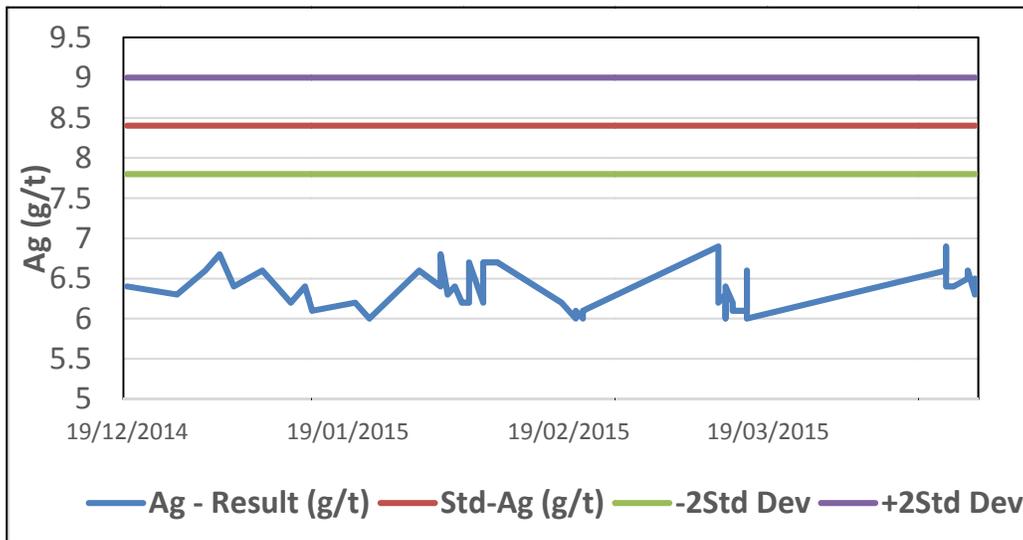
Figure 11.5-7   Chart of Ag Analyses of Standard 06
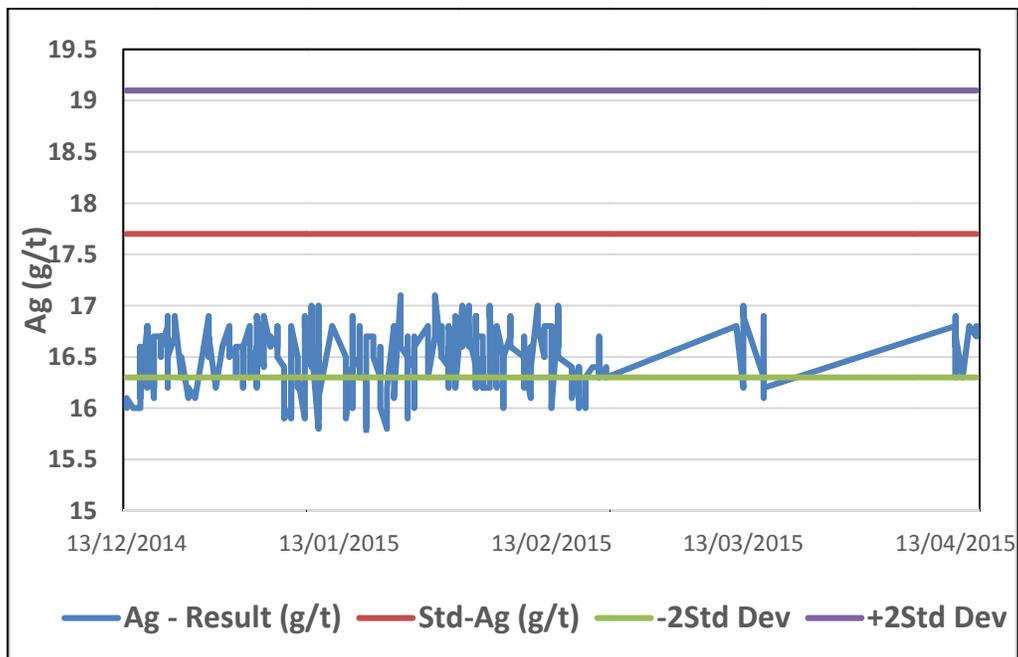
Figure 11.5-8   Chart of Ag Analyses of Standard 54

Tahoe believes the QA/QC process at Shahuindo would benefit from having one standard closer to the anticipated cut-off grade (0.18 g/t Au) and one higher grade gold standard to ensure that laboratory calibration for higher grade samples is appropriate.

11.6 Summary Statement

Tahoe is of the opinion that the sampling methods, security, and analytical procedures used at Shahuindo are adequate for mineral resource estimation. While information is lacking for the Atimmsa and Southern Peru data, it represents only 7.6% of the dataset and is not considered to have a material effect on the resource estimate. The author is not aware of any sampling or assaying factors that may materially impact the Mineral Resource estimate discussed in Section 14.0.

A continuing program of specific gravity measurements is recommended due to the importance of bulk-density in the determination of resource tonnage.

The 2014-2015 QA/QC program demonstrates no evidence of laboratory contamination from the analysis of the blank samples. The field duplicates display good repeatability, particularly around the expected gold cut-off grade to be used while mining. Standards are biased slightly low (gold) to very low (silver). This is unlikely to have any material effect on the resource estimate, although this issue needs to be understood and resolved.

12.0 DATA VERIFICATION

The Shahuindo drill hole database has been subjected to four audits prior to resource estimates in 2004, 2009, 2012 and 2015. The following is a summary of the key features of those audits conducted prior to the resource estimate reported herein.

12.1 Met-Chem 2003/2004 Audit

- Site visits were conducted in 2003 and 2004

- The drill database was compared to the hardcopy assay certificates and geologic logs with no major errors were noted.

- A total of 102 check samples were collected and sent to secondary laboratories for analysis, with occasional local high variation encountered on individual samples; however, global averages of gold and silver from the check samples were in line with the primary samples.

- The overall conclusion was that the database was sufficient for global resource estimates (Saucier and Poulin 2004; Saucier and Buchanan, 2005).

12.2 AMEC 2009 Database Audit and Verification

- AMEC collected 14 check samples; the results of which occasionally showed local high variability, though there was global agreement to grades reported by Sulliden for both gold and silver.

- AMEC completed a comprehensive database audit which included review of the project geology, drill hole logs, interpretations and drill collar locations, and 286 re-analyses of pulp rejects, duplicate pulps, coarse crushed rejects, and field duplicates from reverse circulation cuttings from the 1994-2007 drill programs. AMEC concluded the results of the work were sufficient to support mineral resource estimation (Wright et al., 2010a, 2010b).

12.3 MDA 2012 Database Audit

- The focus of the MDA audit was on the drill hole collar, downhole survey and assay data. Spot checks of geological and geotechnical data were also completed. The Shahuindo database was considered to be of high quality sufficient to support the resource estimate and classification (Defilippi, *et. al.*, 2012).

- MDA verified approximately 15 percent of the pre-2010 drill data to serve as a confirmation of the AMEC 2009 audit. If any discrepancies were identified, MDA checked additional holes from the same drill campaign.

- A comprehensive review of 2,599 inserted standards clearly displayed a constant small negative bias of the primary laboratory (ALS) from both standards and pulp duplicates, when compared to the check laboratory (SGS).

- There were 1,843 analyses of blank material, with only two counting as failures at a nominal 0.01 g/t failure line.

- A high level of repeatability was observed in all forms of field duplicates.

12.4 Tahoe 2015 Database Audit

Tahoe conducted an audit of the 2014-2015 Rio Alto assay database (data through 15 April 2015) by comparing the analytical results reported in the hard copy certificates received from the laboratory (CERTIMIN) to the digital database used for the resource estimate. Tahoe compared 100% of the gold and silver assays in the database against the laboratory certificates with no errors detected.

12.5 Statement on Data Verification

The QA/QC programs conducted on the Shahuindo samples and the multiple database audits are sufficient to ensure that the data used in the resource estimate is valid. While there are some discrepancies regarding the silver standards used by Rio Alto in 2014 and 2015, this is not considered material as silver has a negligible contribution to the economics of the project.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Metallurgical Testing Summary

Cyanidation and flotation testing programs have been conducted on composite samples from Shahuindo by various companies starting around 1996, as summarized in Table 13.1-1.

Table 13.1-1   Cyanide and Flotation Testing Programs on Shahuindo

Year	Laboratory / Company
1996	Dawson Metallurgical Laboratories / Asarco (called Boti Project)
2003-2004	Heap Leach Consultants / Compañia Minera Algamarca
2009-2012	KCA / Sulliden
2014	KCA / Rio Alto
2014-2015	SGS / Tahoe (Rio Alto)
2014-2015	Tahoe (in-house tests at Rio Alto's La Arena facilities)

Cyanidation tests were conducted by KCA from 2009 to 2012, by Rio Alto in 2014 and 2015, and by Tahoe in 2015 on drill core and surface sample composites. The results of the testing program indicated excellent gold recoveries at both run-of-mine (ROM) and coarse crush sizes with low to moderate reagent requirements, implying amenability to heap leaching. Silver recoveries are generally low.

Compacted permeability tests on minus 25mm crushed samples were conducted, both with and without cement. The results are variable with about one-third of the tests conducted in 2015 failing. The results from KCA's compacted permeability tests on -32mm composites conducted in 2012 indicated that mixing of the more weathered samples with competent material would be required to maintain permeability at 6 kg of cement per tonne of ore. Two of the three KCA tests passed the compacted permeability tests at a simulated heap height of approximately 110 meters. There are no compacted permeability tests available at coarser crush sizes. Therefore, no definite conclusions can be made at this time on the permeability characteristics in a ROM or coarse crushed multiple-lift heap leach operation.

The projected field gold and silver recoveries, reagent consumptions, and leach times on oxide material based on the available test work results from both ROM and single-stage crushing tests are summarized in Table 13.1-2.

Table 13.1-2   Metallurgical Test Work Results

Parameter	ROM	Crush
% Au Recovery	73%	80%
% Ag Recovery	7%	12%
NaCN Consumption	0.2 kg/t	0.3 kg/t
Cement	0	6 kg/t*
Lime	2 kg/t	1 kg/t
Leach Time	80 days	70 days
Size, p80	~150mm	60 to 85mm

*Cement addition based on screened minus 75mm material

Figure 13.1-1 shows the locations of the drill holes and surface samples that were used for the metallurgical test work conducted by KCA and Tahoe (Rio Alto). As shown, the samples spatially represent the ore body.
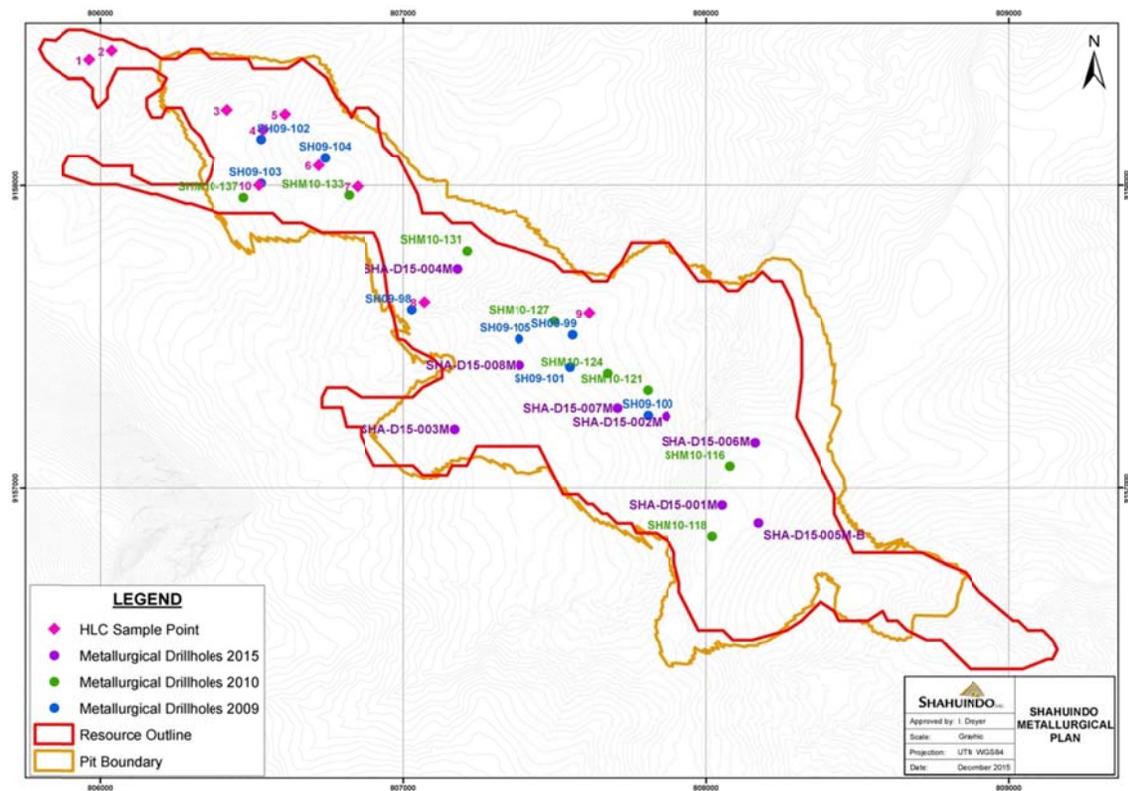
Figure 13.1-1   Location of Metallurgical Drill Holes

13.2   Pre-2014 Metallurgical Test Summary

Tests were conducted early in the project life by Dawson Metallurgical Laboratories (Dawson), KCA and Heap Leach Consultants (HLC). Material tested by Dawson for Asarco included fifteen oxide and four sulfide composites made from RC drill cuttings. Cyanide bottle roll tests on the oxide composites and flotation tests on the sulfide samples were conducted.

The test program initiated by Asarco is of limited use as the work was preliminary in nature and heap leach column tests were not conducted. As such, this program is not mentioned further in this discussion.

13.2.1   Heap Leach Consultants Test Program

Heap Leach Consultants conducted column leach tests and bottle roll tests for Compañia Minera Algamarca on oxide surface bulk samples mainly taken from the northwestern half of the ore body. The column leach tests were conducted on samples at sizes ranging from 'as-received' (ROM) to minus 25mm.

Gold recoveries in the larger HLC column tests ranged from 17% to 91%. The average test recoveries and reagent consumptions by crush size are summarized in Table 13.2-1. Eight of HLC's column tests failed due to permeability issues. There were also a series of small column tests conducted on composites crushed to minus 25mm and minus 75mm. All the minus 25mm tests except one failed due to permeability issues. The one minus 25mm small column test and the minus 75mm tests were agglomerated with 5 kg cement per tonne ore. Results from the failed tests are not included in the summary.

Table 13.2-1   Summary of HLC Column Leach Tests

Crush Size mm	Calc'd Head Au g/t	Calc'd Head Ag g/t	Extraction Au %	Extraction Ag %	NaCN Consumption kg/t	Lime kg/t	Cement kg/t
ROM	1.14	5.8	27	5	0.2	2.4	0
-150	1.18	6.1	40	7	0.3	0.94	3
-100	0.99	6.2	81	14	0.34	0.31	4.4
-75*	N.A.	N.A.	50	6	N.A.	0	5
-25*	1.41	5.6	67	14	0.63	2.35	5

*Small column tests

Sodium cyanide consumptions in the column tests ranged from 0.2 to 0.8 kg/t. In the tests that were agglomerated, 3 to 5 kg cement per tonne of ore was added.

Gold recoveries in the bottle roll tests conducted by HLC at minus 0.15mm (100 Tyler mesh) ranged from 75% to 93% while silver recoveries ranged from 13% to 39%. More detailed results from the column and bottle roll leach test program by HLC can be found in the 2012 Feasibility Study and Technical Report (Defilippi, *et. al.*, 2012) and in HLC's final report, *Informe de Cianuracion en Botellas y Columnas a Escala Piloto* (Heap Leach Consultants, 2005).

The HLC results were not used in the latest evaluation due to the unknown effect on recoveries due to permeability issues. Even though many of their tests went to completion, the specific solution application rate in several of the tests had to be decreased significantly to maintain flow, in some cases lowered to less than 2 l/hr/m². These low application rates were mentioned in HLC's final report. Channeling may or may not have been occurring in many of the tests. Therefore, it is unknown if the lower recoveries in many of the tests were due to 'non-wetting' of the material being tested.

KCA in their 2009 to 2012 test program conducted tests on bulk surface composites that were taken from similar locations as four of the samples that HLC tested. These results were used in this latest evaluation.

13.2.2 2009 to 2012 Kappes, Cassiday & Associates Test Program

KCA's cyanidation tests were conducted on composites made from HQ and PQ drill core intervals taken in 2009 and 2010 and on bulk surface samples taken in 2011. The composites were made from core intervals ranging from surface to a depth of about 160 meters. The surface bulk samples were mainly used for coarse material column leach tests to simulate leaching of samples at ROM sizes.

Coarse material leach tests were conducted on the bulk surface samples at a p80 size of up to 240mm. The tests were conducted on as-received composites and on screened fractions of the composites: +100mm, -100+50mm and -50mm. The +100 and -100+50mm tests were conducted under flooding conditions. The gold and silver recoveries on the as-received composites averaged 77% and 25%, respectively. The test results on the screened composites varied greatly, partially due to permeability issues in several of the tests since the material tested was not agglomerated with cement.

There were a total of 21 column leach tests that were conducted on composites crushed from P_{80} sizes of 15mm up to 36mm. A total of 82 bottle roll leach tests were conducted on pulverized and coarse crushed composites.

Gold recoveries in the crushed ore column leach tests ranged from 79% to 94%. Average gold recovery at an average P_{80} crush size of 22mm was 89%. Gold recovery appears to be more related to sulfide sulfur content than crush size in the size ranges tested. The tests on crushed composites with an approximate sulfide sulfur content of 0.5% averaged 83% gold recovery. Silver recoveries in the crushed material column tests were generally low and ranged from 7% to 21% and averaged 17%.

A series of column leach tests utilizing various levels of agglomeration polymer at two solution application rates on splits of a single composite sample crushed to 21mm were conducted by KCA. Gold recovery ranged from 89% to 91% and averaged 90.6% with no obvious differences in final recoveries due to polymer addition or application rate.

Sodium cyanide consumptions in the crushed material column tests ranged from 0.38 to 1.17 kg/t and averaged 0.82 kg/t. All composites tested except the ROM samples and one at a crush size of minus 36mm were agglomerated with an average of 6 kg Portland Type II cement per tonne. The tests on the coarse material used hydrated lime as a source of alkalinity.

The average results of the ROM and crushed ore column leach tests and on the screened fractions are summarized in Table 13.2-2.

Table 13.2-2   Summary of KCA Column Leach Tests

Sample Description	Avg Crush/Screen Size mm	Avg Calc'd Head Au g/t	Avg Extraction Au %	Avg NaCN Consumption kg/t	Avg % Sulfide
ROM	129	0.41	77	0.28	0.06
Crushed Ore – All	22	1.04	89	0.88	0.11
Crushed Ore (<0.1% Sulfide)	22	1.15	90	0.81	0.05
Crushed Ore (>0.1% Sulfide)	21	1.49	83	0.86	0.49
+100mm Screened Fraction	+100	0.49	54	0.44	0.08
-100+50mm Screened Fraction	-50	0.52	71	0.38	0.08
-50mm Screened Fraction	-50	0.53	85	0.42	0.08

The KCA bottle roll test program included tests on pulverized and crushed composite samples. Gold recoveries in the pulverized bottle roll tests ranged from 73% to 95% while silver recoveries ranged from 19% to 77%. Coarse bottle roll tests were conducted on composite samples crushed at nominal sizes of minus 90, 37.5, 25 and 19mm. Gold recoveries ranged from 3% to 91% while silver recoveries ranged from 3% to 66%. Results from the bottle roll test program are summarized in Table 13.2-3.

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Table 13.2-3   Summary of KCA Bottle Roll Leach Tests

Test Description	Avg P$_{80}$ Crush Size mm	Avg Calc'd Head Au g/t	Avg Extraction Au %	Avg Extraction Ag %	Avg NaCN Consumption kg/t	Avg % Sulfide*
Pulverized	0.075	0.99	87	42	0.44	0.13
nominal -90mm	41.5	0.44	59	5	0.36	0.01
nominal -37.5mm	24.7	1.42	76	12	0.43	0.04
nominal - 25mm	19	1.05	69	21	0.53	0.51
nominal -19mm	13	1.48	79	14	0.34	0.04
All Coarse Tests, >0.1% S*	19.2	1.75	55	16	0.79	1.02
Minus 25mm, >0.1% S*	18.9	1.46	52	19	0.86	1.2
Minus 25mm, <0.1% S*	17.8	0.71	75	22	0.28	0.02

*Sulfide Sulfur

The variability of gold recovery with sulfide content, crush size and sample depth was reviewed in the bottle roll test program. The test results generally indicate a decreasing gold recovery with increasing sulfide content and with increasing crush size. The results also suggest that there is a minor correlation between gold recovery and the depth of the sample with gold recovery decreasing with depth.

Details on KCA's test results can be found in the 2012 Technical Report (Defilippi, *et. al.*, 2012) and in the following unpublished laboratory reports:

- January 2011 KCA Report – Drill Core Composite Samples, Column Leach Test Program, Report of Metallurgical Test Work

  Eight spatial and grade representative core drill holes, composited to three samples by rock code (codes 20, 30 and 40) - head analyses, bottle roll cyanide leach, cyanide shake, agglomeration testing, and column leach test work.

- March 2011 KCA Report – Report of Metallurgical Test Work, Bottle Roll Tests – 2009 Core

  118 bags of broken core intervals combined to create 24 composites - twenty-four bottle roll tests, one on each composite.

- March 2011 KCA Report – Report of Metallurgical Test Work, Bottle Roll Tests – 2010, SHM-10-116 – SHM-10-118

  Nine composites from 2 core hole samples: SHM-10-116 and SHM-10-118; 5 composites developed from SHM-10-116; and 4 composites from SHM-10-118 - twenty-five bottle roll tests on composites crushed to 100% minus 90, 37.5 and 19mm.

- **May 2011 KCA Report** – 116 & 118 Column Tests, Report of Metallurgical Test Work

  Core intervals from holes SHM-10-116 and SHM-10-118 - selected intervals utilized in the generation of three 80 kilogram composites crushed to 100% minus 37.5mm, one for each rock code tested (20, 30, 40) - size fraction analyses, bottle roll leach testing, agglomeration testing and column leach testing - multi-element ICP analysis and whole rock analysis performed on the samples.

- **June 2011 KCA Report** – All Rock Code Composites, Report of Metallurgical Test Work

  Seven composites developed from the following SHM-10 series of drill holes:

  - Composite 1: 121, 124, 127; Composite 2: 131, 133, 137

  - Composite 3: 118, 121, 124, 131, 133; Composite 4: 116, 121, 124, 127

  - Composite 5: 116, 118, 121; Composite 6: 116, 127, 131, 133

  - Composite 7: 116, 124, 127, 131, 133

  Seven 80 kilograms composite samples crushed to 100% minus 37.5mm and one 280 kilogram composite (split of composite 1) crushed to 100% minus 75mm (P80 of 36mm) - size fraction analyses, bottle roll leach testing, agglomeration testing and column leach testing - detoxification testing on barren solution from one of the smaller column tests - ICP and whole rock analyses on each composite.

- **June 2011 KCA Report** – Polymer Testing, Report of Metallurgical Test Work

  Core intervals from holes SHM-10-131 and SHM-10-133 - one 200 kilogram composite crushed to approximately 20mm - size fraction analyses with assays by size fraction, bottle roll leach testing, agglomeration testing, column leach testing and detoxification test work - seven column leach tests on portions of the composite; each test utilized varying amounts of SNF and Nalco polymer as well as varying flow rates.

- **December 2011 KCA Report** – HLC 6, 7, 8, 9 Composites, Report of Metallurgical Test Work

  Nine surface bulk samples received (samples taken from same approximate locations as the HLC 6, 7, 8 & 9 composites) - five of these bulk samples combined into three composites: an "A" composite, a "B" composite and a Global Master Composite - size fraction analyses bottle roll leach testing, agglomeration testing and column/flood leach testing.

- **January 2012 KCA Report** – P1 and P2 Zones, Report of Metallurgical Test Work

  Ten barrels from each of the P1 and P2 Zones - material from each zone screened at 100 and 50mm - flood testing on +100mm and -100 +50 mm samples - size fraction analyses, bottle roll leach testing, agglomeration testing and column leach testing on -50mm material - two run of mine (ROM) composites, one from each zone, for column leach testing.

- May 2012 KCA Report – Bulk ROM Material, Report of Metallurgical Test Work

  Eighty drums of bulk ROM material composited into eight bulk ROM samples - size fraction analyses, bottle roll tests - no column testing due to termination of ROM testing program

- May 2012 KCA Report – Report of Metallurgical Test Work

  Acid-base accounting and humidity cell test work on waste drill core intervals and leached ore.

13.3   2014 Kappes, Cassiday & Associates Test Program

Two column leach tests were conducted on composites from drill hole core samples remaining from the 2009 to 2012 KCA test program. KCA prepared a single composite based on instructions from Rio Alto. This composite was then screened and separated into different size fractions. Splits from each of the size fractions were then recombined into two composites: coarse and fine composites with "coarse" defined as the fractions greater than 25mm. The coarse composite was generated with a ratio of coarse to fine material of 1:1 while the fine composite was generated with a ratio of 1:2.

Column leach tests were conducted on each composite. Gold and silver recoveries in the two tests were the same at 89% and 10%, respectively, after 58 days of leaching. Sodium cyanide consumptions were virtually identical in the two tests at 0.67 and 0.68 kg per tonne. Both composites required a little over 3 kg of lime per tonne for alkalinity control.

Calculated head grades were also very similar, 1.10 g/t Au and 7.1 g/t Ag and 1.05 g/t Au and 6.4 Ag g/t. The tailings screen analyses of the coarse composite resulted in a p80 of 50.9mm while fine composite showed a p80 of 39.7mm.

13.4   2014 and 2015 Test Programs

Numerous cyanidation and permeability tests were conducted under the direction of Rio Alto in 2014 and Tahoe Resources in 2015. The tests were conducted at Rio Alto's La Arena testing facilities and by SGS Minerals Services, Anddes and PUCP (Catholic University, Lima).

13.4.1 Rio Alto, Tahoe Resources and SGS Column Leach Tests

Personnel at Rio Alto's La Area laboratory conducted 38 column leach tests on composites generated from bulk surface samples and drill core intervals. Samples for testing were composited based on rock type and by drill hole. A total of eight core holes were drilled specifically for metallurgical test work.

The rock types developed by Tahoe Resources are summarized in Table 13.4-1.

Table 13.4-1   Rock Type Summary

Unit	Description
Q	Quaternary sandstone & siltstone clasts in clay matrix (>20% fines)
BX	Breccia with high fines content (>20% fines, clasts & matrix)
BXC	Breccia with low fines content (<20% fines, clasts & matrix)
SD	Sandstone (<5% fines)
SDH	Fine-grained sandstone (5%-20% fines)
ST	Siltstone (100% fines)
FPD	Dacite intrusive
SULF	Sulfide

The results from Rio Alto's series of column leach tests are presented in Table 13.4-2 and Table 13.4-3. SGS conducted a total of five column leach tests; the results of which are summarized in Table 13.4-4. Two tests were conducted on individual composites of siltstone and sandstone and three tests on blends of sandstone and siltstone at ratios of 4:1, 2:1 and 1:1.

As shown in Table 13.4-2 through Table 13.4-4, gold recoveries on oxide material are generally very good, averaging approximately 82% including all crush sizes and rock types (except sulfides). Gold recoveries ranged from 68% to 89%.

The test with 68% gold recovery was on a fine-grained sandstone surface composite. The results of the column leach tests show a trend with lower recoveries in the tests containing this sandstone composite. Cyanide soluble tests on ground samples of this same composite also show lower gold recoveries as compared to other rock types. The reasoning for the lower recovery is not clear as tests on other sandstone composites resulted in significantly higher recoveries. It is possible that the composite contained a small quantity of sulfides, which have shown to decrease gold recovery.

In the SGS series of tests, the recovery of gold decreased slightly with increasing siltstone content. This trend was also present in the SGS bottle roll tests as discussed in Section 13.4.3. Silver recoveries in all the tests were generally low, averaging 17%.

Reagent consumptions were low to moderate in these series of column leach tests. Sodium cyanide consumptions varied from 0.12 to 1.43 kg NaCN per tonne ore and averaged 0.78 kg/t, including all results except those on the sulfide test. Lime additions ranged from 0.7 to 2.7 kg lime per tonne ore in tests where no cement was added. Average lime requirement in these tests was 1.8 kg/t. Cement at 4 to 6 kg/t was added to several of the -25mm tests. In these tests, the average cement addition rate was 4.5 kg/t and the average lime added was 1.5 kg/t.

Table 13.4-2   Rio Alto Column Leach Test Results on Surface Samples

Column No.	Sample Description	Crush Size, p100, mm	Rock Type	ppm CN*	Leach Time days	Head g/t		% Recovery		NaCN kg/t	Lime kg/t	Cement kg/t
						Au	Ag	Au	Ag			
15	Drum, Surface PM1	76	Sandstone	150	60	5.570	808.0	79.7	3.3	0.48	2.2	0
16	Drum, Surface PM1	76	Sandstone	150	60	5.570	808.0	79.7	3.3	0.60	2.3	0
17	Drum, Surface PM2	76	Sandstone	150	23	0.170	7.1	83.3	3.7	0.12	1.1	0
18	Drum, Surface PM2	76	Sandstone	150	23	0.170	7.1	84.0	3.5	0.17	1.1	0
8	Drum, Surface Blend of PM1 & PM2	76	Sandstone	500	60	2.550	360.8	83.2	5.2	1.25	1.5	0
1	Truck 1, First Sample	ROM	Sandstone	150	60	0.325	4.7	75.5	4.5	0.20	2.3	0
3	Truck 1, First Sample	100	Sandstone	150	60	0.311	4.9	76.1	4.6	0.28	2.2	0
14	Truck 1, First Sample	12.5	Sandstone	150	30	0.346	7.2	75.1	8.0	0.14	2.4	0
15	Truck 1, First Sample	12.5	Sandstone	300	30	0.346	7.2	78.0	9.5	0.43	2.4	0
16	Truck 1, First Sample	12.5	Sandstone	500	30	0.346	7.2	81.7	9.7	0.74	2.4	0
1	Truck 2: 1:2=Sample 514420 : Sample 514416	ROM	Sandstone, Siltstone	100	80	1.765	8.8	76.2	2.9	0.26	1.8	0
2	Truck 2: Sample 514420	ROM	Sandstone - Medium Grain	100	80	0.474	2.1	77.8	13.1	0.22	1.8	0
3	Truck 2: Sample 514425	150	Siltstone & Sandstone - Fine Grain	100	81	0.967	3.5	84.0	10.7	0.32	1.9	0
4	Truck 2: 1:2=Sample 514420 : Sample 514417	150	Sandstone - Intertwinned	100	81	0.861	2.0	70.3	13.4	0.34	2.0	0
9	Truck 2: Sample 514416	76	Siltstone - Fine Grain	100	77	3.444	10.7	73.9	6.7	0.45	2.7	0
11	Truck 2: Sample 514425	76	Siltstone & Sandstone -Fine Grain	100	77	1.379	4.0	78.1	14.3	0.37	2.5	0
12	Truck 2: Sample 514417	76	Sandstone - Fine Grain	100	83	1.062	3.3	68.1	14.1	0.54	2.6	0
13	Truck 2: Sample 514420	76	Sandstone - Medium Grain	100	83	0.472	2.5	80.8	17.3	0.51	2.2	0

*Average concentration of cyanide (as CN-) in test leach solutions

Table 13.4-3   Rio Alto Column Leach Test Results on Drill Core Composites

Column No.	Sample Description	Crush Size p100 mm	Rock Type	ppm CN*	Leach Time days	Head g/t		% Recovery		NaCN kg/t	Lime kg/t	Cement kg/t
						Au	Ag	Au	Ag			
32	ST1 (Met hole 001M, drill core intervals to 132m)	25	Siltstone	500	60	0.348	1.7	84.2	23.64	0.95	1.3	5.0
21	ST2 (Met hole 001M, intervals 161m to 176m)	25	Siltstone	500	60	0.323	2.0	87.1	34.16	1.13	1.5	5.0
33	SD+SDH (all SD+SDH intervals in met hole 001M)	25	Compact & Fine Grained Sandstone	500	60	0.410	3.3	88.7	25.36	0.91	0.9	0.0
34	BX + BXC (all BX+BXC intervals in met hole 001M)	25	Breccia, High & Low Fines Content	500	60	0.511	2.5	87.4	21.13	0.98	1.0	4.0
35	ST (Met hole 002M, core intervals to 132m)	25	Siltstone	500	60	0.643	1.8	89.0	21.48	1.20	1.3	5.0
36	SD (all SD intervals in met hold 002M)	25	Compact Sandstone	500	60	0.623	7.5	85.0	19.73	1.08	0.7	0.0
22	BX + BXC (all BX+BXC intervals in met hole 002M)	25	Breccia, High & Low Fines Content	500	60	0.924	3.6	85.6	11.68	1.32	1.9	4.0
37	ST (Met hole 003M, core intervals to 132m)	25	Siltstone	500	60	0.533	6.5	87.7	14.18	1.43	1.0	5.0
38	ST (Met hole 004M, core intervals to 132m)	25	Siltstone	500	60	0.887	6.7	89.5	21.05	1.25	2.1	5.0
23	BX + BXC (Met hole 004M)	25	Breccia, High & Low Fines Content	500	60	1.084	4.4	73.2	27.99	0.66	1.6	4.0
39	ST (Met hole 005M, core intervals to 80m)	25	Siltstone	500	60	0.224	1.4	85.5	26.65	1.06	0.9	5.0
40	ST (Met hole 005M, intervals from 82m to 150m)	25	Siltstone	500	60	0.273	1.6	89.4	33.77	1.15	2.0	5.0
41	SD + SDH (all SD+SDH intervals in met hole 005M)	25	Compact & Fine Grained Sandstone	500	60	0.267	4.5	86.6	32.32	0.97	1.2	0.0
42	ST (all ST intervals in met hole 006M)	25	Siltstone	500	60	0.331	5.9	85.0	22.39	0.95	1.1	5.0
43	SD + SDH (all SD+SDH intervals in met hole 006M)	25	Compact & Fine Grained Sandstone	500	60	0.365	6.3	83.8	30.67	0.89	0.9	0.0
44	ST (all ST intervals in met hole 007M)	25	Siltstone	500	60	0.484	1.1	88.4	19.62	1.15	1.4	5.0
45	SD + SDH (all SD+SDH intervals in met hole 007M)	25	Compact & Fine Grained Sandstone	500	60	0.465	8.7	80.7	16.08	1.01	0.8	0.0
46	ST (Met hole 008M, intervals from 0m to 80m)	25	Siltstone	500	60	0.428	6.9	82.2	23.6	1.16	1.8	5.0
47	SD + SDH (all SD+SDH intervals in met hole 008M)	25	Compact & Fine Grained Sandstone	500	60	0.360	4.3	82.5	17.23	1.14	1.6	0.0
48	SULFIDES (008M, intervals from 114m to 160m)	25	Sulfides	500	60	0.695	23.9	19.7	2.527	1.72	2.9	5.0

*Average concentration of cyanide (as CN-) in test leach solutions

Table 13.4-4   SGS Column Leach Test Results

Column No.	Sample Description	Crush Size p100 mm	Rock Type	ppm CN*	Leach Time days	Head g/t		% Recovery		NaCN kg/t	Lime kg/t	Cement kg/t
						Au	Ag	Au	Ag			
SGS 1	Core intervals composited from 003M	25	Silstone	500	48	0.48	9.7	80.7	14.7	1.24	3.92	6
SGS 2	Core intervals composited from 005M	25	Sandstone	500	48	0.28	4.7	84.7	34.9	0.77	2.26	0
SGS 3	4:1 ratio of SD:ST, 001M to 008M	25	Sandstone-Siltstone Blend	500	48	0.3	5.7	83.3	29.7	0.81	1.08	0
SGS 4	2:1 ratio of SD:ST, 001M to 008M	25	Sandstone-Siltstone Blend	500	48	0.41	6.9	83.1	25.0	1.06	0.49	4
SGS 5	1:1 ratio of SD:ST, 001M to 008M	25	Sandstone-Siltstone Blend	500	48	0.46	8.3	83.2	21.8	1.11	0.22	5

*Average concentration of cyanide (as CN-) in test leach solutions

13.4.2 Discussion on the Results of the Rio Alto and SGS Column Leach Tests

The results from the column leach tests by SGS and Rio Alto were sorted and averaged based on crush size. The results from the -25mm tests were also sorted by rock type and averaged. These results are presented in Table 13.4-5.

The tests show some variation in gold recovery with crush size. The average gold recovery from tests conducted on coarser material (p100 of 100mm or greater) averaged 76% while the gold recovery on samples crushed to approximately 76mm averaged 79%. Gold recovery in the minus 25mm column leach tests averaged 84%. The minus 25mm test results also indicate similar gold recoveries on the composites of sandstone and siltstone and slightly lower recoveries on breccia composites. Sodium cyanide consumptions vary based on the concentration of cyanide used in the column tests and do not seem to vary significantly due to differing rock types or on crush size.

One potential issue with the column leach tests on the ROM and coarser crushed siltstone/sandstone blended composites was the high fines content in the pregnant leach solutions. Several of the tests reported a pregnant solution fines content of over 6% solids by weight, which is extremely high. This high fines migration in a heap can quickly fill up a solution storage pond and cause operating problems in the adsorption and pumping circuits. The fines issue needs to be evaluated further in the future. The amount of fines in the pregnant solution would likely be significantly reduced by the introduction of cement agglomeration.

Table 13.4-5   SGS and Rio Alto Column Leach Test Results by Size and Rock Type

Avg Crush Size p100 mm	Rock Type	Avg ppm CN-*	Avg Leach Time days	Avg Head Grade g/t		Avg % Recovery		Avg Reagent Req'd kg/t		
				Au	Ag	Au	Ag	NaCN	Lime	Cement
ROM	Mainly sandstone (surface)	117	73	0.85	5	76	7	0.23	1.94	0.00
150	Sandstone & Siltstone (surface)	100	81	0.91	2.7	77	12	0.33	1.97	0.00
100	Sandstone (surface)	150	60	0.31	4.9	76	5	0.28	2.21	0.00
76	Sandstone & Siltstone (surface)	167	61	2.27	224	79	8	0.50	2.02	0.00
25	Sandstone, Siltstone, Breccia (core)	500	58	0.48	4.8	85	24	1.06	1.37	3.21
12.5	Sandstone (surface)	317	30	0.35	7.2	78	9	0.44	2.43	0.00
25	Breccia	500	60	0.84	3.5	82	20	0.99	1.49	4.00
25	Sandstone	500	58	0.40	5.6	85	25	0.97	1.22	0.00
25	Siltstone	500	59	0.45	4.1	86	23	1.15	1.64	5.09

*Average concentration of cyanide (as CN-) in test leach solutions

13.4.3 SGS Bottle Roll Tests

SGS conducted a series of bottle roll tests on splits of the samples tested in the SGS column leach program. The bottle roll tests were conducted for 72 hours on composites crushed to 100% passing 2mm. These results are presented in Table 13.4-6.

Table 13.4-6   Summary of SGS 72-hour Bottle Roll Tests

Test No.	Sample Description	Crush Size p100 mm	NaCN g/L	Head g/t		% Recovery		NaCN kg/t	Lime kg/t
				Au	Ag	Au	Ag		
1	Siltstone	2	0.94	0.47	9.4	76.7	18.8	1.97	5.56
2	Sandstone	2	0.94	0.28	4.9	84.5	41.9	0.92	1.59
3	Blend 4 Sandstone to 1 Siltstone	2	0.94	0.28	5.5	82.7	38.4	1.38	2.27
4	Blend 2 Sandstone to 1 Siltstone	2	0.94	0.42	6.6	80.6	32.3	1.50	2.31
5	Blend 1 Sandstone to 1 Siltstone	2	0.94	0.48	7.9	79.8	26.2	1.81	3.25
1B	Siltstone (Duplicate)	2	0.94	0.43	9.5	80.1	17.2	2.00	5.75

Gold recoveries did not vary greatly, ranging from 77% to 84%. The siltstone composite had the lowest gold recovery, averaging approximately 78% in the two tests. The recovery of gold decreased with increasing siltstone content in the series of bottle roll tests. This trend is also shown in the SGS column leach tests results previously shown in Table 13.4-4.

Silver recoveries were generally low, averaging 29%. There is a similar trend with decreasing silver recoveries with increasing siltstone content.

Lime and cyanide consumptions were both high in all tests, with the tests on the siltstone material the highest. The series of bottle roll test results also show lime and cyanide requirements increasing with increasing siltstone content in the composites. These trends based on siltstone content are not apparent in the larger column leach tests on the coarser ore composites conducted at La Arena by Rio Alto.

The SGS report stated that the siltstone sample had higher contents of copper, iron and arsenic than the sandstone composite which could account for the higher reagent consumptions. Gold recoveries should only minimally affected by the level of these three elements in the siltstone samples. Cyanide soluble copper levels are low and should not cause any issues with heap performance.

The SGS data also show that the siltstone composite had higher levels of sulfur. It is unknown if the sulfur is due to sulfates (as jarosite), elemental sulfur or sulfides. KCA's 2009 to 2012 test program showed a decrease in gold recovery with increasing sulfide content.

Head grade assays for copper, iron, arsenic and sulfur in the SGS siltstone and sandstone composites are summarized in Table 13.4-7.

Table 13.4-7   Copper, Iron, Arsenic and Sulfur Levels in the SGS Composites

Rock Type	% Iron	% Sulfur	Cu ppm	Arsenic ppm
Siltstone	10.77	1.16	80.5	1909
Sandstone	3.36	0.27	15.9	512

13.4.4 Compacted Permeability Tests

A series of compacted permeability tests were conducted by Anddes and PUCP. Anddes' results are more relevant to determining percolation properties of the ore at various simulated heap heights due to the type and size of test. The tests by PUCP were on small samples and are more oriented to testing soil samples. PUCP's results are not presented here as they were not used in the evaluations.

Anddes' tests were conducted in an approximate 300mm diameter cylinder on leached minus 25mm residues from the series of column leach tests conducted at La Arena. Initial sample heights were kept constant at about 300mm. The tests were conducted as "rigid" tests, with a solid cylinder wall. KCA conducts similar tests, although preferably with a higher sample test height. KCA has used results from these types of tests successfully in estimating cement requirements at varying heap heights in numerous heap leach projects. Anddes' results are presented in Table 13.4-8.

The percolation rate is dependent on the heap height simulated and on the content of fines present in the samples tested. Figure 13.4-1 presents the variation in percolation rates with fines content and simulated heap heights while Figure 13.4-2 presents the change in rates with rock type and simulated heap heights. The results indicate that material with approximately 20% fines (minus 75 microns) or greater could have permeability issues, or this material could cause channelling within the heap due to zones with higher fines content.

The series of compacted permeability tests were conducted on minus 25mm leached residues. The results can be considered to be a worst case scenario and do not necessarily lead to the conclusion that the approximate minus 100mm coarse crushed ore will have permeability issues. The results do indicate that sandstones will have not have any permeability issues as all tests on this rock type passed. The breccia material had mixed results with higher fines content samples not passing. All the siltstone samples failed the tests, even at cement additions of up to 5 kg/t. Additional testing is required, including testing at a coarser crush size, blending of the rock types and varying the cement levels.

Table 13.4-8   Compacted Permeability Test Results

Drill Hole	Column Test No.	Rock Type	Description	Classification (SUCS)				Permeability (Rigid) cm/s				Cement (kg/t)
				Gravel (%)	Sand (%)	Fines (%)	Liquid Limit (%)	1 kPa <6m Heap Ht	300 kPa 16m Heap Ht	800 kPa 45m Heap Ht	2000 kPa 110m Heap Ht	
001M	C-21	ST2	Siltstone (100% fines)	22.7	55.6	21.8	20	5.00E-02	0	0	0	5.0
002M	C-22	BX+BXC	Breccia, High & Low Fines Content	48.8	34.3	16.9	18	2.10E+00	1.00E+00	5.40E-01	2.50E-01	4.0
004M	C-23	BX+BXC	Breccia, High & Low Fines Content	17.3	30.4	52.4	26	1.40E+00	0	0	0	4.0
001M	C-32	ST1	Siltstone (100% fines)	19.2	14	66.8	28	2.70E-01	0	0	0	5.0
001M	C-33	SD+SDH	Compact & Fine Grained Sandstone	61.1	20.1	18.7	22	4.70E-01	1.90E-01	5.80E-02	1.40E-03	0.0
001M	C-34	BX+BXC	Breccia, High & Low Fines Content	27.8	25.9	46.4	19	5.80E-01	0	0	0	4.0
002M	C-35	ST	Siltstone (100% fines)	54	22.4	23.6	23	4.10E-01	2.80E-02	1.20E-02	2.90E-03	5.0
002M	C-36	SD	Sandstone	64.8	22.3	12.9	25	5.70E-01	3.30E-01	1.90E-01	8.20E-02	0.0
003M	C-37	ST	Siltstone (100% fines)	34	26.1	39.9	23	5.20E-02	4.90E-04	4.20E-06	0	5.0
004M	C-38	ST	Siltstone (100% fines)	34	33.3	32.8	28	1.10E-01	0	0	0	5.0
005M	C-39	ST	Siltstone (100% fines)	38.9	28.2	32.9	22	1.50E-01	3.50E-04	0	0	5.0
005M	C-40	ST	Siltstone (100% fines)	46.1	25.5	28.5	24	3.90E-01	2.70E-02	5.60E-03	1.10E-03	5.0
005M	C-41	SD+SDH	Compact & Fine Grained Sandstone	66.4	22.5	11.1	17	3.10E+00	1.80E+00	8.90E-01	3.20E-01	0.0
006M	C-42	ST	Siltstone (100% fines)	35.5	13.7	50.8	24	3.30E-02	0	0	0	5.0
006M	C-43	SD+SDH	Compact & Fine Grained Sandstone	73.3	17.1	9.6	18	1.20E-01	5.60E-01	4.70E-01	3.50E-01	0.0
007M	C-44	ST	Siltstone (100% fines)	43.1	29.9	26.9	27	3.20E-01	7.30E-03	8.80E-04	8.20E-04	5.0
007M	C-45	SD+SDH	Compact & Fine Grained Sandstone	68	21.4	10.6	18	3.10E+00	2.60E+00	1.80E+00	6.40E-01	0.0
008M	C-46	ST	Siltstone (100% fines)	49.3	31.2	19.5	27	4.30E-01	2.60E-02	4.30E-03	5.50E-05	5.0
008M	C-47	SD+SDH	Compact & Fine Grained Sandstone	66.9	26.9	6.2	20	1.80E+00	1.70E+00	1.20E+00	5.50E-01	0.0
008M	C-48	SULFIDES	Sulfides	50.6	26.9	22.4	32	2.80E-02	8.40E-03	5.60E-06	0	5.0
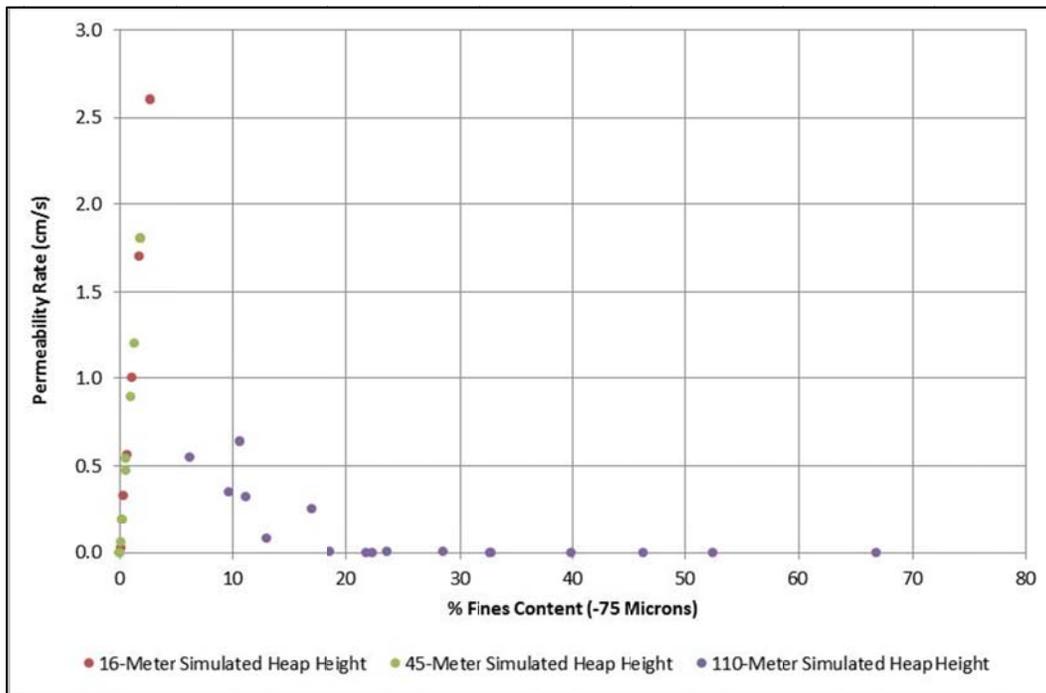
Figure 13.4-1   Permeability Rate and Fines Content at Various Simulated Heap Heights
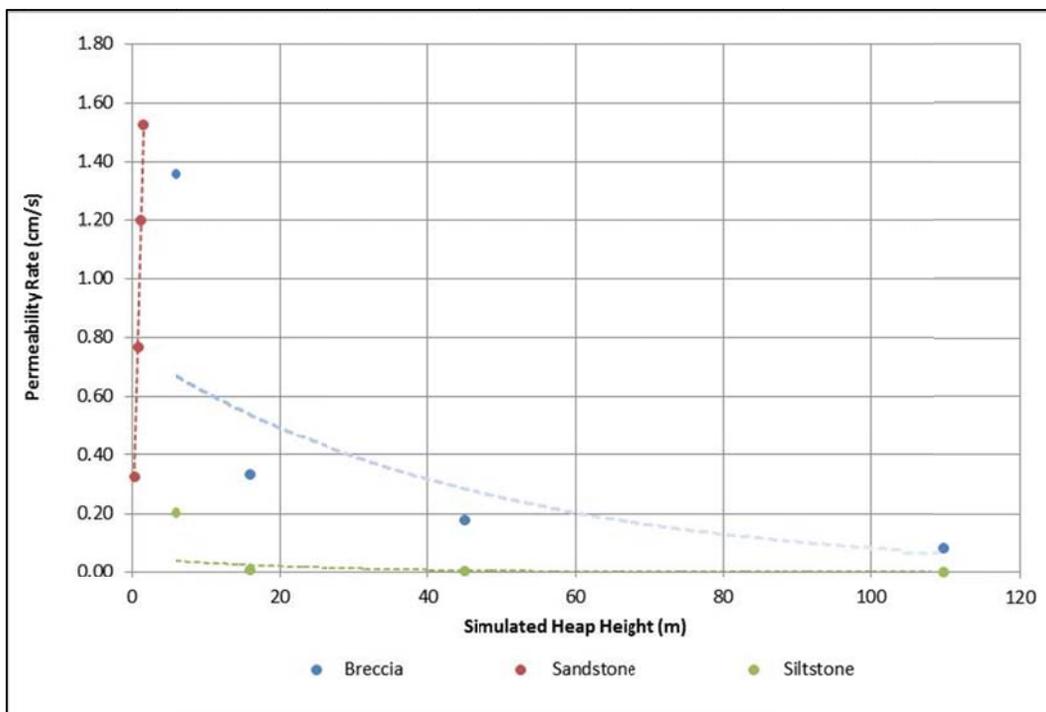
Figure 13.4-2   Permeability Rate and Rock Type at Various Simulated Heap Heights

13.5 Estimated Field Recoveries, Leach Times and Reagent Requirements

Column leach tests on ROM and coarse crushed column leach tests by KCA, Rio Alto and Tahoe were used in estimating field recoveries, leach times and reagent requirements. These leach test results are summarized in Table 13.5-2.

13.5.1 ROM Field Design Parameters

The column leach tests conducted on ROM composites or on composites coarse crushed to 100mm or greater were used in the estimation of ROM field data. Data supplied by Tahoe indicate a preliminary p80 ROM size of approximately 100mm to 150mm. Since there are insufficient test results on individual rock types, the results from these series of tests were averaged to estimate the field recoveries, leach times and reagent requirements.

For the series of column tests labelled as ROM or at sizes of 100mm or greater (items one through eight as presented in Table 13.5-2), the average gold recovery is 76%. Silver recoveries are low and average 12%. The average sodium cyanide consumption and lime requirement are 0.28 kg/t ore and 2 kg/t ore, respectively.

Based on field experience, KCA reduces the column test recoveries by 2-3% for gold and 2-5% for silver for the field recoveries. Factors applied to laboratory column leach test results to estimate field sodium cyanide consumptions on clean, oxide ores vary by column size (weight of sample tested), test procedures, and cyanide strength in the barren leach solutions. Typically, KCA uses 25% to 33% of the column cyanide consumption in smaller columns (generally 75mm to 150mm in diameter and up to 2m in height) and up to 70% to 80% on tests conducted on larger samples (500mm+ in diameter by 6m in height). Cyanide strength in the leach solutions are generally in the 500 to 1000 ppm NaCN range. Based on discussions with Tahoe personnel and KCA's experience, a factor of approximately 70% was used for ROM ore as most of the tests were conducted in larger columns. Field lime requirements are generally close to the laboratory test results.

KCA typically estimates the field leach cycle duration from column leach test data. The method includes studying the shape of the recovery versus solution to solids ratio curve (tonnes of solution per tonne of ore) to determine where it starts to bend. The "solution to solids ratio" at the bend is converted to field time using the heap's solution application rate, stacked ore density and lift height. The recovery versus time curve is then studied to estimate the days between the bend and when leaching is complete. The days are summed to determine a total leach time.

Several of the ROM column tests conducted at La Arena were evaluated for the above information. The "bend" occurs in the 0.3 to 0.5 tonnes of solution per tonne of ore range. Additional leach time to reach the flat part of the curve generally varies from 40 to 60 days. Therefore, at a lift height of 12 meters and a solution application rate of 10 L/hr/m^2, a total leach time of 80 days is recommended. Increasing the lift height to 16 meters, the total leach time recommended increases to 90 days. On multiple lift heaps, additional leach time may be required to wash out pregnant leach solutions in lower lifts during upper lift leaching.

Therefore, for oxide ROM ore and assuming no permeability or fines migration issues, KCA estimates the parameters shown in Table 13.5-1 for this study.

Table 13.5-1   KCA Oxide Ore Parameters - No Permeability or Fines Migration Issues

Parameter	KCA Recommendation
Gold Recovery	73%
Silver Recovery	7%
NaCN Consumption	0.2 kg/t
Lime Requirement	2.0 kg/t
Leach Time	80 days (minimum, 12 meter lifts)

Table 13.5-2   Column Test Results Used in Estimating Field Design Criteria

Item No.	Test ID / Col No.	Description	Size mm	Head Au g/t	Head Ag g/t	Extraction Au %	Extraction Ag %	NaCN Cons kg/t	Lime kg/t	Cement kg/t	Days Leached
1	KCA 60909	Global Composite A & B	102 (p80)	0.94	3.1	85	22	0.52	0	5.95	71
2	KCA 60978	P2, Zonal Moyan	240 (p80)	0.095	0.67	62	27	0.10	0	5.74	56
3	C-1	Truck 1, Sandstone	ROM	0.325	4.7	75	4.5	0.20	2.3	0	60
4	C-3	Truck 1, Sandstone	100 (p100)	0.311	4.9	76	4.6	0.28	2.2	0	60
5	C-1	Truck 2: 1:2 Sample 514420 : Sample 514416	ROM	1.76	8.8	76	2.9	0.26	1.8	0	80
6	C-2	Truck 2: Sample 514420	ROM	0.474	2.1	78	13	0.22	1.8	0	80
7	C-3	Truck 2: Sample 514425	150 (p100)	0.967	3.5	84	11	0.32	1.9	0	81
8	C-4	Truck 2: 1:2 Sample 514420 : Sample 514417	150 (p100)	0.861	2.0	70	13	0.34	2.0	0	81
9	KCA 60991	P1, Zona Este, Huangamarca	45 (p80)	0.196	0.40	83	25	0.22	0	5.97	66
10	KCA 61648	KCA Old Core, 1:1 Coarse:Fines Mix	50.9 (p80)	1.095	7.1	89	10	0.67	3.06	0	58
11	KCA 61651	KCA Old Core, 1:2 Coarse:Fines Mix	39.7 (p80)	1.054	6.4	89	10	0.68	3.02	0	58
12	C-15	Surface, PM1, Sandstone	75 (p100)	5.57	808	80	3.3	0.48	2.2	0	60
13	C-16	Surface, PM1, Sandstone	75 (p100)	5.57	808	80	3.3	0.60	2.3	0	60
14	C-17	Surface, PM2, Sandstone	75 (p100)	0.17	7.1	83	3.7	0.12	1.1	0	23
15	C-18	Surface, PM2, Sandstone	75 (p100)	0.17	7.1	84	3.5	0.17	1.1	0	23
16	C-8	Surface, PM1+PM2 Blend	75 (p100)	2.55	361	83	5.2	1.25	1.5	0	60
17	C-9	Truck 2: Sample 514416	76 (p100)	3.44	11	74	6.7	0.45	2.7	0	77
18	C-11	Truck 2: Sample 514425	76 (p100)	1.38	4.0	78	14	0.37	2.5	0	77
19	C-12	Truck 2: Sample 514417	76 (p100)	1.06	3.3	68	14	0.54	2.6	0	83
20	C-13	Truck 2: Sample 514420	76 (p100)	0.472	2.5	81	17	0.51	2.2	0	83
Averages Items 1 through 8				0.72	3.7	76	12	0.28	2.00		71
Averages Items 9 through 20				1.89	169	81	10	0.51	2.02		61

13.5.2 Primary Crushed Ore Field Design Parameters

The column leach tests conducted on composites crushed to nominally -76mm were used in the estimation of the coarse crushed ore field design parameters. Data supplied by the crusher manufacturer indicate a preliminary p80 crush size ranging from approximately 60mm to 85mm. There are insufficient test results at the primary crushed ore size to estimate field operating data by individual rock types.

For the series of column tests labelled as 76mm down to 45mm (items 12 through 20 as presented in Table 13.5-2), the results from similar composites were combined to prevent one rock type or sample location from biasing the averages. There are several potential combinations, all of which lead to average gold recoveries in the 81% to 83% range. For this study, KCA used the results shown in Table 13.5-4 to estimate field recoveries and reagent requirements.

Estimates for field gold and silver recoveries were made based on the deductions discussed in Section 13.4.1. However, the low silver recovery from the test on the very high silver grade sample (Item 16) was not used. This leads to an average non-deducted silver recovery of 16%.

Sodium cyanide consumption averaged 0.65 kg/t. Based on discussions with Tahoe personnel and KCA's experience, an average sodium cyanide consumption rate of 0.3 kg per tonne of ore was used. This equates to a factor of approximately 45% of the average consumption.

Cement and lime requirements are difficult to estimate based on the lack of data from tests that simulate the planned processing flow sheet on coarse crushed material. The current flow sheet includes primary crushing, then screening at 76mm. The minus 76mm material is agglomerated with 6 kg cement per tonne of minus 76mm ore, then recombined with the plus material prior to conveyor stacking on the heap. Lime is also added at a rate of 1 kg per tonne of ore (whole ore). The cement addition rate appears reasonable based on KCA's and Anddes' compacted permeability test results. However, no permeability tests on screened minus 76mm composites have been conducted.

Field leach time on coarse crushed ore was estimated in a similar manner as the ROM leach time. Several of the minus 76mm tests were evaluated and leach times determined. There are significant variations in the shapes of the curves, especially when comparing KCA's and La Arena's tests. KCA's tests indicate a "bend" at about 0.4 tonne solution per tonne ore while the "bend" in some of La Arena's tests are in the 0.5 to 1 tonne solution per tonne ore range. A couple of La Arena's test had no "bend" in the leach curves. Additional leach time determined from the leach time curves varies from 30 to 60 days. For this study, a 0.4 tonne solution per tonne ore ratio was used with another 40 days of additional leach time. Therefore, at a lift height of 12 meters and a solution application rate of 10

l/hr/m², a total leach time of 70 days is recommended on coarse crushed ore. Increasing the lift height to 16 meters, the total leach time recommended increases to 80 days. On multiple lift heaps; additional leach time may be required to remove pregnant leach solutions in lower lifts during upper lift leaching.

Therefore, for oxide ore crushed to a p80 in the 60mm to 85mm range, KCA estimates the parameters shown in Table 13.5-3 for this pre-feasibility study.

Table 13.5-3   KCA Oxide Ore Recommendation - Crushed to p80 (60mm - 85mm range)

Parameter	KCA Recommendation
Gold Recovery	80%
Silver Recovery	12%
NaCN Consumption	0.3 kg/t
Lime Requirement	1.0 kg/t (whole ore)
Cement Requirement	6.0 kg/t (-76mm screened material)
Leach Time	70 days (minimum, 12 meter lifts)

Table 13.5-4   Test Results Used to Determine Field Parameters on Coarse Crushed Ore

Item	Test ID / Column No.	Description	Avg Size (mm)	Head Grade		Extraction		Reagent Consumption			Days Leached
				Au g/t	Ag g/t	Au %	Ag %	NaCN kg/t	Lime kg/t	Cement kg/t	
9	KCA 61648	Pl, Zona Este, Huangamarca	45 (p80)	0.196	0.4	83	25	0.22	0	5.97	66
10 & 11	KCA 61648/651	KCA Old Core 1:1 & 1:2 Coarse:Fines	45 (p80)	1.07	6.7	89	10	0.68	3.04	0	58
16	C-8	Surface, PM1+PM2 Blend	75 (p100)	2.55	361	83	5.2	1.25	1.5	0	60
17 - 20	C-9,-11,-12,-13	Truck 2 Samples	76 (p100)	1.59	5.14	75	13	0.47	2.5	0	80
Averages				**1.35**	**93**	**83**	**13**	**0.65**	**1.8**	**-**	**66**

13.6   Recommendations and Conclusions

The results of the laboratory testing program indicate excellent gold recoveries at both run-of-mine (ROM) and moderate crush sizes with low to moderate reagent requirements implying amenability to heap leaching.   Silver recoveries are generally low.   Maintaining heap permeability and minimizing channeling at higher heap heights constitutes a risk to the project as additional agglomeration and compacted permeability testing is required.

Tahoe recently started leaching ROM ore on a newly constructed heap leach facility at Shahuindo. Leach pad area will be available to conduct field 'pilot-scale' heap leach tests. This would be ideal for conducting additional tests on near-surface ROM ore composites. The following is recommended for these tests:

- Tests on sandstone/siltstone/breccia blends similar to the mine plan at grades similar to those planned for ROM leaching.

- Tests on individual rock types of sandstone and breccia with low fines content.

The available data indicate that siltstones and breccia with high fines content will most likely not percolate in a ROM heap leach.   However, if these two rock types pass the compacted permeability tests with no cement required at the recommended coarse crush size, then consideration should be given to conducting a pilot-scale test on the ROM pad on a composite of these two rock types.

Splits from each composite tested in the pilot-scale tests should be taken and column leach tests conducted at a coarse crush size of approximately 80% passing 76mm.

Column leach tests on both surface and large diameter core samples should be conducted on each of the rock types (except sulfides) at a p80 crush size of 76mm.   The samples should be spatially representative of the orebody. Large diameter core holes should twin the latest metallurgical drill holes so the results from the series of column leach tests on the minus 25mm tests can be compared to the 76mm test results. The gold grades of the individual rock types to be tested should be similar to those estimated in the mine plan.

Assays for sulfide sulfur, iron, arsenic, mercury and copper should be conducted on each composite tested. Mercury in leach solutions and adsorbed onto carbon should be followed in the next series of tests. Mercury levels in past tests have been low but still present in sufficient quantities that a retort is required to control mercury emissions.

Compacted permeability tests on each rock type from the large core drilling program on composites crushed to 76mm should be conducted. A few tests on blended composites containing the different

rock types in a similar ratio as is planned in crushed ore production should also be conducted. Tests at cement levels of 0, 3 and 6 kg/t at varying simulated heap heights up to the maximum planned height above the liner should be completed. If any samples fail, then additional composites should be tested with increased levels of cement until passing percolation rates are achieved at all simulated heights.

The potential fines migration issue found in several of the non-agglomerated La Arena column leach tests needs to be evaluated further. The operation of the ROM leach pad and the pilot-scale tests should provide sufficient data to determine if fines migration will be an issue or not.

The addition of a secondary crusher should be studied as the data indicate a recovery difference between a 76mm and 25mm crush size of about 4 to 5 percentage points. A trade-off study should be conducted to determine if the additional recovery justifies the increased capital and operating costs of a secondary crushing circuit.

14.0 MINERAL RESOURCES ESTIMATE

14.1 Introduction

Mineral resource estimation described in this Technical Report for the Shahuindo Project adheres to the guidelines of Canadian National Instrument 43-101. The mineral resources described in this section are based on all drilling completed as of 15 April 2015. A major infill drill program (24,522m) of predominantly RC drilling on 25m x 25m spacing was completed in 2015 with the intent to convert Indicated Resources to Measured Resources within the majority of the oxide resource predominantly inside a $1,400 open pit whittle optimization shell.

Hard-boundary domains based on lithologic contacts were used for grade estimation within the intrusive and colluvium lithologies. The grade of mineralization within all other lithologies was estimated within nominal 0.1 g/t Au bulk style interpretations (*i.e.*, grade domain shells), completed in section and plan view. These interpretations are very similar to those completed in 2012; however, the higher-grade domains that were interpreted in 2012 based on a predominantly 50m x 50m drill spacing have been removed in this resource as the recent infill drilling on 25m x 25m spacing does not support the continuity previously suggested. The influence of higher grades in the model was restricted by the use of multiple-pass estimation routines using decreased estimation ranges, further discussed in Section 14.7.

Block model cell sizes and grade interpolation methodologies are both similar to parameters used in the 2012 estimate. The parameters chosen were done so in an attempt to reduce any potential localized smearing of gold or silver grades, particularly as the higher grade domains from the 2012 estimate were removed as hard constraints for grade estimation in this update.

14.2 Database

The drill data includes all historical drilling and the infill drilling data completed in April 2015. The drill hole information includes collar, downhole survey, assay, lithology and oxidation data. The cut-off date for the database was 15 April 2015.

All historical data has been transformed from PSAD 56 datum to WGS 84 datum using the transformation noted below in Table 14.2-1. Drill hole collars laid out in 2014 and 2015 were done relative to the WGS 84 datum.

Table 14.2-1   Grid Transformation Applied to Collar Data in Database

EASTING WGS 84	=	EASTING PSAD56	- 260.9878149 m
NORTHING WGS 84	=	NORTHING PSAD56	- 368.5484922 m

The drill hole database used for this resource estimate contains 1,039 holes for 164,015 meters. There are 105 drill holes that were not used in the estimate as these holes were either condemnation holes or exploration holes drilled well outside the area of the reportable resource.

The majority of the drilling is on either a nominal 50m x 50m grid or was infill RC drilled to a nominal 25m x 25m grid in 2014 and 2015 (Figure 14.2-1), predominantly within the upper portion of the oxide domain. Gaps in the oxide resource still exist on both nominal grids; these gaps are caused either by topography, or they are areas deeper in the oxide portion of the deposit that were not targeted for infill drilling at this stage in the project. The sulfide mineralization is drilled more sporadically than the oxide domain, as it is of secondary importance to the project in this point in time.

Assays below detection were set at 50% of the detection limit.

The topographic surface bounding the upper elevations of the model was formed from the 2m contour surface generated from the 2009 Horizon aerial survey.
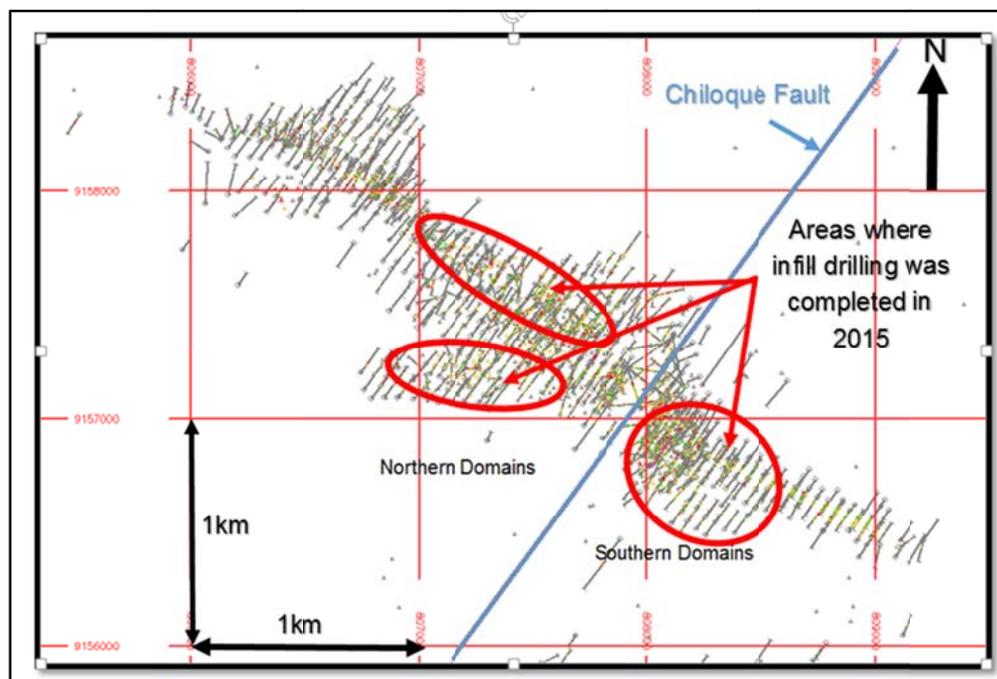
Figure 14.2-1   Plan Projection Displaying Zones of Infill Drilling at 25m x 25m Spacing

14.3   Geological Modeling

14.3.1 Lithologic Domains

The intrusive and colluvium lithologic domains were updated for this resource and a breccia lithologic domain was added to the model based on new data and interpretation. The intrusive, previously 'bulked up' on 8m plan interpretations, was refined by wireframing the unit in Leapfrog® and Maptek Vulcan™. The sediments were relogged on 100m centers (diamond core only) in an attempt to construct bulk mining domains of sandstone, siltstone and breccia. This was ultimately unsuccessful due to the nature of the geology and the wide spaced section lines. This work is ongoing on a much finer scale (50m and 25m sections) and will be incorporated in future resource updates.

The additional data from the 25m x 25m infill RC drilling has increased the confidence of the volume and grade estimate of the colluvium. The intrusive was interpreted on 8m plans in the 2012 resource, so the creation of a valid wireframe in this update is a good advance for more reliable local estimates on the boundaries of the intrusive and the sediments.

The relogging program on 100m centers was completed in an effort to try to define larger (mineable) sandstone and siltstone-dominant rock packages for use as geometallurgical domains.   This was ultimately unsuccessful, due to conflicts with data between neighboring drill holes on section, and between data on the intervening 50m and 25m cross sections. The interim solution, for this resource update, was to interpolate sandstone, siltstone, and mixed sandstone and siltstone lithologies by means of a spherical (50m ellipse) nearest neighbor estimate.

The rationalization of multiple types of logged breccia from historical core (on 100m centers) into one breccia code was completed. The interpretation was bulked up into 8m plans and this was used to hard code the resource model (Figure 14.3-1). The interpretations on 100m centers showed moderate to good visual correlation with the sections on 50m and 25m centers.
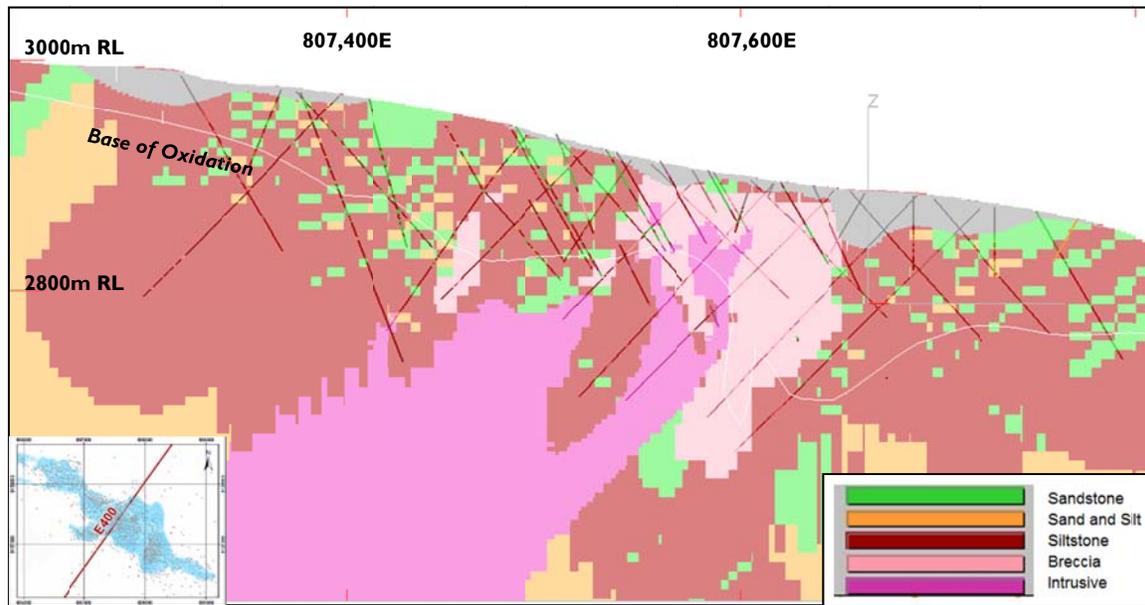
Figure 14.3-1   Lithologic Domains – Section E400

14.3.2 Structural Domains

Two primary structural domains were used in the resource model, with the division between the two domains being the Choloque Fault (Figure 14.3-2). Tahoe has identified a distinct difference in the consistency of mineralization on either side of the Choloque Fault; where south of the Choloque Fault, the mineralization is generally consistent in thickness and attitude and north of the Choloque Fault, the mineralization is less consistent in thickness and attitude and appears to be much more disrupted by northeast and northerly trending structures.

Within the primary structural domains, 23 sub-domains have been interpreted and modeled on cross section in the southern area and six sub-domains modelled in the northern area that are much broader than those in the southern area of the deposit. The sub-domains are reflective of local changes in the strike and dip of the mineralization due to the intense folding of the host strata.
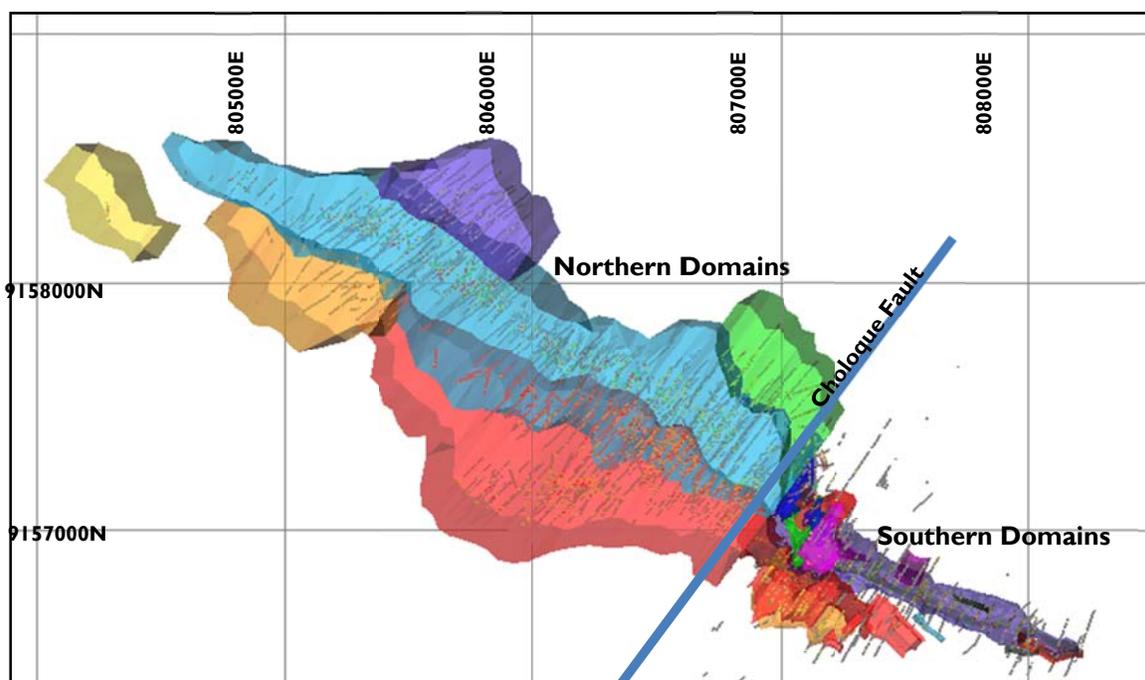
Figure 14.3-2   Plan Projection of Structural Domains

14.3.3 Oxidation Domains

An oxidation model of the deposit spatially defines two zones: an oxide-dominant zone and a sulfide-dominant zone. The oxidation zones are based on cross-sectional interpretations of the presence of oxide and sulfide minerals from diamond core logging. The mixed oxide/sulfide transitional zone in the central core of the deposit is very thin and irregular; preference was given to code transitional material as sulfide, particularly when reviewing the total sulfur assays. The oxide/sulfide surface was wireframed in Leapfrog® and adjusted in Maptek Vulcan™ as necessary to remove any inconsistencies based on spurious data from individual drill holes.

14.4 Grade Estimation Domains

14.4.1 Gold Estimation Domains

Gold estimation domains were interpreted using a 0.1 g/t Au cut-off boundary. In many areas, the 0.1 g/t Au cut-off is a clear natural break when reviewing the drill data statistically and on cross section in the southern portion of the deposit. There is no clear statistical cut-off for the northern domains, so the same lower grade cut-off as the southern domain was used for consistency.

The sub-domains modelled to reflect the differing geometric orientations of the mineralization were constructed on cross section in the southern portion of the deposit and on level plans for the northern portion of the deposit. The sub-domain boundaries in the southern portion were snapped to drill holes as the 0.1 g/t Au grade boundary in this area is reasonably sharp (Figure 14.4-1). The plan interpretations of the northern domains were not snapped to drill holes as the grade boundaries are not always distinct (Figure 14.4-2).

The 0.1 g/t Au domain boundary transgresses all sedimentary rock types, with higher grades either located along contacts with the intrusive bodies, trending in a NNW direction, or occasionally displaying a north to northeast alignment along second order structures. Gold grades encountered in the breccia bodies are highly variable, ranging from <0.05 g/t to +10 g/t. The intrusive appears mineralized in some areas of the southern domains and gold grades have been estimated for the intrusive in this area. In the northern domains, the intrusive has very little mineralization and a default grade below the cut-off grade has been applied to the intrusive in this area.

Results from infill RC drill holes, completed on 25m x 25m spacing in 2015 do not support the use of higher grade gold cut-off domains as the additional drill data shows that there is more discontinuity at short to medium ranges for higher grade mineralization than previously modeled. It is thought that the effect of the north to northeast trending structures (and possibly other structures) that cut across the main north-northwest trend of mineralization are the cause of this lack of continuity. Infill drilling is ongoing to improve confidence in the structural model in this area.

The 0.1 g/t Au domains are considered sufficient to constrain the grade interpolation, given the reasonably dense drilling completed in 2015. Within the 0.1 g/t Au domain, the interpolation of higher grades were restricted during the estimation process (discussed further in Section 14.8).
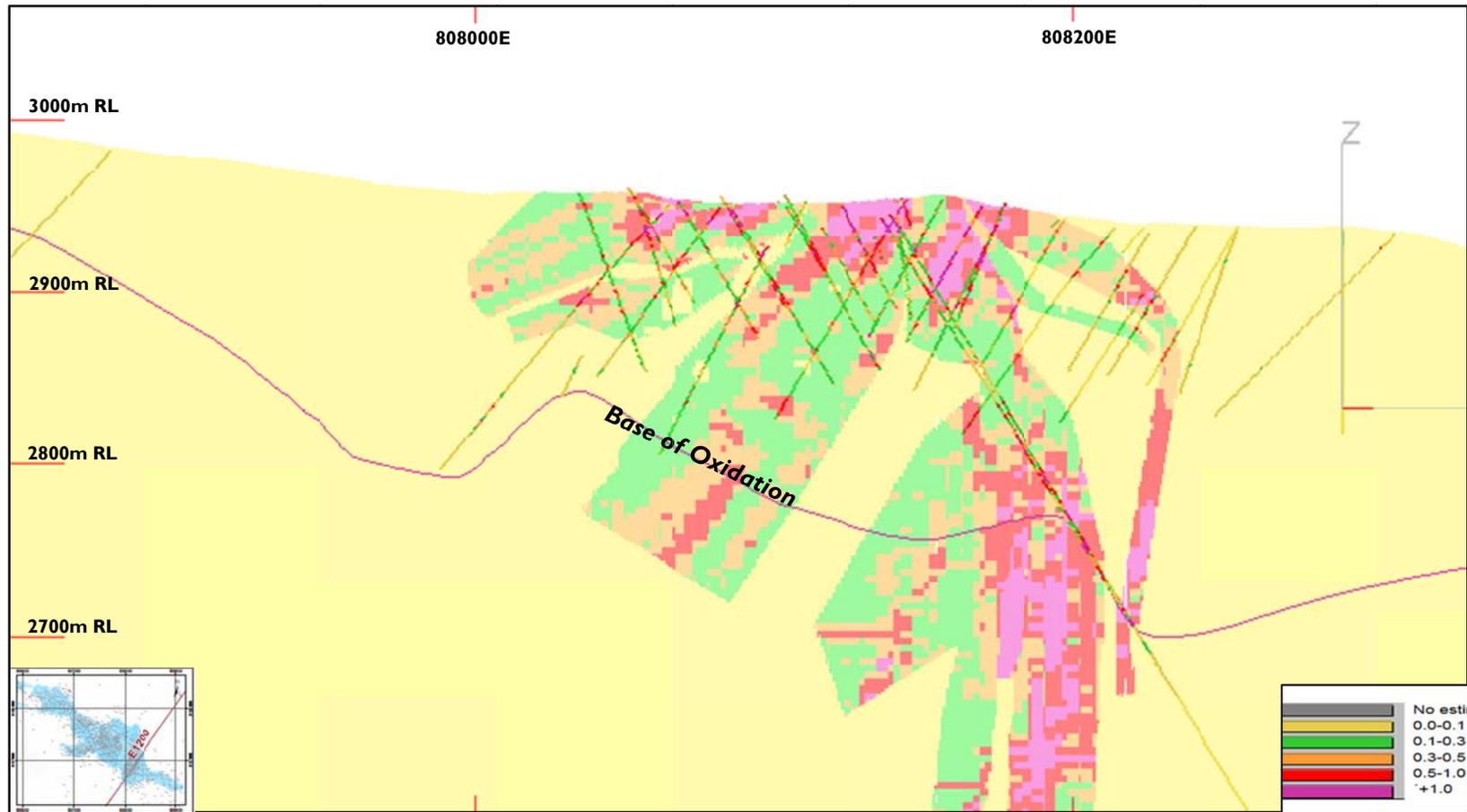
Figure 14.4-1   Au Interpretation - Southern Domains (Cross Section E1200)
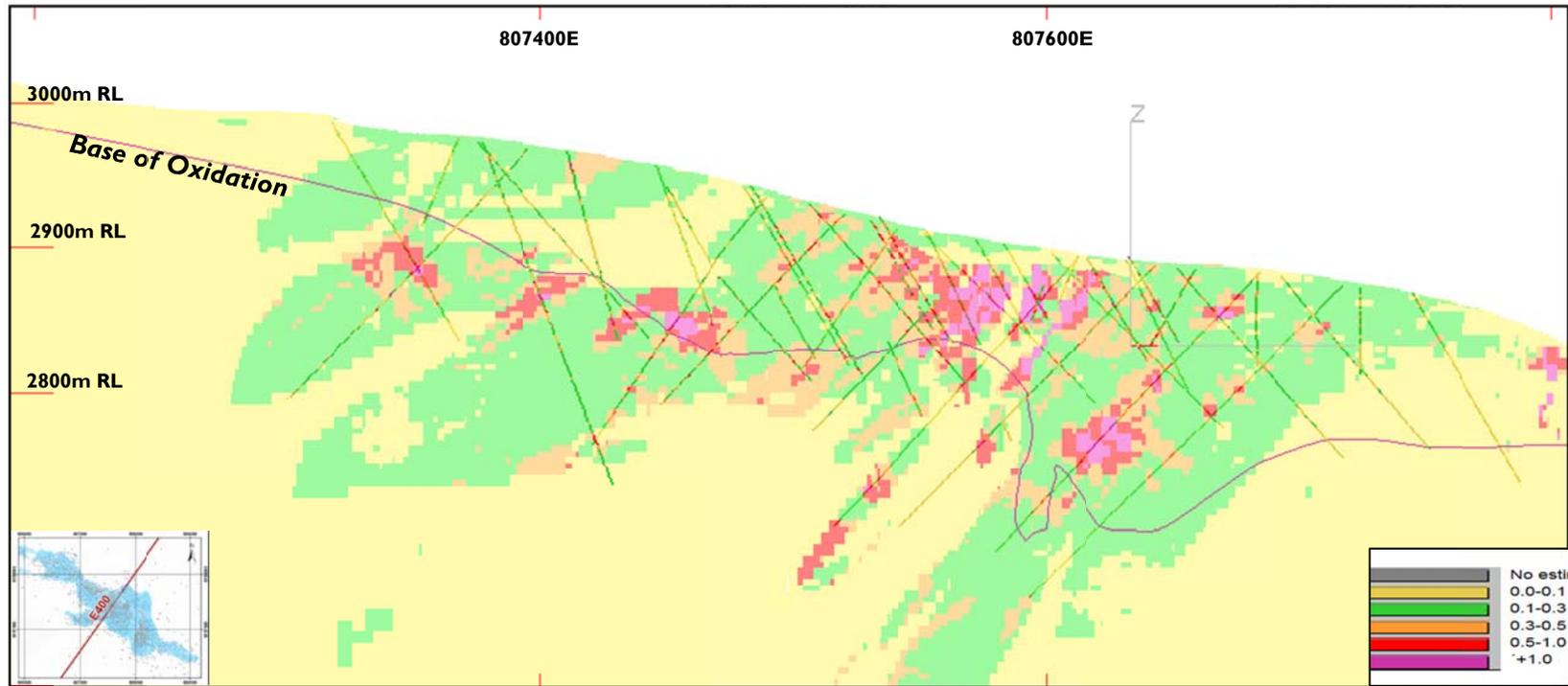
Figure 14.4-2   Au Interpretation - Northern Domains (Cross Section E400)

14.4.2 Silver Estimation Domains

There is a close correlation between the distribution of gold and silver grades in the Shahuindo deposit; as such, the gold estimation domains were used to constrain the silver estimate. The 0.1 g/t Au domains were viewed as sufficient to constrain the silver grade interpolation. There are very rare occurrences where some isolated silver grades fall outside the 0.1 g/t Au domains, but this is not considered material to the estimate.

14.4.3 Other Estimation Domains

A suite of other minor elements were also estimated into the model to assist in waste rock characterization studies. These elements have little to no economic impact on the oxide resource or reserve estimate. The minor elements estimated include sulfur, copper, lead, zinc, arsenic, molybdenum, calcium, total iron, sodium and manganese.

A review of each element was undertaken in three dimensions and statistically to determine appropriate domains for estimation. A variety of constraints were applied where appropriate, based upon combinations of rock type, oxidation state and gold mineralization domains. A more detailed analysis of the minor elements is presented in Section 14.5 of this report.

14.4.4 Sample Selection and Compositing

Data from both RC and diamond core were used in this estimate.

Data in the northern sub-domains were selected using a plan projection of +/- 4m elevation around the 8m plan interpretations. Data within the southern domains were selected within the cross sectional wireframes. Samples were composited based on combinations of rock type, mineralized domain and oxidation state, depending upon the element concerned. This is explained in more detail in the statistics section.

Samples were composited to nominal 2m lengths for all domains, compositing on a best fit length rather than a standard length ensuring no loss of sample in the compositing process. A 2m composite length was chosen as it is 50% of the thickness of a 4m block model cell height, which allows for some short scale 'granularity' in the estimate in an attempt to reflect short scale grade variability.

14.5 Statistics

14.5.1 Bulk Density

Rock density (specific gravity) was interpolated into the model using nearest neighbour estimates; density values by rock type are presented in Table 14.5-1.

Table 14.5-1   Descriptive Statistics of Shahuindo Density Values by Rock Type

Rock Type	SG (g/cm3)	Specific Gravity Statistics (g/cm3)					
		Count	Mean	Median	Min	Max	Std Dev
Overburden	1.80*	15	2.11	2.07	1.68	2.59	0.26
Unsilicified Sediment (Oxide)	2.29	127	2.31	2.33	1.69	2.69	0.17
Silicified Sediment (Oxide)	2.37	57	2.37	2.45	1.83	2.59	0.20
All Sediment (Mixed)	2.55	36	2.57	2.61	2.09	2.91	0.18
Unsilicified Sediment (Sulfide)	2.45	125	2.50	2.49	1.40	3.40	0.30
Silicified Sediment (Sulfide)	2.58	39	2.63	2.64	2.16	3.40	0.26
Porphyry (Oxide-Mixed)	2.04	132	2.06	2.09	1.45	2.64	0.25
Porphyry (Sulfide)	2.25	46	2.26	2.31	1.71	2.75	0.27
Mineralized Material (Oxide-Mixed only)							
Unsilicified Low Grade (~0.1-0.7 g/t Au)	2.15	268	2.18	2.20	1.54	2.90	0.25
Silicified Low Grade	2.30	227	2.32	2.36	1.59	2.87	0.23
Unsilicified Moderate Grade (0.7-2.0 g/t Au)	2.13	178	2.17	2.18	1.40	2.66	0.26
Silicified Moderate Grade	2.25	78	2.26	2.34	1.40	2.72	0.28
Unsilicified High Grade (>2.0 g/t Au)	2.10	40	2.15	2.17	1.45	2.62	0.28
Silicified High Grade	2.20	25	2.32	2.35	1.91	2.61	0.23

* assigned value

14.5.2 Gold Statistics

The density of gold data is reasonably uniform and did not warrant any form of declustering prior to analysis. The statistics on the 2m composites are very similar for both oxide and sulfide domains and support the use of a soft boundary between the oxide and sulfide domains for estimation purposes (Figure 14.5-1).
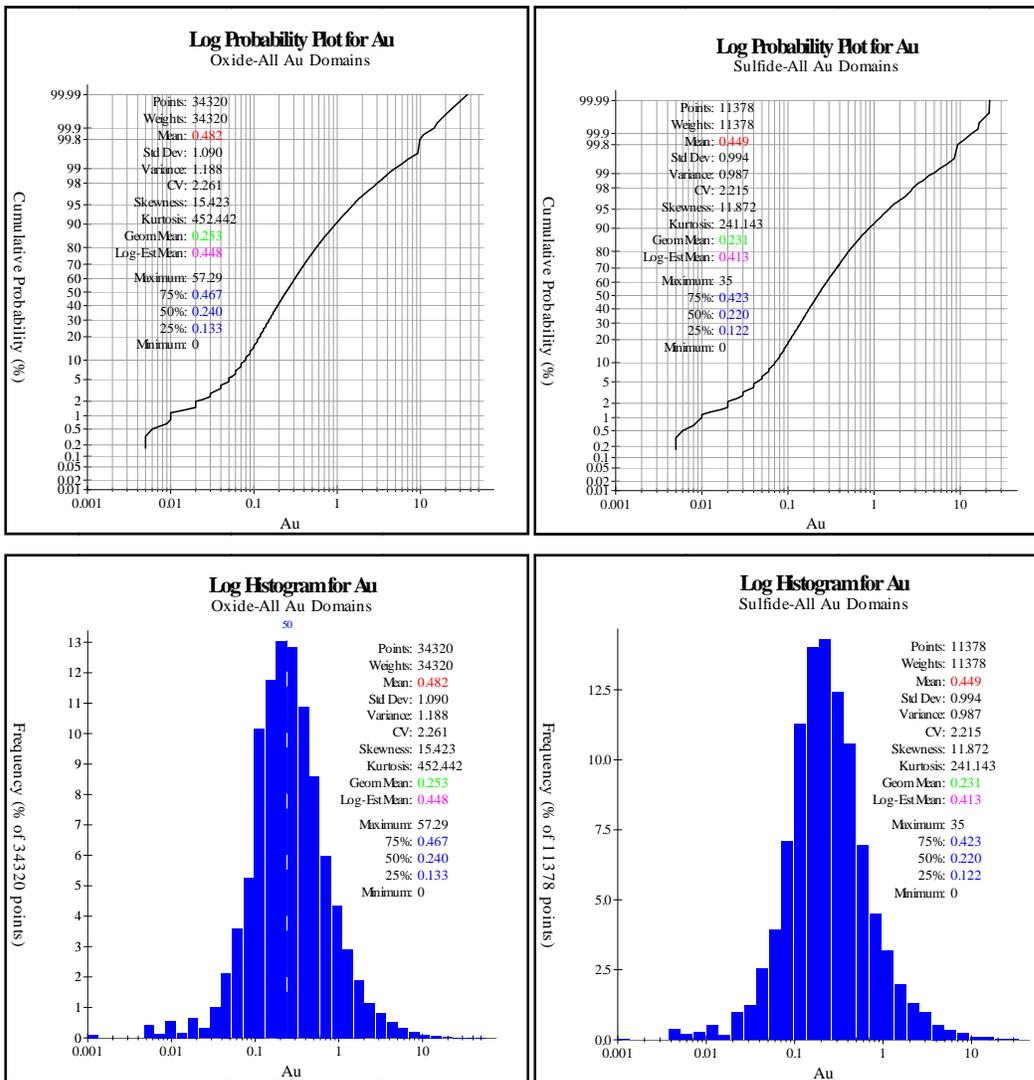
Figure 14.5-1   Gold statistics plots for all domains

Gold distribution of the 2m composites are typically well structured, with minimal outliers; hence very limited grade capping was applied. The only exception to this is domain 1200, which is the intrusive in the southern domain. There are some sporadic higher grades within this domain that required more restrictive capping.

Detailed statistics are only presented for the oxide domains (Table 14.5-2) as the sulfide domain is Inferred and has little materiality to the project at this stage in development. Similar criteria have been applied to upper cuts on gold composites within the sulfide domain as per the oxide domain.

Table 14.5-2   Descriptive Statistics for Gold Oxide Domains

Domain	Sub-Domain	Num of Comps	Mean Au g/t	Median Au g/t	Std Dev	CV	Min Au g/t	Max Au g/t	Capping Au g/t	Percentile Applied
North	11	7,816	0.39	0.21	0.82	2.08	0	37.17	7	0.50%
North	22	219	0.49	0.25	0.7	1.44	0.005	4.44	NC	NA
North	44	1,287	0.55	0.21	1.74	3.15	0.005	26.52	25	0.15%
North	55	14,171	0.52	0.25	1.18	2.29	0	37.36	20	0.05%
North	66	428	0.33	0.19	0.63	1.92	0	9.28	6	0.50%
South	1001	3,933	0.6	0.31	1.1	1.84	0.005	16.65	8	0.70%
South	1002	790	0.38	0.25	0.47	1.23	0.005	5.07	NC	NA
South	1003	2,617	0.51	0.27	1.38	2.72	0.005	57.29	8	0.50%
South	1004	165	0.34	0.24	0.35	1.03	0.02	3.37	NC	NA
South	1006	34	0.3	0.15	0.58	1.94	0.05	3.06	NC	NA
South	1007	901	0.34	0.22	0.56	1.68	0.005	12.52	6	0.15%
South	1008	89	0.64	0.26	1.69	2.64	0.05	11.85	NC	NA
South	1009	627	0.4	0.23	0.63	1.59	0.011	8.35	NC	NA
South	1010	49	0.23	0.13	0.26	1.15	0.01	1.21	NC	NA
South	1011	40	0.21	0.15	0.21	0.97	0.007	0.86	NC	NA
South	1012	430	0.38	0.21	0.61	1.63	0	6.15	NC	NA
South	1013	22	0.52	0.45	0.21	0.41	0.2	1.08	NC	NA
South	1014	78	0.64	0.27	0.94	1.46	0.05	5.79	NC	NA
South	1015	35	0.45	0.35	0.54	1.2	0.005	3.34	NC	NA
South	1016	7	0.72	0.85	0.5	0.69	0.15	1.28	NC	NA
South	1018	7	0.56	0.43	0.51	0.91	0.12	1.63	NC	NA
South	1019	10	1.5	0.58	2.74	1.83	0.21	9.11	NC	NA
South	1020	14	0.24	0.23	0.2	0.81	0.08	0.87	NC	NA
South	1021	12	0.44	0.29	0.46	1.05	0.11	1.76	NC	NA
South	1022	31	0.57	0.27	0.71	1.24	0.09	3.15	NC	NA
South	1141	348	0.53	0.28	0.88	1.66	0.02	9.26	NC	NA
South	1200	9	2.97	0.3	3.21	1.08	0.12	6.51	6	30%
South	1300	151	0.21	0.11	0.41	1.94	0.01	4.38	2	1.10%
Total		34,320	0.48	0.24	1.09	2.26	0	57.29		

14.5.3 Silver Statistics

The statistics for silver distribution (located within the 0.1 g/t Au domains) show sufficient differences between oxide and sulfide domains to warrant a hard estimation boundary (Figure 14.5-2). This is also evident when reviewing cross sections. The upper end of the distributions are a little less stable than the gold populations and hence slightly more aggressive upper cuts have been applied to silver composites in an attempt to reduce the risk of over-estimation of grade, particularly the domains with smaller amounts of data and erratic high grades.

Detailed statistics are only presented for the oxide domains (Table 14.5-3) as the sulfide domain is Inferred and has little materiality to the project at this stage in development.
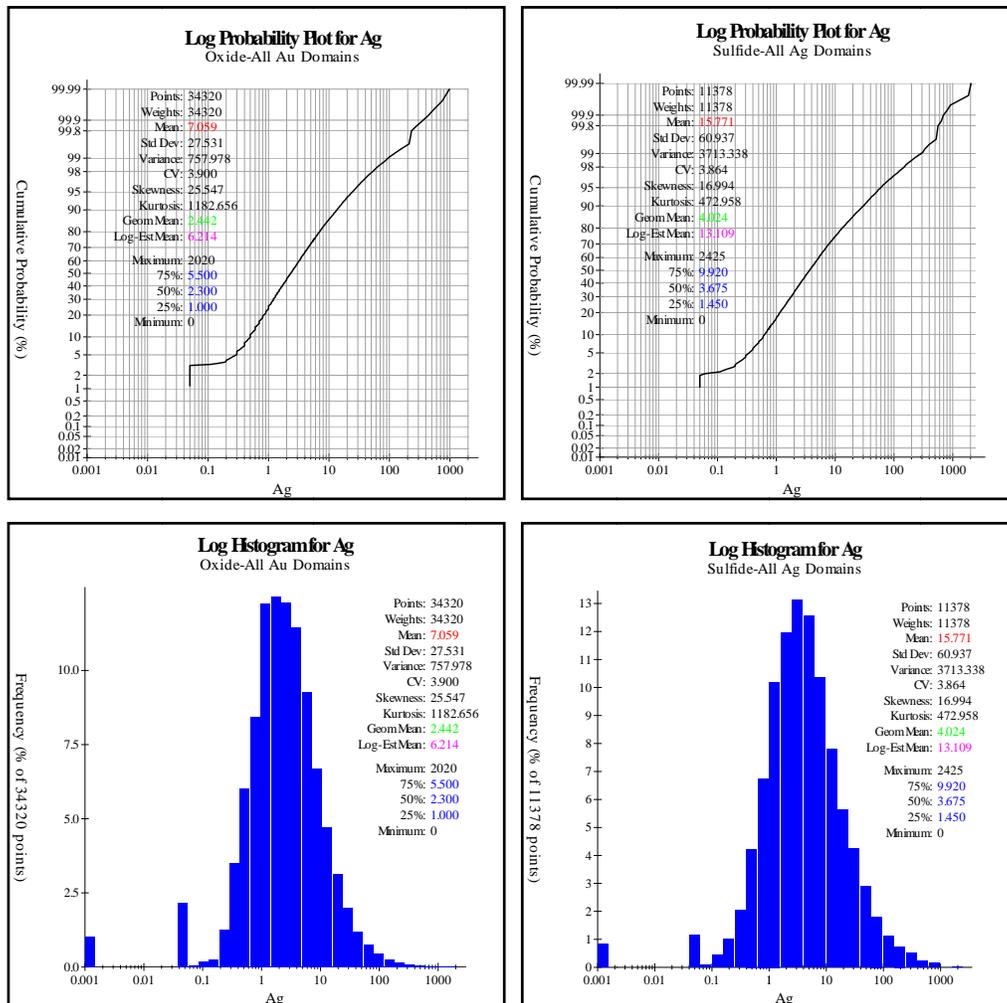
Figure 14.5-2   Silver statistics plots for all domains

Table 14.5-3   Descriptive Statistics for Silver Oxide Domains

Domain	Sub-Domain	Num of Comps	Mean Ag g/t	Median Ag g/t	Std Dev	CV	Min Ag g/t	Max Ag g/t	Capping Ag g/t	Percentile Applied
North	11	7,816	3.89	1.35	11.89	3.05	0	367	90	0.5%
North	22	219	5.71	4.07	7.6	1.32	0	64	NC	NA
North	44	1,287	6.44	2.85	14.49	4.23	0	255	80	0.9%
North	55	14,171	9.10	2.40	38.45	2.29	0	2020	200	0.7%
North	66	428	4.65	2.46	7.71	1.66	0	94.69	60	0.6%
South	1001	3,933	7.0	3.23	14.6	2.08	0.05	270.56	100	0.7%
South	1002	790	5.44	2.79	12.20	2.24	0.05	257	80	0.6%
South	1003	2,617	7.13	3.90	14.49	2.03	0.05	339.05	100	0.6%
South	1004	165	3.69	2.28	5.00	1.36	0.20	43.20	12	4.0%
South	1006	34	1.0	0.80	0.51	0.52	0.05	2.30	NC	NA
South	1007	901	4.21	2.50	6.49	1.54	0.050	81.88	NC	NA
South	1008	89	15.02	2.55	47.43	3.16	0.30	290.50	100	2.5%
South	1009	627	5.3	2.20	12.14	2.30	0.050	206.95	90	0.5%
South	1010	49	3.24	1.08	7.69	2.37	0.23	51.08	NC	NA
South	1011	40	1.49	0.80	3.14	2.11	0.12	20.40	NC	NA
South	1012	430	6.62	3.00	17.06	2.58	0	189	NC	NA
South	1013	22	3.34	3.14	1.30	0.39	1.8	7.27	NC	NA
South	1014	78	23.66	3.29	66.48	2.81	0.05	477.47	95	7.0%
South	1015	35	1.79	1.00	2.32	1.3	0.05	8.50	NC	NA
South	1016	7	2.05	1.60	1.5	0.72	0.30	4.40	NC	NA
South	1018	7	22.60	7.80	44.04	1.95	1.20	122	NC	NA
South	1019	10	9.2	3.20	16.49	1.79	1.20	54	20	7.5%
South	1020	14	2.76	2.50	1.5	0.55	1.40	7.50	NC	NA
South	1021	12	6.35	7.55	4.23	0.70	1.00	13.32	NC	NA
South	1022	31	71.67	14.12	145.98	2.03	0.66	752.64	400	2.0%
South	1141	348	8.18	2.50	24.47	2.99	0.05	382	150	0.5%
South	1200	9	94.85	23.6	103.58	1.09	3.90	209	NC	NA
South	1300	151	2.18	1.10	3.61	1.65	0.05	36.30	8	4.0%
Total		**34,320**	**7.06**	**2.30**	**27.53**	**3.9**	**0**	**2020**		

14.5.4 Minor Elements

A suite of other minor elements were reviewed to mainly assist in waste rock characterization studies. These elements are termed 'minor' as they have little to no economic impact on the oxide resource or reserve estimate. The minor elements estimated are: sulfur, copper, lead, zinc, arsenic, molybdenum, calcium, total iron, sodium and manganese.

A review of each element was undertaken in three dimensions and statistically to determine appropriate domains for estimation. A variety of constraints were applied where appropriate, based upon combinations of rock type and oxidation state. Domains used for the estimation of the minor elements are summarized in Table 14.5-4; descriptive statistics of the minor element data is shown in Table 14.5-5. No upper cuts were applied to any of these elements for the estimation. Hard domains were used for minor element estimation.

Table 14.5-4   Hard Domains Used for Minor Element Estimation

Element	Domain 1	Domain 2	Domain 3	Domain 4
As	Colluvium	Intrusive	All Other Sediments-Oxide	All Other Sediments-Sulfide
Ca	Colluvium	Intrusive	All Other Sediments-Oxide	All Other Sediments-Sulfide
Cu	Colluvium	All Other Lithologies-Oxide	All Other Lithologies-Sulfide	
Fe	Colluvium	Intrusive	All Sediments	
Mn	Intrusive	All Other Lithologies-Oxide	All Other Lithologies-Sulfide	
Mo	Colluvium	All Other Lithologies-Oxide	All Other Lithologies-Sulfide	
Na	Colluvium	Intrusive	All Sediments	
Pb	Colluvium	Intrusive	All Sediments	
S	Intrusive-Sulfide	All Lithologies-Oxide	All Sediments-Sulfide	
Zn	Colluvium	All Lithologies-Oxide	All Other Lithologies-Sulfide	

Table 14.5-5   Description Statistics for Minor Elements

Element	Sub-Domain	Count	Mean	Median	Std Dev	CV	Min	Max	Units
As	Colluvium	3,518	500.10	419.75	538.10	1.08	2.980	10,000	ppm
As	Intrusive	7,635	340.20	144.00	670.80	1.97	1.000	12,300	ppm
As	All Sediments-Oxide	44,530	697.40	492.00	846.30	1.21	1.000	31,800	ppm
As	All Sediments-Sulfide	17,278	652.30	417.00	885.00	1.36	1.000	18,500	ppm
Ca	Colluvium	3,342	0.03	0.01	0.06	1.93	0.005	1.79	%
Ca	Intrusive	7,151	0.10	0.03	0.23	2.26	0.005	3.41	%
Ca	All Sediments-Oxide	40,090	0.02	0.01	0.04	2.27	0.005	1.79	%
Ca	All Sediments-Sulfide	16,547	0.10	0.01	0.66	6.4	0.005	20.95	%
Cu	Colluvium	3,519	68.30	54.10	76.40	1.12	5.740	2,000	ppm
Cu	Other Lithologies-Oxide	58,036	68.70	27.80	303.20	4.41	-	24,728	ppm
Cu	Other Lithologies-Sulfide	23,488	641.10	98.90	2,746.80	4.47	-	197,375	ppm
Fe	Colluvium	3,342	4.36	4.21	2.19	0.5	0.190	33.29	%
Fe	Intrusive	7,151	2.98	2.56	2.21	0.74	0.090	25.86	%
Fe	All Sediments	53,295	5.20	4.54	3.27	0.63	0.020	37.62	%
Mn	Colluvium	3,342	124.30	44.00	311.80	2.51	1.000	8,444	ppm
Mn	Other Lithologies-Oxide	58,036	92.20	13.00	573.50	6.22	-	38,524	ppm
Mn	Other Lithologies-Sulfide	23,488	454.80	26.90	2,050.00	4.51	-	50,000	ppm
Mo	Colluvium	3,518	1.53	1.00	2.30	1.5	0.500	107.00	ppm
Mo	Other Lithologies-Oxide	58,036	1.30	0.75	2.17	1.68	-	107.00	ppm
Mo	Other Lithologies-Sulfide	23,488	1.26	1.00	1.91	1.52	-	99.30	ppm
Na	Colluvium	3,342	0.008	0.005	0.02	1.86	0.005	0.28	%
Na	Intrusive	7,151	0.017	0.010	0.070	4.060	0.005	2.11	%
Na	All Sediments	53,295	0.019	0.005	0.054	2.930	0.005	1.88	%
Pb	Colluvium	3,519	226.30	111.20	411.50	1.82	1.000	10,000	ppm
Pb	Intrusive	7,671	196.90	28.00	959.10	4.87	1.000	39,867	ppm
Pb	All Sediments	58,310	292.20	65.00	1,326.50	4.54	1.000	146,562	ppm
S	Intrusive-Sulfide	3,225	1.92	1.31	2.16	1.12	-	10.10	%
S	All Lithologies-Oxide	58,036	0.22	0.03	0.68	3.05	-	10.10	%
S	All Sediments-Sulfide	20,263	4.51	4.46	3.52	0.78	-	10.10	%
Zn	Colluvium	3,519	59.00	33.70	90.80	1.54	0.250	2,181	ppm
Zn	All Other Lithologies-Oxide	58,036	43.80	10.70	162.00	3.7	-	8,192	ppm
Zn	All Lithologies-Sulfide	23,488	680.60	48.30	2,880.00	4.23	-	109,418	ppm

14.6   Variography

Gold and silver semi-variograms within the 0.1 g/t Au domain are generally poorly structured for most domains, even with log or normal score transformations applied.   The major cause of the poor variogram structures appears to be the conflict of two shorter range mineralized structures which trend north and northeast within the overall mineralized north-northwest trend.   This conflict is evident in most domains that have significant data points (Figure 14.6-1).   The poor global variogram model for the overall strike of the domains contrasts with the improved variogram model aligned with the northerly or northeast trending short-scale structures.   Removing these individual higher grade structures is not possible with the current data density.   It is expected that closely-spaced blasthole information and in-pit mapping will aid in defining these structures more accurately.

In general, the nugget variance is moderate to high, generally greater than 50%.   Ranges of continuity at the total sill are typically around 100-150m, with approximately 75% of the total variance typically seen in the first 25m (Figure 14.6-2).   There is no apparent difference in the variograms between the northern and southern domains.

The results of the variography led to the use of inverse distance methods for grade estimation rather than ordinary kriging as there were concerns that the use of ordinary kriging would over-smooth the grade estimation relative to the composite grades.
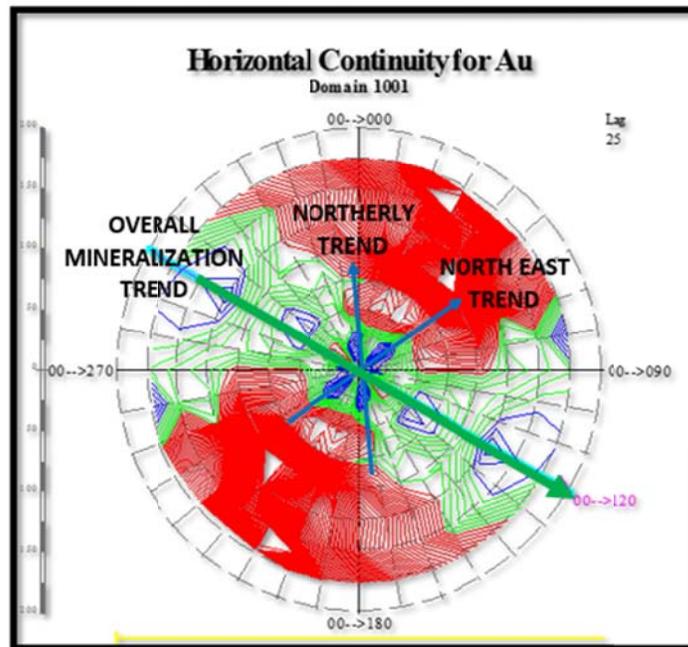
Figure 14.6-1   Horizontal Variogram Fan for Gold Domain 1001
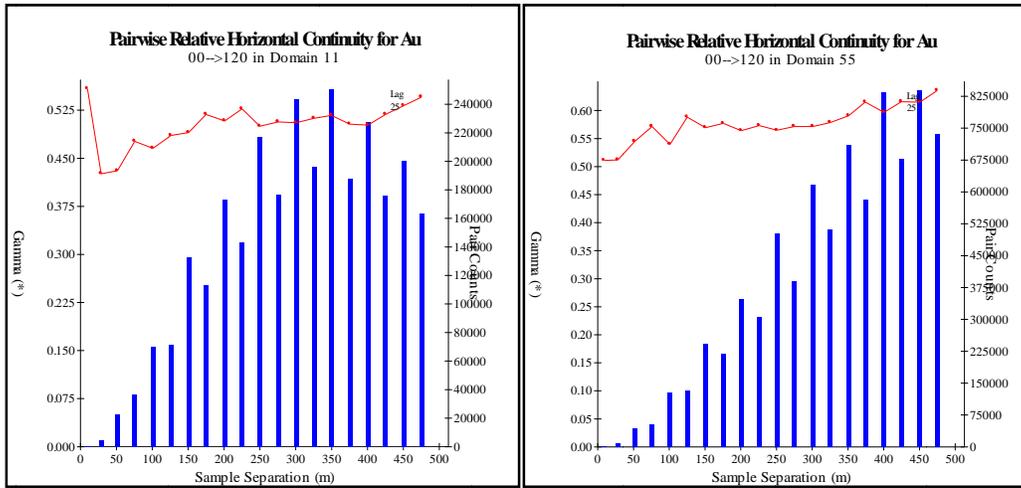
Figure 14.6-2   Variograms of Samples Along Strike

14.7 Block Modelling

The resource block model was generated using Maptek Vulcan™ mining software and imported into Datamine. The parent block size is 4 mE x 8 mN x 4 mRL. A vertical cell size 4m was used to allow for bench height optimization studies. An 8 mE x 16 mN x 8 mRL background model was created around the resource interpretations in Datamine software to allow for Whittle pit optimizations.

All wireframes were checked visually to ensure that there was adequate filling with blocks. All gold domains were projected above the topographic surface, where appropriate, to ensure that there were no edge effects in volume filling, and then trimmed with the surface topography. The block model parameters are shown in Table 14.7-1. Each block was characterized by a series of attributes as described in Table 14.7-2.

Table 14.7-1   Block Model Parameters

Parameter	East	North	Elevation
Minimum Coordinates	805,350	9,155,850	2,396
Maximum Coordinates	809,350	9,159,850	3,356
Parent Block size (m)	4	8	4
Minimum Sub-Block Size (m)	1	2	1

Table 14.7-2   Block Model Attributes List

Attribute	Description
IJK	Parent Cell Identifier
XC	Centroid of cell easting
YC	Centroid of cell northing
ZC	Centroid of cell RL
XINC	Cell easting dimension
YINC	Cell northing dimension
ZINC	Cell RL dimension
ROCK	0=Colluvium;1=Sandstone, 2=Sandstone+Siltstone; 3=Siltstone; 4=Breccia; 5=Intrusive
RES	0=Internal Waste; 1=Potential Resource; 999=Background
DOM	Estimation Domain
RESCODE	1=Measured, 2=Indicated, 3=Inferred,4=Unclassified
DENSITY	Bulk Density
OXIDE	1=Sulfide; 2=Oxide
AU	Uncapped Gold grade (ppm)
AG	Uncapped Silver grade (ppm)
AUCUT	Capped Gold grade (ppm)
AGCUT	Capped Silver grade (ppm)
AS	Arsenic grade (ppm)
CA	Calcium grade (%)
CU	Copper grade (ppm)
FE	Total Iron grade (ppm)
MN	Manganese grade (ppm)
MO	Molybdenum grade (ppm)
NA	Sodium grade (%)
PB	Lead grade (ppm)
S	Sulphur grade (%)
ZN	Zinc grade (ppm)
NUMSAMAU	Number of composites used in estimate
PASSAU	Estimation Pass
DISTAU	Average Distance of composites from cell centroid
NUMDHAU	Number of drill holes used in estimate

14.8   Grade Estimation

The variographic study performed using the gold composites from the most heavily populated domains generally produced poorly structured variograms with maximum ranges of about 100 meters in the horizontal direction at the appropriate azimuth of each major domain, with a corresponding range of 70 meters in the semi-major direction.   Given the generally poorly structured variograms, the decision was made to use in an inverse-distance interpolation.

A soft redox boundary was used for both gold and silver estimates. When reviewing cross sections and statistics, there is no clear change to the distribution of metal grades across the base of oxidation.

The interpolation parameters applied to the gold and silver domains are summarized in Table 14.8-1. The first-pass search distances take into consideration the results of both the variography and drill hole spacing.   The second and third passes were designed to estimate grade into the majority of cells coded to the mineral domains that were not estimated in the first pass.   Octant based searches were utilized for the first two estimation passes.   A minimum of four octants needed to be estimated and each octant required the use of at least two composites to obtain an estimate.   This criteria was removed for the third estimation pass.   Interpolation parameters are similar for the minor elements, as per the gold and silver interpolation parameters, but are not tabled in this report as they are not material to the economics of the resource estimate.

Gold, silver and minor element grades were interpolated using inverse distance to the third power (ID^3) and nearest-neighbor methods.   The mineral resources reported herein were estimated by ID^3 methods, using capped grades for gold and silver and uncapped grades for minor elements.   A nearest-neighbor estimate was completed as a check on the ID^3 interpolation for gold and silver.

The estimation passes were performed independently for each of the mineral domains, so that only composites coded to a particular domain were used to estimate grade into blocks coded by that domain.   Grades were estimated into parent cells only.   Small internal waste blocks were estimated separately from the main domains.   These only occur in the northern sub-domains.   The background model was also estimated, with gold and silver composites capped prior to the estimation to prevent smearing of higher grades into zones of lower grade material.

Table 14.8-1 Search Parameters Used for Gold and Silver Estimation

Au Domain	Variable	Search Ellipse Ranges			Search Ellipse Orientation			First Pass		Second Pass			Third Pass			Max. No. Comps From Any Drill hole
		Major Axis	Semi-Major Axis	Minor Axis	Major Axis	Semi-Major Axis	Minor Axis	Min. No. of Comps Used	Max. No. of Comps Used	Search Volume Factor	Min. No. of Comps Used	Max. No. of Comps Used	Search Volume Factor	Min. No. of Comps Used	Max. No. of Comps Used	
11	Au/Ag	60	60	25	0°/305°	-38°/215°	-52°/035°	10	16	2	8	16	6	4	16	4
22	Au/Ag	50	50	25	0°/305°	-50°/215°	-40°/035°	10	16	2	8	16	6	4	16	4
33	Au/Ag	50	50	20	0°/305°	-87°/035°	-3°/215°	8	16	2	6	16	6	3	16	4
44	Au/Ag	60	60	25	0°/305°	-60°/215°	-30°/035°	10	16	2	6	16	6	3	16	4
55	Au/Ag	60	60	25	0°/305°	-65°/215°	-25°/035°	10	16	2	8	16	6	4	16	4
66	Au/Ag	60	60	20	0°/305°	-80°/035°	-10°/215°	10	16	2	8	16	6	4	16	4
1001	Au/Ag	50	50	25	0°/300°	-90°/000°	0°/030°	10	16	2	8	16	6	4	16	2
1002	Au/Ag	50	50	25	0°/305°	-25°/215°	-65°/035°	10	16	2	8	16	6	4	16	2
1003	Au/Ag	50	50	25	0°/305°	-52°/215°	-38°/035°	10	16	2	8	16	6	4	16	2
1004	Au/Ag	50	50	25	0°/310°	-40°/220°	-50°/040°	10	16	2	8	16	6	4	16	2
1006	Au/Ag	50	50	25	0°/295°	-60°/205°	-30°/025°	10	16	2	8	16	6	4	16	2
1007	Au/Ag	50	50	25	0°/300°	-35°/210°	-55°/030°	10	16	2	8	16	6	4	16	2
1008	Au/Ag	50	50	25	0°/300°	-52°/030°	-38°/210°	10	16	2	8	16	6	4	16	2
1009	Au/Ag	50	50	25	0°/325°	-45°/055°	-45°/235°	10	16	2	8	16	6	4	16	2
1010	Au/Ag	50	50	25	0°/313°	-60°/223°	-30°/043°	10	16	2	8	16	6	4	16	2
1011	Au/Ag	50	50	25	0°/310°	-48°/040°	-42°/220°	10	16	2	8	16	6	4	16	2
1012	Au/Ag	50	50	25	0°/310°	-48°/040°	-42°/220°	10	16	2	8	16	6	4	16	2
1013	Au/Ag	50	50	25	0°/315°	-85°/035°	-5°/225°	10	16	2	8	16	6	4	16	2

Table 14.8-1 (continued)   Search Parameters Used for Gold and Silver Estimation

Domain	Variable	Search Ellipse Ranges			Search Ellipse Orientation			First Pass		Second Pass			Third Pass			Max. No. Comps From Any Drill hole
		Major Axis	Semi-Major Axis	Minor Axis	Major Axis	Semi-Major Axis	Minor Axis	Min. No. of Comps Used	Max. No. of Comps Used	Search Volume Factor	Min. No. of Comps Used	Max. No. of Comps Used	Search Volume Factor	Min. No. of Comps Used	Max. No. of Comps Used	
1014	Au/Ag	50	50	25	0°/310°	-85°/220°	-5°/040°	10	16	2	8	16	6	4	16	2
1015	Au/Ag	50	50	25	0°/296°	-90°/000°	0°/026°	10	16	2	8	16	6	4	16	2
1016	Au/Ag	50	50	25	0°/278°	-90°/000°	-0°/220°	10	16	2	8	16	6	4	16	2
1018	Au/Ag	50	50	25	0°/315°	-38°/045°	-52°/225°	10	16	2	8	16	6	4	16	2
1019	Au/Ag	50	50	25	0°/334°	-80°/244°	-10°/064°	10	16	2	8	16	6	4	16	2
1020	Au/Ag	50	50	25	0°/335°	-85°/245°	-5°/065°	10	16	2	8	16	6	4	16	2
1021	Au/Ag	50	50	25	0°/292°	-90°/000°	0°/022°	10	16	2	8	16	6	4	16	2
1022	Au/Ag	50	50	25	0°/292°	-90°/000°	0°/022°	10	16	2	8	16	6	4	16	2
1041	Au/Ag	50	50	25	0°/310°	-36°/220°	-54°/040°	10	16	2	8	16	6	4	16	2
1200 Intrusive-S	Au/Ag	50	50	25	0°/310°	-60°/220°	-30°/040°	10	16	2	8	16	6	4	16	2
1300 Colluvium-S	Au/Ag	50	50	25	0°/310°	-0°/000°	-0°/040°	10	16	2	8	16	4	4	16	2
Colluvium-N	Au/Ag	60	60	20	0°/310°	-0°/000°	-0°/040°	10	16	2	8	16	4	4	16	2

14.9 Mineral Resources

14.9.1 Mineral Resource Definitions

Mineral Resources for the Shahuindo deposit are classified in accordance with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) *CIM Definition Standards – For Mineral Resources and Mineral Reserves* (2014), whereas:

A <u>Mineral Resource</u> 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. *Mineral Resources are sub-divided, in order of increasing geologic confidence, into Inferred, Indicated and Measured Categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource had a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource.*

An <u>Inferred Mineral Resource</u> 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 Inferred Mineral Resource is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, trenches, pits, workings and drill holes. Inferred Mineral Resources must not be included in the economic analysis, production schedules, or estimated mine life in publicly disclosed Pre-Feasibility or Feasibility Studies, or in the Life of Mine plans and cash flow models of developed mines. Inferred Mineral Resources can only be used in economic studies as provided under NI 43-101.*

An <u>Indicated Mineral Resource</u> 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. *Mineralization may be classified as an Indicated Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralization. The Qualified Person must recognize the importance of the Indicated Mineral Resource category to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support a Pre-Feasibility Study which can serve as the basis for major development decisions.*

A <u>Measured Mineral Resource</u> 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. *Mineralization or other natural material of economic interest may be classified as a Measured Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such that the tonnage and grade or quality of the mineralization can be estimated to within close limits and that variation from the estimate would not significantly affect potential economic viability of the deposit. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit.*

Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

14.9.2 Shahuindo Mineral Resources

The effective date of the Shahuindo Mineral Resource estimate is 15 April 2015.

Measured and Indicated oxide resources for the Shahuindo deposit total 143.1 million tonnes with average grades of 0.50 g/t Au and 6.67 Ag g/t, containing 2.28 million ounces of gold and 30.7 million ounces of silver. Inferred oxide resources total 2.6 million tonnes with average grades of 0.42 g/t Au and 7.40 Ag g/t, containing 36,000 ounces of gold and 626,000 ounces of silver. Oxide resources are reported within a $1,400/oz Au optimal Whittle open pit shell using a 0.14 AuEq g/t cut-off grade. The oxide Mineral Resources are summarized in Table 14.9-1.

Table 14.9-1   Shahuindo Mineral Resources – Oxide

(0.14 g/t AuEq cut-off within $1,400/oz Au pit shell)

Resource Classification	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
Measured	96.5	0.50	6.73	1,546	20,901
Indicated	46.6	0.49	6.53	736	9,778
Measured and Indicated	**143.1**	**0.50**	**6.67**	**2,282**	**30,679**
Inferred	2.6	0.42	7.4	36	626

Numbers may not add due to rounding

The Mineral Resources reported herein represent the *in situ* resources, with no economic or metallurgical recovery factors applied other than the $1,400 per ounce gold pit shell applied to the oxide resources.

Table 14.9-2 through Table 14.9-4 are tabulations of the oxide resources at varying cut-off grades within the $1,400/oz Au pit shell for Measured, Indicated and Inferred Resources, respectively.

Table 14.9-2   Measured Oxide Resources - Grade Tonnage

Cut-off AuEq g/t	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
0.01	169.1	0.30	4.33	1,631	23,540
0.1	104.9	0.47	6.35	1,586	21,426
0.14	**96.5**	**0.50**	**6.73**	**1,546**	**20,901**
0.2	81.6	0.56	7.52	1,470	19,735
0.3	59.3	0.68	9.06	1,297	17,285
0.4	42.6	0.82	10.73	1,123	14,698
0.5	31.4	0.96	12.34	969	12,458
0.6	24.0	1.10	13.78	848	10,624
0.7	18.7	1.24	15.07	745	9,060
0.8	14.9	1.38	16.28	659	7,774
0.9	12.0	1.51	17.35	581	6,680
1.0	9.8	1.65	18.36	518	5,762

Table 14.9-3   Indicated Oxide Resources - Grade Tonnage

Cut-off AuEq g/t	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
0.01	97.6	0.26	3.66	816	11,490
0.1	51.0	0.46	6.15	754	10,078
0.14	**46.6**	**0.49**	**6.53**	**736**	**9,778**
0.2	39.8	0.55	7.21	705	9,237
0.3	28.2	0.68	8.66	617	7,864
0.4	19.2	0.84	10.21	518	6,294
0.5	13.4	1.02	11.79	438	5,066
0.6	9.9	1.20	13.15	381	4,170
0.7	7.7	1.37	14.19	340	3,526
0.8	6.3	1.52	15.18	307	3,067
0.9	5.2	1.66	16.16	278	2,704
1.0	4.4	1.81	17.09	254	2,400

Table 14.9-4   Inferred Oxide Resources - Grade Tonnage

Cut-off AuEq g/t	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
0.01	7.4	0.17	3.38	41	809
0.1	2.8	0.40	7.03	37	642
0.14	**2.6**	**0.42**	**7.40**	**36**	**626**
0.2	2.1	0.49	8.57	33	582
0.3	1.4	0.63	11.18	28	489
0.4	0.9	0.77	13.35	23	402
0.5	0.6	0.94	15.51	19	321
0.6	0.5	1.10	18.60	16	275
0.7	0.3	1.33	23.58	13	236
0.8	0.2	1.57	29.21	11	210
0.9	0.2	1.79	35.31	10	198
1.0	0.1	2.04	43.14	9	188

Measured oxide resources required a minimum of ten composites within 25m of the block centroid; Indicated oxide resources required a minimum of eight composites within 50m of the block centroid;

and Inferred oxide resources required a minimum of between four and eight composites within 100m of the block centroid. Irrespective of the resource classification, the estimate used a maximum of two composites from a single drill hole for the southern domains and a maximum of four composites from a single drill hole for the northern domains.

14.9.2.1 Sulfide Mineral Resources

The sulfide mineral resources at Shahuindo are classified entirely as Inferred due to limited metallurgical characterization and wider drill spacing than in the oxide portion of the deposit, generally from 50m x 50m to 100m x 100m. There have been no economic or mining studies of the sulfide portion of the Shahuindo deposit completed to date; the Inferred sulfide resource is reported at a 0.5 AuEq g/t cut-off per the requirement of "reasonable prospects for eventual economic extraction."

The Inferred sulfide mineral resources for the Shahuindo deposit total 87.7 million tonnes with average grades of 0.71 g/t Au and 21.08 g/t Ag, containing 2.0 million ounces of gold and 59.4 million ounces of silver, as shown in Table 14.9-5.

Table 14.9-5   Shahuindo Mineral Resources – Sulfide
(0.5 g/t AuEq cut-off)

Resource Classification	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
Inferred	87.7	0.71	21.08	2,002	59,441

Table 14.9-6 is a tabulation of the Shahuindo Inferred sulfide resources at varying cut-off grades.

Table 14.9-6   Inferred Sulfide Resources - Grade Tonnage

Cut-off AgEq g/t	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
0.1	349.0	0.29	8.04	3,254	90,216
0.2	196.8	0.45	12.21	2.848	77,272
0.3	153.6	0.52	14.65	2,568	72,355
0.4	116.3	0.61	17.66	2,281	66,034
0.5	**87.7**	**0.71**	**21.08**	**2,002**	**59,441**
0.6	68.7	0.81	24.41	1,788	53,877
0.7	55.3	0.90	27.62	1,601	49,136
0.8	45.8	0.98	30.59	1,444	45,074
0.9	38.5	1.06	33.40	1,312	41,345
1.0	32.6	1.15	36.15	1,206	37,905
2.0	9.2	1.89	60.72	560	17,976
3.0	3.2	2.58	88.70	264	9,070
4.0	1.4	3.29	112.61	144	4,926
5.0	0.7	4.08	128.02	87	2,717

The classification of Inferred Resources required at least 4 drill hole composites within 100m of the block centroid, with a maximum of two composites from a single drill hole for the southern domains and a maximum of four composites from a single drill hole for the northern domains.

14.10   Resource Model Checks

14.10.1 Composites vs Model Grades

Gold and silver composites coded by sub-domain were compared to the Measured and Indicated resource within the model sub-domains. Sub-domains with less than 100,000 tonnes were removed from the comparison as they typically have very few composites.

As shown in Table 14.10-1, the average gold composite values compare favorably to the block model gold values, with three sub-domains displaying slightly higher grades in the resource model. The overall gold grade estimate is slightly below the average composite grade. Silver comparisons are slightly more variable, particularly in the southern sub-domains where there are smaller amounts of composites.

Table 14.10-1   Composites vs Resource Model Grades

Domain	Sub-Domain	Composites			Resource Model		
		Count	Au (g/t)	Ag (g/t)	Tonnes	Au (g/t)	Ag (g/t)
North	11	7,816	0.39	3.89	40,388,439	0.34	4.15
North	12	219	0.49	5.71	405,694	0.23	4.62
North	44	1,287	0.55	6.44	11,650,605	0.58	6.79
North	55	14,171	0.52	9.10	66,549,549	0.48	8.49
North	66	428	0.33	4.65	3,571,893	0.36	6.37
Total Northern Domains		**23,921**	**0.48**	**7.14**	**122,566,180**	**0.44**	**6.83**
South	1001	3,933	0.60	7.03	23,542,517	0.57	7.41
South	1002	790	0.38	5.44	5,011,830	0.35	5.48
South	1003	2,617	0.51	7.13	11,929,335	0.50	7.78
South	1004	165	0.34	3.69	1,982,346	0.29	3.12
South	1007	901	0.34	4.21	3,729,064	0.30	4.36
South	1008	89	0.64	15.02	542,995	0.56	11.54
South	1009	627	0.40	5.27	1,654,303	0.36	4.66
South	1010	49	0.23	3.24	171,115	0.22	2.95
South	1012	430	0.38	6.62	3,000,419	0.37	7.25
South	1014	78	0.64	23.66	397,175	0.63	19.35
South	1015	35	0.45	1.79	139,539	0.48	1.55
South	1022	31	0.57	71.67	119,792	0.70	78.21
South	1141	348	0.53	8.18	973,408	0.43	6.37
Total Southern Domains		**10,093**	**0.51**	**6.90**	**53,193,837**	**0.49**	**7.08**
Total		**34,014**	**0.48**	**7.07**	**175,760,017**	**0.45**	**6.90**

14.10.2 Nearest Neighbor Check Estimate

A nearest-neighbor model was estimated to compare with the Measured and Indicated resources within the ID^3 model.   Sub-domains with less than 100,000 tonnes were removed as they typically have insufficient data points for valid comparison.   The nearest neighbor estimate was limited to the first search pass and constrained within the same domains as the ID^3 resource estimate. As shown in Figure 14.10-1 through Figure 14.10-3, there is good correlation between the two estimates with some variance occurring in areas of lower data density at the margins of the deposit.
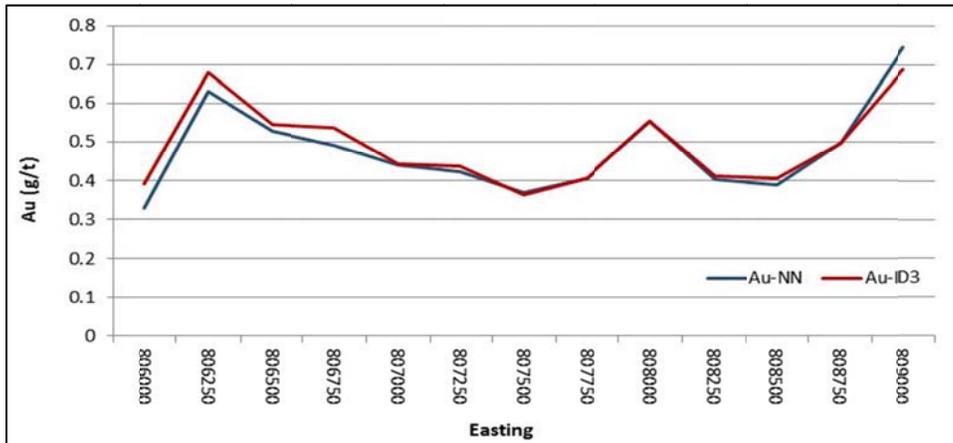
Figure 14.10-1 Inverse Distance (ID³) vs Nearest Neighbor Estimate by Easting
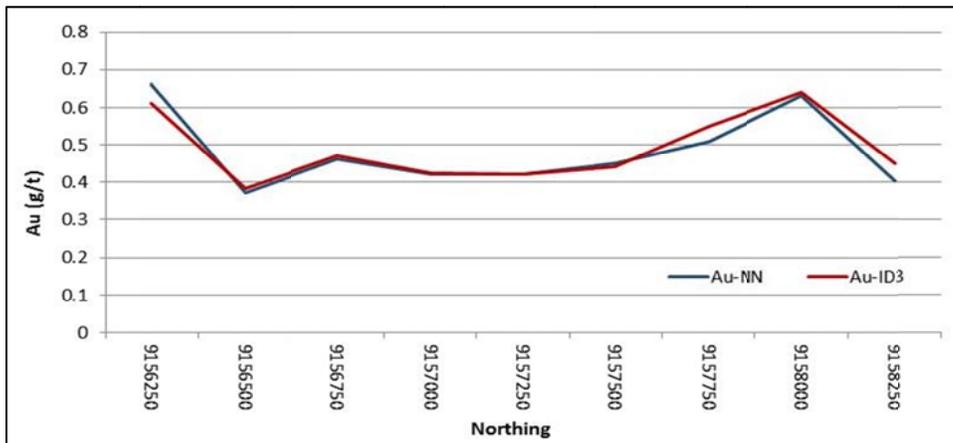
Figure 14.10-2 Inverse Distance (ID³) vs Nearest Neighbor Estimate by Northing
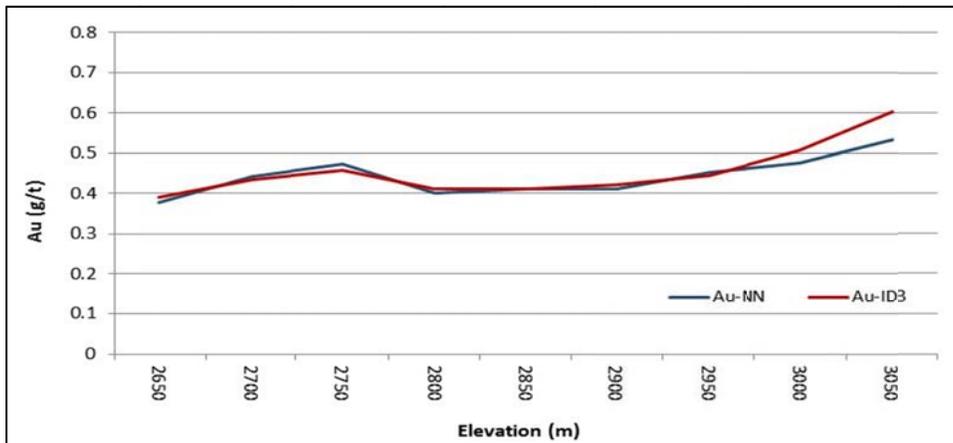
Figure 14.10-3 Inverse Distance (ID³) vs Nearest Neighbor Estimates by Elevation

14.10.3 Visual Comparisons

Visual comparisons on cross sections and plans display a close correlation of composite grades and resource model grades. There does appear to be minor smearing of higher grades on a local level, though this is not seen as a material issue due to the majority of the higher-grade composites and corresponding block grades being surrounded by lower grade material.

14.10.4 Additional Information and Discussion

14.10.4.1 Gold-Equivalent Calculation

Gold-equivalent grades in the Shahuindo resource block model were calculated using the individual gold and silver grades for each block and metal prices of $1,200 per ounce gold and $15 per ounce silver. The formula used to calculate the AuEq grade is AuEq g/t = Au g/t + (Ag g/t x 15/1200).

14.10.4.2 Confidence of Key Criteria

The classification of the resource estimate as Measured, Indicated and Inferred is based on the confidence of the input data and geological interpretation, and grade estimation parameters, as summarized in Table 14.10-2.

Table 14.10-2   Confidence Levels of Key Criteria

Items	Discussion	Confidence
Drilling Techniques	RC and diamond drilling with documented good quality techniques.	High
Logging	Standard nomenclature now adopted.	Moderate
Drill Sample Recovery	High recoveries of RC and diamond core samples.	High
Sub-sampling Techniques and Sample Preparation	Samples are reliable to adequately represent both styles of mineralization.	High
Quality of Assay Data	Data is reliable, based on QAQC results and observed and documented practices.	High
Location of Sample Points	Survey of all collars conducted with DGPS by professional surveyors. Topographic surface is based on 2m survey contours. Historical downhole surveys are of good quality, however the January-March 2015 campaign was not downhole surveyed.	Moderate
Data Density and Distribution	Drilling on nominal 25m x 25m spacing for the majority of the oxide domains consisting of RC and diamond drilling to establish continuity. Drilling on nominal 50m x 50 spacing for the majority of the sulfide domains, although some large data gaps do exist.	High – Oxide Moderate - Sulfide
Geologic Controls	Logging and mapping checked on site. Work still required to determine finer scale geological controls, particularly in the northern portion of the deposit.	Moderate
Database Integrity	Multiple audits; assay certificates checked.	High
Geological Interpretation	Mineralization interpretations are considered reliable for oxide domains as bulk mining entities. Further work required on 50m and 25m sections to determine local controls. Sulfide domains require metallurgical test work, and more detailed structural and geological review and more drilling.	Moderate

(Table 14.10-2 continued)   Confidence Levels of Key Criteria

Items	Discussion	Confidence
Estimation and Modelling Techniques	Inverse distance cubed is an industry standard estimator in high-sulfidation deposits with moderate nuggets and relatively short ranges of continuity.	High
Cut-off Grades	Reasonable cut-off grades applied for the proposed mining method. Ag has been discounted as adding any value to the cut-off grade, given that Ag lies almost entirely within the Au mineralization envelopes, and has 15% metallurgical recovery.	High
Mining Factors or Assumptions	Parent block size for oxides is in line with the SMU planned for mining.	High
Metallurgical Factors or Assumptions	Metallurgy is based on extensive test work for both ROM and agglomeration phases of the oxide project. Metallurgy is of an unknown quantity for sulfide mineralization.	High – Oxide Low - Sulfide
Tonnage Factors (in situ bulk densities)	Sufficient bulk density work for global averages.	Moderate

14.10.4.3 Discussion

As demonstrated by closely-spaced drilling, geologic interpretation, and resource modelling, the Shahuindo deposit is characterized by continuous, near-surface mineralization that extends over a strike of approximately four kilometers. Mineralization is disseminated on fractures and within folded and faulted sedimentary units, with higher grades generally related to high-angle structures at variable orientations, areas of increased silicification, and along zones of dense fracturing and brecciation.

Block model cross sections through the southern and northern portions of the Shahuindo deposit are shown in Figure 14.10-4 and Figure 14.10-5, respectively.

There are several areas proximal to the existing resource that have early indications of potential to expand the overall resource at Shahuindo and Tahoe believes there is good potential to add to the resource with additional exploration. Exploration targets near the Shahuindo deposit are discussed further in Section 24 – Other Relevant Data and Information.

To the best of Tahoe's knowledge, there are no specific environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other factors which could materially affect the Mineral Resources at Shahuindo.
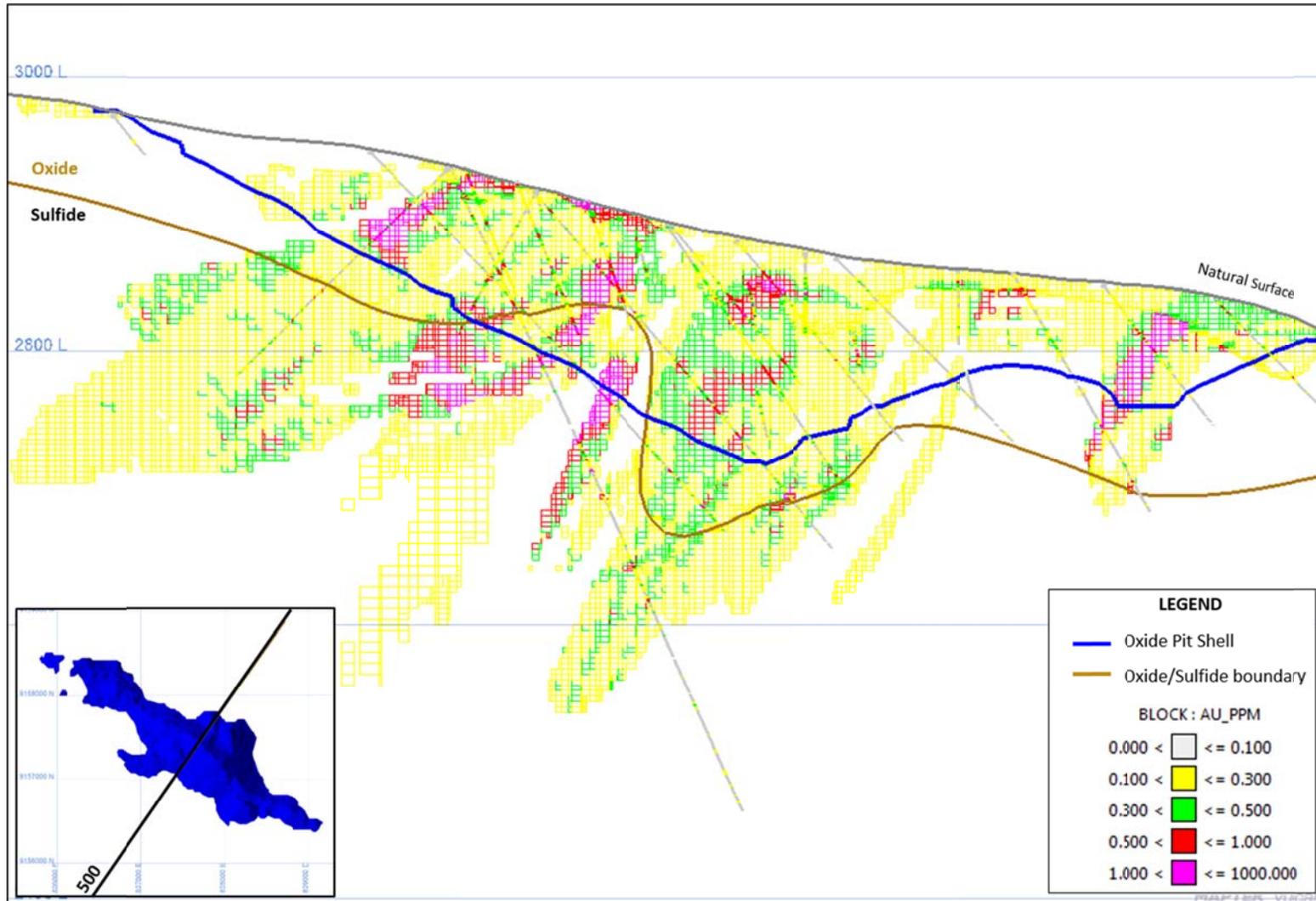
Figure 14.10-4 Shahuindo Resource Model (Section 500N)
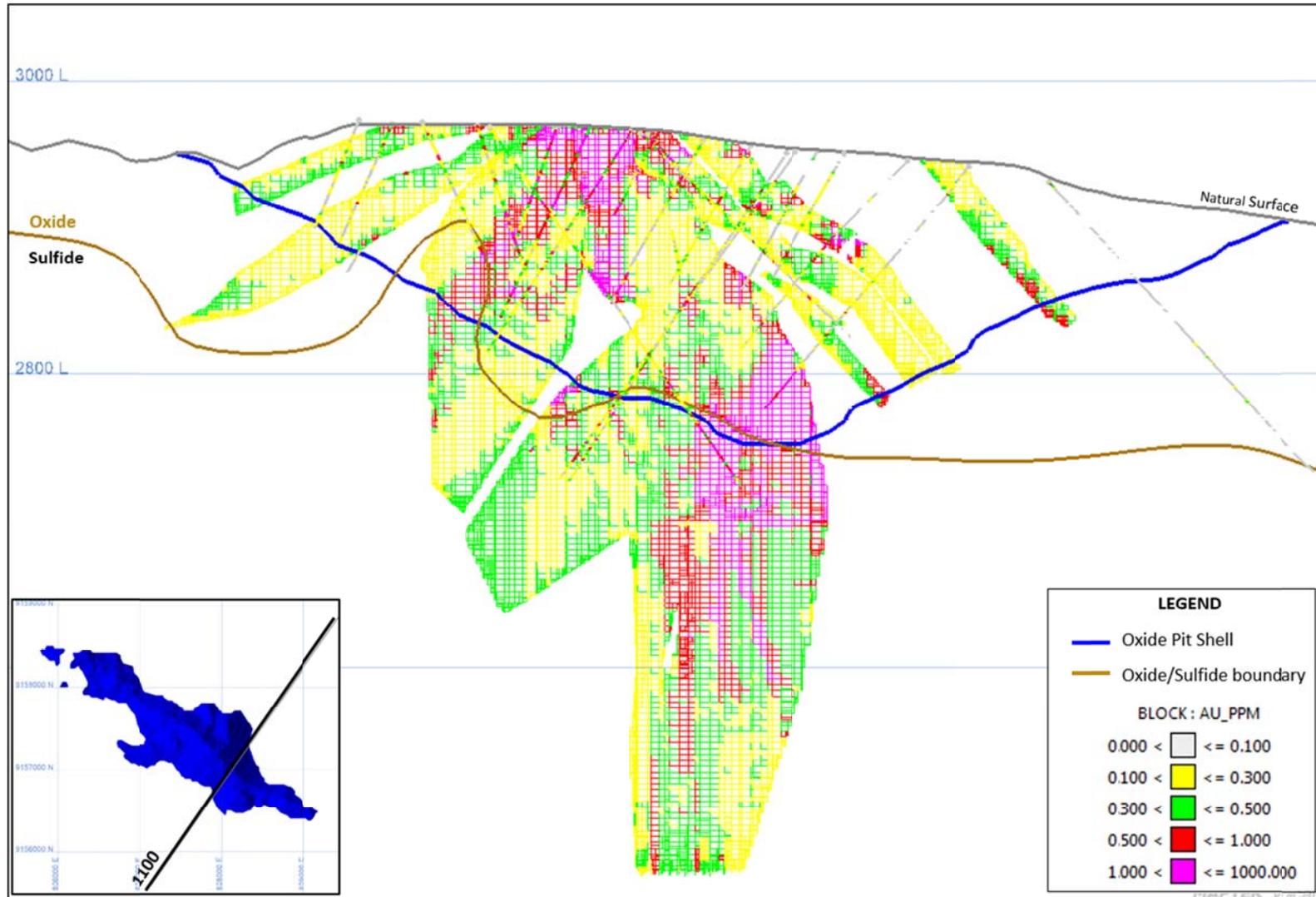
Figure 14.10-5 Shahuindo Resource Model - Section 1100N

15.0   MINERAL RESERVE ESTIMATES

The Mineral Resources for Shahuindo have been converted to Mineral Reserves based upon the following modifying factors:

- Only Measured and Indicated Mineral Resources are included in Mineral Reserves;
- Only the Mineral Resources within the $1,400/oz Au optimized pit limit are considered;
- Mining dilution, mining recovery and metallurgical recovery factors are applied; and
- The Measured and Indicated Mineral Resources are legally, economically and technically feasible to extract.

The Mineral Reserve estimate was completed by first identifying the ultimate pit limits using the economic parameters detailed in Section 15.3 and pit optimization techniques. The results of the optimization were used for guidance in the final pit design to allow access for equipment and personnel. Several phases of mining were defined to enhance the economics of the project. Tahoe used phased pit designs to define the production schedule using MineMax™ open pit net present value (NPV) scheduler software to optimize the NPV under a set of mining constraints. The cash flow model was developed using costs calculated from first principles and experience at Tahoe's La Arena mine to determine the maximum value of the Shahuindo deposit and confirm the Mineral Reserves.

15.1   Mineral Reserves

15.1.1 Mineral Reserve Definitions

Mineral Reserves for the Shahuindo deposit are classified in accordance with *CIM Definition Standards – For Mineral Resources and Mineral Reserves* (2014), whereas:

A <u>Mineral Reserve</u> 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. *Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves. A Probable Mineral Reserve has a lower level of confidence than a Proven Mineral Reserve.*

A <u>Probable Mineral Reserve</u> 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. *The Qualified Person(s) may elect to convert Measured Mineral Resources to Probable Mineral Reserves if the confidence*

in the Modifying Factors is lower than that applied to a Proven Mineral Reserve. Probable Mineral Reserve estimates must be demonstrated to be economic, at the time of reporting, by at least a Pre-Feasibility Study.

<u>Proven Mineral Reserve</u> is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors. *Application of the Proven Mineral Reserve category implies that the Qualified Person has the highest degree of confidence in the estimate with the consequent expectation in the minds of the readers of the report. The term should be restricted to that part of the deposit where production planning is taking place and for which any variation in the estimate would not significantly affect the potential economic viability of the deposit. Proven Mineral Reserve estimates must be demonstrated to be economic, at the time of reporting, by at least a Pre-Feasibility Study. Within the CIM Definition standards the term Proved Mineral Reserve is an equivalent term to a Proven Mineral Reserve.*

Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

15.1.2 Shahuindo Mineral Reserves

Proven and Probable Mineral Reserves for the Shahuindo mine are 111.9 million tonnes with average grades of 0.53 g/t Au and 6.82 g/t Ag, containing 1.91 million ounces of gold and 24.5 million ounces of silver. Mineral Reserves for the Shahuindo mine were developed by applying relevant economic criteria in order to define the economically extractable portions of the Measured and Indicated Mineral Resource. The Mineral Reserve Estimate for the Shahuindo mine is shown in Table 15.1-1. The Mineral Reserves are reported as *in situ* dry tonnes at a cut-off grade of 0.18 g/t Au and include 5% mining dilution and 98% mining recovery.

Table 15.1-1   Shahuindo Mineral Reserves

Reserve Classification	Tonnes (M)	Au Grade (g/t)	Ag Grade (g/t)	Au Ounces (000s)	Ag Ounces (000s)
Proven	82.7	0.54	6.92	1,424	18,400
Probable	29.2	0.51	6.54	483	6,142
Proven & Probable	**111.9**	**0.53**	**6.82**	**1,906**	**24,541**

Numbers may not add due to rounding

The effective date of the Shahuindo Mineral Reserve estimate is 01 November 2015 using metal prices of $1,200 per ounce gold and $15.00 per ounce silver. Mineral Reserves reported for the Shahuindo deposit are inclusive of Mineral Resources.

The Mineral Reserve for the Shahuindo deposit is based upon mineralized material reported as Measured and Indicated Mineral Resources with dilution and mining losses considered. Process recovery factors or additional plant losses were not considered, though metallurgical recovery was incorporated into the optimization. Inferred Resources contained within the final pit design are included in the Mineral Reserve as dilution with zero metal grades.

Tahoe is not aware of any specific metallurgical, infrastructural, environmental, legal, title, taxation, socio-economic or marketing issues that would impact the Mineral Reserve Estimate as presented.

15.2 Cut-off Grade

The cut-off grade value of 0.18 g/t Au was used to determine the minable portion of the Measured and Indicated Resources at Shahuindo is predicated on the assumption that mine production will feed the leach pads and processing facility at capacity throughout the mine life. All costs that are incremental with production are included in the cut-off value calculation. Costs in the cut-off value calculation include the variable and fixed costs directly related to processing, smelting, refining, general and administrative (G&A) costs directly related to production, royalties, and project costs related to production and the plant facilities that do not have a measurable payback.

Costs excluded from the cut-off value calculation include exploration, capitalized development costs, capital infrastructure costs, in-mine projects having a measurable economic benefit, and non-cash charges. The cut-off grade assumes the mining costs for an economic open pit is a sunk cost and is not used in the calculation of the cut-off grade. Sustaining capital and expansion capital costs are excluded from the cut-off value cost basis as these costs are not incremental to a specific unit of production but rather common to large portions of the mineral deposit.

Cut-off grades to define the Mineral Reserves were calculated using operating costs from Tahoe's La Arena mine which is very similar to Shahuindo; the estimated metallurgical performance was sourced from test work and engineering first principles were used to derive operating costs or obtained from La Arena's cost structure. The minimum cut-off grade of 0.18 g/t Au was derived from the equation:

$$\text{COG (Au g/t)} = \frac{\text{Diluted Process Cost}}{\text{Recovery x Metal Price with Royalties and Sales Costs}}$$

The resulting cut-off grade was used to determine the Mineral Reserves reported in Table 15.1-1. Silver is considered to have too little value contribution to be included in the cut-off grade calculation. The economic assumptions used to determine the cut-off grade are presented in Table 15.2-1 and used as the basis for the pit optimization described in Section 15.5.

Table 15.2-1   Cut-Off Grade Assumptions

Gold Price (US$/oz)	1,200
Processing Cost (US$/tonne)	5.47
Royalties & Sales Costs (US$/oz Au)	38
Au Recovery (%)	82
Au Recovery x Au Price (US$)	31.16
Diluted Process Cost (US$/oz Au)	5.70

15.3 Assumptions and Parameters

The Mineral Reserves are constrained by a pit geometry that has been determined by technical and cost and recovery inputs. The lists of assumptions used for the open pit is presented in Table 15.3-1.

Table 15.3-1   Pit Optimization Parameters for Shahuindo Mineral Reserve

Mining (US$/tonne – ore & waste)	2.44
Processing (US$/tonne)	1.57[3]
Sustaining Pad Construction Capex (US$/tonne)	0.68
Crushing & Agglomeration (US$/tonne processed)	1.39
G&A (US$/tonne mined)	1.83
Total Processing (US$/tonne processed)	**5.47**
Oxide Gold Recovery (%)	82
Oxide Silver Recovery (%)	15
Gold Price (US$/oz)	1,200
Silver Price (US$/oz)	15
Metal Payables (%)	99.9
Royalties (%)	1
Mining Losses (%)	2
Mining Dilution (%)	5
Sales Costs (US$/oz)	12.37
Mining Rate (ore mtpa)	12
Total Mining Rate (ore + waste mtpa)	32

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[3] includes processing power and reagents costs.

The base mining cost of $2.44/tonne includes the indirect and direct cost of mining in-situ rock. This cost was obtained from quotes from STRACON GYM Mining Contractors who currently have an alliance contract at Tahoe's La Arena gold mine. It also included a sustaining cost of $0.68 per tonne for pad construction costs and a pit dewatering cost of $0.03/tonne of rock.

The processing, G&A and refining costs are based on actual costs experienced at Tahoe's La Arena mine and processing test work conducted by Tahoe to better define metal recoveries and reagent consumption. Shahuindo processing costs are expected to be slightly higher than La Arena due to increased reagent consumption. The reagent consumption estimate is based on leach column test work.

15.4   Dilution

The resource model was created using 3-dimensional mineralized domains to confine the estimation reporting grade and proportion of each block within the various domains. The domains were then diluted back to the block size based on the contribution of each domain to the block. The resource model contains block dimensions of 8m long by 4m wide by 8m high. The 8m block length is aligned with the general north-west to south-east trend of the deposit to better reflect the mineralization trend. A dilution of 5% at zero grade and an ore loss of 2% has been applied as Tahoe believes that this represents an appropriate amount of dilution for statement of Mineral Reserves based on operating experience at La Arena.

15.5   Pit Optimization

The optimized economic pit shells selected for the basis of open pit designs were created using the GEOVIA Whittle™ software package. Whittle™ is a well-known commercial product that uses geologic, mining, metallurgical and economic inputs to determine the pit shell with the highest net value.

The optimization used economic parameters for various mining and processing scenarios to define the best operating scenario for the project that created the most value. The pit optimization used only Measured and Indicated Resources for processing. All Inferred material was considered to be waste. The Mineral Resource contained no sulfide classified as Measured or Indicated Resources; therefore, all sulfide material within the pit was classified as waste.

The optimization was completed to provide the best economical pit size. A pit phasing strategy was developed based on mining smaller pits inside the optimal pit shell to produce a starter pit and six subsequent mining phases.

15.6   Pit Optimization Results

The inputs for the Whittle pit optimization were based on the criteria listed in Table 15.3-1. Using GEOVIA Whittle™, a series of nested pit shells were generated by applying a range of revenue factors (selling price) to the optimization process.

The pushbacks were selected from the generated pit shells considering the following criteria:

- Significant increases in waste (step change).

- The pushback would allow an operational/practical bench to be generated.

The pushbacks selected were pit shells 5, 10, 15, 20, and 36. The selection of the optimal shell (*i.e.,* final shell) for the pit design considered value and risk. The pit shell selected had an NPV of $512 million (pit shell 36). This shell was selected as it had a revenue factor of one at a gold cut-off grade of 0.18 g/t and processed 36,000 tonnes per day.

The GEOVIA Whittle™ results for pit shells examined are shown in Figure 15.6-1.
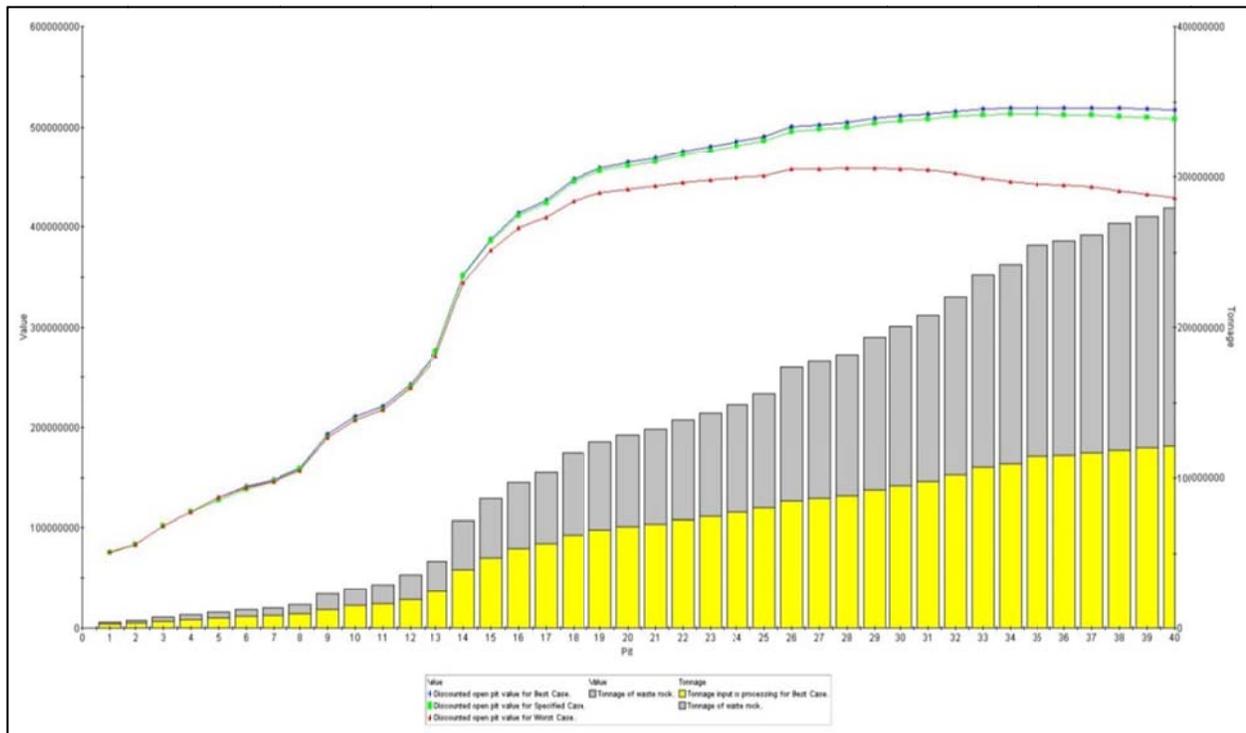
Figure 15.6-1   Graph of Whittle Results

Table 15.6-1 illustrates Best Case, Specified Case and Worst Case for pit shells 5, 10, 15, 20 and 36 in terms of NPV, ore tonnes, waste tonnes and other pertinent information.

Table 15.6-1   Pit Size vs Value

Pit	Au Price ($/oz)	Ag Price ($/oz)	Ore Tonnes (000s)	Au Grade (g/t)	Au Ounces (000s)	Ag Grade (g/t)	Ag Ounces (000s)	Waste Tonnes (000s)	Total Tonnes (000s)	Strip Ratio
5	456	5.7	4,484	1.3	188	11.44	1,650	6,118	10,601	1.36
10	576	7.2	10,652	1.04	357	10.24	3,408	15,883	26,535	1.49
15	696	8.7	33,554	0.81	869	8.42	8,771	52,969	86,523	1.58
20	816	10.2	53,119	0.71	1,208	8.03	13,567	75,258	128,378	1.42
36	1200	15	115,404	0.54	1,995	7	25,788	142,489	257,893	1.23

Pit	Best Discounted Cash Flow ($000s)	Specified Discounted Cash Flow ($000s)	Worst Discounted Cash Flow ($000s)	Best Ore Tonnes (000s)	Best Waste Tonnes (000s)	Best Mine Life (years)	Specified Mine Life (years)	Worst Mine Life (years)
5	130,891	128,299	130,396	6,674	3,927	1.6	2	1.57
10	211,141	208,204	208,214	14,888	11,647	2.46	3	2.42
15	388,877	386,575	377,578	47,128	39,395	4.92	4.88	4.92
20	463,925	460,976	437,613	67,786	60,591	6.49	6.45	6.56
36	519,330	512,607	441,315	115,385	142,508	10.27	10.35	10.35

The optimal shell chosen (pit 36) used a gold price of $1,200 per ounce and contained 115 million tonnes of ore. Material classified as Inferred Mineral Resources were used to define the pit size, as this material presents an opportunity, but Inferred Mineral Resources were not included in the reporting of Mineral Reserves or used in the evaluation of the mineral economics. Pit shell 36 was the basis for the final mine design of the pit and infrastructure; a larger $2,000 per ounce gold pit shell was used as a boundary to ensure that potential long term resources were not sterilized. Figure 15.6-2 is an illustration of the ultimate pit shell 36.

Figure 15.6-2   Plan of Whittle Shell 36
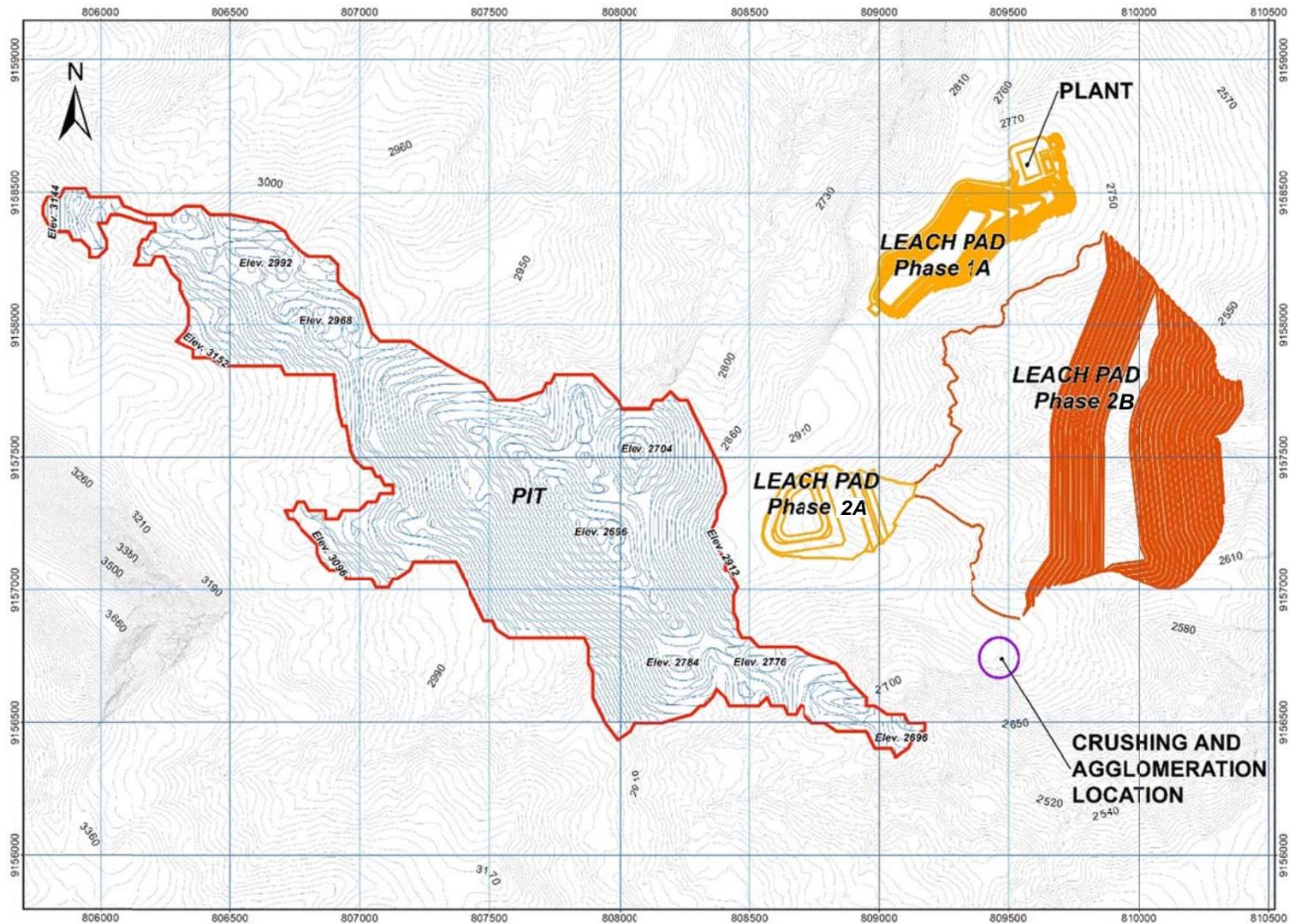
16.0 MINING METHODS

Tahoe's Shahuindo mine consists of an open pit mine and processing facility that is currently in the start-up and commissioning stage. The open pit will be mined in a sequence of phased cutbacks. The mining method used is a conventional drill, blast, shovel and dump truck operation. The mining will be executed under an alliance style contract similar to mining operations at Tahoe's La Arena mine. Mining will be carried out on two 12 hour shifts, operating 7 days a week.

16.1 Geotechnical

Tahoe commissioned Anddes to conduct a geotechnical review and slope angle design for the open pit (Anddes, 2015d). The final version of the report was submitted in October 2015. The Anddes report consisted of a review of the studies provided by Golder and Associates (2012), and further recommendations were made for the slope parameters of the Shahuindo mine. The recommendations made by Anddes are included in Table 16.1-1, and were based on the material strength properties and structures within the sector and the depth of the sector.

Table 16.1-1   Anddes and Associates Geotechnical Parameter Recommendations

Geotechnical Sector	Bench Height (m)	Bench Width (m)	Maximum Batter Angle (°)	Maximum Overall Inter Ramp Angle (°)
Zone 1	8	8	63	33
Zone 2	8	8	55	30
Zone 2	8	8	55	30
Zone 2A	8	8	45	24
Zone 3	8	8	75	37
Zone 3A	8	8	58	31

The average Rock Mass Rating (RMR) (Bieniawski, 1976) ranges from 23 to 44 from test work conducted on 12 geotechnical holes (fair to poor rock mass quality), 40 to 53 for the intrusive units (fair) and 29 to 40 for the breccias (poor). Rock mass shear strengths were evaluated using the semi-empirical Hoek-Brown failure criterion (2002), which can incorporate varying levels of disturbance to the rock mass caused by mining. The shear strength of discontinuities were evaluated based on the results of laboratory direct shear testing, indirect or subjective measurements of discontinuity characteristics, and engineering judgment based on Anddes' experience in similar rock masses at other large open pit mining projects.

Slope stability analyses included kinematic assessments based on the structural mapping and core/borehole logging data, and subsequent deep-seated limit equilibrium analyses of the inter ramp and

overall pit slopes to validate the kinematic bench and inter ramp designs and evaluate the influence of the rock mass competency, discrete fault zones, groundwater pressures and the possible influence of shear strength.

The pit configuration proposed by Anddes was used in the pit optimization process. However, this model only calculated the inter-ramp angle which does not include ramp accesses. The overall slope angle used for the optimization at the Shahuindo mine was 28 degrees. This was shallower than the recommendation of Anddes, as allowance was made to include ramp access and for the topographic terrain variability. For the mine design of the Shahuindo mine, the recommendations of Anddes were used and are included in Table 16.1-2, and Figure 16.1-1.

The Shahuindo open pit falls within Zone 3 of the Peru Seismic zoning. According to this zone, the Shahuindo mine must adhere to the Standard E.030 earthquake resistant design of National Building Regulations (2006). This standard accounts for the high seismicity with a factor zone (Z) of 0.4. According to the historical information collected by Silgado (1978), an area close to the Shahuindo mine has recorded earthquakes of VI intensities in the modified Mercallie Scale.

Probabilistic analysis has determined the maximum acceleration for Shahuindo is 0.17 m/s^2 for a one in 100 year event with a 10% chance of exceeding within 50 years. A value of 0.085 m/s^2 within a one in 100 year event has been factored into the design of slopes.

Table 16.1-2   Shahuindo Geotechnical Parameters

Area	Bench Height (m)	Bench Width (m)	Optimisation Overall Slope Angle (°)	Mine Design Maximum Batter Angle (°)	Mine Design Maximum Overall Slope Angle (°)
Zone 1	8	8	28	63	33
Zone 2	8	8	28	55	30
Zone 2	8	8	28	55	30
Zone 2A	8	8	28	45	24
Zone 3	8	8	28	75	37
Zone 3A	8	8	28	58	31
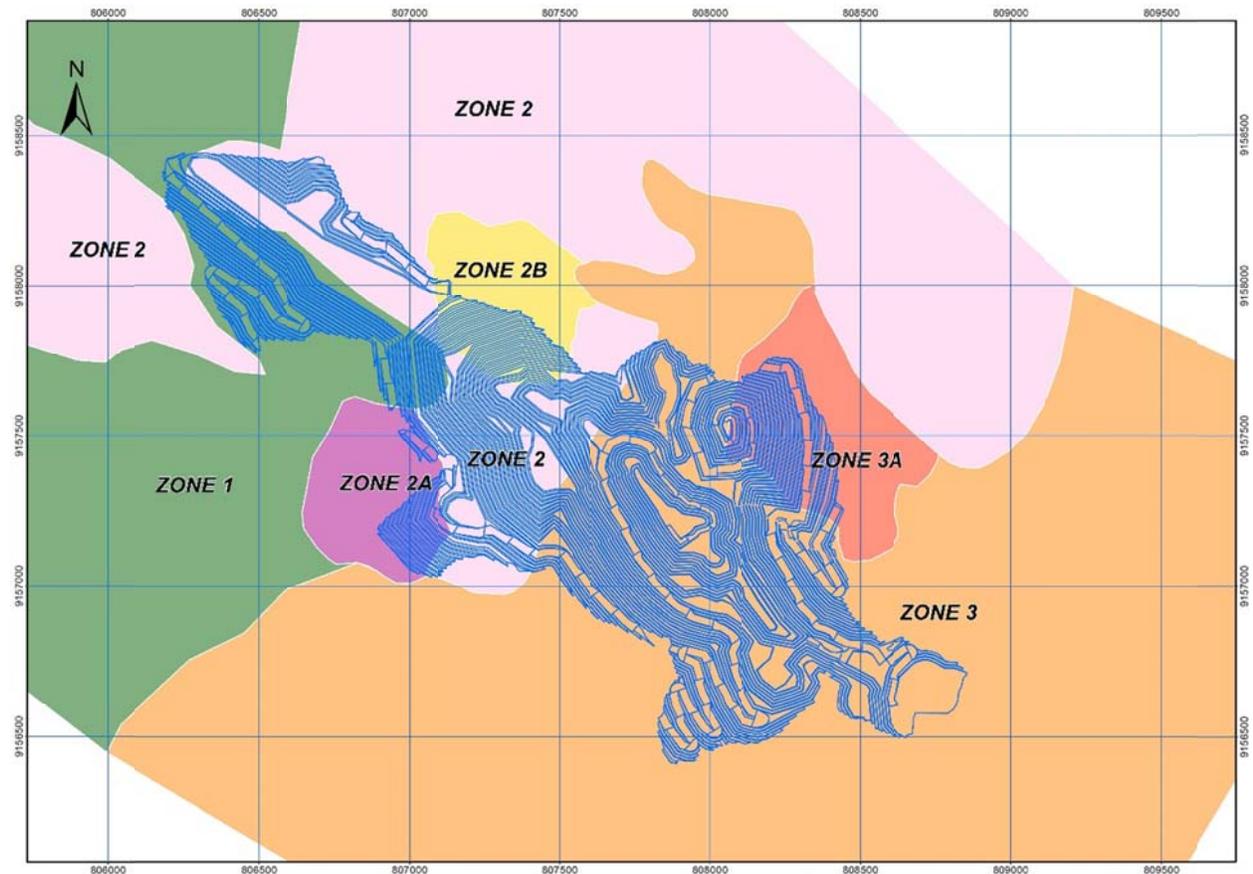
Figure 16.1-1   Geotechnical Zone Areas

16.2   Hydrogeology and Hydrology

In October 2012, Ausenco Vector (Ausenco) delivered a technical memorandum of the hydrogeological studies that were conducted during March 2012 through Oct 2012 (Ausenco, 2012). The report involved a program of fieldwork drill holes and piezometers, hydrogeological characterization and numerical modeling of the phases within the pit in natural condition and after mining was completed. The outcomes of the report also took into consideration the work completed and recommended by Anddes and Golder Associates (2012).

MODFLOW-SURFACT finite software was used to model the expected water flow rates into the pit to be the following;

- For the starter pit, the level of groundwater intercepted slightly inflows of 0.9 L/s; pore pressures are not determinants in the pit slope stability.

- For the final stage, the level of groundwater intercepted inflows of about 7.7 L/s.

Montgomery Watson Harza (MWH) were commissioned in 2015 to update the hydrologic and hydrogeologic models for the Shahuindo property, including a site-wide water balance, in support of the modification to the existing EIA (Montgomery Watson Harza, 2015). MWH estimated annual precipitation to be 600 mm/year in the upper elevations of the project area and up to 1,400 mm/year in the lower parts of the valleys. MHW determined that the water table was on average 45m below the surface, though in topographic extremes the depth varied from 1.1m to 189m below surface.

MWH identified 11 hydrogeological units which were included in their model. Two types of aquifers were identified; the first is in the co-alluvial and alluvial unconsolidated material lying on bedrock and the second in fractured rock material, principally the Chimu sandstone formation, which is the best host rock for a water supply.

Annual projected groundwater inflows into pit over the life of mine are listed in Table 16.2-1.

Table 16.2-1   Predicted Water Inflows during Mining

Year	Projected Inflow L/s
1	0
2	0
3	1
4	12
5	17
6	17
7	16
8	15
9	12
10	18
11 (post-mining)	20
12 (post-mining)	25

Water inflows during mining will be controlled via the use of in-pit sumps and dewatering pumps with water routed to holding ponds for use in processing. It is likely all of this water will be consumed by the process facilities in the dry season, but a portion will require treatment prior to discharge during the wet season.

16.3   Mine Layout

The open pit designs are based on an optimized pit shell followed by a detailed design and development of phased plans. Geotechnical parameters and recommended pit slopes are outlined in Section 16.1. The following criteria were used for the open pit design:

- The designs employ a minimum cutback width of 25m.

- The haul roads were designed at 27m, (23m operational width plus 4m for berms and drainage) to allow for two-way safe passage of the 90 tonne capacity haul trucks that have an operating width of 6.1m. Single lane ramps were used at the base of the pit with a width of 14m on the last 4 benches.

- Maximum center line haul road gradient of 10%. For sections of the haul road that may curve along the outside of the pit, the inside gradient of the ramp has a maximum gradient of 11-12%.

The open pit at Shahuindo contains eight phases. The cutbacks have been designed considering the best ramp positions, pit access, geotechnical recommendations and overall volume. The stages of the open pit are designed to smooth the tonnage movement per period, starting with small starter pits within the overall final pit footprint. The phases are mined in order from Pit 0 to Pit 8. The highest elevation for the Shahuindo pit is 3,154 mRL and the deepest component is 2,696 mRL. The highest pit wall of the design is 270m in height.

The mine waste facilities have been designed as a two stage facility consisting of:

- Starter waste dump used for the waste material until period 2018.

- Main waste dump constructed out of the waste from the starter pit.

- 20Mt of waste is planned to backfill the Northern Phase 6 area of the open pit, or alternatively a new waste facility in the northwest valley will be included later in the mine life.

The location of the dumps has been located close to the pits to minimize hauling. The footprint of the waste dump has been drilled to ensure no sterilization of the future resources.   The main waste dump is a valley fill dump; the dump and the under drainage system for the waste dump was designed by Anddes. The overall slope of the waste dump was designed at 2.5:1 (horizontal: vertical).

The waste dump will be constructed in 10m lifts working from the bottom up. The first stage of the waste dump has a capacity of 20Mt and the main waste dump has a capacity of 100Mt. The starter waste dump was designed to minimize the capital expenditure at the start of the project. Table 16.3-1 outlines the waste dump capacities that includes the main and starter waste dump volumes. The waste

is assumed to have an average bulk density of 1.75 tonnes/ m³; this includes a swell and compaction factor of waste to be approximately 1.3 or an increase of 30% of the original volume.

Initially some waste will be used to build and or widen haul roads and some good quality waste material is also scheduled for the construction of the life of mine leach pad base.

Table 16.3-1   Waste Dump Volumes

Waste Dump	Top Elevation	Bottom Elevation	Volume (m³)	Capacity (t)
Starter Waste	2650	2830	11,692,400	20,461,700
Main Waste	2540	2910	58,287,500	102,003,200
Total			**69,979,900**	**122,464,900**

Two suitable locations in valleys to the northwest and southwest of the pit were considered for leach pad construction. The southwest valley was chosen as the final location for the Phase 2 LOM leach pad due to no restrictions on land ownership as per the waste dump area, and proximity to the processing plant. Geotechnical investigations by Anddes show the area is suitable for the leach pad. At the effective date of this report, the designs are well advanced by Anddes with detailed engineering in progress. The Phase 1 leach pad locations were chosen on areas amenable to easy construction with minimal capital expenditure, and allow for gravity feed to the process plant. The Phase 1 leach pads have a short construction time and low capital expenditure; this allowed a short lead time to first production at the Shahuindo Mine.

The mine site layout has been designed taking into consideration the future expansion of the Shahuindo open pit and infrastructure so no sterilization will occur in the upcoming projects. The final layout for the Shahuindo open pit is presented in Figure 16.3-1. This layout is considered to be the final layout for the project.
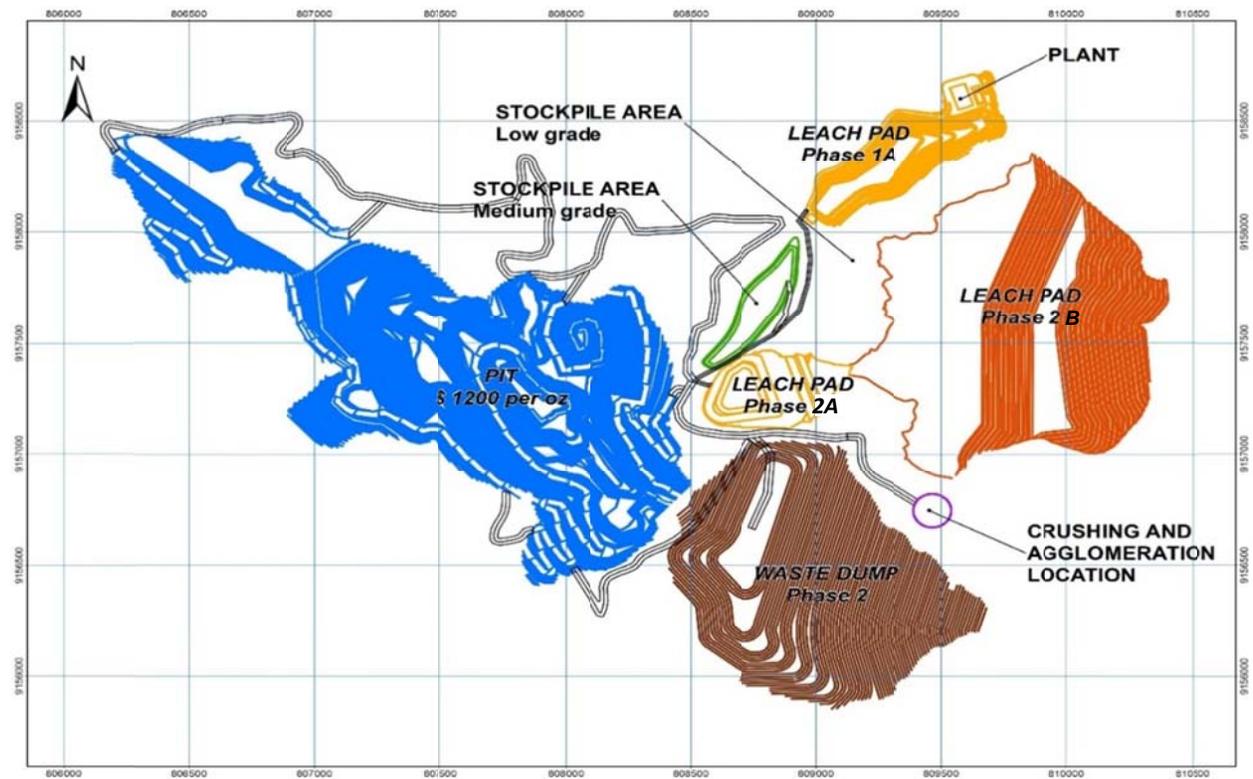
Figure 16.3-1   Shahuindo Mine Layout Plan

16.4   Mining

The Shahuindo mine has been planned as an open pit truck and shovel and excavator operation.   The conventional truck and loading unit method provides reasonable cost benefits and selectivity for this type of deposit.   Only open pit mining methods are considered for mining at Shahuindo.

Mining of the Shahuindo open pit is to be conducted under an alliance agreement with local contractor STRACON GyM.   The material at Shahuindo will be drilled and blasted on 8m benches, using 156mm diameter blast holes and a powder factor of 0.25 – 0.20 kg/BCM.   Loading of ore and waste will be with diesel powered excavators and rigid frame dump trucks.   The ore will be hauled to the dump leach pad or crusher, with the waste hauled to the waste dump.

It is expected that the drill penetration rate will be consistent between ore and waste.   In addition, the deeper benches do not show any changes in the mechanical properties of the rock mass with only the oxide zone being mined. Blasting parameters were chosen by the mining contractor after reviewing the rock properties. The unconfined compressive strength (UCS) varies from 16 MPa in high alteration areas up to 120 MPa in the bedrock. The average penetration rate is 40 m/h which approximately corresponds to a UCS of 32 MPa.   Table 16.4-1 shows the drilling and blasting parameters for the Shahuindo open pit.

Table 16.4-1   Drill and Blast Technical Parameters

Drilling Parameter	Units	Ore	Waste Rock
Hole Diameter	mm	156	156
Drilling Pattern	Burden/Spacing (m)	4.78 / 5.5	5.22 / 6
Bench Height - Nominal - Operative	Meters Meters	8 9-10	8 9-10
Sub Drilling	Meters	0.8	0.8
Re-Drilling	% Total	2.70%	2.70%
Penetration Rate	m/hr	40	40
Powder Factor	kg/BCM	0.25	0.20

An unsensitized gassable bulk emulsion matrix is the primary explosive used for blasting. The emulsion matrix is shipped as an oxidizer and must be sensitized with a chemical gassing technology to become detonable prior to use. This product is being successfully used at Tahoe's La Arena mine, producing an acceptable rock size distribution after blasting due to high shock energy produced. The logistics for this product are already in place at the mine site. Initiation will be by non-electric detonators using cord and surface delays to control the initiation sequence to produce good fragmentation.

The Shahuindo mine will operate with an over-trucking model which means that the production will be limited by the loading fleet, rather than by truck availability.

The running surface on the haul roads of 23m width has been designed using three times the truck width following international operational practices and Peruvian safety regulations. Single-lane haul roads of 14m width were incorporated in the bottom four benches of the pit to maximize ore recovery. The designed haul roads include two 0.5m drains on each side of the ramp and one additional safety berm.

For the run of mine dump, limited leach blending will be required for some softer materials. A blend ratio of 2:1 (two coarse ore to one fine ore) will be employed as a minimum where required to ensure no permeability problems arise.

After 2018, the crushing and agglomeration plant will be commissioned with no restrictions on blending.

Tahoe will mine the Shahuindo open pit using the same mining method as the La Arena mine. The La Arena mine has been used as the basis for the mining method, operational structure and machinery at Shahuindo, as it represents the best value for the project. The Shahuindo mine will also utilize the same mining contractor as the La Arena mine; STRACOM GyM has already started operation under an alliance agreement.

16.5   Pit Design

16.5.1 Bench Height

Pit designs were created to use 8m benches for mining. This corresponds to the resource model block heights which Tahoe believes to be reasonable with respect to dilution and equipment size anticipated to be used in mining.

16.5.2 Final Pit Design

The final ultimate open pit design for the Shahuindo deposit is illustrated in Figure 16.5-1.

16.5.3 Comparison of Final Pit Design to the Optimum Whittle shell

A comparison between the LOM pit design and the Whittle optimization was completed with the results illustrated in Table 16.5-1. There was a total difference of about one percent when comparing the design to the chosen Whittle shell (shell 36). The difference is attributed to the following factors;

- Slope parameters in the design incorporated individual geotechnical sectors, where the Whittle optimization assumed an overall slope angle of 28 degrees.

- Waste tonnes were increased slightly due to the design which included the life of mine haul roads while maintaining the minimum mining width.

- Areas that were below the minimum mining width or deemed not mineable at this point of time were omitted from the design. Further drilling may define these areas as mineable into the future.

Table 16.5-1   Comparison of Pit Design to Whittle Shell

Item	Difference
Ore tonnes	97%
Au grade	99%
Ag grade	99%
Au ounces	96%
Ag ounces	96%
Waste tonnes	105%
Total tonnes	101%
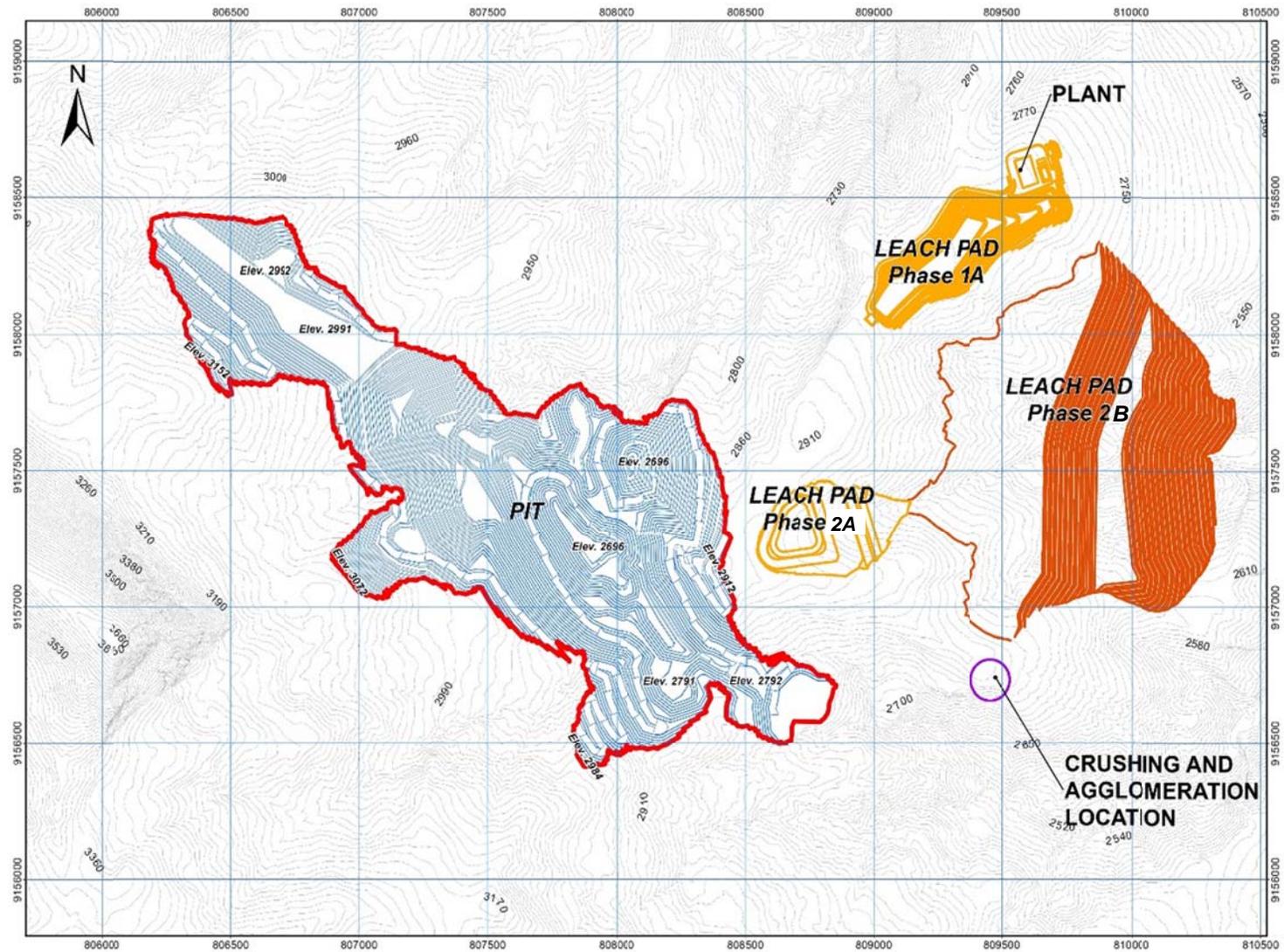
Figure 16.5-1   LOM Pit Design

16.6   In-pit Inferred Resources

Inferred Mineral Resources inside the pit total 1.9 million tonnes with average grades of 0.50 g/t Au and 8.77 g/t Ag. While Inferred Mineral Resources were considered as waste and not used in the economic analysis, successful conversion to either Measured or Indicated classifications through further drilling would result in an increase of approximately 30,000 ounces of gold and 530,000 ounces of silver to the life of mine production totals.

16.7   Mine Production Schedule

The mining strategy at Shahuindo consists of two phases: Phase 1 entails mining higher-grade starter pits and delivering the ore to the two Phase 1 leach pads (pads 1A and 2A) for ROM leaching.   Phase 2 includes the addition of a crushing and agglomeration process facility, a large leach pad (pad 2b), and mining the remainder of the deposit at a higher rate.

16.7.1   Initial Mining Strategy: Phase 1

The short term strategy for the mining operation at Shahuindo will commence with the mining of a smaller operation that does not include crushing and agglomeration. The smaller operation consists of mining small starter pits that will have a duration of approximately 27 months and two leach pads with a combined capacity of 11.5 million tonnes. The initial strategy was designed to take advantage of the near-surface coarse-grain sandstone-hosted ore which does not require crushing and agglomeration.

The initial starter pit is located in a sandstone dominant location at the southern end of the final pit design, located close to the leach pads. Fine-grained high-grade ore from the northern starter pits will be blended with sandstone and placed on the top lift of the Phase 1 leach pads. Good quality waste material and very low grade ore from the initial starter pit will be used for construction of the heap leach Phase 2b pad buttress and other leach pad facilities. Currently, it is anticipated that approximately 4 million tonnes of fill material will be required for the construction of the heap leach pad Phase 2b. The starter pit has a mine life of 2.25 years; this will enable time for further processing blending tests to be completed for the Phase 2 leach pad with revenue from the starter pit used to assist with the capital expenditure for the larger heap leach operation (Phase 2).

The location of the starter pits and the development of the Phase 1 leach pads is shown in Figure 16.7-1. Construction of the Phase 1 leach pad (pad 1A) and process facilities commenced in May 2015 and were complete in November 2015. Mining of the starter pit commenced in November 2015 utilizing 75 tonne excavators and 35 tonne tip trucks. An average of approximately 28,000 tonnes per day (ore and waste) will be mined in Phase 1.
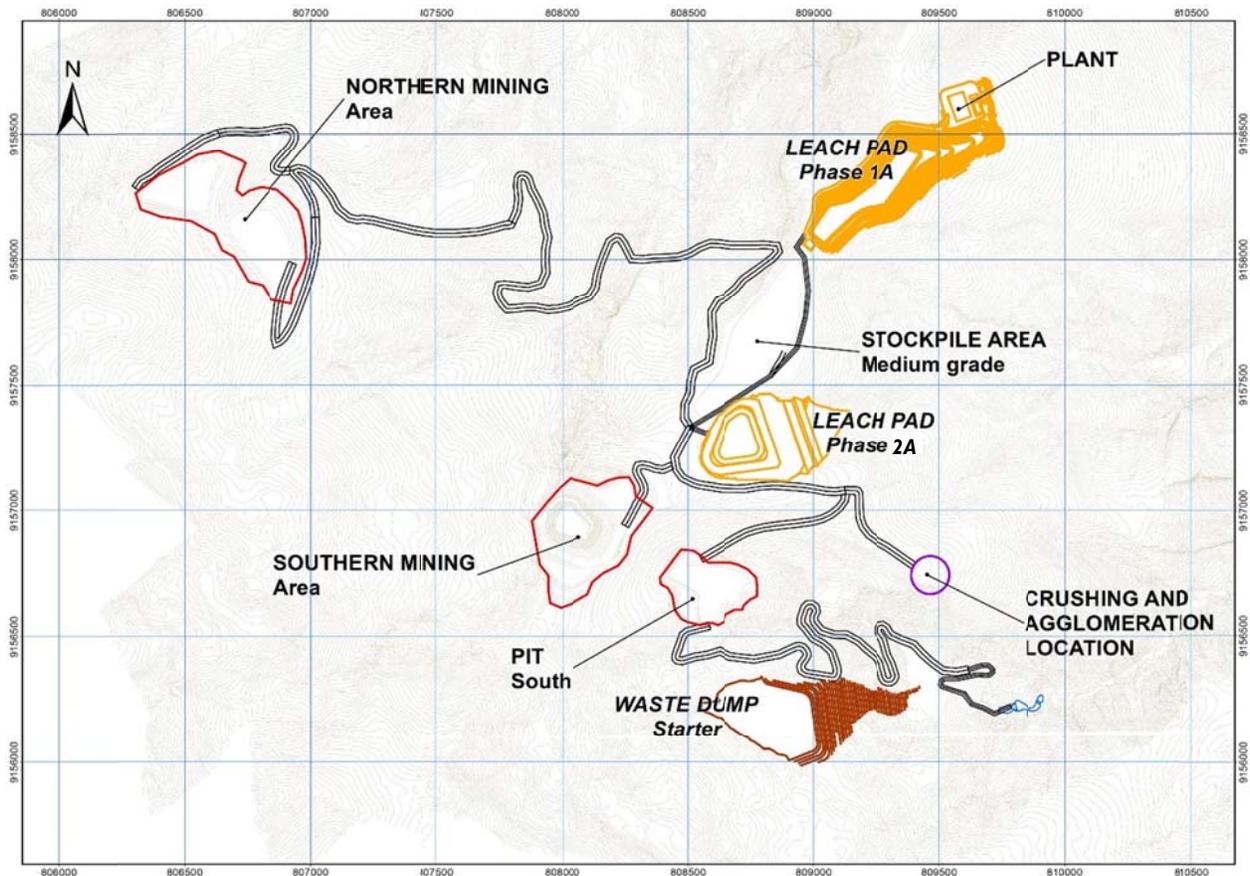
Figure 16.7-1   Site Plan at the end of 2017

16.7.2 Mining Strategy: Phase 2

The mining strategy for Phase 2 will include a crushing and agglomeration processing facility and the Phase 2 leach pad (pad 2B). This facility and leach pad is scheduled to be constructed during 2016 and 2017, ready for production at the start of 2018. Phase 2 includes an increase in total tonnes mined from 28,000 tonnes per day in Phase 1 to a maximum of 89,000 tonnes per day, which will require an upgrade to a larger sized fleet. The Phase 2 leach pad will process a maximum of 13.1 million tonnes of ore per year. The Phase 2 site layout plan is included in Figure 16.7-2.
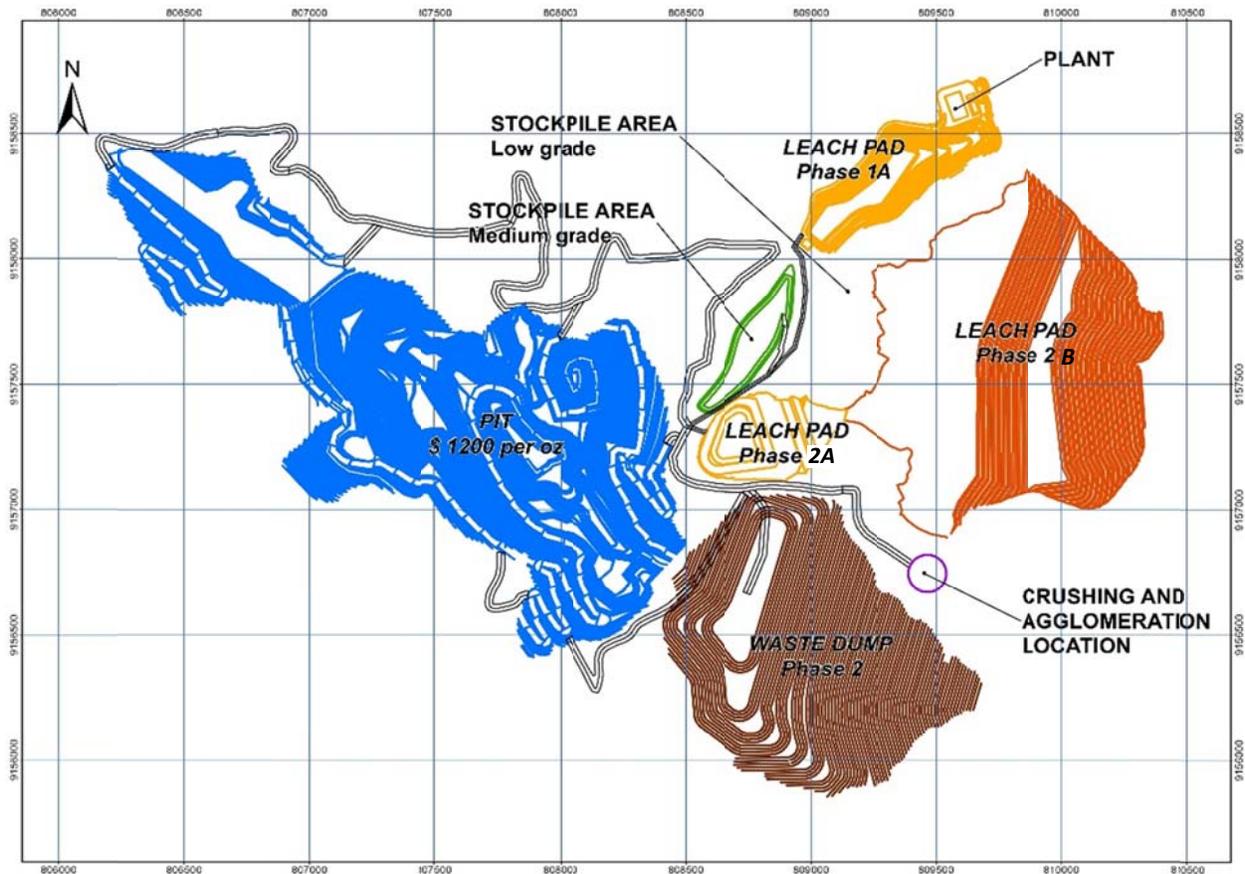
Figure 16.7-2   Final Phase 2 Site Plan

Phase 2 includes a stockpile located close to the crushing and agglomeration facility. The stockpile capacity is about 8 million tonnes of ore.   This stockpile is used to smooth the mining fleet requirements, to maximize the productivity of the mining equipment to reduce costs, and for blending and optimization of ore grades to the pad.

16.7.3 Mining Schedule

The mining schedule for Phase 1 was developed using Gemcom MineSched™ software considering a maximum fleet capacity of 28,000 tonnes per day. The Phase 1 ore production was driven by the space available on the leach pad and the amount of near-surface high-grade sandstone-hosted ore.

The mining schedule for Phase 2 was developed using the MineMax™ open pit scheduling software which maximizes the NPV using linear programming. The Phase 2 mining schedule was constrained by three loading units with a maximum total capacity of 90,000 dry tonnes per year and by the crushing and agglomeration facility which has a maximum capacity of 36,000 tonnes per day.

The waste material is hauled to the waste dump as previously described in Section16.3. The ore is hauled to either a low-grade stockpile or to the crusher pad where trucks can direct tip into the crusher feed bin, which has a live capacity of 240 tonnes. A track feeder feeds the material from the crusher feed bin to a Mining Machinery Developments (MMD) sizer that crushes the ore to 80% passing 100mm. At the end of the open pit mine life, the material in the low-grade stockpiles will be loaded into trucks at the stockpiles and rehandled to the crusher bin.

The geochemical characterization study described in Section 20.0 has been imported into the geological model used by the mine planning engineers. The distribution of potentially acid generating (PAG) material in the model is included in the mine schedule to ensure that it is mined at an appropriate time to allow the material to be encapsulated at the destination and not be in contact with the elements. Information from blast hole samples will also be used to improve the accuracy of the model as mining takes place.

The mine production schedules for the Shahuindo mine are summarized in Table 16.7-1. The tonnes are reported in-situ dry tonnes after applying 2% ore losses and a 5% dilution factor.

Table 16.7-1   Mine Production Schedule

	Unit	2016	2017	2018	2019	2020	2021
Ore Tonnes	k tonnes	5,756	5,602	10,289	13,412	13,039	12,352
Au Grade	g/t	0.68	0.54	0.64	0.48	0.48	0.51
Ag Grade	g/t	5.95	5.73	7.24	6.45	7.05	6.47
Waste Tonnes	k tonnes	4,954	4,113	21,835	18,895	19,246	19,893
Strip Ratio	waste:ore	0.86	0.73	2.12	1.41	1.48	1.61
Total Tonnes	**k tonnes**	**10,710**	**9,715**	**32,124**	**32,306**	**32,285**	**32,245**
Au Mined	k oz	126	97	212	206	200	201
Ag Mined	k oz	905	1,090	2,524	2,741	2,954	2,568

	Unit	2022	2023	2024	2025	Total
Ore Tonnes	k tonnes	16,066	14,405	12,732	7,236	**110,890**
Au Grade	g/t	0.50	0.59	0.52	0.49	**0.53**
Ag Grade	g/t	7.79	7.16	6.36	7.30	**6.86**
Waste Tonnes	k tonnes	16,395	15,922	17,497	11,106	**149,855**
Strip Ratio	waste:ore	1.02	1.11	1.37	1.53	**1.35**
Total Tonnes	**k tonnes**	**32,461**	**30,327**	**30,230**	**18,342**	**260,485**
Au Mined	k oz	258	273	215	113	**1,900**
Ag Mined	k oz	3,599	3,143	2,663	2,246	**24,470**

*Note: The total material moved and grades are slightly different (~1%) to the Mineral Reserve in Section 15.0 due to rounding differences between software packages.

16.8   Mining Equipment

Phase 1 mining will use a smaller mining fleet and no crushing and agglomeration circuit. Phase 2 will include a crushing and agglomeration circuit coupled with an upsized mining fleet.

The mobile equipment selection was conducted by anticipating the fleet requirements that could be used in the open pit operation. The Phase 1 mining fleet includes a CAT 374 excavator matched with a fleet of 35 tonne 8 x 4 tip trucks. Phase 1 mining assumes an average rate of 28,000 tonnes per day (ore and waste). The Phase 2 mining fleet includes RH900 shovels matched with a fleet of 90 tonne Caterpillar rigid frame haul trucks. Phase 2 mining assumes an average production rate of 87,000 tonnes per day (ore and waste).

Table 16.8-1 shows the size of machinery that will be required at each stage of pit development. Only primary equipment units are listed.

Table 16.8-1   Primary Mining Equipment Required for Shahuindo

Mining Phase	Primary Mining Equipment	Quantity
Phase 1	Excavator CAT 374	2
	32 Tonne Actros Tip Truck (maximum)	11
	Sandvik D245 Drills	1
	Dozer (Track and Wheel)	2
Phase 2	RH90 Shovel	3
	90 Tonne CAT 777D Haul Trucks (maximum)	34
	Sandvik D245 Drill	3
	Dozer (Track and Wheel)	3

A general overview of the ancillary equipment needed for the production stages of mining is outlined in Table 16.8-2.

Table 16.8-2   Ancillary Equipment Fleet Size

Equipment	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Tractor CAT D8T	1	2	2	2	2	2	2	2	2	2	2	2
Tractor CAT 834	1	1	1	1	1	1	1	1	1	1	1	1
Grader CAT 16M	0	1	1	1	1	1	1	1	1	1	1	1
Grader CAT 14M	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck	1	1	1	2	2	2	2	2	2	2	2	2
Fuel Truck	1	1	1	2	2	2	2	2	2	2	2	2
Lube Truck	1	1	1	2	2	2	2	2	2	2	2	2
Excavator CAT 374	1	1	1	1	1	1	1	1	1	1	1	1

The ramp up from Phase 1 to Phase 2 will require a fleet change out over a six month period to reach full implementation. This ramp up has been included in the mining schedule.

The mobile equipment selection was conducted by anticipating the fleet requirements, the key parameters used for the calculation of fleet requirements are based on scheduled time, availability, truck and material parameters, and is included in Table 16.8-3. Mining will be conducted by the same contractor, STRACON GyM, utilized at Tahoe's La Arena mine under an alliance agreement. The mining equipment utilized at La Arena is very similar to the proposed mining fleet at the Shahuindo mine. The data for the mining productivities and costs were based on the La Arena mine.

Table 16.8-3   Maximum Loader Productivity Estimate

STRACON GyM Digging Production	Units	Caterpillar 374	RH90C
Availability	%	88	88
Utilization of Available Time	%	83	83
Hours/Day	hours	17.53	17.6
Productivity	tonne (wet)/hour	825	1,650
Moisture Content	%	4	4
Daily Production	tonne (wet)/day	14,462	29040
Daily Production	tonne (dry/day	13,906	27923
Yearly Production per Digging Unit	**Mtpa**	**5.08**	**11.9**

Truck productivity is based on haulage routes and travel speeds. The haulage routes were drawn from the pit designs to each of the potential destinations. Additional haulage lines were drawn for

each bench within the pit designs. The speeds were flagged into the haulage string description fields based on location and haul gradient.

GEOVIA MineSched™ and Maptek Vulcan™ software were used to calculate the truck hours based on assigned speeds for loaded and empty trucks along each of the haul routes. Resulting haulage strings were drawn by GEOVIA MineSched™ and verified to ensure proper routing of haulage was followed.

The available hours per day were adjusted by mechanical availability and operator efficiency. The mechanical availabilities start at 88%, the operator efficiency or utilization factor used is 83%, which accounts for break times, lunches, and shift start-ups and shut downs.

Sandvik D245s drills were selected for blast hole and assay drilling. These drills provide the productivity required for production at a low unit cost per meter drilling up to an 8 meter high bench using single pass drilling. Other equipment selected for support functions including dozers, graders, water trucks and other miscellaneous equipment.

17.0 RECOVERY METHODS

The Shahuindo Project will be developed in two phases. During Phase 1 (years 2016–2017), acceptable recoveries are achievable from ROM ore direct from the mine to the heap leach pad. In Phase 2 (2018 through the end of the mine life), ore will be crushed and agglomerated to achieve increased recoveries, acceptable percolation, and pad stability over the life of mine.

The Phase 1 pilot leach pad (pad 1A) has an area of 18 Ha; a second pad (pad 2A) will be constructed in 2016 to be ready to receive material in 2017. The adsorption-desorption-refining (ADR) process plant capacity has been initially designed to treat 10,000 tonnes of ore per day and will be expanded to process an average of 12,200 tonnes of ore per day in 2016 and 16,500 tonnes of ore per day in 2017. The pilot pad and 10,000 tpd ADR plant have been completed, with commissioning in December 2015.

For Phase 2, the crushing, storage, agglomeration and stacking system, and ADR plant are designed to handle 36,000 dry tonnes per day. Cement (up to 6 kg/tonne) and lime (around 2 kg/tonne) will be added to the crushed ore and the mixture agglomerated at three specially designed transfer points by the addition of a barren solution (or water). The agglomerated ore will be delivered to the Phase 2 leach pad (pad 2B) by downhill regenerative overland conveyors. A series of stackable/shiftable conveyors and grasshopper conveyors will deliver ore to a stacking conveyor that will place it onto the pad in 8 or 16 meter high lifts.

During the first half of 2016, Tahoe geologists will work to refine the geological model by additional drilling and relogging to aid in improving the geometallurgical model to increase confidence in the proposed material blending schemes. The geometallurgical model will also be improved with pilot leach testing of the different lithologies at varying coarse to fine ratios. The execution plan for Phase 2 will be finalized based on these test programs. Agglomeration recoveries and strength test work are ongoing at SGS in Lima and at the La Arena metallurgical lab.

17.1 Phase 1 - Run of Mine Processing

17.1.1 Processing Flow Path – Run of Mine Material

In Phase 1, gold is recovered via dump leaching of ROM ore, which is trucked to the Phase 1 leach pads and dumped on the leach pad to form lifts. The lifts are irrigated uniformly with a sodium cyanide solution by an irrigation system. As the solution passes through the lift, gold is dissolved, forming a pregnant (gold-enriched) solution. The pregnant solution percolates through the lifts and flows into the solution pond.

The pregnant solution is pumped from the solution pond to the ADR circuit where the gold is recovered onto activated carbon. The carbon is stripped of gold to form a solution and the gold is extracted by the process of electrowinning to form a precipitate. The precipitate is dried, mixed with flux and smelted to produce doré. The doré is weighed, sampled and shipped to a refinery for sale.

A specific process has been designed for capture, condensation and storage of mercury during the precipitate drying process. The mercury is removed and disposed of by a qualified third party transporter. The plant design includes retort furnace storage to prevent mercury vaporization at ambient temperatures.

Slag produced as part of the smelting process is crushed and any prills of gold are recovered and recycled for smelting. Stripped carbon is regenerated and recycled to the adsorption circuit. A flow sheet of the ROM leaching operation is illustrated in Figure 17.1-1.
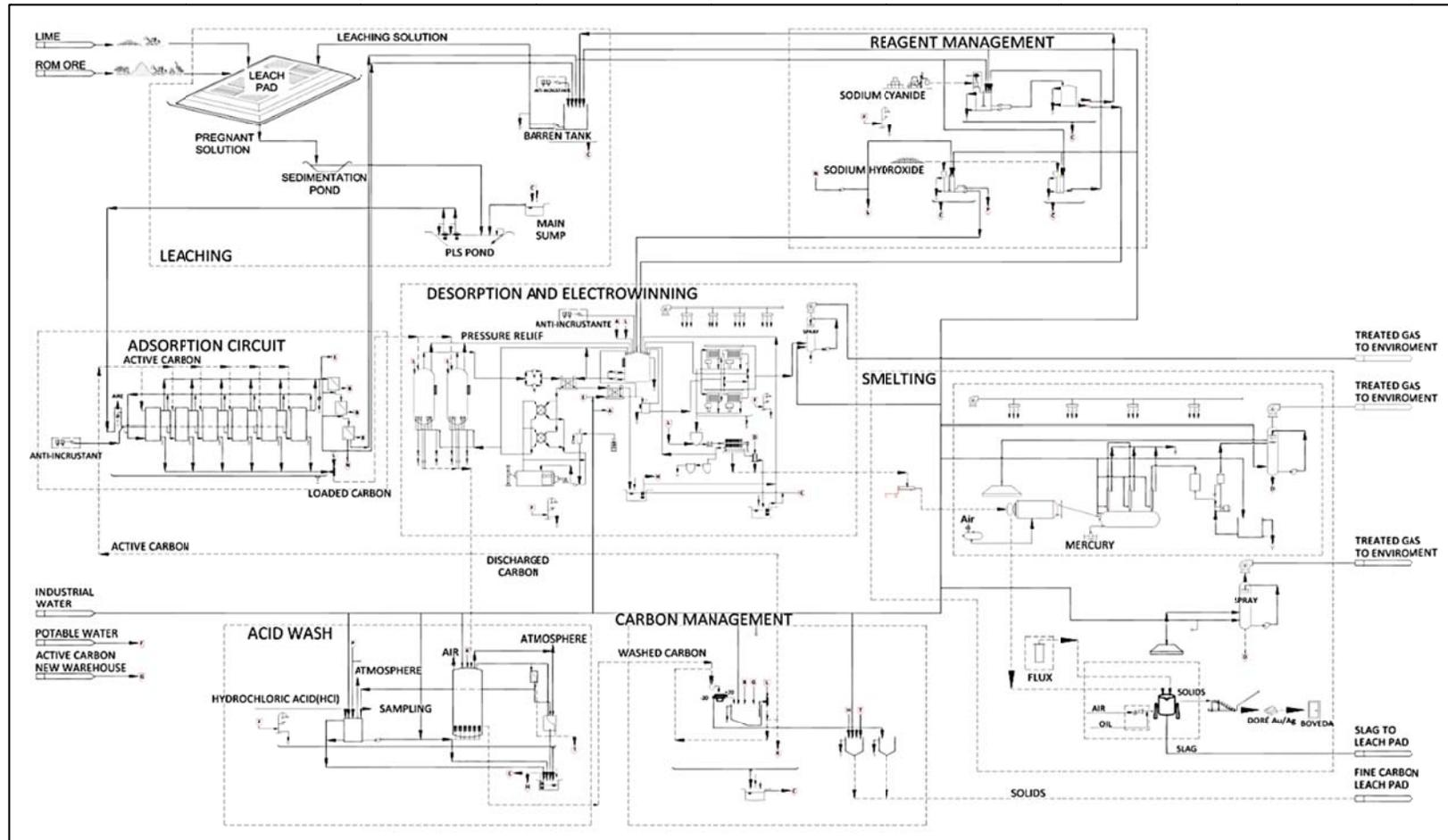
Figure 17.1-1   ROM Process Flow Sheet

17.1.2 Run of Mine Leach Process

The mineralized material is transported from the mine face to the leach pad using dump trucks. In order to maximize recovery, the ROM ore will be blended directly from the pit. The scheduling of the ROM ore from the pit will require input from the onsite metallurgical department to ensure the mining blend maximizes the recovery of gold from the ROM ore. The ROM ore will initially be placed on the leach pad at a rate 10,000 tpd, ramping up to an average of 12,200 tpd in 2016 and 16,500 tpd in 2017 as the plant capacity is expanded.

Lime is added at the required quantity to the leach pads using the mining fleet at the time the irrigation pads are being formed. A spray irrigation system is used to apply the cyanide solution of 200 ppm cyanide concentration at 400 m^3/h at to each pad lift. The vertical height of each lift has been designed at 8m by Anddes (2015e, 2015f, 2015h). As the solution passes through the heap, the solution will leach the gold and silver out of the ore. The pregnant (gold-enriched) solution is collected in the pregnant leach solution (PLS) collection pond and pumped by two 14-inch x 12-inch horizontal centrifugal pumps to a series of adsorption columns.

The cyanide for heap irrigation is first prepared at 27% concentration.   Eight tonnes of sodium cyanide (NaCN) is added to fresh water in a 25m^3 preparation/agitation tank and the concentrated solution transferred via pump to a storage tank of 140m^3 capacity. The concentrated cyanide solution is metered into the barren leach solution to increase the cyanide level up to 200 ppm before pad irrigation. A second cyanide preparation tank is located near the desorption area for gold stripping. Cyanide concentration for stripping is 0.5% (5,000 ppm). Both cyanide mixing units have a scrubber, pH meter and hydrogen cyanide detector.

The solution application will advance in nominal 6,000m^2 cells (60m x 100m). The barren solution is pumped by 305mm x 355mm (12-inch x 14-inch) horizontal pumps. The number of pumps will gradually be increased as the leaching area increases according to the ore tonnes placed. Each leach cell has an irrigation system consisting of a 200mm (8-inch) header and four 100mm (4-inch) sub-headers. The wobblers network are a 6m x 6m triangle pattern with No. 7 wobblers, 19mm (¾-inch) connection fitting and low angle (18°) outlets to minimize solution losses.

The irrigation rate is between 8 to 10 liters per hour per square meter of leaching area. Emitters are 16mm hose installed at 63cm spacing. Each emitter will handle 4 liters per hour. At any given time, there will be a minimum of five irrigation systems under leaching connected to sub-headers, with two systems on standby (one being installed on a new cell with fresh ore, and one being dismantled after 80 days leaching cycle). The flow rate of pregnant solution to the collection pond will be 367 m^3/hour per leaching cell under the 10,000 tpd plant capacity scenario.

The test work conducted indicates that irrigating the ROM ore for 80 days is required. The irrigating of each lift for the 10,000 tpd rate is shown in Table 17.1-1.

Table 17.1-1   Phase 1 Leach Pad Schedule

Leach Pad Phase 1	Vertical Lift Height (meters)	Irrigated Duration (days)
Lift 1	8	40
Lift 2	8	60
Lift 3 - Final Height	8	80

The 10,000 tpd ADR plant has the capacity to process a solution rate of 400 m³/hr at the projected mine head grades and volume under irrigation. Diligent monitoring of the leach pad will be required as to insure potential permeability/channeling do not negatively impact gold recovery from the ROM ore.

17.1.3 Process Plant

Five adsorption circuits are currently available for the treatment of pregnant solution in the ADR plant. Each circuit consists of six columns containing 4 tonnes of activated carbon. The activated carbon adsorbs the gold, silver and some minor impurities such as mercury and copper. The columns have a total treatment capacity of 1,750 m³/h.

The carbon from the adsorption tanks, containing approximately 4 kg of gold per tonne carbon is taken to the desorption plant where the gold is extracted from the carbon using a sodium hydroxide solution in a desorption reactor. The gold and silver is recovered through electrowinning to obtain a precipitate that is dried in the press filters, which then goes through the smelting stage to obtain the doré bars.

The barren solution that flows from the adsorption circuit returns to the leach circuit through the barren tank, and the level of reagents is adjusted prior to being fed back into the process. The carbon in the adsorption circuit is stripped and regenerated twice weekly in the 8m³ desorption reactor. The carbon regeneration takes place in batches in two steps:

1. acid wash every adsorption cycle
2. thermal regeneration every 3 adsorption cycles.

The acid wash adsorption cycle consists of thoroughly washing the carbon with fresh water to ensure that no entrainment of cyanide solution is present. It is then washed with hydrochloric acid (HCl) at a concentration of 2.5%. The acid wash is required to dissolve and remove carbon scale; the duration of this step, including water rinsing, takes approximately three hours.

The thermal regeneration cycle involves dewatering the carbon solution on a vibrating screen and then heating the carbon up to 750°C for 10 to15 minutes in the regeneration kiln, which regenerates the carbon. After the regeneration kiln, the carbon is dropped into a water quenching tank at room temperature, and is then dewatered and screened to remove fines (minus 6 mesh). The coarse fraction of carbon (6 x 12 mesh) will return back to the adsorption circuit, while the fine carbon is filtered and stored. The fine fraction weight is calculated to be approximately 0.5 tonne of carbon per month depending on the quality of the carbon.

17.2 Phase 2 – Crushing and Agglomeration

17.2.1 Process and Flow Path

For Phase 2, the ROM material will be trucked to the crushing pad via 90 tonne haul trucks and fed into a 240 tonne hopper. The material that is -100mm reports directly to the primary crushed ore stockpile and the oversize material is fed to the crusher where it is reduced to p80 of -100mm and fed to the stockpile. The stockpile has a live capacity of two hours and a total capacity of 24 hours.

The material is extracted from the stockpile via a vibrating feeder and is fed through a static screen, where the fine (-75mm) fraction reports to the agglomeration feed conveyor and the course fraction (+75mm) reports directly to the overland conveyor.

The cement and lime addition is conducted on the agglomeration feed conveyor where the quantity of cement and lime added is controlled by a weightometer. The barren solution combined with the lime and cement is added to the agglomeration conveyors at three transfer points before it is added to the overland conveyor. The crushing and agglomeration flow sheet is illustrated in Figure 17.2-1.

The agglomerated material is fed to the leach pad via the downhill regenerative overland conveyor. A series of stackable/shiftable conveyors and grasshopper conveyors will deliver the ore to a stacking conveyor that places it onto the pad in 8 or 16 meter high lifts. The conveying and stacking flow sheet is illustrated in Figure 17.2-2.

The process flow path for the material is the same as Phase 1 for the leaching, adsorption and desorption as described in in Section 17.2.1. An expansion is required for Phase 2 to accommodate the increased capacity to 36 ktpd. The expansion will necessitate increasing the ADR trains from one to four and increasing the PLS pond capacity from 25,000m³ to 80,000m³. The expansion will also increase the number carbon strips required from two to seven per week.
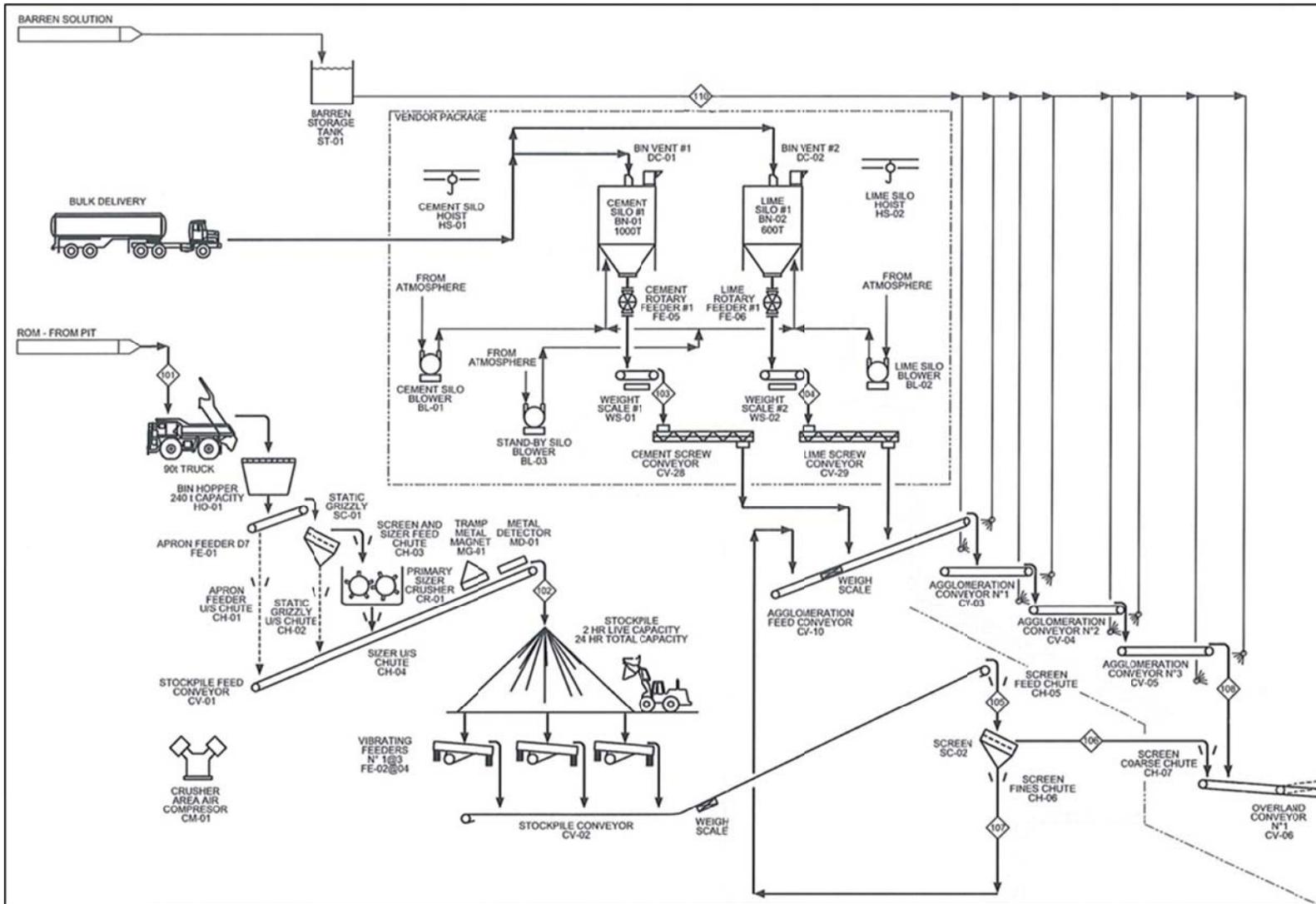
Figure 17.2-1   Crushing, Stockpile, Screening and Agglomeration Flow Sheet
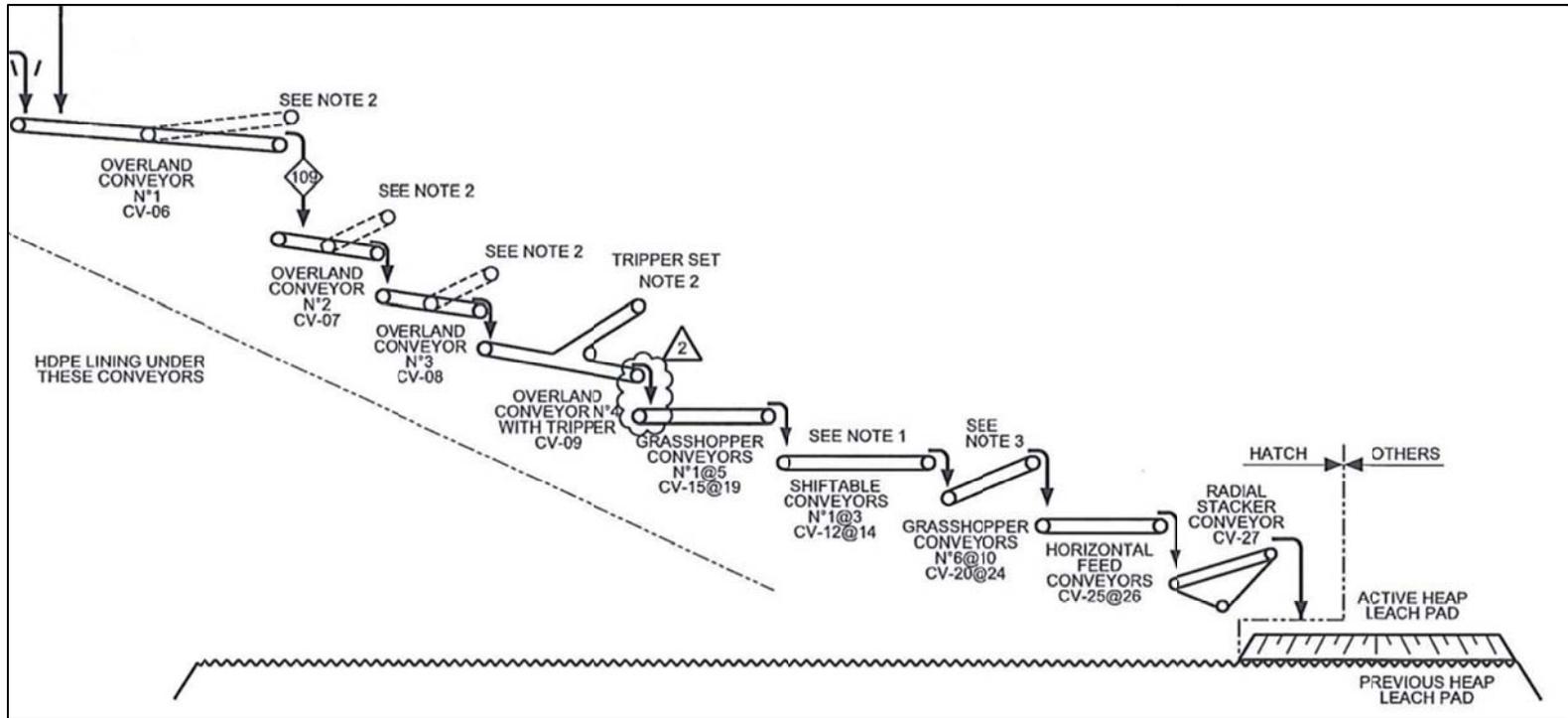
Figure 17.2-2   Overland Conveyor and Stacking System Flow Sheet

17.2.2 Process Plant

The processing of Phase 2 ore is the same as Phase 1 as described in Section 17.1.3. Due to the increase in tonnes to be treated on a daily basis, the Phase 2 processing plant will include an extra reactor for gold desorption with two additional electro winning cells and two DC rectifiers to accommodate the larger flows.

17.3 Heap Leach Pad Design by Anddes

The leach pad designs have been completed by Anddes (2015a, 2015c). The initial Phase 1 heap leach pad (pad 1A) has been constructed and is in operation. Field investigations for the Phase 2 leach pad (pad 2B) were completed in the second quarter of 2015. The current pre-feasibility design has a maximum capacity of 208 million tonnes of ore, with a total lined area of 2,218,800 m^2. The design includes five ponds that include a PLS collection pond, an event pond, raincoat pond and two sedimentation ponds. The Phase 2 pad design criteria are summarized in Table 17.3-1.

Table 17.3-1   Phase 2 Leach Pad Design Criteria

Description	Unit	Design Criteria
Dry tonnes per day	tonne/day	36,000
Bulk density	tonne/m^3	1.7
Overall slope	H:V	2.5H:1V
Operating time	months	120
Average ore moisture	%	4.2
Nominal irrigation rate	L/h/ m^2	10
Maximum irrigation rate	L/h/ m^2	11
Irrigation type	---	wobblers/emitters
Maximum irrigation flow	m^3/hr	1500
Evaporation losses (irrigation)	%	3
Evaporation losses (ponds)	%	100
Evaporation losses (irrigated cells)	%	90
Free percolation flow (drain-down	hr	24
PLS pond capacity	m^3	80,000
Sedimentation pond 1	m^3	10,000
Sedimentation pond 2	m^3	8,000
Raincoat pond	m^3	40,000
Big event pond	m^3	300,000
Pond slope	H:V	2:1
Leak detection system	---	yes
Maximum height	m	180
Maximum capacity	tonnes	208 million

Pond capacities are based on water balance studies conducted by Anddes (2015b). The use of raincoats (HPDE covers) on pad 2B will be required to minimize the amount of water requiring treatment prior to discharge during the wet season. The HDPE covers will act to prevent infiltration of precipitation into the leach pad, minimize dilution of the leach solutions and reduce the amount of effluent requiring treatment. However, even with the use of raincoats, the Phase 2 process facility will not be in water balance during an average precipitation year. Quantities to be discharged during average precipitation years with the use of raincoats will vary from zero to a maximum of approximately 40,000 m³ per year. The effluent to be discharged during an extreme wet year can reach a maximum average of 46.4 L/s. A water treatment plant will be installed in prior to commissioning of the Phase 2 leach pad to handle the potential discharge of process solutions.

17.4   Phase 1 and 2 Process Parameters

The main process parameter for Phase 1 and Phase 2 are summarized in Table 17.4-1.

Table 17.4-1   Phase 1 and Phase 2 Process Parameters

Parameter	ROM	Crush Ore
Dry tonnes of ore/day*	14,300	36,000
Au Head grade	0.64 g/t	0.52 g/t
Average flow rates	400 m³/H	1600-1800 m³/H
Leach time	80-90 days	75-85 days
Lift height	8 meters	8-16 meters
Crush size	100% minus 300mm (p80 minus 150mm)	100% minus 75mm
NaCN consumption	0.2 kg/tonne of ore 1.5	0.3 kg/tonne of ore
Lime consumption	kg/tonne of ore	1.0 kg/tonne of ore
Cement consumption	no addition	6 kg/tonne (-75mm fraction)
Average Au Recovery	73%	80%

*tonnes processed

18.0 PROJECT INFRASTRUCTURE

The infrastructure and services to support the Shahuindo mine include the following major components:

- Site Access Road;

- Power supply including back-up power and distribution;

- Water supply for process water, potable water and fire water;

- Sewage system and solid waste disposal;

- Project buildings including truck shop, explosive magazines, warehouse, maintenance/process warehouse, fuel station and offices;

- Camps for construction and operations including dining facilities; and

- Miscellaneous site services such as security, first aid clinic and communications.

18.1 Services and Infrastructure

18.1.1 Roads

Access to Shahuindo is via a national highway that runs north-south along the east side of the Condabamba river.   From the highway, the Shahuindo site is west of the junction at Pomabamba on an unsealed road four kilometers long.   There is a concrete bridge on concrete piers which crosses the Condebamba river. The bridge over the river is 90m long and 3.5m wide, built approximately 15 years ago. The Company plans to upgrade the bridge in 2017.

A private road enters the mine property a few kilometers from the west side of the bridge.   This 11 kilometer unsealed road provides access to the camps, offices, mine, process plant and other project facilities. This road will be improved during construction of Phase 1.

All site access and haul roads will be designed according to the Company's internal standards (Shahuindo Internal Transit Standard) for widths and grade to ensure safe and efficient operations.   The location of the access roads are shown in Figure 18.1-1.
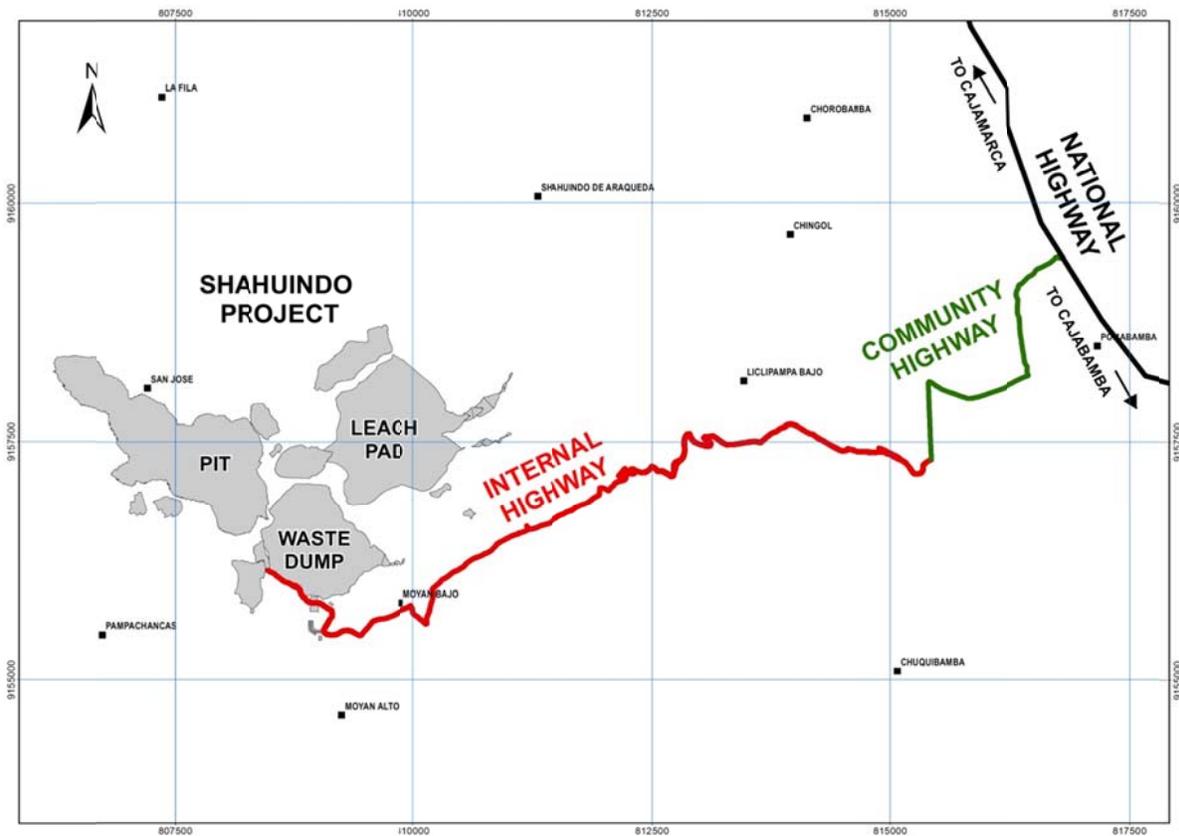
Figure 18.1-1   Mine Access Road

18.1.2 Power Supply

The startup power supply will be with generators supplying 1.2MW. Permanent power supply for Phase 2 operations will be from the National Commercial Grid. The total long-term power requirement is calculated to be 7.4MW.

The temporary power demand for Phase 1 will be supplied by three small diesel generators for loads near the process plant (800Kw); warehouse, camp and offices (350kw); and at the maintenance workshops (250kW). When permanent power is available in Oct 2017, the small generators will be replaced by one 1.8MW diesel generator as a back-up power source for the site.

The Shahuindo substation will connect to the national grid in 2017 at 220kV, distributed on site at 23kV and further stepped down to 4160V, 460V, 220V and 110V. The substation is located at 9152654N 806437E, 4.9 kilometers from the mine and 6.5 kilometers from the process plant.

For Phase 2, power for crushing, agglomeration and ore stacking will be supplied from the process plant substation via 22.9 kV electric overhead line to a secondary distribution system of three small motor control centers located close to the crushing plant, overland conveyors and mobile stacking system.

An internal 23 kV line from the plant to the camp (passing through the crusher/conveyor area) will be installed in 2016 to carry energy from the plant to the workshops and camps. The flow will be reverse when connection to the grid is made in 2017, with power coming from the substation feeding the camps, workshops crusher/agglomeration/conveyor system and then the plant.

18.1.3 Water Supply

Total fresh water consumption for the Phase 1 project will average 10.5 L/s in the dry season with a maximum of 12.7 L/s. This consumption rate, with the use of raincoats, will increase to an average of 33.6 L/s in the dry season and an average of 33.9 L/s (maximum 50.2 L/s) during Phase 2.

Total project water supply will be sourced from an 18,000 m^3 collection pond of run-off water (3 L/s) and a water borehole source located 300m west of Shahuindo pit (25 L/s). The balance of the required flow will come from pit dewatering (15L/s) which will be pumped at the beginning of year two of mine operations, with water stored in the major events pond during the wet season. There is an option to develop a second water well on one of the high flow hydrogeological test holes.

Fresh water for the process plant and leaching will gravity flow from the collection pond to the PLS pond via a 150mm diameter by 3.2 kilometers long HDPE pipeline.

Acquisition of a 75 m^3/day potable water plant is planned in 2016 for drinking and cooking water.

For fire water, an exclusive fire water reserve of 200 m^3 will be stored in the bottom half of the process water tank. Additional water trucks will be rented locally for the three temporary small generators in case of a fire emergency.

18.1.4 Sewage System

There are currently two sewage treatment plants of 40 m^3/day capacity each at the mine site. One is located next to the construction camp and the second located next to the new operations camp. Sludge volume generated in both treatment plants are collected and utilized locally for compost production with the treated water recycled back to the process plant. The plant from the construction camp will be relocated to the new camp in early 2017.

A third sewage treatment unit of 40 m^3/day will be installed in 2016 for the process plant and electrical maintenance areas.

18.1.5 Solid Waste Disposal

Solid waste will be disposed fully in compliance of local regulations. There are currently two waste transfer facilities; one of which is a hazardous material storage / hazardous waste transfer station.

Solid waste will be disposed of in a solid waste landfill off site. Hazardous materials not permitted to be disposed of in a landfill will be transported to the appropriate facilities.

Specific hazardous waste such as used oil, and batteries must disposed of by a Specialized Solid and Dangerous Waste service provider. A certified transport and disposal company will collect all waste to transport offsite for final disposal.

18.2 Project Buildings

The Shahuindo mine buildings include administration offices, mine warehouse, maintenance shop, explosive magazine, construction camp and permanent camp, kitchen & dining facilities, fuel storage, security buildings, and medical center.

18.2.1 Truck Shop

The mining fleet for Phase 1 consists of 21 Volvo 8x4 40-tonne trucks, two Cat 374 excavators, two D-8 dozers and a grader. The truck shop for Phase 1 is designed with a semi-open arrangement to include repair bays for small trucks, ancillary equipment, light vehicles, wash and welding areas.

For Phase 2, the mining fleet will be 90-tonne dump trucks (Cat 777 or equivalent) with corresponding loading and ancillary equipment. This fleet will have a total capacity for 36,000 tonnes per day. A permanent truck shop will be built in the second half of 2017 to accommodate and service the larger equipment.

18.2.2 Explosive Magazine

The explosive magazine has one emulsion storage silo installed for the Phase 1 start up. In 2016 this will be increased to two silos and then four silos in Phase 2 (year 2018).

Explosives will be delivered by supplier trucks to the site. Each silo has a 60-tonne capacity and is equipped with a pneumatic system for unloading. The silos are configured to have drive-through loading for the Mobile Manufacturing Unit (MMU) truck that will be used to deliver the product to the drill holes. Blending and mixing of the emulsion with the gasifying agent will be accomplished inside of the MMU truck.

Two additional storage magazines are included: one powder magazine for storage of boosters, detonation cord, and accessories used to initiate the blasting; and one magazine to store blasting caps. Each of these magazines is located in the explosives storage area near the ANFO/Emulsion silos west of the open pit, separated from the bulk explosives by earthen berms as per regulation.

18.2.3 Warehouse and Process Maintenance

The warehouse storage area and a covered maintenance work shop area are presently available for Phase 1. The infrastructure will be expanded for Phase 2.

18.2.4 Fuel Stations

The main diesel storage facility in Phase 1 consists of two project owned 60,000 gallon storage tanks. This facility is complete with fuel dispensing systems. In the first half of 2018, two additional tanks will be installed to achieve a total site storage capacity of 240,000 gallons which is enough fuel to operate the site for 18 days at full mining capacity.

There are two additional tanks - one 1,000 gallon diesel storage tank located in the process plant area to supply diesel fuel for the elution boiler, carbon regeneration kiln and the refining furnace; and a second tank of 8,000 gallons dedicated to the emergency generator.

Fuel will be delivered to the mine site via the supplier tanker trucks. All storage tanks will be placed in a 110% capacity concrete containment to assure no fuel is leaked to the environment.

18.2.5 Offices

Administration buildings/offices are already in place at the construction camp and includes water and power supply along with sewage facilities. This facility will be relocated near the new permanent camp in early 2016.

18.2.6 Construction and Operations Camps

The Shahuindo mine has an existing camp (Sulliden exploration camp) on site with single and multi-room layouts that currently house 500 people. The existing camp has been expanded for use as a construction camp. The expansion included ten modular tent-style housing units each able to accommodate 32 workers, as well as one module with 64 beds for staff workers.

Modular bathroom/shower units are equipped with toilets, urinals and showers for each tent including the staff module. The associated sewage treatment system is able to treat the amount of waste generated.

The new operations camp is being arranged for up to 800 people near the clinic, dining room and offices. It consists of four new barracks and six refurbished barracks relocated from the construction camp.

The majority of the work force is local and are transported by bus from Cajabamba and surrounding villages.

18.2.7 Dining Facilities

Temporary dining facilities are currently present on site to cater for approximately 1,000 workers and construction personnel. A permanent cooking and dining facility will be built in 2016.

18.3 Miscellaneous Site Services

18.3.1 Laboratory

Chemical assays for full support to the Shahuindo operation will be provided by the La Arena assay laboratory operated by a third party lab, CERTIMIN (certified ISO 9001). The La Arena facility has the equipment and technical capability to conduct the recommended metallurgical column tests (permeability tests) during the course of operations at Shahuindo.

For liquid samples such as PLS, barren solution and other solutions used at the refinery, there will be a temporary satellite lab for gold, silver, cyanide concentration and lime quality control.

Doré samples will be preliminary assayed at the La Arena laboratory and later in Lima at an external lab.

18.3.2 Security

Access to the facility will be limited to two main gates to access process and camp areas. Approximately 2 kilometers of fencing is already installed primarily for safety and security reasons. The entrance to the project is currently manned 24 hours a day 7 days a week for identification control, random checks, drug and alcohol monitoring and vehicle check-in/out.

18.3.3 Medical Center/Clinic

A medical center and ambulance are already present at the construction camp, but will be relocated next to the new operations camp. Emergency medical staff on site include one physician, one paramedic, one nurse and one driver/rescue person.

In the event high level medical intervention is needed, the ambulance is equipped and prepared for emergency transport to either Cajabamba Hospital (40 kilometers) or Cajamarca Hospital (100 kilometers).

18.3.4 Communications

The infrastructure for radio, telephone and internet communications between Lima, the La Arena mine and the Shahuindo mine is currently in service.

A recent upgrade was made to the system connecting the construction camp to the surrounding facilities such as the process plant, new operations camp, future crushing & agglomeration plant, Cajabamba and Cajamarca City. The existing data room and control center will be relocated from the construction camp to the new permanent camp.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Metal Contracts

The Shahuindo mine will produce gold in the form of doré bars. The weight of the doré bars and preliminary assays are used to calculate gold and silver content and the overall value of each shipment.

Several internationally recognized precious metal refineries have expressed interest in refining gold and silver from Shahuindo's production. The initial production will be refined at Metalor Technologies S.A., (Metalor) refinery in Marin, Switzerland. Metalor is currently used to refine the Company's La Arena production. Required due diligence for refining Shahuindo's production by the refinery is underway. Once sustainable production levels are achieved, alternative refining arrangements may be explored.

Consistent with the Company's other doré production, once doré bars are delivered to Metalor's vault in Lima, Metalor will credit 95% of the estimated gold content in the Shahuindo gold bars to the Company's pool account. The remaining gold and silver content are credited to the account of Shahuindo SAC when the final assays have been agreed with the refinery.

Several of the large international bullion banks have expressed interest in purchasing the Shahuindo production. Production will be tendered to the banks on a monthly basis to ensure market pricing and timely cash collection.

The Company anticipates typical shipping and refining costs to be approximately USD 4.50 per ounce of gold refined, based on the historical experience at Tahoe's La Arena mine.

19.2 Mining Alliance

Shahuindo has entered into a mining alliance with STRACON GyM, a prominent mining contractor in Peru. The mining alliance is based on a philosophy of 'best for project' decision making and run by a board or leadership team made up of three representatives from Shahuindo SAC and three representatives from STRACON Gym. The scope of the alliance includes all civil construction and all mining operations including associated indirect support activities. STRACON GyM provides the mining fleet equipment to Shahuindo SAC.

The materials, services, pay roll and equipment used for the in scope activities of the alliance are variously paid by Shahuindo SAC, or STRACON GyM, whichever is determined to be best for the project. STRACON GyM is compensated by reimbursement of their costs and a percent fee on all in-scope costs and is eligible for an incentive bonus at the end of each year of 10% of all fees, conditional on safety, productivity and efficiency targets being met.

The Shahuindo mining alliance is very similar to the successful mining alliance currently operating at La Arena. It offers reduced capital costs to Shahuindo, significant flexibility in LOM planning and fleet requirements, significant 'know how' in civil construction, mining and fleet management and significant reduction of risk to achieving the annual mine production plan.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

The environmental and social aspects of the Shahuindo Project are summarized in this chapter. Environmental studies, laws and regulations, permitting, preliminary closure plan, and social impacts are discussed.

20.1 Environmental Management Plan

Tahoe currently has an established comprehensive Environmental Management Plan that is based on North American practices and regulations. The operating plan that will be implemented at Shahuindo will include Tahoe's mandate that the Shahuindo mine meet or exceed the Company's Environmental Management Plan. The Company's environmental management plan includes regularly and systematic monitoring of:

- Air quality
- Surface Water Quality
- Groundwater Quality
- Stream Sediment Geochemistry
- Blast Vibration
- Noise Levels
- Waste Rock Geochemistry (ARD monitoring)
- Waste Disposal Practices
- Reagent Handling and Storage
- Reclamation and Reforestation Progress

20.2 Environmental Studies

20.2.1 Environmental Impact Statement

The Shahuindo mine is operating under an initial Environmental Impact Statement (EIA, Estudio de Impacto Ambiental) approved in 2013. The EIA was prepared according to Ministry of Energy and Mines (MEM) requirements and complies with Peruvian regulations.

Baseline studies conducted for the EIA included all physical, biological and social aspects related to the construction and operation of the Phase 1 project.

Baseline studies included:

- Meteorology and Climate

- Air Quality

- Noise and Vibration

- Geomorphology

- Geology

- Soils and Land Use

- Hydrology and Hydrogeology

- Sediment Geochemistry

- Flora and Fauna

- Hydrobiology

- Archaeology

- Landscape

- Traffic

- Environmental Liabilities

The Shahuindo EIA determined that the project will have some impacts on the environment as a result of normal construction and operation activities, although with the implementation of the designed mitigation measures, the environment will recover during the years following closure. The Company has committed to insuring suitable water quality for five caserios (villages) downstream of the mine during construction and operations.

20.2.2 Geochemical Characterization

Shahuindo SAC is performing a Geochemical Characterization Study to better understand rock material geochemistry and the water quality associated with the exposure to material extracted during operations. This study will support the establishment of geochemical criteria for future component design and water management through quantitative modelling.

Activities performed include:

- Analysis of the geochemical background information;

- Geochemical sampling plan;

- Development of geochemical assay program;

- Analysis and interpretation of geochemical assays results;

- Definition of Geo Environmental Units (GEU); and

- Pit block model and mine plan assessment for quantification of GEU

20.2.2.1   Analysis of Geochemical Background Information

Background geochemical data includes results from humidity cell tests conducted by KCA for the EIA (Defilippi, *et. al.*, 2012), geochemical analyses of exploration drill core, and the project geological and geochemical databases.   Dominant lithologies and alteration were identified and assessed and their relative sulfur contents evaluated. Dominant lithologies were determined to be siltstone, sandstone, breccia and intrusive rocks. Predominant alteration assemblages noted were phyllic (quartz-sericite), argillic and silicic. Approximately 50% of the material within the pit has a sulfur content less than 0.1%; approximately 15% of the material within the pit has elevated (>1%) sulfur content.

20.2.2.2   Geochemical Characterization

Based on analysis of the baseline data, further sampling and analytical programs were undertaken to better characterize the rock geochemistry, including a statistical analysis of sulfur content of the material within the pit. Thirty-seven (37) core samples, representing the primary rock and alteration types were collected and analyzed; the results of which are summarized in Table 20.2-1.

Table 20.2-1   Sulfur Analysis

| Lithology | Total Sulfur Content | | | | | | | | | | |
| | <0.1% | | | 0.1% - 0.5% | | | 0.5% - 1.0% | | 1.0% - 5.0% | | >5.0% | |
	PH	AR	SI	PH	AR	SI	PH	AR	PH	AR	PH	AA
Siltstone	3	1	-	1	-	1	1	-	2	1	2	1
Sandstone	1	1	2	1	1	1	-	1	1	-	1	-
Intrusive	1	1	-	1	1	-	1	-	1	-	1	-
Breccia	1	-	1	1	-	-	-	-	1	-	-	-
Quaternary	1	1	-	1	-	-	-	-	-	-	-	-
Sample Total	7	4	3	5	2	2	2	1	5	1	4	1

Note: PH: phyllic alteration / AR: argillic alteration / SI: silicic alteration

Completed rock characterization studies include mineralogical studies (microscopy and petrographic studies), Acid-Base Accounting (ABA) static analysis and paste pH analysis, total rock chemistry (WRA), sequential extraction (seven stage) analysis, and humidity cells tests. Mineralogical studies and humidity cell tests and were performed on ten of the 37 core samples. Selection of the samples was based on their further utility in the hydro-geochemical modeling.

ABA results showed acid generation potential for samples with greater than 0.1% sulfur content. Paste pH results corroborated the ABA results and showed increasing acid generation potential with increasing sulfur content. ABA analyses by KCA (Defilippi, *et. al.*, 2012) determined the spent ore is potentially acid-neutralizing. The ABA results, corroborated by the paste pH tests, suggest the neutralization potential of the spent ore outweighed the acid generating potential *i.e.*, net neutralizing).

Sequential extraction analyses showed sulfur present as both primary and secondary sulfides. Total iron present in sulfidic material averaged about 3% (pyrite and/or chalcopyrite). Relevant amounts of iron were also found in the oxide stage (magnetite, hematite or goethite) and a minor fraction was found as silicates (likely associated with biotite). Total copper content was reported around 80 ppm, mainly associated with sulfides (chalcopyrite, chalcocite or covellite). Lead content associated with both sulfides and oxides was below 400 ppm.

Ten humidity cell tests, each with 20 week duration, were completed. Weekly leachate analyses from humidity cells generally showed lower pH values (<2.5) for samples with higher sulfur content, with pH decreasing through cycle advance for all cells. A high correlation between sulfate and sulfur content was verified. It was observed that in leachate from samples with less sulfur content, sulfate concentration diminished quickly to one order of magnitude with respect to cycle 0.

Using the maximum permissible limit (LMP, as determined by statute DS 010-2010 MINAM) as a reference, excess iron and zinc were verified in cells with more than 1% sulfur content. Excess copper, cadmium and arsenic were shown until cycle 10. While there is no LMP for magnesium and aluminum, high concentration of aluminum in high sulfur content (>1%) samples and high magnesium concentrations in some low sulfur content samples (0.1-0.3%) were found.

20.2.2.3   Definition of Geo Environmental Units (GEU)

Results of the geochemical characterization test work were used to classify ore and waste material into Geo Environmental Units (GEU). These GEUs define material based on its acid generation and metal leaching potential (Arcos, 2013).

Formulae developed for the GEU classification form the basis for the modelling of the deleterious elements, including:

- NAG (non-acid generation): <0.1% S
- PAG-Low ML (potential acid generation and low potential of metal leaching): 0.1 < S% < 0.3
- PAG-Mod ML (potential acid generation and medium potential of metal leaching): 0.3 < S% < 1
- PAG-High ML (potential acid generation and high potential of metal leaching): >1% S

The main factor that correlated to metal leaching and acid generation of the Shahuindo material was sulfur content.

20.2.2.4 Quantification of GEU material

The GEU criteria were integrated into the resource block model and mine schedule to determine the distribution of GEUs extracted (ore and waste) over the life of mine; the results of which are presented in Figure 20.2-1.
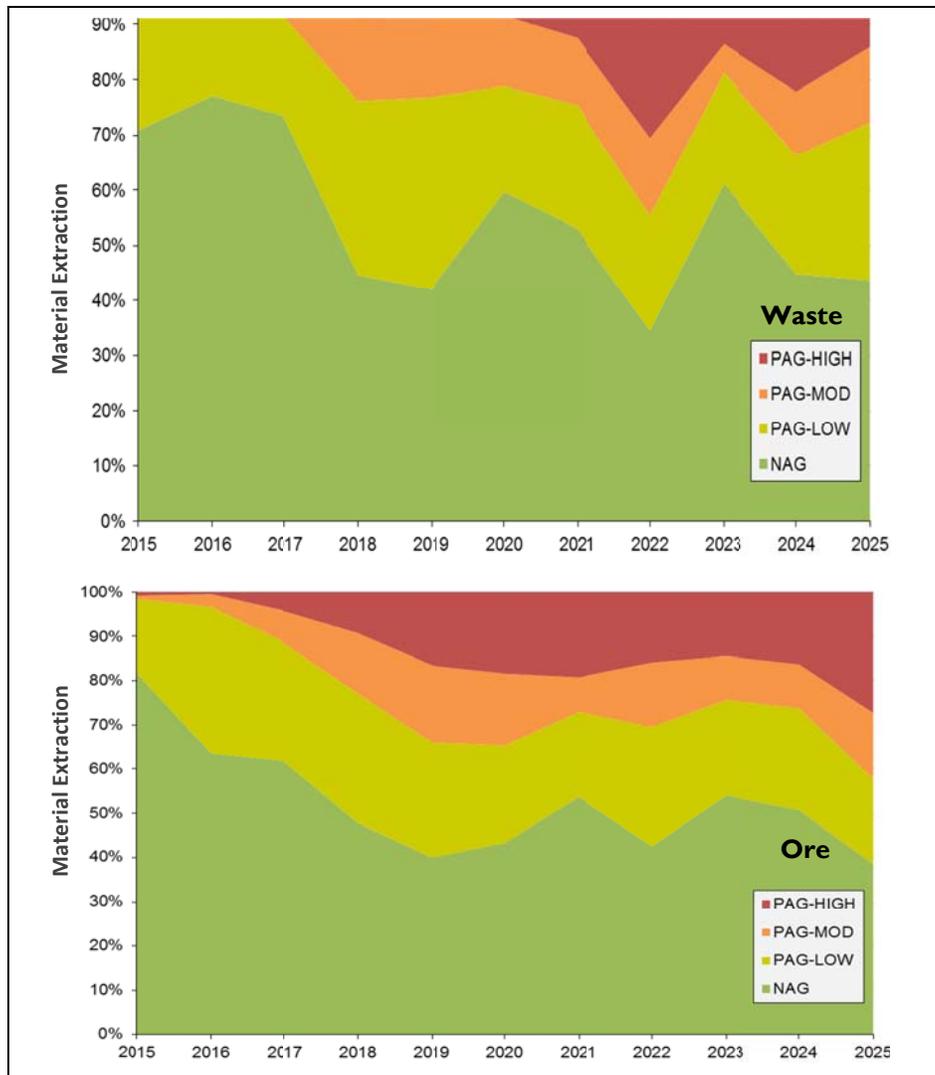
Figure 20.2-1   Annual Distribution of Extracted GEU

The analysis shows that during the first two years of the mine life (2016-2017), about 75% of waste rock will be NAG; 20% will be PAG-LOW; and the combined PAG-MED & PAG-HIGH will be less than 5%. Modeling suggests during the first years of production, effluent from the waste dump will not exceed

permissible limits for metal content, even at 5 pH. Over the remainder of the mine life (2018-2025), the amount of NAG waste rock extracted will reduce to 40-50% and the PAG-MOD & PAG-HIGH will increase up to 25%. Higher metal concentrations in the waste dump effluent during this time would be expected. The Company is actively investigating appropriate ARD prevention and mitigation/treatment solutions to be implemented prior to Phase 2 operations.

20.2.3 Site Monitoring

Shahuindo SAC conducts ongoing environmental monitoring programs as committed to in the EIA environmental management plan that includes air quality (particulate matter and GHG), surface water and groundwater quality, sedimentation and sediment geochemistry, noise levels, and sound pressure (vibration). Frequency of reporting to the authority (Ministry of Energy and Mines, OEFA and Ministry of Agriculture) is quarterly and biannual in the case of biological monitoring.

20.2.4 Closure Plan

The Shahuindo mine has been designed to meet and comply with the environmental standards and legislated closure requirements of Peru. In accordance with Peruvian requirements, company standards, and accepted industry practices, the development, operation, and reclamation plans are designed to:

- Assure long-term physical and geochemical stability;
- Comply with national environmental regulations;
- Recover areas affected by project components;
- Mitigate pre-existing risk conditions;
- Assure that post-closure use of the altered area and its aesthetics are compatible with the environment;
- Execute a Community Relations Plan during the operation, closure and post-closure stages; and
- Complete a Progressive Closure and Final Closure of the operation, such that post-closure conditions get to a state of passive care.

The closure plan includes the following actions to be taken:

- During operations:

  ➢ Concurrent reclamation activities will be initiated as soon as portions of the project are no longer required (Progressive Closure). Progressive closure activities will be completed whenever possible, especially the covering of waste dumps to minimize infiltration from storm events.

    Closure activities will take place whenever possible on all facilities that will no longer be used in the final stage of the mine life; this will occur during the rinsing of the leach pads.

- At closure:

  - The open pit will remain as a permanent feature, with berms installed and roads closed to prevent public access. Any potential acid generating material on the pit floor will be covered with non-acid generating waste. It is expected that the pit will fill with water and form a pit lake. Overflow will be treated in a remediation plant and/or by a passive treatment facility.

  - The heap leach will be rinsed to remove trace cyanide to adequate discharge levels. The heap will undergo minor re-contouring, followed by placement of a low-permeability soil cap and revegetated. The low-permeability soil cap will be designed to prevent infiltration from precipitation, but any leach effluent which occurs will be discharged to the pit lake for treatment if necessary.

  - The solution ponds will be closed following procedures established in the approved closure plan. These procedures include de-compaction, re-contouring of containment embankments and infilling of ponds back to the adjacent land level using inert material from borrow areas followed by a natural covering (cap) of low-permeability soil, then re-vegetated.

  - The water storage ponds will be left intact for future use by the local population or reclaimed depending on community desires and/or requirements. Side slopes and other affected areas will be re-vegetated according to the approved closure plan.

  - Exposed leach pad berms will be re-graded with the exposed liner either removed or buried.

  - The processing plant and support facilities will be removed and the land re-vegetated.

  - Concrete pads and foundations will be demolished and foundations removed.

  - Operating surfaces will be reclaimed and re-vegetated.

  - The waste rock facility will be constructed in lifts at a natural angle of repose. With setbacks between lifts, the overall waste dump slopes will be approximately 2.5(H):1.0(V) and will remain at this gradient at closure. A cap consisting of low-permeability soil will be placed over the facility and re-vegetated.

  - Road accesses to hazardous areas (open pits, waste dump and leach pad) will be close, with access restricted to allow essential monitoring and maintenance work to be carried out. Where practical, roads will be turned over to the local communities for future use.

  - A program of physical and geochemical monitoring will take place during the active closure and post-closure periods.

20.2.5 Existing Environmental Conditions

There are surface disturbances associated with informal mining activity within the project area, primarily in the Algamarca anticline and La Chilca Baja areas. The Company has an expectation that a certain level of environmental remediation will need to be conducted at these sites.

With a perceived exhaustion of easily-mineable mineralization in the Algamarca anticline area, there may be a risk of informal miners moving to exploit other areas within Tahoe's concessions. An inventory of existing environmental conditions within the concessions was submitted as part of the EIA process. At the effective date of this report, Shahuindo SAC is in negotiation with the informal miners at Algamarca to terminate their mining activities and start other legal and productive activities in the area. Shahuindo SAC has committed to support this transition over the next 6 months.

The informal miners at La Chilca were vacated in August 2015. Shahuindo SAC now has full access and possession of the area and is performing an environmental base line study to evaluate the conditions.

20.3   Permits

At the effective date of this report, the majority of permits required for Phase 1 operations have been approved, with the outstanding permits in the final stages of approval. The following discussion summarizes the required permits for both exploration and operation activities and the approval status of the permits.

20.3.1 Exploration

The Ministry of Energy and Mines granted several approvals for Sulliden to conduct their exploration activitiesk between 2003 and 2014. These permits were transferred to Shahuindo SAC upon their acquisition by Rio Alto in 2014. The primary permits include:

- Impact Study Semi Detailed (EIAsd) – approved by R.D. 229-2010-MEM/AAM on 15 July 2010;

- First modification of Impact Study Semi Detailed (EIAsd) approved by R.D. 083-2010-MEM/AAM on 15 March 2011;

- Second modification of Impact Study Semi Detailed (EIAsd) approved by R.D. 096-2012-MEM/AAM on 27 March 2012; and

- Technical Supporting report of Impact Study Semi Detailed (ITS-EIAsd) approved by R.D. 146-2014-MEM-DGAAM on 26 March 2014.

20.3.2 Mine Construction and Operations

20.3.2.1   Environmental Impact Assessment (EIA)

Shahuindo SAC conducts construction activities under an (EIA) approved by R.D. 339-2013-MEM/AAM on 10 September 2013; the First Technical Sustentatory Report of Environmental Impact Assessment (ITS-1-EIA) approved by R.D. 613-2014-MEM-DGAAM on 18 December 2014 and the Second Technical Sustentatory Report of Environmental Impact Assessment (ITS-2-EIA) approved by R.D. 265-2015-MEM-DGAAM on 7 July 2015, The EIA documented the baseline environmental and socioeconomic environment of the Shahuindo project and surrounding area and provided an analysis of the project's potential impacts to air quality, sound levels, surface and groundwater, soils, flora and fauna, archaeological resources and socioeconomic measures, and an Environmental Management Plan which included prevention and mitigation measures.

The approval of the EIA allowed the company to proceed with the permit applications required for construction and operation of the Shahuindo mine, in accordance with Peruvian regulations. Examples of these permits include water use license, archaeological permits, beneficiation concession (process plant operations), and implementation of the mine plan (Mining Permit), among others.

The currently approved EIA is applicable for construction and Phase 1 operations. Shahuindo SAC has submitted an EIA modification (MEIA) to cover the expanded Phase 2 project. The MEIA is under review by the Peruvian authorities with receipt of approval expected in 2016.

20.3.2.2   Certificate for the Inexistence of Archaeological Remains (CIRA).

During 2003 and 2007, Sulliden performed archaeological surveys in the project area in support of environmental permits necessary for them to conduct exploration activities. The surveys indicated the presence of sites considered to have potential archaeological significance. Sulliden undertook an Archaeological Evaluation (PEA is the Spanish acronym) to determine whether a *Certificate for the Inexistence of Archaeological Remains* could be granted. This certificate is a pre-requisite for the Ministry of Energy and Mining and is necessary for the start-up of operations.

Shahuindo SAC continued archaeological investigations within the project and has received the following permits:

- *Certificate for the Inexistence of Archaeological Remains* approved by CIRA No 173-2013 on 11 July 2013 and issued by the Ministry of Culture.

- *Certificate for the Inexistence of Archaeological Remains* corresponding to four potential areas of interest indicated in CIRA No 173-2013 approved by CIRA No 232-2015 on 15 September 2015 and issued by the Ministry of Culture.

- *Archaeological Monitoring Plan* (PMA) was approved by R.D. No 125-2015-DDCCAJ/MC on 29 May 2015 and issued by the Ministry of Culture.

20.3.2.3   Mine Closure Plan

The Mine Closure Plan was approved by R.D No 132-2015-MEM-DGAAM on 10 March 2015 by the Ministry of Energy and Mines. This permit specifies that all components of the project will be closed in three gradual stages (progressive, final and post closure). It also includes the budget for the closure and the amount of guarantees to be paid for the closure bond.

20.3.2.4   Beneficiation Concession

On 25 November 2015, Shahuindo SAC received the Beneficiation Concession which authorized the operation of the processing plant and major processing components for Phase 1 operations. The license was issued by the Ministry of Energy and Mines by means of Resolution No. 2468-2015-MEM/DG - Water Usage Permits (process water).

20.3.2.5   Water Usage Permits

Shahuindo SAC was granted the Water Use license by Resolution No. 1157.2015-ANA-AAA.M on 12 November 2015, issued by the National Water Authority.

20.3.2.6   Mining Plan

On 27 November 2015, Shahuindo SAC received the license authorizing the start of activities for the development and commissioning of the Phase 1 project. Site inspection of the constructed components is scheduled for January 2015 with approvals for full operations expect to follow shortly. Commissioning activities are currently being conducted under a temporary commissioning permit.

20.3.2.7   Operation Permits

At the effective date of this report, Shahuindo SAC has obtained operations permits for fuel storage, reagent storage and use, explosive magazines, explosives handling and use, and power generation.

Resolution No. 3111190008604 approved on 11 November 2015 and issued by the Superintendencia Nacional de Administracion Tributaria (SUNAT) approved reagent storage and use. Resolution No. 02446-2015-SUCAMEC/GEPP approved on 10 November 2015 was issued by the Superintendencia Nacional de Control de Servicios de Seguridad, Armas, Municiones y Explosivos de Uso Civil (SUCAMEC) approving explosives handling and use.

20.3.2.8   Permanent Power Concession

This permit is required for the connection to the transnational power grid and substation operations. Approval was received from the Comité de Operación Económica del Sistema Interconectado Nacional (COES) after acceptance of required environmental and social studies and construction plans.

20.3.2.9   Easements and Right-of-Way

Easements to accommodate subsidiary power lines to the project site, access roads, and roads internal to the project.

20.3.2.10   District and Provincial Municipality Licenses

District and/or Provincial licenses may be required for exploration, development, construction, and operating activities.

20.4   Social Impact

20.4.1 Location of the Study Area

Shahuindo is located in the department of Cajamarca, in the province of Cajabamba and the district of Cachachi, (Figure 20.4-1). The project area is characterized by varied topography with several areas heavily dissected by rivers and streams. Altitudes range from 2,500m to 3,350m above sea level.

20.4.2 Social Baseline Study

According to the ESIA Modification, the Area of Influence has been further divided into Direct and Indirect Areas of Influence . The Direct Area of Influence (Figure 20.4-1) is defined as those people and or places which may directly experience either positive or negative social effects from the Shahuindo mine to varying degrees. Fourteen villages have been identified within the Direct Area of Influence and include Algamarca, La Fila, Liclipampa Alto, Pauquilla, Rosahuayta, San Jose, Araqueda, Quillishpampa, Moyan Alto, Moyan Bajo, Pampachancas, Shahuindo, Liclipampa Bajo and Siguis. Within the Direct Area of Influence, the four communities of San Jose, Shahuindo, Moyan Alto and Moyan Bajo will experience some levels of resettlement.   A detailed Resettlement Action Plan, structured in accordance with International Finance Corporation (IFC) Performance Standard 5 for Land Acquisition and Involuntary Resettlement has been prepared to mitigate the effects from resettlement and land acquisition.

The Indirect Area of Influence is composed of people and or places that may experience positive social impacts and reduced negative social impacts compared to those located in the Direct Area of Influence. Communities within the Indirect Area of Influence include those living in the districts of Cachachi and Condebamba.
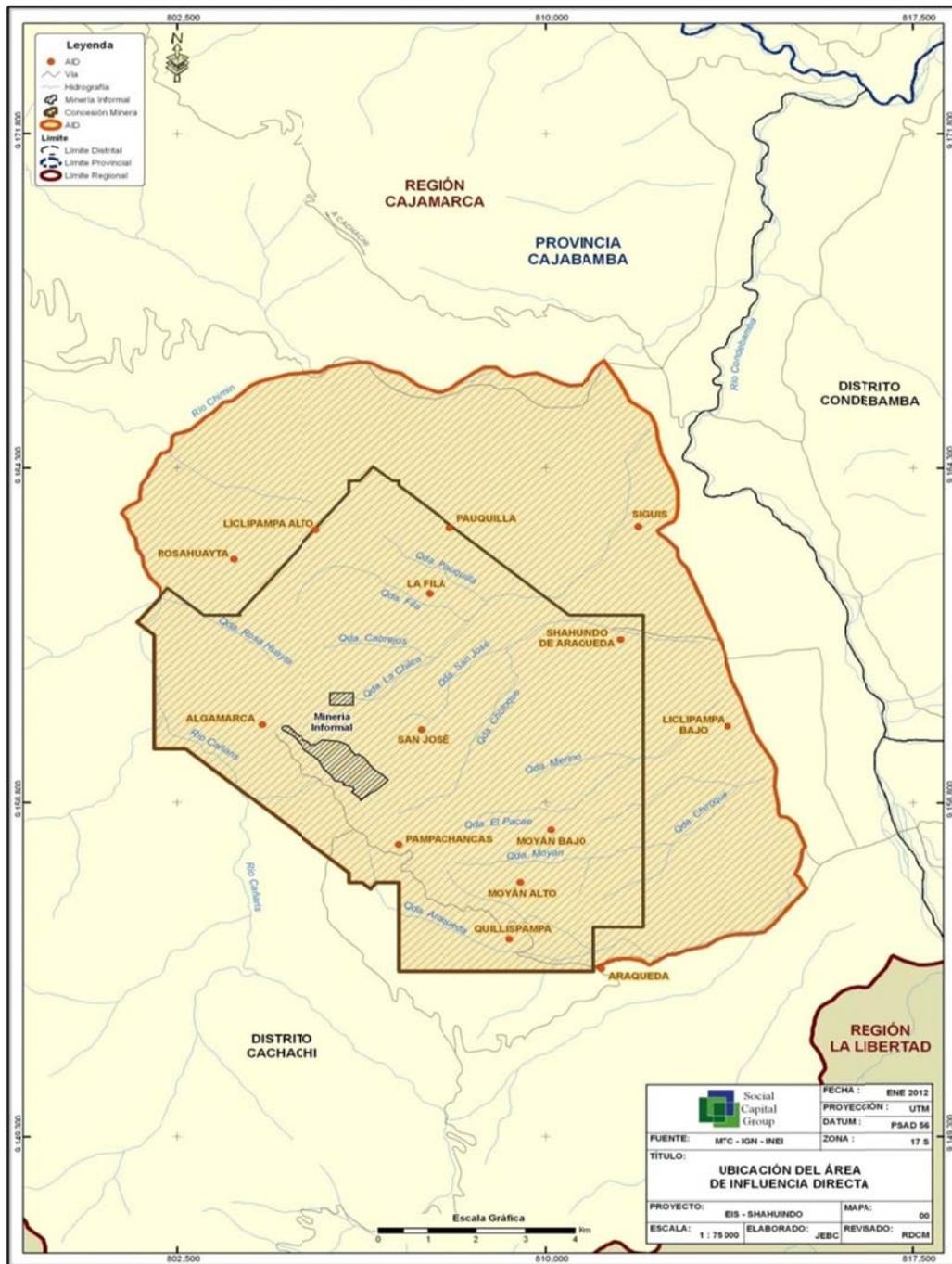
Figure 20.4-1   Location of Direct Influence Area

20.4.3 Public Consultation and Engagement Plan

Shahuindo SAC is committed to proactive and transparent engagement with the communities, public institutions and government agencies located within the project's area of influence. The company's public consultation and engagement plan is built around the following commitments:

- Compliance with Peruvian legislation regarding community consultation and engagement;

- Implementation of a consultation and communication plan in an open, honest and transparent manner with neighboring populations and interest groups to create an atmosphere of mutual trust;

- Actions based on comprehensive understanding of the social, economic and cultural context in which the mine is developed;

- Contributions to strengthening local social organizations through participation in the development of the mine and in the activities that may affect them; and

- Engagement with local communities throughout the baseline study stage of the ESIA through a participatory monitoring program and the extension of this program throughout the construction, operation and closure stages.

To ensure that the Company communicates effectively, Shahuindo SAC has established the following methods of communication and access to information:

- Two public information offices, one at the mine site and one in the town of Cajabamba;

- The development and distribution of project information;

- Use of local radio to provide information about progress of the mine;

- Guided tours of the project site; and

- Informative workshops.

20.4.4 Community Development Program

The Company recognizes its role and responsibility to contribute to local sustainable development by utilizing its ability to mobilize technical and financial resources to support the implementation of initiatives for local development during the construction and operational stages of the mine.

The objectives of the community development program include:

- Strengthening the local productive capacities to generate opportunities for alternative employment for the population in the Direct Area of Influence;

- Strengthen technical capacities of the stakeholders in the areas of influence;

- Providing capacity building initiatives to local organizations and leaders to better manage local development initiatives in a transparent and participatory manner; and

- Creating and consolidating channels of coordination and dialogue between the local communities and the mine.

The Company will focus its sustainable development initiatives in the following areas:

- <u>Local Employment and Purchase of Local Goods and Services.</u> Training for local people within the Direct Area of Influence in multifaceted disciplines and the purchase of goods and services from local providers.

- <u>Economic Production</u>. Improvement to local productive capacities and infrastructure (agriculture, livestock and fish farming) and the sustainable management of forest resources.

- <u>Small Business Development and Entrepreneurship</u>. Promotion of entrepreneurship and small business programs.

- <u>Local Social Development</u>. Work with national, regional and local levels of government to implement projects aimed at training to improve general employability, education and health.

- <u>Strengthening Local Institutions</u>. Strengthen the capacity of local stakeholders, such as local governments and grassroots organizations, among others.

21.0 CAPITAL AND OPERATING COSTS

All capital and operating costs used in this study are in 2015 US dollars. Where costs will be incurred in Peruvian Nuevo Soles, an average conversion rate of 3.10 Soles per US dollar was used. Sales tax (Impuesto General A Las Ventas, IGV) is not included in the capital or operating cost estimates.

21.1 Capital Cost Estimate

21.1.1 List of Areas

Project capital and sustaining capital for the Shahuindo project are divided into three primary areas:

- Mine – includes leach pad and waste dump construction;

- Plant – includes crushing, conveying and agglomeration equipment and infrastructure; and

- Other – includes site infrastructure, roads, land acquisition and certain social projects.

21.1.2 Basis of Estimate

Capital costs for the Shahuindo project have been derived from construction contracts currently in place, contractor and vendor quotes, costs incurred for similar projects at the La Arena mine and engineering first principles. Mine construction capital costs (leach pads and waste dumps) are based on contractual rates with the on-site mining contractor. All mining equipment is assumed owned by the contractor and rented based on annual contractual rates. These costs have been included in the operating expenses. Plant equipment for all areas was estimated, quoted, or purchased in 2015 dollars. No growth allowance has been included.

The cost associated with reclamation and closure is included in the cash flow model beginning in 2021 through 2031. Mine operating costs include the cost of constructing waste piles and heap leach piles to slopes that facilitate regrading at mine closure.

21.1.3 Capital Estimate

Total capital for the project is estimated to be $320.3 million dollars beginning on 01 January 2016; including construction capital of $179.6 million and $140.7 million in sustaining capital. Anticipated life of mine capital expenditures by year are shown in Table 21.1-2.

Table 21.1-1   Estimated Capital Expenditure Summary by Year (US$M)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Project Capital										
Mining	27.45	-	-	-	-	-	-	-	-	-
Process Plant	18.94	86.63	-	-	-	-	-	-	-	-
Other	28.54	11.81	6.26	-	-	-	-	-	-	-
Sustaining Capital										
Mining	-	28.14	21.89	17.05	17.7	13.76	10.05	14.67	4.33	2.71
Process Plant & Other	0.34	4.3	2.79	1.24	0.38	0.37	0.17	0.27	0.26	0.25
Total Capital	**75.27**	**130.88**	**30.94**	**18.29**	**18.08**	**14.13**	**10.23**	**14.94**	**4.59**	**2.97**

Major component capital expenditures are summarized in Table 21.1-2.

Table 21.1-2   Major Component Capital Expenditures – Life of Mine

Component	US$M
Leach Pad Construction (incl. raincoats)	118.56
Waste Dump Construction	32.24
Haul Roads	0.66
Process Plant (incl. stockpile construction)	28.30
Crushing / Agglomeration / Conveyance	84.05
Water Supply	0.18
Camps, Offices, Communication Systems	7.86
Workshops	6.26
Substation	11.46
Access Roads / Bridge Upgrade	11.41
Engineering & Environmental Studies	3.46
Land Purchases, Social Projects, Other Capital	15.88
Total Capital Expenditures	**320.31**

21.2   Operating Cost Estimate

Operating costs were determined by quotes received from the mining contractor, STRACON GyM, actual operating costs incurred at the La Arena mine, engineering first principles and management experience at similar operations. Labor costs are included using a project specific staffing plan. The average cash operating cost over the life of the mine is estimated to be $9.28 per ore tonne.

The life of mine operating costs summarized in Table 21.2-1 are the projected costs for ore defined as oxide ore for leaching.

Table 21.2-1   Operating Cost Summary

Operating Cost	Value
Mining Cost ($/tonne mined)	$1.91
Mining Cost ($/ ore tonne mined)	$4.50
Process Plant Operating Cost ($/tonne processed)[4]	$2.55
General Administration ($/tonne processed)	$2.23

Operating costs were determined by year, with power consumption and operating costs increasing in 2018 as a result of transitioning from run of mine heap leaching to utilizing a crush, convey and agglomeration system.

The operating costs presented are based upon the assumption that all major mining equipment is leased throughout the mine life. Maintenance of leased equipment has been included.

Operating costs are presented without any added contingency or growth allowances.

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[4] Includes $1.42 /tonne ore for crushing and agglomeration beginning in 2018

22.0 ECONOMIC ANALYSIS

The financial evaluation presents the determination of the Net Present Value (NPV), and payback period (time in years to recapture the capital investment), and the Internal Rate of Return (IRR) for the project. Annual cash flow projections were estimated over the life of the mine based on the estimates of capital expenditures, production costs and sales revenue. The sales revenue is based on the production of a gold/silver doré. The estimates of capital expenditures and site production costs have been developed specifically for this project and have been presented in earlier sections of this report.

22.1 Mine Production Statistics

Mine production is reported as ore and overburden from the mining operation. The annual production figures were obtained from the mine plan as reported in Section 16.8 of this report.

The life of mine ore quantities and grades are presented in Table 22.1-1.

Table 22.1-1   Life of Mine Production

	Tonnes (000s)	Gold Grade (g/t)	Silver Grade (g/t)	Contained Gold Ounces (000s)	Contained Silver Ounces (000s)
Oxide Ore	110,890	0.53	6.86	1,898	24,465
Waste	149,855	-	-	-	-

22.2 Process Plant Production Statistics

The oxide ore will be processed using heap leaching technology to produce gold/silver doré. Metallurgical recoveries for gold and silver are:

Gold   79% LOM Recovery (73% 2016-2017 / 80% 2018+)

Silver   12% LOM Recovery (7% 2016-2017 / 12% 2018+)

The estimated life of mine metal production (*i.e.*, metal in doré) is estimated to be 1.504 million ounces of gold and 2.834 million ounces of silver.

22.3   Capital Expenditures

22.3.1 Project Capital

The financial indicators have been determined with 100% equity financing of the initial capital.   Any acquisition costs or expenditures prior to 01 January 2016 have been treated as 'sunk' costs and have not been included in this analysis

The total project capital carried in the financial model for new construction is expended over a three year period.   The cash flow will be expended in the year of first production and certain costs carried over into future years for major projects including crushing and agglomeration, substation and a maintenance shop.   The project capital is presented in Table 22.3-1.

Table 22.3-1   Project Capital

Project Capital	US$M
Mining	27.5
Process Plant	105.6
Other	46.6
Total	**179.70**

22.3.2 Sustaining Capital

Capital cost expenditures during the production period are included in the financial analysis under Section 21.1.3.   The total life of mine sustaining capital is estimated to be $140.7 million (Table 22.3-2). This capital will be expended over a ten year period.

Table 22.3-2   Sustaining Capital

Sustaining Capital	US$M
Mining	130.3
Process Plant & Other	10.4
Total	**140.7**

22.3.3 Working Capital

A ten day delay of receipt of revenue from sales is used for accounts receivable.   A delay of payment for accounts payable of 30 days is also incorporated into the financial model. All of the working capital is recaptured at the end of the mine life and the final value of these accounts is $0.

22.4   Salvage Value

No allowance has been made for salvage value of the capital equipment for this analysis.

22.5   Revenue

Annual revenue is determined by applying estimated gold and silver prices to the annual payable metal estimated for each operating year. Escalating metal prices, as shown in Table 22.5-1, have been applied to the life of mine production without hedging. The revenue is the gross value of payable metals sold before refining and transportation charges.

Table 22.5-1   Gold and Silver Prices

Metal	2016	2017	2018	2019 - 2025	LOM Average
Gold $/troy ounce	$1,100	$1,200	$1,300	$1,400	$1,340
Silver $/troy ounce	$14.75	$17.25	$20.00	$23.50	$21.65

22.6   Shipping and Refining

The gold and silver doré will be shipped to a precious metal refinery with refining charges negotiable at the time of agreement. Costs are estimated at $4.50 per ounce of gold, similar to the refining contract in place at the La Arena mine. There are no refining charges for silver *per se*, as silver is used as a credit against doré treatment charges. Refining charges over the life of mine are estimated at $0.06 per tonne of ore. Refining terms used in the financial analysis are shown in Table 22.6-1.

Table 22.6-1   Gold and Silver Refining Terms

Doré Refining Terms	
Payable Gold	99.9%
Payable Silver	99.5%

22.7   Operating Costs

The average Cash Operating Cost over the life of the mine is estimated to be $9.28 per ore tonne. Cash Operating Cost includes mine operations, process plant operations and general administrative costs. Table 22.7-1 shows the estimated operating cost by area per tonne of ore placed on the leach pad.

Table 22.7-1   Life of Mine Operating Cost

Cash Operating Cost	$/ore tonne
Mine	$4.50
Process Plant	$2.55
General Administration	$2.23
Total Operating Cost	**$9.28**

22.8   Total Cash Cost

The average Total Cash Cost over the life of the mine is estimated to be $9.83 per ore tonne. Total Cash Cost consists of Operating Cost plus worker profit share and certain production taxes which are calculated at $0.55 per ore tonne.

22.8.1   Worker Profit Share and other production taxes

Mining companies in Peru are obliged to pay workers a participation of 8% on the net profits of the company (Shahunido SAC) up to a maximum of 18 times base salary. The amount is permitted as a tax deduction in calculating corporate income tax. The Worker Profit Share and other production taxes are estimated at $60.6 million over the life of mine.

22.8.2   Reclamation and Closure

Non-cash accretion expense in the amount of $24.0 million over the life of mine has been included in the financial model and will impact net earnings. A cash flow estimate of $37.4 million for reclamation and closure was included in the working capital adjustment.

22.8.3   Depreciation

Depreciation is calculated using the units of production method and may not correlate to the depreciation taken for tax purposes. The project capital and sustaining capital used a unit of production method based on gold ounces produced.

22.8.4   Taxation

Income tax is calculated at rates substantially enacted and applied to the net taxable income, which is computed by subtracting the allowable deductions and carry forward losses from revenues.

The financial model includes corporate income taxes at a 28% (2015-2016), 27% (2017-2018) and 26% (2019-end of mine life) rate on taxable income.

The Company is also subject to a Special Mining Tax (SMT) and Modified Mining Royalty (MMR), as discussed in detail in Section 4.6. The SMT is applied on operating income based on a sliding scale with progressive marginal rates ranging from 2% to 8.4%. The MMR is applied based on a sliding scale ranging from 1% to 12% against operating income but may not be lower than 1% of the company's sales revenues. The SMT and MMR have been included in Income tax for the purposes of this study.

Cash income taxes paid are estimated to be $196.2 million over the life of mine.

Deferred income taxes are estimated based on the difference between depreciation taken for accounting and tax purposes. The substantially enacted tax rate is then applied to the difference to create the deferred tax expense (benefit). The deferred tax benefit is estimated at $12.7 million over the mine life.

22.9 Project Financing

The project was evaluated on an unleveraged and un-inflated basis.

22.10 Net Income After Tax

Net Income after Tax amounts to $338.6 million.

22.11 NPV and IRR

The economic analysis indicates that the project has an Internal Rate of Return (IRR) of 40.6% with a payback period of 4.1 years after taxes. See Table 22.11-1.

Table 22.11-1 Economic Indicators (US$M)

Economic Indicators	Before Taxes	After Taxes
NPV @ 5%	$462,203	$318,863
IRR	-	40.6%
Payback	-	4.1 years

22.12 Sensitivities

Table 22.12-1 through Table 22.12-4 compare the base case project after tax financial indicators with the financial indicators when different variables are applied. Variables included in the sensitivity analysis include changes to metal prices, operating cost, capital expenditures, and metallurgical recovery. Changes in metal prices have the most impact on the project economics, followed by changes to operating cost.

Table 22.12-1   NPV Sensitivity Analysis on Metal Prices

Change in Metal Prices	NPV @ 0%	NPV @ 5%	NPV @ 10%	IRR%	Payback
+20%	$723,045	$508,619	$362,690	67.7%	3.3
+10%	$597,309	$413,960	$289,289	53.1%	3.6
Base Case	$471,200	$318,863	$215,413	40.6%	4.1
-10%	$342,701	$221,333	$139,143	29.0%	4.8
-20%	$202,022	$113,741	$54,457	17.1%	6.1

Table 22.12-2   NPV Sensitivity Analysis on Operating Cost

Change in Operating Cost	NPV @ 0%	NPV @ 5%	NPV @ 10%	IRR%	Payback
+20%	$348,725	$225,158	$141,508	29.0%	4.9
+10%	$411,022	$273,026	$179,417	34.8%	4.4
Base Case	$471,200	$318,863	$215,413	40.6%	4.1
-10%	$530,361	$363,820	$250,632	46.7%	3.8
-20%	$588,728	$407,955	$285,031	53.1%	3.6

Table 22.12-3   NPV Sensitivity Analysis on Total Capital

Change in Capital	NPV @ 0%	NPV @ 5%	NPV @ 10%	IRR%	Payback
+20%	$409,200	$263,661	$165,625	29.1%	4.8
+10%	$440,142	$291,213	$190,477	34.2%	4.5
Base Case	$471,200	$318,863	$215,413	40.6%	4.1
-10%	$502,354	$346,596	$240,419	49.0%	3.7
-20%	$533,592	$374,233	$265,224	60.2%	3.4

Table 22.12-4   Sensitivity Analysis on Metal Recovery

Change in Recovery	NPV @ 0%	NPV @ 5%	NPV @ 10%	IRR%	Payback
+2%	$508,599	$347,156	$237,466	44.2%	3.9
+1%	$489,905	$333,014	$226,443	42.4%	4.0
Base Case	$471,200	$318,863	$215,413	40.6%	4.1
-1%	$452,456	$304,682	$204,358	38.9%	4.2
-2%	$433,662	$290,459	$193,265	37.2%	4.3

22.13 Shahuindo Financial Model

The life of mine base case assumptions for the Shahuindo financial model are summarized in Table 22.13-1. The detailed life of mine financial model is included in Table 22.13-2.

Table 22.13-1   LOM Base Case Summary - Assumptions

Production Statistics	Base Case
Mine	
Ore (ktonnes)	110,890
Gold Grade (g/t)	0.53
Silver Grade (g/t)	6.86
Contained Gold (kozs)	1,900
Contained Silver (kozs)	24,470
Waste (ktonnes)	149,855
Total Tonnes Mined (ktonnes)	260,745
Processing	
Ore Placed on Pad (ktonnes)	110,890
Gold Production (kozs recovered)	1,504
Silver Production (kozs recovered)	2,834
Gold Recovery	79%
Silver Recovery	12%
Revenues, Capital Cost & Operating Cost	
Revenues ($000)	$2,110,507
Project Capital ($000)	$179,629
Sustaining Capital ($000)	$140,676
Mining Cost ($/tonne mined)	$1.91
Mining Cost ($/ore tonne mined)	$4.50
Process Plant Operating Cost ($/tonne processed)	$2.55
General Administration ($/tonne processed)	$2.23
Treatment & Transportation Charges ($/tonne processed)	$0.06
Total Operating Cost ($/tonne processed)	$9.28
Economic Indicators before Taxes	
NPV @ 0% ($000)	$667,385
NPV @ 5% ($000)	$462,203
NPV @ 10% ($000)	$322,836
Economic Indicators after Taxes	
NPV @ 0% ($000)	$471,200
NPV @ 5% ($000)	$318,863
NPV @ 10% ($000)	$215,413
IRR	40.6%
Payback (yrs)	4.1

Table 22.13-2   Shahuindo Life of Mine Financial Model

Base Case	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Mining Operations																		
Ore																		
Beginning Inventory (kt)	**110,890**	110,890	105,133	99,531	89,242	75,830	62,791	50,439	34,374	19,969	7,236	-	-	-	-	-	-	-
Mined (kt)	**110,890**	5,756	5,602	10,289	13,412	13,039	12,352	16,066	14,405	12,732	7,236	-	-	-	-	-	-	-
Ending Inventory (kt)	**-**	105,133	99,531	89,242	75,830	62,791	50,439	34,374	19,969	7,236	-	-	-	-	-	-	-	-
Gold Grade (g/t)	**0.53**	0.68	0.54	0.64	0.48	0.48	0.51	0.50	0.59	0.52	0.49	-	-	-	-	-	-	-
Silver Grade (g/t)	**6.86**	5.95	5.73	7.24	6.45	7.05	6.47	7.79	7.16	6.36	7.30	-	-	-	-	-	-	-
Contained Gold (kozs)	**1,900**	126	97	212	206	200	201	258	273	215	113	-	-	-	-	-	-	-
Contained Silver (kozs)	**24,470**	1,102	1,032	2,395	2,779	2,954	2,568	4,023	3,314	2,606	1,698	-	-	-	-	-	-	-
Waste																		
Beginning Inventory (kt)	**149,855**	149,855	144,901	140,789	118,954	100,059	80,813	60,921	44,525	28,603	11,106	-	-	-	-	-	-	-
Mined (kt)	**149,855**	4,954	4,113	21,835	18,895	19,246	19,893	16,395	15,922	17,497	11,106	-	-	-	-	-	-	-
Ending Inventory (kt)	**-**	144,901	140,789	118,954	100,059	80,813	60,921	44,525	28,603	11,106	-	-	-	-	-	-	-	-
Total Material Mined (kt)	**260,745**	10,710	9,715	32,124	32,306	32,285	32,245	32,461	30,327	30,230	18,342	-	-	-	-	-	-	-
Waste to Ore Ratio	**1.35**	0.86	0.73	2.12	1.41	1.48	1.61	1.02	1.11	1.37	1.53	-	-	-	-	-	-	-
Leach Pad Operations																		
Beginning Ore Inventory (kt)	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ore Placed on Pad	**110,890**	4,446	6,022	11,179	13,000	13,039	12,352	13,140	13,140	13,140	11,431	-	-	-	-	-	-	-
Mined Ore - Processed (kt)	**110,890**	4,446	6,022	11,179	13,000	13,039	12,352	13,140	13,140	13,140	11,431	-	-	-	-	-	-	-
Ending Ore Inventory		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold Grade (g/t)	**0.53**	0.79	0.52	0.60	0.48	0.48	0.51	0.55	0.62	0.52	0.41	-	-	-	-	-	-	-
Silver Grade (g/t)	**6.86**	6.59	5.63	6.84	6.56	7.05	6.47	8.52	7.44	6.30	6.28	-	-	-	-	-	-	-
Contained Gold (kozs)	**1,898**	113	101	216	202	200	201	233	262	218	151	-	-	-	-	-	-	-
Contained Silver (kozs)	**24,465**	942	1,090	2,458	2,741	2,954	2,568	3,599	3,143	2,663	2,308	-	-	-	-	-	-	-
Dore																		
Recovery Gold (%)	**79%**	73.00%	73.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	-	-	-	-	-	-	-
Recovery Silver (%)	**12%**	7.00%	7.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%	-	-	-	-	-	-	-
Recovered Gold (kozs)	**1,504**	83	74	173	162	160	161	187	210	175	121	-	-	-	-	-	-	-
Recovered Silver (kozs)	**2,834**	66	76	295	329	354	308	432	377	320	277	-	-	-	-	-	-	-
Payable Metals																		
Dore																		
Payable Gold (kozs)	**1,502**	83	74	173	162	160	161	186	209	174	121	-	-	-	-	-	-	-
Payable Silver (kozs)	**2,823**	68	76	293	327	353	307	430	375	318	276	-	-	-	-	-	-	-

Table 22.13-2 (continued) Shahuindo Life of Mine Financial Model

Base Case		Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Income Statement ($000)																			
Gold ($/oz)	$	1,362.17	1,100.00	1,200.00	1,300.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00	1,400.00
Silver ($/oz)	$	22.76	14.75	17.25	20.00	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50	23.50
Revenues																			
Dore - Au	$	2,046,275	90,758	88,794	224,564	226,231	223,841	224,945	260,846	293,070	244,246	168,978	-	-	-	-	-	-	-
Dore - Ag	$	64,232	1,005	1,310	5,869	7,690	8,288	7,205	10,098	8,819	7,473	6,475	-	-	-	-	-	-	-
Total Revenues	$	2,110,507	91,763	90,104	230,433	233,921	232,129	232,150	270,944	301,889	251,720	175,454	-	-	-	-	-	-	-
Operating Cost																			
Mining	$	498,640	28,239	21,127	61,726	70,227	59,381	54,372	64,858	60,469	52,960	25,282	-	-	-	-	-	-	-
Process Plant	$	282,711	7,820	9,637	29,638	34,408	34,509	32,714	34,774	34,558	34,558	30,098	-	-	-	-	-	-	-
General Administration	$	247,358	23,399	18,949	24,939	24,550	25,306	26,778	28,524	27,754	27,902	19,257	-	-	-	-	-	-	-
Treatment & Refining Charges	$	6,760	371	333	777	727	719	723	838	942	785	543	-	-	-	-	-	-	-
Total Operating Cost	$	1,035,469	59,828	50,046	117,080	129,912	119,915	114,587	128,994	123,722	116,204	75,180	-	-	-	-	-	-	
Production Taxes & Profit Share	$	60,842	3,056	1,535	6,828	5,783	6,058	6,406	9,087	11,277	7,416	3,397	0	-	-	-	-	-	
Reclamation Accretion (non-cash)	$	24,038	2,577	1,386	1,455	1,528	1,604	1,684	1,769	1,848	1,940	2,028	2,050	1,251	1,145	893	758	122	
Total Production Cost	$	1,120,349	65,461	52,967	125,363	137,222	127,578	122,677	139,850	136,848	125,560	80,605	2,050	1,251	1,145	893	758	122	-
Operating Income	$	990,158	26,302	37,137	105,070	96,699	104,551	109,473	131,094	165,042	126,159	94,849	(2,050)	(1,251)	(1,145)	(893)	(758)	(122)	-
Project Capital Depreciation	$	260,431	5,571	9,161	30,668	29,713	29,426	29,559	33,875	37,749	31,879	22,830	-	-	-	-	-	-	-
Sustaining Capital Depreciation	$	140,676	1,355	2,169	7,383	8,853	10,376	14,114	17,166	19,287	16,074	11,120	-	-	-	-	-	-	-
Total Depreciation	$	401,107	6,926	11,330	38,051	38,566	39,802	43,672	51,041	57,036	47,953	33,950	-	-	-	-	-	-	-
Net Income After Depreciation	$	589,050	19,375	25,807	67,019	58,133	64,749	65,801	80,053	108,006	78,206	60,898	(2,050)	(1,251)	(1,145)	(893)	(758)	(122)	-
Tax Loss Carry Forward	$	(66,985)	(19,375)	(15,870)	(15,870)	(15,870)	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxable Income	$	522,065	-	9,937	51,149	42,263	64,749	65,801	80,053	108,006	78,206	60,898	(2,050)	(1,251)	(1,145)	(893)	(758)	(122)	-
Current Income Taxes	$	196,186	2,198	2,492	20,106	15,499	21,072	22,450	32,926	41,732	26,278	11,432	-	-	-	-	-	-	-
Deferred Income Taxes	$	(12,740)	720	2,479	(3,598)	(1,281)	(926)	(1,808)	(3,506)	(4,918)	(2,099)	2,197	-	-	-	-	-	-	-
Total Taxes	$	183,445	2,918	4,971	16,508	14,218	20,146	20,642	29,420	36,814	24,179	13,628	-	-	-	-	-	-	-
Net Income After Taxes	$	338,620	(2,918)	4,966	34,641	28,045	44,603	45,158	50,633	71,192	54,027	47,270	(2,050)	(1,251)	(1,145)	(893)	(758)	(122)	-

Table 22.13-2 (continued)   Shahuindo Life of Mine Financial Model

Base Case	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Cash Flow																		
Operating Income	$ 990,158	$ 26,302	$ 37,137	$ 105,070	$ 96,699	$ 104,551	$ 109,473	$ 131,094	$ 165,042	$ 126,159	$ 94,849	$ (2,050)	$ (1,251)	$ (1,145)	$ (893)	$ (758)	$ (122)	$ -
Working Capital																		
Accounts Payable (30 days)		$ 4,261	$ (804)	$ 5,510	$ 1,055	$ (822)	$ (438)	$ 1,196	$ (444)	$ (607)	$ (3,279)	$ (197.62)	$ (5,872)	$ 170	$ (165)	$ 587	$ (657)	$ (150)
IGV		$ (5,320)	$ (16,693)	$ 14,380	$ 15,688	$ 4,978	$ (1,227)	$ (388)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Closure Costs (Cash)		$ -	$ -	$ -	$ -	$ -	$ (3)	$ (146)	$ (15)	$ (146)	$ (1,277)	$ (14,224)	$ (2,607)	$ (4,678)	$ (2,672)	$ (9,818)	$ (1,829)	$ -
Total Working Capital		(1,059)	(17,497)	19,889	16,742	4,156	(1,668)	662	(459)	(753)	(4,556)	(14,422)	(8,479)	(4,508)	(2,837)	(9,231)	(2,486)	(150)
Capital Expenditures																		
Project Capital																		
Mine	$ 27,452	$ 27,452	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Process Plant	$ 105,568	$ 18,943	$ 86,625	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other	$ 46,609	$ 28,537	$ 11,811	$ 6,261	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sustaining Capital																		
Mining	$ 130,305	$ -	$ 28,140	$ 21,890	$ 17,045	$ 17,696	$ 13,762	$ 10,052	$ 14,674	$ 4,332	$ 2,713	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Process Plant & Other	$ 10,372	$ 338	$ 4,301	$ 2,787	$ 1,240	$ 382	$ 368	$ 174	$ 266	$ 262	$ 254	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Capital Expenditures	$ 320,306	$ 75,270	$ 130,877	$ 30,937	$ 18,285	$ 18,078	$ 14,130	$ 10,226	$ 14,941	$ 4,594	$ 2,967	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cash Flow before Taxes	$ 667,235	$ (47,451)	$ (109,852)	$ 95,477	$ 96,684	$ 92,233	$ 95,359	$ 123,299	$ 151,491	$ 122,752	$ 89,354	$ (14,422)	$ (8,479)	$ (4,508)	$ (2,837)	$ (9,231)	$ (2,486)	$ (150)
Taxes																		
Current Income Taxes	$ 196,186	$ 2,198	$ 2,492	$ 20,106	$ 15,499	$ 21,072	$ 22,450	$ 32,926	$ 41,732	$ 26,278	$ 11,432	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cash Flow after Taxes	$ 471,049	$ (49,649)	$ (112,344)	$ 75,371	$ 81,185	$ 71,161	$ 72,909	$ 90,373	$ 109,759	$ 96,474	$ 77,923	$ (14,422)	$ (8,479)	$ (4,508)	$ (2,837)	$ (9,231)	$ (2,486)	$ (150)
Cummulative Cash Flow after Taxes		$ (49,649)	$ (161,993)	$ (86,622)	$ (5,436)	$ 65,725	$ 138,633	$ 229,006	$ 338,765	$ 435,239	$ 513,161	$ 498,740	$ 490,261	$ 485,753	$ 482,916	$ 473,685	$ 471,200	471,049
Payback (Years)		1	1	1	1	0	-	-	-	-	-	-	-	-	-	-	-	-

Economic Indicators before Taxes			
NPV @ 0%	0%	$	667,385
NPV @ 5%	5%	$	462,203
NPV @ 10%	10%	$	322,836

Economic Indicators after Taxes			
NPV @ 0%	0%	$	471,200
NPV @ 5%	5%	$	318,863
NPV @ 10%	10%	$	215,413

IRR	40.6%	
Payback	4.1 years	

	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Cash Cost per Ounce	$686.35	$749.24	$678.71	$682.65	$791.34	$735.32	$707.48	$686.22	$602.16	$665.08	$596.77
Operating Cost per Tonne Ore	110,890	5,756	5,602	10,289	13,412	13,039	12,352	16,066	14,405	12,732	7,236
Mining	$4.50	$4.91	$3.77	$6.00	$5.24	$4.55	$4.40	$4.04	$4.20	$4.16	$3.49
Process Plant	$2.55	$1.36	$1.72	$2.88	$2.57	$2.65	$2.65	$2.16	$2.40	$2.71	$4.16
General Administration	$2.23	$4.06	$3.38	$2.42	$1.83	$1.94	$2.17	$1.78	$1.93	$2.19	$2.66
Refining	$0.06	$0.06	$0.06	$0.08	$0.05	$0.06	$0.06	$0.05	$0.07	$0.06	$0.08
Total	$9.28	$10.33	$8.87	$11.30	$9.63	$9.14	$9.22	$7.98	$8.52	$9.07	$10.31
Mining Cost per Tonne Mined	$ 1.91	$ 2.64	$ 2.17	$ 1.92	$ 2.17	$ 1.84	$ 1.69	$ 2.00	$ 1.99	$ 1.75	$ 1.38

23.0 ADJACENT PROPERTIES

Other than prospects in the area previously exploited by informal miners (as discussed in this report), the Company is not aware of any mineral properties adjacent to the Shahuindo Project.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Construction and Mining Activities through 01 January 2016

24.1.1 Construction

Infrastructure and facilities construction to support mining operations at Shahuindo began in March 2015. Construction activity was sufficiently advanced to support plant commissioning and the commencement of Phase 1 mining operations in the fourth quarter of 2015.

24.1.1.1   Access Road

A new access road to the Shahuindo mine site was constructed to accommodate trucks and equipment required for project construction. This involved construction of a new two kilometer road to link the existing access to the preexisting road. The preexisting road was regraded and widened to enable tanker trucks and low-bed trucks access to the site with materials and equipment. The access road was completed in May 2015, which significantly reduced travel time to the project site and impact to the townships of Chuquibamba, Araqueda & Pampachancas regarding dust, interaction with pedestrians, schools, animals and local vehicle traffic.

Figure 24.1-1   Access Road Improvements

24.1.1.2   Water Storage Pond

A water storage pond with a capacity of 18,000 m^3 was completed in June 2015 to capture and store water from a local spring for use during plant commissioning and operation. A water well will be drilled and constructed in early 2016 to provide a constant source of inflow to the pond. Water from this pond will be distributed to the plant, camp facilities and other areas of the operation.

Figure 24.1-2   Water Storage Pond

24.1.1.3   Haul Roads

Two haul roads to facilitate the commencement of mining operations were completed in the second quarter of 2015. The first haul road connects the Phase 1 starter pit to the ROM leach pad (Pad 1); the second road was built to move mine waste from the starter pit to the base of the future second leach pad, where the foundation for the pad is currently under construction. These two haul roads were built to accommodate the start of mining operations, with each road having a 12 meter operational width and maximum grade of 12%. These roads will be widened in 2017 to accommodate the larger fleet required for Phase 2 operations; the steeper sections at the bottom of the valley will have been eliminated, reducing the maximum grade to 10%.

Figure 24.1-3   Haul Road Construction

24.1.1.4   Camp and Office Facilities

Construction of new camp and office facilities to support Phase 1 operations began in June 2015. The existing exploration camp will be decommissioned, with some of the buildings relocated to the new camp and others provided to the local San Jose community. The location of the new camp, close to the project entrance, also serves to reduce the interaction between mine traffic and local community traffic.

The new camp includes five workforce personnel modules with 16 rooms each, one staff personnel module with 16 rooms and two barracks modules for security staff. Construction of these facilities was completed in late November 2015, with electricity, water, and sewage facilities installed. An office building, kitchen and dining facilities, medical center and training room will be constructed in early 2016.

Figure 24.1-4   New Camp under Construction

Figure 24.1-5   Sewage Treatment Plant under Construction

A second phase of camp construction is planned for 2017 to accommodate the increased workforce required for Phase 2 operations scheduled to begin in 2018.

24.1.1.5   Explosive Magazine

The explosives magazine facility includes one 60 tonne emulsion silo and two containers for explosives and accessories suitable for commissioning activities. An additional two silos will be in added in 2106, with another three silos erected in 2017 prior to Phase 2 operations.

Figure 24.1-6   Emulsion Silo
(MMU truck in foreground; explosives container in background)

24.1.1.6   Temporary Workshop

A temporary relocatable workshop was constructed in the third quarter of 2015 to support construction activities and mining operations during the first two years of production. A more expansive permanent truck shop is planned for 2017 to support the larger equipment necessary for Phase 2 operations in 2018.

Figure 24.1-7   Temporary Workshop under Construction

24.1.1.7   Fuel Farm

Construction of the Phase 1 fuel farm facilities, consisting of two 60,000 gallon capacity tanks, was completed in the fourth quarter of 2015. Upon inspection and approval from MEM, the facility is expected to be operational in early 2016. Expansion of the fuel farm to 240,000 gallon capacity is scheduled for 2017.

Figure 24.1-8   Fuel Farm under Construction

24.1.1.8 Leach Pad 1A

The pilot leach pad (Pad 1A) was constructed in the second half of 2015. The pad has an area of 18 hectares and will accommodate approximately four million tonnes of ore; after which construction of the second ROM leach pad (Pad 2A) will be completed. The site was chosen based on the relative simplicity of construction (level ground) and proximity to the process plant and starter pit.

Figure 24.1-9   Leach Pad 1A under Construction

Figure 24.1-10 Leach Pad 1A completed with Collection Piping

Figure 24.1-11 Leach Pad 1A with Overliner Being Placed

24.1.1.9   Lime storage Shed

A lime storage shed with capacity of 500 tonnes was completed in November 2015. The structure is necessary to keep the lime dry during the rainy season and is a requirement for the storage of controlled substances in Peru. The lime storage shed was built adjacent to pad 1where the lime is mixed with the ore to maintain the cyanide solution at an optimal pH.

Figure 24.1-12 Lime Storage Shed

24.1.1.10 ADR Plant and PLS Pond

Process plant and pregnant leach solution (PLS) pond construction for the Phase 1 operation was completed and commissioned in December 2015. Ongoing work into 2016 includes the installation of additional carbon columns to increase the adsorption capacity to 24,000 tpd, with continuing expansion in 2017 to increase capacity to the Phase 2 production rate of 36,000 tpd.

Figure 24.1-13 ADR Plant

Figure 24.1-14 PLS Pond

Figure 24.1-15 ADR Plant and PLS Pond

24.1.1.11   Leach Pad 2B

The Phase 2 leach pad (pad 2B) is located in a valley to the south/southwest of the pad 1A. Approximately five million cubic meters of compacted fill will be placed as a foundation to insure the stability of the pad.   The foundation is being constructed using suitable material derived from construction activities and waste rock from the starter pit.   The foundation is scheduled for completion in mid-2017 to enable pad construction to be completed to receive ore from Phase 2 mining. A second PLS pond and storm event pond will be constructed downstream of the pad.

Figure 24.1-16 Leach Pad 2B Foundation and Sub-Drain Excavation

Figure 24.1-17 Leach Pad 2B Foundation Construction

24.1.2 Mine and Plant Commissioning

Mining of the starter pit commenced in early November 2015. At the end of December 2015, approximately 184,000 tonnes with an average grade of 1.05 g/t Au had been mined from the pit, with 164,000 of these tonnes placed on the ROM pad.

Commissioning of the Pad 1A irrigation system began in mid-December 2015, with process plant commissioning initiated in the second half of December 2015. The Shahuindo mine poured its initial doré containing 581 ounces of gold and 347 ounces of silver on 22 December 2015. All commissioning activities are proceeding on schedule and the Company anticipates reaching commercial production in the second quarter of 2016.
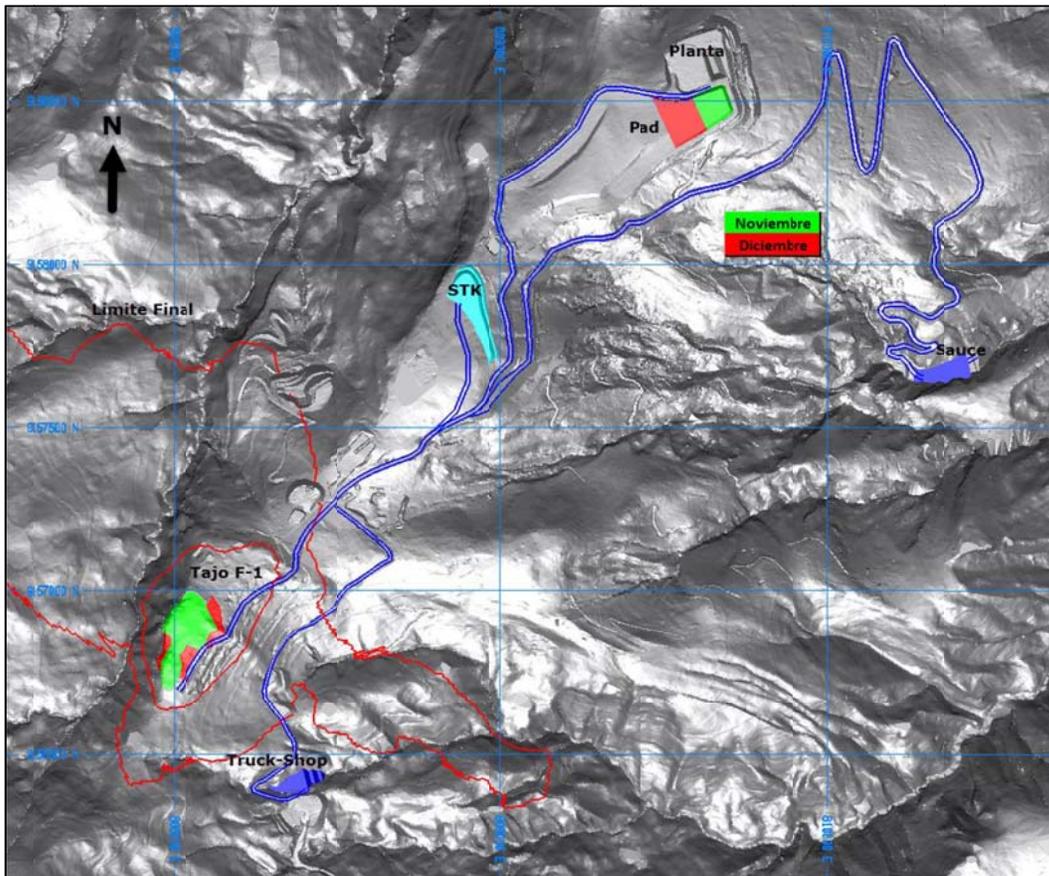
Figure 24.1-18 Schematic of Starter Pit, ROM Pad and Haul Roads

Figure 24.1-19 Overview of Starter Pit, ROM Pad and Haul Roads
(View to the NE)

Figure 24.1-20 Initial Drill Pattern – November 2015

Figure 24.1-21 Ore Place on Pad 1A – December 2015

Figure 24.1-22 Pad 1A Irrigation Commissioning – December 2015

24.2   Exploration Potential

Multiple exploration targets have been identified in the Shahuindo district based on surface mapping, rock-chip and soil surveys, geophysical surveys and drilling. These prospects include San Lorenzo, Choloque, Shahuindo Southeast Extension, El Sauce, La Chilca, Azules, Algamarca, Cantera and Malvas. The locations of the exploration targets are shown in Figure 24.2-1.
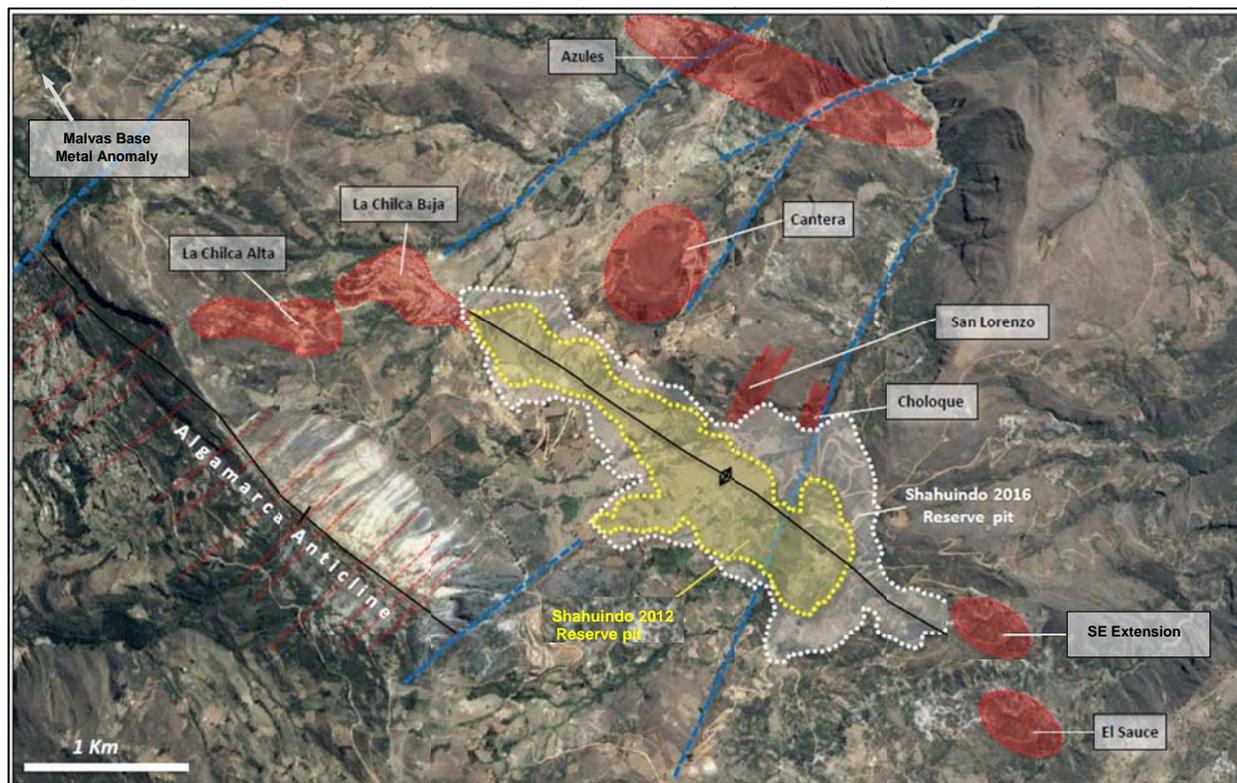
Figure 24.2-1   Major Exploration Targets around the Shahuindo Project

24.2.1   San Lorenzo and Choloque

The San Lorenzo and Choloque targets are situated to the northeast of the currently-defined pit. The prospects were identified by mapping and sampling of surface exposures of hydrothermal breccia and mineralized sandstone along sub-parallel northeast-trending structures which are interpreted to be a secondary control to mineralization at the Shahuindo deposit. Tahoe conducted additional mapping and sampling prior to the initiation of reconnaissance drilling in the second half of 2015.

Drilling at San Lorenzo in 2015 included two core holes (422m) and 24 RC holes (4,076m); drilling at Choloque included one core hole (300m) and four RC holes (1,066m). Select drill results from San Lorenzo and Choloque are presented in Table 24.2-1 and Table 24.2-2, respectively. A complete

tabulation of significant intercepts from Tahoe's 2015 drill program at San Lorenzo and Choloque is included in the Appendix. Figure 24.2-2 is a drill hole location map of the San Lorenzo and Choloque areas.

Table 24.2-1   San Lorenzo – Select Drill Results

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SHA-D15-019	156.4	167.1	10.7	5.3	0.93	1.87
including	*156.4*	*157.8*	*1.4*	*0.7*	*5.93*	*9.10*
SHA-D20-020	50.0	56.9	6.9	3.4	0.70	1.30
	113.9	117.2	3.3	1.7	4.30	6.00
including	*113.9*	*117.2*	*1.5*	*0.8*	*9.14*	*8.40*
	129.6	133.6	4.0	2.0	1.61	12.10
	142.5	153.0	10.5	5.3	0.96	5.54
SHA-R15-277	80.0	90.0	10.0	5.0	0.48	2.44
SHA-R15-279	12.0	50.0	38.0	19.0	0.58	6.05
	62.0	82.0	20.0	10.0	0.40	3.12
	120.0	138.0	18.0	9.0	0.69	7.17
	152.0	156.0	4.0	2.0	7.13	22.25
	180.0	212.0	32.0	16.0	0.51	3.87
including	*194.0*	*196.0*	*2.0*	*1.0*	*3.19*	*11.20*
SHA-R15-280	0	8.0	8.0	4.0	0.89	3.78
	28.0	38.0	10.0	5.0	0.34	3.42
SHA-R15-281	46.0	74.0	28.0	14.0	0.98	2.88
including	*60.0*	*62.0*	*2.0*	*1.0*	*9.13*	*6.50*
SHA-R15-282	16.0	58.0	42.0	21.0	0.45	11.02
SHA-R15-283	16.0	48.0	32.0	16.0	0.42	3.79
SHA-R15-284	24.0	70.0	46.0	23.0	1.11	3.36
including	*54.0*	*56.0*	*2.0*	*1.0*	*2.87*	*4.10*
including	*60.0*	*66.0*	*6.0*	*3.0*	*3.89*	*2.27*
SHA-R15-286	154.0	166.0	12.0	6.0	3.84	6.38
including	*160.0*	*164.0*	*4.0*	*2.0*	*10.97*	*15.10*
SHA-R15-345	86.0	92.0	6.0	3.0	1.04	9.33
SHA-R15-347	50.0	80.0	30.0	15.0	1.07	3.08
including	*52.0*	*54.0*	*2.0*	*1.0*	*2.82*	*2.20*
including	*74.0*	*78.0*	*4.0*	*2.0*	*2.74*	*6.60*
SHA-R15-348	6.0	72.0	66.0	33.0	2.62	27.49
including	*14.0*	*20.0*	*6.0*	*3.0*	*21.36*	*182.87*
	52.0	*54.0*	*2.0*	*1.0*	*3.71*	*34.40*
SHA-R15-349	0.0	34.0	34.0	17.0	0.61	6.94
SHA-R15-351	64.0	90.0	26.0	13.0	2.54	8.54
including	*68.0*	*76.0*	*8.0*	*4.0*	*4.64*	*19.73*
including	*86.0*	*90.0*	*4.0*	*2.0*	*3.19*	*3.75*

Table 24.2-2   Choloque – Select Drill Results

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SHA-R15-306	168.0	194.0	26.0	13.0	4.02	18.58
including	*172.0*	*178.0*	*6.0*	*3.0*	*14.55*	*48.70*
	224.0	234.0	10.0	5.0	8.42	102.22
including	*232.0*	*234.0*	*2.0*	*1.0*	*41.43*	*486.00*
SHA-R15-327	140.0	176.0	36.0	18.0	2.27	53.54
including	*150.0*	*152.0*	*2.0*	*1.0*	*26.91*	*344.00*
including	*160.0*	*164.0*	*4.0*	*2.0*	*4.02*	*83.70*
	244.0	260.0	16.0	8.0	2.89	98.84
including	*244.0*	*252.0*	*8.0*	*4.0*	*5.43*	*116.48*
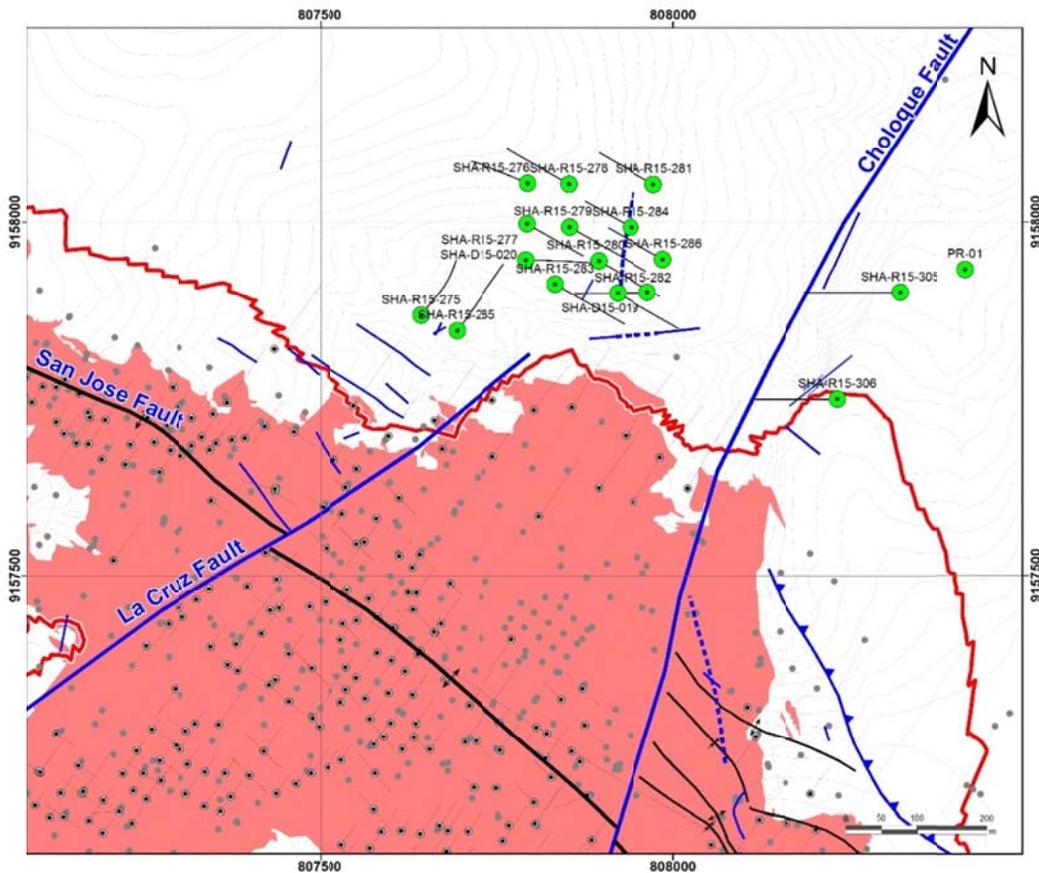
Figure 24.2-2   San Lorenzo and Choloque Drill Hole Location Map

note: map was created prior to the cessation of the 2015 drill program – all drill holes not shown

24.2.2 Shahuindo Southeast Extension and El Sauce

Condemnation drilling in 2015 identified two areas of mineralization in colluvium and bedrock sediments along the southeastern extension of the San Jose anticline. Mineralization at the Shahuindo Southeast Extension and El Sauce targets are outside of the current resource, but a portion of this mineralization will be mined and likely processed in 2016 prior to construction of the primary waste dump.

Condemnation drilling in 2015 included 19 core holes (3,631m) and 28 RC holes (2,814m). Additional drilling is planned for 2016 to further delineate the mineralization in these areas. Select drill results are presented in Tables 24.2-3 and 24.2-4. A complete tabulation of significant intercepts from the condemnation drilling at the Southeast Extension and El Sauce targets is included in the Appendix.

Table 24.2-3   Southeast Extension – Select Drill Results

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SHA-D15-001S	62.0	69.0	7.0	n/a	1.20	12.57
including	*67.2*	*69.0*	*1.8*	*n/a*	*3.48*	*4.70*
SHA-D15-003S	0.0	24.3	24.3	21.0	0.79	1.85
	42.0	50.0	8.0	n/a	0.35	4.15
SHA-D15-011S	167.0	200.2	33.2	n/a	0.42	2.55
SHA-D15-017S	12.7	32.2	19.5	n/a	0.70	10.88
including	*22.8*	*26.5*	*3.7*	*n/a*	*2.53*	*50.78*
SHA-D15-019S	47.5	58.2	10.7	n/a	1.00	8.73
including	*47.5*	*49.0*	*1.5*	*n/a*	*3.05*	*6.00*
SHA-R15-299	182.0	188.0	6.0	n/a	1.26	29.47
SHA-R15-304	6.0	22.0	16.0	9.2	0.37	0.24

Table 24.2-4   El Sauce – Select Drill Results

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SHA-R15-292	38.0	42.0	4.0	n/a	0.88	0.10
SHA-R15-293	*0.0*	*4.0*	*4.0*	*1.9*	*0.45*	*0.20*
SHA-R15-295	32.0	64.0	32.0	n/a	1.49	6.10
including	*32.0*	*38.0*	*6.0*	*n/a*	*5.73*	*25.33*
SHA-R15-330	22.0	38.0	16.0	n/a	0.40	5.55
SHA-R15-334	2.0	14.0	12.0	6.9	0.56	1.90
	46.0	58.0	12.0	n/a	0.50	1.13
SHA-R15-335	0.0	18.0	18.0	15.6	0.58	2.00
SHA-R15-336	12.0	26.0	14.0	n/a	0.56	1.63
	44.0	54.0	10.0	n/a	1.26	1.76
including	*48.0*	*50.0*	*2.0*	*n/a*	*3.45*	*3.10*

Table 24.2-4 (continued) El Sauce – Select Drill Intercepts

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SHA-R15-337	42.0	58.0	16.0	n/a	1.28	4.44
SHA-R15-338	0.0	12.0	12.0	10.5	0.50	2.43
	34.0	62.0	28.0	n/a	0.79	2.61
including	*36.0*	*38.0*	*2.0*	*n/a*	*3.24*	*9.90*
SHA-R15-339	10.0	24.0	14.0	n/a	0.46	2.23
SHA-R15-340	54.0	68.0	14.0	n/a	1.58	1.63
including	*56.0*	*60.0*	*4.0*	*n/a*	*4.48*	*1.50*
SHA-R15-341	16.0	22.0	6.0	n/a	0.51	0.97

24.2.3 La Chilca Baja Cu-Au porphyry

The La Chilca Baja target is a felsic intrusive with a surface expression approximately 200m in diameter located northwest of the Shahuindo resource. The intrusive has been pervasively altered to sericite with pyrite-chalcopyrite veinlets containing gold and silver values. Informal miners had been working underground in this area for the past ten years or so, exploiting narrow veins within the intrusive.

Tahoe drilled three exploratory core holes totaling 350m at La Chilca Baja in 2015. Select drill intercepts are shown in Table 24.2-5. A complete listing of significant intercepts is included in the Appendix. Tahoe will continue to explore this target in 2016.

Table 24.2-5 La Chilca Baja – Select Drill Results

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SHA-D15-022	8.0	19.5	11.5	n/a	0.32	3.22
SHA-D15-023	*4.0*	*73.4*	*69.4*	*n/a*	*1.36*	*13.64*
including	*26.0*	*35.9*	*9.9*	*n/a*	*7.13*	*64.16*
SHA-D15-024	0.0	54.0	54.0	n/a	1.26	5.80
including	*18.0*	*24.5*	*6.5*	*n/a*	*6.65*	*3.64*

24.2.4 La Chilca Alta

Field observations in the La Chilca Alta area identified mineralization in the Chimu and Santa formations (the same host rocks as Shahuindo). Structurally, this area occurs along the northwest projection of the Algamarca anticline, where steep axial-plane parallel fracture patterns were recognized in Chimu quartzite and in weakly silicified dacite near the quartzite contact.

Mineralization in the Chimu formation includess quartz-pyrite veinlets up to one cm wide and brecciated sandstone with pyrite, euhedral quartz druse lining vugs, and locally coarse-grained illite (sericite). Cubic and pyritohedron voids up to 3mm in diameter filled with hematitic iron oxides indicate the presence of significant pyrite.

Informal miners exploited northeast-striking veins that consisted of crackle- and rotated-clast breccia in Chimú quartzite; open-space hydrothermal fill consists of drusy quartz and various sulfides (pyrite, chalcopyrite, tennantite-tetrahedrite, and possibly chalcocite). Numerous breccia types similar to those encountered at Shahuindo have been recognized in this area, including monolithic-clast breccia (quartzite clasts), heterolithic igneous-matrix breccia (diatreme breccia with sedimentary and porphyry clasts), and monolithic igneous-matrix breccia with sedimentary clasts (along the Chimú-dacite contact).

Tahoe has not conducted any drilling at La Chilca Alta to date, though the mineralization is similar to that found in the main Shahuindo deposit and represents a significant exploration target in the district.

24.2.5 Azules

The Azules prospect (also referred to as the Northern Corridor Project) is a sediment-hosted gold target previously identified by the Minera Algamarca Company in the 1980s. Buenaventura Ingenieros completed a report in 1986 for Minera Algamarca Company that reportedly described a 35m long narrow (1.35m) northwest-striking vein, dipping 60° to the southwest with average grades of 12 g/t Au and 34 oz/t Ag and a second low angle structure approximately 1.2m wide and of unknown extent that averaged 27 g/t Au and 19 oz/t Ag (E. Garay, pers. comm.). The report also referenced a silicified dacitic sill, approximately 2m thick and of unknown extent, with average grades of 6.6 g/t Au and 2.6 oz/t Ag. Tahoe has not verified this information.

Sulliden conducted exploration activities in the Azules area and identified anomalous gold and silver values in hydrothermal breccia emplaced in sandstone beds of the Farrat Formation. During 2011, Sulliden drilled 6,178m of core at 29 locations (Figure 24.2-3) that returned numerous mineralized intercepts including 0.79 g/t Au and 77 g/t Ag over 59.5m (drill hole SHN11-328) and 0.41 g/t Au and 8.89 g/t Ag over 60m (drill hole SHN11-330). The oxidation boundary appears to be shallow (less than 50m depth). A summary of Sulliden's drilling is shown in Table 24.2-6.

Tahoe has not conducted exploration activities at the Azules prospect to date.

Table 24.2-6   Azules – Sulliden Drill Results

Hole ID	From (m)	To (m)	Drilled Length (m)	Est. True Width (m)	Au g/t	Ag g/t
SH04-56	43.5	55.5	12	n/a	0.35	19.63
	97.5	106.5	9	n/a	0.32	19.71
SH04-57	18	33	15	n/a	0.35	40
SHN11-297	7.9	26.7	18.8	n/a	0.29	1.21
	127.9	142.4	14.5	n/a	0.65	3.83
SHN11-301	88.7	99.2	10.5	n/a	0.27	9.49
SHN11-307	0	8.4	8.4	n/a	0.99	26.15
SHN11-308	40.7	49.7	9	n/a	0.16	4.64
SHN11-311	271.7	318.3	46.6	n/a	0.28	3.44
SHN11-312	94.7	114.9	20.2	n/a	0.3	7.26
	129.2	148.7	19.5	n/a	0.22	5.4
	177.2	199.7	22.5	n/a	0.18	4.13
SHN11-313	82.5	90	7.5	n/a	0.47	7
	115.5	135	19.5	n/a	0.29	9.79
	153	165	12	n/a	0.17	13.98
SHN11-317	192	205.5	13.5	n/a	0.18	2.94
SHN11-318	62.7	81.2	18.5	n/a	0.34	29.72
SHN11-319	234.1	268.6	34.5	n/a	0.16	3.14
SHN11-320	85.2	140.9	55.7	n/a	0.18	2.55
Including	*96.4*	*106.4*	*10*	*n/a*	*0.28*	*1.37*
Including	*132.4*	*140.9*	*8.5*	*n/a*	*0.29*	*6.66*
	167.9	175.2	7.3	n/a	0.24	3.38
	222.4	244.4	22	n/a	0.59	18.22
SHN11-323	47.9	81.6	33.7	n/a	0.2	7.16
	112.7	127.4	14.7	n/a	0.27	10.41
	163.7	173.3	9.6	n/a	0.28	1.8
SHN11-328	0	59.5	59.5	n/a	0.79	76.61
Including	*27.2*	*46.7*	*19.5*	*n/a*	*1.55*	*127.04*
SHN11-329	43.7	69.2	25.5	n/a	0.35	24.98
	109.7	121.7	12	n/a	1.06	37.61
SHN11-330	119.5	179.5	60	n/a	0.41	8.89
	187	200	13	n/a	0.18	6.11
SHN11-332	3	18.5	15.5	n/a	0.23	2.99
SHN11-335	60.1	93.1	33	n/a	1.01	15.21
	166.75	195.1	28.35	n/a	0.25	6.91
	217.6	261.1	43.5	n/a	0.39	18.29
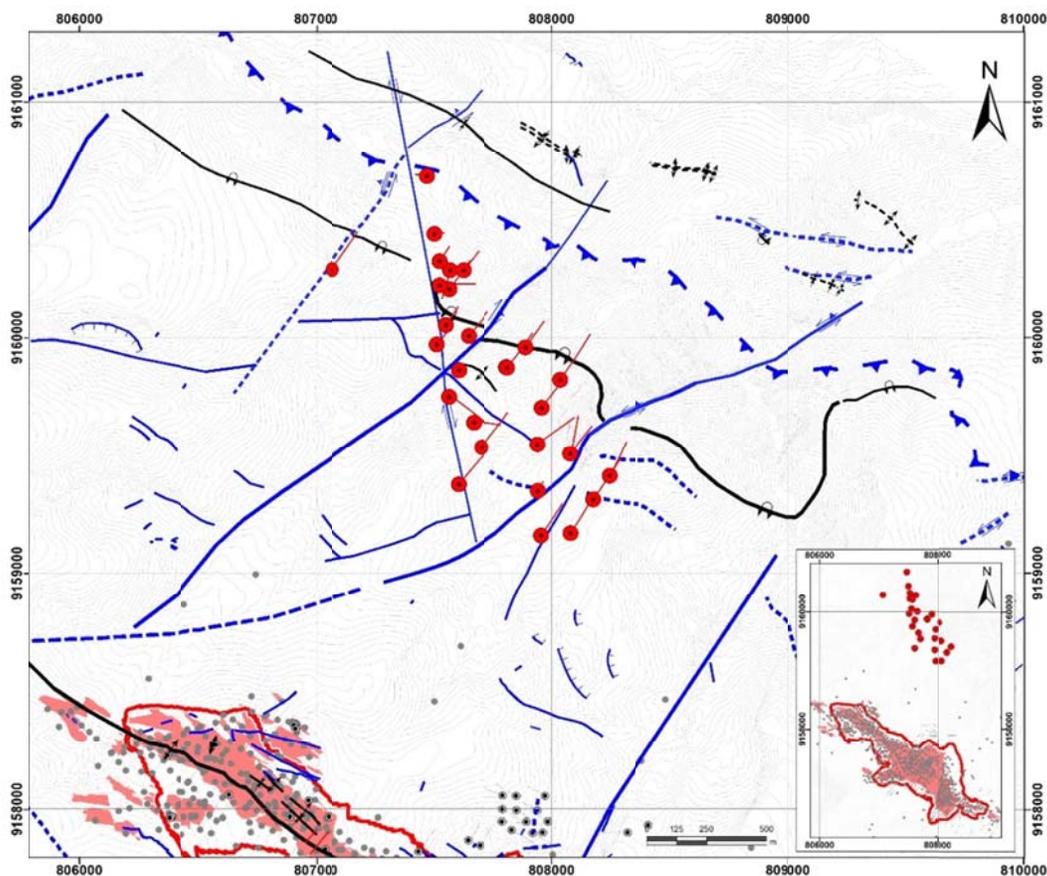
Figure 24.2-3   Azules Drill Hole Location Map

24.2.6 Algamarca Au-Ag-Cu Vein system

Algamarca is an underground mine that has been worked for over 40 years and is currently being exploited on a small scale by informal miners. At least six narrow veins have been recognized in thick sandstone beds of the Chimu formation. The veins generally strike northeast and dip 60° to 70° to the southeast (Figure 24.2-4), vary in thickness from 0.2m to 2m, and tend to bifurcate when they trend into host rocks other than the Chimu. The Algamarca veins have been identified over a 400m strike length and 200m down dip.

The most exploited vein at Algamarca is the Descubridora vein. The vein mineralogy is pyrite, galena, sphalerite, chalcopyrite, bornite, and Ag-sulfosalts (Figure 24.2-5). The wall rock has been pervasively altered to sericite.   The wallrock alteration and mineral assemblage suggests Algamarca is an intermediate-sulfidation type deposit.   Rio Alto geologists sampled the Descubridora vein at limited locations on the 4 and 5 levels of the mine. The sample results summarized in Table 24.2-7 are considered indicative only, as access was limited.

Table 24.2-7   Algamarca – Sample Results from the Descubridora Vein

Location	Type	Sample Length (m)	True Width (m)	Au g/t	Ag g/t	Cu %
Level 5	Vein	1.2	1.2	5.70	4,298	15.59
	Vein	0.6	0.6	8.31	860	5.81
	Wallrock	1.5	n/a	0.16	19	0.07
	Vein	0.6	0.6	9.30	1,782	5.57
	Vein	0.4	0.4	13.90	2,740	24.55
	Wallrock	1.0	n/a	1.21	66	0.22
	Wallrock	1.0	n/a	6.15	617	2.26
Level 4	Vein	0.4	0.4	10.87	3,282	14.11
	Wallrock	1.0	n/a	0.43	68	0.26
	Wallrock	1.0	n/a	0.59	50	0.58
	Vein	0.5	0.5	2.92	430	13.49
	Wallrock	1.0	n/a	0.03	2	0.01
	Vein	0.5	0.5	10.17	2,359	21.78
	Vein	1.0	1.0	5.81	715	5.24

Figure 24.2-4   Algamarca Sample Location Map (4 and 5 Levels)

Figure 24.2-5   Algamarca – Descubridora Vein on Levels 4 and 5
(massive chalcopyrite as clasts and matrix)

24.2.7 Cantera

The Cantera prospect is a sediment-hosted gold target northwest of the Shahuindo deposit. Cantera was identified by IP surveys followed by reconnaissance surface mapping and limited surface geochemical sampling. Further field work is necessary to define drill targets.

24.2.8 Malvas

The Malvas base metal anomaly is located along a northwest-trending topographic ridge that follows the trend of the Algamarca anticline. Folded sedimentary rocks of the Carhuaz Formation are intruded by a large irregularly shaped body of heterolithic biotite diorite breccia about one kilometer in diameter, which is in turn intruded by foliated biotite quartz diorite porphyry and then cut by a circular body of heterolithic megabreccia 500m in diameter.

The heterolithic biotite diorite breccia displays strong quartz-illite-pyrite alteration for 30 to 40 meters along the southeast contact with foliated biotite quartz diorite porphyry. The foliated biotite quartz diorite and the heterolithic megabreccia are magnetic and show only traces of weak chlorite-epidote alteration.

At the northwest contact with foliated biotite quartz porphyry, heterolithic biotite diorite breccia is again strongly altered to quartz-illite assemblage and may include zones with pyrophyllite and alunite. Brecciated sandstone adjacent to the igneous matrix breccia appears to originally have had up to 10% pyrite in areas that now have abundant iron oxide and jarosite.

Tahoe considers the Malvas prospect as an important long-term exploration target. Focus on this prospect will commence when the extent of the oxide mineralization that could add to the economics of the current project are delineated.

25.0 INTERPRETATION AND CONCLUSIONS

The Shahuindo mine is registered in the name of Shahuindo SAC. Tahoe Resources is a sole proprietor of the Shahuindo mine through its subsidiary, Shahuindo SAC.   The Shahuindo mine is currently completing Phase 1 construction which includes the development of the Phase 1 leach pads and processing facility. Commissioning is expected to be completed in January 2016 with commercial production anticipated by the second quarter of 2016.

The results of this study conclude:

- The Shahuindo mine prefeasibility study demonstrates the economic viability of the Shahuindo mine from 01 January 2016 through to the end of the estimated mine life and supports the declaration of Proven and Probable Mineral Reserves.

- The Mineral Resource Estimate for the Shahuindo deposit contains 1.55 million ounces of gold classified as Measured resources, 0.74 million ounces classified as Indicated resources and 0.62 million ounces of gold classified as Inferred resources. The cut-off grade for oxide of 0.14 g/t AuEq and sulfide of 0.5 g/t AuEq was used to equate the Resource. The effective date for the Mineral Resource is 15 April 2015.

- The Shahuindo Mineral Resource Estimated is supported by the geological model and is based on sufficient sample analytical and density measurements, detailed drill hole lithology and alteration data, and metallurgical testing.

- The recent infill drill program has increased the confidence in the resource resulting in an upgrade of material that was previously classified as Indicated to the Measured classification.

- The results of four data verification programs found that the QAQC is sufficient to ensure the dataset used in the resource estimate is reliable for estimation purposes of the Shahuindo Mineral Resources and the assignment of Measured and Indication classifications to the stated resource.

- The Shahuindo Proven and Probable Mineral Reserve for the Shahuindo mine using a cut-off grade of 0.14 g/t Au is 111.9 million tonnes with an average grade of 0.53 g/t Au and 6.82 g/t Ag, containing 1.91 million ounces of gold and 24.5 million ounces of silver. The effective date of the Mineral Reserve is 01 November 2015.

- The operating assumptions used in this study are based on operating results already achieved at Tahoe Resources' La Arena mine which is very similar to the Shahuindo mine.

- The results of the laboratory testing program indicate very good gold recoveries at both run-of-mine (ROM) and moderate crush sizes with low to moderate reagent requirements implying amenability to heap leaching. Silver recoveries are generally low.

- The mining strategy at Shahuindo consists of two phases. The first phase consists of mining higher grade starter pits feeding the Phase 1 leach pads with run of mine material at an initial rate of 10,000 tonnes of ore per day and increasing plant capacity in mid-2016 to process an average of 12,200 tonnes of ore per day in 2016 and 16,500 tonnes of ore per day in 2017. The second phase includes the addition of a crushing and agglomeration facility, a large leach pad, and an increase in mining production to 36,000 tonnes of ore per day, which will require an upgraded mining fleet. The phased approach enables gold production as soon as possible with minimal capital expenditure, generating cash flow early in the project.

- The phased approach to mining and processing also allows the Company to conduct field-scale metallurgical testing to optimize the processing scheme for the remainder of the mine life (Phase 2). While there are clear benefits to metal recovery by the use of agglomeration, there may be opportunities to achieve lower operating and capital costs by reducing the amount of material in the current plan that are subject to agglomeration and/or crushing.

26.0 RECOMMENDATIONS

The recommendations for this report are as follows:

- Tahoe holds exploration licenses near the existing facility where the regional geology appears to be a favorable environment for the formation of mineral deposits. Tahoe has established numerous exploration prospects within Tahoe's exploration area. The authors of this report recommend the Company continues to aggressively explore the Shahuindo district and accelerate district exploration with the goal of discovering additional oxide feed for the Shahuindo heap leach processing facility.

- The recent drilling conducted by Rio Alto in 2014-2015 and by Tahoe in 2015 has identified ore grade mineralization that is outside of the current oxide resource, beyond the limits of the current pit design. Tahoe should aggressively explore for extensions of the Shahuindo deposit and delineate the mineralization in these areas to expand the resource and incorporate these extensions into a new pit design.

- Assay standards should be validated and/or replaced. Validation should include consulting with CERTMIN in regards to the observed bias in the assay standards and also obtain the round-robin assays for the standards from SGS to determine the assay variance. In the event that no solution is found, it is recommended that the current standards be replaced with other commercially available standards. It is also recommended to incorporate standards into the sample stream that are either at or near the cut-off grades.

- Tahoe should investigate the practicality of creating new assay blanks from coarse RC rejects and begin using a second lab for check assays to improve the confidence in the current assay results.

- Continue to refine the geologic model to provide a more accurate prediction of material types to improve the predictability of the geometallurgical model.

- As additional drill data becomes available, the resource model should be refined and resource estimates updated. Additional infill drilling will lend further confidence in the resource model.

- Update and refine the life of mine water balance as operational data becomes available.

- Maintaining heap permeability and minimizing channeling at higher heap heights constitutes a risk to the project as additional agglomeration and compacted permeability testing is required. The authors recommend Tahoe conduct pilot-scale heap leach tests on the current ROM leach pad to investigate field-scale performance on composites with varying degrees of coarse-to-fines ratios.

- The available data indicates that siltstones and breccia with high fines content will most likely not percolate in a ROM heap leach. The authors recommend conducting compacted permeability tests at the recommended coarse crush size, with no cement on these two material types. If the results of these tests are positive, then consideration should be given to conducting a pilot-scale test on a composite of these two rock types on the ROM pad. The splits from each composite tested in the pilot-scale tests should be taken and column leach tests conducted at a coarse crush size of approximately 80% passing 76mm.

- It is recommended that additional tests be conducted on samples taken from the drilling program, including:

  - Column leach tests on both surface and large diameter core samples should be conducted on each of the rock types (except sulfides) at a p80 crush size of 76mm. The samples should be spatially representative of the orebody. Large diameter core holes should match the latest metallurgical drill holes so the results from the series of column leach tests on the -25mm tests can be compared to the 76mm test results. The gold grades of the individual rock types to be tested should be similar to those estimated in the mine plan.

  - Compacted permeability tests on each rock type from the large core drilling program on composites crushed to 76mm should be conducted. The tests should include blended composites containing the different rock types at a ratio shown in the mining schedule. Tests at cement levels of 0 kg/t, 3 kg/t and 6 kg/t at varying simulated heap heights up to the maximum planned height above the liner should be completed. If any samples fail, then additional composites should be tested with increased levels of cement until acceptable percolation rates are achieved at all simulated heights.

- After reaching commercial production, the authors recommend the Company systematically evaluate mining, processing and other surface operations to optimize processes and procedures and reduce capital and operating costs. Example of these would include the following:

  - Conduct a trade-off study to evaluate the potential to reduce or eliminate the requirements for crushing and/or agglomeration. It is recommended this be conducted by evaluating a series of material blends for leaching, percolation, and geotechnical stability characteristics. The analysis would need to review the operating and capital cost versus recovery. This would need to be conducted before the construction of the Phase 2 agglomeration and crushing circuit.

  - The data for the secondary crusher indicated a recovery difference of 4-5% between a 76mm and 25mm crush size for the ROM material. A trade-off study should be conducted to determine if the additional recovery justifies the increased capital and operating costs of a secondary crushing circuit.

> ➤ Expand the geotechnical and hydrogeological evaluations to further optimize the overall slope angle of the final design of the Shahuindo open pit. This has the potential to increase the NPV of the overall project.

> ➤ There is potential to reduce the operating costs of the mine by evaluating the potential to place mined waste in the pit. This will require defining the underlying sulfide resource and understanding the economic potential (if any) of the sulfide mineralization.

The work completed to date demonstrates the project is technically and economically viable; the recommendations listed above are intended to provide the Company with guidance to optimize the Shahuindo mine.

27.0 REFERENCES

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28.0   AUTHORS CERTIFICATES

28.1 Certificate of Qualified Person – Carl E. Defilippi

I, Carl E. Defilippi, M.Sc., C.E.M., do hereby certify that I am currently employed as a Project Manager for Kappes, Cassiday & Associates, 7950 Security Circle, Reno, Nevada 89506.

1. I graduated with a Bachelor of Science degree in Chemical Engineering from the University of Nevada in 1978 and a Master of Science degree in Metallurgical Engineering from the University of Nevada in 1981. I have practiced my profession continuously since 1981.

2. I am a Registered Member in good standing of the Society for Mining, Metallurgy and Exploration (775870RM).

3. I have read 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 fulfil the requirements to be a "Qualified Person" for the purposes of NI 43-101.

4. I am independent of Tahoe Resources Inc. and its related companies, as independence is described in Section 1.5 of NI 43-101.

5. I am one of the authors of this Technical Report titled *Technical Report on the Shahuindo Mine, Cajabamba, Peru* prepared for Tahoe Resources Inc., with an effective date of 01 January 2016 and dated 25 January 2016. I am responsible for Sections 13 and 17 and the corresponding items in Sections 1, 25 and 26 of this report. This technical report has been prepared in compliance with NI 43-101 and Form 43-101F1.

6. I am the co-author of two previous technical reports completed on the Shahuindo property on behalf of Sulliden Gold titled *Updated Technical Report on the Shahuindo Project, Cajabamba, Peru*, dated 15 October 2012, and *Technical Report on the Shahuindo Heap Leach Project, Cajabamba, Peru*, dated 09 November 2012.

7. I visited the Shahuindo project site on April 6-8, 2010; May 4-7, 2010; and September 2-3, 2015.

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

9. I hereby consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 25 January 2016

/s/ Carl E. Defilippi

Carl E. Defilippi, SME Registered Member

28.2   Certificate of Qualified Person – Charles V. Muerhoff

I, Charles V. Muerhoff, B.Sc., do hereby certify that I am currently employed as Vice President Technical Services for Tahoe Resources Inc., 5310 Kietzke Lane, Reno, Nevada 89511

1. I graduated with a Bachelor of Science Degree in Geology and Geophysics from the University of Missouri-Rolla in 1989. I have practiced my profession continuously since 1990.

2. I am a Registered Member in good standing of the Society for Mining, Metallurgy and Exploration (4182272RM).

3. I have read 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 fulfil the requirements to be a "Qualified Person" for the purposes of NI 43-101.

4. I am not independent of Tahoe Resources Inc. and its related companies, as independence is described in Section 1.5 of NI 43-101.

5. I am one of the authors of this Technical Report titled *Technical Report on the Shahuindo Mine, Cajabamba, Peru* prepared for Tahoe Resources Inc., with an effective date of 01 January 2016 and dated 25 January 2016. I am responsible for Sections 2, 3, 6, 7, 8, 9, 10, 11, 12, 14, 19, 21, 22, 23 and 24, and the corresponding items in Sections 1, 25 and 26 of this report. This technical report has been prepared in compliance with NI 43-101 and Form 43-101F1.

6. I visited the Shahuindo property May 19-20, 2015 and November 13-14, 2015.

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

8. I hereby consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated 25 January 2016

 /s/ Charles V. Muerhoff
Charles V Muerhoff, SME Registered Member

28.3 Certificate of Qualified Person – Tim Williams

I, Tim Williams, M.Sc., do hereby certify that I am currently employed as Vice President Operations & Peru Country Manager for Tahoe Resources Inc., 5310 Kietzke Lane, Reno, Nevada 89511.

1. I graduated with a Bachelor of Engineering (Geology) degree from Curtin University, Western Australian School of Mines in 1991, a Masters of Engineering Science degree from Curtin University in 2000 and a Graduate Diploma in Mining from Curtin University in 2006. I have practiced my profession continuously since 1991.

2. I am a Fellow of the Australasian Institute of Mining and Metallurgy (AusIMM).

3. I have read 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 fulfil the requirements to be a "Qualified Person" for the purposes of NI 43-101.

4. I am not independent of Tahoe Resources Inc. and its related companies, as independence is described in Section 1.5 of NI 43-101.

9. I am one of the authors of this Technical Report titled *Technical Report on the Shahuindo Mine, Cajabamba, Peru* prepared for Tahoe Resources Inc., with an effective date of 01 January 2016, and dated 25 January 2016. I am responsible for Sections 4, 5, 15, 16, 18, and 20 and corresponding items in Sections 1, 25 and 26 of this report. This technical report has been prepared in compliance with NI 43-101 and Form 43-101F1.

5. I have visited and worked at the Shahuindo property regularly and on numerous occasions in 2014 and 2015.

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

7. I hereby consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their website accessible by the public, of the Technical Report.

Dated January 25, 2016

 /s/ Tim Williams

Tim Williams, FAusIMM

APPENDIX

POST-RESOURCE DRILL INTERCEPTS

STEPOUT DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-D15-003	808,033.1	9,156,523.2	2935.2	-60.0°	35°	235.9	core	99.5	122.5	23.0	n/a	0.25	2.57
								198.1	200.0	1.9	n/a	0.24	1.30
								216.5	220.2	3.7	n/a	0.35	0.99
SHA-D15-004	808,357.6	9,156,461.9	2846.2	-63.4°	36°	260	core	146.5	158.0	11.5	n/a	0.43	1.88
								175.5	177.5	2.0	n/a	0.51	1.70
								235.8	237.0	1.2	n/a	0.26	0.50
								253.0	258.0	5.0	n/a	0.94	1.66
SHA-D15-005	807,932.0	9,156,546.5	2972.2	-60°	43°	200	core	16.7	18.4	1.7	n/a	0.24	0.30
								27.0	28.4	1.4	n/a	0.38	0.10
SHA-D15-006	807,870.5	9,156,659.8	2948.5	-52°	30°	230.1	core	52.4	69.0	16.6	n/a	0.79	10.00
							including	*59.4*	*63.0*	*3.6*	*n/a*	*2.48*	*30.28*
								83.6	91.7	8.1	n/a	0.28	1.73
								143.6	144.8	1.2	n/a	0.64	0.30
								151.0	157.5	6.5	n/a	0.32	0.99
								161.9	163.4	1.5	n/a	0.41	0.40
								176.7	178.3	1.6	n/a	0.20	0.30
								187.2	191.1	3.9	n/a	0.32	0.63
								215.9	217.0	1.1	n/a	0.37	1.20
SHA-D15-007	807,856.0	9,157,737.0	2842.5	-59°	35°	210.1	core	0.0	32.0	32.0	n/a	0.26	2.11
								38.0	40.0	2.0	n/a	0.26	1.40
								180.3	181.6	1.3	n/a	1.13	15.70
SHA-D15-008	807,932.4	9,157,697.8	2830.6	-61°	35°	239.4	core	0.0	10.0	10.0	n/a	0.25	2.74
								16.0	31.0	15.0	n/a	0.31	2.02
								43.8	45.8	2.0	n/a	0.23	1.40
								203.5	214.2	10.7	n/a	0.50	24.83
SHA-D15-009	807,870.5	9,156,659.8	2948.5	-52°	213°	213.7	core	no significant intercepts					
SHA-D15-010	808,020.4	9,157,623.5	2802.3	-56°	30°	260.3	core	24.5	29.1	4.6	n/a	0.26	6.46
								90.0	97.1	7.1	n/a	0.55	5.27
								218.0	222.0	4.0	n/a	0.38	7.50
								232.0	235.5	3.4	n/a	0.37	1.51
SHA-D15-011	807,521.9	9,156,913.1	2974.0	-61°	37°	306.9	core	119.4	121.0	1.6	n/a	0.25	0.10
								174.0	177.5	3.5	n/a	0.28	1.18
								204.0	223.0	19.0	n/a	0.26	1.83
								235.0	306.9	71.9	n/a	0.50	13.49
SHA-D15-012	807,931.6	9,156,630.2	2965.9	-60°	35°	700	core	160.5	162.0	1.5	n/a	0.25	0.10
								169.7	171.0	1.3	n/a	0.31	0.10
								181.0	182.9	1.9	n/a	0.32	1.00
								300.0	302.0	2.0	n/a	0.49	0.60
								421.0	422.0	1.0	n/a	0.22	0.70
								430.0	443.3	13.3	n/a	1.09	0.85
							including	*441.3*	*443.3*	*2.0*	*n/a*	*4.50*	*1.10*
								462.0	480.0	18.0	n/a	0.72	3.75
							including	*472.0*	*476.0*	*4.0*	*n/a*	*2.33*	*7.30*
								502.0	509.0	7.0	n/a	0.62	7.17
								520.0	540.9	20.9	n/a	0.34	3.65

drill interval composites reported using 0.2 g/t Au Cut-off

STEPOUT DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
								548.0	580.0	32.0	n/a	0.48	2.33
								589.6	608.0	18.4	n/a	0.75	7.36
							including	*589.6*	*591.0*	*1.4*	*n/a*	*5.6*	*14.0*
SHA-R15-235	807,932.1	9,156,630.7	2965.0	-64°	41°	242	RC	124.0	126.0	2.0	n/a	0.21	1.70
								156.0	158.0	2.0	n/a	0.29	0.40
								166.0	176.0	10.0	n/a	0.22	1.16
								182.0	184.0	2.0	n/a	0.20	0.10
								186.0	188.0	2.0	n/a	0.23	0.10
SHA-R15-236	807,894.6	9,156,563.7	2975.4	-61°	37°	298	RC	24.0	26.0	2.0	n/a	0.52	0.10
								124.0	126.0	2.0	n/a	0.16	0.10
								132.0	134.0	2.0	n/a	0.35	0.30
								144.0	146.0	2.0	n/a	0.44	0.70
SHA-R15-237	807,890.7	9,156,493.2	2980.8	-60°	35°	242	RC	36.0	38.0	2.0	n/a	0.26	0.10
								176.0	182.0	6.0	n/a	0.23	0.90
SHA-R15-238	807,971.7	9,156,597.0	2962.3	-60°	34°	240	RC	40.0	46.0	6.0	n/a	0.24	0.60
								108.0	110.0	2.0	n/a	0.21	2.80
								124.0	126.0	2.0	n/a	0.31	1.40
								134.0	136.0	2.0	n/a	0.21	1.40
								156.0	162.0	6.0	n/a	0.79	0.83
								192.0	194.0	2.0	n/a	0.20	0.80
SHA-R15-239	807,995.2	9,156,550.4	2955.0	-61°	34°	268	RC	122.0	124.0	2.0	n/a	0.20	0.60
								130.0	138.0	8.0	n/a	0.26	1.93
								210.0	212.0	2.0	n/a	0.20	0.50
								220.0	222.0	2.0	n/a	0.25	0.70
								230.0	232.0	2.0	n/a	0.59	1.40
								240.0	242.0	2.0	n/a	0.22	0.50
SHA-R15-240	808,074.2	9,156,549.2	2926.5	-61°	36°	210	RC	88.0	108.0	20.0	n/a	0.66	2.75
								132.0	178.0	46.0	n/a	0.30	1.84
								186.0	194.0	8.0	n/a	0.26	1.45
								204	206	2.0	n/a	0.408	30.9
SHA-R15-241	808,083.5	9,156,490.0	2912.4	-62°	36°	300	RC	88.0	96.0	8.0	n/a	0.23	0.28
								186.0	190.0	4.0	n/a	0.44	0.50
								196.0	198.0	2.0	n/a	0.23	0.10
								210.0	212.0	2.0	n/a	0.38	0.20
SHA-R15-242	808,226.9	9,156,449.3	2872.3	-61°	39°	258	RC	32.0	50.0	18.0	n/a	0.27	1.87
								60.0	72.0	12.0	n/a	0.51	1.03
								78.0	80.0	2.0	n/a	0.22	0.40
								102.0	112.0	10.0	n/a	0.36	0.46
								190.0	218.0	28.0	n/a	0.23	1.06
								228.0	230.0	2.0	n/a	0.39	0.80
								92.0	94.0	2.0	n/a	1.63	0.70
SHA-R15-243	808,297.9	9,156,487.8	2872.7	-59°	25°	230	RC	174.0	188.0	14.0	n/a	0.25	2.11
SHA-R15-244	808,136.0	9,156,396.0	2893.0	-59°	37°	300	RC	no significant intercepts					

STEPOUT DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-R15-245	808,186.0	9,156,463.3	2883.8	-60°	36°	260	RC	52.0	68.0	16.0	n/a	0.23	1.08
								86.0	98.0	12.0	n/a	0.39	0.78
								106.0	116.0	10.0	n/a	0.24	0.74
								196.0	198.0	2.0	n/a	0.20	0.90
								230.0	232.0	2.0	n/a	0.24	1.30
SHA-R15-246	807,970.1	9,156,518.2	2960.3	-60°	55°	272	RC	110.0	114.0	4.0	n/a	0.34	0.30
								214.0	218.0	4.0	n/a	0.21	1.95
SHA-R15-247	807,992.9	9,156,455.4	2952.2	-60°	35°	300	RC	18.0	20.0	2.0	n/a	0.37	0.10
								166.0	168.0	2.0	n/a	0.26	20.10
								172.0	174.0	2.0	n/a	0.22	84.10
								182.0	194.0	12.0	n/a	0.23	21.77
								210.0	212.0	2.0	n/a	0.42	5.10
SHA-R15-248	808,105.3	9,156,457.8	2899.9	-60°	35°	250	RC	104.0	106.0	2.0	n/a	0.54	0.50
								170.0	174.0	4.0	n/a	0.50	1.75
								188.0	196.0	8.0	n/a	0.20	2.63
								202.0	204.0	2.0	n/a	0.24	0.70
SHA-R15-249	807,770.4	9,156,759.9	2914.9	-60°	35°	210	RC	60.0	66.0	6.0	n/a	0.67	4.10
								72.0	76.0	4.0	n/a	0.22	0.75
SHA-R15-250	807,771.6	9,156,762.3	2914.4	-60°	75°	210	RC	102.0	104.0	2.0	n/a	0.20	0.30
								116.0	120.0	4.0	n/a	0.24	0.75
								186.0	190.0	4.0	n/a	1.29	2.05
SHA-R15-251	807,756.7	9,156,808.8	2912.0	-59°	35°	300	RC	94.0	98.0	4.0	n/a	0.26	1.30
								202.0	220.0	18.0	n/a	0.40	6.92
								228.0	300.0	72.0	n/a	0.30	3.36
SHA-R15-252	807,816.4	9,156,797.2	2897.5	-61°	35°	210	RC	46.0	48.0	2.0	n/a	0.36	6.10
								58.0	60.0	2.0	n/a	0.33	1.00
								98.0	102.0	4.0	n/a	0.29	1.30
								108.0	110.0	2.0	n/a	0.22	0.90
								176.0	182.0	6.0	n/a	0.44	6.77
								204.0	208.0	4.0	n/a	0.32	1.30
SHA-R15-254	807,824.0	9,156,819.1	2895.2	-61°	90°	180	RC	50.0	60.0	10.0	n/a	0.26	0.74
								142.0	146.0	4.0	n/a	0.30	0.25
SHA-R15-256	807,520.1	9,157,000.6	2966.0	-61°	35°	246	RC	84.0	88.0	4.0	n/a	1.03	7.45
								136.0	150.0	14.0	n/a	0.20	0.77
								156.0	158.0	2.0	n/a	0.24	0.30
								174.0	176.0	2.0	n/a	0.20	0.70
								192.0	244.0	52.0	n/a	0.55	20.41
SHA-R15-257	807,584.4	9,156,897.8	2955.6	-59°	35°	300	RC	104.0	106.0	2.0	n/a	0.34	0.80
								118.0	120.0	2.0	n/a	0.60	0.10
								216.0	238.0	22.0	n/a	0.22	0.36
								252.0	262.0	10.0	n/a	0.48	42.50
								288.0	290.0	2.0	n/a	0.20	2.50
								294.0	298.0	4.0	n/a	0.32	6.65

drill interval composites reported using 0.2 g/t Au Cut-off

STEPOUT DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-R15-258	807,557.9	9,156,976.5	2953.9	-61°	35°	230	RC	22.0	24.0	2.0	n/a	0.24	2.70
								30.0	36.0	6.0	n/a	0.35	2.57
								44.0	46.0	2.0	n/a	0.25	0.60
								54.0	58.0	4.0	n/a	0.20	0.70
								124.0	126.0	2.0	n/a	0.30	0.40
								168.0	226.0	58.0	n/a	0.39	9.44
SHA-R15-259	807,597.0	9,156,969.3	2948.2	-60°	35°	80	RC	no significant intercepts					
SHA-R15-260	807,131.0	9,156,877.0	3025.0	-60°	35°	30	RC	no significant intercepts					
SHA-R15-261	807,943.5	9,157,603.9	2828.3	-60°	35°	172	RC	14.0	18.0	4.0	n/a	0.31	0.55
								24.0	30.0	6.0	n/a	0.71	1.10
								40.0	42.0	2.0	n/a	0.30	1.80
								60.0	62.0	2.0	n/a	0.25	0.70
								94.0	98.0	4.0	n/a	0.32	2.90
SHA-R15-262	807,894.3	9,157,624.2	2839.7	-60°	35°	230	RC	10.0	14.0	4.0	n/a	0.21	1.80
SHA-R15-263	807,744.1	9,157,747.2	2845.5	-59°	35°	200	RC	no significant intercepts					
SHA-R15-264	807,802.8	9,157,733.5	2848.0	-60°	35°	270	RC	12.0	16.0	4.0	n/a	0.20	2.60
								24.0	26.0	2.0	n/a	1.49	48.30
								66.0	74.0	8.0	n/a	0.36	2.53
								80.0	84.0	4.0	n/a	0.54	1.65
								92.0	178.0	86.0	n/a	0.59	2.76
								234.0	238.0	4.0	n/a	0.36	4.30
SHA-R15-265	807,520.5	9,157,663.4	2866.8	-60°	35°	200	RC	0.0	2.0	2.0	n/a	0.25	2.10
								10.0	12.0	2.0	n/a	0.23	1.30
								28.0	54.0	26.0	n/a	0.32	2.88
SHA-R15-266	807,597.4	9,157,696.9	2860.9	-59°	35°	168	RC	no significant intercepts					
SHA-R15-267	807,662.1	9,157,719.1	2858.0	-60°	35°	200	RC	no significant intercepts					
SHA-R15-268	807,672.5	9,157,678.6	2871.3	-61°	35°	200	RC	no significant intercepts					
SHA-R15-269	807,981.6	9,157,666.9	2809.2	-60°	35°	218	RC	no significant intercepts					
SHA-R15-270	808,038.7	9,156,603.8	2942.2	-62°	35°	204	RC	8.0	10.0	2.0	n/a	0.21	0.20
								170.0	172.0	2.0	n/a	0.25	0.90
SHA-R15-271	807,729.0	9,156,880.4	2913.9	-61°	35°	240	RC	166.0	168.0	2.0	n/a	0.20	0.10
SHA-R15-272	807,130.8	9,156,883.0	3024.7	-60°	35°	300	RC	194.0	196.0	2.0	n/a	0.29	3.30
								218.0	220.0	2.0	n/a	0.38	8.30
								234.0	236.0	2.0	n/a	0.31	2.70
SHA-R15-273	807,186.1	9,156,867.8	3016.7	-59°	35°	270	RC	no significant intercepts					
SHA-R15-274	807,148.5	9,157,010.8	3030.9	-60°	35°	284	RC	162.0	164.0	2.0	n/a	0.27	18.20
								190.0	192.0	2.0	n/a	0.23	0.60
SHA-R15-287	807,548.8	9,157,739.5	2858.9	-62°	35°	180	RC	no significant intercepts					
SHA-R15-288	807,435.2	9,157,819.9	2898.0	-59°	35°	184	RC	no significant intercepts					
SHA-D15-001S	809,501.3	9,156,274.2	2552.4	-60°	32°	202.2	core	2.2	4.3	2.1	n/a	0.25	6.00
								62.0	69.0	7.0	n/a	1.20	12.57
							including	67.2	69.0	1.8	n/a	3.48	4.70
SHA-D15-003S	809,137.5	9,156,153.6	2697.9	-60°	35°	155.2	core	0.0	24.3	24.3	n/a	0.79	1.85
								42.0	50.0	8.0	n/a	0.35	4.15

drill interval composites reported using 0.2 g/t Au Cut-off

STEPOUT DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-D15-009S	808,756.3	9,156,768.9	2795.3	-61°	216°	200.2	core	166.9	168.9	2.0	n/a	0.21	0.90
								175.8	176.3	0.5	n/a	0.27	3.30
								185.7	200.2	14.5	n/a	0.29	5.59
SHA-D15-010S	808,981.2	9,156,403.9	2735.7	-61°	34°	200	core	108.9	113.6	4.7	n/a	0.44	0.56
								150.1	159.9	9.8	n/a	0.44	1.79
								173.9	175.5	1.6	n/a	0.20	0.70
								192.1	200.0	7.9	n/a	0.41	1.78
SHA-D15-011S	808,840.6	9,156,715.5	2771.9	-61°	213°	200.2	core	92.5	100.5	8.0	n/a	0.16	1.14
								140.1	141.9	1.8	n/a	0.23	0.70
								154.7	156.7	2.0	n/a	0.24	2.40
								167.0	200.2	33.2	n/a	0.42	2.55
SHA-D15-012S	808,597.0	9,156,535.8	2796.3	-61°	31°	203.5	core	50.0	52.0	2.0	n/a	0.29	4.20
								186.2	191.2	5.0	n/a	0.27	0.87
								197.0	202.0	5.0	n/a	0.23	0.88
SHA-D15-013S	808,442.2	9,156,566.5	2835.1	-62°	33°	200	core	95.9	97.6	1.7	n/a	0.38	7.30
SHA-D15-017S	808,969.8	9,156,117.0	2725.1	-60°	36°	200	core	12.7	32.2	19.5	n/a	0.70	10.88
							including	*22.8*	*26.5*	*3.7*	*n/a*	*2.53*	*50.78*
								70.4	90.8	20.4	n/a	0.20	0.99
SHA-D15-018S	808,890.1	9,156,184.4	2707.8	-60°	35°	200.5	core	54.0	61.6	7.6	n/a	0.27	0.71
SHA-D15-019S	809,232.9	9,156,407.7	2667.7	-62°	37°	200.7	core	31.3	36.0	4.7	n/a	0.33	0.21
								47.5	58.2	10.7	n/a	1.00	8.73
							including	*47.5*	*49.0*	*1.5*	*n/a*	*3.05*	*6.00*
SHA-R15-299	808,348.9	9,156,337.3	2834.7	-60°	35°	200	RC	182.0	188.0	6.0	n/a	1.26	29.47
							including	*182.0*	*184.0*	*2.0*	*n/a*	*3.38*	*84.30*
SHA-R15-301	808,646.6	9,155,975.6	2827.9	-60°	35°	96	RC	50.0	56.0	6.0	n/a	0.29	1.53
SHA-R15-304	808,229.9	9,156,329.0	2868.5	-61°	35°	156	RC	6.0	22.0	16.0	n/a	0.37	0.24
								94.0	96.0	2.0	n/a	1.03	45.20
								144.0	154.0	10.0	n/a	0.24	0.60
SHA-R15-328	809,015.5	9,156,085.3	2714.4	-62°	35°	100	RC	26.0	32.0	6.0	n/a	0.27	1.20
								40.0	42.0	2.0	n/a	0.21	1.00
								52.0	66.0	14.0	n/a	0.37	1.90
SHA-R15-329	808,993.9	9,156,093.8	2714.2	-61°	35°	100	RC	48.0	52.0	4.0	n/a	0.30	0.70
SHA-R15-330	809,055.1	9,156,170.9	2684.8	-61°	35°	84	RC	8.0	10.0	2.0	n/a	2.99	52.40
								22.0	38.0	16.0	n/a	0.40	5.55
SHA-R15-333	809,103.3	9,156,167.9	2686.0	-60°	35°	96	RC	26.0	34.0	8.0	n/a	0.24	1.88
SHA-R15-334	809,122.8	9,156,126.0	2695.7	-60°	35°	70	RC	2.0	14.0	12.0	n/a	0.56	1.90
								30.0	32.0	2.0	n/a	0.48	0.90
								46.0	58.0	12.0	n/a	0.50	1.13

drill interval composites reported using 0.2 g/t Au Cut-off

CONDEMNATION DRILLING - SOUTHEAST EXTENSION

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-D15-001S	809,501.3	9,156,274.2	2552.4	-60°	32°	202.2	core	2.2	4.3	2.1	1.8	0.25	6.00
								62.0	69.0	7.0	n/a	1.20	12.57
							including	*67.2*	*69.0*	*1.8*	*n/a*	*3.48*	*4.70*
SHA-D15-003S	809,137.5	9,156,153.6	2697.9	-60°	35°	155.2	core	0.0	24.3	24.3	21.0	0.79	1.85
								42.0	50.0	8.0	n/a	0.35	4.15
SHA-D15-009S	808,756.3	9,156,768.9	2795.3	-61°	216°	200.2	core	166.9	168.9	2.0	n/a	0.21	0.90
								175.8	176.3	0.5	n/a	0.27	3.30
								185.7	200.2	14.5	n/a	0.29	5.59
SHA-D15-010S	808,981.2	9,156,403.9	2735.7	-61°	34°	200	core	108.9	113.6	4.7	n/a	0.44	0.56
								150.1	159.9	9.8	n/a	0.44	1.79
								173.9	175.5	1.6	n/a	0.20	0.70
								192.1	200.0	7.9	n/a	0.41	1.78
SHA-D15-011S	808,840.6	9,156,715.5	2771.9	-61°	213°	200.2	core	92.5	94.0	1.5	n/a	0.20	2.20
								95.3	97.0	1.7	n/a	0.28	1.00
								99.0	100.5	1.5	n/a	0.21	0.40
								140.1	141.9	1.8	n/a	0.23	0.70
								154.7	156.7	2.0	n/a	0.24	2.40
								167.0	200.2	33.2	n/a	0.42	2.55
SHA-D15-012S	808,597.0	9,156,535.8	2796.3	-61°	31°	203.5	core	50.0	52.0	2.0	n/a	0.29	4.20
								186.2	191.2	5.0	n/a	0.27	0.87
								197.0	202.0	5.0	n/a	0.23	0.88
SHA-D15-013S	808,442.2	9,156,566.5	2835.1	-62°	33°	200	core	95.9	97.6	1.7	n/a	0.38	7.30
SHA-D15-017S	808,969.8	9,156,117.0	2725.1	-60°	36°	200	core	12.7	32.2	19.5	n/a	0.70	10.88
							including	*22.8*	*26.5*	*3.7*	*n/a*	*2.53*	*50.78*
								70.4	72.4	2.0	n/a	0.33	0.90
								77.6	90.8	13.2	n/a	0.22	1.02
SHA-D15-018S	808,890.1	9,156,184.4	2707.8	-59°	35°	200.5	core	52.0	55.5	3.5	n/a	0.37	0.51
								60.0	61.6	1.6	n/a	0.45	1.00
SHA-D15-019S	809,232.9	9,156,407.7	2667.7	-62°	37°	200.7	core	31.3	36.0	4.7	n/a	0.33	0.21
								47.5	58.2	10.7	n/a	1.00	8.73
							including	*47.5*	*49.0*	*1.5*	*n/a*	*3.05*	*6.00*
SHA-R15-299	808,348.9	9,156,337.3	2834.7	-60°	35°	200	RC	182.0	188.0	6.0	n/a	1.26	29.47
							including	*182.0*	*184.0*	*2.0*	*n/a*	*3.38*	*84.30*
SHA-R15-301	808,646.6	9,155,975.6	2827.9	-60°	35°	96	RC	50.0	56.0	6.0	n/a	0.29	1.53
SHA-R15-304	808,229.9	9,156,329.0	2868.5	-61°	35°	156	RC	6.0	22.0	16.0	9.2	0.37	0.24
								94.0	96.0	2.0	n/a	1.03	45.20
								144.0	154.0	10.0	n/a	0.24	0.60

CONDEMNATION DRILLING - EL SAUCE

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-R15-292	809,121.5	9,156,052.1	2739.2	-59°	35°	102	RC	18.0	20.0	2.0	n/a	0.56	0.10
								38.0	42.0	4.0	n/a	0.88	0.10
								52.0	54.0	2.0	n/a	0.41	1.30
								78.0	80.0	2.0	n/a	0.69	6.60
SHA-R15-293	809,212.5	9,156,074.3	2700.1	-62°	36°	76	RC	0.0	4.0	4.0	1.9	0.45	0.20
SHA-R15-294	808,917.3	9,156,033.9	2761.9	-61°	35°	78	RC	20.0	22.0	2.0	n/a	0.26	0.50
SHA-R15-295	809,184.6	9,156,125.1	2699.1	-60°	35°	78	RC	0.0	4.0	4.0	3.5	0.26	1.15
								32.0	64.0	32.0	n/a	1.49	6.10
							including	32.0	38.0	6.0	n/a	5.73	25.33
SHA-R15-297	809,057.4	9,156,093.8	2725.3	-60°	35°	78	RC	56.0	64.0	8.0	n/a	0.27	1.60
								74.0	78.0	4.0	n/a	0.20	1.25
SHA-R15-328	809,015.5	9,156,085.3	2714.4	-61°	35°	100	RC	26.0	32.0	6.0	n/a	0.27	1.20
								40.0	42.0	2.0	n/a	0.21	1.00
								52.0	54.0	2.0	n/a	0.34	1.50
								58.0	66.0	8.0	n/a	0.50	2.65
SHA-R15-329	808,993.9	9,156,093.8	2714.2	-62°	35°	100	RC	48.0	52.0	4.0	n/a	0.30	0.70
SHA-R15-330	809,055.1	9,156,170.9	2684.8	-61°	35°	84	RC	8.0	10.0	2.0	n/a	2.99	52.40
								22.0	38.0	16.0	n/a	0.40	5.55
								26.0	34.0	8.0	n/a	0.24	1.88
SHA-R15-334	809,122.8	9,156,126.0	2695.7	-59.58°	35°	70	RC	2.0	14.0	12.0	6.9	0.56	1.90
								30.0	32.0	2.0	n/a	0.48	0.90
								46.0	58.0	12.0	n/a	0.50	1.13
SHA-R15-335	809,173.9	9,156,156.2	2697.9	-60°	35°	70	RC	0.0	18.0	18.0	15.6	0.58	2.00
								44.0	50.0	6.0	n/a	0.38	1.17
SHA-R15-336	809,199.6	9,156,138.5	2695.3	-60°	35°	70	RC	0.0	6.0	6.0	5.2	0.25	0.73
								12.0	26.0	14.0	n/a	0.56	1.63
								44.0	54.0	10.0	n/a	1.26	1.76
							including	48.0	50.0	2.0	n/a	3.45	3.10
SHA-R15-337	809,208.3	9,156,108.8	2696.2	-60°	35°	84	RC	42.0	58.0	16.0	n/a	1.28	4.44
SHA-R15-338	809,157.6	9,156,133.6	2702.6	-61°	35°	70	RC	0.0	12.0	12.0	10.5	0.50	2.43
								24.0	26.0	2.0	n/a	0.55	0.80
								34.0	62.0	28.0	n/a	0.79	2.61
							including	36.0	38.0	2.0	n/a	3.24	9.90
SHA-R15-339	809,174.6	9,156,097.7	2707.7	-60°	35°	120	RC	10.0	24.0	14.0	n/a	0.46	2.23
SHA-R15-340	809,136.2	9,156,070.6	2734.8	-60°	35°	132	RC	16.0	18.0	2.0	n/a	0.22	0.10
								54.0	68.0	14.0	n/a	1.58	1.63
							including	56.0	60.0	4.0	n/a	4.48	1.50
SHA-R15-341	809,076.6	9,156,084.5	2728.5	-62°	35°	120	RC	16.0	22.0	6.0	n/a	0.51	0.97
								42.0	70.0	28.0	n/a	0.27	5.91

SAN LORENZO DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-D15-019	807,965.0	9,157,899.2	2824.3	-61°	270°	221.3	core	20.0	22.0	2.0	1.0	0.29	3.60
								32.5	46.9	14.4	7.2	0.30	6.75
								76.0	78.0	2.0	1.0	0.31	8.20
								131.5	133.5	2.0	1.0	0.69	20.50
								138.0	140.0	2.0	1.0	0.25	3.20
								156.4	167.1	10.7	5.3	0.93	1.87
							including	*156.4*	*157.8*	*1.4*	*0.7*	*5.93*	*9.10*
								197.5	198.7	1.2	0.6	0.20	3.40
SHA-D15-020	807,792.1	9,157,949.1	2840.3	-61°	90°	200.8	core	18.0	20.0	2.0	1.0	0.21	1.80
								31.0	36.0	5.0	2.5	0.32	2.30
								50.0	56.9	6.9	3.4	0.70	1.30
								105.0	107.0	2.0	1.0	0.72	17.10
								113.9	117.2	3.3	1.7	4.30	6.00
								129.6	133.6	4.0	2.0	1.61	12.10
								142.5	153.0	10.5	5.3	0.96	5.54
SHA-R15-275	807,643.4	9,157,867.4	2848.1	-60°	35°	212	RC	2.0	4.0	2.0	1.0	0.18	1.00
								40.0	56.0	16.0	8.0	0.22	0.86
								60.0	62.0	2.0	1.0	0.23	0.60
SHA-R15-276	807,794.6	9,158,054.2	2889.6	-60°	300°	200	RC	6.0	8.0	2.0	1.0	0.21	1.00
								68.0	70.0	2.0	1.0	0.25	0.60
								146.0	148.0	2.0	1.0	0.20	0.70
SHA-R15-277	807,793.6	9,157,997.1	2867.4	-60°	120°	180	RC	12.0	14.0	2.0	1.0	0.29	1.10
								28.0	32.0	4.0	2.0	0.34	2.05
								64.0	70.0	6.0	3.0	0.21	0.70
								80.0	90.0	10.0	5.0	0.48	2.44
SHA-R15-278	807,852.4	9,158,053.1	2874.7	-59°	300°	200	RC	4.0	6.0	2.0	1.0	0.41	2.20
SHA-R15-279	807,853.4	9,157,992.6	2871.8	-59°	120°	250	RC	12.0	50.0	38.0	19.0	0.58	6.05
								56.0	58.0	2.0	1.0	0.21	3.00
								62.0	82.0	20.0	10.0	0.40	3.12
								90.0	96.0	6.0	3.0	0.25	4.13
								100.0	106.0	6.0	3.0	0.56	2.43
								120.0	138.0	18.0	9.0	0.69	7.17
								152.0	156.0	4.0	2.0	7.13	22.25
								180.0	212.0	32.0	16.0	0.51	3.87
							including	*194.0*	*196.0*	*2.0*	*1.0*	*3.19*	*11.20*
								216.0	226.0	10.0	5.0	0.22	1.24
								234.0	238.0	4.0	2.0	0.21	1.70
SHA-R15-280	807,894.2	9,157,944.6	2848.3	-62°	120°	200	RC	0.0	8.0	8.0	4.0	0.89	3.78
								18.0	22.0	4.0	2.0	0.38	10.45
								28.0	38.0	10.0	5.0	0.34	3.42
								46.0	50.0	4.0	2.0	0.38	10.55
								94.0	96.0	2.0	1.0	0.22	1.90
								98.0	100.0	2.0	1.0	0.22	4.10
								120.0	122.0	2.0	1.0	0.23	2.70
								162.0	168.0	6.0	3.0	0.85	15.07

SAN LORENZO DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-R15-281	807,972.8	9,158,052.6	2835.4	-59°	300°	180	RC	34.0	36.0	2.0	1.0	0.59	2.50
								46.0	74.0	28.0	14.0	0.98	2.88
							including	*60.0*	*62.0*	*2.0*	*1.0*	*9.13*	*6.50*
								120.0	122.0	2.0	1.0	0.20	0.50
SHA-R15-282	807,920.9	9,157,898.7	2831.8	-60°	120°	200	RC	10.0	12.0	2.0	1.0	0.28	13.30
								16.0	58.0	42.0	21.0	0.45	11.02
								186.0	190.0	4.0	2.0	0.44	1.90
SHA-R15-283	807,833.0	9,157,911.5	2833.6	-60°	120°	224	RC	4.0	6.0	2.0	1.0	0.28	1.50
								16.0	48.0	32.0	16.0	0.42	3.79
								54.0	60.0	6.0	3.0	0.29	9.40
								80.0	82.0	2.0	1.0	1.36	3.90
								134.0	138.0	4.0	2.0	0.53	36.05
								144.0	146.0	2.0	1.0	0.20	5.90
								160.0	162.0	2.0	1.0	0.20	1.40
								176.0	186.0	10.0	5.0	0.26	4.74
SHA-R15-284	807,939.9	9,157,991.8	2840.1	-61°	300°	150	RC	14.0	16.0	2.0	1.0	0.21	8.20
								24.0	70.0	46.0	23.0	1.11	3.36
							including	*54.0*	*56.0*	*2.0*	*1.0*	*2.87*	*4.10*
							including	*60.0*	*66.0*	*6.0*	*3.0*	*3.89*	*2.27*
								84.0	86.0	2.0	1.0	0.21	2.10
SHA-R15-285	807,693.9	9,157,845.7	2833.7	-61°	35°	180	RC	72.0	76.0	4.0	2.0	0.28	5.10
SHA-R15-286	807,985.8	9,157,946.7	2821.7	-60°	300°	180	RC	36.0	42.0	6.0	3.0	0.64	21.30
								62.0	64.0	2.0	1.0	0.22	2.30
								66.0	68.0	2.0	1.0	0.28	1.00
								78.0	80.0	2.0	1.0	0.39	2.20
								154.0	166.0	12.0	6.0	3.84	6.38
							including	*160.0*	*164.0*	*4.0*	*2.0*	*10.97*	*15.10*
SHA-R15-326	808,037.9	9,157,793.0	2788.3	-66°	125°	300	RC	164.0	166.0	2.0	1.0	0.22	2.50
								174.0	182.0	8.0	4.0	0.24	100.48
SHA-R15-331	808,037.1	9,157,793.3	2788.2	-61°	300°	220	RC	56.0	58.0	2.0	1.0	0.37	2.40
								76.0	78.0	2.0	1.0	0.91	1.80
SHA-R15-342	807,792.8	9,157,998.8	2868.3	-61°	300°	120	RC	22.0	24.0	2.0	1.0	0.93	0.90
								64.0	66.0	2.0	1.0	0.21	3.50
SHA-R15-343	807,800.2	9,158,052.5	2889.6	-61°	120°	120	RC	60.0	62.0	2.0	1.0	0.58	0.10
								68.0	72.0	4.0	2.0	0.50	1.65
								110.0	116.0	6.0	3.0	0.41	1.10
SHA-R15-344	807,876.0	9,158,102.9	2885.4	-60°	120°	120	RC	72.0	76.0	4.0	2.0	0.47	1.15
								100.0	104.0	4.0	2.0	0.23	1.60
SHA-R15-345	807,853.6	9,158,051.2	2875.3	-60°	120°	120	RC	68.0	70.0	2.0	1.0	0.40	0.90
								86.0	92.0	6.0	3.0	1.04	9.33
								118.0	120.0	2.0	1.0	0.44	0.30
SHA-R15-346	807,840.1	9,158,027.5	2877.2	-60°	120°	120	RC	4.0	10.0	6.0	3.0	0.47	0.97
								22.0	24.0	2.0	1.0	0.30	2.80
								60.0	64.0	4.0	2.0	0.56	4.30

drill interval composites reported using 0.2 g/t Au Cut-off

SAN LORENZO DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-R15-346 (continued)	807,840.1	9,158,027.5	2877.2	-60°	120°	120	RC	70.0	72.0	2.0	1.0	0.20	1.80
								94.0	96.0	2.0	1.0	0.30	2.30
								108.0	110.0	2.0	1.0	0.21	1.10
								114.0	130.0	16.0	8.0	0.40	1.66
SHA-R15-347	807,933.4	9,158,133.5	2856.0	-61°	120°	120	RC	36.0	44.0	8.0	4.0	0.20	1.08
								50.0	80.0	30.0	15.0	1.07	3.08
							including	*52.0*	*54.0*	*2.0*	*1.0*	*2.82*	*2.20*
							including	*74.0*	*78.0*	*4.0*	2.0	*2.74*	*6.60*
								140.0	142.0	2.0	1.0	0.21	0.80
SHA-R15-348	807,900.7	9,157,995.4	2855.6	-61°	120°	120	RC	6.0	72.0	66.0	33.0	2.62	27.49
							including	*14.0*	*20.0*	*6.0*	*3.0*	*21.36*	*182.87*
								84.0	86.0	2.0	1.0	0.50	5.00
SHA-R15-349	807,882.0	9,157,921.0	2842.0	-60°	120°	120	RC	0.0	34.0	34.0	17.0	0.61	6.94
								46.0	48.0	2.0	1.0	0.37	4.90
								90.0	92.0	2.0	1.0	0.25	5.30
SHA-R15-350	808,000.0	9,158,000.0	2821.0	-61°	300°	120	RC	8.0	10.0	2.0	1.0	0.61	1.10
								26.0	28.0	2.0	1.0	0.33	1.50
								34.0	44.0	10.0	5.0	0.39	1.74
								56.0	58.0	2.0	1.0	0.69	6.80
								74.0	76.0	2.0	1.0	0.23	1.20
								102.0	106.0	4.0	2.0	0.50	8.60
SHA-R15-351	807,902.0	9,158,052.0	2859.0	-61°	120°	120	RC	24.0	26.0	2.0	1.0	0.74	11.30
								38.0	46.0	8.0	4.0	0.23	0.90
								64.0	90.0	26.0	13.0	2.54	8.54
							including	*68.0*	*76.0*	*8.0*	*4.0*	*4.64*	*19.73*
							including	*86.0*	*90.0*	*4.0*	*2.0*	*3.19*	*3.75*
								100.0	102.0	2.0	1.0	0.20	1.70

drill interval composites reported using 0.2 g/t Au Cut-off

CHOLOQUE DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-D15-021	808,333.1	9,157,947.0	2774.5	-61°	270°	300	core	129.9	131.4	1.5	0.8	0.35	4.20
SHA-R15-305	808,320.0	9,157,900.0	2777.0	-60°	270°	270	RC	32.0	34.0	2.0	1.0	0.20	52.40
								116.0	118.0	2.0	1.0	0.26	5.90
								150.0	156.0	6.0	3.0	0.28	4.03
								258.0	260.0	2.0	1.0	0.20	3.40
SHA-R15-306	808,232.0	9,157,749.0	2821.0	-60°	270°	234	RC	26.0	28.0	2.0	1.0	0.23	13.40
								42.0	44.0	2.0	1.0	0.20	5.40
								150.0	154.0	4.0	2.0	0.25	34.35
								168.0	194.0	26.0	13.0	4.02	18.58
							including	172.0	178.0	6.0	3.0	14.55	48.70
								224.0	234.0	10.0	5.0	8.42	102.22
							including	232.0	234.0	2.0	1.0	41.43	486.00
SHA-R15-327	808,199.6	9,157,646.3	2838.4	-60°	270°	300	RC	140.0	176.0	36.0	18.0	2.27	53.54
							including	150.0	152.0	2.0	1.0	26.91	344.00
							including	160.0	164.0	4.0	2.0	4.02	83.70
								226.0	228.0	2.0	1.0	0.45	13.80
								244.0	260.0	16.0	8.0	2.89	98.84
							including	244.0	252.0	8.0	4.0	5.43	116.48
							including	244.0	246.0	2.0	1.0	18.07	413.00
								294.0	296.0	2.0	1.0	0.24	12.10
SHA-R15-332	808,271.3	9,157,825.7	2801.1	-62°	270°	262	RC	4.0	6.0	2.0	1.0	0.40	0.30
								12.0	14.0	2.0	1.0	0.20	1.90
								146.0	152.0	6.0	3.0	0.58	6.40
								178.0	182.0	4.0	2.0	0.22	3.10
								218.0	220.0	2.0	1.0	0.57	12.70

LA CHILCA DRILLING

Hole ID	Easting	Northing	Elevation	Inclination	Azimuth	Depth (m)	Drill Type	From (m)	To (m)	Drilled Length (m)	Est True Width (m)	Au g/t	Ag g/t
SHA-D15-022	806,220.0	9,158,278.0	3054.0	-61°	305°	100	core	8.0	19.5	11.5	n/a	0.32	3.22
SHA-D15-023	806,235.0	9,158,348.0	3039.0	-59°	305°	150	core	4.0	73.4	69.4	n/a	1.36	13.64
							including	26.0	35.9	9.9	n/a	7.13	64.16
SHA-D15-024	806,235.0	9,158,348.0	3039.0	-61°	0°	100	core	0.0	54.0	54.0	n/a	1.26	5.80
							including	18.0	24.5	6.5	n/a	6.65	3.64
								57.0	62.0	5.0	n/a	0.20	3.22