Prepared for: Belo Sun Mining Corp.



Feasibility Study on Volta Grande Project, Pará, Brazil
NI 43-101 Technical Report

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CONTENTS

TABLES

FIGURES

APPENDICES

FREQUENTLY USED ACRONYMS AND ABBREVIATIONS

AA	Atomic absorption spectrometry
AACE	American association of cost engineering
AARL	Anglo american research laboratories
ABA	Acid-base accounting
ABNT	Associação Brasileira de Normas Técnicas
ADIS	Automated digital imaging system
A_i	Bond abrasion index
Ag	Silver
Amp	Amperes
ARD	Acid rock drainage
Au	Gold
AUD	Australian dollar (currency)
A x B	"A" (asymptote) multiplied by "B" (slope), of impact breakage test
BQR	Budget quotation request
BW_i	Bond ball mill work index
BRL	Brazilian real (currency)
BOOT	Build own operate transfer
CAD	Canadian (currency)
CaO	Calcium oxide
$Ca(OH)_2$	Calcium hydroxide
CCTV	Closed circuit television
CIL	Carbon-in-leach processing method
CIM	Canadian institute of mining, metallurgical, and petroleum
CIP	Carbon-in-pulp processing method
cm	Centimeters
CN	Cyanide
CN_{WAD}	Cyanide (weak acid dissociable)

^{o}C	Degrees Celsius
Cu	Copper
CW_i	Crusher work index
DC	Direct current
DMS	Documentation management systems
DO	Dissolved oxygen
DWT	Drop weight test (impact breakage test)
EGL	Effective grinding length
EHV	Extra high voltage
E&I	Electrical and instrumentation
EPCM	Engineering, procurement & construction management
ERP	Enterprise resource planning
EUR	Euro dollar (currency)
FACC	Fire alarm command center
FEL	Front end loader
FOBOT	Fibre optic break out tray
ft	Foot
g/L	Grams per litre
g/m^3	Grams per cubic meter
g/t	Grams per tonne
GRG	Gravity recoverable gold
GS	Grota Seca (deposit)
G&A	General and administrative
h	Hour
ha	Hectares
HCl	Hydrochloric acid
HCN	Hydrogen cyanide
HG	High grade

H_2SO_4	Sulphuric acid
HV	High voltage
ICP	Inductively coupled plasma geochemical analysis
IEC	International electrotechnical commission
IEEE	Institute of Electrical and Electronics Engineers
I/O	Input output
kg	Kilograms
kg/t	Kilograms per tonne
kg/batch	Kilograms per batch
kg/strip	Kilograms per strip
kL	Kiloliters
km	Kilometers
kPa	Kilopascal
kV	Kilovolt
kVA	Kilovolt-amp
kW	Kilowatt
kWh	Kilowatt-hour
kWh/year	Kilowatt-hour per year
kWh/t	Kilowatt-hour per tonne
LAN	Local area network
LG	Low grade
L/s	Liters per second
LF	Load factor
LIMS	Laboratory information management system
LNB	Low-noise block up converter
L/t	Liters per tonnes
LOM	Life- of-mine
LRS	Liquid resistance starter

LV	Low voltage
m	Meter
m^2	Square meter
m^3	Cubic meter
m^3/h	Cubic meters per hour
µm	Micron
mm	Millimeters
mg/L	Milligram per Liter
MCC	Motor control center
MIBC	Methyl isobutyl carbinol
Mt/a	Million tonnes per annum
MV	Medium voltage
MW	Megawatt
MWh	Megawatt-hour
NaCN	Sodium cyanide
Nm^3/h	Normal cubic meters per hour (measure of gas volume)
OIT	Operator interface terminals
OV	Ouro Verde (deposit)
oz	Troy ounce (12 oz to 1 pound)
PCS	Plant control system
PF	Productivity factor
ppm	Parts per million (used for concentration)
P_{80}	80 percent passing
Pa	Pascal
PAX	Potassium amyl xanthate
PCS	Process control system
PF	Power factor
PLC	Programmable logic controller

PLS	Pregnant leach solution
PWT	Process water tank
QA/QC	Quality assurance and quality control
RC	Reverse-circulation drilling method
ROM	Run of mine
RQD	Rock-quality designation
RW_i	Bond rod mill work index
S	sulphur
SINMETRO	Sistema nacional de metrologia
SAG	Semi-autogenous grinding
Sap	Saprolite (deposit)
Set/y	Set per year
SG	Specific gravity
SMBS	Sodium metabisulphite
SMP	Structural mechanical piping
SPI	SAG power index (comminution test)
SO_2	Sulphur dioxide
STP	Sewage treatment plant
SVC	Static VAR compensator
t	Tonnes
TDS	Total dissolved solids
TEU	Twenty-foot equivalent unit
TMF	Tailings management facility
t/d	Tonnes per day
t/h	Tonnes per hour
t/a	Tonnes per annum
UF	Utilization factor
UPS	Uninterrupted power supply

USD	US dollars
$	US dollars (currency)
$/oz	US dollars per troy ounce
$/t	US dollars per tonne
$/y	US dollars per year
UV	Ultraviolet
V	Volts
VFD	Variable frequency drive
VOIP	Voice over internet protocol
WAD	Weak acid dissociable (used for cyanide concentration)
WAN	Wide area network
WRIM	Wound rotor induction motor
w/w	Weight by weight concentration basis
w/v	Weight by volume concentration basis
ZAR	South Africa rand (currency)

1.0 SUMMARY

1.1 Principal Outcomes

The principal outcomes from the Feasibility Study (Study) as contained in this Technical Report are summarized in Table 1-1.

Table 1-1: Volta Grande Project Performance Summary

Project Data	Feasibility Study Results
Production Data	
Life-of-Mine (LOM)	17.2 years
Annual Throughput – Phase 1	3.5 Mt/a
Annual Throughput – Phase 2	7 Mt/a
LOM Gold Recovery	93%
LOM Annual Gold Production	205,155 oz/a
Mine Design	
LOM Waste to Ore Strip Ratio	4.3:1
Average Resource Grade	0.90 g/t Au
Average Reserve Grade	1.02 g/t Au
LOM Operating Costs	
Mining	$10.62/t Ore
Processing	$7.26/t Ore
General and Administrative	$0.84/t Ore
Total Operating Cost	$18.72/t Ore
Post-Tax Capital Costs	
Initial Capital Cost	$298 M
All-In-Sustaining-Cost (AISC)	$779 oz/a
Post-Tax Economics	
Net Present Value (NPV @ 5%)	$665 M
Internal Rate of Return (IRR)	26%
Payback	3.9 years

1.2 Background

In May 2014 Belo Sun Mining Corp. (Belo Sun) commissioned Lycopodium Minerals Canada Ltd. (Lycopodium) to complete a Study of the Volta Grande Project (Project) with inputs from the following consultants:

- SRK Consulting (Canada) Inc. (SRK);
- SGS Chile Ltda. (SGS);
- HDA Serviços (HDA);
- Pocock Industrial Inc. (Pocock);
- GH Wahl & Associates Consulting (George Wahl);
- Orway Mineral Consultants (Orway);
- JS Analytical Laboratory Consultants Ltd. (Jack Stanley);
- McClelland Laboratories Inc. (McClellend);
- JK Tech Pty Ltd. (JK Tech);
- AGP Mining Consultants Inc. (AGP);
- VOGBR Recursos Hidricos e Geotecnia Ltda. (VOGBR);
- BGC Engineering Inc. (BGC);
- Environmental Resources Management Inc. (ERM);
- Dalben Consultoria em Engenharia Eletrica e Treinamento Ltda. (Dalben);
- TRANSGLOBAL Operador Logistico Multimodal (Transglobal); and
- L&M Assessoria Empresarial (L&M).

The Study was executed over the period of June 2014 to March 2015. The Study was based on a “fit for purpose” design basis and was conducted with the objective of updating the resource and reserve estimates, designing to feasibility level the appropriate facilities required for mining, processing, tailings management, ancillary facilities, on-site and off-site infrastructure.

This Technical Report summarizes the exploration history, resource and reserves estimates, mine design, metallurgical testing, process design, infrastructure design, environmental studies, cost and operating estimates, project implementation planning, risk assessment and economic analyses performed during the Study period.

The Technical Report is considered by Lycopodium appropriate to feasibility level (±15% accuracy) as defined by the Association for the Advancement of Cost Engineering (AACE).

All currency in this Technical Report is stated in US dollars unless otherwise indicated.

1.3 Reliance on Other Experts

In compiling this Technical Report Lycopodium has relied upon others for certain aspects including mineral title, surface rights, property agreements, political setting, socio-economic studies, environmental and taxes as outlined in Section 3.

1.4 Location, Climate and Property Description

The Project is located adjacent to the Xingu River south-east of Altamira. The Project is situated in an area of low topographic relief with elevations in a range of 100 m to 120 m above mean sea level. The dominant topographic feature is the valley of the meandering and northeast flowing Xingu River and the Itatá River which drains into the Xingu River in the eastern part of the property.

The Project is moderately forested. The land in neighbouring areas is used mainly for grazing of cattle and subsistence agriculture.

Belo Sun holds 100% interest in the Project through its wholly owned subsidiary Verena Mineração Ltda. The project comprises 20 exploration permits, covering an area of 103,354 ha; 4 mining concession application, covering an area of 2,356 ha; 10 exploration applications for exploration in mineral rights covering an area of 23,208 ha; and 8 exploration applications for exploration in mineral rights in public tender, covering an area of 31,660 ha. Four of the exploration applications in public tender are in a priority regime.

1.5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Project is located approximately 65 km south-east of the city of Altamira.

The property is located north of the Carajás mineral province, which has a long mining history. However, local infrastructure is poor for mining activities since the property is located in a remote area.

Access to the Project site takes two hours from Altamira either by river in a small motorboat along the Xingu River, or by land by crossing the Xingu River by barge, and taking a paved and dirt road (BR-158) to the stretch of river known as the Big Bend (or *Volta Grande*) where the exploration camp is situated. Due to the construction of the Belo Monte hydroelectric dam, road access from Altamira to the dam construction site is being paved. From the construction site, approximately halfway between Altamira and the Project the road is unpaved but in good condition.

The climate is tropical with a rainy season from January to April and a dry season extending from May to December. The mean temperature is nearly the same (25 to 30ºC) throughout the year. The relative humidity ranges from about 65% to 85%.

Electric power at the property is provided by two main diesel generators that operate alternately during the day and at night. A third generator is dedicated to the operation of rock saws. Water is available from wells on the property as well as from the Xingu River, which drains the general area. Well water is treated on-site continuously with chlorine and stored in a water tower outside of the camp perimeter. Telephone communication and internet service are available on the property.

1.6 History

Extraction of gold in the eastern Amazon region dates back to the Portuguese colonization in the 17th century. The discovery of gold along the stretch of the Xingu River, known as Volta Grande, occurred in the early 20th century. Since the 1950s, irregular small-scale miners (*garimpeiros*) have worked in the Project area in small alluvial deposits, especially in the area of the South Block. In the 1990s, the garimpeiros started to exploit saprolite and fresh rock deposits, constructing shafts that appear to reach considerable depths. Systematic exploration started in the late 20th century.

1.7 Geological Setting and Mineralization

The Project is situated along the northern boundary of the Carajás-Iricoumé Block of the Eastern Amazonian Craton which contains the west-northwest–trending Três Palmeiras Greenstone Belt. It comprises Upper Proterozoic metavolcanic and metasedimentary rocks.

The volcanic, sedimentary and syntectonic rocks of the Project have been affected by a wide spread hydrothermal alteration events. Surficial alteration is present in an extensive layer of red saprolite, which covers the entire property, including topographic highs and lows.

The Project contains two target areas consisting of the North and South Blocks; the former contains four large mineralized areas: (1) the Ouro Verde area in the north western part of the North Block, (2) the Grota Seca area to the south-east, (3) the Junction area that connects Grota Seca and Ouro Verde, and (4) the Greia area north of Grota Seca. The South Block comprises three target areas: (1) Pequi in the northern part of the South Block, (2) Grande in the southern part of the South Block, and (3) Itatá in the southeastern part of the South Block.

Primary gold mineralization is associated with altered diorite within a 300 m wide alteration zone, which straddles the contact zone between the intrusive and the metasedimentary rock. Gold occurs in a stack of mineralized zones ranging in size from strike trends over 1 km long, depths from surface to approximately 400 m with true thicknesses up to 50 m. The dip of the mineralized zones is generally moderate to steep (50^o to 85^o) to the south.

Mineralization in the Ouro Verde area extends for approximately 1,100 m along an approximate north-west to south-east strike and extends to a vertical depth of 540 m below surface.

Mineralization in the Grota Seca area extends for approximately 2,900 m along a west to north-westerly trend and extends to a vertical depth of 400 m below surface.

1.8 Deposit Types

Exploration work has indicated that the Project is situated in a geological environment similar to other gold deposits in this part of South America, such as the oxide zones of several gold and copper-gold deposits in the Carajás region of Brazil.

Lateritic and saprolitic gold deposits are typically situated in tropical environments, such as the northern part of South America. In these environments, gold is mechanically transported and distributed in a volume of lateritic material overlying the mineralized structures in bedrock.

1.9 Exploration

Recent exploration activities carried out by Belo Sun include the following:

- Reinterpretation of Airborne Geophysical Survey from March to September 2010;
- Preliminary Geotechnical Studies in October 2010;
- IP Survey between October and November 2010;
- Photogeological and Landsat Lithostructural Interpretation in July 2011;
- LIDAR and Aerophotographic Survey in August 2011;
- Structural Study in early 2012;
- Airborne Geophysical Survey in August 2012.

1.10 Drilling

Table 1-2 provides a summary of the exploration drilling performed to date on the North and South Blocks.

Table 1-2: Summary of Drilling on Project

Company	Period	Type	Target Area	No. of Boreholes	Total Length m
Volta Grande Mineração Ltda. (TVX Gold Inc.)	1995	Core	South Block	2	245
	1996	Core	South Block	4	450
		Core	Grota Seca	24	3,533
	1997	Core	Grota Seca	41	7,003
		RC	Grota Seca	11	1,696
		Core	Ouro Verde	5	852
	1998	Core	Grota Seca	34	6,041
		Core	Ouro Verde	10	2,175
Verena Minerals Corp.	2006	Core	Grota Seca	23	5,000
	2007	Core	South Block	16	2,675
		Core	Grota Seca	6	1,240
		Core	Ouro Verde	5	1,351
	2008	Core	Grota Seca	1	217
		Core	Ouro Verde	26	4,083
Belo Sun Mining Corp.	2010	Core	Grota Seca	23	5,617
		Core	Ouro Verde	36	9,123
	2011	Core	South Block	21	5,575
		Core	Grota Seca	142	37,330
		RC	Grota Seca	42	8,328
		Core	Ouro Verde	82	23,287
	2012	Core	South Block	30	8,552
		Core	Grota Seca	173	47,827
		Core	Ouro Verde	128	39,099
		RC	Grota Seca	6	1,201
	2013	Core	South Block	35	6,413
		Core	Grota Seca	7	1,799
		Core	Ouro Verde	22	5,340
	2014	Core	Grota Seca	14	1,438
		Core	Ouro Verde	3	261
Total				972	237,751

SRK believes the procedures undertaken by Belo Sun at the Project for reverse circulation (RC) and core drilling, chip and core handling, logging and maintenance of the database for the Project are well managed, documented, and undertaken with a well defined set of procedures that exceed industry standard practice.

SRK considers that the exploration data collected by Belo Sun and previous Project operations are of sufficient quality to support mineral resource evaluation.

1.11 Sample Preparation, Analyses and Security

Section 11 of the Technical Report describes the measures taken for sampling, analysis and security of ore samples during the various stages of exploration carried out from 1996 to 2012.

In the opinion of SRK, Belo Sun personnel used care in the collection and management of field and assaying exploration data. In the opinion of SRK, the sampling preparation, security, and analytical procedures used by Belo Sun are consistent with generally accepted industry best practices and are, therefore, adequate. SRK considers that the exploration data collected by Belo Sun and previous project operators are of sufficient quality to support mineral resource evaluation.

1.12 Data Verification

Quality control measures were set in place by Belo Sun and included independent verifications of assaying that involve external quality control measures on all sampling. Assaying protocols involved replicating assays (pulp duplicates), inserting certified quality control samples (blanks and standards) and check assaying. Section 12 of this Technical Report describes the acceptance criteria and various independent audits that were performed during the Study.

SRK conducted a series of routine verifications to ensure the reliability of the electronic data, which represents the exploration data set as of August 2014, provided by Belo Sun. This included checking the digital data against original assay certificates. More than 10% of the new assay data were audited for accuracy against assay certificates. No input errors were detected in the Belo Sun data.

1.13 Mineral Processing and Metallurgical Testing

The process design criteria are based on test work conducted from 2011 through to 2014. The test work has been consistent across the various campaigns and laboratories and showed that gold is readily recovered using conventional cyanide leaching with a leaching time of 32 hours. Utilizing a P_{80} 75 µm grind size, gold recoveries between 91% and 95% are expected over the LOM.

The Ouro Verde and Grota Seca ore bodies are very homogeneous in terms of comminution characteristics and confirm that the ore is very competent. The average A X b value of 30.2 places the ore in the 85th percentile of the OMC database. The average BW_i of 15.7 kWh/t places the ore in the 54th percentile for grinding amenability.

Leaching reagent consumptions are relatively low ranging from 0.11 to 0.21 kg/t NaCN and 0.32 to 0.58 kg/t $Ca(OH)_2$.

Section 13 of the Technical Report provides a detailed description of the mineral processing and metallurgical testing completed to date in support of the Study process design.

1.14 Mineral Resource Estimate

SRK believes that the resource evaluation reported herein is a reasonable representation of the global gold mineral resources found in the Project at the current level of sampling. The mineral resources have been estimated in conformity with the widely accepted CIM Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines and are reported in accordance with the Canadian Securities Administrators' National Instrument 43-101. Mineral resources are not mineral reserves and have not demonstrated economic viability. There is no certainty that all or any part of the mineral resource will be converted into mineral reserve.

The Project is subdivided in 2 areas - North Block and South Block. The mineral resource model for the South Block was prepared by Belo Sun and was audited by SRK in September 2013. There has been no change to the mineral resource model for South Block. For the North Block, a new mineral resource model was prepared by SRK during the first quarter of 2015 to account for new drilling information based on a revision of the geological interpretation. This section is subdivided in two parts. The first part documents the methodology and the key assumptions considered by SRK to prepare the new mineral resource model for the North Block. The second part summarizes the key assumptions used by Belo Sun to prepare the mineral resource model for the South Block and results of the SRK audit.

GEOVIA GEMS™ software (version 6.5) was used by SRK and Belo Sun to construct the geological solids. SRK used a combination of GEMS, Leapfrog™, Gocad, and GSLib™ software to prepare assay data for geostatistical analysis, construct the block model, estimate gold grades, and tabulate mineral resources.

SRK considers that the gold mineralization found in the Volta Grande project is primarily amenable to open pit extraction. SRK used a pit optimizer to assist with determining which portions of the gold deposits show "reasonable prospect for eventual economic extraction" from an open pit and to assist with selecting reporting assumptions. The optimization assumptions are summarized in Table 1-3.

Table 1-3: Conceptual Open Pit Optimization Assumptions

Parameter	North Block	South Block
Pit Berm Height	20 m	20 m
Pit Bench Height	10 m	10 m
Overall Slope Angle (saprolite/unweathered rock)	31° / 51°	31° / 51°
Processing and G & A Costs (US$/t mined)	$9.11	$14.87
Gold Recovery (saprolite and unweathered rock)	94%	94%
Gold Price ($/oz)	$1,400	$1,400

After review of optimization results and through discussions with Belo Sun, SRK considers that it is reasonable to report as open pit mineral resource those classified blocks located within the conceptual pit shells above a cut-off grade of 0.4 g/t Au for the North Block. No underground mineral resource is reported.

SRK is satisfied that the mineral resources were estimated in conformity with the widely accepted CIM Estimation of Mineral Resource and Mineral Reserve Best Practices Guidelines. The mineral resources may be affected by further infill and exploration drilling that may result in increases or decreases in subsequent mineral resource estimates. The mineral resources may also be affected by subsequent assessments of mining, environmental, processing, permitting, taxation, socio-economic, and other factors. The Mineral Resource Statement for the North Block is presented in Table 1-4 with an effective date of March 16, 2015, and the Audited Mineral Resource Statement for the South Block is given in Table 1-5 with an effective date of October 1, 2013. Both statements were prepared by Dr. Oy Leuangthong, PEng (PEO#90563867) and Dr. Jean-Francois Couture, PGeo (APGO#0196). Drs. Leuangthong and Couture are independent qualified persons as this term is defined in National Instrument 43-101.

Table 1-4: Resource Statement*, North Block Volta Grande Gold Project, Pará State, Brazil, SRK Consulting (Canada) Inc., March 16, 2015

Deposit	Category	Quantity Kt	Gold Grade g/t Au	Contained Gold Koz
Ouro Verde Open Pit				
Saprolite	Measured	750	0.96	23
	Indicated	709	0.78	18
	Inferred	216	0.67	5
Unweathered	Measured	18,532	1.16	693
	Indicated	52,647	1.06	1,796
	Inferred	22,576	0.89	643
Grota Seca Open Pit				
Saprolite	Measured	249	0.96	8
	Indicated	1,386	0.74	33
	Inferred	832	0.61	16
Unweathered	Measured	24,270	1.00	782
	Indicated	54,611	0.87	1,519
	Inferred	12,557	0.82	332
Junction Open Pit				
Saprolite	Measured	2	1.53	0
	Indicated	215	0.78	5
	Inferred	82	0.66	2
Unweathered	Measured	271	0.71	6
	Indicated	2,950	0.77	73
	Inferred	1,491	0.75	36
Greia Open Pit				
Saprolite	Inferred	512	1.06	17
Unweathered	Inferred	1,503	2.04	98
Total Open Pit				
	Measured	44,075	1.07	1,512
	Indicated	112,518	0.95	3,444
	Measured + Indicated	156,593	0.98	4,956
	Inferred	39,767	0.90	1,151

*Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Open pit mineral resources are reported at a cut-off grade of 0.4 g/t Au. The cut-off grades are based on a gold price of $1,400/oz and metallurgical recoveries of 94% for saprolite and 94% for unweathered material.

Table 1-5: Audited Mineral Resource Statement*, South Block of Volta Grande Gold Project, Pará State, Brazil, SRK Consulting (Canada) Inc., October 1, 2013

Domain	Category	Quantity Kt	Gold Grade g/t Au	Contained Gold Koz
South Block Open Pit				
Saprolite	Inferred	169	1.68	9
Unweathered	Indicated	2,503	3.06	246
	Inferred	2,752	4.08	361
South Block Underground				
Unweathered	Indicated	24	4.24	3
	Inferred	193	4.05	25
Total Open Pit				
	Indicated	2,503	3.06	246
	Inferred	2,921	3.94	370
Total Underground				
	Indicated	24	4.24	3
	Inferred	193	4.05	25
Total South Block				
	Indicated	2,527	3.07	249
	Inferred	3,114	3.95	395

*Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Open pit mineral resources are reported at a cut-off grade of 0.5 g/t Au and underground mineral resources are reported at a cut-off grade of 2.0 g/t Au. The cut-off grades are based on a gold price of $1,400/oz and metallurgical recoveries of 94% for saprolite and unweathered material.

1.15 Mineral Reserve Estimates

The mineral reserve estimates of the Project have been prepared by AGP.

The reserves are based on the conversion of the measured and indicated resources within the current Study mine plan. Measured resources are converted directly to proven reserves and indicated resources to probable reserves.

The reserves are shown in Table 1-6.

Table 1-6: Proven and Probable Reserves

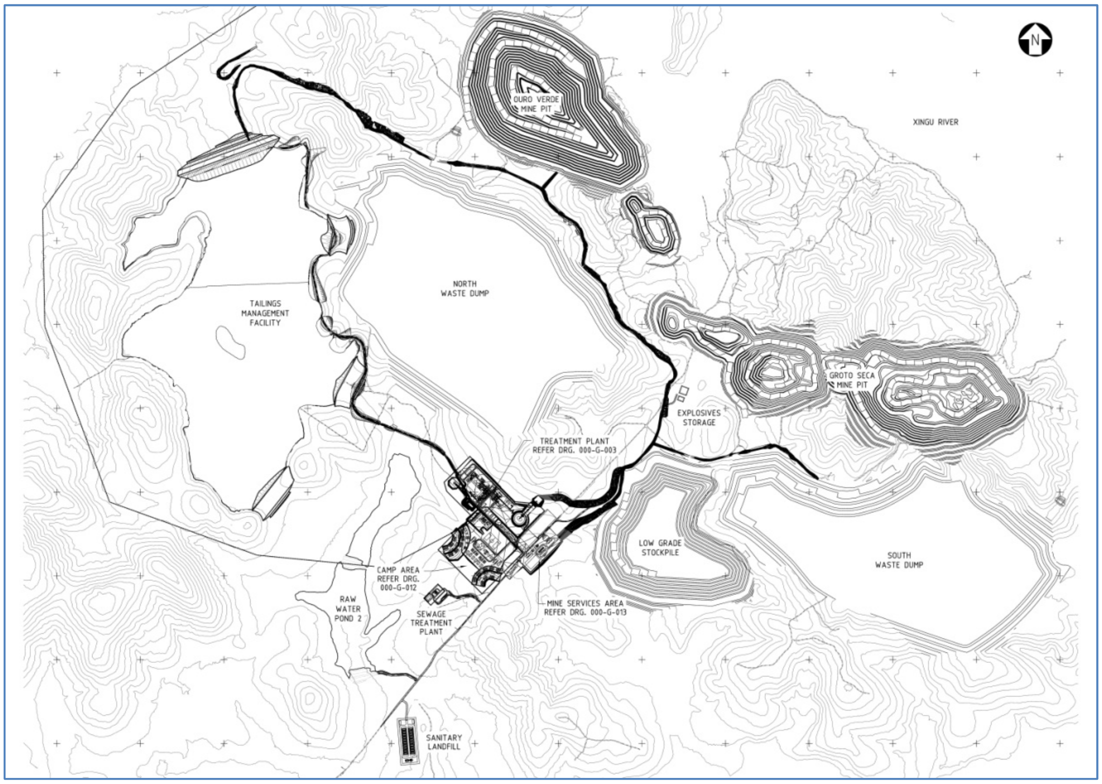
Classification	Reserves Kt	Grade g/t Au	Contained Gold Koz
Proven	41,757	1.07	1,442
Probable	74,212	0.98	2,346
Proven + Probable*	115,969	1.02	3,788

*The South Block is not considered in the Study and the resources associated with South Block are not converted or discussed further. Tonnages for underground potential are part of the March 16 2015 resource but are also not discussed further or converted.

1.16 Mining Method

The open pit mine includes two separate pits - Ouro Verde and Grota Seca. They are designed to be mined with proven technology and equipment. The layout of the two open pits and waste management facilities (WMF) is shown in Figure 1-1.

Figure 1-1: Site Layout with Open Pits and Waste Management Facilities



The saprolite overlain on the deposits requires no drilling and blasting. This saprolite has more of a sandy texture than clay. Mining of this material will be with the front end loaders initially. As the shovels are erected, they will be tasked with mining the lower portion of the saprolite near the weathered contact where underfoot conditions will be more stable.

Suspended dump bodies have been included in the specification and costing of the haulage trucks. The suspended dump bodies are designed to reduce carry back of the saprolite material and also increased life from increased abrasion resistance with their rubber beds hauling the rock, both waste and ore.

The rock beneath the saprolite will be drilled with 200 mm down the hole (DTH) drills with a 10 m bench. Benches will be prepared with the track dozers and rubber tired dozer. The drill will then drill on the pattern size as specified by engineering for either waste or ore. That determination will be made based on the results of the grade control drilling completed with the RC drills. The grade control drilling will be in ahead of the bench mining to allow up to 18 months of advance information on the contacts.

The Study mine schedule is based on the mining of 4 phases in Ouro Verde and 6 phases in Grota Seca. A quarry is opened initially in Ouro Verde that is within the footprint of the third phase of Ouro Verde.

The mine schedule consists of eight months of pre-production stripping and 13 years of mining. Processing will continue until early into year 18 to complete the removal of the low grade stockpile. Over the LOM, 116 Mt of ore grading 1.02 g/t Au will be delivered to the process plant. Waste moved totals 504 Mt for a LOM strip ratio of 4.3:1.

Ouro Verde delivers 55 Mt of ore grading 1.09 g/t Au with a waste total of 248 Mt. The strip ratio for Ouro Verde is 4.5:1 LOM.

Grota Seca delivers 61 Mt of ore grading 0.95 g/t Au with a waste total of 256 Mt. The strip ratio for Grota Seca is 4.1:1 LOM.

The Study mine schedule is a staged sequence, providing 3.5 Mt/a initially, then ramping in year 2 and maintaining 7 Mt/a for the remainder of the mine life starting in year 3. The Study mine schedule is shown in Table 1-7.

Table 1-7: Study Mine Schedule – Summary

Period	Ore to Process Plant Kt	Grade g/t Au	Direct to Process Plant Kt	To Stockpile Kt	From Stockpile Kt	Waste Kt	Total Material Kt
PP	148	0.70	20	322	128	10,677	11,019
Yr 1	3,500	1.56	3,218	4,871	283	42,280	50,368
Yr 2	6,000	1.46	5,659	6,249	341	61,350	73,258
Yr 3	7,000	1.40	7,000	6,653	-	65,091	78,743
Yr 4	7,000	1.38	7,000	6,757	-	67,185	80,942
Yr 5	7,000	1.26	7,000	3,819	-	70,175	80,994
Yr 6	7,000	1.26	7,000	4,008	-	47,858	58,866
Yr 7	7,000	1.20	7,000	3,530	-	36,054	46,584
Yr 8	7,000	1.12	5,631	2,961	1,369	31,502	40,093
Yr 9	7,000	1.32	7,000	3,738	-	30,016	40,754
Yr 10	7,000	1.25	5,092	1,937	1,908	16,770	23,799
Yr 11	7,000	1.22	5,815	2,109	1,185	16,262	24,185
Yr 12	7,000	0.87	1,871	898	5,129	6,907	9,676
Yr 13	7,000	0.51	476	309	6,524	1,700	2,485
Yr 14	7,000	0.47	-	-	7,000	-	-
Yr 15	7,000	0.47	-	-	7,000	-	-
Yr 16	7,000	0.47	-	-	7,000	-	-
Yr 17	7,000	0.49	-	-	7,000	-	
Yr 18	1,321	0.49	-	-	1,321	-	
Total	115,969	1.02	69,780	48,162	46,189	503,824	621,766

Note: Total material is the sum of direct to process plant, to stockpile and waste only. Stockpile reclaim is not included. Stockpile losses account for the difference in the "To Stockpile" and "From Stockpile" tonnage.

1.17 Process Design

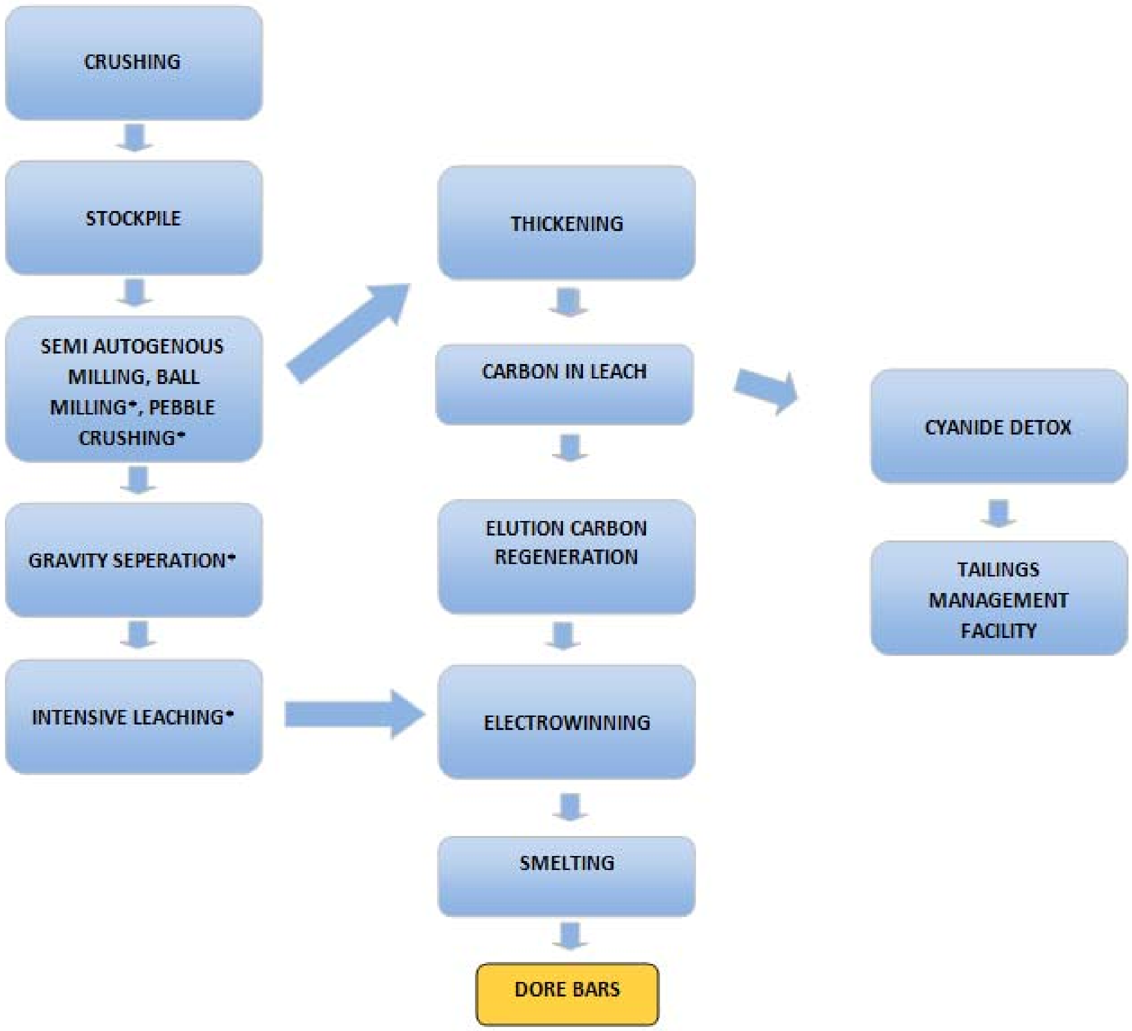
The process plant is designed with a Phase 1 capacity of 3.5 Mt/a and a Phase 2 expansion capacity to 7 Mt/a in year 3. The process plant will recover gold with a conventional and robust flow sheet utilizing crushing, grinding, gravity recovery with intensive leach, cyanidation of slurry in carbon, AARL recovery, electrowinning, carbon regeneration and cyanide detoxification. An overall expected gold recovery of 91% during Phase 1 and 93% during Phase 2 has been established (for an overall LOM gold recovery of 93%) and is well supported by the test work.

The simplified process flow sheet is shown in Figure 1-2. A detailed description of the process plant and the Phase 2 expansion is provided in Section 17.

The main process design characteristics of the plant are:

- Phase 1 throughput: 3.5 Mt/a;
- Phase 2 throughput: 7 Mt/a;
- Top size of ROM ore to primary crusher: 252 mm;
- Grinding product size P_{80}: 75 µm;
- Phase 1 gold head grade: 1.56 g/t Au;
- Phase 2 gold head grade: 0.97 g /t Au;
- LOM gold head grade: 1.02 g/t Au;
- Mill operating hours per year: 8,000;
- LOM gold production: 205,155 oz/a.

Figure 1-2: Simplified Process Flow Diagram



*Denotes Phase 2

1.18 Project Infrastructure

The Project will comprise the following on-site buildings and facilities:

- Open pits;
- Waste management facilities:
- Mine haul roads;
- Site roads;
- Primary crusher;
- Ore stockpile;
- Process Facilities – milling, gravity circuit, thickener, leach / CIP, cyanide destruct, elution and carbon regeneration facilities, electrowinning and gold room, reagent buildings;
- Ancillary buildings (administration complex, workshops, warehouse, mine services);
- Main electrical substation and distribution substations;
- Power distribution system;
- Tailings management facility;
- Tailings pipelines including reclaim water return line;
- Water storage and distribution systems; and
- Fire water system.

In addition there are various off-site facilities which include:

- 230 kV power line; and
- Access road.

The infrastructure is described in detail in Section 18 of this Technical Report.

1.19 Market Studies and Contracts

Belo Sun has not conducted a market study in relation to the gold doré which may be produced by the Project. Gold is a freely traded commodity on the world market for which there is a steady demand by numerous buyers.

1.20 Environmental Studies, Permitting and Social or Community Impact

Environmental Resource Management Inc. (ERM) was retained to prepare a summary report of environmental and social studies and management plans prepared for the Project. ERM completed its review as of January 2015.

An Environmental Impact Assessment (EIA) was prepared for the Project and submitted to the state environmental regulatory authority (SEMA). Following approval received in December 2013, the Project received its Preliminary License (LP) in

February 2014. The LP establishes conditions for achieving the next major permitting requirement, the Installation License (LI) and Belo Sun has been given 1,095 days to address the conditions of the LP. These conditions include a number of studies, management plans and environmental and social programs designed to mitigate impacts and risks associated with the Project.

At the time of issuing the Study the LI application has been submitted to SEMA. The LI application must present details on the design of the Project and the environmental and social protection measures that will be implemented. The LI application provides an update on the ongoing environmental and social studies required as part of the LP conditions. The Project has undergone changes since the completion of the EIA and the issuance of the LP. The LI application updates the evaluation of potential environmental and social impacts based on the updated Project footprint.

An executive summary of the ERM Report can be found in Section 20 of this Technical Report.

1.21 Capital and Operating Costs

The operating cost estimate for the Project is presented in Section 21 of this Technical Report.

The capital cost estimate (estimate) includes all the direct and in-direct costs along with the appropriate project estimating contingencies for all the facilities required to bring the Project into production, as defined by this Study.

All equipment and material are assumed to be new. The labour rate build up is based on the statutory laws governing benefits to workers in effect in Brazil at the time of the estimate. Brazilian import tariffs have been applied.

Cost items obtained from local sources are converted via the a USD:BRL = 1:1.3 exchange rate, as per the first quarter of 2015.

The estimate does not include any allowances for escalation, exchange rate fluctuations or project risks. The execution strategy is based on an engineering, procurement and construction management (EPCM) implementation approach and horizontal (discipline based) construction contract packaging. The capital cost estimate has a predicted accuracy of ± 15%.

The total initial capital cost of the 3.5 Mt/a (Phase 1) plant is $264 million dollars excluding duties and taxes.

The capital cost summary by area is presented in Table 1-8.

Table 1-8: Capital Cost Summary - Major Area

Cost Category	Main Area Code	Cost Without Duties / Taxes $
Indirect Costs	000 Construction In-directs	25,001,506
	300 Infrastructure	1,039,997
	500 Management Costs	17,565,004
	600 Owners Project Costs	23,916,715
	700 Owners Operations Costs	34,585,877
Indirect Costs Total		102,109,099
Direct Costs	100 Process plant	65,056,340
	200 Reagents and Plant Services	17,872,863
	300 Infrastructure	34,562,542
	400 Mining	20,698,934
Direct Costs Total		138,190,679
Contingency	900 Contingency	23,437,816
Total Capital 3.5 Mt/a Plant		263,737,595

This capital cost estimate reflects the joint efforts of Lycopodium, Belo Sun and specialist consultants retained by Belo Sun - AGP, VOGBR, Transglobal and Dalben. Lycopodium was responsible for compiling the submitted data into the overall estimate but did not review or validate the inputs from Belo Sun or its other consultants.

The sustaining capital cost for the Project reflects additional capital expenditures after the Project is in operation to expand the process plant to 7 Mt/a throughput, procure new / replacement mining equipment, replacement of light vehicles / office equipment, increasing the storage capacity of the TMF and mine closure / environmental rehabilitation costs. The total expansion and sustaining capital cost for the Project during the production years 1 to 18 is $166 million dollars excluding closure costs, salvage value and duties / taxes.

The major expenditures in the sustaining capital include the expansion of the process plant, procure / replacement of the mine fleet, raising of the TMF dams and closure/environmental rehabilitation costs.

Direct cash operating costs for the Project have been estimated under three functional headings: mining; processing; and general and administrative (G&A). The operating costs have been estimated by the following parties:

- Mining – AGP and Belo Sun;
- Processing – Lycopodium and Belo Sun;
- G&A – Lycopodium, AGP and Belo Sun.

The life-of-mine overall operating cost for the Project is $18.72/t of ore processed based on an owner operated mine fleet. As shown in Table 1-9, this average operating cost is a sum of the mine, process and general and administrative costs. The life of mine operating cost, in terms of cost per ounce of gold, is $618.

Table 1-9: LOM Operating Cost Summary

	LOM	
	$/t ore	$/oz
Mining	10.62	350
Process Plant	7.26	240
G&A	0.84	28
Total	18.72	618

The operating cost estimates are expressed in US dollars in fourth quarter 2014 terms and are estimated to be accurate within ±15%.

1.22 Economic Analysis

A detailed explanation of the Project economics is provided in Section 22 of the Technical Report.

As per Table 1-10, at a gold price of $1,200/oz, the Project is estimated to have the following results:

Table 1-10: Financial Results Summary

Summary Criteria		
Phase 1 Throughput	3.5 Mt/a	
Phase 2 Throughput	7 Mt/a	
Average Annual Gold Production	205,155 oz/a	
Mine Life	17.2 years	
Discount Rate	5%	
Gold Price	$1,200/oz	
Results	After Tax	Before Tax
Initial Capital Costs	$298 M	$264 M
Expansion Costs	$63 M	$55 M
Sustaining Costs	$125 M	$111 M
LOM Cash Cost	$618 oz/a	$618 oz/a
All-In-Sustaining Cost (AISC)	$779 oz/a	
Net Present Value (NPV @ 5%)	$665 M	$942 M
Internal rate of Return (IRR)	26%	37%
Payback	3.9 years	2.9 years

Note: Sustaining costs do not include mine close cost or salvage value.

The results of the economic analysis represent forward-looking information and there can be no assurance that gold production forecasts, projected capital and operating costs, cash flows, or mine operating schedules will prove to be accurate, as actual results and future events could differ materially from those anticipated. Risks related to forecast mine operations include unexpected events and delays during construction; expansion and start-up; variations in metal grade and recovery rates; changes to government regulations; results of current exploration activities; changes in project parameters as plans continue to be refined; future metal prices; failure of equipment or processes to operate as anticipated; labour or community disputes and other risks of the mining industry.

More details on the assumptions used and factors applied when developing the forward-looking information, as well as the risk factors that could cause actual results to differ materially from the forward-looking information are provided in the relevant sections of the Technical Report.

1.23 Adjacent Properties

There are no adjacent properties to the Project that are considered relevant to this Technical Report.

1.24 Other Relevant Data and Information

Not applicable.

1.25 Interpretation and Conclusions

The Project has been investigated at a feasibility level and this Technical Report provides a summary of the results and findings from each major area of investigation and study including but not limited to resource exploration; metallurgical sampling and testing; mineral resource estimation; mineral reserve estimation, mine design; process design; infrastructure design; environmental assessment; capital and operating cost estimates; economic analysis and preliminary risk assessment. The extent and level of investigation and study for each of these areas is considered to be consistent with that normally associated with feasibility level studies for resource development projects.

Each section of this Technical Report describes in detail the results of the various investigations and studies along with principal findings and appropriate discussions of significant risks that may have been identified during the Study as well as recommendations for the next steps.

Based on the accumulative findings from the various technical areas of the Study the economic analysis performed shows the Project is financially viable and should advance to the execution phase.

1.26 Recommendations

The principal recommendation emanating from the Study is for Belo Sun to proceed with basic engineering for the Project together with some additional investigations and studies leading to a project execution decision.

Belo Sun has identified a budget of $15 million dollars to advance basic engineering and complete the additional investigations and studies required to bring in order to launch detailed engineering, procurement and construction by the beginning of Q1 2016.

Details are provided in Section 26 of the Technical Report.

2.0 INTRODUCTION

2.1 Background

This Technical Report was prepared for Belo Sun Mining Corp. (Belo Sun), which is listed on the Toronto Stock Exchange (TSX).

The Technical Report has been prepared with contributions from several parties as presented in Table 2-1.

Table 2-1: NI 43-101 Technical Report Matrix

Section	Title	Responsible
1	Summary	Multiple QPs
2	Introduction	Lycopodium
3	Reliance on Other Experts	Lycopodium / SRK
4	Property Description and Location	SRK
5	Accessibility, Climate, Local Resources, Infrastructure, and Physiography	SRK
6	History	SRK
7	Geological Setting and Mineralization	SRK
8	Deposit Types	SRK
9	Exploration	SRK
10	Drilling	SRK
11	Sample Preparation, Analysis and Security	SRK
12	Data Verification	SRK
13	Mineral Processing and Metallurgical Testing	Lycopodium / George Wahl
14	Mineral Resource Estimates	SRK
15	Mineral Reserve Estimates	AGP
16	Mining Methods	AGP
17	Recovery Methods	Lycopodium
18	Project Infrastructure	Lycopodium / VOGBR / AGP
19	Market Studies and Contracts	Lycopodium / Belo Sun

20	Environmental Studies, Permitting and Social or Community Impact	ERM
21	Capital and Operating Costs	Lycopodium / AGP / Belo Sun
22	Economic Analysis	L&M
23	Adjacent Properties	SRK
24	Other Relevant Data and Information	Lycopodium
25	Interpretation and Conclusions	Multiple QPs
26	Recommendations	Multiple QPs
27	References	Multiple QPs

2.2 Terms of Reference

In May 2014 Belo Sun commissioned Lycopodium Minerals Canada Ltd. (Lycopodium) to complete a Feasibility Study (Study) of the Volta Grande Project (Project) with inputs from the following consultants:

- SRK Consulting (Canada) Inc. (SRK);
- SGS Chile Ltda. (SGS);
- HDA Serviços (HDA);
- Pocock Industrial Inc. (Pocock);
- GH Wahl & Associates Consulting (George Wahl);
- Orway Mineral Consultants (Orway);
- JS Analytical Laboratory Consultants Ltd. (Jack Stanley);
- McClelland Laboratories Inc. (McClellend);
- JK Tech Pty Ltd. (JK Tech);
- AGP Mining Consultants Inc. (AGP);
- VOGBR Recursos Hidricos e Geotecnia Ltda. (VOGBR);

  BGC Engineering Inc. (BGC);
- Environmental Resources Management Inc. (ERM);
- Dalben Consultoria em Engenharia Eletrica e Treinamento Ltda. (Dalben);
- TRANSGLOBAL Operador Logistico Multimodal (Transglobal); and
- L&M Assessoria Empresarial (L&M).

The Project is subdivided in 2 areas - North Block and South Block. The North Block contains the Ouro Verde, Grota Seca, Junction and Greia gold deposits. The South Block contains the Itata, Pequi, and Grande gold deposits. The mineral resource model for the South Block was prepared by Belo Sun and was audited by SRK in September 2013. There has been no change to the mineral resource model for South Block. For the North Block, a new mineral resource model was prepared by SRK during the first quarter of 2015 to account for new drilling information and a revision to the geological interpretation. This section is subdivided in two parts. The first part documents the methodology and the key assumptions considered by SRK to prepare the new mineral resource model for the North Block. The second part summarizes the key assumptions used by Belo Sun to prepare the mineral resource model for the South Block and results of the SRK audit.

The Ouro Verde and Grota Seca deposits, contained inside the North Block, were used as a basis of this Study processing initially 3.5 Mt/a later expanding to 7 Mt/a to produce 205,155 oz/a (6,381 kg/a) of gold. This Study was conducted with the objective of designing the appropriate facilities required for the aforementioned operation. This Technical Report summarizes the engineering studies performed at a feasibility level (± 15% accuracy) and used in the economic evaluation of the Project and supports first time disclosure of mineral reserves on the Volta Grande property.

2.3 Qualified Persons (QPs)

The following Table 2-2 provides a summary listing of the Qualified Persons who have contributed to the preparation and content of this Technical Report.

Table 2-2: Volta Grande Project Technical Report Qualified Persons

Name	Professional Designation	Title	Responsible for Sections
Mr. Derek Chubb	P.Eng. Ontario	Senior Partner (ERM)	1.20, 20, 25.8, 26.8
Mr. Aron Cleugh	P.Eng. Ontario	Lead Process Engineer (Lycopodium)	1.13, 1.17, 13, 17, 21.2.2, 25.4, 26.4
Dr. Jean-Francois Couture	PhD, P. Geo.	Corporate Consultant (SRK)	1.4 to 1.12, 1.14, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 23, 25.2, 26.2
Mr. Paulo Franca	AusIMM	Principal Consultant (for VOGBR)	18.8, 18.9, 25.6, 26.3, 26.6
Mr. Stefan Gueorguiev	P.Eng. Ontario	VP Projects (Lycopodium)	1 (part), 2, 3, 18.1 to 18.7, 18.10, 18.12 to 18.17, 21.1, 24, 25 (part), 26 (part), 27
Dr. Oy Leuangthong	PhD, P. Eng.	Principal Consultant (SRK)	1.14, 14, 25.2, 26.2
Mr. Alexandre Luz	AusIMM	Director (L&M)	1.19, 1.21, 1.22, 19, 21 (part), 22, 25.7, 25.9, 26.1
Mr. George Wahl	P. Geo.	Principal Consultant (George Wahl)	13.2.3
Dr. Lars Weiershäuser	PhD, P. Geo.	Senior Consultant (SRK)	1.4 to 1.12, 4, 5, 6, 7, 8, 9, 10, 11, 12, 23, 25.2, 26.2
Mr. Gordon Zurowski	P.Eng. Ontario	Principal Mining Engineer (AGP)	1.15, 1.16, 15, 16, 18.9, 21.2.1, 25.3

2.4 Scope of Personal Inspection

The following Table 2-3 provides a summary listing of the site visits performed by the various Qualified Persons.

Table 2-3: Site Visits by Qualified Persons

Name	Site Visit	Duration and Dates
Mr. Derek Chubb	Yes	September 24-26, 2013
Mr. Aron Cleugh	No	
Dr. Jean-Francois Couture	No	
Mr. Paulo Franca	Yes	November 14-16, 2012 January 9-11, 2013 April 22-24, 2013
Mr. Stefan Gueorguiev	No	
Dr. Oy Leuangthong	No	
Mr. Alexandre Luz	No	
Dr. Lars Weiershäuser	Yes	April 28-30, 2012 October 19-21, 2012
Mr. George Wahl	Yes	January 24-27, 2013
Mr. Gordon Zurowski	Yes	October 21-23, 2012

2.5 Effective Dates

The effective cut-off date for the borehole database is June 17 2014 for Grota Seca and June 24 2014 for Ouro Verde.

The effective cut-off date for the Mineral Resource Estimate is March 16 2015.

The effective date of the Technical Report is considered to be May 8 2015.

2.6 Previous Technical Reports

Belo Sun has previously filed the following Technical Report for the Project:

- Mineral Resource Technical Report for the Volta Grande Gold Project, Pará, Brazil" prepared by SRK Consulting (Canada) Inc. effective date 18 December 2012;
- "Pre-feasibility Study on the Volta Grande Project, NI 43-101 Technical Report" prepared by AMEC effective date 6 May 2013; and
- "Volta Grande Project, Preliminary Economic Assessment, NI 43-101" prepared by AGP Mining Consultants Inc. effective date 31 March 2014.

3.0 RELIANCE ON OTHER EXPERTS

3.1 Mineral Tenure

SRK has relied upon the expert advice of Azevedo Sette Advogados (December 7 2012) and information supplied by Departamento Nacional de Produção Mineral of Brazil for the explanation of Mineral Tenure.

3.2 Surface Rights

SRK has relied upon the expert advice of Azevedo Sette Advogados (December 7 2012) and information supplied by Departamento Nacional de Produção Mineral of Brazil for the explanation of Mineral Tenure.

3.3 Permitting

SRK has relied upon the expert advice of Azevedo Sette Advogados (December 7 2012) for matters related to permitting.

3.4 Environmental

In compiling this Technical Report, Lycopodium has fully relied upon, and disclaims responsibility for the report by Brandt Meio Ambiente entitled "Environmental Studies, Permitting and Social or Community Impact" prepared for Belo Sun and dated February 2013. This information is used in the description of known environmental liabilities in Section 4.5 and in compiling Section 20 Environmental Studies, Permitting, and Social or Community Impact of this Technical Report.

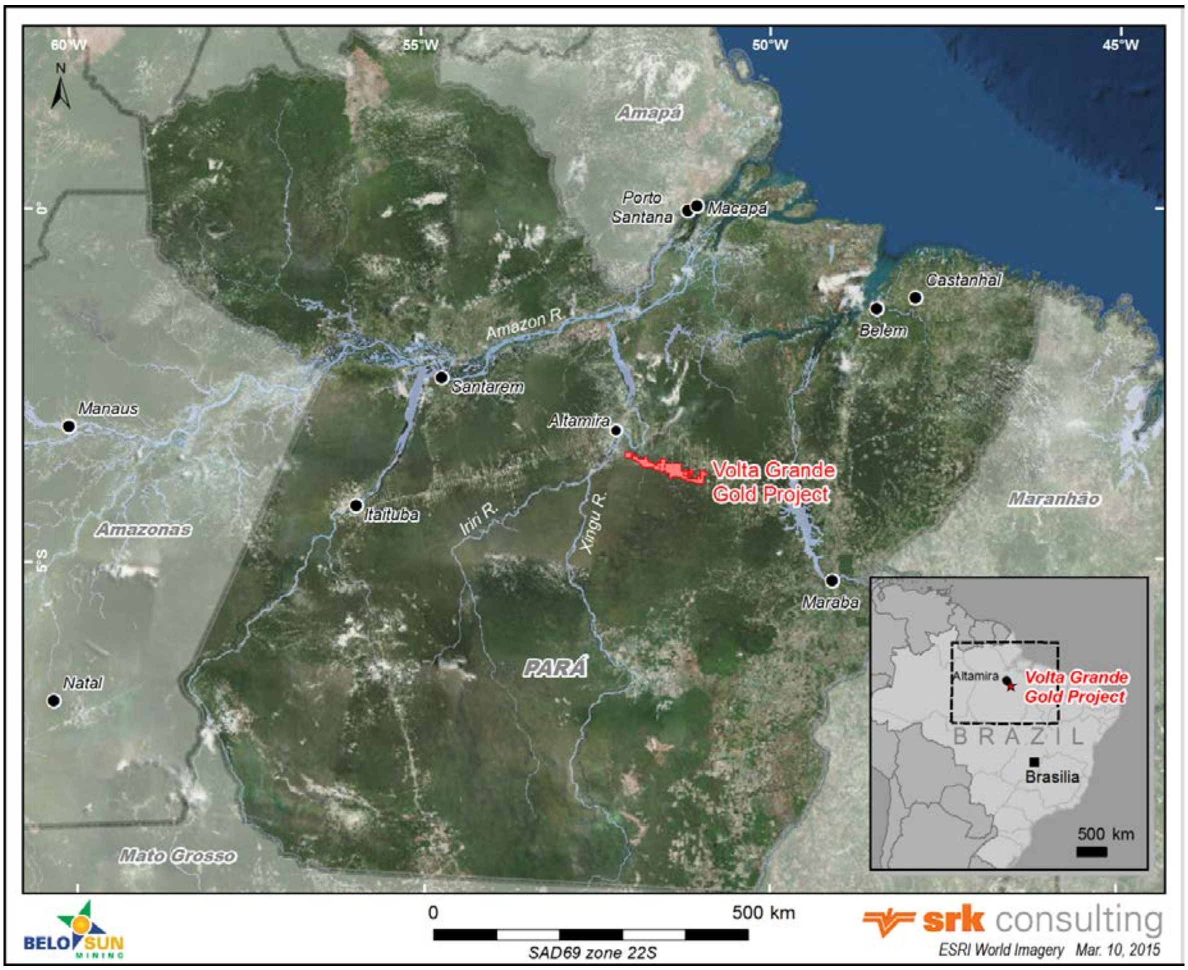
Lycopodium is also relying on Barros, Mauro and Pinheiro A. F., Brazilian Legal Counsel to Belo Sun, that the environmental assessment executed by Brandt Meio Ambiente was performed in accordance with Brazilian law and fulfills the requirements established by the applicable regulations for the granting of the environmental preliminary licence.

4.0 PROPERTY DESCRIPTION AND LOCATION

The Project comprises 20 contiguous exploration permits, 4 mining concession applications, 10 exploration applications for exploration in mineral rights and 8 exploration applications for exploration in mineral rights in public tender. Four of the exploration applications in public tender are in a priority regime. The tenement package covers an area of 160,578.78 ha. It is located in the municipality of Senador José Porfírio in the northern region of Pará State in northern Brazil (Figure 4-1).

The Project is located on the Xingu River, north of the Carajás mineral province, approximately 65 km south-east of the city of Altamira.

Figure 4-1: Location Map



4.1 Mineral Tenure

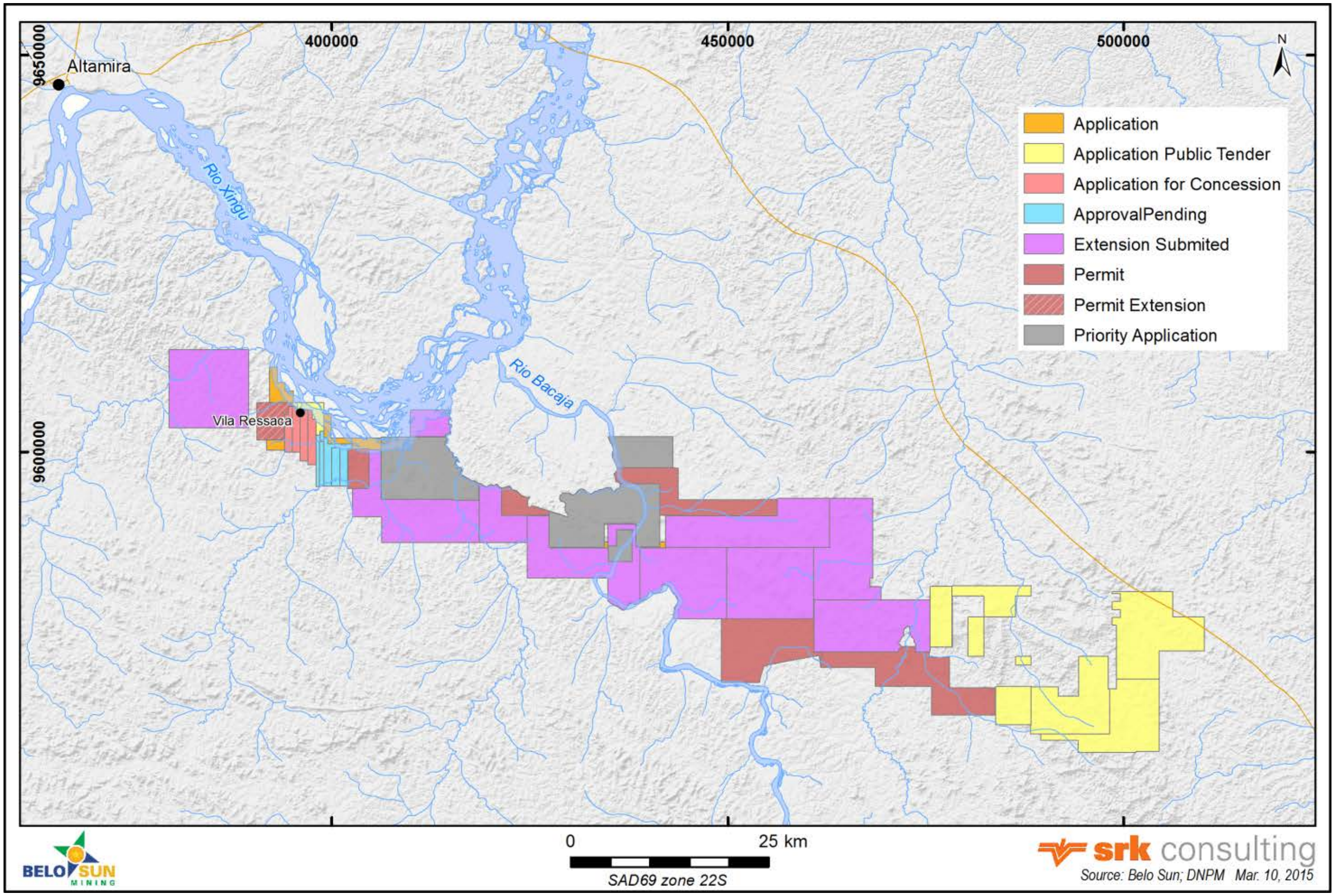
Belo Sun holds 100% interest in the Project through its wholly owned subsidiary Verena Mineração Ltda. The project comprises 20 exploration permits, covering an area of 103,354 ha; 4 mining concession application, covering an area of 2,356 ha; 10 exploration applications for exploration in mineral rights covering an area of 23,208 ha; and 8 exploration applications for exploration in mineral rights in public tender, covering an area of 31,660 ha. Four of the exploration applications in public tender are in a priority regime (Figure 4-2).

Exploration applications by public tender process are for lands that have been held by other landholders but have been allowed to lapse. Table 4-1summarizes the mineral tenure information for the exploration permits and exploration applications.

The *Departamento Nacional de Produção Mineral* (DNPM) (National Department of Mineral Production) is responsible for the management of exploration and mining activities in Brazil and is under the control of the Ministry of Mines and Energy (MME). Exploration permits do not have physical boundaries, but are issued based on digital geographic map staking, that is, they are not required to be legally surveyed and are subject to an annual rental fee of one Real (BRL 1.00:CAD 0.45, March 2015) per hectare to the state government of Pará.

Even though the exploration permits have already expired, the mineral rights remain fully valid and in force during the period of analysis by the DNPM.

Figure 4-2: Land Tenure Map



According to the legal opinion of Azevedo Sette Advogados (December 7 2012), the mineral rights for the exploration permits are all valid, regular, and in good standing. SRK is of the opinion that recent changes to the tenement status of certain permits are not material in relation to the legal title opinion provided by Belo Sun in 2012. Hence, no updated title opinion is needed. Table 4-1 lists mineral tenements and their current status. Belo Sun is in compliance with the mining regulation related to the mining rights, which includes meeting the requirements of the DNPM rules, the payment of the annual fee per hectare or any other applicable fees.

Table 4-1: Mineral Tenure Information

DNPM-ID	Area ha	Company	Phase	Status	Expiry Date dd/mm/yy
850.253/01	481.83	Belo Sun Mineração Ltda	Exploration	Permit, Approval Pending	28/06/14
850.507/11	311.99	Belo Sun Mineração Ltda	Exploration	Permit, Approval Pending	28/06/14
850.249/01	1,730.86	Belo Sun Mineração Ltda	Exploration	Permit Extension	5/16/2016
850.250/01	1,256.96	Belo Sun Mineração Ltda	Exploration	Permit, Approval Pending	5/7/2014
850.439/08	324.98	Belo Sun Mineração Ltda	Exploration	Approval Pending	3/11/2016
850.312/10	9,884.05	Belo Sun Mineração Ltda	Exploration	Permit, Extension Submitted	30/12/13
850.315/10	8,750.81	Belo Sun Mineração Ltda	Exploration	Extension Submitted	21/06/14
850.316/10	3,114.04	Belo Sun Mineração Ltda	Exploration	Extension Submitted	21/06/14
850.702/11	8,358.97	Belo Sun Mineração Ltda	Exploration	Extension Submitted	5/8/2014
850.699/11	7,995.43	Belo Sun Mineração Ltda	Exploration	Extension Submitted	5/8/2014
850.700/11	9,246.10	Belo Sun Mineração Ltda	Exploration	Extension Submitted	5/8/2014
850.701/11	9,900.00	Belo Sun Mineração Ltda	Exploration	Extension Submitted	5/8/2014
850.696/11	8,448.89	Belo Sun Mineração Ltda	Exploration	Extension Submitted	5/8/2014
850.697/11	9,728.63	Belo Sun Mineração Ltda	Exploration	Extension Submitted	5/8/2014
850.314/10	1,654.62	Belo Sun Mineração Ltda	Exploration	Extension Submitted	3/10/2014
850.013/11	8,139.23	Belo Sun Mineração Ltda	Exploration	Permit	12/11/2016
851.668/11	10.38	Belo Sun Mineração Ltda	Exploration	Permit	2/4/2017
850.265/12	5,081.59	Belo Sun Mineração Ltda	Exploration	Permit	6/13/2017
850.703/11	7,649.94	Belo Sun Mineração Ltda	Exploration	Permit	6/13/2017
850.692/11	1,284.54	Belo Sun Mineração Ltda	Exploration	Permit	12/11/2016
Subtotal (1) 103,353.84					
805.657/76	522.02	Belo Sun Mineração Ltda	Mining Concession	Application	

DNPM-ID	Area ha	Company	Phase	Status	Expiry Date dd/mm/yy
805.658/76	552.02	Belo Sun Mineração Ltda	Mining Concession	Application	
805.659/76	645.07	Belo Sun Mineração Ltda	Mining Concession	Application	
812.559/76	637.3	Belo Sun Mineração Ltda	Mining Concession	Application	
Subtotal (2) 2,356.41					
850.313/10	1,359.04	Belo Sun Mineração Ltda	Exploration	Application	
850.266/12	283.92	Belo Sun Mineração Ltda	Exploration	Application	
850.624/12	25.12	Belo Sun Mineração Ltda	Exploration	Application	
850.625/12	145.97	Belo Sun Mineração Ltda	Exploration	Application	
850.626/12	109.48	Belo Sun Mineração Ltda	Exploration	Application	
851.220/12	565.32	Belo Sun Mineração Ltda	Exploration	Application	
850.693/11	8,656.74	Belo Sun Mineração Ltda	Exploration	Priority Application	
850.887/13	1,000.01	Belo Sun Mineração Ltda	Exploration	Priority Application	
850.694/11	8,070.12	Belo Sun Mineração Ltda	Exploration	Priority Application	
850.695/11	2,992.62	Belo Sun Mineração Ltda	Exploration	Priority Application	
Subtotal (3) 23,208.34					
850.214/04	696.6	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
850.633/08	1.72	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
850.633/15	2,168.26	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
850.635/08	3,598.74	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
850.636/08	7,007.65	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
850.637/08	9,007.66	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
850.639/08	7,091.39	Belo Sun Mineração Ltda	Exploration	Application Public Tender	
Subtotal (4) 31,660.19					
Total 160,578.78					

No decisions have been received on the exploration applications in public tenders. Belo Sun is the only applicant in the public tender process.

No royalties are currently due since the Project's mineral rights are currently in phases of exploration permit and exploration application.

The mineral rights are not located within buffer zones of environmental conservation units, indigenous areas or areas dedicated to land reform purposes.

The tenements containing the mineral resources at the Ouro Verde and Grota Seca areas of the project are 805.657/1976, 805.658/1976, 805.659/1976, and 812.559/1976. On September 12, 2012, the DNMP approved the final exploration report for the Project. As a result, Belo Sun has submitted an application to the DNPM (Application for Concession) to convert the four exploration permits that contain the mineral resource to mining leases by August 2013 or earlier after Belo Sun submits a pre-feasibility study to the DNPM. By May 8 2015 the DNPM had not reached a decision on this application.

4.2 Underlying Agreements

In February 2004, Verena Minerals Corporation (Verena) entered into an agreement with *Oca Mineração Ltda.* (Oca), whose controlling shareholder is Confab Industrial S.A., a member of the Tenaris Group, to acquire a 100% interest in the Volta Grande Project. Under terms of the agreement, Verena would acquire 100% of the Volta Grande Project by making payments totalling $3 million dollars over four years. In September 2005, an agreement was signed modifying the terms of the acquisition of the Project. Under the modified agreement, Verena would pay Confab a total of $600,000, of which $62,500 had been paid. The balance outstanding would be paid in six months from the signing of the modified acquisition agreement. In addition, Verena would pay to the Bank of Pará approximately $1,500,000 on favourable terms. The loan would be paid beginning in two years, only if Verena has produced a bankable feasibility study. Principal and interest can be paid over 10 years on a quarterly basis.

In June 2006, Verena completed an agreement with the *Companhia de Pesquisa de Recursos Minerais* (CPRM), a Brazilian state-owned geological survey company, to replace CPRM's corporate guarantee on the Project. Verena committed to paying approximately $1.5 million dollars to CPRM if a mineable deposit is defined on the property and to investing a minimum of $1.5 million dollars in the Project over 2 years.

In October 2006, Verena closed the acquisition of the Project by putting $1,722,708 on deposit, being the total amount outstanding that would be owed by Verena to CPRM should the company produce a bankable feasibility study for the Project.

In March 2008, Verena renegotiated the terms of the security held by CPRM. Under the new terms, CPRM agreed to release to Verena approximately $2,035,738 of the total term deposit of $2,467,708 held in security to cover the company's debt owed to CPRM. In addition, the company allocated the balance of the original term deposit that was not released, amounting to approximately $430,000, to be retained in an interest bearing term deposit to cover the next eight quarterly payments, starting with the March 2008 quarter.

In February 2010, Forbes & Manhattan Inc. (F & M), a private investment firm based in Toronto, Canada, invested in Verena through a private placement of CAD$6 million dollars in Verena. Subsequently, Verena was renamed Belo Sun Mining Corp. (Belo Sun).

The Project is located in an area consisting of 3 farms - Fazenda Ouro Verde, Fazenda Ressaca and Fazenda Galo de Ouro, which are currently under the domain of squatters. Between May 15 and May 22, 2012, Belo Sun acquired the properties and thus surface rights. Under the agreement, the squatters had until the end of April 2013 to vacate the properties. According to Belo Sun, all squatters have vacated the premises and Belo Sun erected fencing around the garimpos (illegal mining sites) in order to secure them. SRK has not confirmed this statement. In order to ensure compliance, Belo Sun paid 50% of the agreed purchase price to the land owners; the remaining 50% of the purchase price were paid once all squatters had vacated the properties.

4.3 Permits and Authorization

The following has been extracted from the legal title option by Azevedo Sette Advogados (December 7 2012).

Mineral rights in exploration phase or public tender processes require no environmental operation licences at the federal level, except in the case of exploration activities that involve deforestation or the use of significant quantity of water resources. The current exploration activities at the Volta Grande Project do not involve deforestation and the use of water, and thus do not require a specific environmental authorization at the federal level.

Pará State environmental law sets forth that drilling activities shall be licenced by the Pará State Environmental Authority (*Secretaria de Estado de Meio Ambiente - SEMA*). Belo Sun has received an operating licence (License Number 4115/2010) for exploration permits 805.657-659/1976, 812.559/1976, 805.249/2001 and 850.250/2001. The operating licence was issued on January 27, 2010 with an expiry date of January 27, 2012. Belo Sun filed a renewal application with the environmental agency on August 8, 2011, within the statutory period required by law. According to Belo Sun, the application is under consideration but no final response has been received by Belo Sun. As such, the old operating license is considered valid until a formal reply has been received by Belo Sun. Furthermore, the application for renewal also includes a request for the respective environmental license to perform drilling activities on ground covered by exploration permits 850.253/2001, 850.439/2008, and 850.507/2011, in addition to exploration permits discussed above.

Belo Sun has requested a preliminary licence from SEMA, which is necessary to carry out exploitation activities on exploration permits 805.657-659/1976 and 812.559/1976, once exploitation permits are approved and issued by the DNPM.

A public hearing was held by SEMA on September 13 2012. The execution of such public hearing is established by federal environmental regulation (CONAMA Administrative Rules 01/1986 and 09/1987) and by the Law 5.887/1995 of the State of Pará. The public hearing is part of the standard preliminary licensing process and involves the analysis of the EIA/RIMA submitted by Belo Sun. Thus, the execution of the public hearing indicates that the environmental licensing procedure has been conducted according to the applicable regulations.

Belo Sun has all environmental licences necessary for the current stage of the Volta Grande Project. The operation licence granted to Belo Sun is fully valid and in force and its terms and conditions have been fulfilled by Belo Sun. Any drilling activities recommended on the other exploration permits will require an operating licence.

4.4 Environmental Considerations

The following has been extracted from the legal title opinion by Azevedo Sette Advogados (2012).

Title holders are responsible for any environmental damages to the area even if the damages were caused by third parties prior to Belo Sun acquiring and carrying out exploration work on the properties. Belo Sun may be liable for environmental damages eventually caused by irregular small-scale miners (*garimpeiros*) that operate minor illegal mining activities in some areas within the limits of the Volta Grande gold project. Belo Sun has not received any infraction notice or summons regarding eventual environmental liabilities pursuant to the Volta Grande Project.

4.5 Mining Rights in Brazil

The following has been extracted from Azevedo Sette Advogados (2012).

As set forth in Article 14 of the Mining Code (Law Decree # 227/1967) and in Article 18 of its Regulation (Regulatory Decree n. 62.934/1968), mineral exploration comprises the necessary work performed in order to measure and evaluate a mine and its technical and economic feasibility. The DNPM grants the authorization to an interested party to perform mineral exploration works by means of a specific title named exploration permit (*Alvará de Pesquisa*). Such document allows the performance of exploration works in the mineral rights' areas.

In order to obtain the exploration permit, the mining company shall submit an application to the DNPM, the so termed exploration application (*Requerimento de Pesquisa*), according to the provisions set forth in Article 16 of the Mining Code. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the exploration application, including in public tenders. Applicants will have priority over the mineral right area according to the date their application was submitted and until the DNPM's decision over the exploration application such titleholder priority right shall be valid and in force. After the analysis of the exploration application, the DNPM shall issue the exploration permit that shall be valid for a period of one to three years. As established in Article 22, III, of the Mining Code, this period may be extended, subject to the analysis and approval of the exploration reports by DNPM.

Article 22 of the Mining Code also sets forth that the holder of the exploration permit (i) may assign or transfer it, provided that the assignee fulfills the legal conditions to hold the title; (ii) may, at any time, relinquish the exploration permit; (iii) shall be exclusively responsible for damages caused to third parties as a result of the performance of the mineral exploration works; (iv) shall submit to DNPM a detailed report on the exploration works prior to the final term of the exploration permit, the mineral exploration report (*Relatório de Pesquisa*); and (v) pay to DNPM the annual fee per hectare (Taxa Anual por Hectare) once a year, in January or July, depending on the semester that the exploration permit was issued by DNPM, until the end of the exploration works.

By means of the mineral exploration report, the mining company shall decide if the exploitation of the mineral right is technically and economically feasible or not. The mineral exploration report shall be submitted to the analysis of DNPM, which shall approve it, according to the mineral exploration report and under objective criteria.

It is worth mentioning that the Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the mineral exploration report, therefore, the DNPM may issue the mining concession at its own time. During the period in which the report is under DNPM's analysis, the mining company continues to be the sole and lawful titleholder of the exploration permit, which remains valid and in force. Meanwhile, the mining company has all the rights and interests connected to such protected mineral right.

If the mineral exploration report is approved by the DNPM, the holder of the exploration permit shall then, according to Article 31 of the Mining Code, have the right to apply for the exploitation permit (*Concessão de Lavra*) within one year. This one year period may be extended by DNPM once, for another year, in case the titleholder requires the extension prior to the expiration of the first year term.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The Project is located approximately 65 km south-east of the city of Altamira.

Access to the Project site takes two hours from Altamira either by river in a small motorboat along the Xingu River, or by land by crossing the Xingu River by barge, and taking a paved and dirt road (BR-158) to the stretch of river known as the Big Bend (or *Volta Grande*) where the exploration camp is situated. Due to the construction of the Belo Monte hydroelectric dam, road access from Altamira to the dam construction site is being paved. From the construction site, approximately halfway between Altamira and the Project the road is unpaved but in good condition.

Belo Sun does not have information on changes to river travel times once damming of the Xingu River is complete.

Altamira can be accessed by road via the *Rodovia Transamazônica* (Transamazon Highway) (BR-2300) in Brazil or by plane via Altamira's airport that is served on a daily basis by a number of regional airlines.

5.2 Local Resources and Infrastructure

The city of Altamira is situated on the Xingu River, in the north of the municipality of Altamira, which has a population of approximately 150,000. Infrastructure for mining equipment and experienced mining personnel are available in Altamira. Altamira is linked to the Pará State power grid.

The property is located north of the Carajás mineral province, which has a long mining history. However, local infrastructure is poor for mining activities since the property is located in a remote area.

Electric power at the property is provided by two main diesel generators that operate alternately during the day and at night. A third generator is dedicated to the operation of rock saws. Water is available from wells on the property as well as from the Xingu River, which drains the general area. Well water is treated on-site continuously with chlorine and stored in a water tower outside of the camp perimeter. Telephone communication and internet service are available on the property.

Since mid-2012, a mechanics shop has been set up, primarily to maintain the vehicle fleet on site. A small carpenters shop is equipped to produce and maintain most wooden implements at the camp. Core storage is being built on-site as the need arises with ongoing drilling.

Recently, the Brazilian federal government completed the planning for the construction of the Belo Monte hydroelectric power dam. Construction is now ongoing. The dam will be situated approximately 2 km north from the western property boundary and 15 km (up river) of the property campsite. When the dam is completed, it will generate approximately 11,000 MW of electric power and will supply electric power to the property campsite. The construction of the dam will also provide better quality road access from Altamira.

There are a number of small settlements within the property, including the village of Ressaca, along the Xingu River and the village of Itatá, which is situated approximately 3 km south-south-east of the Project. Both of these are predominantly inhabited by irregular small-scale miners (*garimpeiros*) who undertake illegal mining activities on the property.

5.3 Climate

The climate in north-western Brazil is tropical, with a rainy season from January to April and a dry season extending from June to December. The mean temperature is nearly the same (25 to 30°C) throughout the year. The relative humidity ranges from about 65 to 85%.

5.4 Physiography

The Project is situated in an area of low topographic relief, generally in the order of 50 m. The dominant topographic feature is the valley of the meandering and north-east flowing Xingu River and the Itatá River, which drains into the Xingu River in the eastern part of the property. The topographic elevation of the low-lying areas ranges from 100 m to 120 m above mean sea level.

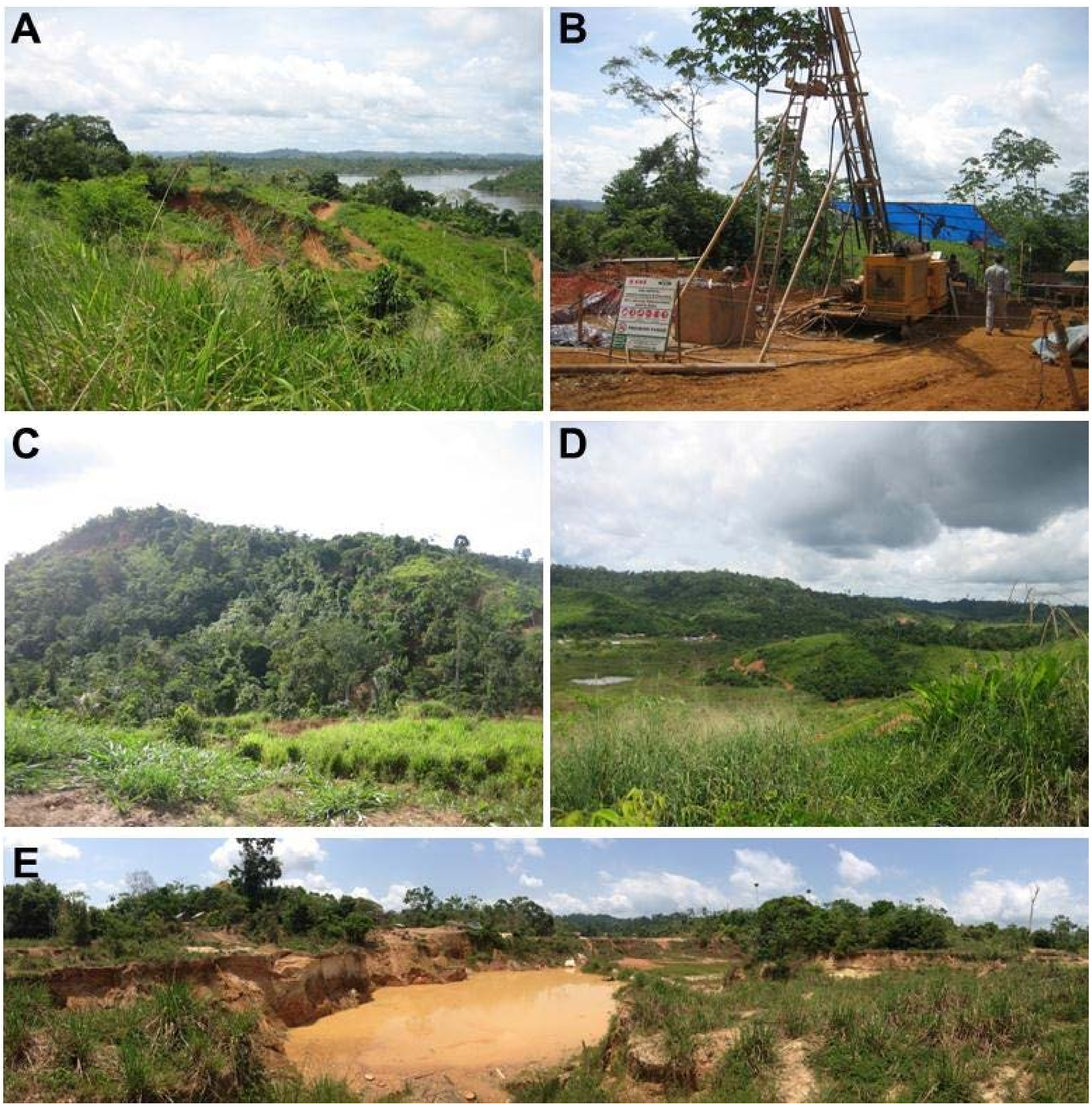
The Project is moderately forested. The land in neighbouring areas is used for agriculture, mainly grazing of cattle.

The area around the Project is covered with a number of small hills separated by north and north-west trending valleys in a tropical rainforest, with occasional outcrops. On hilltops and flanks of hills, occasional tall Brazil nut trees are present and are reported to be exempt from harvesting by the Brazilian government. Vegetation in low lying areas consists predominantly of tall grass and fern, typical of tropical rainforests.

Occasional outcrops of saprolitic material are present on the property; overburden thickness ranges from 3 m to more than 10 m. Typical lateritic and saprolitic profiles are observed in the many small open pits as well as in the collars of the diamond drill boreholes. For general impressions of the Project area see Figure 5-1 A to E.

Figure 5-5-1: Typical Landscape in the Project Area

A) View to the north-east across the south-east end of the Ouro Verde deposit, forming locally eroded ridge in middle ground, Xingu River in the background.
B) Drilling operation at Borehole VVGD 387.
C) View from Borehole 225 across main area of Grota Seca.
D) View toward the east, the small knoll in middle ground forms the connecting zone between the Ouro Verde and Grota Seca deposits; houses belong to village of Ressaca.
E) View toward the west showing the Grande Garimpo, near Itatá in the South Block area.



6.0 HISTORY

The extraction of gold in the eastern Amazon region dates back to the Portuguese colonization in the 17th century. The discovery of gold along the stretch of the Xingu River known as the Big Bend or *Volta Grande,* where the Project is located, occurred in the early 20th century. Since the 1950s, irregular small-scale miners (*garimpeiros*) have worked in the Project area in small alluvial deposits, especially in an area of thick alluvium southeast of the current deposit area. In the 1990s, the *garimpeiros* started to exploit saprolite and fresh rock deposits, constructing shafts that appear to reach considerable depths Figure 6-1 A and B. Early research was undertaken in the 1970s and systematic exploration started in the late 20th century.

The Project is also located within the Três Palmeiras Greenstone Belt, which hosts numerous gold occurrences.

Figure 6-1: Typical Garimpeiro Operation in Saprolite and Hard Rock

A) "Head frame"

B) View into shaft showing the considerable depth of the operation.

6.1 Prior Ownership and Changes

Oca Mineração Ltda. (Oca) owned the Volta Grande gold project in the 1970s.

From 1996 to 1998, *Volta Grande Mineração Ltda.* (VGML), a company created in partnership between Oca and the EBX Group (*TVX Participações S.A.* [TVX] and *Battle Mountain Gold Mineração* [BMG] in a joint venture with *Companhia Nacional de Mineração* [CNM]) acquired interests in the Project. In 1998, TVX and BMG terminated their joint venture agreement with CNM and transferred all their interests back to Oca. In 2004, TVX merged with Kinross Gold Corporation and BMG was acquired by Newmont Mining Corporation.

Verena acquired a 100% interest in the Project under an agreement with Oca in 2004. Verena was renamed Belo Sun Mining Corp. in February 2010. Since 2004, Verena and Belo Sun have carried out systematic exploration on the Project (see Section 8 for exploration by Belo Sun).

6.2 Previous Exploration Work

Historical exploration since the 1970s has been divided into work done by Oca (1970s), VGML (1996-2004) and Verena (2004-2009).

Exploration work reportedly also included lithological sampling (totalling 95 samples), construction of underground workings, sampling, and mining on one level, as well as bulk sampling (Belo Sun, 2011). No details or results are available.

6.2.1 Oca Mineração Ltda., 1970s

Preliminary research was performed on the project property by Oca in the 1970s. Prospecting work, including field observations and sampling, confirmed the existence of gold at varying levels of concentration.

Initial work by Oca determined areas of interest. The company did a literature study aimed at better understanding the regional geology. This work included the interpretation and review of aerial photographs at a 1:60,000 scale, dated 1976 and was aimed at identifying areas with alluvial potential. Further aerial photography was flown over areas of interest. These aerial photographs were used to produce base maps at 1:50,000 and 1:25,000 scales to support field work.

Once favourable areas were defined, a grid (800 m X 200 m) was established. Exploration wells in the alluvium were completed, using two machines from Maquesonda with 4-inch diameter drill bits. Oca carried out sampling of veins and geological mapping on the 1:10,000 scale. Oca built a base camp in the area to support this work.

6.2.2 Volta Grande Mineração Ltda., (1996 to 2004)

From 1996 to 1998, systematic exploration was carried out by VGML covering what was later defined as the North and South Blocks.

Exploration work on the Project by VGML outlined approximately nine target areas based on significant gold results. These target areas were combined into four groups. Core drilling results (see Section 9) were used to complete a historical mineral resource estimate for which preliminary pit designs were produced.

The exploration work carried out by VGML and its results are discussed below.

Regional Exploration

Prospecting by stream sediment and rock sampling covered an area of 64 square km with 41 sampling stations, sampling on average every 1.5 square km. The samples were analyzed for copper, zinc, lead, arsenic and gold. Two regional anomalies were outlined of which one became the North Block.

Soil Geochemistry

Soil sampling was executed on a grid of 200 m X 200 m; 1,711 samples were collected and analyzed.

Samples were collected from the B-horizon, some 50 cm below the A-horizon, which is rich in humus material. Sample preparation methods included drying and screening. The -80 mesh aliquot was sent for geochemical analyses by atomic absorption (AA). The samples were sent to NOMOS, a laboratory owned by Rio Tinto Mining in Brazil. Analytical procedures included acid digestion and gold, copper, lead, zinc, and nickel determinations using the AA method. In addition, arsenic determination was carried on the samples using the colorimetric method.

The results outlined an anomalous area coinciding with the regional northwest-southeast trend, and extending 5 km along strike with an average width of 1.2 km.

Results outlined two narrow anomalies named Area 1 and Area 2 within the North Block (Agnerian, 2004). Area 1 is defined by a contour line of 400 parts per billion (ppb) Au. It is 200 m to 300 m wide and approximately 2 km long, located at the contact zone between metasedimentary rocks in the south and syntectonic diorite in the north. Area 2, situated approximately 1 km north of Area 1, is 50 m to 100 m wide and approximately 1.2 km long. Area 2 is underlain by mafic metavolcanic rock, close to the northern contact zone with diorite. Agnerian (2004) also reported that an additional 1,282 samples were taken.

Geological Mapping

Geological mapping detected the main lithologic contact between a syntectonic diorite in the north and an assemblage of metasedimentary and metavolcanic rock in the south. Geological mapping also identified several northeast-trending cross faults.

Auger Drilling

Auger drilling was executed on grids of 200 m X 20 m and 100 m X 20 m. A total of 874 boreholes were drilled, totalling 5,943 m.

Auger drill samples were taken on 1 m intervals yielding a total of 2,923 samples that were collected and analyzed. The sampling preparation methods included drying, splitting using a Jones splitter, and pulverizing:

- Collecting of a 7.5 kg (1 m long) sample. If the sample was wet, then it was dried;
- Crushing the sample to 20 mesh, thoroughly mixing it and splitting it using a Jones splitter, and separating a 2 kg aliquot for processing;
- Pulverizing the 2 kg subsample to 200 mesh using a ring mill;
- Thoroughly mixing the sample and splitting it again using a Jones splitter;
- Separating a 250 g aliquot for assay and keeping the remaining 1.75 kg reject in temporary storage for further processing; and
- Sending the 250 g sample to NOMOS for gold assays. At NOMOS, this sample was further separated into 50 g and 200 g portions, fire assaying was carried out on the 50 g portion, the 200 g portion was archived.

The results outlined gold in soil anomalies that ranged from 100 to 500 ppb Au; these anomalies follow known local trends. The results also detected a similarly anomalous zone as the soil geochemical anomaly and delineated a narrow zone of 100 m X 750 m containing a concentration greater than 1,000 ppb of Au.

Channel Sampling

Channel sampling was done at 1-m intervals yielding 989 samples that were collected and analyzed. The methods for sample preparation are similar to the auger drilling sampling.

Mineralogical Studies

In August 1996, a petrographic study was carried out on six thin sections of rocks from the Volta Project. Results of this study indicated that three samples were composed of monzodiorite, two samples were of rhyolitic composition and one sample was of dacitic composition (Agnerian, 2004).

In November 1996, CNM carried out a petrographic study on four polished sections of rocks from the Project. The rocks were brecciated and exhibited intense hydrothermal alteration with boron enrichment (tourmaline alteration). Results of this study indicated that two samples (VPS-01 and VPS-03) consisted of tourmaline-scorodite rock and tourmaline-scorodite-arsenopyrite rock. Nineteen grains of native gold were detected, ranging in size from 5 µm to 75 µm, mostly in the transparent gangue of sample VPS-03. Gold particles were mostly string like, possibly filling small fractures (Agnerian, 2004). Sample VPS-04 was classified as tourmaline quartzite and sample VPS-02 was classified as mylonitic tonalite.

6.2.3 Verena Minerals Corporation (2004 to 2009)

Starting in 2004, Verena carried out systematic exploration on the Volta Grande Project, including testing the various anomalies and/or target areas outlined by VGML. Exploration work carried out and the results are discussed below.

Airborne Geophysical Survey

From May 21 to June 7 2007, *Fugro / Engenheria e Prospecções S.A.* (Fugro) of Rio de Janeiro, Brazil carried out a combined airborne magnetic and radiometric survey over the entire property. Flight lines (north-south) were spaced 200 m apart; with control lines (east-west) 2,000 m apart; ground clearance was 50 m. The objective of this survey was to obtain baseline data and associated parameters in relation to gold mineralized areas that have been (and still are being worked) by *garimpeiros*. A further goal was to identify possible locations for infrastructure for conceptual development of the area. In total, approximately 3,087 line km were flown covering an area of 55 square km. Results of the airborne geophysical survey indicated that linear magnetic highs correspond with areas underlain by intrusive rocks, close to *garimpeiros* workings.

Geochemical Surveys

In 2007, Verena carried out soil sampling, totalling 4,427 samples. As a result of this one previously unknown anomalous area in the North Block was identified.

6.3 Previous Mineral Resources Estimates

A historic mineral resource estimate was prepared by VGML in 1998 (Agnerian, 2004) considering the core drilling data. At a cut-off grade of 0.80 g/t Au the unclassified mineral resources were estimated at 17,050,743 t grading an average of 2.34 g/t Au or 1.4 million ounces of gold. The historical mineral resource was estimated using polygonal methodology on vertical sections. Densities of 2.795 g/cm^3 for dry rock and 1.225 g/cm^3 for saprolitic material were applied in the estimation. The reader is cautioned that this historical resource estimate was prepared before the development of National Instrument 43-101 guidelines and therefore should not be relied upon. The historical resource estimate is superseded by the Mineral Resource Statement discussed herein.

Since 2004, nine independent technical reports have been prepared for the Project for Verena and Belo Sun. These are listed in chronological order:

- Report on the Volta Grande Gold Property, Brazil for Verena dated May 31, 2004 (Agnerian, 2004);
- Technical Report on the Volta Grande Gold Property, Brazil for Verena dated December 12, 2005 (Agnerian, 2005);
- Preliminary Assessment on the Volta Grande Project, Pará, Brazil for Verena dated September 23, 2009 (Agnerian and Krutzelmann, 2009);
- Technical Report on the Ouro Verde Deposit, Volta Grande Project, Pará, Brazil for Belo Sun dated November 5, 2010 (Agnerian, 2010);
- Technical Report on the Volta Grande Project, Pará State, Brazil for Belo Sun dated February 25, 2011 (Agnerian, 2011);
- Mineral Resource Technical Report for the Volta Grande Gold Project, Pará, Brazil dated March 7, 2012 (SRK, 2012a);
- Mineral Resource Technical Report for the Volta Grande Gold Project, Pará, Brazil dated June 8, 2012 (SRK, 2012b);
- Mineral Resource Technical Report for the Volta Grande Gold Project, Pará, Brazil dated January 31, 2013 (SRK, 2013);
- Pre-feasibility Study on the Volta Grande Project, Pará, Brazil dated June 21, 2013 (AMEC, 2013); and,
- Preliminary Economic Assessment on the Volta Grande Project, Pará, Brazil, dated March 31, 2014 (AGP, 2014).

6.4 Historical Production

Many parts of the Project have been mined in the past by *garimpeiros.* From the 1960s to the late 1990s, the average grade of the material extracted from numerous small alluvial gold deposits in the area was reported to be up to 3 oz/short ton Au. These included the Ouro Verde, Gaúcho, Canela, Serrinha, Grota Seca, Galo, Japão, and Nobelino deposits, and other workings by *garimpeiros* near the village of Itatá.

Until the change in land ownership early in 2013, small-scale mining was still being carried out by garimpeiros in several areas of the property. Belo Sun's “best guess estimates” of total gold production from garimpeiro-run underground workings in the Grota Seca and Ouro Verde deposit areas total approximately 340 kg of gold and are based on the size of surveyed waste stockpiles and an assumed gold grade of approximately 20 g/t Au. No small-scale operations were occurring in the Junction or Greia areas of the North Block. Belo Sun has not attempted to reconcile the amount of gold extracted by garimpeiros in the South Block.

According to Belo Sun all garimpeiros have been removed from the property. Furthermore, Belo Sun has advised SRK that the property has been fenced off in order to restrict unauthorized access.

7.0 GEOLOGICAL SETTING AND MINERALIZATION

The following sub-sections are extracted from Agnerian (2004).

7.1 Regional Geology

The Project area is situated along the northern boundary of the Carajás-Iricoumé Block of the Eastern Amazonian Craton (Figure 7-1). In this part of the Amazonian Craton, the regional structures have a north-westerly trend. In the area west of Belém, the southern segment of the Amazonian Craton is underlain by east-northeast trending Phanerozoic cover rocks of the Amazon Basin. The Project area is located in the western portion of the west-north-west trending Três Palmeiras Greenstone Belt, which is surrounded by the Xingu Complex in central Pará State of the Brazilian Shield (Figure 7-1). The greenstone belt is 3 to 10 km wide and extends approximately 70 km along strike (Figure 7-1). It comprises Upper Proterozoic metavolcanic and metasedimentary rock enveloping linear granodioritic to dioritic domes, interpreted to be syntectonic plutons of Proterozoic age.

Rocks of the Xingu Complex are predominantly Archean basement granitic gneisses originating from tonalite, trondhjemite, and granodiorite. In places, they may be migmatitic. The Xingu Complex is subdivided into different groups, including the Igarapé Salobo, Igarapé Pojuca, Igarapé Bahia, Grão Pará, Buritirama, and Rio Fresco groups. All of the above Archean-age rocks are intruded by anorogenic granitic bodies, which have an approximate age of 1.86 billion years. All rocks in the area exhibit strong foliation with a number of mylonitic zones and a steeply dipping attitude to the south. Other structures in the area include northeast, north-northeast, north-northwest, and east-trending faults.

7.2 Local Geology

The Project area is situated along a major ductile deformation zone within the Três Palmeiras Greenstone Belt. It is underlain by west-northwest–trending and steeply south-dipping gneisses of metasedimentary and/or metavolcanic origin and syntectonic diorite (Figure 7-2). Occasional chert horizons (chemical sedimentary rock) and banded iron formation (BIF) are included within the metasedimentary sequence. A number of anorogenic granitic plutons are also present along the southern contact of the greenstone belt.

In the Project area, the Três Palmeiras Greenstone Belt is interpreted to consist of a basal portion of predominantly metasedimentary rock in the southern part of the belt, and predominantly mafic volcanic rock in the northern part of the belt as well as synvolcanic intrusions. The sedimentary assemblage includes thin units of chemical sediments (chert, graphitic sedimentary rock, and oxide-facies iron formation), which serve as marker horizons in the interpretation of the local geology. Both assemblages commonly exhibit strong penetrative fabric (foliation and lineation) as well as metamorphic banding. In places, where the rock has undergone migmatization, mylonitic zones with associated silicification are commonly observed.

The volcanic, sedimentary, and syntectonic rocks of the Project have been affected by a widespread hydrothermal alteration event. Surficial alteration is present in an extensive layer of red saprolite, which covers the entire property, including topographic highs and lows.

Figure 7-1: Regional Geology Setting (Source: Belo Sun)

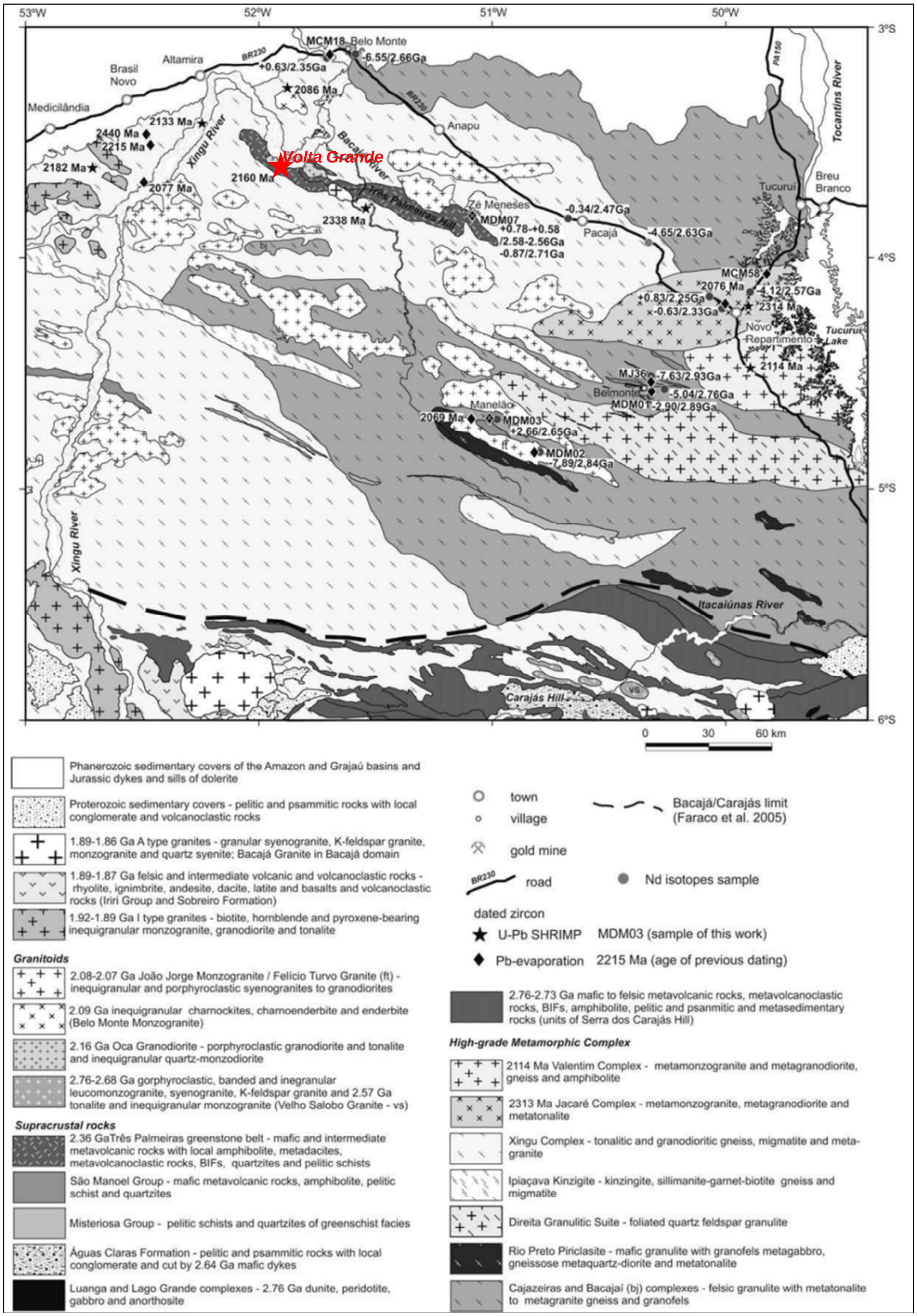
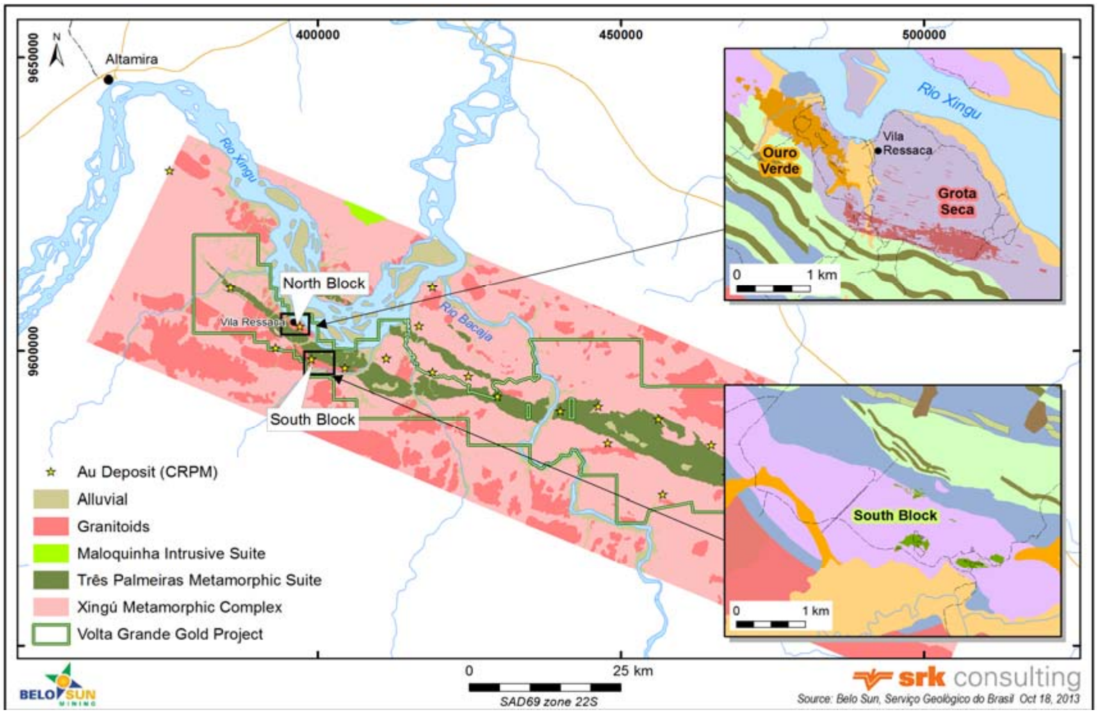
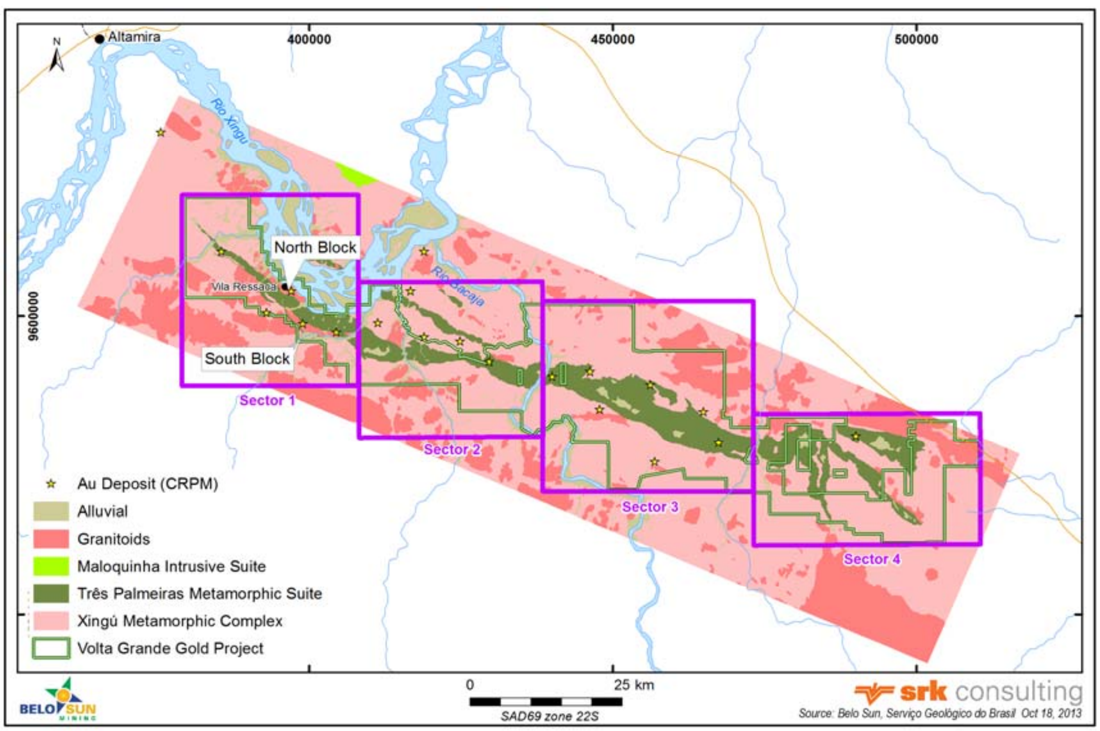


Figure 7-2: Local Geology





In general, the subsurface geology can be interpreted from the subtle colour differences of the overlying saprolitic material, as follows:

- Dark brick red to brown colour resulting from the weathering of underlying metavolcanic and metasedimentary rocks;
- Red to brown colour resulting from the weathering of underlying granodioritic rocks; and
- Pale brown to beige colour resulting from the weathering of underlying gneisses of the Xingu Complex.

Observations on outcrops, drill core and mineralogical (thin section) work show that the alteration assemblage within the red saprolite consists of clay minerals, opaque minerals (mainly pyrite and chalcopyrite), iron oxides, such as limonite and quartz.

7.3 Property Geology

The Volta Grande gold project contains two target areas named the North and South blocks; the former contains four large mineralized areas: (1) the Ouro Verde area in the northwestern part of the North Block, (2) the Grota Seca area, (3) the Junction area that connects Grota Seca and Ouro Verde and (4) the Greia area north of Grota Seca. The South Block comprises three target areas: (1) Pequi in the northern part of the South Block, (2) Grande in the southern part of the South Block, and (3) Itatá in the southeastern part of the South Block. The North Block as well as the South Block include old and new garimpeiros workings.

In the central part of the North Block, a north-northwest–trending lineament separates the southeastern mineralized zones of the Grota Seca from the northwestern zones at Ouro Verde and coincides largely with the Junction area. This lineament is parallel to other regional lineaments with similar orientation.

There is a complicated contact relationship between auriferous bedrock and the overlying saprolitic material. At Grota Seca, near recent garimpeiros workings, almost fresh diorite is in sharp contact with saprolitic material, which is at least 8 metres thick. This juxtaposition indicates that the saprolite is not made up of regular regolithic material developed on top of bedrock, but is transported by faulting parallel to the major shear zone that hosts the gold mineralization.

There are a number of north-northwest–trending regional structures present in the area. One of these is parallel to the segment of the Xingu River flowing from Altamira to the Volta Grande gold project exploration camp. Other structures with similar orientation are present in the area west of Ouro Verde, one of which cuts a northeast-trending structure.

In the South Block, mineralization is primarily hosted in granodiorite; however, the Pequi target is located at the northern contact of the granodiorite body to an amphibolite body to the north. While mineralization in the North Block is controlled by northwest-striking structural features, mineralization in the South Block appears to occur primarily where northwest-striking structures intersect with north-striking faults. Drilling as well as exposure in a large pit dug by garimpeiros shows two distinct mineralization directions (Figure 7-3). The first is steep, subvertical with a north-east strike. The second direction is shallow, dipping approximately 20 degrees to the southwest. These two directions can be seen in core as well and strongly influenced the modelling of the boundaries of the gold mineralization for the Grande deposit, which changed significantly from an earlier model. SRK expects that future drilling will refine further the understanding of the geology of the South Block.

Figure 7-3: Grande Artisanal Mine showing Subvertical and Shallow dipping Quartz Veins (view to the south)

7.4 Mineralization

There are two types of gold mineralization at Project - primary gold in intrusive rock and secondary gold in saprolitic rock. Both types of gold mineralization occur within a major shear zone. In general, the gold mineralization in bedrock occurs in zones of intense hydrothermal replacement and is associated with up to approximately five percent sulphides (pyrite and / or arsenopyrite) at Grota Seca and Ouro Verde. Specifically, mineralization styles are:

- Intense silicification with with up to five percent fine-grained sulphide (predominantly arsenopyrite) within strongly sheared diorite, such as at the Grota Seca area;
- Weak to moderate silicification in diorite with minor sulphides (mainly pyrite), such as at the Ouro Verde area; and

- Intensive silification overprinted by sulphide alteration (pyrite) and potassium alteration (sericitization and potassic feldspar formation), such as in the South Block area.

In all cases, the distribution of alteration assemblages and the replacement textures suggest evolution of fluid-rock alteration. The initial hydrothermal alteration involved silicification (quartz flooding) of the host diorite. Subsequent alteration included replacement by pyrite and / or arsenopyrite, followed by potassium feldspar alteration and sericitization.

Finally, all of the rocks in the area were subjected to carbonate alteration. This alteration is evidenced by the presence of numerous calcite veinlets in the diorite as well as in the metavolcanic rock.

Gold deposition is interpreted to be related to changes in local chemical conditions of mineralizing fluids in response to progressive fluid-rock interaction, which triggered sulphide precipitation. The sulphide content of the gold mineralization is low.

7.4.1 Primary Gold Mineralization

Gold mineralization at the Project occurs primarily in intrusive rock, while subordinate mineralization occurs in saprolitic rock. Primary gold mineralization is associated with altered diorite within a 300 m wide alteration zone, which straddles the contact zone between the intrusive and the metasedimentary rock. Gold occurs in a stack of mineralized zones ranging in size from strike trends over 1 km long, depths from surface to approximately 400 m, with true thickness ranging up to 50 m.

The dip of the mineralized zones is generally moderate to steep (50˚ to 85˚) to the south. Two large mineralized areas occur in the North Block: Ouro Verde in the north-western portion of the block and Grota Seca in the southern portion.

Mineralization in the Ouro Verde area extends for approximately 1,100 m along an approximate northeast-southwest strike and extends to a vertical depth of 540 m below surface.

Mineralization in the Grota Seca area extends for approximately 2,900 m along a west to north-west trend and extends to a vertical depth of 400 m below surface. Examples of Ouro Verde mineralization are provided in Figure 7-4 and Figure 7-5.

Recent drilling in the area between the Ouro Verde and Grota Seca has intersected mineralization, suggesting a continuous zone of mineralization.

7.4.2 Saprolite Gold Mineralization

Surficial weathering has resulted in an extensive saprolitic profile overlying the primary mineralization at the Project. In general, the thickness of the saprolitic material ranges from 3 m to 20 m. Locally the thickness can reach up to 45 m, as in the Ouro Verde area. Occasional outcrops of saprolitic material occur in the Project area.

Overburden thickness ranges from 3 m to more than 10 m. Typical lateritic and saprolitic profiles with gold mineralization are observed in the many small open pits as well as in diamond drill core.

The lateral transport of the gold in the surficial environment is caused by frequent changes in the water table in the rock and surficial alteration of the sulphides as well as the gangue minerals in the rock.

In general, the average grade of the lateritic material is lower than the saprolitic material, which is also lower grade than the primary mineralization underlying the saprolite. Occasionally, however, the saprolite may also contain high-grade intersections. These occurrences are generally due to mineralized quartz vein material, which is more resistant than the enclosing saprolitic rock; the quartz becomes enriched in the saprolite leading to increased gold values.

Typically, gold anomalies in laterite / saprolite extend beyond underlying mineralization in hard rock; however, in the Project area, the saprolitic zone gold mineralization does not appear to be much larger than the underlying primary mineralization in bedrock.

Figure 7-4: Typical Gold Mineralization of the Ouro Verde Deposit in Highly Silicified Diorite with Moderate Sheared Texture

A

A) Borehole VVGD-066, 268.4 to 268.95 m, mineralization associated quartz veining and sulfide stringers. Sampled interval was assayed at 38.0 g/t Au.

B) Close-up of quartz-pyrite stringer in A.

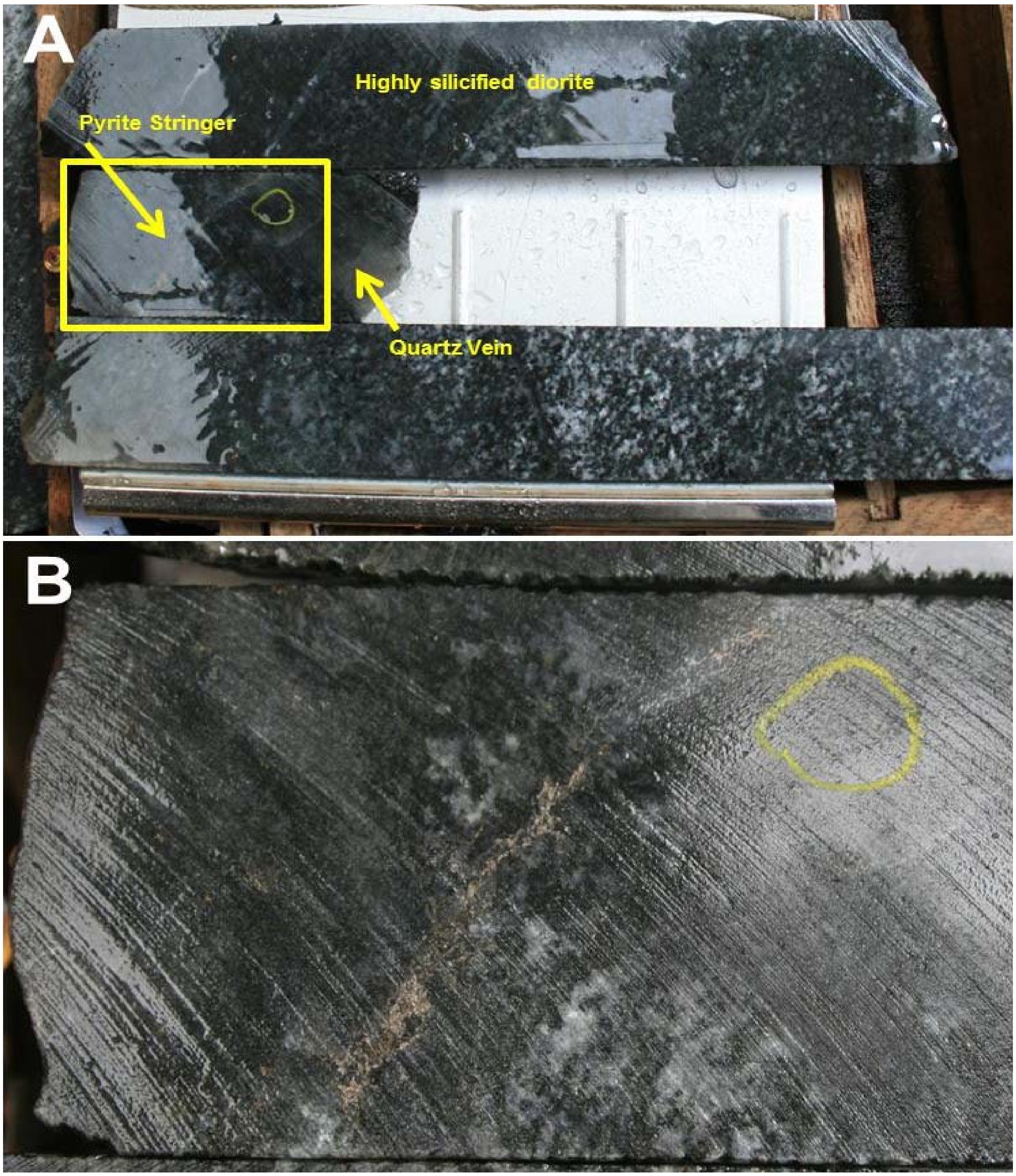
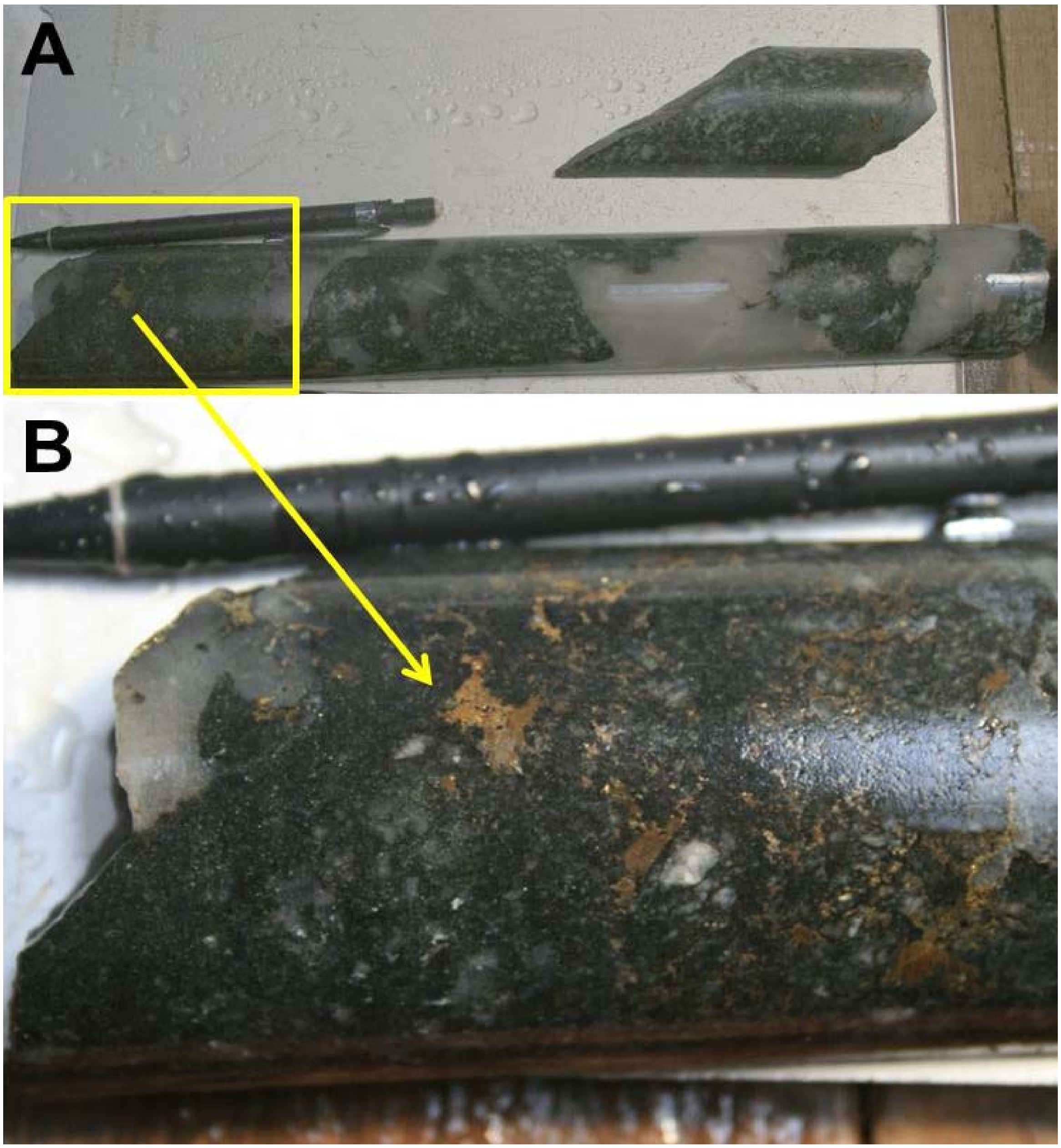


Figure 7-5: Ouro Verde Mineralization

Borehole VVGD-008, 271.0 to 271.3 m.

A) Silicified porphyritic diorite, brecciated quartz veins, fine to coarse disseminations of pyrite and pyrite veinlets, 15% to 20% pyrite. Sampled interval was assayed at 3.80 g/t Au.

B) A close-up of pyrite stringer zone.



8.0 DEPOSIT TYPES

The Project is situated along a major ductile deformation zone within the west-northwest–trending Três Palmeiras Greenstone Belt. It is underlain by west-northwest–trending and steeply south-dipping gneisses of metasedimentary and/or metavolcanic origin and syntectonic diorite. Gold mineralization is hosted by a major west-northwest–trending shear zone within the diorite.

Shear zone hosted gold deposits, also known as orogenic gold deposits, are common in most Archean granitoid-greenstone terranes. Shear zone hosted gold deposits have formed at all times through geological history and are associated with regionally metamorphosed terranes where they exhibit a strong relationship with regional arrays of major shear zones. Mineralization occurs often in second or third order structures in close association to crustal scale structures.

Exploration work has indicated that the Project is situated in a geological environment similar to other gold deposits in this part of South America, such as the oxide zones of several gold and copper-gold deposits in the Carajás region of Brazil and other gold deposits in neighbouring countries in South America, such as the Las Cristinas and El Callao gold deposits in Venezuela, the Wenot Zone of the Omai gold mine in Guyana and the Gross Rosebel gold deposit in Suriname.

Lateritic and saprolitic gold deposits are typically situated in tropical environments, such as the northern part of South America, the Caribbean islands, Central Africa, Australia and Southeast Asia. In these environments, gold is mechanically transported and distributed in a volume of lateritic material overlying the mineralized structures in bedrock.

In the Amazon Basin of Brazil, alluvial gold deposits are generally situated in material overlying primary mineralization, with very little, if any, lateral transport. In general, the creeks along which alluvial mining is carried out coincide with structures associated with zones of hydrothermal alteration that host gold deposits.

9.0 EXPLORATION

9.1 Belo Sun Mining Corp. (2010 – Present)

9.1.1 Reinterpretation of Airborne Geophysical Survey

From March to September 2010, Belo Sun re-interpreted the 2007 magnetic and radiometric airborne geophysical survey data.

The re-interpretation indicated that the mineralized area at the Grota Seca deposit coincides with a linear magnetic anomaly (first vertical derivative) as well as an area of anomalous radiometric responses in terms of total counts and potassium channels.

The re-interpretation also identified a possible contact zone approximately 300 m south of the southern part of the Ouro Verde deposit.

9.1.2 Preliminary Studies

In October 2010, VOGBR conducted preliminary geotechnical, hydrogeological and hydrological studies required for the development of the Project.

9.1.3 IP Survey

In the period between October 18 and November 26 2010, a spectral induced polarisation survey was completed by Fugro Brazil over the Project. During this time, 31,950 line m were surveyed using the pole-dipole array in the time domain with 50 m spacing.

9.1.4 Photogeological and Landsat Lithostructural Interpretation

In July 2011, an exploration-oriented Landsat 7ETM/TM image interpretation at a 1:100,000 scale was carried out over 6,000 square km of the Project and surrounding areas by Barry McGrail & Associates, Australia. In addition, a 1:60,000 scale photogeological interpretation, compiled at 1:50,000 scale over a 1,000 square km area, within the Landsat project area, was also completed. The final results were presented as lithostructural maps in MapInfo format.

9.1.5 LIDAR and Aerophotographic Survey

In August 2011, a light detection and ranging (LIDAR) and aerophotographic survey was carried out over the Project by Topografia Engenharia e Aerolevantamentos S.S. Ltda. (Topocart), Brazil.

9.1.6 Regional Summary

The Geological Survey of Brazil database covering the Três Palmeiras Greenstone Belt was reviewed and regional field reconnaissance, including rock and soil sampling, as well as mapping, was undertaken. There are 27 gold occurrences covered by Belo Sun claims along approximately 120 km of the belt.

This work was expanded on during 2013 when Belo Sun identified drilling targets from earlier geophysical data and began reconnaissance geological mapping as well as soil and rock sampling in Sectors 1, 2 and 3. In total 89 km (Sector 1 - 24, Sector 2 - 13 and Sector 3 - 52 km) of line were cut in preparation for the sampling programs (refer to Figure 4-2).

9.1.7 Structural Study

The interpretation of radiometric and magnetic airborne data was aimed at understanding the signature of the Volta Grande gold deposit. This work resulted in a preliminary structural study of the gold-bearing shear zone at the Project. The work was completed in September 2010.

Belo Sun started to acquire structural data from oriented core. For this purpose, Belo Sun used a Reflex ACT RD 2 tool. To date, core from 19 boreholes has been oriented and approximately 200 structural measurements have been acquired - 125 measurements from Grota Seca and 74 measurements from Ouro Verde. Data from these measurements are being integrated into the Project structural model to better understand the structural control on mineralization.

In early 2012, Belo Sun commissioned independent consultant Dr. Roberto Viseu Lima Pinheiro to complete a structural study of the Ouro Verde and Grota Seca areas to aid in the understanding of the spatial and temporal relations between the structural fabric of the rocks and the mineralization within the regional tectonic framework (Pinheiro, 2012).

9.1.8 Airborne Geophysical Survey

In August 2012, Belo Sun completed an airborne magnetic and gamma survey over the entire contiguous tenement area. The survey was carried out by Prospectors Aerolevantamentos e Sistemas Ltda., from Rio de Janeiro, Brazil. The survey comprised 15,542 line km; survey lines were spaced 200 m apart, while control lines were flown with a line spacing of 2,000 m. Survey lines were oriented at 23°, approximately perpendicular to the general strike of the greenstone belt. Nominal terrain clearance was 100 m.

10.0 DRILLING

10.1 Introduction

VGML, Verena, and Belo Sun drilled a combined total of 684 core boreholes (approximately 169,835 m) and 59 reverse circulation boreholes (11,225 m) at Ouro Verde and Grota Seca in the North Block of the Project. A total of 62 core boreholes (14,274 m) have been drilled in the South Block and include the Itata, Grande, and Pequi deposits.

The distribution of drilling is summarized in Table 10-1 and Figure 10-1 to Figure 10-6. Belo Sun drilling data contribute about 80% of the total drilling information (measured by drilled metres).

Table 10-1: Summary of Drilling on Project

Company	Period	Type	Target Area	No. of Boreholes	Total Length m
Volta Grande Mineração Ltda. (TVX Gold Inc.)	1995	Core	South Block	2	245
	1996	Core	South Block	4	450
		Core	Grota Seca	24	3,533
	1997	Core	Grota Seca	41	7,003
		RC	Grota Seca	11	1,696
		Core	Ouro Verde	5	852
	1998	Core	Grota Seca	34	6,041
		Core	Ouro Verde	10	2,175
Verena Minerals Corp.	2006	Core	Grota Seca	23	5,000
	2007	Core	South Block	16	2,675
		Core	Grota Seca	6	1,240
		Core	Ouro Verde	5	1,351
	2008	Core	Grota Seca	1	217
		Core	Ouro Verde	26	4,083
Belo Sun Mining Corp.	2010	Core	Grota Seca	23	5,617
		Core	Ouro Verde	36	9,123
	2011	Core	South Block	21	5,575
		Core	Grota Seca	142	37,330
		RC	Grota Seca	42	8,328
		Core	Ouro Verde	82	23,287
	2012	Core	South Block	30	8,552
		Core	Grota Seca	173	47,827
		Core	Ouro Verde	128	39,099
		RC	Grota Seca	6	1,201
	2013	Core	South Block	35	6,413
		Core	Grota Seca	7	1,799
		Core	Ouro Verde	22	5,340
	2014	Core	Grota Seca	14	1,438
		Core	Ouro Verde	3	261
Total				972	237,751

* RC = reverse circulation

Figure 10-1: Drilling in Ouro Verde and Grota Seca (North Block)

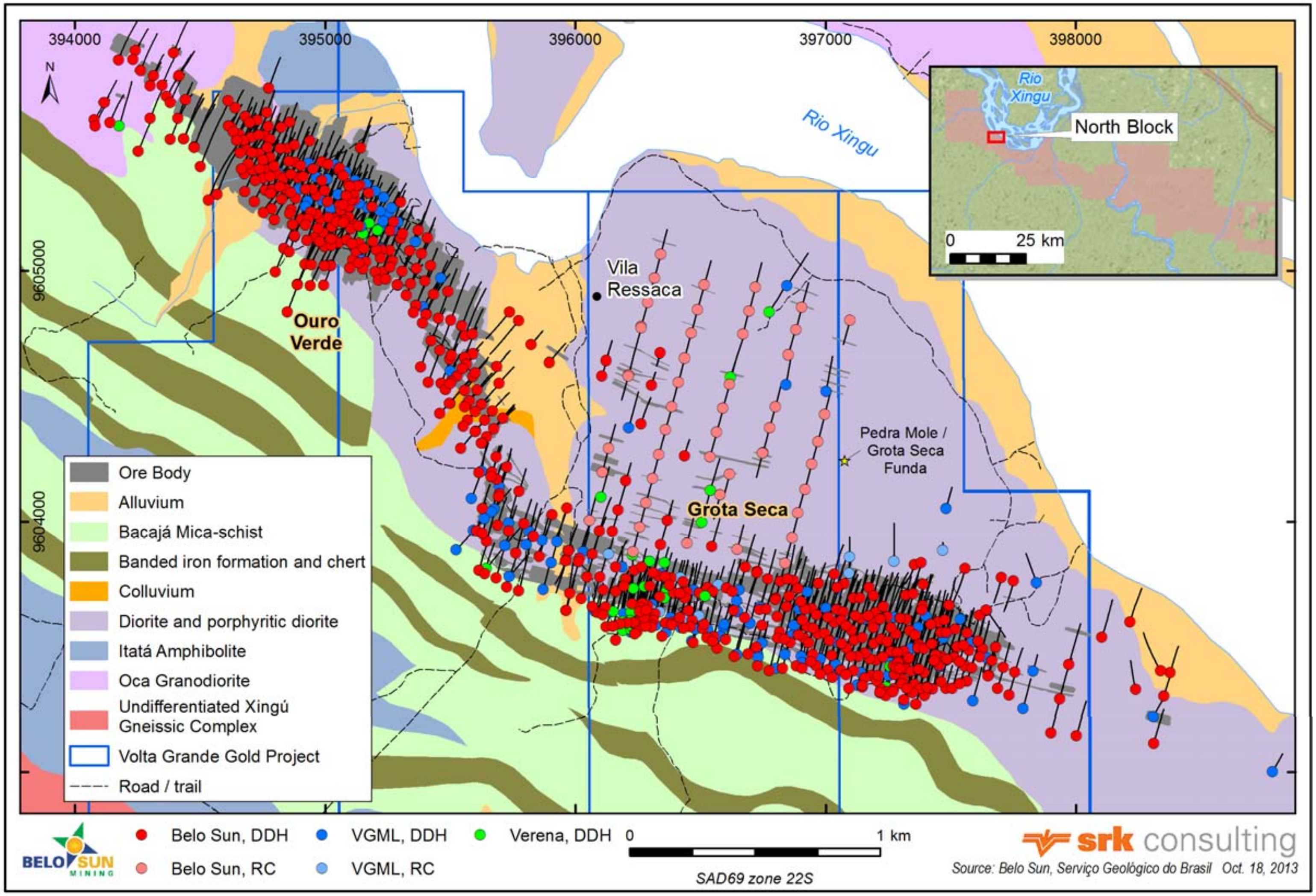


Figure 10-2: Drilling in South Block

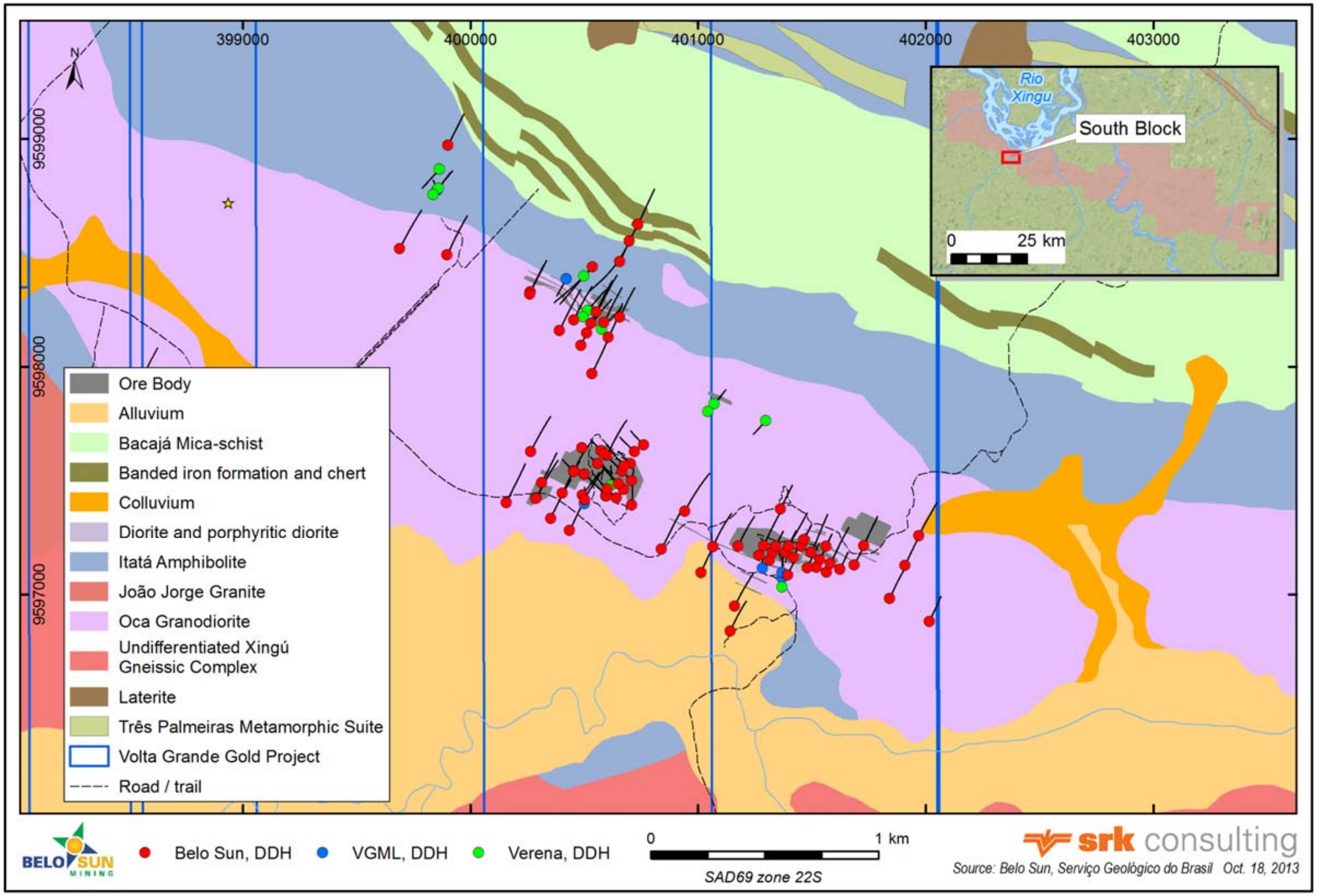


Figure 10-3: Drilling in Ouro Verde

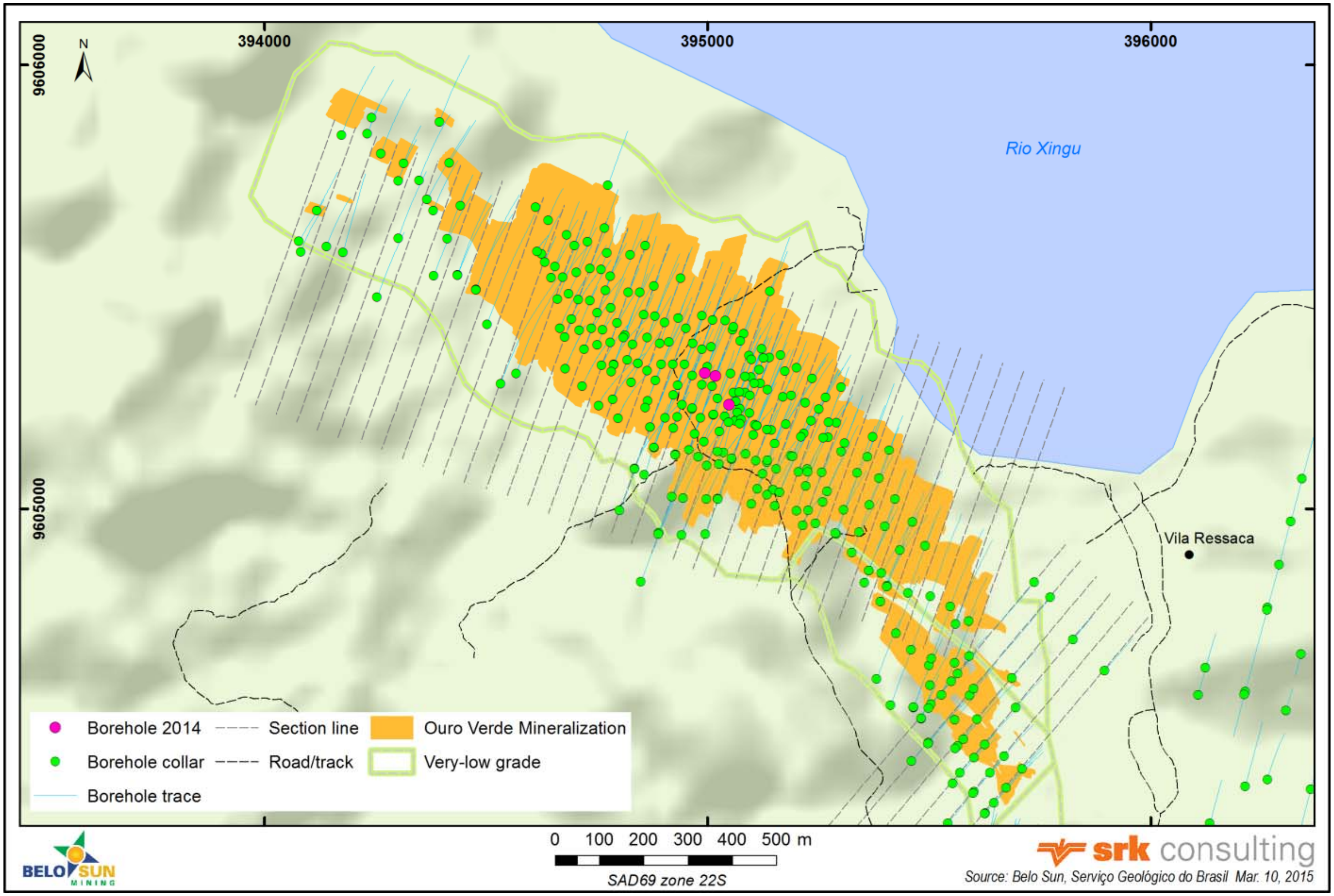


Figure 10-4: Drilling in Grota Seca

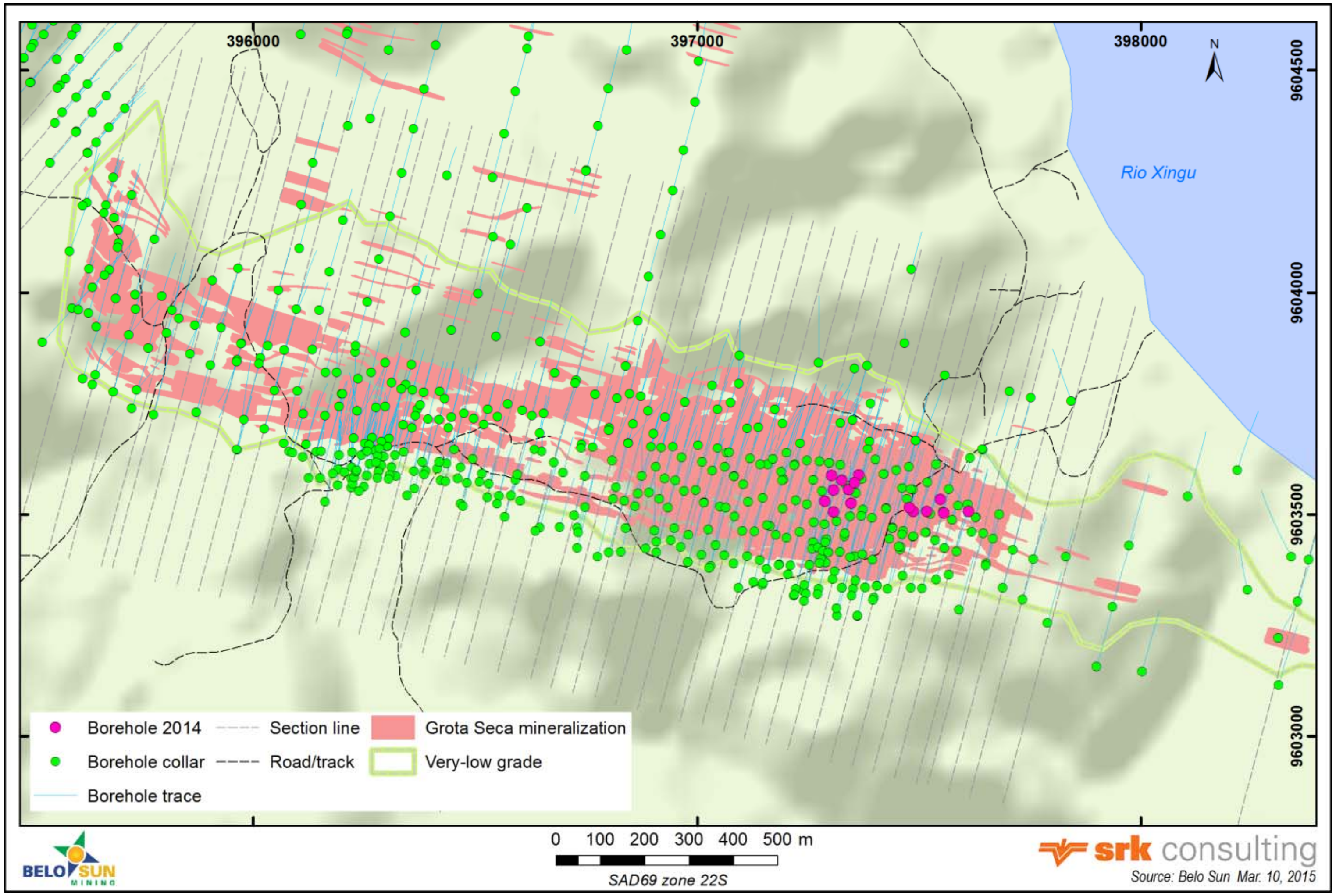


Figure 10-5: Detailed Drilling Plan for the South Block Deposit with Grid

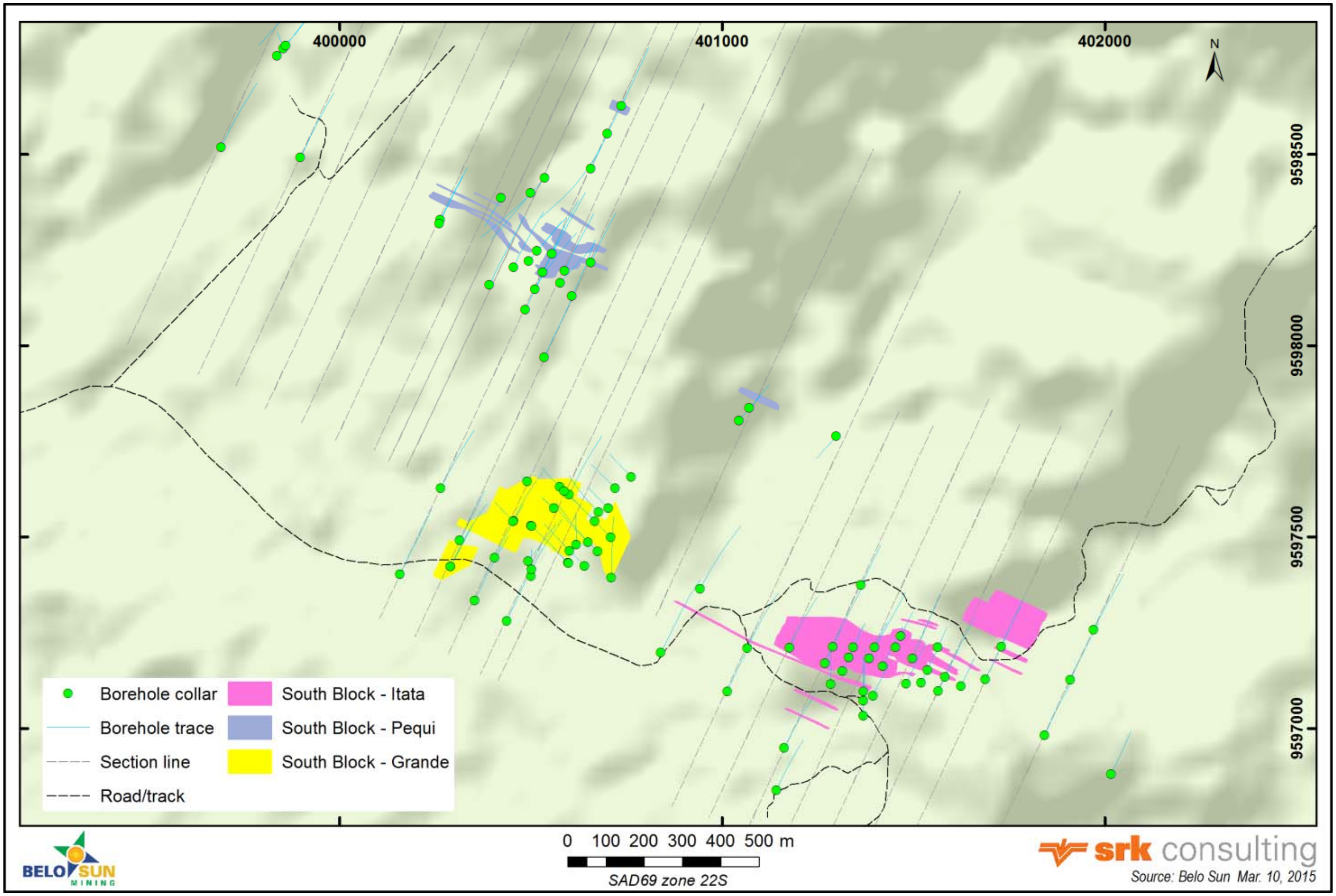
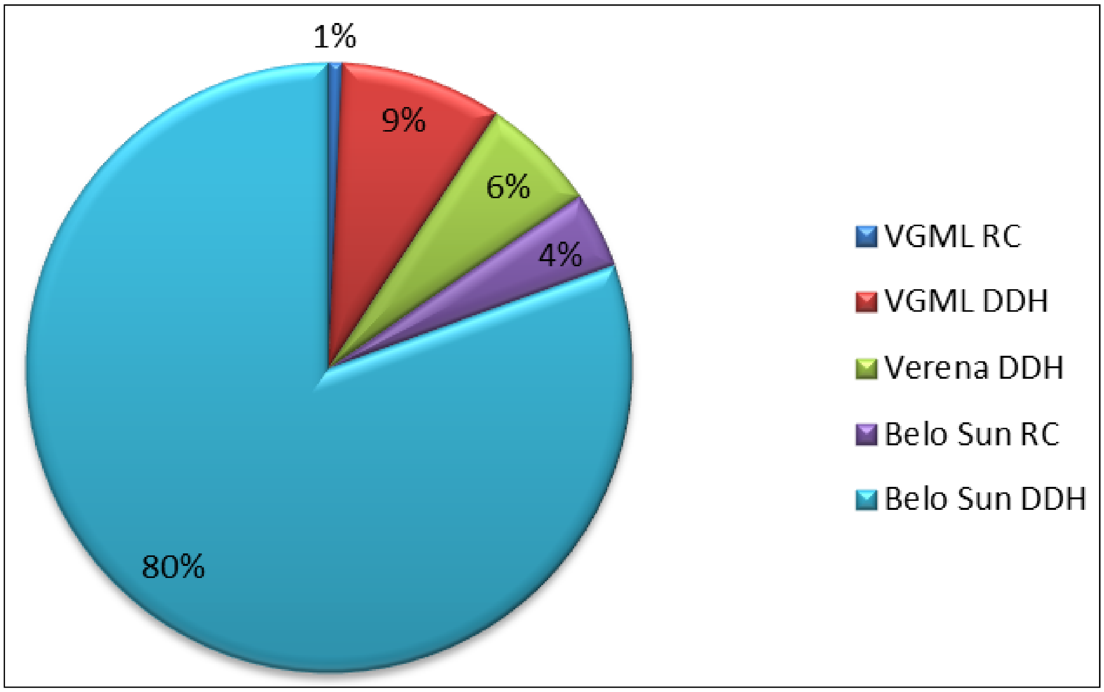


Figure 10-6: Drilling Data by Company



10.2 Drilling Procedures and Sampling Method and Approach

10.2.1 Volta Grande Mineração Ltda. (1996 to 2004)

The drilling was undertaken by Diana Drill Ltda. of Sao Paulo, Brazil. Core boreholes were drilled with Diakore VI, Longyear 38, and Maquesonda 700 drill rigs. The reverse circulation boreholes were drilled with a Rocky-300 drill rig. During the core drilling, the saprolite and the weathered rock were drilled using HW diameter (101.6 mm core diameter) and reduced to NW diameter (76.2 mm core diameter) when fresh rock was reached. Agnerian (2004) reported that core drilling recovered BQ, NQ and HQ core diameter sizes. During the reverse circulation drilling, a 5.5-inch diameter was used. Core boreholes were surveyed using a Tropari instrument.

According to Agnerian (2004), core was logged using logging forms, marking lithological contacts, structural features and alteration, and/or mineralization assemblages. Core recovery and core orientation were noted as part of the borehole logging to determine the true orientation of planar and other structural features, such as bedding and fractures, intersected in core. Boreholes were then plotted and manual checking was done by the project geologist for any errors in the plots. Logging, sampling, and assaying procedures for reverse circulation rock chips were similar to the ones used during the diamond drilling program.

Core is stored in core sheds at the Project exploration camp.

10.2.2 Verena Minerals Corporation (2004 to 2009)

Core drilling was undertaken by *Geoserv Pesquisas Geológicas S.A.* (Geoserv) from Rio de Janeiro, Brazil. Drilling utilized HQ equipment for weathered material and NQ for unweathered rock.

All borehole collar locations were surveyed and marked in the field using a global positioning system (GPS) instrument. Down-hole surveys were performed at 50 m intervals using Maxibore equipment. Core was brought in by Verena authorized exploration personnel one or more times per shift from the drill rig directly to a drill logging and sampling area, which is fenced within the Project exploration camp. The latter also has an outside fence. Within 48 hours, the material core intervals (for example, potentially mineralized intervals) were photographed, logged, and sampled. Samples were only handled by Verena personnel.

Logging was completed by depicting all down-hole data including assay values. All information was recorded on handwritten logs, including:

- Lithological contacts;
- Descriptive geology;
- Intensity of various alteration types;
- Structural features, such as foliation, fracture and brecciated zones;
- Core angles;
- Core diameter;
- Down-hole inclination;
- Percent core recovery record (in general, this was 98 percent);
- Geotechnical data, such as the numbers of fractures per metre;
- Rock quality designation (RQD) measurements; and
- A photographic record of the core was maintained with a digital camera. Photographs were taken of all exploration drill core and key information was summarized in a digital database.

Mineralized core intervals to be sampled were identified and marked. Sample lengths were approximately 1 metre. Visual indicators of the intervals to be sampled include lithologic contacts and altered rock, such as hematitic, silicified, sericitic and sulphide zones. The sampling procedure was as follows:

- The entire core was sampled with individual sample lengths of 1 m;
- Sample intervals were marked by metal tags in the core box, and were normally extended for several metres into unmineralized rock;
- Prior to sampling, core was marked by a line drawn along the core axis, so that systematically one side of the core (with hatched lines) was sampled;
- Sample tags were inserted at the beginning of each sample;

- Sample tags were inserted in the same bags only after the samples were collected;
- Sample bags were numbered prior to sampling;
- Marked sample intervals were cut in half using a diamond saw, and the half core was sent for assay to SGS Geosol Laboratories (SGS), Belo Horizonte, Minas Gerais, Brazil, and the other half core was retained for future reference or for metallurgical tests; and
- Samples were collected in medium-sized 25 cm X 40 cm clear polyethylene bags and sealed.

The second half of the split core was stored at the Project exploration camp as a control sample, available for review and re-sampling, if required.

10.2.3 Belo Sun Mining Corp. (2010 to Present)

The drilling was undertaken by Geologia e Sondagens S.A. (Geosol) of Belo Horizonte, Minas Gerais, Brazil; Rede Engenharia e Sondagem S.A. (Rede) of Lagoa Santa, Minas Gerais, Brazil; and Boart Longyear Ltd. (Longyear) of Belo Horizonte, Minas Gerais, Brazil. Drilling utilized HQ equipment for weathered material and NQ for unweathered rock. All borehole collars were surveyed according to the local UTM coordinates (SAD69 datum, Zone 22S), using differential GPS equipment before drilling started, once the drilling equipment was in position, and once drilling had been completed and concrete markers had been set. Down-hole surveys were completed at 3-metre intervals using a Maxibore down-hole survey tool. Core recovery exceeds 95 percent in unweathered rock. All core was logged by geologists with direct digital entry of data into a comprehensive database program.

Core intervals to be sampled were identified and marked by Belo Sun's geologists. Sample intervals range between 0.4 and 1.6 m in length, averaging 1.0 m. Visual indicators of the intervals to be sampled included lithological contacts and hydrothermal alteration zones (sulphidation, silicification, and quartz veining) that can modify the 1-metre sampling interval. The sampling procedures were as follows:

- Core was brought in by authorized exploration personnel one or more times per shift from the drill rig directly to a drill logging and sampling area, which was fenced within the Project exploration camp. The latter also has an outside fence. Within 48 hours, the material core intervals were photographed, logged, and sampled;
- Sample intervals were marked with metal tags in the core box;
- Prior to sampling, core was marked by a line drawn along the core, so that systematically one side of the core (with hatched lines) was sampled. The other half core was retained for future reference;
- Sample tags were inserted at the end of each sample;
- Sample tags were inserted in the same bags only after the samples were collected;
- Sample bags were numbered prior to sampling;

- Each sample was assigned a unique sample number that allowed it to be traced through the sampling and analytical procedures, for validation against the original sample site; and
- Marked sample intervals were cut in half using a diamond saw, and the half core was sent to the preparation laboratory (Acme) on-site or to Acme preparation laboratory in Itaituba, Brazil, where the samples were prepared for sending for analysis to Acme Laboratory in Santiago, Chile.

Sample tags and quality control samples were generated by a database program that automatically generated quality control sample numbers in sequence with the core samples. Belo Sun has implemented an innovative colour code system for the quality control of the samples to reduce errors made by technical staff in selecting certified reference material and other quality control samples.

10.3 SRK Comments

Procedures undertaken by Belo Sun at the Project for reverse circulation and core drilling, chip and core handling, logging and maintenance of the database for the Project are well managed, documented, and undertaken with a well-defined set of procedures that exceed industry standard practice.

SRK considers that the exploration data collected by Belo Sun and previous Project operators are of sufficient quality to support mineral resource evaluation.

11.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Volta Grande Mineração Ltda. (1996 to 2004)

Sample preparation for core and reverse circulation samples was done at a sample preparation laboratory at the site. The security measures taken to ensure the validity and integrity of the samples are unknown (Agnerian, 2004).

Samples were sent to NOMOS, a laboratory owned by Rio Tinto Mining in Brazil. This laboratory was the primary laboratory used for assaying. Gold was analyzed using fire assay with atomic absorption finish. Further information about assaying methods and procedures were not available to SRK. Assaying and analytical procedures used by NOMOS are not well documented. Agnerian and Krutzelmann (2009) reported that rejects were stored on site.

Umpire check assaying was performed on drill core samples at secondary laboratories Bondar-Clegg and SGS Canada Inc. (SGS) and Metais Especiais in Brazil (Agnerian, 2004).

Sample preparation methods and known analytical procedures for each sampling program are described below. Information is taken from Agnerian (2004).

11.1.1 Drill Core Sampling

Mineralized and altered core intervals were split and sent for assaying. In general, sample lengths were 1 m. Core samples were taken by splitting or sawing the core longitudinally in half. Half of the core was sent to an assay laboratory and the other half was retained for reference. Samples were assayed by the fire assay method.

Procedures for core sample preparation included the following:

- Crushing the 2 to 3 kg assaying sample to quarter-inch size using a jaw crusher;
- Grinding the sample to 20 mesh and subsequently pulverizing it to 200 mesh using a ring mill;
- Thoroughly mixing the sample and separating it using a Jones splitter;
- Separating a 250 g aliquot for assay and keeping the remaining 1.75 kg reject in temporary storage for further processing; and
- Carrying out fire assays with atomic absorption finish on a 50 g aliquot of the sample.

11.1.2 Reverse Circulation Chip Sampling

The sampling preparation methods included drying, splitting using a Jones splitter, and pulverizing, as follows:

- Collecting a 30 to 40 kg sample. If the sample was wet, it was dried first;

- Thoroughly mixing the sample and splitting it using a Jones splitter, and separating a 2 kg aliquot for processing;
- Pulverizing the 2 kg subsample to 200 mesh using a ring mill;
- Thoroughly mixing the sample and splitting it again using a Jones splitter;
- Separating a 250 g aliquot for assaying and keeping the remaining 1.75 kg reject in temporary storage for further processing; and
- Sending the 250 g sample to NOMOS for gold assaying. At NOMOS, this sample was separated into a 50 g and a 200 g portion; the 50 g portion was assayed for gold by fire assay, while the 200 g portion was kept for reference.

11.2 Verena Minerals Corp. (2004 to 2009)

Sample preparation and assaying was undertaken by SGS-Geosol Laboratories Ltda. (SGS-Geosol) in Belo Horizonte, Minas Gerais, Brazil. SGS-Geosol is ISO14001:2004 and ISO 9001:2008 accredited and is independent of Belo Sun.

Agnerian and Krutzelmann (2009) stated that sample preparation procedures at SGS-Geosol were similar to those used at SGS, Canada and reported the following for SGS-Geosol:

- The samples were dried in paper bags or metal pans in a dryer at 60 degrees Celsius;
- The samples are crushed to 90 to 95% passing 2 mm;
- Samples are split using a Jones riffle splitter to 200 g and milled using a ring and puck made of either hardened chrome steel or mild steel material, to 90 to 95% passing 200 mesh; and
- Samples were then assayed for gold by fire assay with an atomic absorption spectrometry finish using analysis method FAA 313 for 30 g aliquots or FAA505 for 50 g aliquots.

11.3 Belo Sun Mining Corp. (2010 to Present)

Sample preparation was undertaken by the preparation laboratory adjacent to the Volta Grande Project exploration camp. The preparation laboratory was independently managed by Acme Labs. When the sample volume was too large for the on-site laboratory to manage, sample preparation was also undertaken by the Acme preparation laboratory in Itaituba, Brazil when the sample volume was too large for the on-site laboratory to manage.

- All core sample and quality control samples were delivered to the Acme preparation laboratory in sealed plastic barrels with samples in zip strap sealed plastic bags;
- Samples were logged into the laboratory and assigned barcodes;
- Sample pulps were shipped to the Acme Laboratory in Santiago, Chile, independently of Belo Sun for assaying. Acme Laboratory S.A in Santiago, Chile was accredited by the Standards Council of Canada in November, 2012

(accredited laboratory no. 764) for the determination of gold by lead collection fire assay with atomic absorption spectrometry and gravimetric finish conforming to requirements of ISO/IEC 17025:2005;

- The samples were weighed (2.5 to 3.0 kg/m) and dried for 4 hours at 60 degrees Celsius;
- Samples were crushed to 80% passing 10 mesh (2 mm). A 1000 g split was pulverised to 85% passing 200 mesh (75 microns);
- A 150 g split (pulp) was analyzed by 50 g fire assay with atomic absorption spectrometry finish;
- Samples that yielded greater than 10 g/t Au were re-analyzed by 50 g fire assay with gravimetric finish;
- Replicate pulp assays (duplicates) were analyzed by Acme Laboratory in Santiago, Chile, and check assays were performed by ALS Chemex in Lima, Peru. ALS Peru S.A. is accredited by the Standards Council of Canada (accredited laboratory no. 670) for the determination of gold by lead collection fire assay and atomic absorption spectrometry and gravimetric finish conforming to requirements of ISO/IEC 17025:2005;
- Rejects were sent back to site and stored.

SRK notes that the place names of these laboratories are incorrect in the SRK reports dated March 7, 2012 and June 8, 2012.

11.4 Specific Gravity Data

Specific gravity was not measured by VGML or Verena. Belo Sun carried out specific gravity determinations during the 2010 and 2011 drilling programs.

Specific gravity was measured by Belo Sun at site on core samples using the standard weight in air and weight in water procedure from complete sample intervals. Split core was used for the measurements. The entire split core from one sample interval was used for each determination. One sample interval per box was measured. In cases where the sample interval consisted of numerous individual split core pieces, the weight of all pieces was measured at the same time. Specific gravity standards were used informally by Belo Sun. The scale was certified and re-certified at manufacturer suggested intervals. Following earlier recommendations by SRK, Belo Sun uses a set of certified weights to check the accuracy of the scale.

If specific gravity was lower than 2.50 or greater than 3.20, the test was repeated for validation.

A total of 5,531 and 2,360 specific gravity measurements were taken from unweathered material at Ouro Verde and Grota Seca in the North Block, respectively. A total of 124 specific gravity measurements were taken from fresh rock in the South Block. A total of 48 measurements were obtained from saprolite material for all deposits combined. While the saprolite specific gravity data are scarce, the bulk of the mineralization occurs in fresh rock. Hence the risk associated with saprolite specific gravity is considered low.

Following past recommendations by SRK, Belo Sun also measured specific gravity using an in-situ sand replacement method. For this method, a flat surface is prepared on the ground in which a hole is dug with known dimensions. The excavated soil is weighed. A bottle with measuring sand of known specific gravity is weighed, then the hole is filled with sand and the bottle weighed again. From the weight difference of the sand bottle, the volume of excavated soil can be determined. From the known weight and volume of the soil its specific gravity can be determined.

Furthermore, Belo Sun implemented SRK's suggestion to check the scale routinely using a certified set of weight standards and several core samples as standards for the scale as part of a quality control program for measuring specific gravity.

11.5 Quality Assurance and Quality Control Programs

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

Analytical control measures typically involve internal and external laboratory control measures implemented to monitor the precision and accuracy of the sampling, preparation, and assaying. They are also important to prevent sample mix-up and to monitor the voluntary or inadvertent contamination of samples.

Assaying protocols typically involve regularly duplicating and replicating assays and inserting quality control samples to monitor the reliability of assaying results throughout the sampling and assaying process. Check assaying is normally performed as an additional test of the reliability of assaying results; it generally involves re-assaying a set number of sample rejects and pulps at a secondary umpire laboratory.

11.5.1 Volta Grande Mineração Ltda.

Check assaying was performed at Bondar Clegg (now ALS Chemex), SGS laboratories in Canada and at Metais Especiais laboratory in Brazil. A total of 794 check assays were assayed: 206 check assays were assayed by Bondar Clegg, 264 check assays were assayed at SGS and 324 check samples were assayed by Metais Especiais (Agnerian, 2004). This number of check assays amounts to approximately 4.2% of the samples assayed at NOMOS between 1995 and 1998 by VGML. Agnerian and Krutzelmann (2009) stated that the check assays were done on different batches of samples and not on the same batch.

Assaying protocols, other than the check assaying described above, are not available to SRK.

11.5.2 Verena Mineral Corporation

Verena relied partly on the internal analytical control measures implemented by SGS. In addition, Verena implemented external quality control measures on all sampling, consisting of control samples, blanks, standards and duplicates, in all sample batches submitted for assaying. Standards consisted of a high grade standard (Standard 1) with expected value of 14.89 g/t Au and a low grade standard (Standard 2) with an expected value of 1.29 g/t Au. Duplicates consisted of mineralized rock.

Control samples were inserted every 20 samples. A total of 203 standard samples were assayed: 115 of Standard 1 and 88 of Standard 2. 381 pairs of duplicate samples were assayed (Belo Sun, 2011).

Other assaying protocols for quality control and quality assurance programs are not available to SRK.

11.5.3 Belo Sun Mining Corp.

The following review considers the quality assurance and quality control data collected by Belo Sun between June and August 2014. For a review of the quality assurance and quality control data for prior periods Refer to previous technical reports (SRK 2012a, 2012b, 2013, and 2014).

Belo Sun relied partly on the internal analytical quality control measures implemented by Acme. In addition, Belo Sun implemented external analytical control measures on all sampling. These measures involved the use of control samples, including blanks and certified reference materials (standards), inserted in all sample batches submitted for assaying

Two sample blanks were used: a non-certified coarse material consisting of building stone or sand and sourced from gneiss of the Xingu Complex in Brazil (COARSE BLANK) and a certified fine blank (GF-02 BLANK) consisting of a fine powder derived from gneiss of the Xingu Complex in Brazil, which was prepared and certified by Instituto de Tecnologia August Kekulé (ITAK), Brazil.

Five commercial certified gold reference materials (standards) sourced from ITAK (Instituto de Tecnologia August Kekule Ltda.) in João Monlevade, MG-Brazil for Belo Sun were used. They are listed in Table 11-1.

Table 11-1: Specification of Certified Reference Materials Used by Belo Sun for the Volta Grande Project between June and August 2014

Certified Reference Material	Source	Certified Value g/t Au	Standard Deviation g/t Au	Number of Samples
GF-02 Blank	ITAK	<0.005	-	53
ITAK 559	ITAK	1.12	0.540	38
ITAK 561	ITAK	0.242	0.018	33
ITAK 558	ITAK	2.23	0.077	28
ITAK 517	ITAK	22.7	0.490	9
ITAK 525	ITAK	2.75	0.100	2

Note: Coarse blank is not included in table because it is not certified.

For all batches of samples analyzed, Belo Sun inserted approximately 5% of control samples and 4% of replicate field duplicate samples (duplicates). No umpire laboratory testing was performed during the 2014 drilling.

11.6 SRK Comments

Based on SRK's review, the Acme analytical laboratory used procedures and equipment that were adequate for the analysis of gold samples from the Project.

In the opinion of SRK, Belo Sun personnel used care in the collection and management of field and assaying exploration data. The analysis of the analytical quality control data is presented in the following section. In the opinion of SRK, the sampling preparation, security and analytical procedures used by Belo Sun are consistent with generally accepted industry best practices and are, therefore, adequate. SRK considers that the exploration data collected by Belo Sun and previous project operators are of sufficient quality to support mineral resource evaluation.

12.0 DATA VERIFICATION

12.1 Verifications by Volta Grande Mineração Ltda

Verifications by VGML are not well documented. Quality control measures on sampling and assaying involved a standard and umpire check assaying.

12.2 Verifications by Verena

According to Agnerian (2004), Verena carried out compilation and verification of historical data on the project as part of its due diligence prior to acquiring the Volta Grande gold project. This work included site visits and collection of samples of mineralized material both from old artisanal underground workings and from surface operations and diamond drill core.

Agnerian (2004), Agnerian and Krutzelmann (2009) reported that samples were collected for independent verification by Roscoe Postle Associates Inc. (RPA), who was requested by Verena to prepare an independent technical report on the Volta Grande gold project. As part of this work, RPA confirmed the presence of gold in grab samples from *garimpeiros* sites and in core samples drilled by VGML and Verena.

Agnerican and Krutzelmann (2009) also reported that RPA verified a number of borehole collar locations drilled by Verena.

Quality control measures were set in place by Verena and included independent verifications on sampling and assaying, and involved external quality control measures on all sampling including field blanks, standards, and replicate pulp assays.

12.3 Verifications by Belo Sun

Belo Sun has undertaken due diligence, database verifications, quality assurance, and quality control programs (Agnerian, 2010).

Quality control measures are set in place by Belo Sun and include independent verifications of assaying that involve external quality control measures on all sampling. Assaying protocols involve replicating assays (pulp duplicates), inserting certified quality control samples (blanks and standards) and check assaying.

Regular analysis of quality control data is undertaken by Belo Sun using the following acceptance criteria:

- If one standard fails between two standard deviations and three standard deviations, and no other failure occurs in the batch, the batch is accepted;
- If a standard fails beyond three standard deviations, the standard is classified as:
  - Accepted: If another standard (same type) was classified as approved, and all of the others control samples were approved in the same batch;
  - Accepted: If a high grade standard assayed via gravimetric finish failed, and any other sample was not analyzed, the batch is approved;

  - Accepted: If the moving average stays between two standard deviations and all of the others control samples were approved in the same batch; and
  - Failure: If above conditions were not applicable.
- If two or more standards fail between two standard deviations and three standard deviations in a batch, the batch is classified as a failure;
- If a standard and the nearest blank fail in a batch, the batch is classified as a failure; and
- If both blanks (coarse and fine) fall over the warning line, the batch is classified as a failure until the next and / or the previous blank sequence.

According to Agnerian (2010), Belo Sun has carried out unscheduled visits to the Acme preparation laboratory in Itaituba, Brazil to check on sample preparation techniques and methodology.

12.4 Verifications by SRK

12.4.1 First Site Visit (April 2011)

SRK's first audit of the Project consisted of an initial site visit from April 28 to May 1 2011, followed by discussions at the Belo Sun offices in Belo Horizonte, Brazil from May 2 to May 6 2011 (SRK, 2011).

SRK observed drilling, core handling, and logging undertaken by Belo Sun. SRK re-logged 18 boreholes drilled by Verena and Belo Sun. SRK also observed procedures for sampling core, assigning sample numbers, and collecting assay quality control samples developed by Belo Sun and implemented in all aspects of the sampling process.

SRK visited the Acme sample preparation laboratory also located on the Project site. SRK considers the laboratory equipment and procedures appropriate for crushing and pulverizing core samples. SRK considers that the laboratory is appropriately managed and independent of Belo Sun.

SRK also visited Acme Analytical Laboratories S. A. located in Santiago, Chile on June 30 2011. SRK reviewed the fire assay and analytical portions of the laboratory used for gold analysis. Pamela Muñoz, Quality Control Manager for the Acme laboratory, and her staff were very knowledgeable and provided SRK with details on the laboratory operations. SRK reviewed procedures and equipment used for gold fire assays including:

- Sample pulp handling and electronic sample tracking systems;
- Fire assay procedures including automated addition of flux to samples;
- Cupellation and digestion procedures;
- Gravimetric determination of gold; and
- Atomic absorption determination of gold.

12.4.2 Second Site Visit (April 2012)

In April 2012, SRK returned to the Project site to inspect the additional exploration work completed by Belo Sun since April 2011. This site visit was completed by Dr. Lars Weiershäuser between April 28 and April 30 2012. Dr. Weiershäuser, who is from SRK's Toronto office, was accompanied by Ricardo Lopez, Belo Sun Exploration Manager. SRK inspected new drilling sites and reviewed core from several boreholes. Furthermore, SRK inspected the equipment used to measure specific gravity of fresh rock and saprolite. SRK verified the location of 11 boreholes using a handheld GPS receiver. Typically, the results are within approximately 5 m of the location determined by Belo Sun using a DGPS receiver (Table 12-1) suggesting that collar coordinates determined by Belo Sun are reliable.

Table 12-1: Borehole Collar Location Verified by SRK (April 2012 site visit)

Hole ID	Deposit	SRK Handheld GPS		Belo Sun Database		Differential	
		Easting*	Southing*	Easting*	Southing*	Easting	Southing
VVGD 071	GS	397,327	9,603,338	397,326	9,603,334	-0.66	-3.73
VVGD 211	GS	397,396	9,603,311	397,397	9,603,307	0.57	-4.37
VVGD 214	GS	396,205	9,603,598	396,206	9,603,595	0.72	-2.66
VVGD 225	GS	397,360	9,603,276	397,361	9,603,272	1.37	-4.09
VVD 128	GS	396,222	9,603,609	396,222	9,603,606	-0.16	-3.20
VVGD 002	OV	395,162	9,605,039	395,162	9,605,037	0.06	-1.73
VVGD 030	OV	395,056	9,605,408	395,056	9,605,404	0.11	-3.88
VVDG 097	OV	394,965	9,605,303	394,965	9,605,301	0.46	-1.87
VVGD 125	OV	395,059	9,605,415	395,059	9,605,411	-0.41	-3.83
VVGD 202	OV	395,011	9,605,280	395,010	9,605,278	-0.95	-2.39
VVGD 265	OV	395,027	9,605,103	395,026	9,605,101	-1.39	-1.83

* SAD69 datum, Zone 22S

12.4.3 Third Site Visit (October 2012)

In October 2012, SRK returned to the Project site to inspect the additional exploration work completed by Belo Sun since April 2012. This site visit was completed by Dr. Lars Weiershäuser, who is from SRK's Toronto office, and Camila Passos, from SRK's Belo Horizonte office, between October 19 and October 21 2012. SRK staff was accompanied by Ricardo Lopez, Belo Sun Exploration Manager and Thiago Bonás, Belo Sun Resource Geologist. SRK inspected new drilling sites and reviewed core from several boreholes. SRK verified the location of 27 boreholes using a handheld GPS receiver. Typically, the results are within approximately 5 m of the location determined by Belo Sun using a DGPS receiver (Table 12-2), suggesting that collar coordinates determined by Belo Sun are reliable. Five collars presented difference bigger than 5 m.

Table 12-2: Borehole Collar Location Verified by SRK (October 2012 site visit)

Hole ID	Deposit	SRK Handheld GPS		Belo Sun Database		Differential	
		Easting*	Southing*	Easting*	Southing*	Easting	Southing
VVGD-336	OV	394,827	9,605,374	394,831	9,605,371	-4.35	2.64
VVGD-340	OV	394,779	9,605,381	394,780	9,605,377	-1.00	4.53
VVGD-369	OV	395,301	9,605,280	395,302	9,605,277	-0.90	5.15
VVGD-371	OV	395,260	9,605,167	395,261	9,605,162	-0.56	5.17
VVGD-376	OV	395,085	9,605,129	395,086	9,605,124	-0.98	4.72
VVGD-399	OV	395,108	9,605,115	395,108	9,605,109	-0.32	5.99
VVGD-417	OV	394,782	9,605,315	394,783	9,605,310	-0.54	4.58
VVGD-429	OV	394,819	9,605,340	394,819	9,605,336	0.33	3.57
VVGD-433	OV	394,761	9,605,329	394,761	9,605,324	0.01	4.77
VVGD-498	OV	395,112	9,605,050	395,112	9,605,045	0.31	4.78
VVGD-101	GS	397,392	9,603,400	397,395	9,603,397	-2.96	2.60
VVGD-144	GS	397,330	9,603,454	397,332	9,603,450	-1.76	3.70
VVGD-159	GS	397,330	9,603,460	397,333	9,603,457	-3.24	3.13
VVGD-286	GS	397,493	9,603,670	397,493	9,603,667	0.09	3.36
VVGD-326	GS	397,493	9,603,670	397,493	9,603,667	-0.05	2.85
VVGD-370	GS	396,279	9,603,635	396,280	9,603,632	-1.15	3.45
VVGD-373	GS	396,274	9,603,622	396,276	9,603,617	-2.28	4.72

Hole ID	Deposit	SRK Handheld GPS		Belo Sun Database		Differential	
		Easting*	Southing*	Easting*	Southing*	Easting	Southing
VVGD-377	GS	396,256	9,603,647	396,257	9,603,642	-1.01	5.12
VVGD-383	GS	396,282	9,603,653	396,285	9,603,648	-2.62	4.59
VVGD-447	GS	397,289	9,603,448	397,291	9,603,444	-1.97	4.07
VVGD-467	GS	396,736	9,603,654	396,738	9,603,649	-1.89	4.79
VVGD-477	GS	396,238	9,603,557	396,238	9,603,553	-0.26	4.34
VVGD-489	GS	396,067	9,603,876	396,069	9,603,871	-2.32	5.01
VVGD-500	GS	395,969	9,603,888	395,973	9,603,886	-3.86	2.47
VVGD-507	GS	395,969	9,603,888	395,973	9,603,885	-3.71	2.91
VVGD-533	GS	397,290	9,603,440	397,289	9,603,438	0.63	2.17
VVGD-561	GS	397,371	9,603,413	397,373	9,603,410	-1.72	2.76

* SAD69 datum, Zone 22S

12.4.4 Database Verifications

SRK conducted a series of routine verifications to ensure the reliability of the electronic data provided by Belo Sun. This included checking the digital data against original assay certificates. More than 10% of the new assay data were audited for accuracy against assay certificates including 1,846 samples from the Grota Seca area and 1,887 samples from the Ouro Verde area. Only certificates from Acme Analytical laboratories were reviewed as older certificates were not available for review. No input errors were detected in the Belo Sun data.

12.4.5 Verifications of Analytical Quality Control Data

The analyses of analytical quality control data produced by Belo Sun since prior to 2014 have been discussed in previous technical reports by SRK (2012a, 2012b, 2013, and 2014).

SRK analyzed the analytical quality control data produced from June to August 2014. Belo Sun provided SRK with external analytical control data containing the assay results for the quality control samples for the Volta Grande gold project. All data were provided in Microsoft Excel spreadsheets. SRK aggregated the assay results of the external analytical control samples for further analysis. Control samples (blanks and certified reference materials) were summarized on time series plots to highlight the performance of the control samples. Paired data (field duplicate assays) were analyzed using bias charts, quantile-quantile, and relative precision plots.

The external analytical quality control data produced in 2014 are summarized in Table 12-3 and presented in graphical format in Appendix A. The external quality control data produced on this project represent 15% of the total number of samples assayed.

Table 12-3: Summary of Analytical Quality Control Data Produced in 2014 by Belo Sun on the Volta Grande Project

	Total	%	Comment
Sample Count	1,980		
Blanks	108	5.45%	
Coarse Blank	55		Building stone or sand
GF-02 Blank	53		ITAK (<0.005 g/t Au)
Standards	110	5.56%	
ITAK 558	28		ITAK (2.23 g/t Au)
ITAK 559	38		ITAK (1.12 g/t Au)
ITAK 561	33		ITAK (0.242 g/t Au)
ITAK 517	9		ITAK (22.7 g/t Au)
ITAK 525	2		ITAK (2.75 g/t Au)
Field Duplicates	86	4.34%	
Total QC Samples	304	15.35%	

Analyses of all blank samples (including coarse and fine blanks) yielded gold values significantly below the warning limit of 0.05 g/t Au, as defined by SRK (equivalent to 10 times the detection limit of 0.005 g/t Au). Furthermore, all blank samples yielded gold values equal to or below 0.016 g/t Au.

Belo Sun used five certified reference materials (standards). All standards performed within expected ranges, and mean grades are similar to expected values. Analyses of all standards for which more than two samples were analyzed indicate that 29% or less of analyzed samples yield values beyond two standard deviations. All analyses of standard materials are within three standard deviations.

Paired assay data examined by SRK show that assay results from field duplicate samples can be reproduced by Acme with high confidence (i.e., correlation coefficient of 0.98). Reasonable confidence is also confirmed when examining the rank half absolute difference (HARD) plots, which show that 64% of the samples have HARD below 10%.

In general, SRK considers that analytical quality control data reviewed by SRK attest that the assay results delivered by the primary laboratory used by Belo Sun are sufficiently reliable for the purpose of resources estimation. The data sets examined by SRK do not present obvious evidence of analytical bias. It should be noted that umpire laboratory testing was not undertaken for the 2014 drilling.

13.0 METALLURGICAL TEST WORK AND MINERAL PROCESSING

Volta Grande is an advanced stage exploration project located in the western portion of the west-northwest-trending Três Palmeiras Greenstone Belt of the Brazilian Shield in Pará State. The volcanic, sedimentary and syntectonic rocks of the Project have been affected by a wide spread hydrothermal alteration events. Surficial alteration is present in an extensive layer of red saprolite, which covers the entire property, including topographic highs and lows. The Project contains two target areas consisting of the North and South Blocks. The former contains two large mineralized areas: (1) the Ouro Verde (OV) area in the north-western part of the North Block and (2) the Grota Seca (GS) area, which contains Grota Seca West, Grota Seca and Grota Seca East areas, along the southern part of the North Block. A map of the deposits is shown in Figure 13-1. Gold mineralization at the Project occurs primarily in intrusive rock and is associated with altered diorite. The overlying saprolite material will be blended with the primary ore throughout the life-of-mine (LOM) at <10% by mass such that it will not significantly impact mineral processing.

13.1 Metallurgical Test Work Outline

The term “ore” is used in this section with regard to metallurgy and is not intended to imply that a particular sample could be treated economically.

The test work reports considered in the mineral processing design of the Study are listed in Table 13-1.

Table 13-1: List of Reports Considered in the Study

Source	Title	Date of Issue
HDA	Design and Simulation of Volta Grande Industrial Comminution Circuit	September 2011
HDA	Process Development for Volta Grande Gold Project Ore	October 2011
SGS	Comminution and Leaching Metallurgical Tests on Gold Ores – Volta Grande Project	December 2012
SRK	Mineral Resource Technical Report for the Volta Grande Gold Project	January 2013
McClelland	Report on Heap Leach Cyanide Testing	February 2013
AGP	Transfer of Met Samples from the Volta Grande Camp to SGS Chile	July 2013
George Wahl	Metallurgical Testwork Sample Selection Report	December 2013
SGS	Gravity Concentration and Leaching Tests on Gold Ores – Volta Grande Project	February 2014

Source	Title	Date of Issue
SGS	CIP and CIL Circuit Modelling Memo	March 2014
SGS	Comminution, Gravitational Concentrations and Leaching Tests on Gold Ore Samples	March 2014
George Wahl	Assessment of Metallurgical Head Grades	February 2015 (updated from December 2013)
SGS	Gravity Separation and CIL Tests with Gold	May 2014

13.2 Metallurgical Test Work Samples

Figure 13-1shows the full drilling map for the Project. Detailed drilling plan views of the Ouro Verde and Grota Seca deposits are shown in Figure 13-2. The samples used for metallurgical testing have been selected from material recovered from the drill holes located on these maps.

Figure 13-1: Map Showing Drill Hole Locations

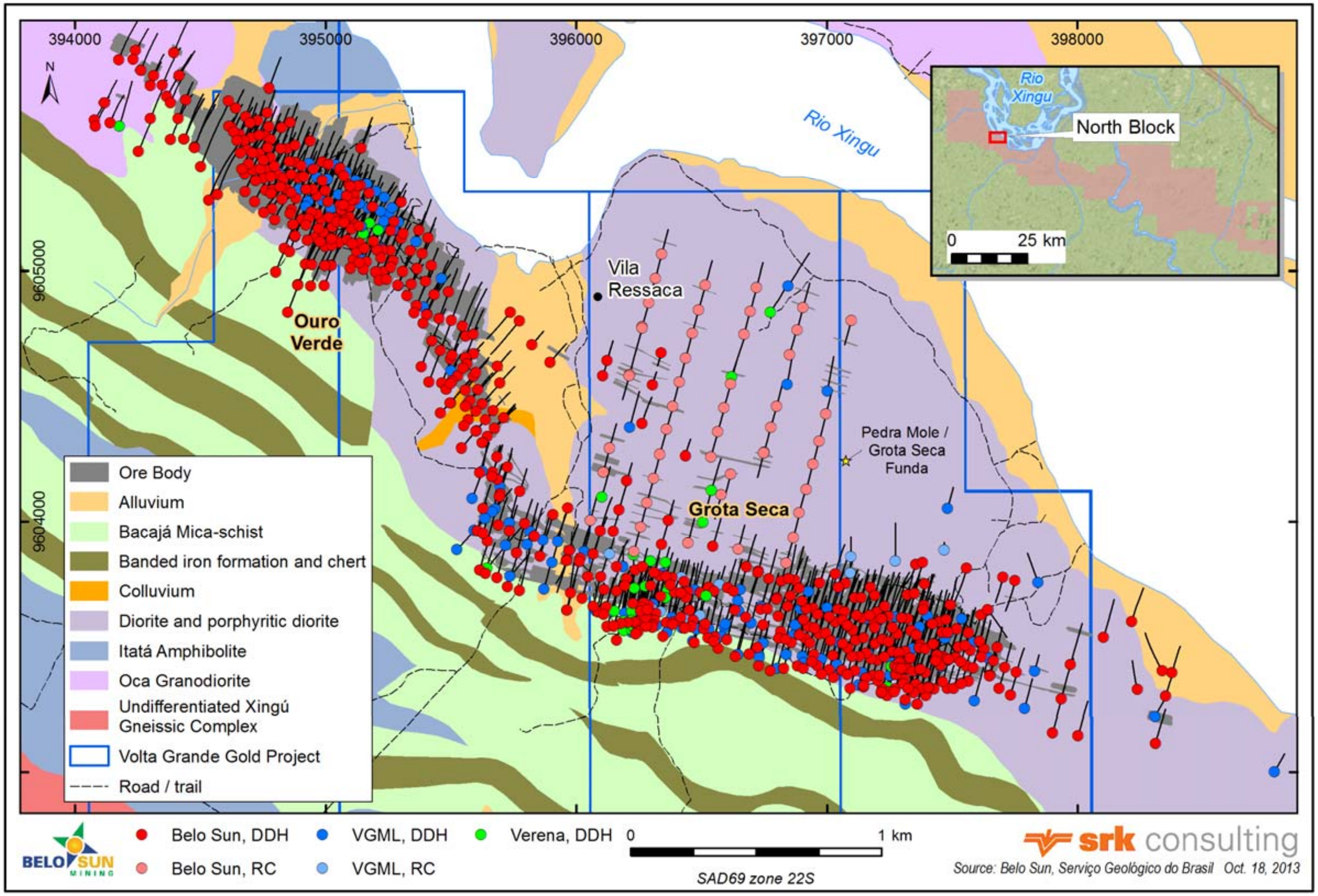
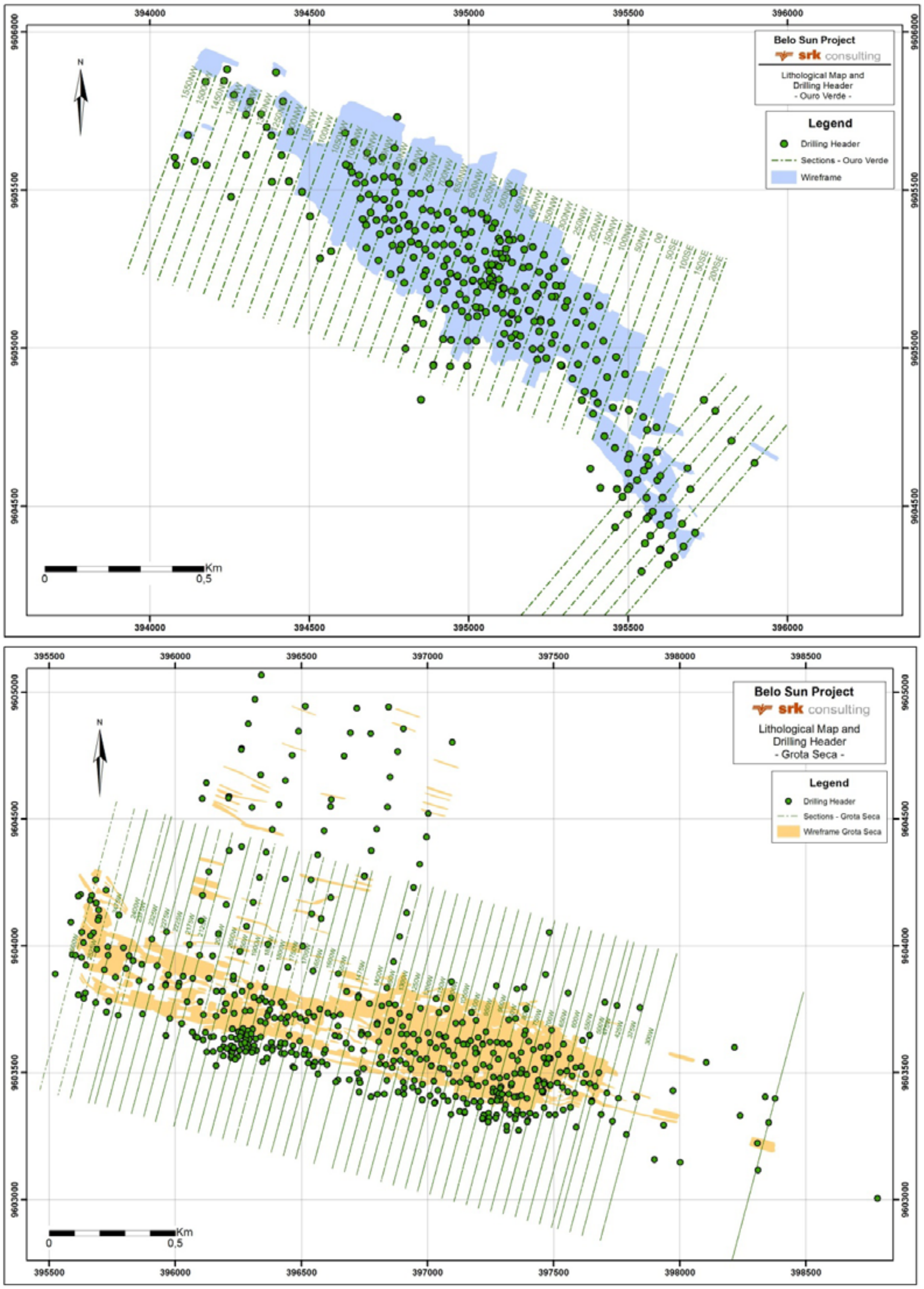


Figure 13-2: Drilling Plan for Ouro Verde (top) and Grota Seca (bottom) Deposits



Based on the comments from SRK (January 2013), procedures undertaken by Belo Sun at the Project for reverse circulation and core drilling, chip and core handling, logging and maintenance of the database for the project are well managed, documented and undertaken with a well-defined set of procedures that exceed industry standard practice. SRK commented that the exploration data collected by Belo Sun and previous project operators are of sufficient quality to support mineral resource evaluation. As shown in the drilling maps (Figure 13-2), the drill holes are distributed throughout the Ouro Verde and Grota Seca ore deposits.

13.2.1 HDA Test Work Samples (September – October 2011)

Comminution test work performed by HDA was conducted on three non-mineralized samples including two Ouro Verde rock and saprolite, as well as one Grota Seca rock sample.

Process development test work was performed using rock Grota Seca, rock Ouro Verde and saprolite Ouro Verde mineralized samples. Two blended samples at 5% and 15% saprolite were also included in the test work program. The origin of the samples with respect to drill hole or location in the ore body is not reported and therefore, the representativeness of the HDA samples cannot be evaluated.

13.2.2 SGS Test Work Samples (December 2012)

Samples for this test work were received in 146 drums of 60 L size in June 2012. The individual samples in the drums were labelled with sample numbers and full record of which samples were used to create the test composites is included in the test work report. Quantities of samples used in test work are as follows:

Table 13-2: SGS December 2012 Sample Weights

Composite	Total Weight kg
Comminution Composites (6)	381
Composite LG OV	578
Composite HG OV	226
Composite ROM GS	305
Composite LG GS	199
Composite HG GS	533
Composite ROM GS	902

13.2.3 SGS Test Work Samples (February and March 2014)

All samples in this test work campaign were selected by George Wahl.

The samples in the February 2014 report were selected from NQ core rejects while the March 2014 samples were selected from fresh PQ core from 7 drill holes specifically selected to represent variability within the ore body.

Metallurgical samples collected were comprised of 8 comminution and ore variability samples. Ouro Verde and Grota Seca, high grade (HG) (~5 g/t Au), (low grade (LG) (~0.5 g/t Au) and run-of-mine (ROM) (~1.3 g/t Au) composites were also collected for a total of 14 samples. The metallurgical composites and variability samples were selected to represent the dominant ore types within the deposits.

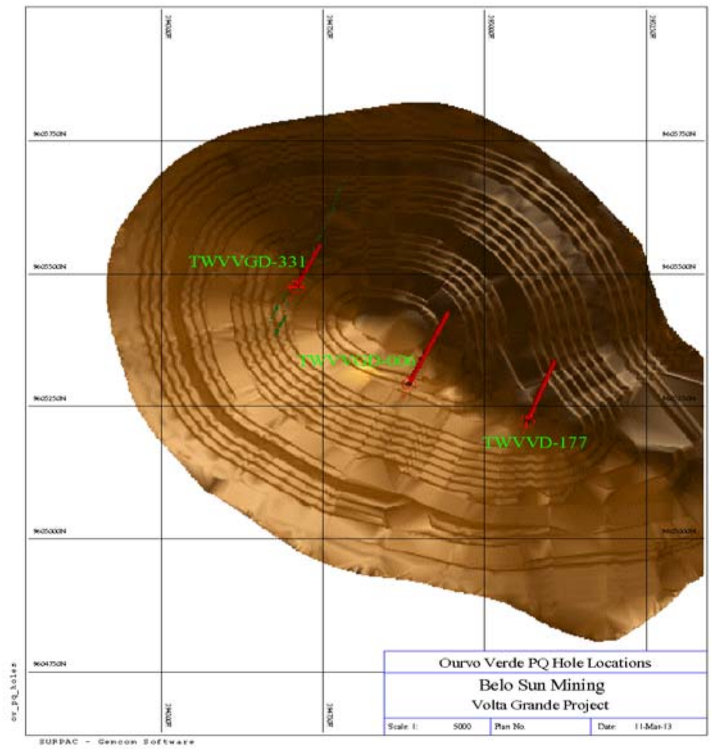
Establishing consistent head grades proved challenging due to the nugget effect. As a result, a second set of ROM composites (~1.3 g/t Au) from Ouro Verde and Grota Seca were selected and re-tested in April and May 2014. Revised sample preparation and assaying procedures were established and different test equipment was selected which successfully addressed the high nugget effect. Metallurgical re-testing from the two April 2014 composite ROM samples confirmed earlier test work results.

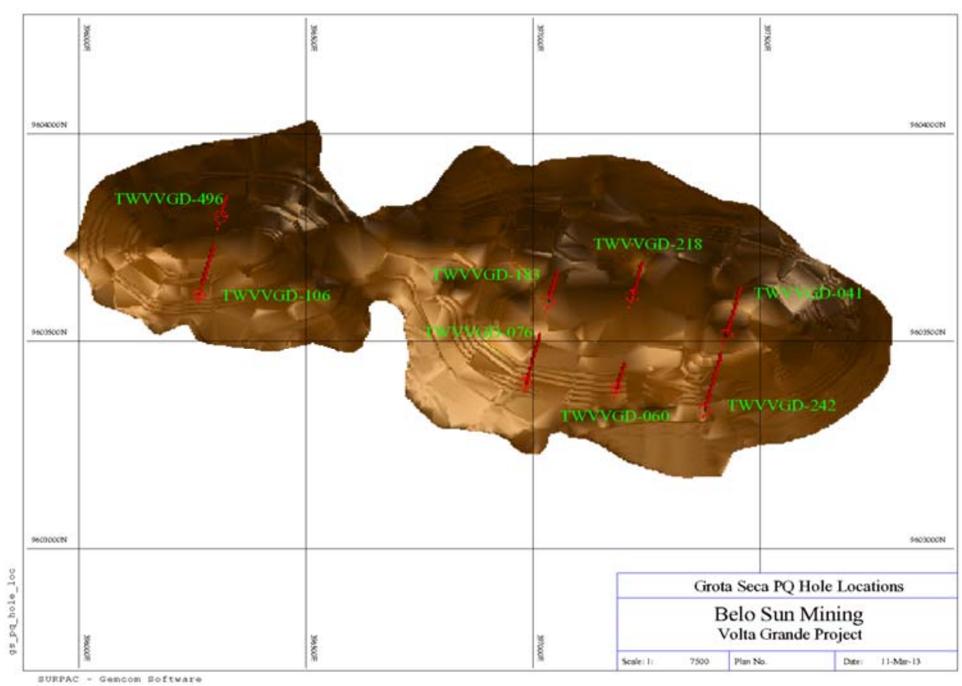
The comminution samples were designed to test a variety of ore types with potentially different comminution characteristics. A core re-logging program oriented towards defining potentially different comminution characteristics was initiated to quantify proportions of lithologies, degree of shearing, degree of quartz veining and degree of silicification. An analysis of these re-logged geometallurgical parameters is included in a memo entitled, “Metallurgical Testwork Sample Selection Report” (December 2013). Based on this analysis, an initial total of 8 comminution variability samples were selected to represent a variety of dominant plant feed material types. Each interval was roughly 10 m in length and was comprised of full PQ (85 mm) diameter core samples, each weighing approximately 150 kg to 200 kg. The samples represented material across the strike and depth extent of mineralization within the Ouro Verde and Grota Seca 5 and 10 year pit limits. The same intervals were used to provide process variability test work. Table 13-3 provides descriptions of the various samples while Figure 13-3 shows the location of each sample.

Table 13-3: Comminution and Variability Samples

Ouro Verde – Diorite									
Hole No	From m	To m	Pit Shell Yr	Comminution Samples	Lithology	Grade	Interval Avg. g/t Au	Length m	Mass kg
VVGD-006	102	112	5	DRT Med SIL Low Def LG	DRT	LG	0.45	10	156.0
VVD-177	136.75	149.92	5	DRT Low SIL Low Def MG	DRT	MG	0.67	13.17	205.5
VVGD-331	182	192.6	10	DRT High SIL Low Def HG	DRT	HG	1.19	10.6	165.4
Grota Seca - Sheared Diorite									
Hole No	From m	To m	Pit Shell Yr	Comminution Samples	Lithology	Grade	Interval Avg. g/t Au	Length m	Mass kg
VVGD-218	213	223.05	5/10	DRTS Low SIL Low Def MG	DRTS	MG	0.93	10.05	156.8
VVGD-496	59	69.4	5	DRTS Low SIL Med Def MG	DRTS	MG	0.68	10.4	162.2
VVGD-218	99.45	109.65	5	DRTS Med SIL Low Def MG	DRTS	MG	0.80	10.2	159.1
VVGD-060	128.05	138.2	10	DRTS Med SIL Med Def HG	DRTS	HG	1.08	10.15	158.3
Ouro Verde - Diorite Porphyry									
Hole No	From m	To m	Pit Shell Yr	Comminution Samples	Lithology	Grade	Interval Avg. g/t Au	Length m	Mass kg
VVD-177	33.74	46	5	DRTP Low SIL Low Def LG	DRTP	LG	0.46	12.26	191.3

Figure 13-3: Plan Map of Ouro Verde Metallurgical Drill Hole Locations





Composites representing Ouro Verde and Grota Seca material within the 5 and 10 year pit shells were also generated for ROM (~1.3 g/t Au), high grade (~5 g/t Au) and low grade (~0.5 g/t Au) target samples. See Table 13-4 to Table 13-11. These samples were comprised of ¼ splits of NQ core left over from the 2012 metallurgical test work program completed at SGS. Intervals selected for each composites represented a variety of typical process plant feed types including a variety of grades, lithologies, degree of silicification, deformation and quartz vein types.

Table 13-4: Ouro Verde Target Composite Weights and Grades

Sample	Mass kg	Grade g/t Au
OV LG	80.44	0.50
OV ROM	248.50	1.32
OV HG	66.52	5.04

Table 13-5: Ouro Verde ROM Composite Sample Intervals

Hole-ID	From m	To m	Length m	Mass kg
VVD-148	112.00	119.00	6.00	5.30
VVD-148	120.00	121.00	1.00	0.94
VVD-182	161.00	167.00	5.00	4.86
VVD-183	60.00	80.00	10.37	10.14
VVGD-025	267.20	276.40	9.20	9.24
VVGD-028	240.10	249.40	9.30	9.68
VVGD-033	81.55	88.80	7.25	7.24
VVGD-034	196.00	208.00	12.00	11.28
VVGD-034	243.30	246.30	3.00	3.10
VVGD-034	337.30	349.40	12.10	12.16
VVGD-039	262.22	265.32	3.10	2.92
VVGD-039	207.10	213.20	6.10	6.48
VVGD-048	165.00	172.87	7.87	8.78
VVGD-066	321.70	331.00	9.30	9.44
VVGD-066	369.00	372.60	3.60	3.66

Hole-ID	From m	To m	Length m	Mass kg
VVGD-095	298.40	309.35	10.95	11.94
VVGD-107	76.60	86.45	9.85	10.60
VVGD-107	256.20	269.15	12.95	13.78
VVGD-113	135.85	142.45	6.60	7.02
VVGD-115	307.85	311.08	3.23	3.22
VVGD-132	103.25	110.00	6.75	7.70
VVGD-141	181.29	190.49	9.20	9.12
VVGD-148	78.00	86.00	8.00	10.06
VVGD-156	96.00	108.50	12.50	15.78
VVGD-178	265.00	278.00	13.00	14.26
VVGD-187	302.05	311.00	8.95	7.86
VVGD-190	188.50	193.20	4.70	5.38
VVGD-190	241.70	250.70	9.00	10.00
VVGD-198	201.50	209.20	7.70	9.68
		TOTAL	234.70	248.50

Table 13-6: Ouro Verde HG Composite Sample Intervals

Hole-ID	From m	To m	Length m	Mass kg
VVD-177	186.62	192.60	5.98	5.70
VVD-179	44.00	47.20	3.20	4.90
VVD-182	168.00	172.00	4.00	4.08
VVGD-010	154.00	156.27	2.27	2.24
VVGD-026	332.00	335.00	3.00	3.32
VVGD-033	77.31	81.55	4.24	4.32
VVGD-034	251.80	256.00	4.20	4.62
VVGD-034	216.10	220.20	4.10	3.48
VVGD-050	156.80	162.00	5.20	5.36
VVGD-066	319.70	321.70	2.00	2.18
VVGD-095	219.10	226.60	7.50	7.66
VVGD-153	281.00	295.25	7.70	8.12
VVGD-178	243.00	245.60	2.60	2.68
VVGD-190	201.22	208.30	7.08	7.86
VVD-177	186.62	192.60	5.98	5.70
VVD-179	44.00	47.20	3.20	4.90
VVD-182	168.00	172.00	4.00	4.08
VVGD-010	154.00	156.27	2.27	2.24
VVGD-026	332.00	335.00	3.00	3.32
VVGD-033	77.31	81.55	4.24	4.32
		TOTAL	63.07	66.52

Table 13-7: Ouro Verde LG Composite Sample Intervals

Hole-ID	From m	To m	Length m	Mass kg
VVD-150	77.25	80.00	2.75	2.50
VVD-192	155.00	161.00	6.00	6.02
VVD-193	50.75	54.23	3.48	3.28
VVGD-009	152.00	157.64	5.64	5.38
VVGD-025	276.40	280.90	4.50	4.46
VVGD-028	235.10	240.10	5.00	5.02
VVGD-034	212.00	214.85	2.85	2.44
VVGD-034	122.00	127.00	5.00	5.80
VVGD-037	321.40	326.22	4.82	4.86
VVGD-050	162.00	166.00	4.00	4.08
VVGD-058	224.25	226.61	2.36	2.54
VVGD-074	231.70	234.30	2.60	2.32
VVGD-086	260.00	265.60	5.60	4.76
VVGD-095	214.10	218.10	4.00	4.34
VVGD-115	245.00	247.88	2.88	2.82
VVGD-131	345.75	348.25	2.50	2.56
VVGD-153	267.00	271.52	4.52	4.92
VVGD-156	319.90	322.86	2.96	3.32
VVGD-174	430.85	435.85	5.00	5.64
VVGD-178	314.80	317.90	3.10	3.38
		TOTAL	79.56	80.44

Table 13-8: Grota Seca Target Composite Sample Weights and Grades

Composite	Mass kg	Grade g/t Au
GS HG	70.04	5.00
GS LG	82.38	0.52
GS ROM	281.68	1.30

Table 13-9: Grota Seca ROM Composite Sample Intervals

Hole-ID	From m	To m	Length m	Mass kg
VVD-130	102.00	122.00	20.00	21.00
VVD-170	179.50	187.50	8.00	8.36
VVGD-015	46.30	53.00	6.70	6.54
VVGD-015	139.20	142.20	3.00	3.10
VVGD-036	30.66	41.70	11.04	13.02
VVGD-038	88.07	106.60	18.53	20.18
VVGD-040	134.00	143.60	9.60	9.34
VVGD-056	63.55	70.90	7.35	7.28
VVGD-065	174.70	203.80	23.10	26.46
VVGD-098	177.80	189.65	11.85	14.40
VVGD-105	122.20	130.90	8.70	8.30
VVGD-108	230.31	248.36	18.05	20.52
VVGD-109	72.80	82.00	9.20	10.34
VVGD-118	164.90	171.05	5.45	5.14
VVGD-121	88.59	92.17	3.58	4.30
VVGD-121	64.00	72.40	8.40	10.24
VVGD-127	218.00	229.25	11.25	14.18
VVGD-130	185.00	193.70	8.70	10.54
VVGD-136	81.70	93.95	12.25	15.74
VVGD-139	47.70	55.58	7.88	8.26

Hole-ID	From m	To m	Length m	Mass kg
VVGD-140	233.40	242.00	8.60	9.34
VVGD-144	164.57	167.41	2.84	3.50
VVGD-145	181.35	188.20	6.85	8.84
VVGD-147	236.55	243.20	6.65	7.64
VVGD-155	47.00	50.00	3.00	3.20
VVGD-155	129.63	141.00	11.37	11.92
		TOTAL	251.94	281.68

Table 13-10: Grota Seca 2013 HG Composite Sample Intervals

Hole-ID	From m	To m	Length m	Mass kg
VVD-135	242.00	244.00	2.00	2.18
VVGD-012	49.00	52.00	3.00	2.86
VVGD-018	56.70	59.00	2.30	2.52
VVGD-027	124.04	126.65	2.61	2.84
VVGD-032	139.63	142.42	2.79	3.34
VVGD-032	29.68	32.25	2.67	3.22
VVGD-032	122.21	124.93	2.32	2.76
VVGD-041	90.60	95.50	4.90	4.76
VVGD-043	125.80	128.60	2.80	2.62
VVGD-047	157.35	159.75	2.40	2.22
VVGD-060	165.60	169.00	3.40	3.82
VVGD-067	135.46	137.96	2.50	2.64
VVGD-093	88.00	90.52	2.52	3.24
VVGD-101	201.95	205.00	3.05	3.02
VVGD-106	232.40	234.75	2.35	2.76
VVGD-108	224.53	228.00	3.47	3.90

VVGD-110	108.27	112.00	3.73	3.62
VVGD-123	59.40	63.35	3.95	4.30
VVGD-126	197.80	200.00	2.20	2.28
VVGD-135	182.40	183.90	4.26	5.00
VVGD-147	232.65	234.65	2.00	2.48
VVGD-147	51.65	54.60	2.95	3.66
		TOTAL	64.17	70.04

Table 13-11: Grota Seca 2013 LG Composite Sample Intervals

Hole-ID	From m	To m	Length m	Mass kg
VVD-135	247.50	250.00	2.50	2.68
VVD-135	301.00	305.00	4.00	4.46
VVD-147	85.00	88.00	3.00	3.10
VVD-170	176.50	179.50	3.00	3.06
VVGD-013	131.77	142.00	10.23	10.02
VVGD-018	49.17	53.95	4.78	4.64
VVGD-024	112.40	118.40	6.00	6.38
VVGD-032	36.77	40.12	3.35	3.84
VVGD-032	14.07	17.34	3.27	4.02
VVGD-036	48.28	52.86	4.58	5.44
VVGD-041	244.70	248.12	3.42	3.52
VVGD-047	147.76	153.85	6.09	5.54
VVGD-067	142.75	145.73	2.98	3.04
VVGD-093	95.80	99.00	3.20	4.12
VVGD-110	102.17	106.05	3.88	3.82
VVGD-123	47.15	52.90	5.75	5.92
VVGD-137	177.32	181.00	3.68	4.68
VVGD-147	44.55	47.60	3.05	4.10
		TOTAL	76.76	82.38

As mentioned earlier, obtaining repeatable head grades for the ROM composite samples were difficult due to the nugget effect. Jack Stanley was contracted to evaluate the head assay issue and found that the nugget effect in the sample preparation stage was the most probable cause of the head grade discrepancies. Jack Stanley was then contracted to select a laboratory with appropriate equipment and oversee the entire sample preparation and assaying method for a new set of ROM composites. This test work program significantly reduced the loss of gold during sample preparation and significantly reduced the variance in head grade assays.

New ROM composites were selected from the available Volte Grande ¼ NQ exploration core using the same lithology, shearing, degree of silicification and veining parameters as the earlier ROM composites to ensure that the samples were representative of the Ouro Verde and Grota Seca mineralization. The two new April 2014 ROM composites were created with a target grade of 1.3 g/t Au for Ouro Verde and Grota Seca. Intervals were selected to represent the entire strike and depth extent of mineralization within the 5 and 10 year pit limits. See Table 13-12 and Table 13-13 for the drill holes and intervals used to build these composites.

Table 13-12: New Ouro Verde April 2014 ROM Composite Intervals

New OV ROM Composite Sample – April 2014				
Hole ID	From m	To m	Length m	Weight kg
VVGD-331	34.00	41.00	7.00	8.09
VVGD-331	128.37	134.00	5.63	6.09
VVGD-331	146.78	167.00	20.22	21.22
VVGD-331	170.20	178.80	8.60	8.16
VVGD-331	182.00	192.60	10.60	10.36
VVGD-331	215.00	221.00	6.00	6.61
VVGD-331	285.00	292.00	7.00	7.64
VVGD-331	303.00	308.00	5.00	5.12
VVGD-006	66.00	78.00	12.00	11.43
VVGD-006	84.00	88.00	4.00	3.96
VVGD-006	104.00	116.00	12.00	11.44
VVGD-006	126.00	130.00	4.00	3.45
VVGD-006	137.00	153.00	16.00	15.12
VVGD-006	179.00	185.00	6.00	5.59
VVGD-006	200.00	213.00	13.00	12.57
VVGD-006	223.00	256.00	33.00	31.20
VVGD-006	277.00	288.00	11.00	10.25
VVGD-234	95.00	106.35	11.35	11.03
VVGD-234	125.10	131.80	6.70	6.22
VVGD-234	176.60	179.50	2.90	2.70
VVGD-234	199.60	221.20	21.60	20.94
VVGD-234	222.80	271.00	48.20	44.32
VVGD-234	331.25	337.30	6.05	5.08
VVGD-234	345.20	352.80	7.60	7.06
		TOTAL	285.45	275.671

Table 13-13: New Grota Seca April 2014 ROM Composite Sample Intervals

New GS ROM Composite Sample – April 2014				
Hole ID	From m	To m	Length m	Weight kg
VVGD-183	23.40	27.60	4.20	5.090
VVGD-183	43.10	47.00	3.90	4.474
VVGD-183	80.20	84.00	3.80	4.492
VVGD-183	88.80	94.35	5.55	5.718
VVGD-183	123.95	129.95	6.00	7.102
VVGD-183	185.85	190.70	4.85	5.594
VVGD-242	90.35	94.70	4.35	4.608
VVGD-242	99.60	107.80	8.20	8.956
VVGD-242	115.55	146.70	31.15	36.612
VVGD-242	233.00	248.00	15.00	17.778
VVGD-195	14.00	24.50	10.50	14.440
VVGD-195	38.70	46.90	8.20	9.114
VVGD-195	52.80	63.35	10.55	11.674
VVGD-195	82.80	88.15	5.35	5.356
VVGD-195	133.49	141.70	8.21	8.858
VVGD-195	153.60	156.68	3.08	3.320
VVGD-195	167.31	175.83	8.52	8.880
VVGD-195	205.65	212.55	6.90	8.078
VVGD-195	250.00	252.90	2.90	3.472
VVGD-383	15.93	30.90	14.97	17.962
VVGD-383	43.30	98.80	55.50	63.062
VVGD-511	125.30	136.15	10.85	11.186
VVGD-511	148.50	153.00	4.50	5.368
VVGD-511	158.40	162.00	3.60	4.256
VVGD-143	8.00	18.20	10.20	13.698
VVGD-143	78.40	85.00	6.60	6.066

New GS ROM Composite Sample – April 2014				
Hole ID	From m	To m	Length m	Weight kg
VVGD-143	160.65	192.00	31.35	28.144
VVGD-218	33.17	42.93	9.76	11.686
VVGD-218	79.50	85.50	6.00	6.704
VVGD-218	104.30	109.65	5.35	5.906
VVGD-218	143.43	161.70	18.27	20.742
VVGD-218	205.05	208.95	3.90	4.372
VVGD-218	213.00	219.00	6.00	6.932
VVGD-218	233.42	237.22	3.80	4.212
VVGD-496	28.00	34.20	6.20	6.913
VVGD-496	75.62	81.00	5.38	6.488
VVGD-496	86.00	95.00	9.00	9.936
VVGD-123	34.85	46.15	11.30	11.436
VVGD-123	64.25	88.50	24.25	24.055
		TOTAL	397.99	442.74

Jack Stanley selected Acme Laboratories in Santiago as the new sample preparation and assaying facility. The sample preparation for the April 2014 ROM composites was based on a coarse crush of the entire composite to 87% passing 4 mm, blending via a Y-cone blender at 3% moisture to reduce sticking and splitting via a belt feed rotary splitter to 10-12 kg sub-samples. These samples were then re-split to 1 kg sub-samples and combined with segments 1-4-7-10 to create 4 kg samples for pulverizing to 95% passing 106 µm. These 4 kg samples were homogenized and rotary split to create 12 segments of 0.34 kg each. Segments 1-5-9 were combined and screened using a 106 µm nylon or poly screen. The plus 106 µm fraction was added to a 40 g crucible and combined with 140 g of flux. The minus 106 µm fraction was rolled and cut into 4 subsamples and fused with 140 g of flux for standard gravimetric finish for the plus fraction and AA finish for the minus fraction. Assays were calculated for the 1 kg sample.

Efforts were made to ensure that each set of variability samples and composites were representative of all of the different parameters that could potentially affect processing, and were selected from the entire strike and depth extent of each pit limit. Samples were also chosen to reflect the anticipated average ROM grades as well as anticipated plant feed grade ranges to ensure that they were representative of variations in LOM feed.

Following the newly defined sample preparation procedures (described above) resulted in an average head grade for Ouro Verde of 1.24 g/t Au with a range of 0.91 g/t to 1.50 g/t Au. Average head grade for Grota Seca was 1.32 g/t Au with a range of 1.09 g/t to 1.61 g/t Au.

Composite Ouro Verde and Grota Seca samples were sent from Acme to SGS for re-assay and re-testing. SGS head assays returned comparable average head grades of 1.29 g/t Au for Ouro Verde and 1.33 g/t Au for Grota Seca and comparable gold recoveries of 94% and 91% respectively.

13.3 Metallurgical Test Work Results

13.3.1 Specific Gravity

Ore specific gravity (SG) has been measured and reported multiple times in the recent and historical test work. It has also been measured as part of the drilling campaign. SRK reports (SRK January 2013) that the specific gravity of core from complete sample intervals was measured by Belo Sun using a standard weight in water / weight in air methodology. The specific gravity database is reported (Jan 2014) to contain 826, 1,269 and 124 measurements of unweathered material for Ouro Verde, Grota Seca and South Block respectively. The deposit average SG for Ouro Verde and Grota Seca is 2.75 in each case and 2.77 for South Block. Based on 48 measurements, the average saprolite SG is 1.36.

The most recent SG measurements were taken on the variability composites of the SGS test work (March 2014). The average of these measurements is 2.76, which is consistent with the measurements obtained in the drilling campaigns.

The SGS (December 2012) and HDA (October 2011) specific gravity measurements were taken by gas pycnometry. In gas pycnometry, a difference in pressure represents the volume of the solids rather than a displacement of liquid. This technique is used for solids that may dissolve in liquid or for porous solids into which the liquid would not fully penetrate. Given that the average specific gravity of the 12 rock samples tested using gas pycnometry is the same as the average of the hundreds of other samples measured during drilling, the SG of the rock can safely be considered to be 2.75. Saprolite SG values measured by pycnometry do not align with the average SG obtained in the drilling results. The drilling measurement average is based on 48 measurements however; it may not be more accurate. The SG of saprolite varies depending on depth because SG decreases as minerals are altered and mass is removed. Saprolite SG should be quoted as a range, however, the range of the 48 drill results is unknown.

The specific gravity laboratory measurements including the gas pycnometry measurements are presented in Table 13-14.

Table 13-14: Selected Specific Gravity Measurements

Phase	Composite	SG Gas Pycnometry	SG LEIT	SG DW	SG SMC
HDA (October 2011)	Rock OV	2.73			
		2.71			
		2.70			
	Rock GS	2.70			
		2.71			
		2.73			
	Saprolite OV	2.69			
		2.68			
		2.66			
SGS (December 2012)	Low Grade Ouro Verde	2.821			
	High Grade Ouro Verde	2.744			
	ROM Ouro Verde	2.786			
	Low Grade Grota Seca	2.787			
	High Grade Grota Seca	2.798			
	ROM Grota Seca	2.780			
SGS (March 2014)	Composite 1 (OV)		2.71	2.67	2.72
	Composite 2 (OV)		2.88	2.69	2.72
	Composite 3 (OV)		2.92	2.79	2.72
	Composite 4 (GS)		2.75	2.79	2.76
	Composite 5 (GS)		2.85	2.70	2.73
	Composite 6 (GS)		2.7	2.69	2.69
	Composite 7 (GS)		2.85	2.72	2.75
	Composite 8 (OV)		2.78	2.80	2.78
	Saprolite Average	2.68			
	Rock Averages	2.75			2.76

13.3.2 Ore Chemistry

Ore chemistry was analysed to varying degrees in each of the test campaigns. Samples were analyzed using chemical analysis techniques that included fire assay, atomic absorption, LECO and ICP. Head assay results of all tested samples are shown in Table 13-15.

Table 13-15: Head Grade Chemical Analysis Results

Phase	Sample Name	Chemical Analysis						
		Au ppm	Ag ppm	S %	S^{2-} %	Cu %	CO_3 %	Corg. %
HAD 2011	Grota Seca (GS)	1.26	<2	-	-	-	-	-
	Ouro Verde (OV)	1.31	<2	-	-	-	-	-
	Saprolite Ouro Verde (SOV)	1.01	-	-	-	-	-	-
	Blend 1 (5% SOV)	1.42	<2	-	-	-	-	-
	Blend 2 (15% SOV)	1.29	<2	-	-	-	-	-
SGS 2012	Ouro Verde High Grade	3.80	1.6	0.19	0.17	0.034	1.20	0.05
	Ouro Verde Low Grade	0.47	0.5	0.20	0.19	0.017	1.50	0.05
	Ouro Verde ROM	1.17	0.4	0.20	0.19	0.02	1.55	<0.05
	Grota Seca High Grade	3.90	0.6	0.27	0.23	0.01	2.91	<0.05
	Grota Seca Low Grade	0.39	0.3	0.30	0.27	0.012	3.18	0.05
	Grota Seca ROM	1.06	0.4	0.37	0.33	0.012	2.85	<0.052
SGS Feb 2014	ROM OV	1.00*	-	-	-	-	-	-
	ROM GS	1.17*	-	-	-	-	-	-
SGS Mar 2014	Composite 1	2.67	0.5	0.12	-	0.013	-	-
	Composite 2	1.26	0.5	0.19	-	0.016	-	-
	Composite 3	0.42	0.3	0.09	-	0.010	-	-
	Composite 4	0.67	0.4	0.85	-	0.008	-	-

Phase	Sample Name	Chemical Analysis						
		Au ppm	Ag ppm	S %	S^{2-} %	Cu %	CO_3 %	Corg. %
	Composite 5	0.52	0.3	0.15	-	0.005	-	-
	Composite 6	1.37	0.5	0.13	-	0.014	-	-
	Composite 7	0.53	0.5	0.54	-	0.012	-	-
	Composite 8	0.10	0.3	0.22	-	0.010	-	-
	Composite 9	0.38	1.0	0.61	-	0.011	-	-
	Composite 10	0.66	0.5	1.54	-	0.007	-	-
	Composite LG-OV	0.72	0.6	0.16	-	0.026	-	-
	Composite HG-OV	6.55	1.2	0.16	-	0.041	-	-
	Composite LG-GS	0.55	0.6	0.35	-	0.013	-	-
	Composite HG-GS	4.57	0.8	0.37	-	0.013	-	-

13.3.3 Deleterious Elements

Full ICP analysis was performed on head samples in each of the SGS test campaigns. Full assay results can be found in the test work reports. The results for selected elements are presented in Table 13-16. Of the elements presented, arsenic, antimony, lead, copper and sulphur can cause leaching problems and / or excess cyanide consumption. However, the concentrations of these elements present in the Volta Grande samples are sufficiently low and should not be problematic for cyanide leaching. The presence of these elements warrants attention with regard to management of tailings and effluent.

The average silver head grade is 0.58 g/t Ag based on the 19 samples assayed. Silver has not been included in the mine plan and it is only considered in the design of the carbon loading, elution and electrowinning circuits. Silver has not been given economic consideration in the Study.

The low organic carbon content of the samples supports non-preg-robbing nature of the ore.

Three samples returned mercury values between 1 and 3.4 ppm while ten samples were below the limit of detection of 0.1 ppm. Given these results, mercury capture equipment is not likely required. However, regeneration kiln and drying oven exhaust will be monitored for mercury and capture equipment installed if elevated levels of mercury are detected. The detoxified tailings will be routinely analyzed for the presence of mercury.

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Table 13-16: ICP Analysis - Selected Elements

Element	Sample																						
	Unit	Ouro Verde High Grade	Ouro Verde Low Grade	Ouro Verde ROM	Grota Seca High Grade	Grota Seca Low Grade	Grota Seca ROM	ROM OV	ROM GS	Composite 1	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6	Composite 7	Composite 8	Composite 9	Composite 10	Composite LG-OV	Composite HG-OV	Composite LG-GS	Composite HG-GS
As	ppm			246			782	86	739	103	8	9	25	434	611	641	296	583	348	80	57	428	772
Cd	ppm			2			<1	2.0	3.0	4	5	4	4	4	3	4	4	4	4	4	4	4	5
Cu	%			0.02			0.01	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.03	0.05	0.02	0.01
Fe	%			4.09			3.74	3.20	3.58	3.52	3.24	3.5	3.77	2.97	2.67	2.81	3.75	4.04	3.82	3.31	3.34	3.65	3.98
Mg	%			2.39			2.30	1.90	2.07	1.8	1.74	1.78	2.95	2.27	1.37	2.65	2.45	1.61	2.34	2.1	1.64	2.42	2.85
Mn	ppm			754			654	594	593	587	574	591	696	588	394	581	685	623	798	688	583	723	767
Ni	ppm			103			98	63	71	60	52	46	95	71	45	69	60	42	73	59	67	74	91
Pb	ppm			21			16	16	14	26	30	21	19	11	19	21	19	28	28	22	23	17	18
S	%			0.2			0.43	0.11	0.5	0.14	0.19	0.11	0.79	0.16	0.16	0.53	0.23	0.6	1.51	0.14	0.16	0.33	0.37
Sb	ppm			<2			<2	3	<2	2	2	<2	4	4	4	4	2	<2	<2	<2	<2	<2	<2
Sr	ppm			486			441	378	439	408	431	437	488	441	393	540	422	551	712	531	442	558	479
Zn	ppm			62			51	55	56	81	99	65	69	68	59	78	72	62	87	78	74	70	75
Zr	ppm			248			215	200	194	332	316	338	259	195	378	193	205	274	206	275	243	218	189
Hg*	ppm	<0.1	<0.1	<0.1	1.3	<0.1	0.1	1.6	3.4	0.2	<0.1	<0.1	0.2	0.3	0.2	0.2	0.2	<0.1	<0.1	0.1	<0.1	0.2	<0.1

*By Atomic Absorption

13.3.4 Diagnostic Leaching

Diagnostic leaching determines the nature of the gold deportment in a given ore. The method employs three sequential leaching steps:

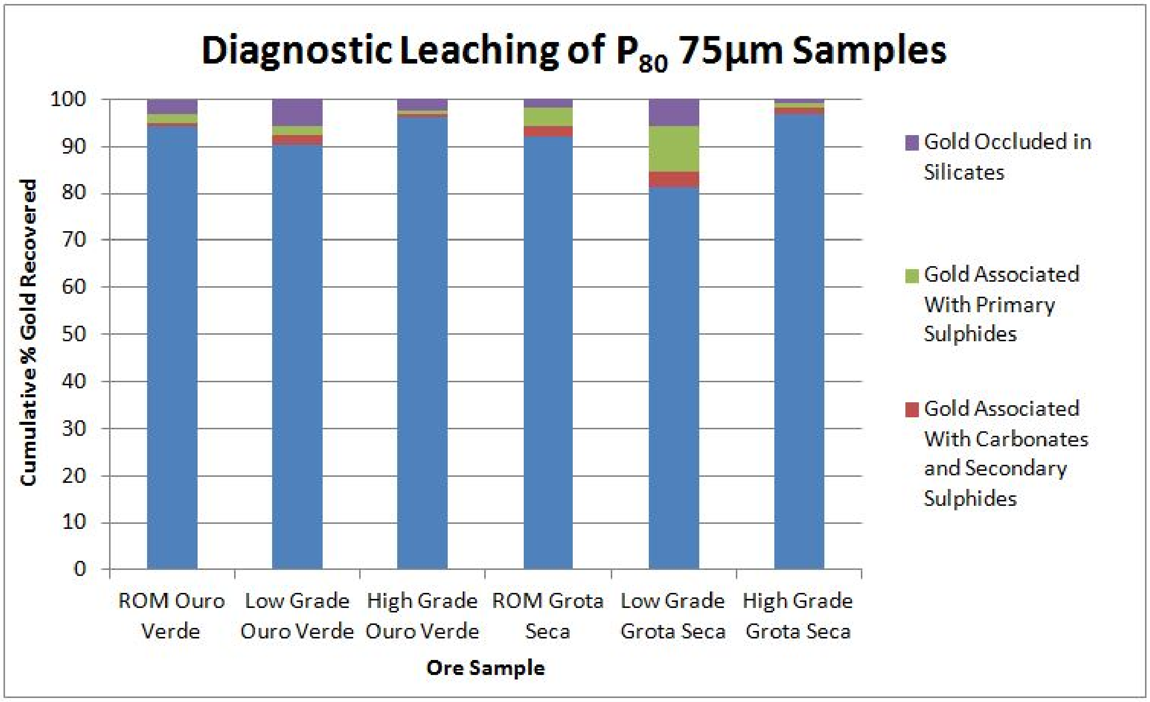
- The first: direct cyanide leach to determine the amount of cyanide soluble gold present;
- The second: acidification of the cyanide residue solids from the first leach with sulfuric acid followed by cyanidation to determine the amount of gold associated with acid soluble minerals such as carbonates or pyrrohitie;
- The third: oxidative acidification of the cyanide leach residue from the sulfuric acid step followed by cyanidation to determine the amount of gold associated with sulfides and the amount encapsulated (tails).

Diagnostic leach testing was performed in the SGS 2012 campaign. The tests were performed on ore samples at a grind size of P_{80} of 75 µm. The results of these tests are presented in both Table 13-17 and Figure 13-4.

Table 13-17: Diagnostic Leaching Results at P_{80} of 75 µm

Composites	Head Grade g/t Au	Gold Recovery %			Residue % Au Remaining
		1st Stage	2nd and 3rd Stages	4th and 5th Stages	
		Cyanide Leaching	Sulphuric Acid and Cyanide Leaching	HNO_3 Acid and Cyanide Leaching	
High Grade Ouro Verde	3.8	96.2	0.7	0.7	2.5
ROM Grota Seca	1.06	91.9	2.2	4.0	1.9
Low Grade Grota Seca	0.39	81.4	3.1	9.8	5.7
High Grade Grota Seca	3.9	96.9	1.2	1.0	1.0
Gold Deportment		Cyanide Soluble Gold	Gold Associated with Carbonates and Secondary Sulphides	Gold Associated with Primary Sulphides	Gold Occluded in Silicates

Figure 13-4: Diagnostic Leaching (SGS 2012)



Based on these results, the ore can be described as "free milling" with all samples achieving >80% recovery in cyanide leaching and all but one achieving >90%. The Low Grade Grota Seca sample contained approximately 13% unleachable gold associated with sulphide minerals. Results presented show that the gold units in the residue were consistent across all samples except the high grade Ouro Verde sample, indicating that regardless of the sample, there was a consistent portion of unrecoverable gold associated with silicates.

It is important to note that the sulphur assays are consistently higher for the Grota Seca ore ranging from 0.28 to 0.39 %S compared with 0.13 to .014% S for Ouro Verde ore.

Both flotation and finer grinding were explored independently in the test work campaigns with unfavorable results (see sections 13.3.7 and 13.3.13 for details). Given the high conventional leach recoveries achieved, further flotation and ultra-fine grinding test work was not pursued.

13.3.5 Comminution

Comminution work was completed in three test programs: HDA September 2011, SGS December 2012 and SGS March 2014. The test work results are consistent from all programs indicating both of the ore bodies are homogeneous in terms of comminution characteristics and confirm that the ore is very hard. The average A X b of 30.2 places the ore in the 85th percentile of the Orway database for competency with 1 being low competency and 100 being extremely high. The average Bond ball mill work index (BW_i) of 15.7 kWh/t places the ore in the 54th percentile for grinding amenability and therefore is considered to be moderately hard.

13.3.5.1 Bond Ball and Bond Rod Work Index Tests

Table 13-18 summarizes the Bond work indices and includes Bond rod mill work index (RW_i), BW_i and crusher work index (CW_i) tests.

Table 13-18: Summary of Bond Work Indices

Test Work Campaign	Sample Name	Description	BW_i kWh/t	RW_i kWh/t	CW_i kWh/t
HAD 2011	Ouro Verde (OV)	Diorite	14.6	14.6	
	Grota Seca (GS)	Diorite	15.1	15.9	
SGS 2012	Composite 1	Unknown	16.2	14.3	
	Composite 2-3	Unknown	16.5	16.0	
	Composite 4-6	Unknown	14.8	16.6	
	Composite 5-7	Unknown	15.5	16.2	
	Composite 8	Unknown	15.5	15.6	
	Composite 9	Unknown	14.2	17.0	
SGS 2014	Composite 1 (OV)	Diorite	17.5	15.7	29.7
	Composite 2 (OV)	Diorite	16.2	15.6	18.4
	Composite 3 (OV)	Diorite	16.8	14.7	25.8
	Composite 4 (GS)	Sheared Diorite	15.5	14.4	15.6
	Composite 5 (GS)	Sheared Diorite	15.6	14.4	15.9
	Composite 6 (GS)	Diorite / Sheared Diorite	15.2	15.2	21.1
	Composite 7 (GS)	Sheared Diorite	16.4	15.7	19.1
	Composite 8 (OV)	Diorite Porphyry	16.5	16.0	27.7
Average			15.7	15.5	21.7
85^{th} Percentile			16.5	16.2	27.6

13.3.5.2 Bond Abrasion Test

Bond abrasion tests were performed to provide information for calculating the consumption of grinding media and wear liners in the crushers and mills. Table 13-19 summarises the bond abrasion index (A_i) values of all tested samples. At an overall average value of 0.462, the ore is classified as abrasive.

Table 13-19: Bond Abrasion Index (A_i) Values

Test Work Campaign	Sample Name	Bond Abrasion Index Value A_i
HDA 2011	Grota Seca (GS)	0.647
	Ouro Verde (OV)	0.383
SGS 2012	Composite 1	0.383
	Composite 2-3	0.286
	Composite 4-6	0.444
	Composite 5-7	0.458
	Composite 8	0.496
	Composite 9	0.282
SGS 2014	Composite 1 (OV)	0.595
	Composite 2 (OV)	0.567
	Composite 3 (OV)	0.599
	Composite 4 (GS)	0.438
	Composite 5 (GS)	0.452
	Composite 6 (GS)	0.593
	Composite 7 (GS)	0.358
	Composite 8 (OV)	0.429
Overall Average		0.462
85^{th} Percentile		0.594

13.3.5.3 JK Drop Weight, SMC and SPI Tests

A summary of the SMC and Drop Weight Test (DWT) results is provided in Table 13-20.

The average A X b of 30.2 places the ore in the 85th percentile of the Orway database for competency with 1 being low competency and 100 extreme.

The Project samples with average SAG power index (SPI) value of 168.6 minutes and 80th percentile of 199.0 minutes are classified as extremely hard to grind. The high SPI values reinforce the classification of the ore as extremely competent as defined by the DWT results.

Table 13-20: Summary of Drop Weight, SMC and SPI results

Campaign	Sample Name	SMC			DWT			SPI minutes
		A	b	A X b	A	b	A X b	
HDA 2011	Ouro Verde (OV)	54.0	0.65	35.1				
	Grota Seca (GS)	57.2	0.57	32.6				
SGS 2012	Composite 1	74.4	0.42	31.3				123.7
	Composite 2-3	80.5	0.38	30.6				133.2
	Composite 4-6	100	0.24	24.0				201.0
	Composite 5-7	100	0.26	26.0				173.9
	Composite 8	89.6	0.33	29.6				147.8
	Composite 9	73.1	0.33	25.6				199.8
SGS 2014	Composite 1 (OV)	84.4	0.33	27.9	100	0.28	28	
	Composite 2 (OV)	85.2	0.33	28.1	100	0.27	27	
	Composite 3 (OV)	77.2	0.45	34.7	93.8	0.36	33.8	
	Composite 4 (GS)	91.2	0.36	32.8	76.4	0.43	32.9	
	Composite 5 (GS)	70.1	0.57	40.0	81.2	0.45	36.5	
	Composite 6 (GS)	88.6	0.34	30.1	100	0.29	29	
	Composite 7 (GS)	76.2	0.37	28.2	64.5	0.47	30.3	
	Composite 8 (OV)	85.7	0.31	26.6	76.6	0.36	27.6	
Average				30.2				163.2
85^{th} Percentile of A X b				26.2				200.1

13.3.6 Gravity Concentration

In the December 2012 test work by SGS, gravity gold recovery was tested using the flow sheet depicted in Figure 13-5. Ore samples were first ground to different P_{80} sizes of 600, 300 and 106 µm. Table 13-21 details the results.

Figure 13-5: SGS Gravity Concentration Test Circuit

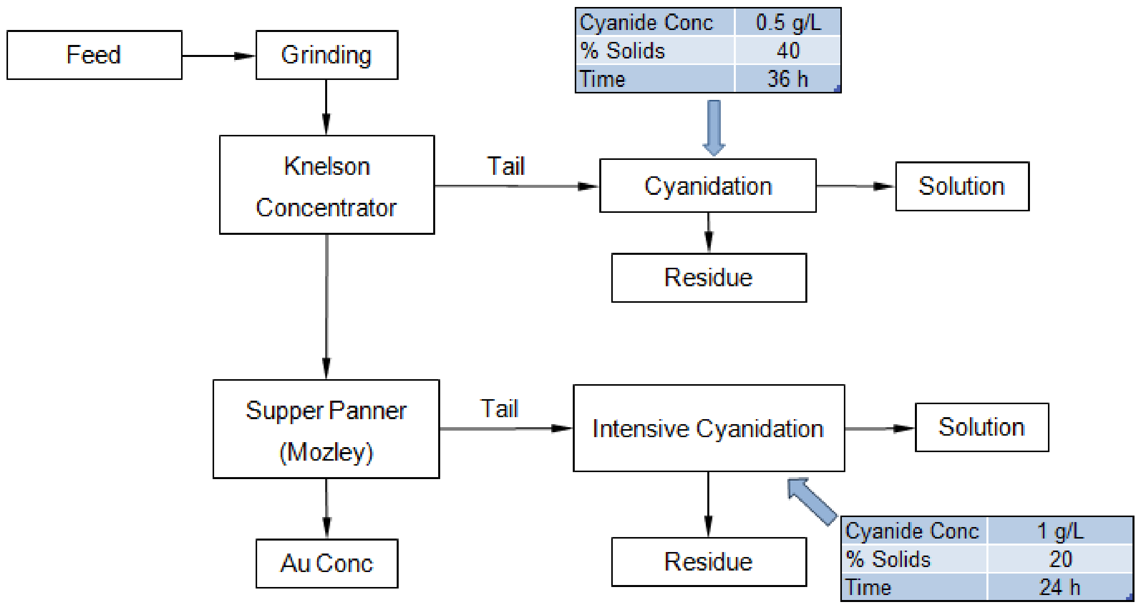


Table 13-21: Gravity Concentration Circuit Gold Recoveries

Gravity Gold Recovery %					
Sample	P_{80} µm	Knelson Au Recovery %	Knelson Tail Conventional Leach Au Recovery %	Estimated Table Concentrate Au Recovery %	Table Tail Intensive Leach Au Recovery %
OV ROM	106	38.5	80.6	32.8	98.3
OV ROM	300	33.0	71.8	18.8	97.3
OV ROM	600	14.5	66.9	9.0	87.2
OV HG	106	49.8	85.3	42.0	98.7
OV HG	300	33.7	64.7	28.9	97.1
OV HG	600	26.2	57.5	16.3	94.3
OV LG	106	59.9	85.2	23.6	99.2
OV LG	300	29.1	66.1	21.0	95.2
OV LG	600	22.2	57.1	9.6	90.4
GS ROM	106	56.0	77.2	30	98.5
GS ROM	300	34.2	63.8	13	96.2
GS ROM	600	17.9	59.9	7.1	89.7
GS HG	106	65.4	82.4	36.2	98.8
GS HG	300	48.3	69.7	22.3	97.5
GS HG	600	26.4	59.3	16.7	88.1
GS LG	106	30.8	74.5	25.7	82.9
GS LG	300	23.1	71.2	17.3	76.5
GS LG	600	18.7	64.4	15.3	74.5

The SGS tests did not follow the gravity recoverable gold (GRG) gravity recovery testing procedure of progressive size reduction; instead, they produced separate flow sheets for each sample at each grind size. As a result, the size by size distribution of gravity recoverable gold is unknown.

Gravity recoveries improved with decreasing grind size for all samples tested. Knelson concentrator recoveries for P_{80} 106 µm ranged from 38.5% to 59.9% for OV material, and 30.8% to 65.4% for GS material. The ROM samples ran 38.5% recovery for OV and 56% recovery for GS at 106 µm.

Subsequent gravity recovery test work was reported in February 2014 by SGS on two ROM GS and OV samples. The primary purpose of the tests was to generate gravity tailings samples for subsequent cyanidation tests and again the progressive GRG test method was not followed. Specific feed rates were not reported. These and subsequent gravity tests performed by SGS followed a different flow sheet as depicted in Figure 13-6. In this flow sheet, the intensive leach residue is reground to ~25 µm to simulate the additional liberation that could occur when the leach residue is returned to the milling circuit. Alternatively, the residue can be assumed to leach to the same extent as the gravity concentrator (Knelson) tails and the regrind step can be omitted with the effect of reporting a slightly different recovery. Table 13-31 summarizes the results.

Figure 13-6: Second SGS Gravity Test Flow Sheet

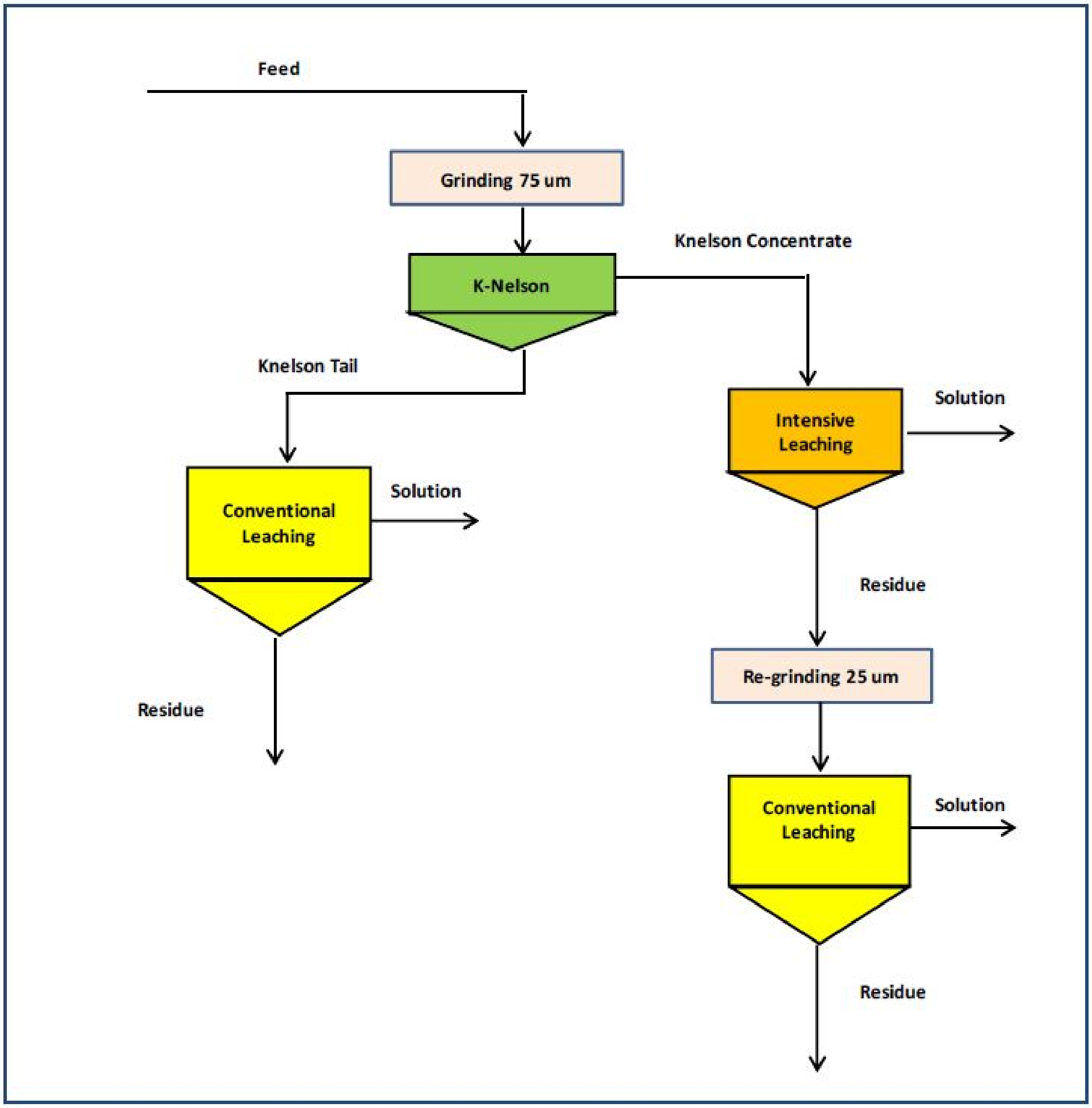


Table 13-22: Summary of February 2014 Gravity Concentration Test Results

Grind P_{80}		53 µm	75 µm	106 µm	150 µm
ROM OV	Head Grade (g/t Au)	1.17	1.17	1.17	1.17
	Gravity Gold Recovery (%)	53.9	49.7	47.1	47.1
ROM GS	Head Grade (g/t Au)	1.00	1.00	1.00	1.00
	Gravity Gold Recovery (%)	46.1	43.1	41.2	40.2
Combined ROM OV + ROM GS	Intensive Leaching Recovery (%)	91.7	92.9	91.7	95.7
	Intensive Leach Tails Grade (g/t Au)	23.6	15.0	17.6	8.6
	Conventional Leach Gold Recovery of Intensive Leach Tails Reground to ~25 µm (%)	58.1	60.9	60.5	13.4

Gravity recovery improved with decreasing grind size while intensive leaching recovery did not. Conventional leaching of the re-ground intensive leach tails showed maximum recovery at 75 µm with significantly lower recovery at the coarser size of 150 µm.

In the variability test work performed by SGS and reported in March 2014, 14 additional gravity recovery tests were performed at a P_{80} of 75 µm. These tests followed the SGS second gravity test work flow sheet shown in. The results are summarized in Table 13-23.

The overall (all test campaigns) average recoveries through the gravity concentrator for both P_{80} 75 µm and 106 µm were 55.3% for Ouro Verde and 50.9% for Grota Seca. At these test values, inclusion of a gravity circuit is considered advantageous. The gravity circuit significantly reduces the possibility of incomplete leaching of coarse gold particles in CIL circuits thereby reducing losses to tailings.

These gravity tests were performed at a P_{80} of 75 µm and are not entirely representative of in process plant gravity recovery configurations that process cyclone underflow (or occasionally cyclone feed), which typically have a P_{80} coarser than the target grind size. The gravity recoverable gold test represents the ultimate gravity recovery conditions and prediction of plant performance must take into account the gangue specific gravity, the GRG size distribution, silver content, and the recovery effort. Therefore, a plant scale-up factor should be applied to the results presented. A scale-up factor of 0.66 is used in the process plant recovery predictions presented in section 13.4.

Intensive leach recoveries of the gravity concentrate where the particle size was ≤ 106 µm averaged 97.7% for Ouro Verde and 91.9% for Grota Seca material. No scale up factor is applied to the intensive leach recovery.

Table 13-23: Summary of March 2014 Gravity Concentration Test Results

P_{80} 75 µm Composite	Head Grade Measured g/t Au	Head Grade Calculated g/t Au	Mass Recovery to Gravity Conc %	Knelson Gold Recovery %	Knelson Concentrate		Knelson Tail
					Intensive Leach Recovery %	24 hour Conventional Leach Recovery %	48 hour Conventional Leach Recovery %
Composite 1 OV	2.67	2.36	0.49	70.8	98.5	95.2	93.6
Composite 2 OV	1.26	1.22	0.32	51.0	99.4	79.9	88.3
Composite 3 OV	0.42	0.47	0.34	54.6	98.6	91.1	91.8
Composite 4 GS	0.67	0.72	0.41	57.6	96.2	56.7	87.0
Composite 5 GS	0.52	0.53	0.30	49.9	96.9	85.4	93.3
Composite 6 GS	1.37	1.31	0.51	70.3	98.6	84.2	92.6
Composite 7 GS	0.53	0.52	0.44	38.1	74.2	16.0	77.7
Composite 8 OV	0.10	0.11	0.44	51.3	92.4	30.8	68.2
Composite 9 GS	0.38	0.41	0.59	45.1	96.3	25.5	87.9
Composite 10 GS	0.66	0.58	0.62	50.5	85.7	20.6	84.8
Composite LG OV	0.72	0.81	0.36	66.3	95.0	37.9	89.2
Composite HG OV	6.55	5.29	0.42	55.2	98.9	48.1	89.7
Composite LG GS	0.55	0.61	0.59	26.6	85.4	20.2	73.5
Composite HG GS	4.57	4.10	0.46	69.0	97.9	22.2	86.9

13.3.7 Flotation

Flotation tests were conducted by HDA in 2011. These tests were carried out in two phases. The exploratory tests conducted on OV and GS rock samples targeted maximum metallurgical recovery of gold and silver in rougher and scavenger stages using several collectors (amyl-xanthate, dithiophosphate, mercapto-benzothiazole, and thio-carbamate). A total of 23 flotation tests were carried out per the flow sheet in Figure 13-.

The second testing phase was carried out using the selected collector based on the exploratory tests and a cleaner stage to reduce the mass recovery while maintaining high metal recovery. These consolidation tests were carried out with 5 selected samples: rock OV, rock GS, saprolite OV, blend 1 and blend 2 per the flow sheet in Figure 13-7. The consolidation test conditions and results are presented in Table 13-24.

Figure 13-7: Exploratory Flotation Test Flow Sheet

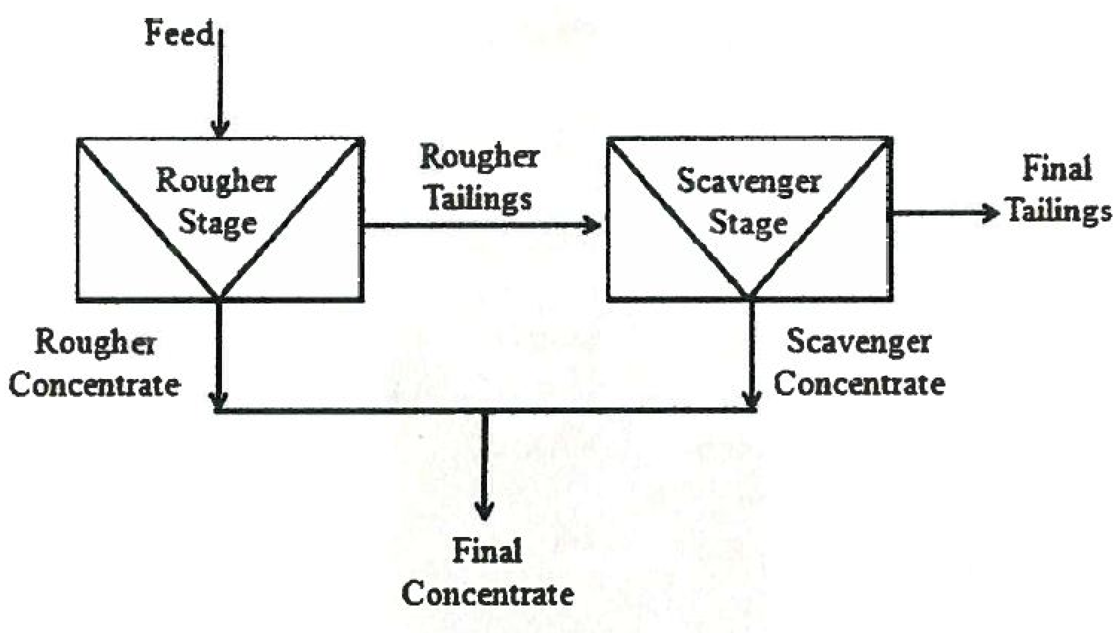


Figure 13-8: Consolidation Flotation Test Flow Sheet

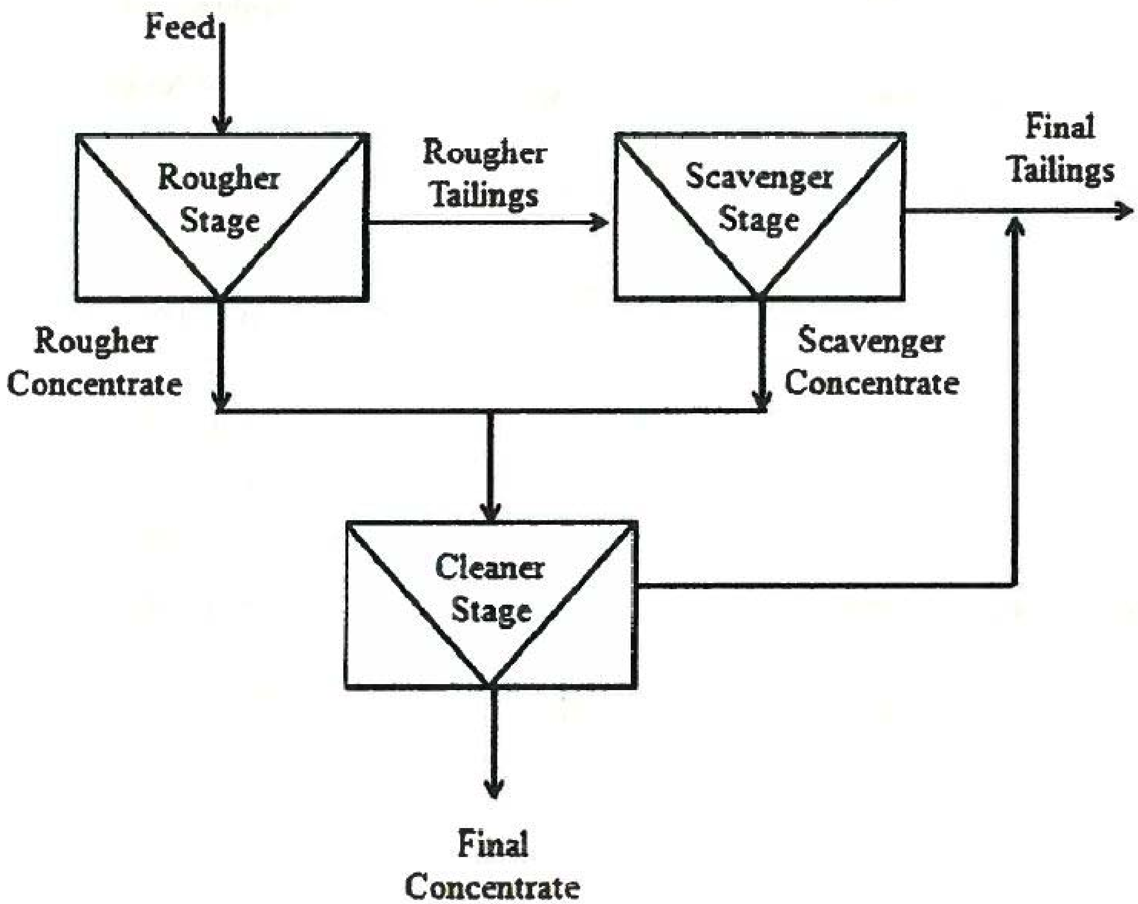


Table 13-24: Consolidation Flotation Test Conditions and Results

Composite	P_{80} µm	pH	Collector Dosage g/t		Flotanol Frother Dosage g/t	Mass Recovery %	Au Recovery %
			Rougher	Scavenger			
Rock GS	74	8.5	PAX: 50	PAX: 12.5 + Hostaflot LIB: 12.5	6	27.9	82.8
Rock OV	74	8.5	PAX: 50	PAX: 12.5 + Hostaflot LIB: 12.5	6	23.4	88.2
Saprolite OV	74	8.5	PAX: 50	PAX: 12.5 + Hostaflot LIB: 12.5	6	21.0	34.5
Blend 1	74	8.5	PAX: 50	PAX: 12.5 + Hostaflot LIB: 12.5	6	21.3	77.6
Blend 2	74	8.5	PAX: 50	PAX: 12.5 + Hostaflot LIB: 12.5	6	29.5	79.4

Given the relatively low gold metallurgical recoveries (especially for saprolite) combined with high mass recoveries, the gold selectivity is considered inadequate and flotation is not recommended.

Subsequent flotation rougher tests were carried out on both 150 µm and 106 µm material by SGS in the February 2014 study. In these tests, 2 kg gravity tails samples at 38% solids were floated with concentrate sample collection at 2, 5, 10, 20 and 30 minutes. The tests occurred at a natural pH of 8.2 with AERO-208 and PAX collectors and MIBC frother. While the mass pull to concentrate ranged from only 10.5% to 12.7%, the metallurgical recoveries of gold were slow and low (70% to 81.7%) relative to cyanide leaching. This confirms the earlier HDA test work where flotation was not recommended.

13.3.8 Settling

SGS (December 2012) performed sedimentation test work on Ouro Verde and Grota Seca ROM leach slurry ground to P_{80} 75 µm. Sedimentation tests were performed with six types of flocculant each at dosages of 10, 20 and 50 g/t. The sedimentation tests were performed in one liter measuring cylinders over 2 hours.

Results demonstrated that 10 g/t flocculant is insufficient for phase separation of the Ouro Verde and Grota Seca samples. The best flocculant tested for the Ouro Verde samples was MF- 919 flocculant at a minimum dosage of 20 g/t as it is the only one that generated a clear supernatant. A dosage of 20 g/t flocculant addition is insufficient for Grota Seca as a clear supernatant could not be achieved; however, clarity was achieved with most of the flocculants at 50 g/t addition.

Pocock (August 2013) was commissioned to perform sedimentation and rheology studies on test five leach tails composite samples generated by SGS. Refer to the rheology discussion for rheology results.

Flocculant screening tests were performed with Hychem AF303 being selected as the preferred flocculant. AF303 is a medium to high molecular weight, 7% charge density, anionic polyacrylamide.

Static thickening tests showed good flocculation and settling characteristics for all five samples at feed solids concentrations of 15 to 20% weight with the saprolite material performing best in the 10 to 15% solids range. Flocculant dosages of 20 to 25 g/t were required to achieve acceptable supernatant clarity and settling rates. These results agree with the test work performed by SGS (December 2012) that indicated an anionic flocculant provided the best response and a minimum of 20 g/t flocculant addition is required.

Dynamic thickening tests were also performed, the results of which are presented as design conditions for high rate thickening in Table 13-25.

The Pocock static beaker tests, used for the design of conventional thickeners, yielded results as summarized below. Note that all of the Pocock work was conducted at the natural pH of the slurries which ranged from pH 8.5 to 9.

Table 13-25: Recommended High Rate Thickener Operating Parameters

Sample	Feed Solids %	Hychem AF303 Dosage g/t	Design Basis Net Feed Loading $m^3/m^2/h$	Predicted Overflow TSS mg/L	Predicted Maximum Underflow Density %
Grota Seca 53 µm	16.6	20-25	4.21	150-250	68
Grota Seca 75 µm	20.1	20-25	4.03	150-250	68
Ouro Verde 53 µm	16.8	20-25	4.08	150-250	68
Ouro Verde 75 µm	20.9	20-25	4.10	150-268	69
Saprolite Blend (45%GS53 + 45%OV53 + 5%GS SAP + 5%OV SAP)	15.3	25-30	3.86	150-250	64

In dynamic testing, standard in-line flocculation was capable of producing acceptable flocculation efficiency and settling performance for all of the materials. With proper flocculation, overflow clarities were generally acceptable for all five materials. The recommended feed solids concentrations varied depending on the particle size.

Static gravity consolidation tests were performed on each of the thickened pulps at 46% solids. The following table summarizes the results, which suggest that the majority of the process solution entrained in the thickened tails will release within approximately eight hours. Near ultimate tailings densities may vary greatly with changing process conditions and variations in ore.

Table 13-26: Leach Tails Consolidation Test Results

Sample	Residual Flocculant	Consolidated Solids Concentration at Specified Time Interval %			
		Initial % Solids	8 Hours	25 Hours	77 Hours
Grota Seca 53 µm	AF303 ~20 g/t	46	73	75	78
Grota Seca 75 µm	AF303 ~15 g/t	46	73	75	78
Ouro Verde 53 µm	AF303 ~20 g/t	46	70	72	76
Ouro Verde 75 µm	AF303 ~15 g/t	46	69	71	76
Saprolite Blend (45%GS53 + 45%OV53 + 5%GS SAP + 5%OV SAP)	AF303 ~20 g/t	46	67	70	76

Subsequent static settling tests were performed by SGS (March 2014). The best sedimentation conditions, as determined by the Pocock test work, were applied to the detoxified pulp generated during the detoxification tests on each of the composites. Static sedimentation tests were conducted with 200 g of dry residue at a P_{80} of 75 µm in a one liter test cylinder (20% w/v) using Hychem AF303 type flocculant dosed at 20 g/t. The 24 hour results are presented in Table 13-27. The average sedimentation rate was 5.66 m/h.

Table 13-27: Sedimentation Rates of Composite Samples

Sample	Velocity m/h	Unit Area $m^3 \cdot h/t$	Unit Area 24h m^2/t
Composite 1 OV	6.03	0.657	0.027
Composite 2 OV	6.00	0.671	0.028
Composite 3 OV	5.61	0.707	0.029
Composite 4 GS	5.13	0.771	0.032
Composite 5 GS	5.07	0.778	0.032
Composite 6 GS	6.18	0.646	0.027
Composite 7 GS	5.34	0.752	0.031
Composite 8 GS	5.49	0.729	0.030
Composite 9 GS	5.55	0.282	0.012
Composite 10 GS	5.94	0.262	0.011
Composite LG OV	6.03	0.260	0.011
Composite HG OV	5.79	0.270	0.011
Composite HG GS	5.76	0.273	0.011
Composite LG GS	5.37	0.293	0.012

13.3.9 Rheology

In the Pocock test work (August 2013), rheological data was collected using a Fann Model 35A instrument. Rheological data provides essential information for design of equipment such as agitators, pipelines, pumps, and screens. Viscosity tests were performed to examine the rheological behavior of the thickened pulps across a specific shear rate range. Data correlated include the relationship between apparent viscosity and shear rate, and shear stress and shear rate at anticipated operating temperatures, grind size, solids concentrations, residual flocculant and pH.

The results indicated that pumping and agitation issues should not be encountered at the anticipated operating densities.

13.3.10 Whole Ore Cyanidation

13.3.10.1 HDA 2011

HDA (October 2011) conducted whole ore leaching tests on Ouro Verde and Grota Seca mineralized samples as well as saprolite blends of 5% and 15% of OV saprolite. Three sets of kinetic tests were completed with increasing concentrations of cyanide. The leaching tests conducted with the highest cyanide concentration also included carbon in the leach slurry.

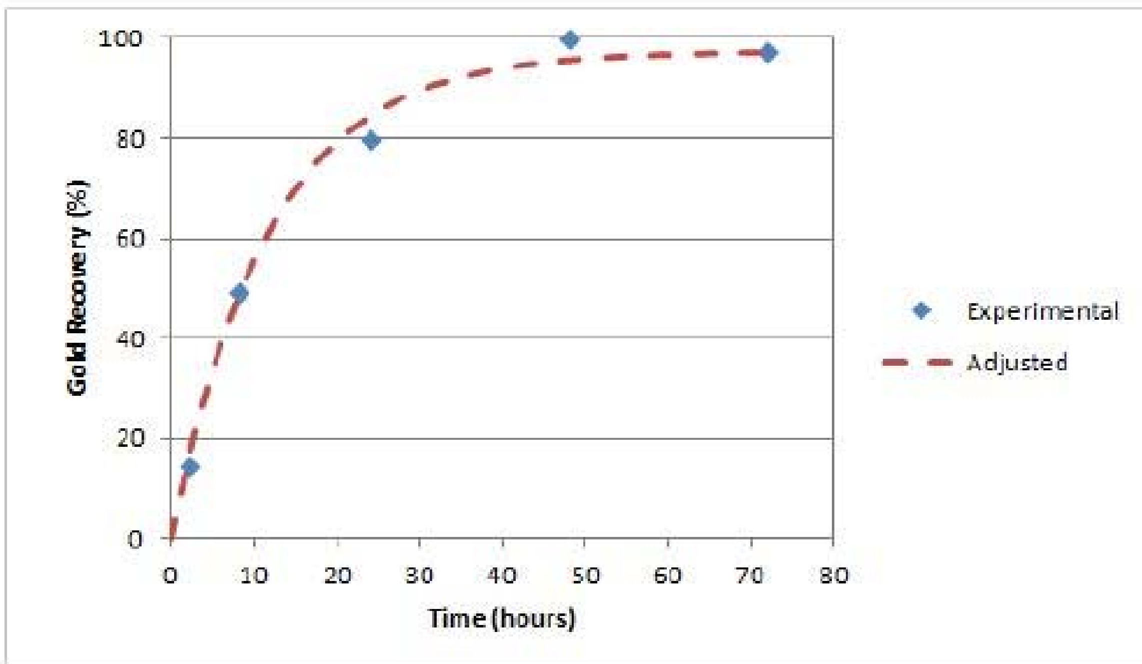
In the first set of tests, samples were pulped to 45% solids w/w and the pH was adjusted to 10.5 to 11. Sodium cyanide was added to 560 ppm cyanide ion concentration and leaching was carried out for 72 hours. The results are summarized in Table 13-28.

Table 13-28: Whole Ore Gold Leach Recovery at 560 ppm CN- (72 Hours)

Sample	Grind Size µm	Assay g/t Au			Lime Dosage kg/t	NaCN Dosage kg/t	Estimated Time To Complete Leach h	Au Recovery %
		Average Measured Head	Calculated Head	Solid Tail				
Rock OV	P_{90} 150	1.26	1.01	0.06	3.07	1.44	10	94.3
	P_{80} 74		1.03	0.10	3.20	1.54	8	90.4
	P_{80} 74		2.05	0.07	3.60	1.16	8	96.5
Rock GS	P_{90} 150	1.31	1.28	0.10	1.50	1.55	18	92.6
	P_{80} 74		1.46	0.07	1.30	1.47	18	95.3
Sap. OV	P_{80} 74	0.804	1.01	0.03	14.1	2.25	72	97.4
Blend 1	P_{80} 74	1.42	1.78	0.05	4.10	1.25	20	97.0
Blend 2	P_{80} 74	1.29	1.86	0.06	4.20	2.20	13	97.0

The Ouro Verde sample leached very well, yielding >90% gold extraction within 8 hours. The Grota Seca sample leached slower with 18 hours required to achieve > 92% extraction. For the saprolite tested, a very long leach time of 72 hours achieved > 97% extraction, however as can be seen from the leach curve in Figure 13-8, 30 hours achieved ~80% recovery. All of the tests confirm that finer grinding improves leach recovery.

Figure 13-7: Saprolite Leaching Kinetics at P_{80} 75 µm and 550 pm CN^-



Intensive cyanide leaching tests were also conducted to determine maximum cyanide leaching recoveries. The gold recoveries of the intensive leaching test work are compared to the conventional leach test work recoveries in Table 13-30. Cyanide consumption for the rock samples ranged from 115 g/t (Rock GS) to 467 g/t (Rock OV) as well as 252 g/t for both blend 1 and 2 samples.

In the second set of tests, samples were pulped to 40% solids and the pH was adjusted to 10.5 to 11. Sodium cyanide was added to 1120 ppm cyanide ion concentration and leaching was carried out for 72 hours. Results are tabulated in Table 13-30.

In the third set of leaching tests performed by HDA (October 2011), activated carbon was added to the leach slurry for the 48 hour duration of the tests. Samples were pulped to 40% solids and the pH was adjusted to 10.5 to 11. Sodium cyanide was added to 2,240 ppm cyanide ion concentration. Results of these tests are presented in Table 13-31.

Table 13-29: Average Whole Ore Leach Recoveries

Sample	Kinetic Leach Test Work Au Recovery %	Intensive Leach Test Work Au Recovery %
Rock OV	93.5	96.5
Rock GS	95.3	96.2
Saprolite OV	97.4	98.8
Blend 1	97	95.6
Blend 2	97	96.7

Table 13-30: Whole Ore Leach Recovery at 1120 ppm CN^-

Sample	Grind Size µm	Assay g/t Au			Lime Dosage kg/t	NaCN Dosage kg/t	Au Recovery %
		Average Measured Head	Calculated Head	Solid Tail			
Rock OV	P_{80} 150	1.26	1.49	0.10	4.97	3.98	93.0
	P_{80} 150		1.43	0.10	5.48	3.99	93.2
	P_{80} 74		1.46	0.06	2.19	3.98	96.2
	P_{80} 74		1.62	0.05	2.39	3.98	96.7
Rock GS	P_{80} 150	1.31	1.55	0.09	5.09	4.00	94.3
	P_{80} 150		1.61	0.08	4.98	4.00	95.3
	P_{80} 74		1.60	0.06	3.41	4.01	96.2
	P_{80} 74		1.44	0.06	3.70	4.00	96.2
Sap. OV	P_{80} 74	0.80	1.09	0.1	13.4	4.00	98.8
Blend 1	P_{80} 74	1.42	1.35	0.06	4.41	4.01	95.6
Blend 2	P_{80} 74	1.29	1.48	0.05	5.60	4.00	96.7

Table 13-31: Whole Ore Leach Recovery with Activated Carbon at 2240 ppm CN^-

Sample	Grind Size µm	Assay g/t Au			Lime Dosage kg/t	NaCN Dosage kg/t	Au Recovery %
		Average Measured Head	Calculated Head	Solid Tail			
Rock OV	P_{80} 74	1.26	1.16	0.10	3.33	7.17	87.1
Rock GS	P_{80} 74	1.31	1.26	0.23	2.05	7.07	72.3
Sap. OV	P_{80} 74	0.80	1.01	0.13	14.2	10.3	78
Blend 1	P_{80} 74	1.42	1.60	0.24	2.20	4.90	77
Blend 2	P_{80} 74	1.29	1.25	0.10	5.50	5.10	87

13.3.10.2 SGS 2012

A significant number of whole ore cyanide leaching tests were performed by SGS (December 2012) to ascertain optimum leaching conditions. Low grade, high grade and ROM composites for OV and GS deposits were tested across a number of grind sizes, sodium cyanide concentrations and solids contents. Grind sizes P_{80} of 75, 106, 150, and 212 µm were tested. Pulp solids concentrations were either 40% or 50% solids w/w. Cyanide concentrations of 1, 0.5, and 0.3 g/L were tested. pH was maintained at 10.5 for all of the tests. In total, 72 bottle leach tests were conducted; the results of which are presented in the following charts.

After 32 hours of leaching at the 75 µm grind size, Grota Seca gold recoveries ranged from 75.8% to 96.7% with an average recovery of 90.6%, while Ouro Verde gold recoveries ranged from 90.2% to 96.7% with an average of 94.1%.Silver recoveries, although not considered in project economics, averaged 48.2% for GS, and 47.0% for OV, after 32 hours leaching. The average recoveries for each sample across the varied leaching conditions are presented in Table 13-32. The results of all of the whole ore leach tests across the range of conditions are presented in Figures 13-11 and 13-12 for Grota Seca and Ouro Verde samples respectively.

Table 13-32: Average Composite Sample Whole Ore Leach Recoveries at 75 µm

Sample	Grind Size µm	Measured Head Grade g/t Au	Measured Head Grade g/t Au	Tails Residue Grade g/t Au	Au Recovery %
ROM GS	P_{80} 74	1.06	0.4	0.05	95.5
HG GS	P_{80} 74	3.90	0.6	0.17	95.6
LG GS	P_{80} 74	0.39	0.3	0.08	80.6
ROM OV	P_{80} 74	1.17	0.4	0.07	94.4
HG OV	P_{80} 74	3.8	1.6	0.17	95.5
LG OV	P_{80} 74	0.47	0.5	0.04	92.3

Figure 13-8: GS Whole Ore Leach Recovery at 75 µm Under Varying Leach Conditions

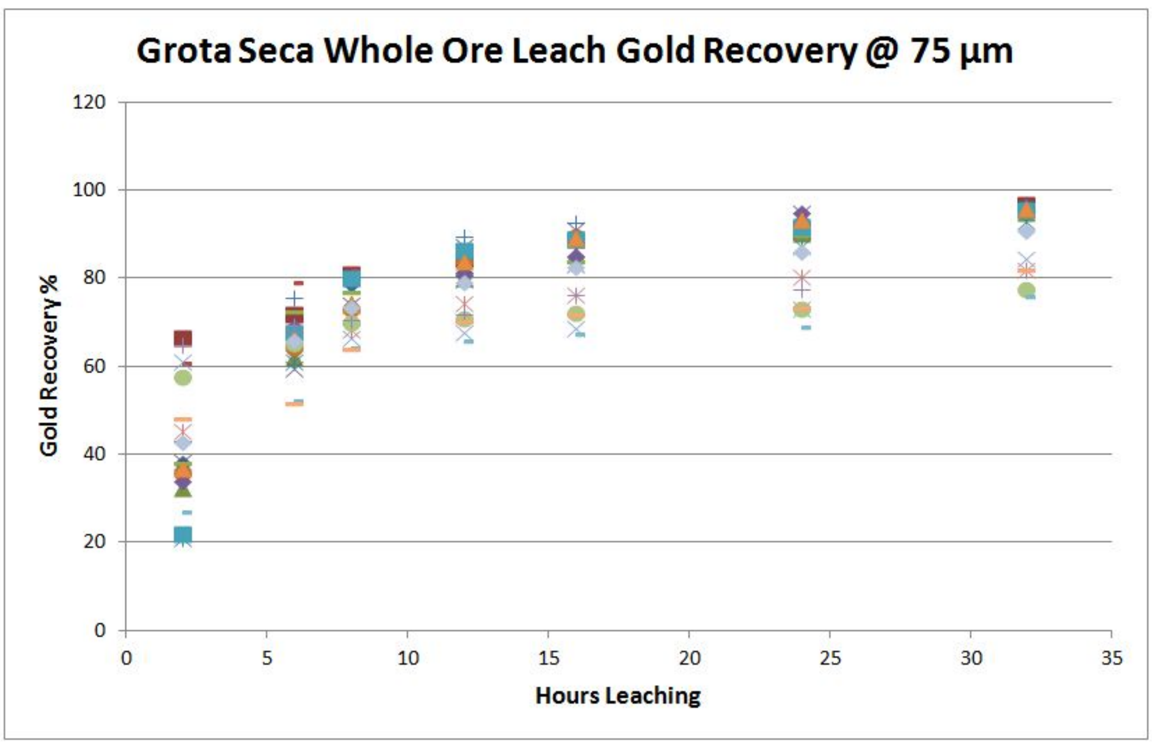
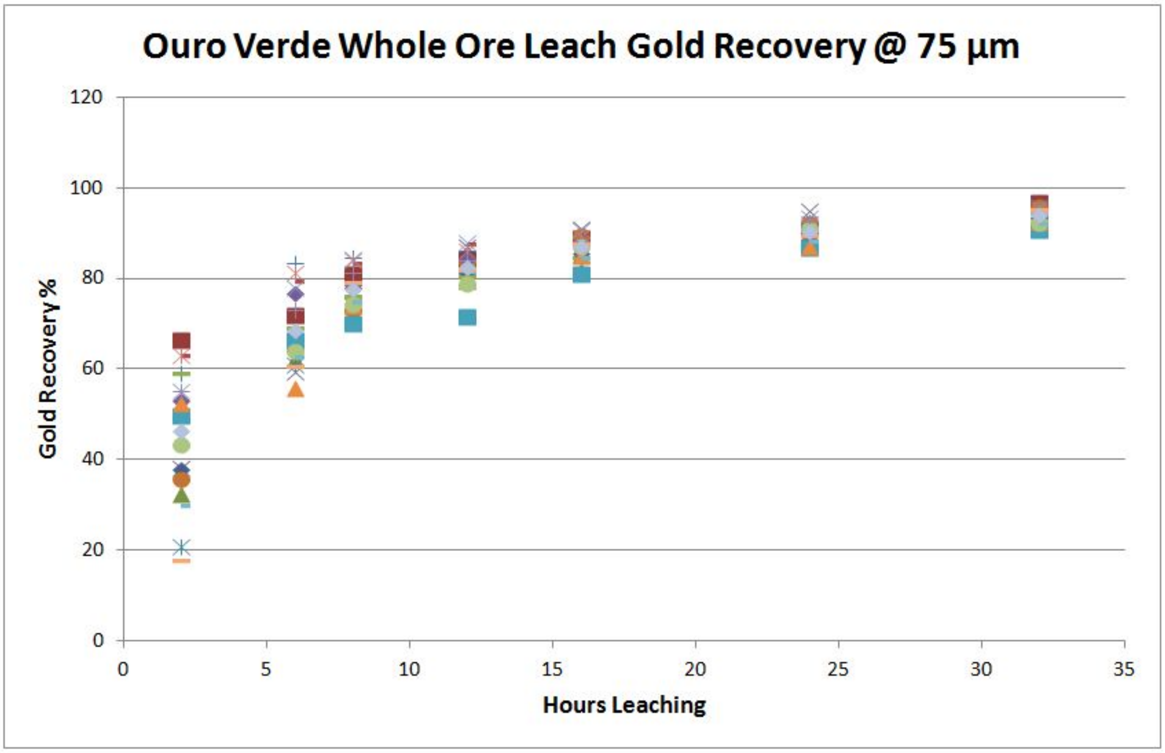


Figure 13-9: OV Whole Ore Leach Recovery at 75 µm Under Varying Leach Conditions



Based on the results of these leach tests, it can be concluded that:

- The ores leach easily with all samples providing >90% recovery with the exception of the Low Grade Grota Seca sample which averaged 80.6% gold recovery. The diagnostic leach tests (section 13.3.4) showed that the additional unleached gold in the LG Grota Seca sample is locked in primary and secondary sulphides. Despite relatively low recovery, the LG GS sample had a low tails grade of 0.08 g Au/t.
- Changing the solids concentration from 40 to 50% solids (w/w) made no significant difference to recoveries. In general, it is desirable to maintain the higher solids concentrations to reduce tankage and reagent requirements. However, if the density varies it is unlikely to impact recoveries for the Project.
- Grinding finer resulted in higher recoveries (also refer to section 13.3.3).
- Sodium cyanide concentrations of 1 g/L and 0.5 g/L showed no difference in recovery, while a concentration of 0.3 g/L resulted in a 2 to 3% loss of recovery.

SGS also performed cyanidation test work to assess the effect of oxygen and lead nitrate addition on leaching kinetics and extraction. The tests all showed that neither lead nitrate addition nor elevated oxygen levels provided any benefit to either the kinetics or final gold extraction.

Average reagent consumptions under leach conditions of 75 µm, 0.5 g/L sodium cyanide, and 32 hours are presented in Table 13-33.

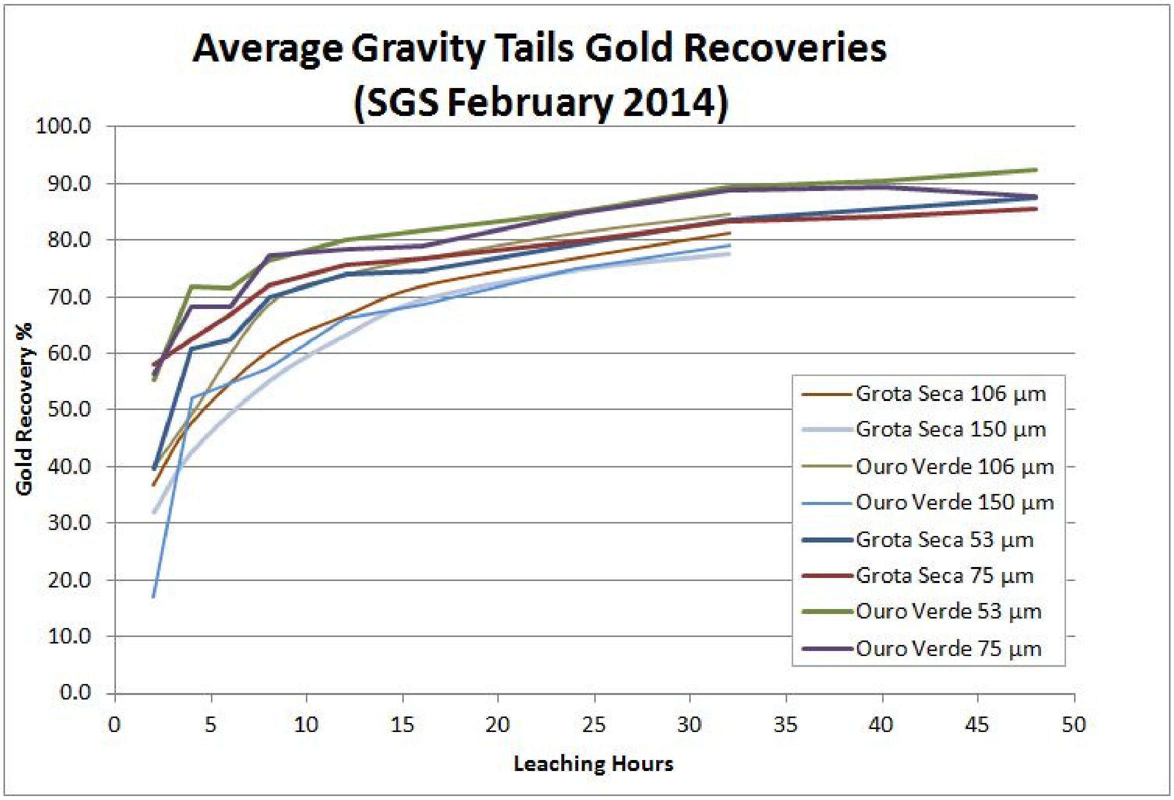
Table 13-33: Whole Ore Leach Reagent Consumptions (75 µm, 0.5 g/L NaCN, 32 hours)

Sample	Average NaCN Consumption kg/t	Average $Ca(OH)_2$ Consumption kg/t
Grota Seca	0.16	0.35
Ouro Verde	0.21	0.38

13.3.11 Cyanidation of Gravity Tails

SGS conducted a number of bottle roll cyanide leach tests on gravity circuit tails. Test work was performed on two composite samples ground to P_{80} 53 µm and 75 µm and included pre-aeration, oxygen sparging and air sparging as methods of oxygen supply. The leach tests were performed at pH 10.5, 50% solids and 0.5 g/L NaCN. The calculated head grades agreed with the average measured head grades which were 0.51 g/t Au and 0.2 g/t Ag for ROM Ouro Verde and 0.54 g/t Au and 0.2 g/t Ag for Grota Seca. Some of these tests were conducted over 32 hours and some over 48 hours. Additional bottle tests on the same composite samples were performed at P_{80} 106 and 150 µm with varying sodium cyanide concentrations of 0.2, 0.4, 0.6 and 0.8 g/L NaCN. These additional tests were conducted over 32 hours. The average recoveries at various grind sizes are presented in Figure 13-11.

Figure 13-10: Cyanide Leaching of Gravity Tails Under Varying Conditions



All methods of oxygen supply (pre-oxygenation, oxygen sparging, and air sparging) provided similar recoveries for both Grota Seca and Ouro Verde samples. There was minimal increase in gold recovery observed when grinding finer from 75 µm down to 53 µm. Increasing the leach time beyond 32 hours showed increased recoveries and in fact, leaching appeared to be incomplete even at 48 hours. There was a significant improvement in recovery when going from a P_{80} of 150 µm and 106 µm down to 75 µm. The average reagent consumptions are presented in Table 13-34.

Table 13-34: Average Reagent Consumptions of Gravity Tails Samples

Sample	32 h NaCN kg/t	48 h NaCN kg/t	32 h $Ca(OH)_2$ kg/t	48 h $Ca(OH)_2$ kg/t
OV 53 µm	0.11	0.18	0.39	0.57
OV 75 µm	0.12	0.17	0.32	0.51
GS 53 µm	0.16	0.13	0.40	0.58
GS 75 µm	0.12	0.13	0.42	0.58

13.3.12 SGS March 2014

In the March 2014 report, SGS detailed the results of 14 Knelson concentrator tails leach tests performed on the variability samples. These tests were performed at a P_{80} of 75 µm and 50% solids by weight. The NaCN concentration was 0.4 g/L and the pH was 10.5. The tests were performed without addition of air or oxygen. Leaching was carried out over 48 hours with sample taken at 2, 8, 26 and 48 hours. During the leaching period, pH was maintained and NaCN was added if the concentration dropped below 100 ppm. The results are presented in Table 13-35.

Table 13-35: Gravity Tails Conventional Leach Recoveries (SGS 2014)

Sample	Gravity Tails Grade g/t Au	Conventional Leach of Gravity Tails 48 h Recovery %	Leach Tails Residue g/t Au
Composite 1 (OV)	0.69	93.6	0.04
Composite 2 (OV)	0.60	88.3	0.07
Composite 3 (OV)	0.22	91.8	0.02
Composite 4 (GS)	0.31	87.0	0.04
Composite 5 (GS)	0.27	93.3	0.02
Composite 6 (GS)	0.39	92.6	0.03
Composite 7 (GS)	0.32	77.7	0.07
Composite 8 (OV)	0.06	68.2	0.02
Composite 9 (GS)	0.21	87.9	0.03
Composite 10 (GS)	0.29	84.8	0.04
LG-OV	0.28	89.2	0.03
HG-OV	2.38	89.7	0.25
LG-GS	0.45	73.5	0.12
HG-GS	1.28	86.9	0.17

13.3.13 Grind Size

Grind versus recovery data was obtained during the HDA 2011, SGS December 2012 and February 2014 campaigns. All of the test work results are presented in Figures 13-14 and 13-15 for OV and GS ore types respectively.

Figure 13-11: Ouro Verde Gold Leach Recovery vs. Grind Size

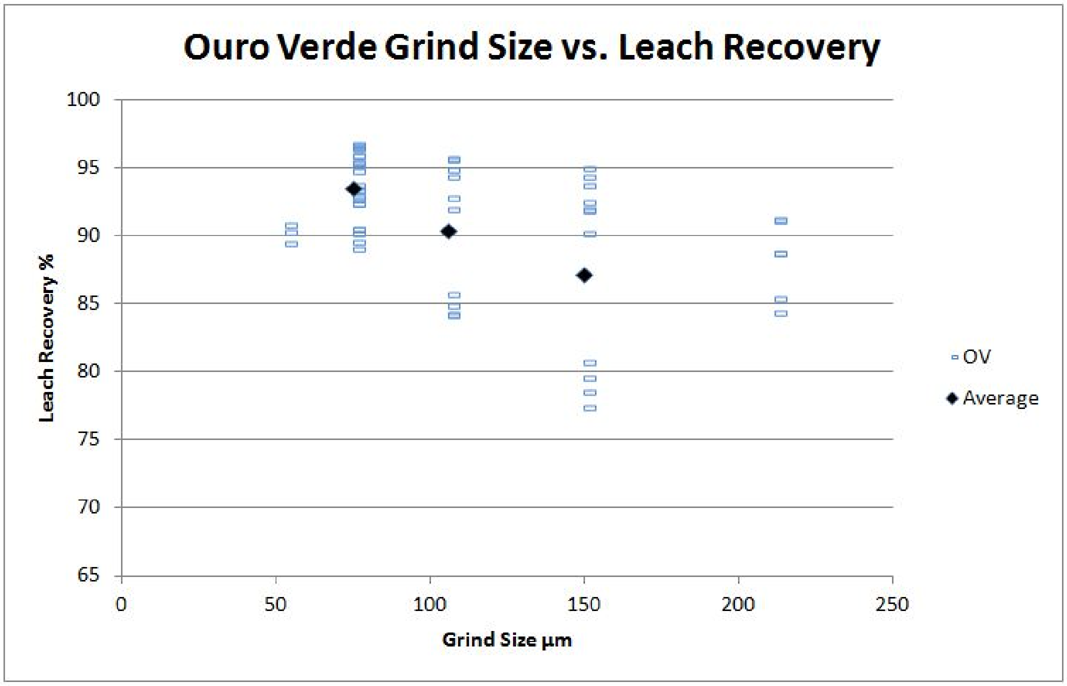
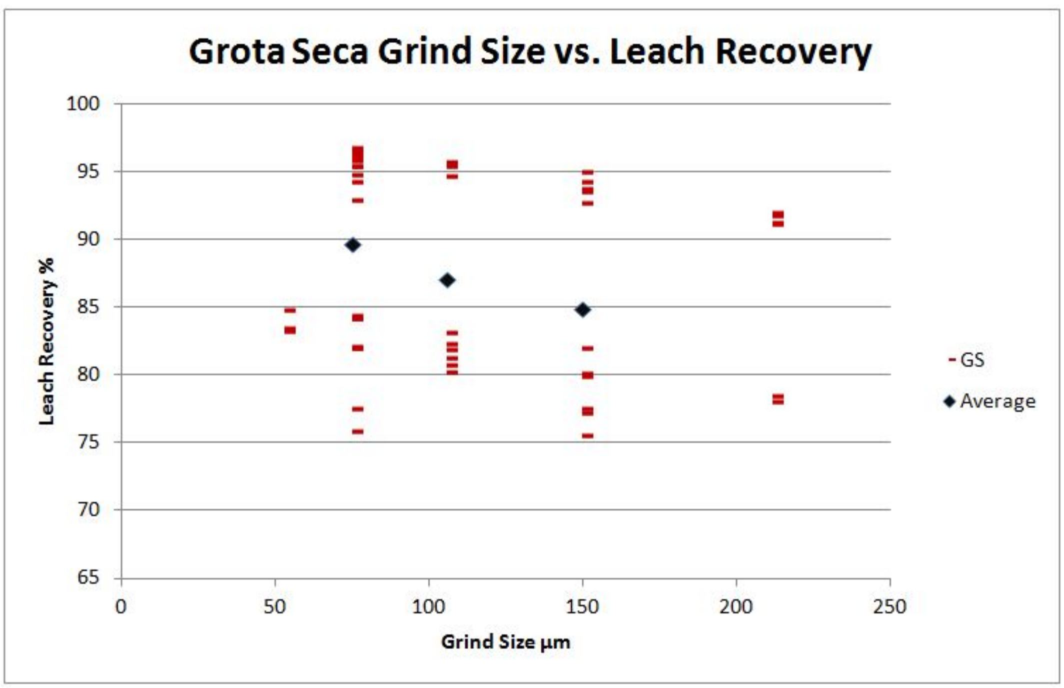


Figure 13-12: Grota Seca Gold Leach Recovery vs Grind Size



In general, leach recoveries decrease with increasing grind size. The large spread in recoveries within individual grind sizes is due to differing leach conditions such as cyanide concentration and head grade.

From the limited number of tests conducted at 53 µm, it appears that leach recoveries do not improve when compared to the 75 µm results. Due to the high recoveries achieved at a grind size of P_{80} 75 µm across all of the test work campaigns, it is concluded that P_{80} 75 µm is the optimum grind size. However, depending on project constraints (capital expenditure), the most economic grind size might be different.

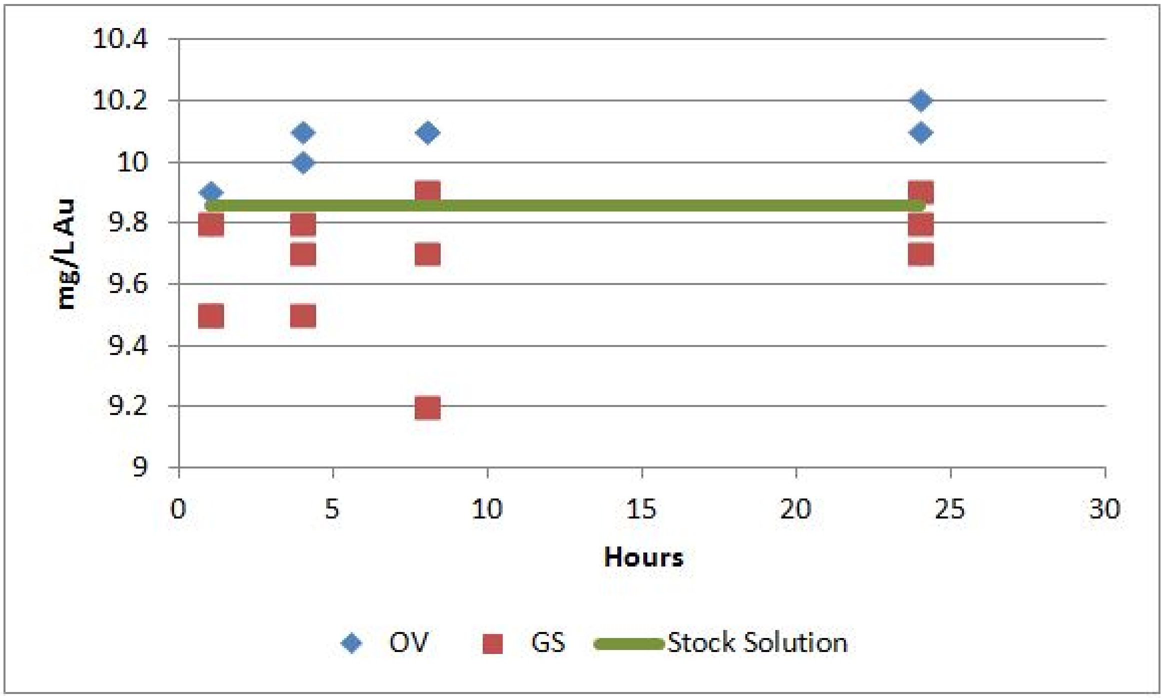
Utilizing the average recovery at each grind size, an increase in grind size from 75 µm to 106 µm would result in a 3% reduction in leach recovery for Ouro Verde and a 2.6% reduction in leach recovery for Grota Seca ore.

13.3.14 Preg-Robbing Test Work

HDA (October 2011) conducted whole ore leach tests in the presence of activated carbon. These results can be found in Table 13-31. While these tests were not specifically designed to determine preg robbing characteristics of the rock, the fact that lower recoveries were obtained could indicate that preg robbing materials are not present in the rock samples.

SGS conducted six preg robbing tests (December 2012). In these tests, samples ground to P_{80} 50 µm were contacted with a stock solution of gold containing 9.86 mg/L Au as a cyanide complex and 50 mg/L NaCN. The test was carried out at 50% solids and a pH of 10.5 to 11. Samples were taken at 1, 4, 8 and 24 hours to determine the adsorption characteristics of the rock samples. As there is no discernible decrease in solution tenor during the course of the tests, and the mineralogy analysis did not indicate preg robbing potential, it can be concluded that the samples did not contain significant preg robbing constituents.

Figure 13-13: Results of Preg Robbing Tests (December 2012)



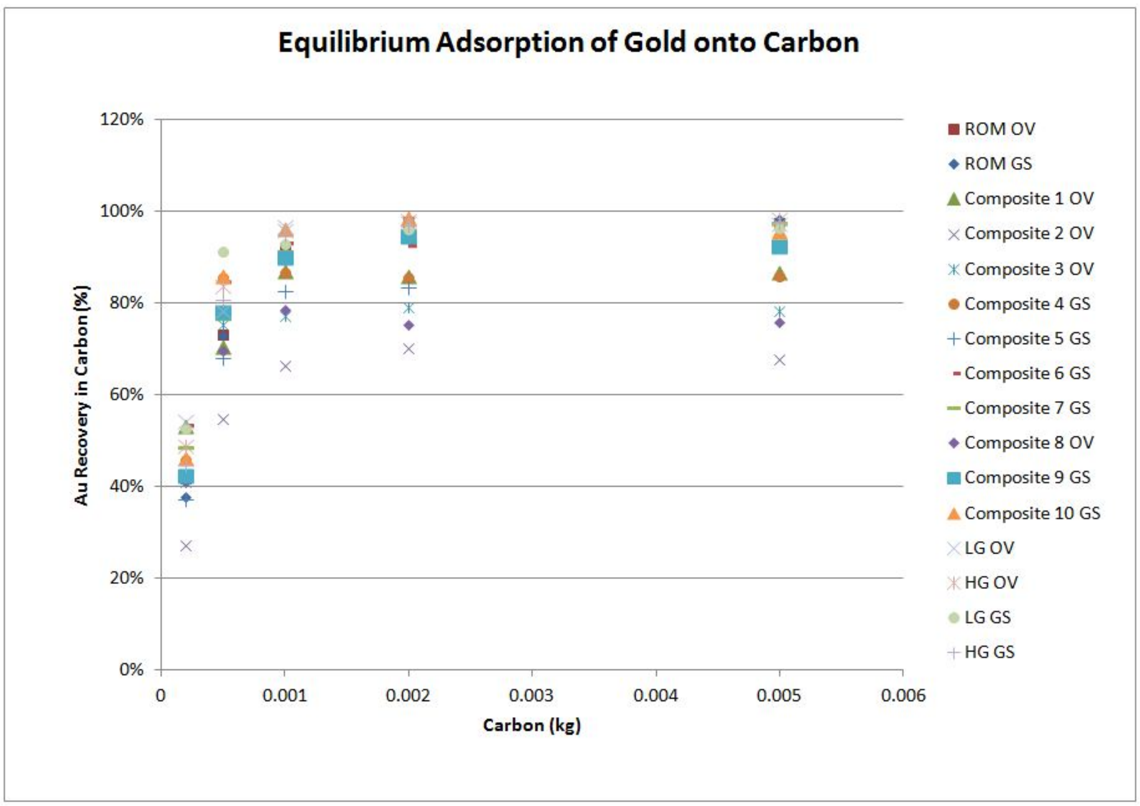
13.3.15 Carbon Adsorption

Both equilibrium and kinetic carbon adsorption testing was conducted by SGS in the February and March 2014 test work campaigns. In the equilibrium bottle roll tests, 0.2, 0.5, 1, 2 and 5 g of activated carbon were contacted with 2 L of pulp for 4 days. After 4 days, the carbon and solution were assayed. In the kinetic tests, 2 g of carbon were added to 2 L of pulp and samples of the pulp were removed at timed intervals and assayed for gold. At the end of the kinetic tests, the activated carbon was also assayed. While silver would have also leached and subsequently loaded onto the carbon, silver assays were not presented and presumably not performed.

Silver loading rates have been assumed to be the same as gold for the purpose of CIP modelling.

The combined results of the February and March 2014 tests are presented in Figure 13-15 and Figure 13-16.

Figure 13-14: Equilibrium Gold Loadings



The adsorption of gold from solution onto activated carbon in a continuous CIL / CIP plant generally obeys the following empirical relationship:

$$d[Au]_c = k \cdot [Au]_s \cdot t^n$$

Where: $d[Au]_c$ = increase in gold loading to carbon (mg/L)
k = empirical constant related to operating parameters
$[Au]_s$ = solution grade of gold
t = elapsed time (h)
n = empirical constant related to gold loading

Based on the kinetic test results, regression was performed to determine the k and n constants for the adsorption model based a combined ore type. The values determined for k and n are k = 292 and n = 0.698 respectively. The calculated model has been plotted with the test results in Figure 13-17. The straight line on the figure depicts the model with the slope equal to n and ten raised to the power of the intercept equal to k. The adsorption model can be used in modelling of the CIL / CIP circuit to more accurately determine solution losses and carbon loadings.

A hybrid CIL / CIP process consisting of leaching only tank(s) upstream of carbon in leach tanks has been designed for the Project. This configuration aims to leverage the advantages offered by both the CIL (reduced capital cost) and the CIP (improved adsorption efficiency) configurations while accommodating the slow leach kinetics (32 hour) presented in section 13.3.11.

Figure 13-15: Gold Adsorption Kinetics

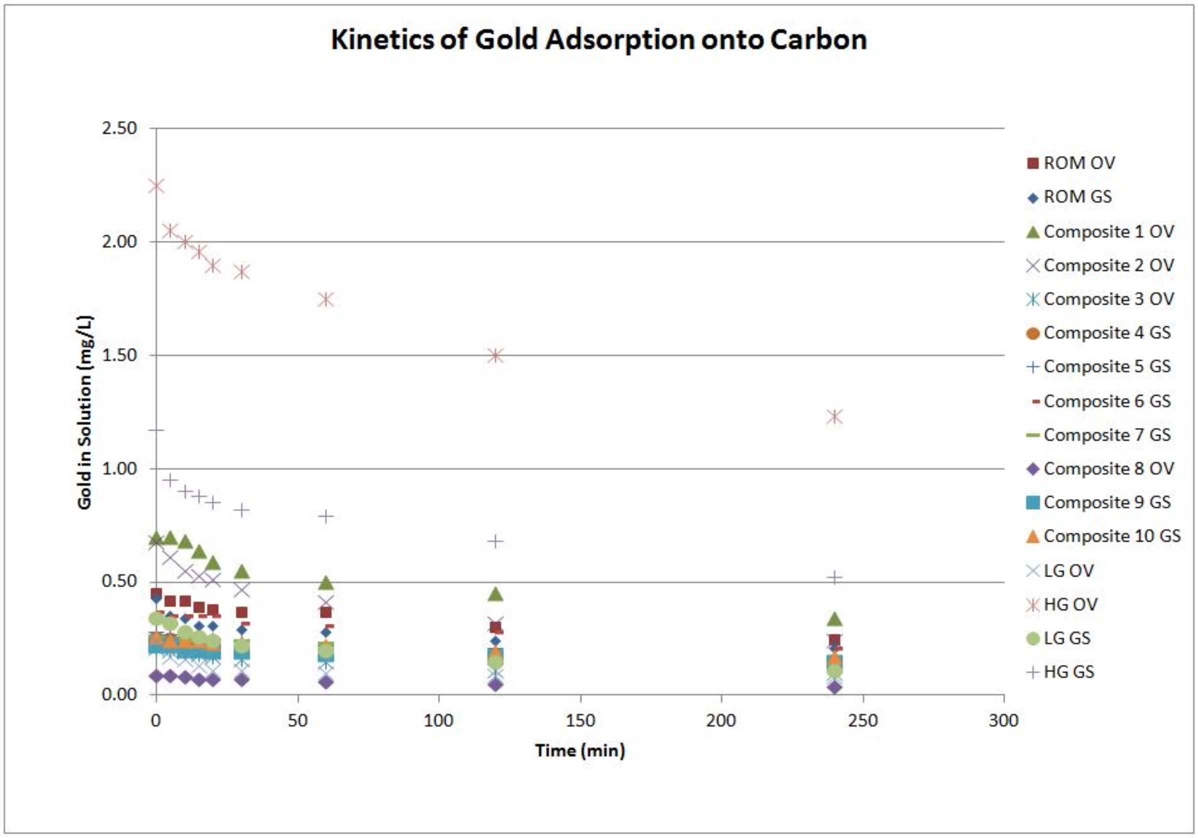
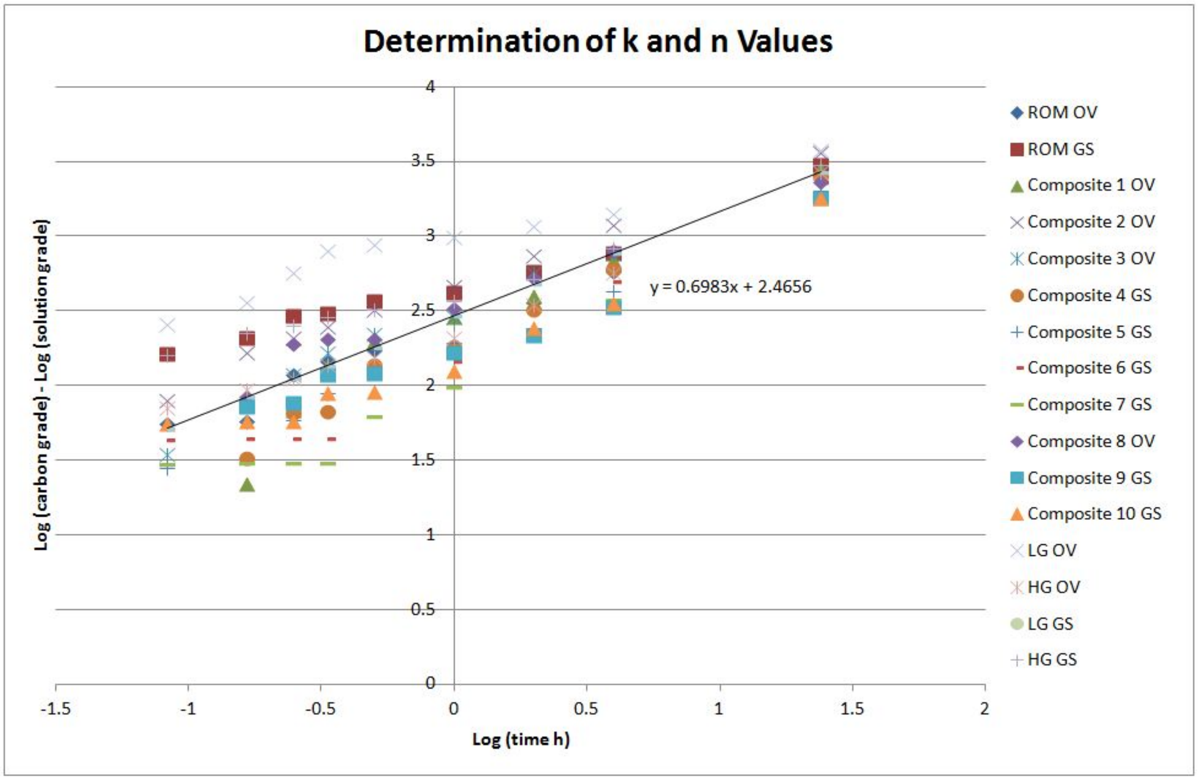


Figure 13-16: Determination of k and n Values



13.3.16 Cyanide Destruction

During the December 2012 campaign, SGS performed an exploratory detoxification study of cyanidation tails. The SO_2 / air (or oxygen) and Caro's acid processes were both tested on OV and GS composites. Leach tails WAD cyanide concentrations were 477 mg/L and 454 mg/L respectively for the OV and GS composites, while Cu and Fe averaged 8.1 mg Cu/L and 1.5 mg Fe/L. Although not documented, the composites used for the December 2012 cyanide destruction test work referred to as ROM OV and ROM GS are assumed to have been leached for 32 hours.

Results and reagent consumptions of the December 2012 detoxification tests are presented in Table 13-36. In all phases, cyanide destruction testing continued until <1 ppm CN_{WAD} was achieved.

Caro's acid was also tested, however, subsequent confirmatory testing was not performed because of anticipated operational costs and safety risks and the SO_2 / air process was selected as the preferred option. The reader is referred to the 2012 SGS report for details of the Caro's acid test work which determined that the optimal ratio of H_2SO_4:CN_{WAD} is 4:1.

Table 13-36: Results of SO_2/Air Cyanide Detoxification Tests

	Composite	Feed CN_{WAD} mg/L	Feed Cu mg/L	Feed Fe mg/L	g SO_2 / g CN_{WAD}	g $Ca(OH)_2$ / g CN_{WAD}	Time h	CN_{WAD} mg/L
SGS 2012	ROM OV	477	7.4	1.0	3.51	9.48	6.5	0.70
	ROM GS	454	8.8	2.0	3.55	10.23	7.0	0.89
SGS Feb 2014	ROM OV $_{AVE}$	85	31.1	20	17.2	-	2.7	1.0
	ROM GS $_{AVE}$	80	23.7	25	21.7	-	3	1.0
SGS March 2014	Composite 1 OV	137	6.1	<1	6.92	-	4	<1
	Composite 2 OV	180	7.8	<1	3.69	-	3	<1
	Composite 3 OV	174	6.2	<1	3.93	-	3	<1
	Composite 4 GS	187	4.0	<1	4.32	-	3.5	<1
	Composite 5 GS	177	4.0	<1	4.93	-	4	<1
	Composite 6 GS	187	6.3	<1	4.33	-	3.5	<1
	Composite 7 GS	189	3.6	<1	6.16	-	4.5	<1
	Composite 8 GS	182	5.1	<1	5.45	-	3.5	<1
	Composite 9 GS	176	6.5	<1	6.09	-	3	<1
	Composite 10 GS	192	6.6	<1	4.53	-	3	<1
	Composite LG OV	159	25.4	<1	3.45	-	2.5	<1
	Composite HG OV	164	26.1	<1	2.91	-	2.5	<1
	Composite LG GS	180	3.3	<1	3.91	-	3	<1
	Composite HG GS	164	14.5	<1	4.37	-	3	<1

A set of 3 cyanide destruction tests were performed for both the OV and GS ROM composites by SGS in late 2013 (SGS February 2014). Analyses of the bulk leach solution prior to the destruction test indicated elevated concentrations of iron and copper. SO_2 consumption was high because of the elevated iron content. Additional copper was required to precipitate out the iron cyanide complexes. It was mentioned that the high iron content was likely due to long leaching times; however, the actual leach time was not mentioned. Leach tests in the February 2014 program lasted for 48 hours so it is assumed that 48 hours of leaching was responsible for the elevated iron. Three detoxification tests were performed for each composite at different copper addition rates (25, 12.5 and 6 ppm Cu) with copper addition being reported in concentration units. The average test results for the three different Cu additions for each deposit are presented in Table 13-36.

In 2014 (SGS March 2014), 14 detoxification tests were performed, the results of which are also presented in Table 13-36. The March 2014 cyanide leach tests were carried out for 48 hours and it is assumed that these same samples were used for the detoxification test work. While the dissolved Fe content of the leached slurry remained low and did not correlate with the 48 hour leach results from the SGS February 2014 testing, the dissolved Cu content of some of the March 2014 composites was elevated.

The elevated soluble Fe assays in the SGS February 2014 work indicate that copper sulphate addition should be allowed for, although it may not be required. The average time required to achieve <1 ppm CN_{WAD} (weak acid dissociable) in the SGS 2014 (February and March) test work is 3.2 hours. It should be noted that solution assay samples were collected every half hour. The kinetic curves for cyanide destruction in the February 2014 test work are presented in Figure 13-20.

SO_2 consumption averaged 3.53 gSO_2/gCN_{WAD} (SGS 2012) and 4.64 gSO_2/gCN_{WAD} (SGS March 2014).

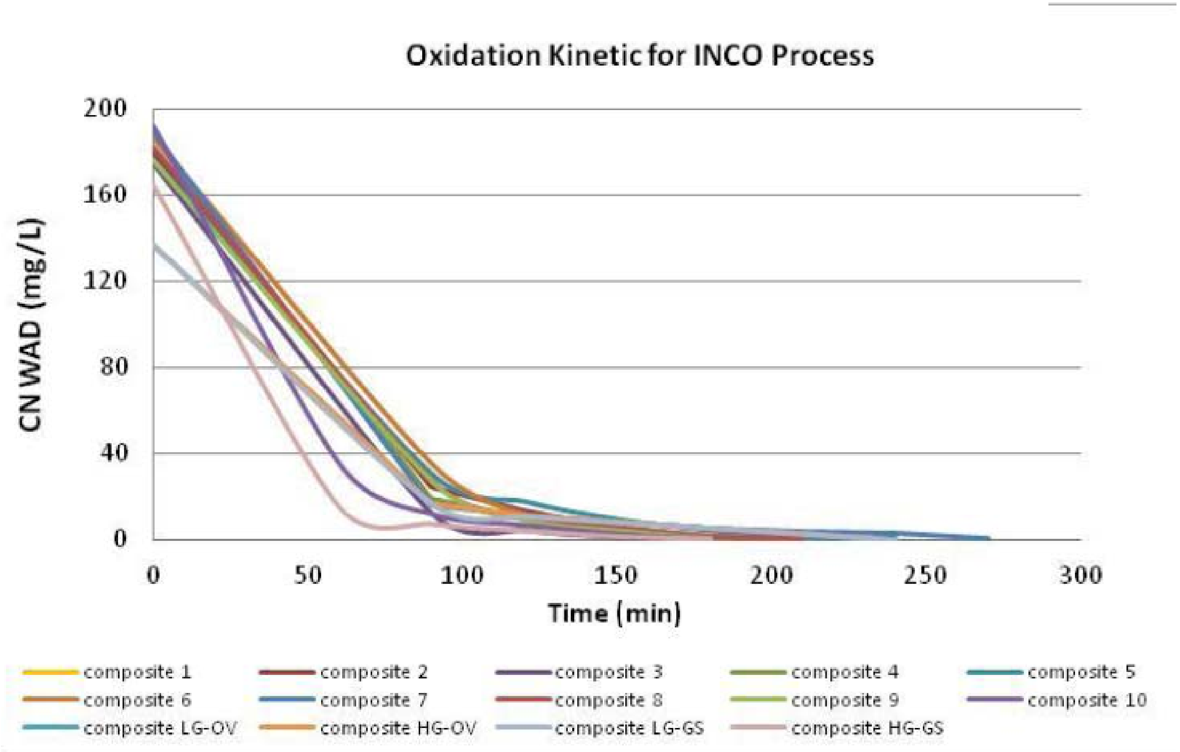
Pre and post detoxification assays of cyanide, copper, iron and zinc were measured and are presented in Table 13-37. Based on the ore concentrations of arsenic, manganese, strontium, and zirconium as presented in Table 13-6, full ICP measurement assay results of detoxified tailings should be reviewed to identify possible effluent environmental issues.

Additional detoxification test work is recommended to confirm reaction kinetics at increased Cu levels of up to 50 ppm Cu^{2+} for detailed design purposes. Dynamic testing should be performed to determine optimal operating conditions.

Table 13-37: Pre and Post Cyanide Detoxification Assays of Selected Metals

	Composite	Pre-Cyanide Detoxification			Post Cyanide Detoxification			Oxidation Time min
		Cu mg/L	Fe mg/L	Zn mg/L	Cu mg/L	Fe mg/L	Zn mg/L	
SGS March 2014	Composite 1 OV	6.1	<1	0.38	<0.1	<1	0.03	240
	Composite 2 OV	7.8	<1	0.28	<0.1	<1	<0.02	180
	Composite 3 OV	6.2	<1	0.24	<0.1	<1	<0.02	180
	Composite 4 GS	4.0	<1	0.22	0.7	<1	<0.02	210
	Composite 5 GS	4.0	<1	0.19	<0.1	<1	<0.02	240
	Composite 6 GS	6.3	<1	0.27	<0.1	<1	<0.02	210
	Composite 7 GS	3.6	<1	0.27	<0.1	<1	0.03	270
	Composite 8 GS	5.1	<1	0.24	<0.1	<1	<0.02	210
	Composite 9 GS	6.5	<1	0.26	<0.1	<1	<0.02	180
	Composite 10 GS	6.6	<1	0.18	<0.1	<1	<0.02	180
	Composite LG OV	25.4	<1	0.37	<0.1	<1	0.02	150
	Composite HG OV	26.1	<1	0.44	<0.1	<1	<0.02	150
	Composite LG GS	3.3	<1	0.41	<0.1	<1	<0.02	180
	Composite HG GS	15.4	<1	0.35	<0.1	<1	0.03	180

Figure 13-17: Cyanide Detoxification Kinetics



13.4 Process Plant Recovery Prediction

Recovery of gold in the processing plant is dependent on a number of factors including but not limited to head grade, grind size, gravity concentrator recovery, mineralogical variations in the feed, particle short circuiting in the leach train, solution losses in CIP tails and fine carbon losses to tails. Overall gold recovery is calculated according to the following formula:

$$\text{Recovery} = \frac{\text{Gravity Circuit Recovered Gold (GRG) + Leach Circuit Recovered Gold (LRG)}}{\text{Gold in Feed}} \times 100\% - 0.5\%$$

Where:

GRG = (Mill Head Grade g/t)(Gravity Concentrator Recovery %)(Plant Scale-up Factor)(Intensive Leach Recovery %)

and

LRG = ((Mill Head Grade g/t) – GRG)(Leach Recovery)

As discussed in section 13.3.7, the test work gravity recoveries are 55.3% for Ouro Verde and 50.9% for Grota Seca at grind sizes in the 75 µm to 106 µm range. A gravity circuit plant scale-up factor of 0.66 has been selected based on the design of the circuit. Applying the scale-up factor results in predicted gravity concentrator recoveries of 36.5% for Ouro Verde and 33.6% for Grota Seca. Applying the intensive leach recoveries (97.7% for OV and 91.9% for GS) directly to the predicted concentrator recoveries, results in “in plant gravity circuit” recoveries of 35.7% for OV and 30.9% for GS.

Leach circuit recoveries are based on leach test work from the SGS December 2012 and March 2014 campaigns. Leach recovery for each ore type is calculated as a function of the head grade using the relationships presented in Figure 13-21. The data presented in Figure 13-21 is based on leach results from the aforementioned campaigns for 75 µm and 32 hour test conditions. As can be seen, the leach tails grade increases with increasing head grade. To allow for losses in the plant, the overall recovery is reduced by 0.5%.

The overall gold recovery versus head grade curves were generated for each ore type using the approach detailed above. The curves are presented in Figure 13-22, which also includes the overall gold recovery recoveries from the SGS March 2014 test campaign for fit comparison. Using regression analysis, the recovery curves have been determined to fit the following equations:

Ouro Verde Gold Recovery % = 96.75 * (1-1/(39.82*Mill Head Grade gAu/t))

Grota Seca Gold Recovery % = 97.41 * (1-1/(19.03*Mill Head Grade gAu/t))

given that the leach time is 32 hours and the P_{80} is 75 µm.

The recoveries predicted by the curves are in agreement with test work results for the grade of ore expected over the LOM (1 and 2 g/t Au). At head grades above and below this range, the variability in the tests results is higher and under those conditions, the accuracy of the predictions may be lower.

Figure 13-19: Gold Leach Tails Grade vs. Head Grade

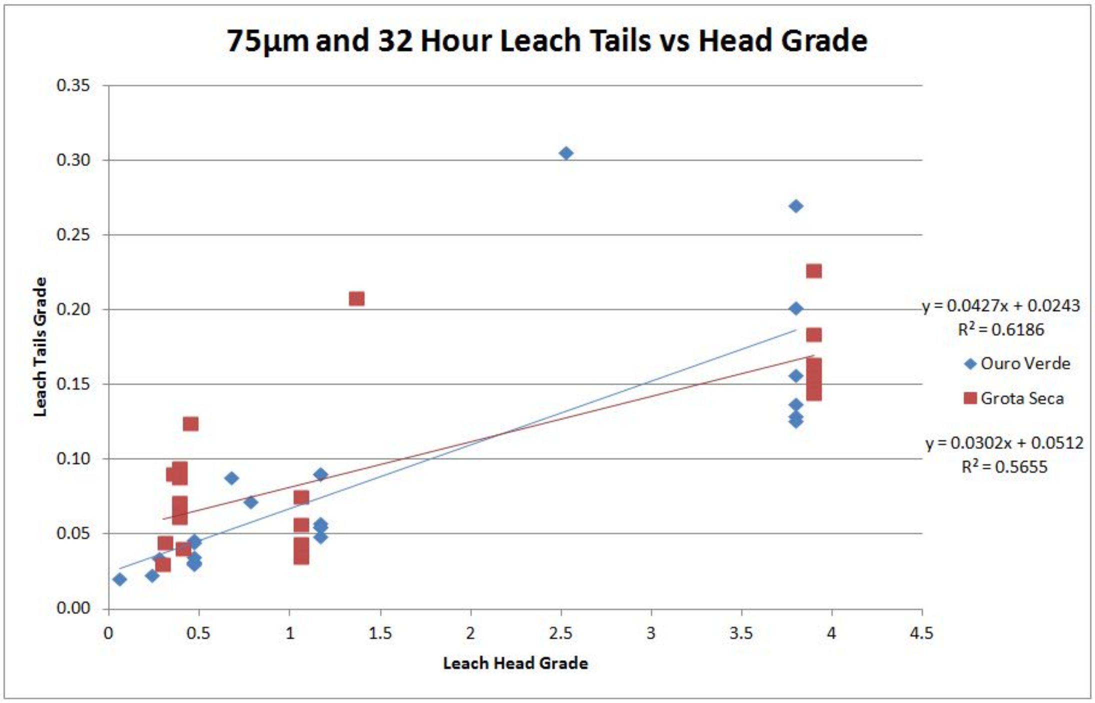
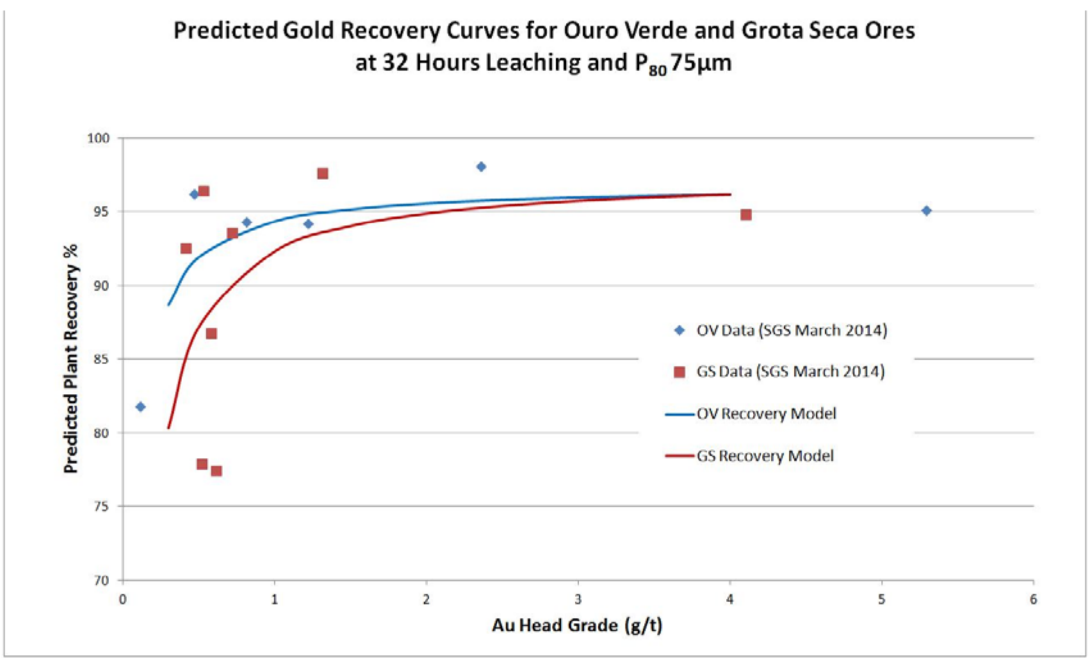


Figure 13-18: Gold Recovery Curves at Design Conditions of 32 Hours and P_{80} 75 um



13.5 Conclusions and Recommendations

13.5.1 Conclusions

The test work is consistent across the various campaigns and laboratories. It also aligns with historical test work not included in this Study. Gold was readily recovered from the samples using conventional cyanide leaching. The leaching kinetics were relatively slow requiring 32 hours to obtain acceptable recoveries. Gravity circuit recoveries were acceptable. Due to long leach times, the inclusion of a gravity circuit followed by intensive leaching of the concentrate will be beneficial in reducing gold tails losses. Optical examination of the leach tails could prove useful in confirming the usefulness of a gravity circuit. Given a grind size of P_{80} 75 µm and 32 hours of leaching time, process plant recoveries in excess of 90% are expected. An adequate plant scale up factor has been applied to the gravity circuit and an allowance of 0.5% overall reduction in recovery has been provided for process plant losses, resulting in a robust prediction of plant metallurgical performance.

Due to low silver head grades, average silver recoveries of 47% and insufficient assaying for inclusion in the resource, silver has not been included in the economic analysis of the project. However, silver should be given consideration when determining activated carbon and elution equipment requirements, sizing of the electro-winning circuit, and the selection of gold room equipment.

Leaching reagent consumptions under design conditions are relatively low ranging from 0.11 to 0.21 kg/t NaCN and 0.32 to 0.58 kg/t $Ca(OH)_2$.

13.5.2 Recommendations

1. Additional continuous cyanide detoxification testing by the SO_2 / air process to verify residence time and reagent requirements and to clarify the circuit configuration;
2. Additional rheology testing with increasing amounts of saprolite mixed with the Ouro Verde and Grota Seca rock;
3. Material flow property testing of the Ouro Verde and Grota Seca rock with saprolite;
4. Detailed final tailings characterization including multi element scan by ICP.

14.0 MINERAL RESOURCE ESTIMATES

14.1 Introduction

The Project is subdivided in two areas: North Block and South Block. The North Block contains the Ouro Verde, Grota Seca, Junction and Greia gold deposits (see Figure 7-2, Figures 10-1 to Figures 10-4). The South Block contains the Itata, Pequi, and Grande gold deposits (see Figure 7-2 and Figure 10-5). The mineral resource model for the South Block was prepared by Belo Sun and was audited by SRK in September 2013. There has been no change to the mineral resource model for South Block. For the North Block, a new mineral resource model was prepared by SRK during the first quarter of 2015 to account for new drilling information and a revision to the geological interpretation. This section is subdivided in two parts. The first part documents the methodology and the key assumptions considered by SRK to prepare the new mineral resource model for the North Block. The second part summarizes the key assumptions used by Belo Sun to prepare the mineral resource model for the South Block and results of the SRK audit.

The resource evaluation reported herein is a reasonable representation of the global gold mineral resources of the Project at the current level of sampling. The mineral resources have been estimated in conformity with the widely accepted CIM *Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines* and are reported in accordance with the Canadian Securities Administrators' National Instrument 43-101. Mineral resources are not mineral reserves and have not demonstrated economic viability. There is no certainty that all or any part of the mineral resource will be converted into mineral reserve.

GEOVIA GEMS™ software (version 6.5) was used by SRK and Belo Sun to construct the geological solids. SRK used a combination of GEMS, Leapfrog™, Gocad, and GSLib™ software to prepare assay data for geostatistical analysis, construct the block model, estimate gold grades, and tabulate mineral resources. The same software tools were used to prepare and audit the mineral resource model for the South Block.

The Mineral Resource Statement for the North Block and the Audited Mineral Resource Statement for the South Block were prepared by Dr. Leuangthong and Dr. Couture, who are independent qualified persons pursuant to National Instrument 43-101. The effective date of the Mineral Resource Statement for the North Block is March 16, 2015. The effective date for the Audited Mineral Resource Statement for the South Block is October 1, 2013.

14.2 North Block, Volta Grande

14.2.1 Mineral Resource Estimation Methodology

The mineral resource model for the North Block considers 316 core boreholes (85,420 m) for the Ouro Verde deposit, 489 core boreholes (117,046 m) and 59 reverse circulation boreholes (11,225 m) for the Grota Seca deposit. These drilling data also inform the Junction and Greia area.

The construction of the North Block mineral resource model was a collaborative effort between Belo Sun and SRK staff from the Belo Horizonte and Toronto offices. Thiago Bonas and Stephane Amireault, of Belo Sun, provided technical support and assistance. Mr. Bonas constructed the medium and high grade wireframes and provided input to the modelling of the low and very low grade wireframes created by SRK. Mr. Amireault provided input to all stages of the mineral resource modelling. The data review, geological modelling, estimation sensitivity analyses, and classification were performed by Camila Passos, PGeo (APGO#2431), Dr. Lars Weiershäuser, PGeo (APGO#1504), Dorota El-Rassi, PEng (PEO#100012348), and Dr. Oy Leuangthong, PEng (PEO#90563867). The geostatistical review was performed by Dr. Leuangthong. The pit optimization review was conducted by Goran Andric, PEng. The overall process was reviewed by Dr. Jean-Francois Couture, PGeo (APGO#0196).

The evaluation of mineral resources involved the following procedures:

- Database compilation and verification;
- Construction of explicit wireframe models for major units, using stratigraphy, geological indices, and structural trends;
- Definition of geostatistical resource domains;
- Data conditioning (compositing and capping) for geostatistical analysis and variography;
- Selection of estimation strategy and estimation parameters;
- Block modelling and grade interpolation;
- Validation, classification, and tabulation;
- Assessment of “reasonable prospects for eventual economic extraction” and selection of reporting assumptions;
- Preparation of the Mineral Resource Statement.

The following sections summarize the methodology and assumptions made by SRK to construct the mineral resource model.

14.2.2 Resource Database

The database used to evaluate the project’s mineral resources includes 316 core boreholes (85,420 m) for the Ouro Verde deposit, and 489 core boreholes (117,046 m) and 59 reverse circulation boreholes (11,225 m) for the Grota Seca deposit. These drilling data also inform the Junction and Greia area. The drilling data were collected by TVX Gold Inc. (1996 to 1998), Verena Minerals Corp. (2006 to 2008), and Belo Sun (since 2010). TVX used BQ and NQ core drilling equipment in fresh rock and HQ core in weathered material. Verena’s and Belo Sun’s core drilling utilized HQ equipment in weathered material and NQ in fresh rock. Table 14-1 provides a summary of available boreholes for Ouro Verde and Grota Seca.

Table 14-1: Summary of Available Data for North Block, Volta Grande

Deposit	Core		Reverse Circulation	
	Count	Length m	Count	Length m
Ouro Verde	316	85,420		
Grota Seca	489	117,046	59	11,225
Total	805	202,466	59	11,225

The effective dates of the drilling database for the various deposits are:

- June 17, 2014 for Grota Seca;
- June 24, 2014 for Ouro Verde.

All borehole collars were surveyed according to UTM coordinates (SAD69 datum, Zone 22S). TVX and Verena completed down-hole surveys at intervals of approximately 50 m. Belo Sun's down-hole surveys were completed at 3-m intervals using a Maxibore down-hole survey tool. Core recovery is good, exceeding 95% within the auriferous intervals.

Based on the three previous site visits completed by SRK between April 2011 and October 2012, SRK believes that drilling, logging, core handling, core storage, and analytical quality control protocols used by Belo Sun exceed generally accepted industry best practices. As a result, SRK considers that the exploration data collected by Belo Sun and previous project operators are of sufficient quality to support mineral resource evaluation.

14.2.3 Geological Interpretation and Modelling

The gold mineralization at the Project occurs primarily in fresh intrusive rock; subordinate mineralization occurs in the near surface saprolite. Gold occurs in quartz veins forming a stack of mineralized zones up to 1 km in strike length, from the surface to approximately 400 m in depth. The true thickness of the gold mineralization ranges from a few m up to 50 m. In general, the gold mineralization is associated with:

- Intense silicification with fine-grained sulphide (predominantly arsenopyrite) within strongly sheared diorite, such as at the Grota Seca area;
- Weak to moderate silicification in diorite with minor sulphide (mainly pyrite), such as at the Ouro Verde area;
- Intense silicification overprinted by sulphide alteration (pyrite) and potassium alteration (sericitization).

Prior to 2013, gold mineralization at Ouro Verde and Grota Seca was modelled at a single cut-off value of 0.5 g of gold per tonne (g/t Au). The boundaries of the gold mineralization were based on a combination of lithological and assay information and also considered sulphide content, and abundance of quartz veining and/or silification. The following criteria were used to define the early grade domains:

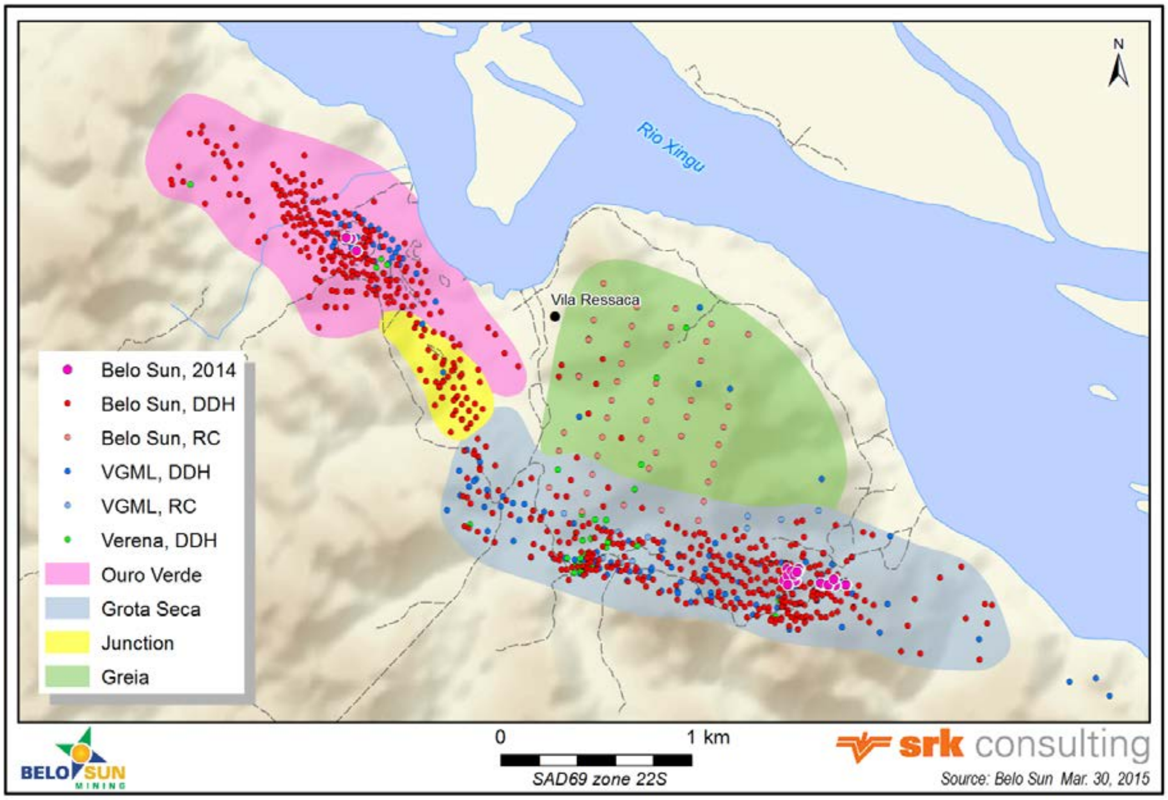
- Minimum average grade of composite interval (hanging wall to footwall contact) is 0.5 g/t Au for saprolite or unweathered rock;
- Maximum length of internal dilution within mineralized interval is 3.0 m;
- Generally, the minimum thickness of an interval is 2.0 m and should be composed of at least two assayed intervals;
- The trend of mineralization is generally assumed to be subparallel to the deposit scale foliation strike and dip trends.

The domains based on these criteria eventually became the Medium Grade domains (MG) that include the bulk of the gold mineralization in the North Block.

In 2013, Belo Sun identified a number of areas at Ouro Verde and Grota Seca where higher grade borehole intersections allowed for the modelling of additional High Grade (HG) domains within the MG domains. These HG domains were based on a 1.0 g/t Au threshold. Two new HG domains were defined: (1) within Ouro Verde MG Domain 2; and (2) within Grota Seca MG Domain 1. At the same time, Belo Sun introduced a new Low Grade domain (LG) to recognize that there is a broad halo of low grade gold mineralization surrounding the MG domains. This LG domain was based on a threshold of 0.25 g/t Au and on the interpretation and extrusion of the boundary of the gold mineralization on vertical sections spaced at 25 m. Similar to previous mineral resource models, Belo Sun used a lithological assay-based approach to define the boundaries of the gold mineralization in the Ouro Verde and Grota Seca.

After careful review of the geological and analytical data during the summer of 2014, Belo Sun remodelled substantial parts of the grade domains, introducing several new domains. The remodelling of the geology and grade domains was a collaborative effort between Belo Sun and SRK during November and December 2014.

Figure 14-1: Plan VIew Showing the Ouro Verde, Junction, Grota Seca, and Greia Deposits in the North Block of the Volta Grande Project



The resulting model of the gold mineralization in the North Block recognizes four distinct geographic mineralized areas, which are in turn subdivided into several grade domains: Ouro Verde, Grota Seca, Junction, and Greia (see Figure 14-1).

In previous mineral resource models, Junction was included primarily in Ouro Verde, while Greia was part of Grota Seca. The separation of Junction recognizes a transition zone between Ouro Verde and Grota Seca, where the general dip of the gold mineralization changes from steeply dipping in Ouro Verde to subvertical in Grota Seca. In addition, Belo Sun has recognized slight variations in mineralization styles between Grota Seca and Ouro Verde. These changes in geology coupled with the overall change in strike of the gold mineralization justify separating Junction from Ouro Verde and Grota Seca.

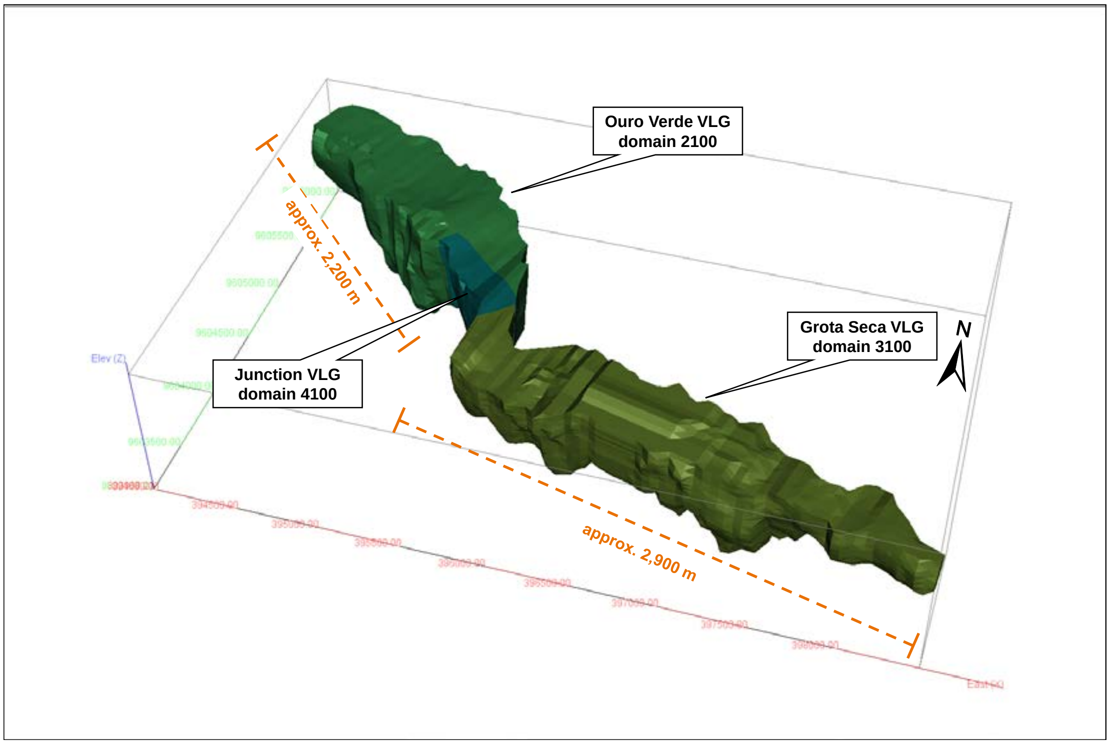
In past models, the Greia region has always represented an area with future exploration potential. The controls on the distribution of the gold mineralization in the Grea area remains poorly understood. Defining Greia as a separate area recognizes the lower confidence in the continuity of the gold mineralization relative to Ouro Verde and Grota Seca.

Within each region, four grade domains were defined:

1. Very Low Grade (VLG) domain is introduced to broadly encompass the entire mineralized region. This was modelled by SRK.
2. Low Grade (LG) domain that is completely remodelled, corresponding to a 0.15 g/t Au threshold. This was modelled by SRK with input from Belo Sun on the chosen grade threshold.
3. Medium Grade (MG) domain that forms the core of the gold mineralization. This was modelled by Belo Sun.
4. High Grade (HG) domains within Ouro Verde and Grota Seca, which were modelled by Belo Sun.

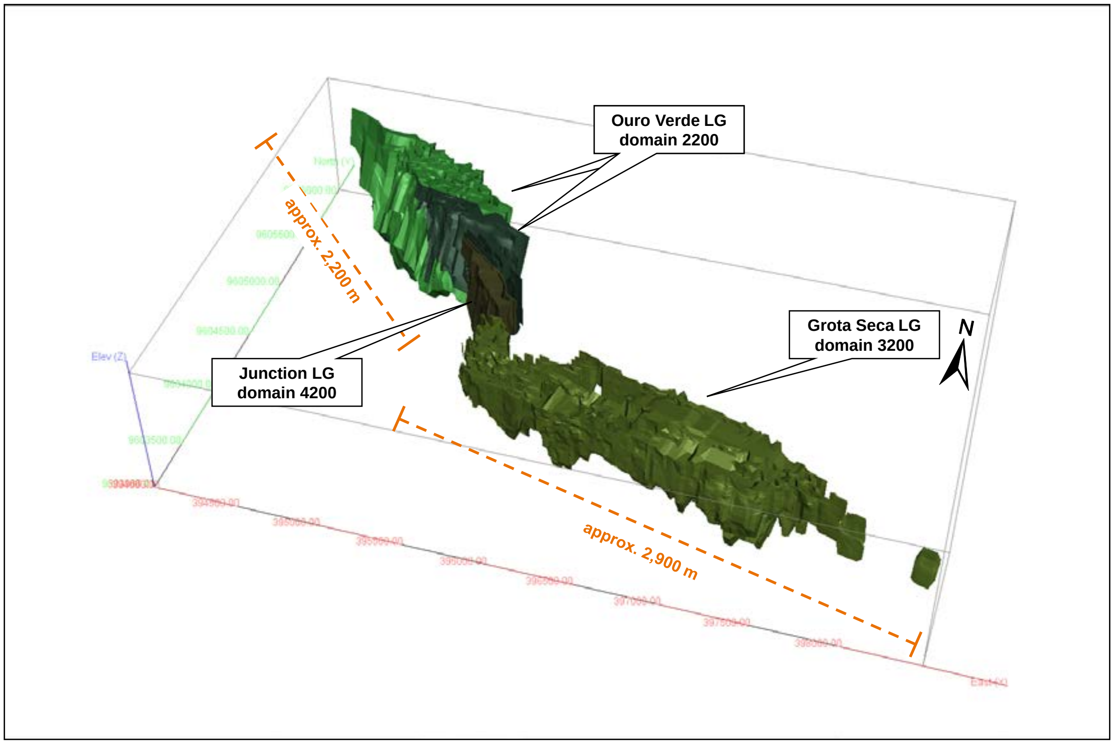
These changes were introduced to capture more accurately the observed grade variation in the Ouro Verde and Grota Seca deposits. Due to time constraints, the MG domains remain largely unchanged from the previous resource model, except where the 17 boreholes were drilled in 2014 (see Figure 14-1). SRK regrouped the wireframes to account for similarities in strike and dip continuity of the gold mineralization. The total number of MG domains after regrouping decreased slightly from the previous model. Similar to previous mineral resource models, separate grade domains were constructed in the thin saprolite overlying the fresh rock.

Figure 14-2: Oblique View Looking North Showing the Very Low Grade Domains (VLG) Forming a Single Continuous Wireframe Encompassing the Ouro Verde, Junction, Grota Seca Gold Deposits



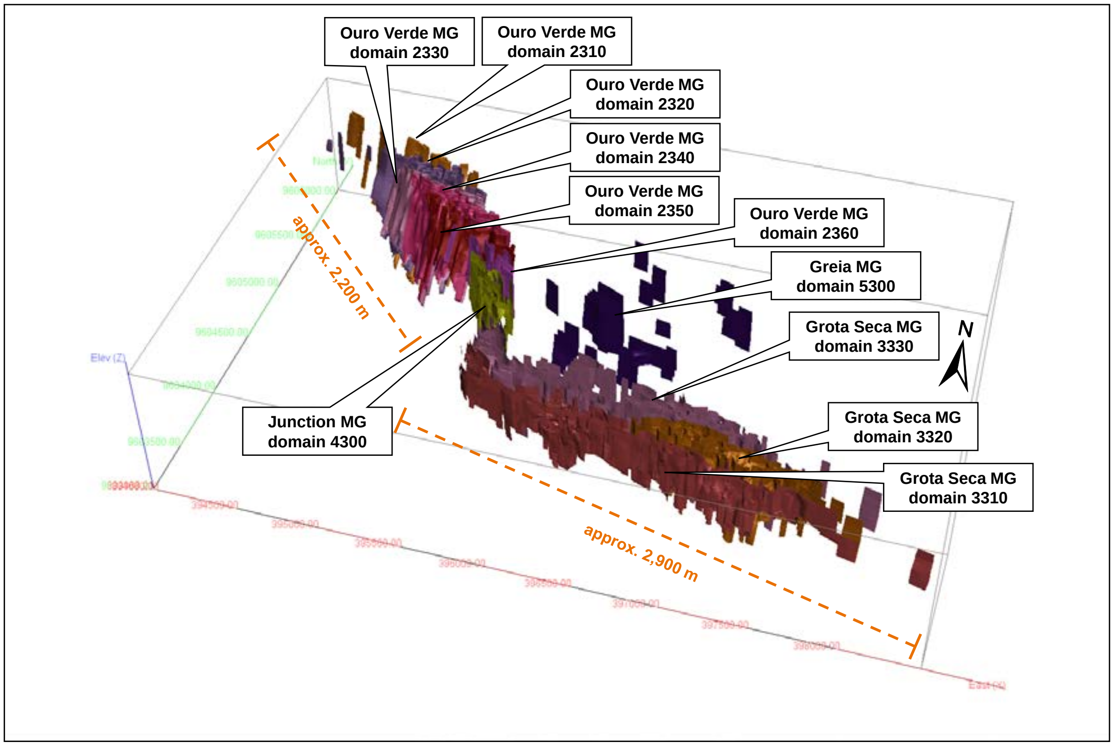
The VLG domain (Figure 14-2) aims to account for gold mineralization observed distal to the main mineralized bodies but within the rock volume largely affected by the proposed open pit mine. This domain was defined using a threshold of 0.1 g/t Au but also considered the occurrence of sulphide and quartz veining. During modelling, waste intervals up to 50 m thick were allowed to ensure that the domain captures as many borehole intervals as possible. SRK used Leapfrog to generate initial implicit wireframes that were used as guides to construct explicit wireframes on vertical sections. The VLG domain is based on contours digitized on vertical section every 50 m. Care was taken that all MG domains were included fully, resulting in a final wireframe with a longer down-dip extent than suggested by Leapfrog modelling. The VLG domain comprises one contiguous wireframe; it was subdivided into subdomains to provide consistent domain nomenclature for Ouro Verde, Grota Seca, and the Junction area.

Figure 14-3: Oblique View Looking North Showing the Low Grade Domains (LG) defined in the Ouro Verde, Junction, Grota Seca Gold Deposits



The LG domain is based on a threshold of 0.15 g/t Au, but, unlike the VLG domain, does not allow inclusion of large waste intervals. To facilitate modelling, Belo Sun queried the assay database and tagged contiguous sample intervals at or above 0.15 g/t Au. This information was shown during sectional interpretation of the LG domain and used as strict guide to produce explicit wireframes. Rings were digitized on vertical sections every 25 m, snapped to borehole intersections and connected into wireframes. The resulting wireframes (Figure 14-3) enclose completely the MG domains and follow the local strike and dip of the MG domains more closely and capture local changes in thickness

Figure 14-4: Oblique View Looking North Showing the Medium Grade Domains (MG) Modelled in the Ouro Verde, Junction, Grota Seca, and Greia Deposits

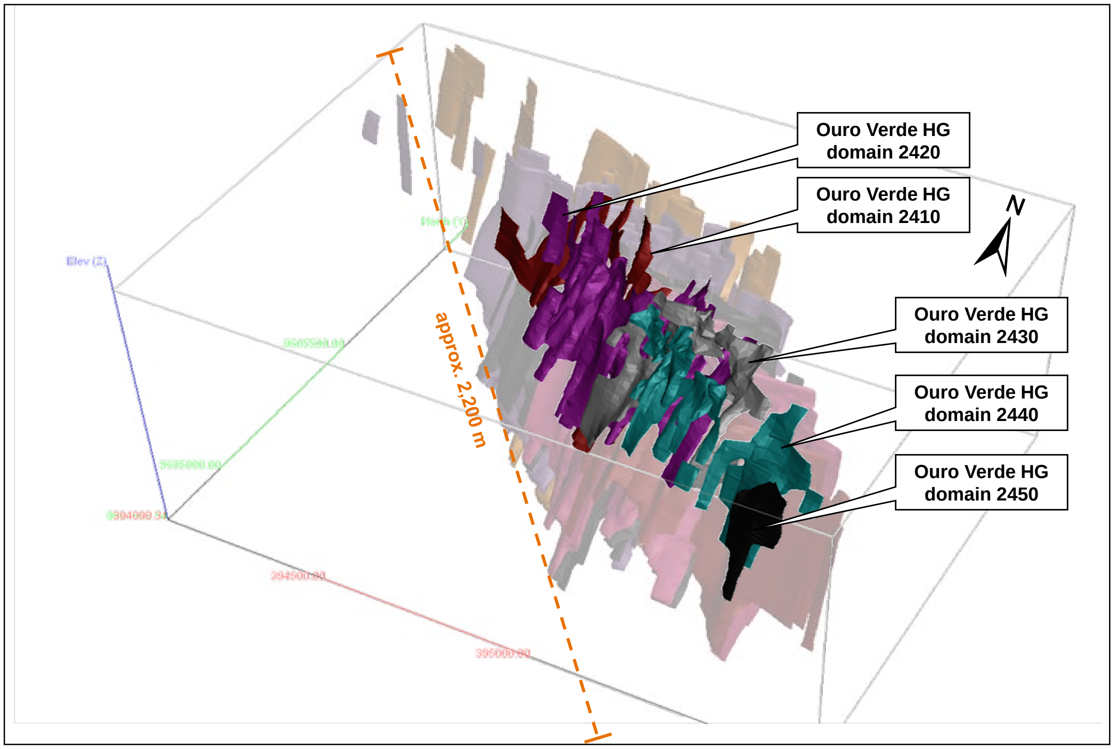


The MG domains (Figure 14-4) are unchanged from the previous mineral resource model. They were defined based on auriferous intervals associated with silicification, sulphide, or quartz veining using the following criteria:

- Minimum average grade of composite interval (hanging wall to footwall contact) is 0.5 g/t Au for saprolite or unweathered rock;
- Maximum length of internal dilution within mineralized interval is 3.0 m;
- Generally, the minimum thickness of an interval is 2.0 m and should comprise at least two contiguous sample intervals;
- The strike continuity of the gold mineralization is generally assumed to be subparallel to the regional foliation.

The previously modelled domains were regrouped to simplify grade modelling. The new domain grouping comprises six domains in fresh rock at Ouro Verde, three at Grota Seca, one domain in the Junction area, and one domain in the Greia area. In all, there are 11 MG domains across the three deposits and correspond to the zones considered in previous mineral resource models that were independently audited by SRK.

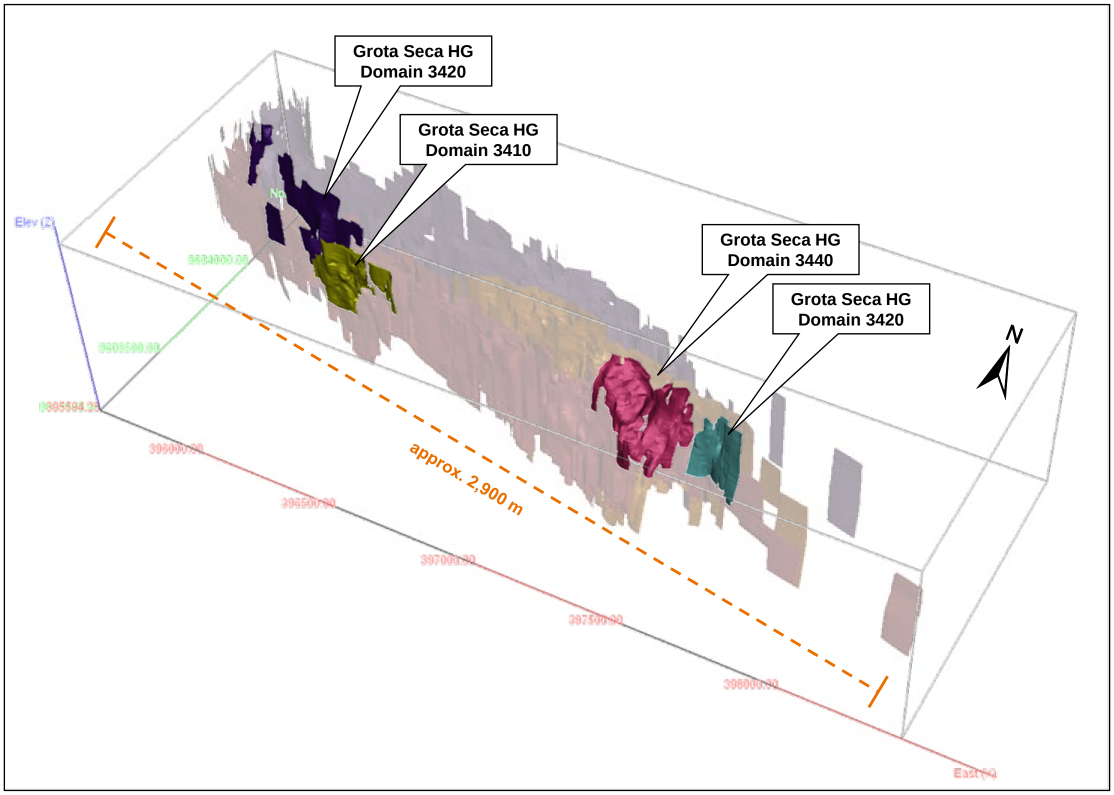
Figure 14-5: Oblique View Looking North Showing the High Grade Domains (HG) Modelled in the Ouro Verde Deposit



(The MG domains are shown for reference as a shaded background.)

The HG domains changed significantly from the previous model. Nine HG domains were defined, 5 in Ouro Verde and 4 in Grota Seca (Figure 14-5 and Figure 14-6, respectively). The domains were modelled by Belo Sun based on a threshold of 1 g/t Au with minimal waste inclusion. The wireframing strategy for the HG domains is the same as the one used for the MG domains.

Figure 14-6: Oblique View Looking North Showing the High Grade Domains (HG) Modelled in the Grota Seca Deposit



(The MG domains are shown for reference as a shaded background.)

Table 14-2 provides a listing of the domains constructed for the Project mineral resource model, including rock codes found within the GEMS project.

Table 14-2: Domains with Principal Orientation Angles for Ouro Verde, Grota Seca, Junction, and Greia

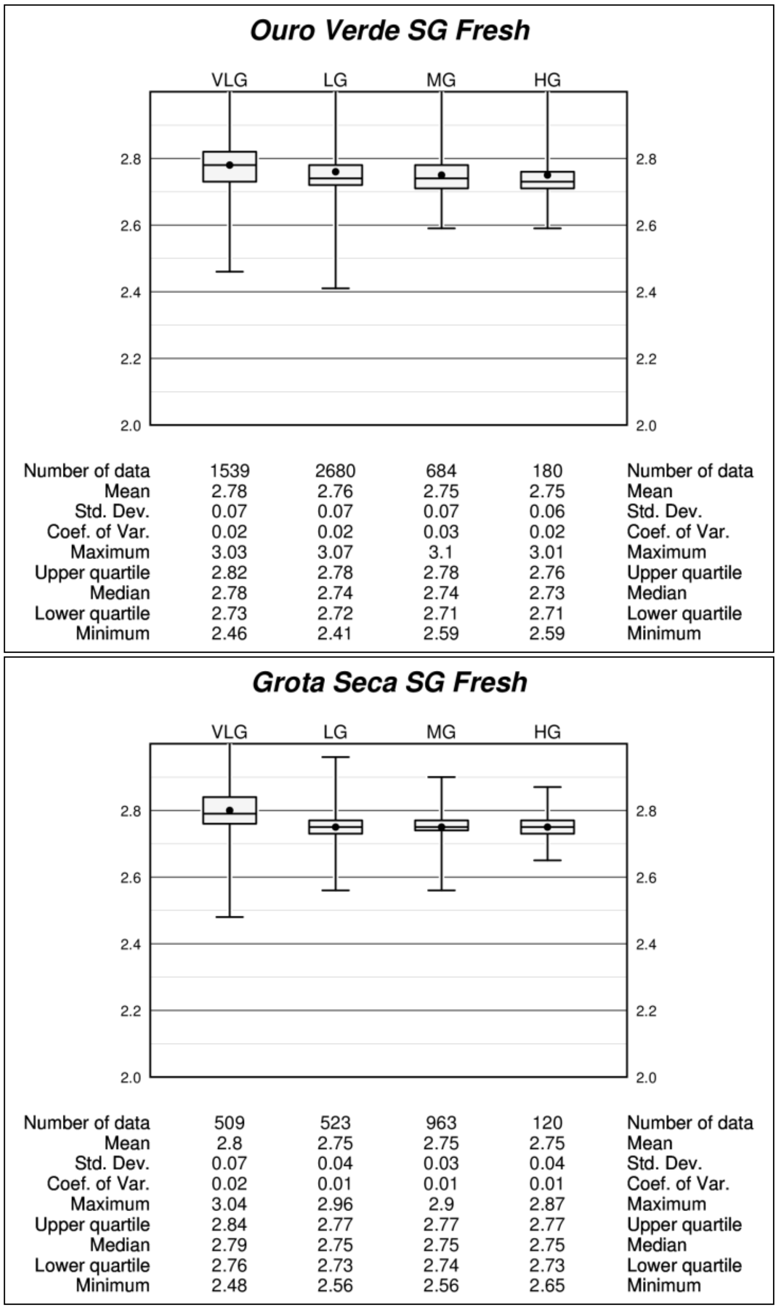
Area	Grade Domain	Sub-Domain Count	Rock Code	GEMS Rotation (ADA)		
				Azimuth °	Dip °	Azimuth °
Ouro Verde	VLG		2100	215	-70	305
	LG	1	2210	210	-60	300
		2	2220	205	-70	295
	MG	1	2310	198	-50	288
		2	2320	198	-55	288
		3	2330	198	-60	288
		4	2340	204	-65	294
		5	2350	204	-70	294
		6	2360	210	-80	300
	HG	1	2410	198	-50	288
		2	2420	198	-55	288
		3	2430	198	-60	288
		4	2440	204	-65	294
		5	2450	204	-70	294
Grota Seca	VLG		3100	195	-85	285
	LG		3200	195	-85	285
	MG	1	3310	195	-90	285
		2	3320	195	-80	285
		3	3330	195	-85	285
	HG	1	3410	195	-90	285
		2	3420	195	-80	285
		3	3430	195	-85	285
		4	3440	185	-65	275
Junction	VLG		4100	225	-85	315
	LG		4200	225	-85	315
	MG		4300	225	-85	315
Greia	MG		5300	195	-90	285

14.2.4 Specific Gravity

Specific gravity was measured by Belo Sun using a standard weight in water/weight in air methodology on core from complete sample intervals. The specific gravity database contains 5,531 and 2,360 measurements on fresh rock from Ouro Verde and Grota Seca, respectively. Figure 14-7 shows boxplots of the specific gravity measurements by grade domains within the two regions. For both areas, the core of the mineralization is found mostly in the HG, MG, and LG domains, where average specific gravities are constant at 2.75. As such, SRK applied this average specific gravity of 2.75 to all fresh rock domains.

Only 48 specific gravity measurements were taken on saprolite material for all deposits combined. The data yield an average specific gravity of 1.36. While the saprolite specific gravity data are scarce, the bulk of the mineral resources occur in fresh rock. Hence the risk associated with saprolite specific gravity is considered low.

Figure 14-7: Boxplots of Specific Gravity by Grade Domain in Ouro Verde (top) and Grota Seca (bottom)



14.2.5 Compositing, Statistics, and Capping

Table 14-3 summarizes the assay statistics for the North Block of the Project on a by deposit and by grade domain basis.

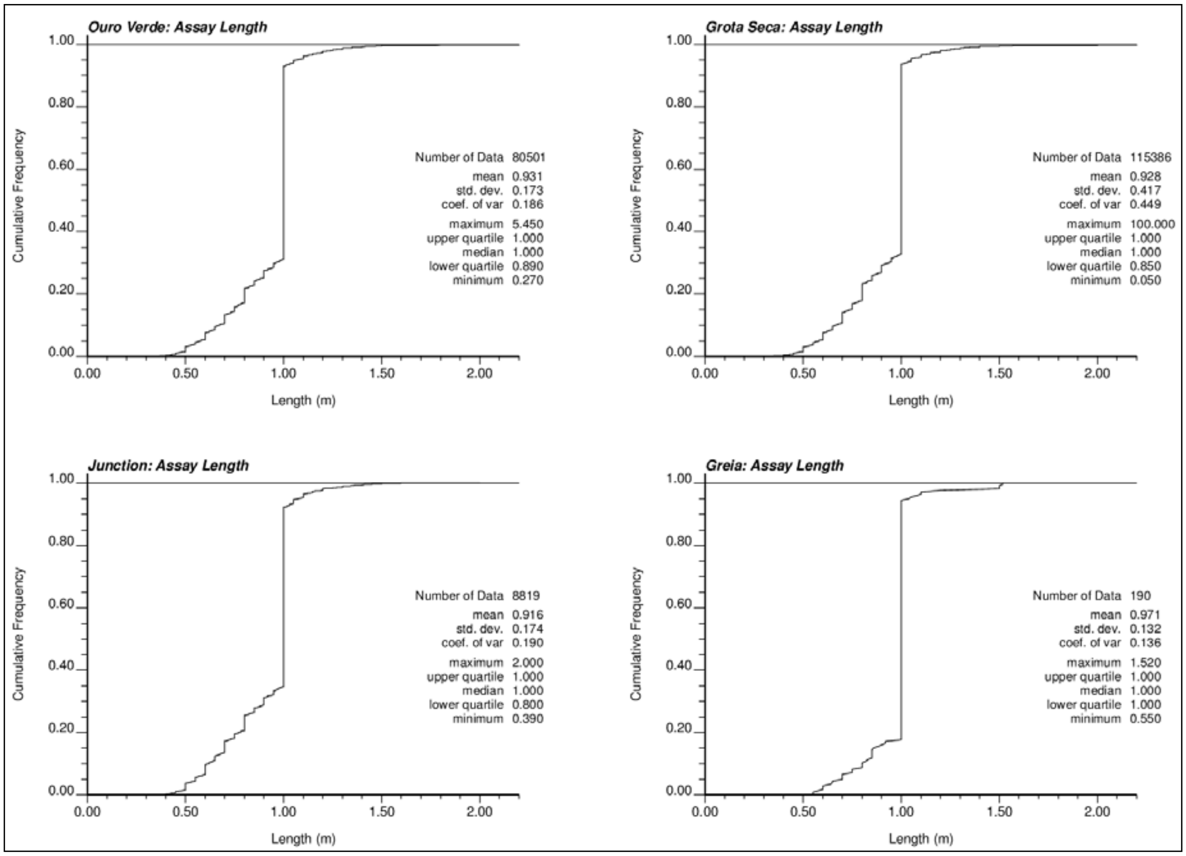
Figure 14-8 shows the distribution of assay lengths by deposit. Overall, approximately 93% of assays within all four deposits are less than 1 m in length, and virtually all samples are less than 2 m long.

Table 14-3: Summary Assay Statistics for North Block (length weighted)

Deposit	Rock Type	Zone	Assays					
			Count	Mean	StDv.*	Minimum	Median	Maximum
Ouro Verde	All	2000	80,501	0.398	2.561	0	0.085	299.500
	VLG	2100	26,882	0.061	0.170	0	0.025	8.064
		2170	2,523	0.092	0.226	0	0.048	6.412
	LG	2200	35,420	0.196	0.457	0	0.109	26.900
		2270	2,505	0.244	0.366	0	0.180	15.700
	MG	2300	9,953	1.468	5.522	0.003	0.582	277.500
		2370	932	1.305	3.052	0.040	0.706	50.500
	HG	2400	2,259	3.504	9.446	0.003	1.534	299.500
		2470	27	4.789	7.641	0.764	2.568	41.100
Grota Seca	All	3000	115,386	0.358	2.275	0.001	0.071	415.800
	VLG	3100	37,609	0.073	0.282	0.001	0.023	20.500
		3170	3,292	0.095	0.264	0.001	0.037	8.430
	LG	3200	55,367	0.209	1.042	0.001	0.089	153.300
		3270	2,215	0.210	0.209	0.001	0.164	3.888
	MG	3300	14,151	1.432	5.165	0.001	0.618	415.800
		3370	956	0.993	1.279	0.034	0.729	28.970
	HG	3400	1,761	3.550	9.083	0.005	1.594	227.000
		3470	35	3.325	4.832	0.603	2.092	29.640
Junction	All	4000	8,819	0.227	1.347	0.003	0.047	67.300
	VLG	4100	3,913	0.072	0.520	0.003	0.023	24.600
		4170	509	0.104	0.284	0.003	0.032	4.797
	LG	4200	3,307	0.163	0.420	0.003	0.068	9.800
		4270	331	0.232	0.264	0.005	0.161	2.500
	MG	4300	654	1.426	3.520	0.013	0.590	55.700
		4370	105	1.851	7.135	0.041	0.742	67.300
Greia	All	5000	190	1.268	1.777	0.012	0.740	14.500
	MG	5300	137	1.415	2.040	0.012	0.759	14.500
		5370	53	0.902	0.694	0.114	0.694	3.869

* StDv. = Standard Deviation

Figure 14-8: Sample Length Distribution within LG, VLG, MG, and HG Domains at Ouro Verde (top left), Grota Seca (top right), Junction (bottom left), and Greia (bottom right)



Previous mineral resource models were based on 1-m composites. There are several reasons to consider longer composite lengths. These include a better understanding of change-of-support on grade variability prior to the block size support, assay intervals in excess of 1 m will not require decomposition to yield more than a single composite, and longer length composites introduce some support-related dilution that mitigate the impact of any extreme high grade assay intervals in block estimation.

SRK assessed the sensitivity of compositing to 1, 2, and 3 m by comparing the average grade before and after compositing and considering the number of composites that would be available for mineral resource estimation. As drilling in the North Block is quite extensive, the scarcity of longer-length composites available for mineral resource estimation is not a concern. The block size for mineral resource estimation is also considered in the choice of composite length. Previous models used blocks of 6 by 6 by 10 m, while the current model is based on 5 X 5 X 5 m (see Section 14.2.7). SRK considers that a composite length of 2 m achieves a better understanding of support variability while maintaining a sufficient number of composites for grade estimation in the smallest grade domain.

Residual length composites were evaluated to determine if they should remain in the database. The general concern is that shorter composite intervals may be associated with higher grades, and the direct use of these composites in mineral resource estimation may lead to overestimation. This is particularly concerning if the length of the composites is not used as a weight in the estimation; as most general mine planning packages do not allow the use of weighting composite grades by length, this may be a risk in implementation. SRK reviewed the impact of residual composites by comparing the length-weighted average of assay intervals against the unweighted average of composite grades when residual composites of 10, 25, and 50% (0.2, 0.5, and 1.0 m) lengths were removed from the database. This was performed for all regions except for Grota Seca, where solid body modelling was ongoing at the time of this analysis.

The results for Ouro Verde indicate that there is 8, 5, and -1% difference in the mean grade relative to the length-weighted average of the informing assays when excluding intervals shorter than 10, 25, and 50% of the composite lengths, respectively. This corresponds to 1, 2, and 5% reduction in the number of available composites. Results for Junction are comparable to those for Ouro Verde. The omission of composites shorter than 25% of the length (0.5 m) provides a good balance between matching length-weighted assay mean grades and reducing the number of omitted composites. Thus, SRK chose to exclude composites shorter than 25% of the composite length (or 0.5 m) in subsequent data analysis and block grade estimation.

To further limit the influence of high gold grade outliers during the grade estimation, SRK chose to cap composites as these are the data used explicitly in estimation. Capping was performed by grade domain and by rock type (saprolite and fresh) within each of the four regions. SRK relied on a combination of probability plots, decile analysis, capping sensitivity plots, and three-dimensional visualization to determine the capping values. Separation of grade populations characterized by inflections in the probability plot or gaps in the high tail of the grade distribution were indicators of potential capping values. Decile analysis and spatial clustering were then used to confirm the reasonableness of capped threshold. The saprolite zones within Greia, Ouro Verde HG, and Grota Seca HG were not capped. Selected capping values are outlined in Table 14-4; Appendix C shows relevant capping plots on a by grade domain basis. Composite statistics before and after capping are provided in Table 14-5.

Table 14-4: Gold Capping Values for North Block

Deposit	Rock Type	Zone	Capped Value	Probability of Cap Value %	Count Capped
Ouro Verde	VLG	2100	1.1	99.80%	25
		2170	1.8	99.72%	4
	LG	2200	4.5	99.93%	13
		2270	0.8	97.85%	29
	MG	2300	21.0	99.55%	24
		2370	11.0	98.89%	5
	HG	2400	21.0	98.05%	22
		2470	-	-	0
Grota Seca	VLG	3100	1.7	99.82%	32
		3170	0.8	99.31%	11
	LG	3200	3.0	99.92%	19
		3270	0.8	99.29%	8
	MG	3300	14.0	99.27%	57
		3370	4.0	99.03%	5
	HG	3400	21.0	98.85%	9
		3470	-	-	0
Junction	VLG	4100	0.7	99.39%	11
		4170	0.3	96.26%	9
	LG	4200	0.8	97.82%	34
		4270	0.6	95.99%	7
	MG	4300	4.5	96.63%	10
		4370	5.0	95.26%	2
Greia	MG	5300	5.5	97.05%	2
		5370	-	-	0

Table 14-5: Summary Statistics for Uncapped and Capped Composites (length weighted)

Deposit	Domain	Zone	Composites						Capped Composites					
			Count	Mean	StDv.*	Min.*	Med.*	Max.*	Count	Mean	StDv.*	Min.*	Med.*	Max.*
Ouro Verde	All	2000	38,693	0.40	1.76	0.00	0.11	139.74	38,693	0.37	1.20	0.00	0.11	21.98
	VLG	2100	12,824	0.06	0.11	0.00	0.03	4.00	12,824	0.06	0.09	0.00	0.03	1.10
		2170	1,285	0.09	0.17	0.00	0.05	3.38	1,285	0.09	0.15	0.00	0.05	1.80
	LG	2200	16,909	0.20	0.31	0.00	0.14	12.57	16,909	0.20	0.25	0.00	0.14	4.50
		2270	1,325	0.24	0.33	0.00	0.19	15.69	1,325	0.23	0.16	0.00	0.19	0.80
	MG	2300	4,771	1.46	3.76	0.01	0.70	139.74	4,771	1.37	2.33	0.01	0.70	21.00
		2370	516	1.30	2.39	0.05	0.76	29.66	516	1.20	1.54	0.05	0.76	11.00
	HG	2400	1,049	3.49	5.87	0.17	2.01	84.10	1,049	3.21	3.70	0.17	2.01	21.00
		2470	14	4.79	5.42	0.82	2.84	21.98	14	4.79	5.42	0.82	2.84	21.98
Grota Seca	All	3000	55,152	0.36	1.46	0.00	0.09	113.95	55,152	0.34	1.00	0.00	0.09	21.00
	VLG	3100	17,943	0.07	0.18	0.00	0.03	10.27	17,943	0.07	0.14	0.00	0.03	1.70
		3170	1,683	0.10	0.23	0.00	0.04	4.41	1,683	0.09	0.13	0.00	0.04	0.80
	LG	3200	25,45	0.17	0.25	0.00	0.11	18.43	25,454	0.17	0.21	0.00	0.11	3.00
		3270	1,154	0.21	0.16	0.00	0.17	1.37	1,154	0.21	0.15	0.00	0.17	0.80
	MG	3300	7,552	1.44	3.08	0.01	0.75	109.74	7,552	1.34	1.93	0.01	0.75	14.00
		3370	534	1.02	1.16	0.09	0.76	16.09	534	0.96	0.65	0.09	0.76	4.00
	HG	3400	814	3.54	5.90	0.11	2.13	113.95	814	3.31	3.61	0.11	2.13	21.00
		3470	18	3.29	3.72	1.27	2.05	17.67	18	3.29	3.72	1.27	2.05	17.67
Junction	All	4000	4,135	0.23	0.90	0.00	0.06	33.86	4,135	0.19	0.46	0.00	0.06	5.00
	VLG	4100	1,830	0.07	0.46	0.00	0.03	18.99	1,830	0.06	0.10	0.00	0.03	0.70
		4170	249	0.10	0.24	0.00	0.04	2.59	249	0.07	0.08	0.00	0.04	0.30
	LG	4200	1,539	0.16	0.25	0.00	0.09	3.40	1,539	0.15	0.16	0.00	0.09	0.80
		4270	168	0.23	0.22	0.01	0.17	1.48	168	0.22	0.16	0.01	0.17	0.60
	MG	4300	293	1.41	2.00	0.07	0.80	18.88	293	1.24	1.16	0.07	0.80	4.50
		4370	56	1.85	4.73	0.08	0.77	33.86	56	1.20	1.18	0.08	0.77	5.00
Greia	All	5000	101	1.26	1.18	0.17	0.86	6.54	101	1.24	1.13	0.17	0.87	5.50
	MG	5300	72	1.41	1.34	0.17	1.02	6.54	72	1.39	1.28	0.17	1.02	5.50
		5370	29	0.89	0.50	0.23	0.81	2.11	29	0.89	0.50	0.23	0.81	2.10

* StDv. = Standard Deviation; Min. = Minimum; Med. = Median; Max. = Maximum

14.2.6 Variography

SRK used the Geostatistical Software Library (GSLib, Deutsch and Journel, 1998) to calculate and model variograms for the grade domains within each deposit. For each zone, SRK assessed three different spatial metrics: (1) traditional semivariogram of original gold, (2) correlogram of original gold, and (3) traditional semivariogram of normal scores of gold.

Within each grade domain, SRK calculated the spatial correlation using the entire grade domain database for the fresh rock within that deposit, based on the main orientation of the grade domain. Sub-domain orientations were also assessed (see Table 14-2 for orientation angles). The orientation that yielded the most continuous and/or inferable model was chosen for variogram fitting. With the exception of the Junction area, all other grade domains within Ouro Verde and Grota Seca were modelled using the traditional variogram. In the Junction area, the fitted model was based on back-transformation of the normal scores variogram and considered composites from all Junction grade domains. All gold variograms for each grade domain within North Block are provided in Table 14-6 and Appendix D. There are far fewer saprolite composites than fresh rock composites. SRK verified that reliable saprolite variograms were not possible given the thin nature of this zone. The fresh rock variograms within a grade domain were applied to the corresponding saprolite domain.

Table 14-6: Summary of Belo Sun Variogram Model Parameters

Area	Grade Domain	Variogram Model						
		Nugget*	Structure Number	Type	CC*	Range X m	Range Y m	Range Z m
Ouro Verde	VLG	0.1	1	Exponential	0.70	80	60	5
			2	Spherical	0.20	200	500	5
	LG	0.2	1	Exponential	0.35	50	25	2
			2	Spherical	0.25	140	25	50
			3	Spherical	0.20	140	120	50
	MG	0.2	1	Exponential	0.50	25	80	2
			2	Spherical	0.30	200	80	15
	HG	0.2	1	Exponential	0.30	80	40	2
			2	Spherical	0.15	120	40	5
			3	Spherical	0.35	120	250	5
Grota Seca	VLG	0.1	1	Spherical	0.50	8	20	40
			2	Spherical	0.40	25	500	400
	LG	0.2	1	Exponential	0.50	65	10	17
			2	Spherical	0.30	150	120	17
	MG	0.2	1	Exponential	0.40	50	30	55
			2	Spherical	0.40	300	300	55
	HG	0.15	1	Spherical	0.45	45	40	6
			2	Spherical	0.40	80	80	6
Junction	VLG, LG, MG	0.2	1	Exponential	0.20	5	25	5
			2	Exponential	0.60	45	110	50
Greia	MG	0.2	1	Exponential	0.40	50	30	55
			2	Spherical	0.40	300	300	55

* Standardized to a sill of 1.0

14.2.7 Block Model Parameters

In discussions with Belo Sun, the block size in the North Block was reduced from 6.0 X 6.0 X 10.0 m to 5.0 X 5.0 X 5.0 m. This change to a smaller block size was motivated by a desire to conform the block geometry to the thin and local variations found within the MG domain that contains the bulk of the gold mineralization, particularly in Grota Seca where the gold mineralization exhibits a sigmoidal shape.

A rotated block model was created using GEMS, with a rotation angle of -17˚. The block model coordinates are based on the local UTM grid (SAD 69 datum, Zone 22S).

Table 14-7 summarizes the block model definition.

Table 14-7: North Block GEMS Block Model Definition

	Block Size m	Origin* m	Block Count
X	5	393,205	1,110
Y	5	9,604,125	460
Z	5	290.00	220

* SAD 69 datum, Zone 22S

SRK populated grades for each of the grade domains into a percent block model. The final block model delivered to Belo Sun includes a fully diluted grade attribute that provides a single grade per block that takes into account the percent of all grade domains within that block.

14.2.8 Estimation

The block model was populated with a gold value using ordinary kriging and three estimation runs with progressively relaxed search ellipsoids and data requirements. Table 14-8 summarizes the data requirements for fresh rock within each grade domain and Table 14-9 summarizes similar information for saprolite zones. The first two estimation passes are based on an octant search with search radii up to the variogram range. The third pass uses an ellipsoidal search and generally fills the rest of the blocks within the fresh rock domain.

The estimation ellipse ranges and orientations are based on the variogram models developed for the various grade domains within each deposit. Pass 1 search ellipsoid is based nominally on the inflection point of the variogram model, and for the most part corresponds to approximately 70 to 85% of the variogram sill. Pass 2 search radii is based on the full variogram range, with the exception of Grota Seca MG where the variogram range was considered to be too large and double the first pass range was used instead. Pass 3 search radii corresponds to 1.5 times the variogram range, except for Grota Seca MG where one time the variogram range was used.

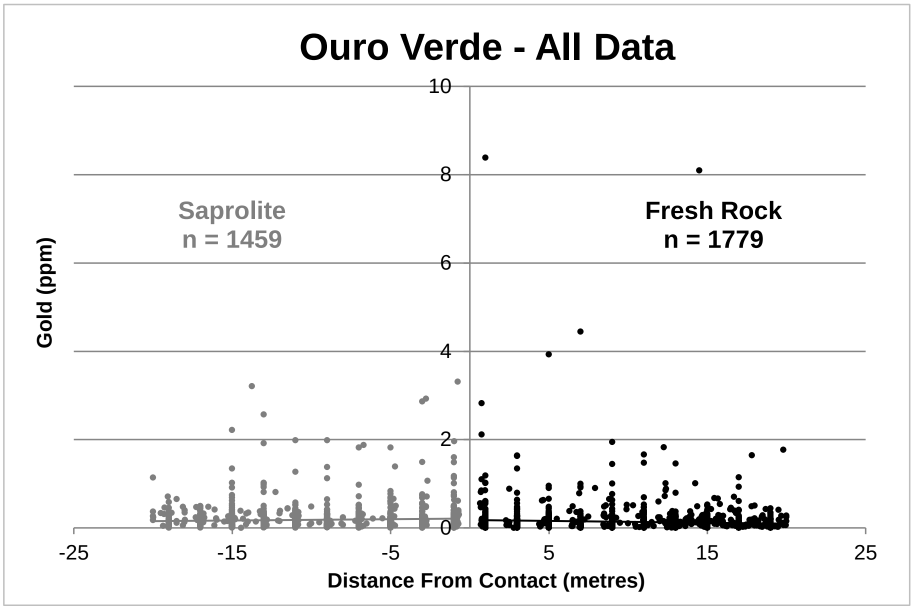
For all fresh rock domains, a hard boundary was used between grade domains and a soft boundary between subdomains. Fresh rock domains were estimated using fresh rock composites only.

In previous mineral resource models, a hard boundary was used between saprolite and fresh rock. Because the saprolite is very thin (average of approximately 20-30 m) the use of a hard boundary created unwarranted boundary effects in both grade and classification. Other than specific gravity differences, there is no real difference in geology and grade across that boundary. Contact plots confirm there is no sharp change in grade profile within 20 m of the boundary between saprolite and fresh rock within Ouro Verde and Grota Seca domains (see Figure 14-9 for sample figures and Appendix E for all plots).

Consequently, the saprolite domains were estimated using saprolite composites and fresh rock composites up to 30 m away from the bottom of the saprolite domains (for the first 3 passes only). While there are a few areas where the saprolite zone may be thicker than 30 m, SRK found that for most of the North Block, the saprolite zone is up to 30 m thick. A fourth pass was run in saprolite with the primary purpose of filling in blocks near surface that would likely be mined.

For the MG domains and the fourth estimation pass in saprolite, the influence of high grade composites was restricted depending on the pass. SRK considered probability plots and indicator kriging to select an appropriate grade threshold, and visual inspection of estimated grades and informing composites to assess reasonableness of selected radii of influence. The chosen grade thresholds and corresponding ranges of influence are summarized in Table 14-8 and Table 14-9 for fresh and saprolite zones, respectively.

Figure 14-9: Contact Plot of Composites within Ouro Verde (top) and Grota Seca (bottom) within 20-m Boundary of Saprolite-Fresh Domains



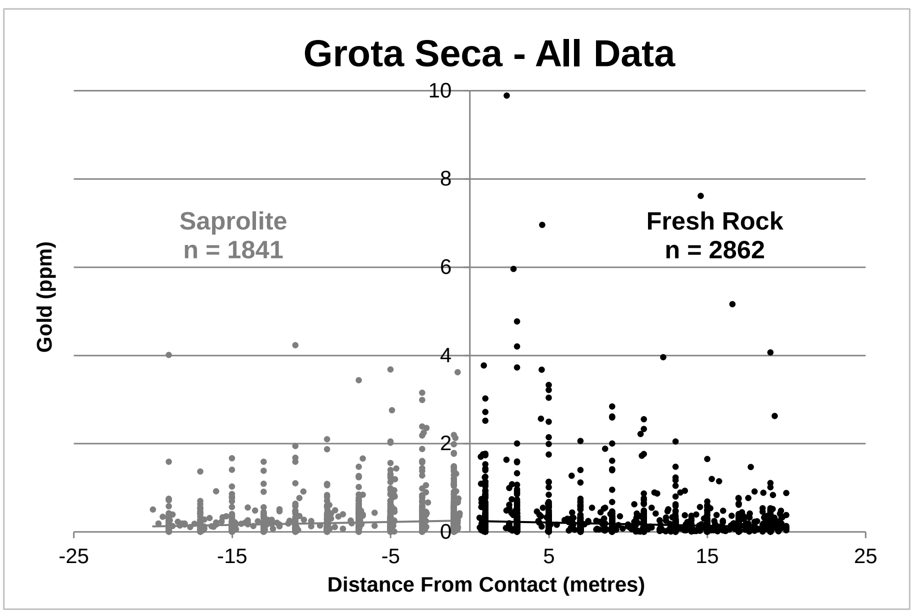


Table 14-8: Data and Search Parameters for Estimation of Fresh Rock Domains

Domain	Est. Pass	Search Type	Composites			Search Ellipse			Octant Search		HG Restriction**	
			Min.	Max.	Max. hole	Svx* m	Svy* m	Svz* m	Min. Octants	Max. per octant	Radii m	Grade g/t Au
Ouro Verde												
VLG	1	Octant	4	8	3	75	100	5	3	4		
	2	Octant	3	10	3	200	500	10	2	4		
	3	Ellipsoidal	2	15	-	300	500	20	-	-		
LG	1	Octant	4	8	3	80	30	25	3	4		
	2	Octant	3	10	3	140	120	50	2	4		
	3	Ellipsoidal	2	15	-	210	180	75	-	-		
MG	1	Octant	4	8	3	70	50	5	3	4		
	2	Octant	3	10	3	200	80	10	2	4	60x60x5	8
	3	Ellipsoidal	2	15	-	300	120	35	-	-	30x30x5	8
HG	1	Octant	4	8	3	50	50	5	3	4		
	2	Octant	3	10	3	120	250	10	2	4		
	3	Ellipsoidal	2	15	-	180	300	20	-	-		
Grota Seca												
VLG	1	Octant	4	8	3	10	180	140	3	4		
	2	Octant	3	10	3	25	500	400	2	4		
	3	Ellipsoidal	2	15	-	50	500	400	-	-		
LG	1	Octant	4	8	3	55	30	10	3	4		
	2	Octant	3	10	3	150	120	20	2	4		
	3	Ellipsoidal	2	15	-	225	180	30	-	-		
MG	1	Octant	4	8	3	60	60	5	3	4		
	2	Octant	3	10	3	120	120	10	2	4	60x60x5	8
	3	Ellipsoidal	2	15	-	300	300	55	-	-	30x30x5	8
HG	1	Octant	4	8	3	40	40	5	3	4		
	2	Octant	3	10	3	80	80	10	2	4		
	3	Ellipsoidal	2	15	-	120	120	15	-	-		
Junction												
VLG, LG	1	Octant	4	8	3	20	50	20	3	4		
	2	Octant	3	10	3	45	110	50	2	4		
	3	Ellipsoidal	2	15	-	65	165	75	-	-		
MG	1	Octant	4	8	3	20	50	5	3	4		
	2	Octant	3	10	3	45	110	10	2	4	60x60x5	8
	3	Ellipsoidal	2	15	-	65	165	75	-	-	30x30x5	8
Greia												
MG	1	Octant	4	8	3	60	60	5	3	4		
	2	Octant	3	10	3	120	120	10	2	4	60x60x5	8
	3	Ellipsoidal	2	15	-	300	300	55	-	-	30x30x5	8

* Min = Minimum; Max = Maximum; Max Hole = Maximum per borehole; Svx, Svy, Svz = Search volume in x, y and z directions

** Influence restriction applied to certain higher grade composites.

Table 14-9: Data and Search Parameters for Estimation of Saprolite Domains

Grade Domain	Est. Pass	Search Type	Composites			Search Ellipse			Octant Search		HG Restriction**	
			Min.	Max.	Max. hole	Svx* m	Svy* m	Svz* m	Min. Octants	Max. per octant	Radii m	Grade g/t Au
Ouro Verde												
VLG	1	Octant	4	8	3	30	100	5	3	4		
	2	Octant	3	10	3	30	500	10	2	4		
	3	Ellipsoidal	2	15	-	30	500	20	-	-		
	4	Ellipsoidal	2	15	-	100	500	100	-	-	30x30x5	1
LG	1	Octant	4	8	3	30	30	25	3	4		
	2	Octant	3	10	3	30	120	50	2	4		
	3	Ellipsoidal	2	15	-	30	180	75	-	-		
	4	Ellipsoidal	2	15	-	100	180	100	-	-	30x30x5	1
MG	1	Octant	4	8	3	30	50	5	3	4		
	2	Octant	3	10	3	30	80	10	2	4	30x60x5	8
	3	Ellipsoidal	2	15	-	30	120	35	-	-	30x30x5	8
	4	Ellipsoidal	2	15	-	100	120	100	-	-	30x30x5	2
HG	1	Octant	4	8	3	30	50	5	3	4		
	2	Octant	3	10	3	30	250	10	2	4		
	3	Ellipsoidal	2	15	-	30	300	30	-	-		
	4	Ellipsoidal	2	15	-	60	300	60	-	-	30x30x5	5
Grota Seca												
VLG	1	Octant	4	8	3	10	180	140	3	4		
	2	Octant	3	10	3	25	500	400	2	4		
	3	Ellipsoidal	2	15	-	30	500	400	-	-		
	4	Ellipsoidal	2	15	-	60	500	400	-	-	30x30x5	1
LG	1	Octant	4	8	3	30	30	10	3	4		
	2	Octant	3	10	3	30	120	20	2	4		
	3	Ellipsoidal	2	15	-	30	180	30	-	-		
	4	Ellipsoidal	2	15	-	100	180	100	-	-	30x30x5	1
MG	1	Octant	4	8	3	30	60	5	3	4		
	2	Octant	3	10	3	30	120	10	2	4	30x60x5	8
	3	Ellipsoidal	2	15	-	30	300	55	-	-	30x30x5	8
	4	Ellipsoidal	2	15	-	100	300	100	-	-	30x30x5	2
HG	1	Octant	4	8	3	30	40	5	3	4		
	2	Octant	3	10	3	30	80	10	2	4		
	3	Ellipsoidal	2	15	-	30	120	15	-	-		
	4	Ellipsoidal	2	15	-	60	120	60	-	-	30x30x5	5
Junction												
VLG, LG	1	Octant	4	8	3	20	50	20	3	4		
	2	Octant	3	10	3	30	110	50	2	4		
	3	Ellipsoidal	2	15	-	30	165	75	-	-		
	4	Ellipsoidal	2	15	-	100	165	100	-	-	30x30x5	1
MG	1	Octant	4	8	3	20	50	5	3	4		
	2	Octant	3	10	3	30	110	10	2	4	30x60x5	8
	3	Ellipsoidal	2	15	-	30	165	75	-	-	30x30x5	8
	4	Ellipsoidal	2	15	-	100	165	100	-	-	30x30x5	1
Greia												
MG	1	Octant	4	8	3	30	60	5	3	4		
	2	Octant	3	10	3	30	120	10	2	4	30x60x5	8
	3	Ellipsoidal	2	15	-	30	300	55	-	-	30x30x5	8
	4	Ellipsoidal	2	15	-	100	300	100	-	-	30x30x5	2

* Min = Minimum; Max = Maximum; Max Hole = Maximum per borehole; Svx, Svy, Svz = Search volume in x, y and z directions

** Influence restriction applied to certain higher grade composites

14.2.9 Estimation Sensitivity Assessment

SRK assessed the sensitivity of the block estimates to the estimation strategy by varying some parameters. The following parameters were assessed:

- Maximum number of boreholes used for a block estimate;
- Minimum and maximum number of composites used for a block estimate;
- Type of search in Pass 2;
- Search radii in Pass 1;
- Impact of subdomain orientation;
- Impact of volume constraint imposed by MG and HG domains within LG domain;
- HG limited radii within VLG, LG, and MG domains;
- Effect of grade capping by using uncapped gold composites.

Table 14-10 provides details of the different sensitivity cases evaluated by SRK. The results of these sensitivities were compared globally considering global in situ quantity, grade, and contained metal at zero cut-off. Overall, the percentage difference in contained metal ranged between -4 to +4 percent across all cases. The final case chosen for reporting the mineral resources of the North Block is the most conservative of all scenarios examined. For each grade domain, SRK and Belo Sun reviewed the block model on a sectional basis, comparing block grades and nearby composites. SRK found that HG restrictions within the LG and VLG domains were immaterial especially at cut-off grades above 0.3 g/t Au. As such, the last few sensitivity cases are focussed on controlling the impact of high grade composites, with particular emphasis on the MG domain. The final set of parameters was chosen on the basis of overall quantitative and qualitative comparisons.

Following the selection of satisfactory parameters, SRK then calculated a diluted grade attribute for each block. This diluted grade is based on summing the product of the percent of each grade domain with the grade estimated for that grade domain. This yields one grade per block, rather than partial block grades as was reported in previous Mineral Resource Statements.

Table 14-10: SRK Sensitivity Analysis on Estimation Parameters using Capped Composites

Case	Pass 1				Pass 2				Pass 3				Search Ellipse
	Min.*	Max.*	Max Hole*	Type*	Min.*	Max.*	Max Hole*	Type*	Min.*	Max.*	Max Hole*	Type	(Pass 1; 2; 3)***
1	5	9	3	Octant	3	12	3	Elliptical	2	15	0	Elliptical	1; 1; 1.5
2	5	9	3	Octant	3	12	3	Octant	2	15	0	Elliptical	80% sill; 1; 1.5
3	3	8	3	Octant	3	10	3	Octant	2	15	0	Elliptical	80% sill; 1; 1.5
4	3	8	3	Octant	3	10	3	Octant	2	15	0	Elliptical	80% sill; 1; 1.5
5	3	8	3	Octant	3	10	3	Elliptical	2	15	0	Elliptical	80% sill; 1; 1.5
6	3	8	3	Octant	3	10	3	Octant	2	15	0	Elliptical	95% sill; 1; 1.5
7[†]	3	8	3	Octant	3	10	3	Octant	2	15	0	Elliptical	80% sill; 1; 1.5
8	3	8	3	Octant	4	10	3	Octant**	2	15	0	Elliptical	80% sill; 1; 1.5
9[‡]	3	8	3	Octant	4	10	3	Octant**	2	15	0	Elliptical	80% sill; 1; 1.5
10[††]	4	8	3	Octant	3	10	3	Octant**	2	15	0	Elliptical	80% sill; 1; 1.5
Final[††]	4	8	3	Octant	3	10	3	Octant**	2	15	0	Elliptical	80% sill; 1; 1.5

* Min = Minimum; Max = Maximum; Max Hole = Maximum per borehole; Wherever octant search is specified, minimum number of octants is 3 with a maximum of 4 composites per octant

** Minimum number of octants = 2

*** Unless otherwise specified, values are multiples of longest range of variogram model per grade domain

† No MG and HG domains; testing impact of volume constraints in estimation

‡ HG limited radii on LG and VLG domains

†† Grota Seca MG reduced searches (70%, 80% and 1x variogram range for Passes 1, 2, and 3, respectively

14.2.10 Block Model Validation

SRK validated the block model using a visual comparison of block estimates and informing composites; statistical comparisons between composites and block model distributions; statistical comparisons between ordinary kriging estimates and alternate estimators at zero cut-off; and change-of-support checks for the Grota Seca MG and Ouro Verde MG domains.

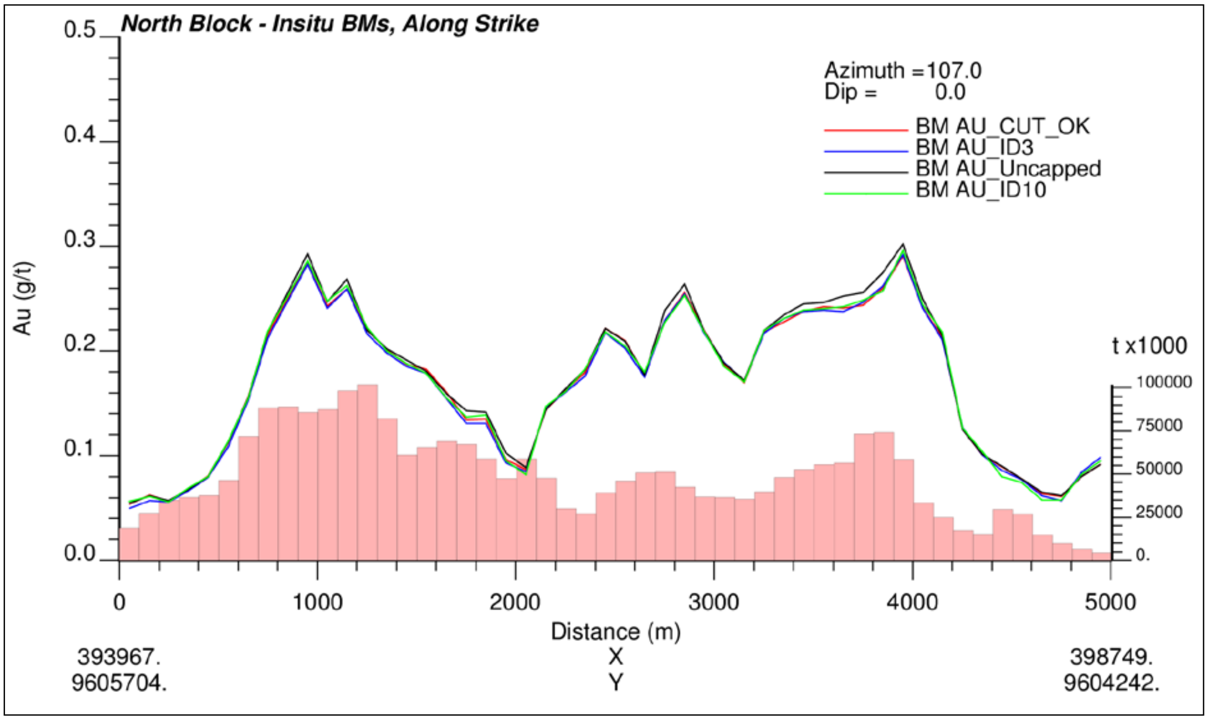
SRK generated block estimates using inverse distance (ID) to a power of 3 and 10, as well as using uncapped composites. Table 14-11 shows how these alternate estimators compare to ordinary kriging estimates at two cut-off grades, 0 g/t and 0.5 g/t. The latter corresponds to the cut-off grade of the previous Mineral Resource Statement. At zero cut-off, both inverse distance models yield total contained gold within one percent of the ordinary kriging model, while the use of uncapped estimates produced 2% more contained gold relative to the capped model. At a cut-off grade of 0.5 g/t Au, the differences in contained gold are less than 6% across all models. A swath plot showing a comparison of these four block models is provided in Figure 14-10, and shows good agreement among the various estimators.

Table 14-11: Comparison of Estimation Methods at 0 and 0.5 g/t Au Cut-off Grades

Cut-off Grade g/t Au	Estimation Method	Quantity Kt	Grade g/t Au	Metal oz	Difference* %
0.0	OK	2,262,340	0.197	14,314,418	
	ID3	2,248,310	0.196	14,203,672	-0.77%
	ID10	2,256,340	0.198	14,362,781	0.34%
	Uncapped OK	2,249,080	0.203	14,646,154	2.32%
0.5	OK	193,808	1.044	6,508,038	
	ID3	187,351	1.082	6,515,286	0.11%
	ID10	185,636	1.130	6,744,453	3.63%
	Uncapped OK	197,303	1.085	6,881,928	5.75%

* Relative to the ordinary kriging estimates

Figure 14-10: Swath Plot of Block Models, Oriented along Strike



SRK also compared the ordinary kriging block model distribution with the declustered, change-of-support corrected distribution of the informing composites for the Ouro Verde and Grota Seca grade domains. Declustering mitigates the influence of preferential sampling of borehole data; this often results in a distribution of composites whose mean statistic is often comparable to that of the estimated model. Further, a change-of-support correction is applied to account for the volume difference between the composite scale and the final block volume scale. Depending on the grade domain, SRK applied discrete Gaussian model (DGM) or indirect lognormal change-of-support based on how well the mean and variance conform to theoretical expectations.

Figure 14-11 shows the quantile-quantile (left) and probability-probability (right) comparison of the gold distribution from the block model and the expected grade distribution following declustering and change-of-support corrections for Ouro Verde and Grota Seca. Overall, the mean grades from the block model are lower than those predicted from declustering. The quantile-quantile plot shows that the block model is smoother than that predicted by the change-of-support with deviations from the 45˚ line occuring in the lower and upper 5% of the distribution.

Figure 14-12 shows how the ordinary kriging block model compares to the alternate estimators such as ID3, ID10, ordinary kriging with uncapped composites and ordinary kriging with no constraints on the influence of higher grade samples within the MG domain. SRK observes that:

- The ordinary kriging and ID3 models are quite comparable in average grade with the OK model being slightly smoother than the ID3 model; deviations in distributions appear at the higher tail of the distribution;
- The ordinary kriging model is smoother than the ID10 model, as expected. The average grade of the ID10 model is lower than the ordinary kriging model, and this is likely due to how the lower grade data in the VLG domain are assigned and its volumetric contribution to the statistics;
- The impact of capping is minimal yielding only 2% increase in the average grade, and a slightly more variable model than the capped model.

Figure 14-11: Quantile-Quantile Comparison of Block ModelGrades to Declustered Change-of Support Corrected Gold Distribution

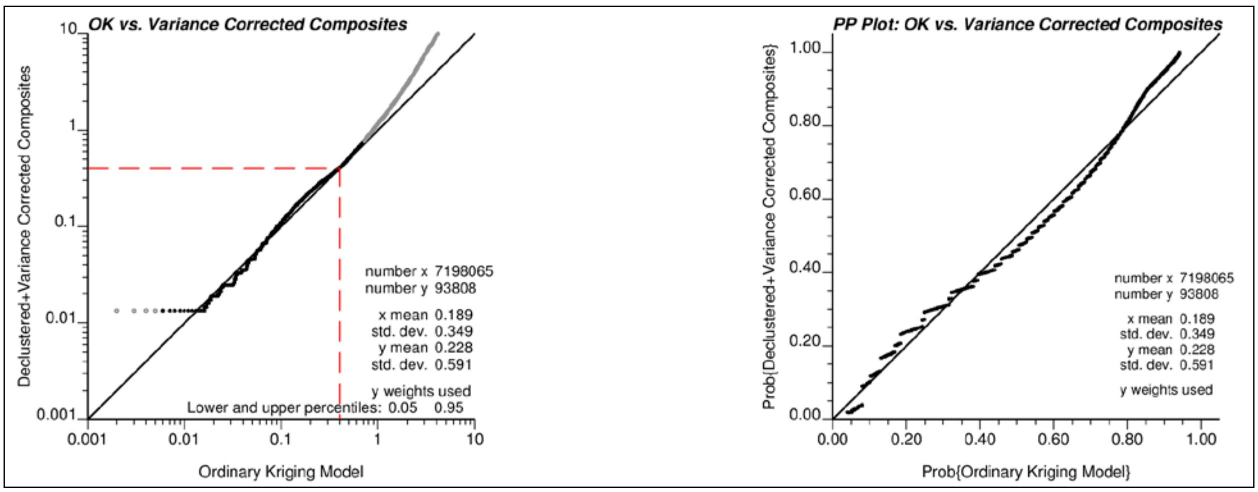
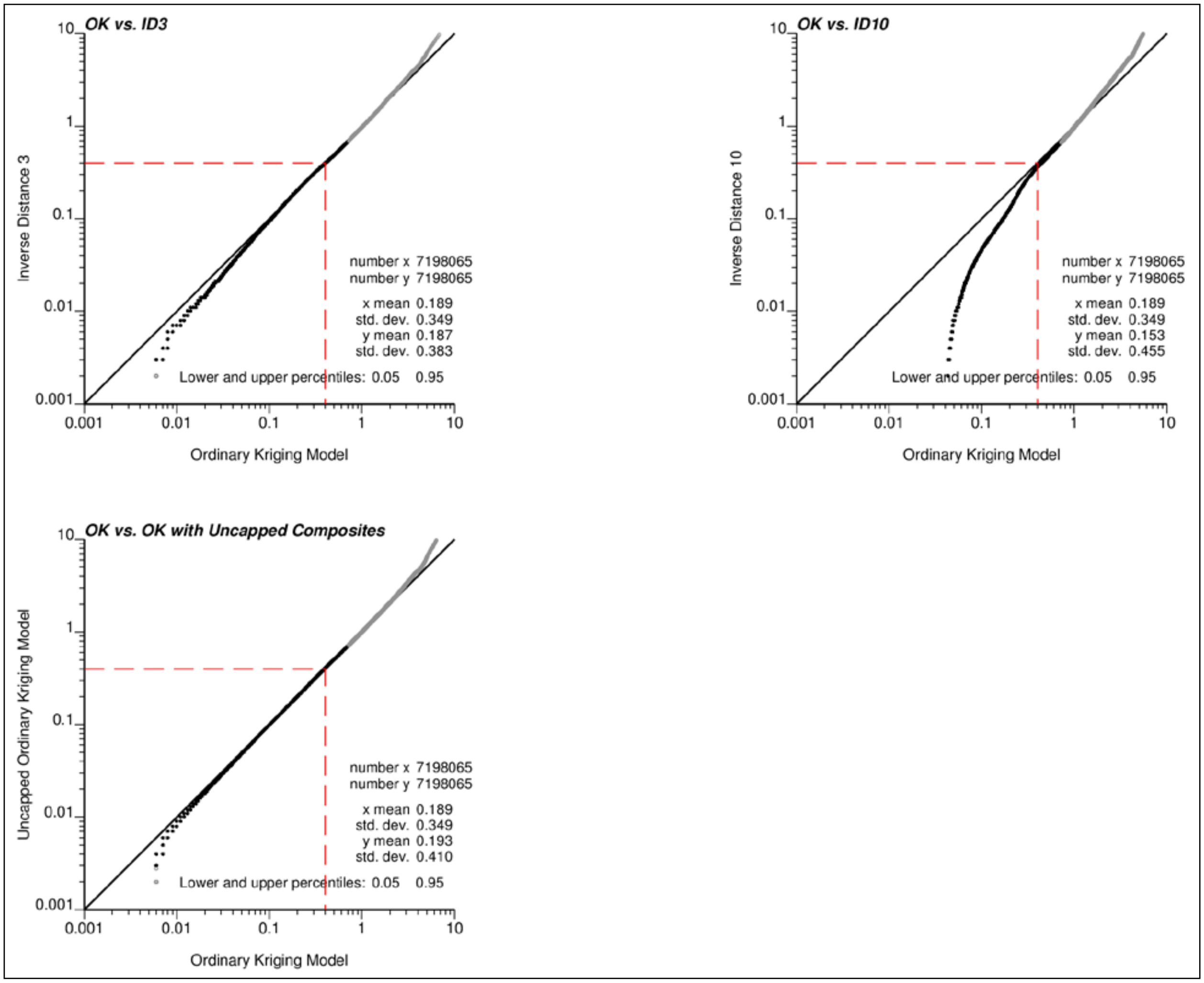


Figure 14-12: Quantile-Quantile Comparison of Ordinary Kriging Estimates to Alternative Estimators



14.2.11 Classification

In the previous model, block classification was based on estimation results and criteria inherited from a period when the gold mineralization had been delineated with more widely spaced boreholes. Those classification criteria had not been revised. The block model for the North Block is quite intricate and in several areas quite narrow domains were modelled. SRK considers that the previous classification strategy created unwarranted boundaries effects and may have been confusing especially in converting the percent block model to a full block model. For these reasons, the block classification strategy was simplified to consider classification on the basis of all available composites, irrespective of their domain. A separate block model was created solely to assist with block classification using three estimation runs. Criteria used for block classification are:

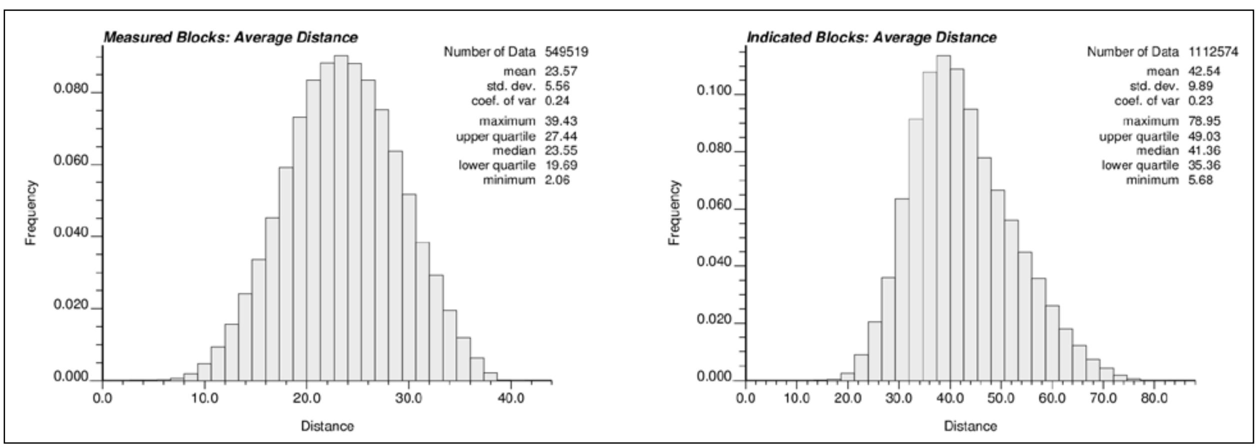
Measured: Blocks estimated within a 40 X 40 X 5 m search radii, where the thinnest axis corresponds to the direction of vein thickness, using a minimum of three boreholes and a minimum of three octants. The mean average distance of informing composites for this category is within 25 m (Figure 14-13).

Indicated: Blocks estimated in the first pass above or within a 80 X 80 X10 m search radii, where the thinnest axis corresponds to the direction of vein thickness, using a minimum of three boreholes and a minimum of two octants. The mean average distance of informing composites for this category is within 50 m (Figure 14-13).

Inferred: All blocks not classified as Measured or Indicated passes above, and any blocks whose grade was estimated within the first three grade estimation runs (up to 1.5 times the variogram range).

SRK examined the classification visually by inspecting sections and plans through the block model. SRK concludes that the parameters used to define Measured blocks reasonably reflect estimates that can be considered to be at a high confidence level, material classified as Indicated reflect estimates made with a moderate level of confidence within the meaning of CIM *Definition Standards for Mineral Resources and Mineral Reserves* (May 2014), and all other material is estimated at a lower confidence level. Additionally, SRK applied a post-smoothing filter on the classified material to ensure continuity within the classification categories.

Figure 14-13: Distribution of Average Distance for Measured Blocks (left) and Indicated Blocks (right)



14.3 South Block

The South Block geology and mineral resource model was constructed by Belo Sun in August 2013, and was audited by SRK in September 2013. This model has not been updated since 2013. It is based on 95 core boreholes (21,318 m). The drilling data were acquired by TVX Gold Inc. (1996 to 1998), Verena Minerals Corp. (2006 to 2008), and Belo Sun Mining Corp. (since 2010).

The gold mineralization zones in the South Block are associated with crosscutting faults. Three deposits have been delineated: Itata, Pequi and Grande (Figure 10-5 and Figure 14-14). In general, the gold mineralization is associated with intense silicification overprinted by sulphide alteration (pyrite) and potassium alteration (sericitization).

Using auriferous intervals defined in a manner similar to those defined in the North Block MG domain (see Section 14.2.3), three zones in fresh rock were defined in the South Block (Figure 14-14 and Table 14-12). Due to the relatively small number of boreholes in the South Block area, gold mineralization boundaries are more conceptual in nature compared to the better-defined boundaries at Ouro Verde and Grota Seca in the North Block.

The mineral resource model was prepared by Belo Sun. SRK performed audits of statistical and geostatistical data, block model checks, and a review of classification parameters.

Figure 14-14: South Block Resource Domains (Source: Belo Sun)

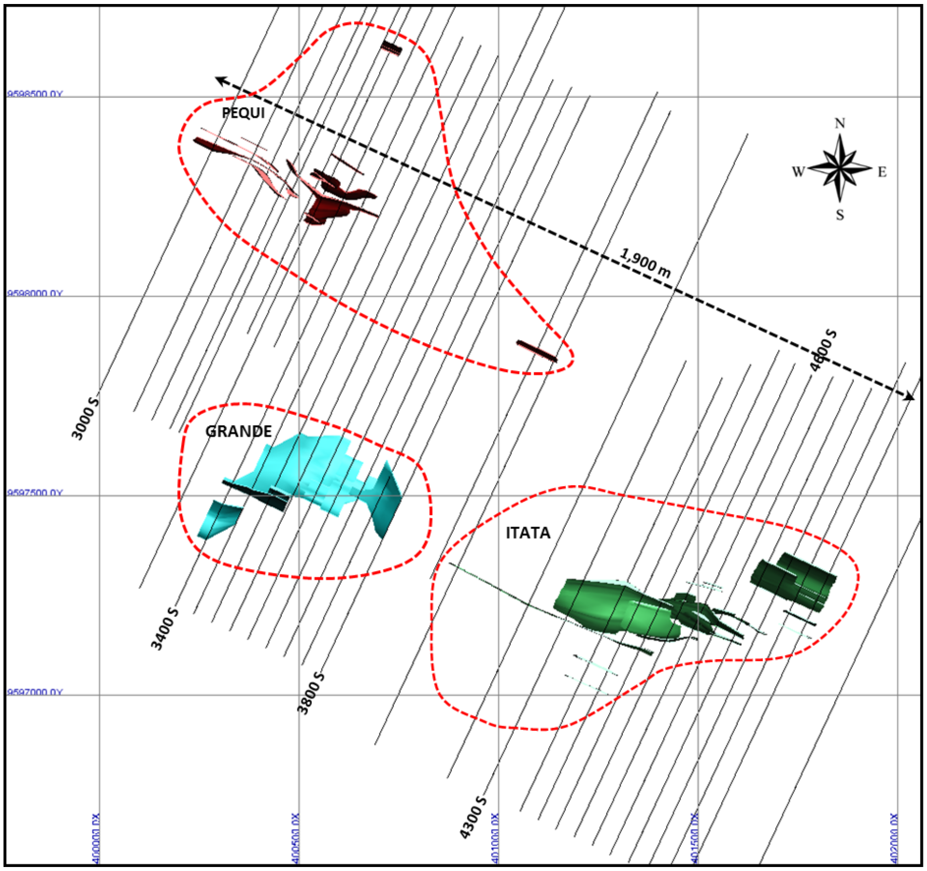


Table 14-12: Resource Domains for South Block

Grade Domain	Domain	Rock Code
MG	Saprolite	600
	Itatá	601
	Pequi	602
	Grande	603

14.3.1 Specific Gravity

Specific gravity was measured by Belo Sun using a standard weight in water/weight in air methodology on core from complete sample intervals. The specific gravity database for the South Block contains 124 measurements for unweathered material and the average specific gravity is 2.77. There are no specific gravity measurements taken on saprolite material for the South Block; as such, the average specific gravity of 1.36 for the North Block was used in the South Block.

SRK has reviewed the Belo Sun specific gravity database and confirms that the average specific gravity used is appropriate for resource estimation.

14.3.2 Resource Database, Compositing, Statistics and Capping

The borehole database considered for mineral resource modelling in the South Block consists of 95 core boreholes (21,318 m) yielding 711 assay intervals. The effective date of the drilling database for the South Block is May 17, 2013.

All assay intervals within the resource domains were composited to a length of 1.0 m. A plot of sample length frequencies for the South Block deposits is provided in Figure 14.15. Approximately 85% of the all sample intervals are 1.0 m or less in length.

To limit the influence of high gold grade outliers, Belo Sun applied capping to the Pequi and Grande zones. No capping was applied to the saprolite and Itatá zone in the South Block (see Table 14-13 for selected capping values). Summary sample statistics for the assays and composites are provided in Table 14-14 and Table 14-15, respectively.

SRK compared assays and composite statistics for data generated independently by Belo Sun and SRK. No differences were found between the two data sets. SRK checked the selected capping values by comparing probability plots of gold composites for each zone, plotting the mean grade and the number of affected data by the chosen cap value, and decile analysis for the various subdomains. SRK's checks confirmed the capping values used for Pequi and Grande. Capped composite statistics for the two areas are summarized in Table 14-15.

Based on the assay and composite database checks as well as a review of the capping values, SRK concludes that the data are reasonable and appropriate, and can be used for the estimation of mineral resources.

Figure 14-15: Sample Length Distribution within South Block

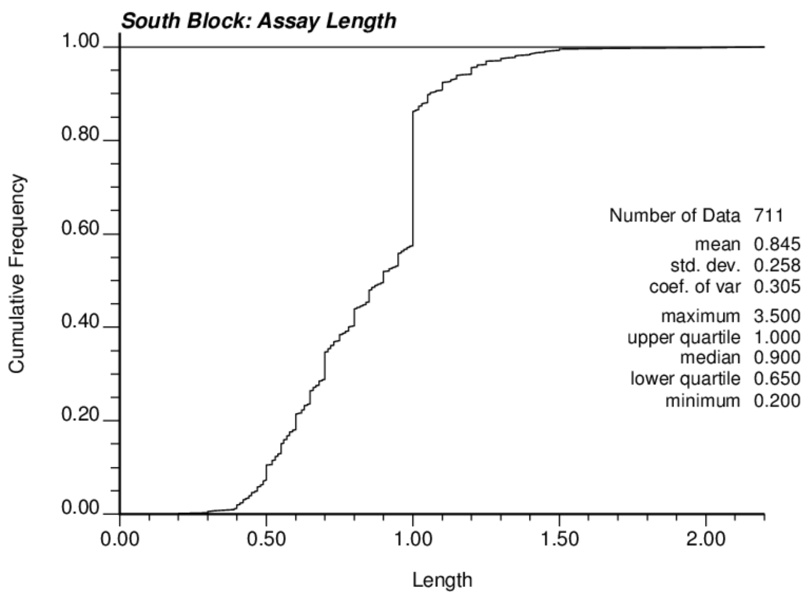


Table 14-13: South Block Composite Capping Values

Target	Capping Value g/t Au	Number Capped
Saprolite	No cap	-
Pequi	20	2
Grande	40	6
Itatá	No Cap	-

Table 14-14: Summary Assay Statistics for South Block (length weighted)

Area	Subdomain	Assays				
		Count	Mean	StDv.*	Minimum	Maximum
South Block	All	711	3.422	10.64	0	168.80
	Saprolite	54	1.186	2.072	0	10.60
	Pequi	215	2.586	7.278	0.003	88.30
	Grande	165	6.474	18.786	0.010	168.80
	Itatá	277	3.004	7.000	0	73.60

*StDv. = Standard deviation

Table 14-15: Summary Statistics for Uncapped and Capped Composites (length weighted)

Area	Subdomain	Composites					Capped Composites				
		Count	Mean	StDv.*	Min.*	Max.*	Count	Mean	StDv.*	Min.*	Max.*
South Block	All	639	3.424	8.076	0.001	134.50	639	3.141	5.933	0.001	43.20
	Saprolite	62	1.186	1.856	0.001	10.60	62	1.186	1.856	0.001	10.60
	Pequi	204	2.588	6.851	0.003	88.30	204	2.228	3.220	0.003	20.00
	Grande	139	6.474	12.978	0.018	134.50	139	5.696	9.314	0.018	40.00
	Itatá	234	3.005	5.513	0.001	43.20	234	3.005	5.513	0.001	43.20

* StDv. = Standard deviation; Min. = Minimum; Max. = Maximum

14.3.3 Variography

Belo Sun used GEMS mining software to model the spatial continuity of gold in the South Block. In SRK's December 2012 audit of the Project, lack of data in the South Block led to poor inference of the variogram model. While the South Block data remains small relative to the North Block, Belo Sun was able to infer and model a variogram for the Pequi zone (Table 14-16). Unfortunately, the Itatá and Grande zones remain a challenge for variogram inference.

Table 14-16: Summary of Belo Sun Variogram Model Parameters

Area	Grade Domain	GEMS Rotation (ADA)			Variogram Model						
		Azimuth °	Dip °	Plunge °	Nugget*	Structure Number	Type	CC*	Range Y m	Range X m	Range Z m
South Block	Pequi	115	0	25	0.10	1	Spherical	0.90	8	150	125

* Normalized to sill of 1.0

SRK audited the Belo Sun variogram models for the South Block by reviewing the detailed GEMS parameters used to generate the variograms, and independently calculated a gold variogram GSLib. SRK assessed four different spatial metrics: (1) traditional semivariogram of original gold, (2) correlogram of original gold, (3) traditional semivariogram of normal scores of gold, and (4) correlogram of normal scores of gold. Belo Sun's fitted model appears to fit reasonably the experimental values based on these four spatial metrics. In general, SRK considers that Belo Sun's calculations of parameters, orientation, and fitted variogram models are appropriate for the available data and geological interpretation.

14.3.4 Block Model Parameters

The South Block model is rotated and it was generated using GEMS. The block model coordinates are based on the local UTM grid (SAD 69 datum, Zone 22S). The model is rotated using GEMS convention at -25 degrees (see Table 14-17 for the block model definition).

Table 14-17: Volta Grande GEMS Block Model Definition for South Block

	Block Size m	Origin* m	No. Blocks
X	6	399,504.26	440
Y	6	9,597,547.69	270
Z	10	250.00	47

* SAD 69 datum, Zone 22S

14.3.5 Estimation

Belo Sun estimated gold using ordinary kriging and three estimations runs with progressively relaxed search ellipsoids and data requirements. The estimation parameters were adjusted after discussion with Belo Sun to reduce the sensitivity of the block model to certain parameters (data requirement). SRK verified that the revised model yields the expected quantity and quality of estimates. SRK is comfortable with the final South Block resource model.

Table 14-18 shows the data requirements per estimation pass for the South Block. An ellipsoidal search was used for all estimation passes. The first and second estimation runs considered search neighbourhood sizes based on the variogram ranges of the second structure. The third estimation run considered search ellipses sized at twice the variogram ranges. All estimates used hard boundaries, relying only on data within each zone or saprolite domain. An average specific gravity of 1.36 was assigned to saprolite blocks, and an average specific gravity of 2.77 was assigned to all unweathered blocks within the South Block.

Table 14-18: Data and Search Parameters for Estimation, All Targets in South Block

Estimation Pass	Number of Composites			SVx* m	Svy* m	SVz* m	GEMS Rotation (ADA)		
	Min.*	Max.*	Max Hole*				Azimuth °	Dip °	Plunge °
1	7	16	6	150	8	125	115	0	25
2	4	16	16	150	8	125	115	0	25
3	4	16	16	300	16	250	115	0	25

* Min. = Minimum; Max. = Maximum; Max Hole = Maximum number of composites per hole; Search radii along axes described by GEMS rotation angles

14.3.6 Classification

The classification parameters used by Belo Sun for the South Block are as follows:

- Indicated: Blocks estimated in the first or second estimation runs (within the variogram range), whose estimation required a minimum of two boreholes
- Inferred: All blocks not classified as Measured or Indicated in the first and second estimation runs and all blocks estimated in the third estimation run (twice the variogram range)

There are no Measured blocks in the South Block. Only the Pequi and Itatá deposits have Indicated blocks. An isolated and small group of blocks initially assigned in the Indicated category located between Pequi and Itatá was also re-classified as Inferred blocks. SRK also re-classified any Indicated blocks in Grande to an Inferred category due to the potential secondary orientation within the Grande domain. The current database does not support the reliable estimation of mineral resources within this structural domain.

Additional infill drilling and sampling is required to support a higher classification. It cannot be assumed that all or any part of an Inferred mineral resource will be upgraded to an Indicated or Measured mineral resource as a result of continued exploration.

14.4 Mineral Resource Statement

SRK prepared two Mineral Resource Statements for the Volta Grande gold project: a Mineral Resource Statement for the North Block and an Audited Mineral Resource Statement for the South Block. This section describes how the statements were prepared.

CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) define a Mineral Resource as:

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

The "reasonable prospects for eventual economic extraction" requirement generally implies that quantity and grade estimates meet certain economic thresholds and that mineral resources are reported at an appropriate cut-off grade that takes into account extraction scenarios and processing recovery. SRK considers that the gold mineralization found in the Project is primarily amenable to open pit extraction. SRK used a pit optimizer to assist with determining which portions of the gold deposits show "reasonable prospect for eventual economic extraction" from an open pit and to assist with selecting reporting assumptions. The optimization assumptions are summarized in Table 14-19.

Table 14-19: Conceptual Open Pit Optimization Assumptions

Parameter	North Block	South Block
Pit berm height	20 m	20 m
Pit bench height	10 m	10 m
Overall slope angle (saprolite/unweathered rock)	31˚ / 51˚	31˚ / 51˚
Processing and G & A costs (US$/tonne mined)	$9.11	$14.87
Gold recovery (saprolite and unwethered rock)	94%	94%
Gold price (US$/oz)	$1,400	$1,400

After review of the optimization results and through discussions with Belo Sun, open pit mineral resource for the North Block include those classified blocks located within the conceptual pit shells above a cut-off grade of 0.4 g/t Au (see Figure 14.16). No underground mineral resource is reported.

Previous Mineral Resource Statements for the North Block reported the mineral resources using the percentage of each domain within each block. SRK delivered to Belo Sun a block model for the North Block with a single classification per block and a fully diluted gold grade that accounts for the proportion of each grade domain that may intersect a block. The Mineral Resource Statement for the North Block reported herein is based on a diluted block model.

There has been no change to the South Block model. The mineral resources in the South Block include those classified blocks located within the conceptual pit shells above a cut-off grade of at 0.5 g/t Au (see Figure 14.17). In 2013, underground mineral resources were also reported for the South Block and include those classified blocks located outside the conceptual pit shells above a cut-off grade of 2.0 g/t Au.

Figure 14-16: Plan Showing Estimated Blocks Above 0.4 g/t Gold Within the North Block Deposits Relative to the Conceptual Pit

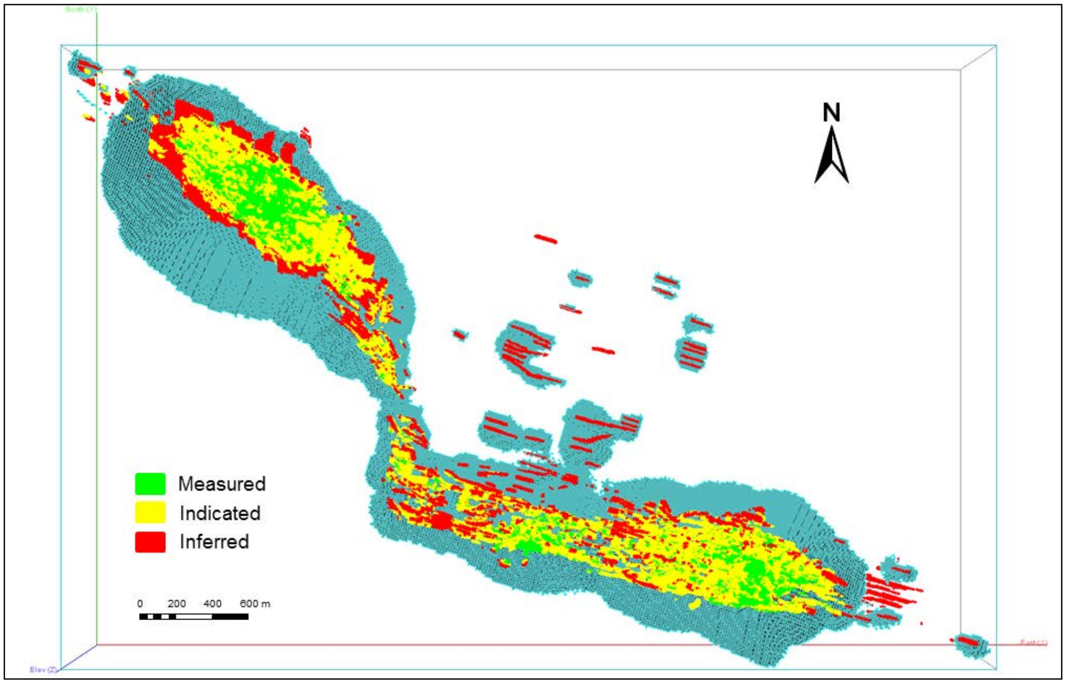
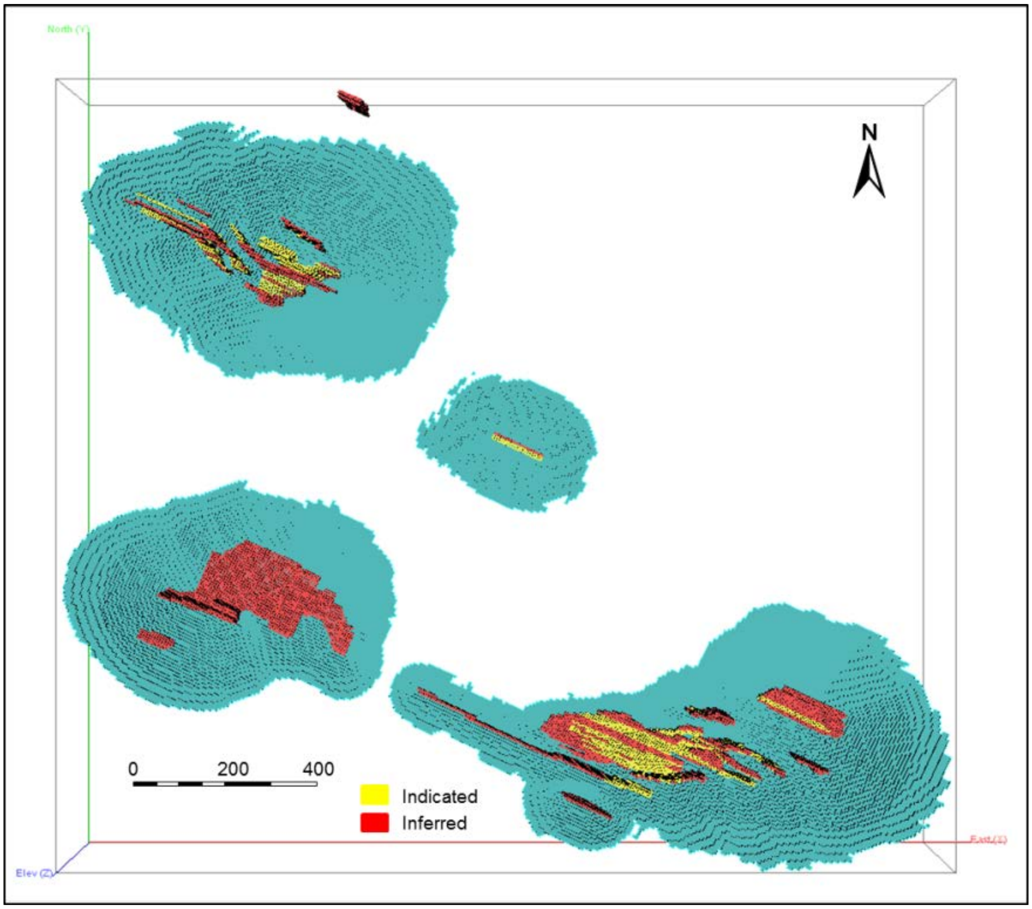


Figure 14-17: Plan Showing Estimated Blocks Above 0.5 g/t Gold Within the South Block Deposits Relative to the Conceptual Pit



SRK is satisfied that the mineral resources were estimated in conformity with the widely accepted CIM *Estimation of Mineral Resource and Mineral Reserve Best Practices Guidelines*. The mineral resources may be affected by further infill and exploration drilling that may result in increases or decreases in subsequent mineral resource estimates. The mineral resources may also be affected by subsequent assessments of mining, environmental, processing, permitting, taxation, socio-economic, and other factors. The Mineral Resource Statement for the North Block presented in Table 14-20 and the Audited Mineral Resource Statement for the South Block is given in Table 14-21 with an effective date of October 1, 2013. Both statements were prepared by Dr. Oy Leuangthong, PEng (PEO#90563867) and Dr. Jean-Francois Couture, PGeo (APGO#0196).

Table 14-20: Mineral Resource Statement*, North Block Volta Grande Gold Project, Pará State, Brazil, SRK Consulting (Canada) Inc., March 16, 2015

Deposit	Category	Quantity Kt	Gold Grade g/t Au	Contained Gold Koz
Ouro Verde Open Pit				
Saprolite	Measured	750	0.96	23
	Indicated	709	0.78	18
	Inferred	216	0.67	5
Unweathered	Measured	18,532	1.16	693
	Indicated	52,647	1.06	1,796
	Inferred	22,576	0.89	643
Grota Seca Open Pit				
Saprolite	Measured	249	0.96	8
	Indicated	1,386	0.74	33
	Inferred	832	0.61	16
Unweathered	Measured	24,270	1.00	782
	Indicated	54,611	0.87	1,519
	Inferred	12,557	0.82	332
Junction Open Pit				
Saprolite	Measured	2	1.53	0
	Indicated	215	0.78	5
	Inferred	82	0.66	2
Unweathered	Measured	271	0.71	6
	Indicated	2,950	0.77	73
	Inferred	1,491	0.75	36
Greia Open Pit				
Saprolite	Inferred	512	1.06	17
Unweathered	Inferred	1,503	2.04	98
Total Open Pit				
	Measured	44,075	1.07	1,512
	Indicated	112,518	0.95	3,444
	Measured + Indicated	156,593	0.98	4,956
	Inferred	39,767	0.90	1,151

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Open pit mineral resources are reported at a cut-off grade of 0.4 g/t Au. The cut-off grades are based on a gold price of $1,400/oz and metallurgical recoveries of 94% for saprolite and 94% for unweathered material.

Table 14-21: Audited Mineral Resource Statement*, South Block of Volta Grande Gold Project, Pará State, Brazil, SRK Consulting (Canada) Inc, October 1, 2013

Domain	Category	Quantity Kt	Gold Grade g/t Au	Contained Gold Koz
South Block Open Pit				
Saprolite	Inferred	169	1.68	9
Unweathered	Indicated	2,503	3.06	246
	Inferred	2,752	4.08	361
Unweathered	South Block Underground			
	Indicated	24	4.24	3
	Inferred	193	4.05	25
	Total Open Pit			
	Indicated	2,503	3.06	246
	Inferred	2,921	3.94	370
	Total Underground			
	Indicated	24	4.24	3
	Inferred	193	4.05	25
	Total South Block			
	Indicated	2,527	3.07	249
	Inferred	3,114	3.95	395

* Mineral resources are not mineral reserves and have not demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates. Open pit mineral resources are reported at a cut-off grade of 0.5 g/t Au and underground mineral resources are reported at a cut-off grade of 2.0 g/t Au. The cut-off grades are based on a gold price of $1,400/oz and metallurgical recoveries of 94% for saprolite and unweathered material.

14.5 Comparison with Previous Mineral Resource Statement

This section presents reconciliation between the 2013 and 2015 Mineral Resource Statements for the North Block. There is no change to the South Block mineral resources.

It is difficult to reconcile the Mineral Resources Statement for the North Block disclosed herein with the previous statement disclosed on October 1, 2013 because the two statements are quite different. A partial comparison is shown in Table 14-22. SRK cautions that in the 2013 Audited Mineral Resource Statement the open pit mineral resources were reported undiluted at a cut-off grade of 0.5 g/t Au and the statement included the South Block, which was not remodelled. In contrast, in 2015 the open pit mineral resources are reported on a fully diluted block basis at a cut-off grade of 0.4 g/t Au. Further, the 2015 model introduces significant changes in domain modelling, estimation strategy, and classification criteria.

The 2015 mineral resource model shows a significant increase in tonnage at approximately 40% lower grade. This is expected, given the introduction of the LG and VLG domains, and the reporting of fully diluted block grades compared to 2013 where the mineral resources were reported on the basis of partial block grades. SRK also notes that the 2015 Mineral Resource Statement is based on a slightly shallower conceptual pit envelope than that used in 2013, explaining the reduction in reported Inferred mineral resources. Despite the significant percentage differences in quantity, grade, and contained gold in the various categories, the overall impact of these changes on the combined Measured and Indicated mineral resources is a modest increase of 3% in contained metal. The new classification strategy resulted in a significant reclassification of Measured mineral resources to the Indicated category. SRK is comfortable that the current classification reflects better the sampling density and the confidence in the geological continuity of the gold mineralization between sampling points. It also removes any artefacts resulting from estimation strategies.

Table 14-22: Partial Comparison between the October 2013 and March 2015 Mineral Resource Statements, North Block Only

	October 2013 (audited by SRK)			March 2015 (constructed by SRK)			Percentage Difference Oct. 2013 to Mar. 2015		
Class	Quantity Kt	Grade g/t Au	Contained Au Koz	Quantity Kt	Grade g/t Au	Contained Au Koz	Quantity Kt	Grade g/t Au	Contained Au oz %
Measured	55,420	1.68	2,999	44,075	1.07	1,512	-20%	-37%	-50%
Indicated	35,758	1.59	1,825	112,518	0.95	3,444	215%	-40%	89%
Meas. & Ind.	91,178	1.65	4,824	156,593	0.98	4,956	72%	-40%	3%
Inferred	40,867	1.53	2,011	39,767	0.90	1,151	-3%	-41%	-43%

15.0 MINERAL RESERVE ESTIMATES

15.1 Summary

The reserves for the Project are based on the conversion of the measured and indicated resources within the current Study mine plan. Measured resources are converted directly to proven reserves and indicated resources to probable reserves.

The total reserves for the Project are shown in Table 15-1.

Table 15-1: Proven and Probable Reserves

Classification	Reserves Kt	Grade g/t Au	Contained Gold Koz
Proven	41,757	1.07	1,442
Probable	74,212	0.98	2,346
Proven + Probable*	115,969	1.02	3,788

*The South Block is not considered in the Study and the resources associated with South Block are not converted or discussed further. Tonnages for underground potential are part of the March 16 2015 resource but are also not discussed further or converted.

16.0 MINING METHODS

16.1 Geotechnical

Belo Sun retained VOGBR for work on the open pit slopes of the Project. From September 2011 until August 2012, VOGBR completed a series of tasks including site investigation and supervision of geotechnical and hydrogeological drilling.

In the Ouro Verde and Grota Seca areas, 50 diamond drill core holes were completed amassing over 7,000 m of core samples. The holes were of either NQ or HQ2 diameter. The distribution of holes included:

- 24 geotechnical drill holes;
- 16 hydrogeology drill holes;
- 10 packer testing drill holes for permeability measurements.

The core was geomechanically logged. Most of the geotechnical and hydrogeological holes in the Ouro Verde pit are in the center of the pit area with seven intersecting the northeast wall and one hole intersecting the southwest wall. All holes are oriented to the northeast. In Grota Seca, numerous holes were collared in the center of the proposed pit area with 12 holes drilled into the southwest wall. Several of the holes were oriented to the southwest. Eight were drilled towards the northeast.

Table 16-1 shows a summary of work conducted and the number of field and laboratory tests carried out.

Table 16-1: Summary of Geotechnical Logging and Testing

Work Executed	Quantity
Geotechnical Core Description (m)	7,072
Fracturing Attitude Measurements	2,236
Point Load Tests	238
Tilt Test	64
Seepage Tests (permeability of different types of soils)	17
Packer Test	30
Uniaxial Compression Test	26
Triaxial Compression Test	34
Shear Strength Tests	20
Indirect Tensile Strength (Brazilian Test)	46

The attitude measurements determined in the field were obtained from drill core samples oriented through the ACE Core Tool (ACT) method, taking into consideration only the open discontinuities. The main types of discontinuities collected were fractures, foliations, and less frequently faults with cm to mm displacement.

These structures were collected for evaluating the structural behavior of the design and to verify its influence on the stability of the final pits.

Stereographic projection of the foliation of the Ouro Verde pit data shows an average dip of 60° to south-west. The dispersion present in the stereogram reflects the anastomotic pattern of the mylonitic foliation. The Grota Seca area foliation has a separate orientation from that observed in the Ouro Verde deposit area. In the Grota Seca area, it is sub-vertical to vertical dipping to south-west and north-east.

The faults generally observed have a north-east to south-west direction with a 55° dip to north-west.

Each described parameter was statistically analyzed in order to gather enough information for interpretation and development of the geomechanical model.

The geomechanical classification of the rock mass under study was developed based on the geomechanical descriptions of the drill core samples. In the pit areas the rock mass is constituted by five classes:

Class V Rock Mass (very poor rock) – surface rock mass covering the largest portion of the area; constitutes a very poor geomechanical rock mass, with low strength, completely altered and fractured. The highest Class V thicknesses, comprising mature residual soils, transported soils, and saprolite of about 10 m are concentrated to the south of both pits.

Class IV Rock Mass (poor rock) – poor rock mass comprising very altered and fractured rock; located near the surface covered by the Class V rock. It is the most restricted among the strata occurring mostly in the form of lenses. Its thickness varies between 2 m and 15 m, with an average of 5 m. Generally, this class represents the soil-rock transition zone.

Class III Rock Mass (fair rock) – comprises fractured rock mass. The rocks exhibit moderate to high strength and low alteration. The Grota Seca pit has a variable thickness between 10 m and 60 m, with average thickness of 25 m that decreases to the north. With a localized occurrence in the northeast portion of the Ouro Verde, Class III exhibits thickness varying from 10 m to 50 m, and is exposed on practically the entire north slope of the pit.

Class I-II Rock Mass (good / very good rock) – the most relevant to the study, representing approximately 80% and 68% of the exposed area of the slopes of the Ouro Verde and Grota Seca final pits, respectively. Corresponds to a rock mass with very good geomechanical quality, characterized by a sound rock mass with high strength, unaltered and with little fracturing. Classes I and II were grouped in the same group, since for the purpose of the design of the slopes in question, both classes display similar geomechanical behaviour.

These geomechanical types are shown in typical sections for Ouro Verde and Grota Seca in Figure 16-1 and Figure 16-2.

Figure 16-1: Typical Geomechanical Section – Ouro Verde Pit

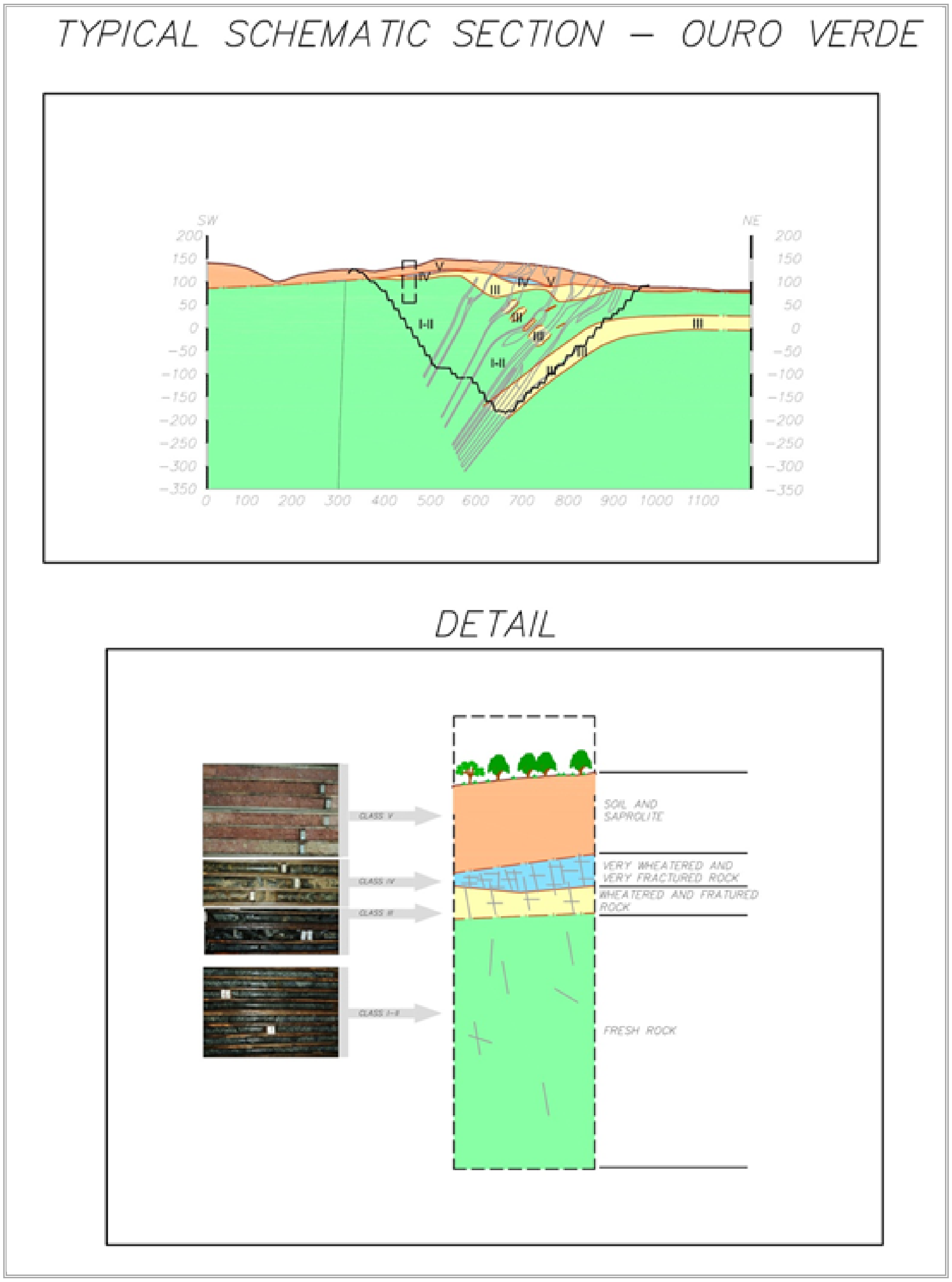
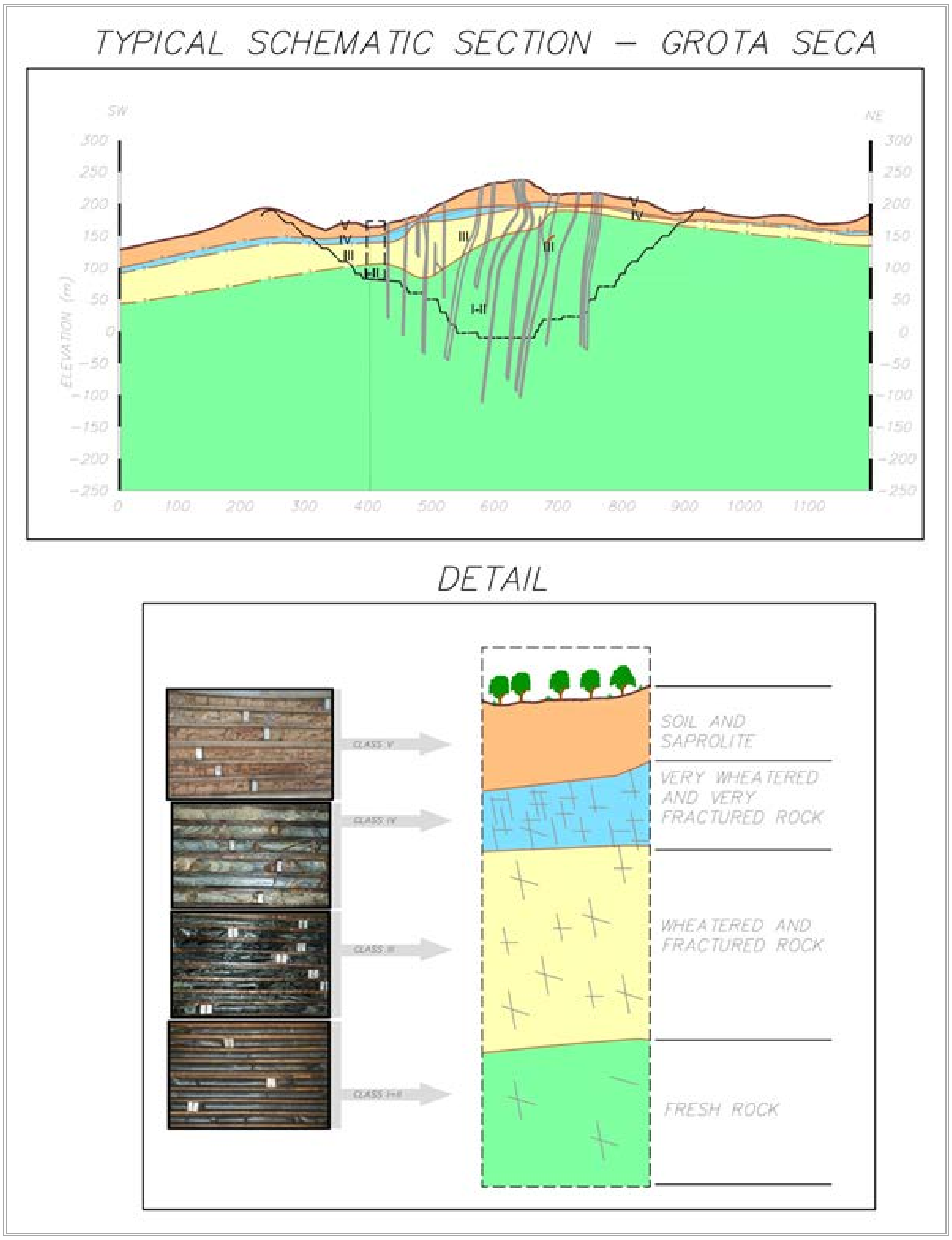


Figure 16-2: Typical Geomechanical Section – Grota Seca



Based on the results of the geomechanical analysis, the Ouro Verde pit was divided into 7 sectors (Figure 16-3) and the Grota Seca pit was divided into 10 geometric sectors (Figure 16-4).

Figure 16-3: Pit Slope Sectors – Ouro Verde Pit

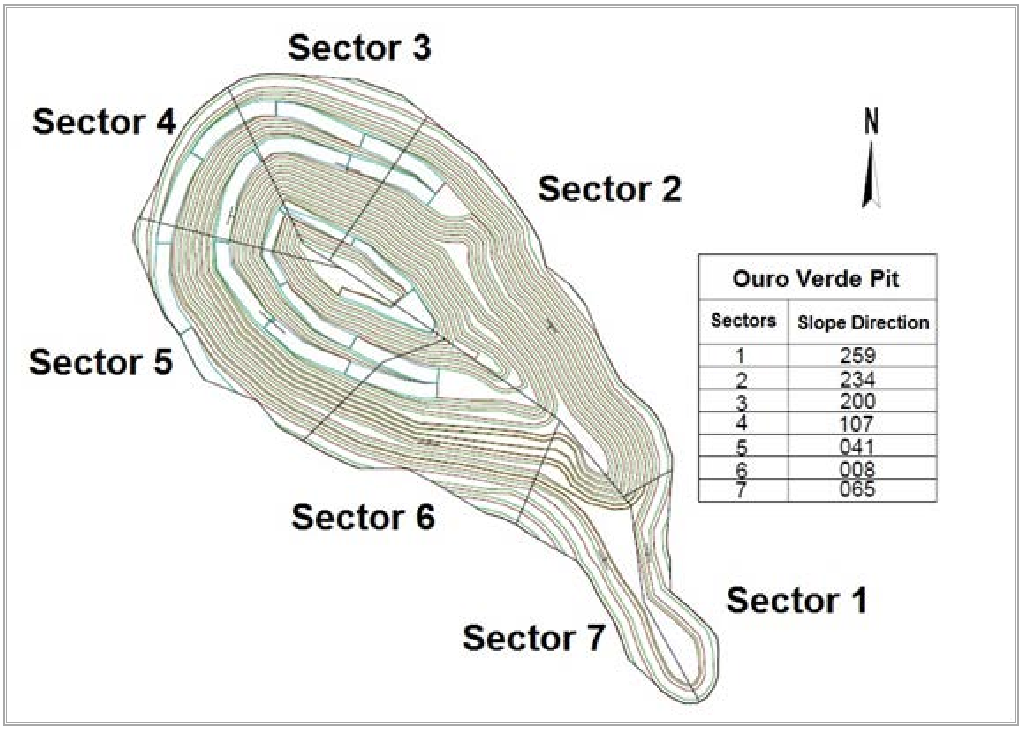
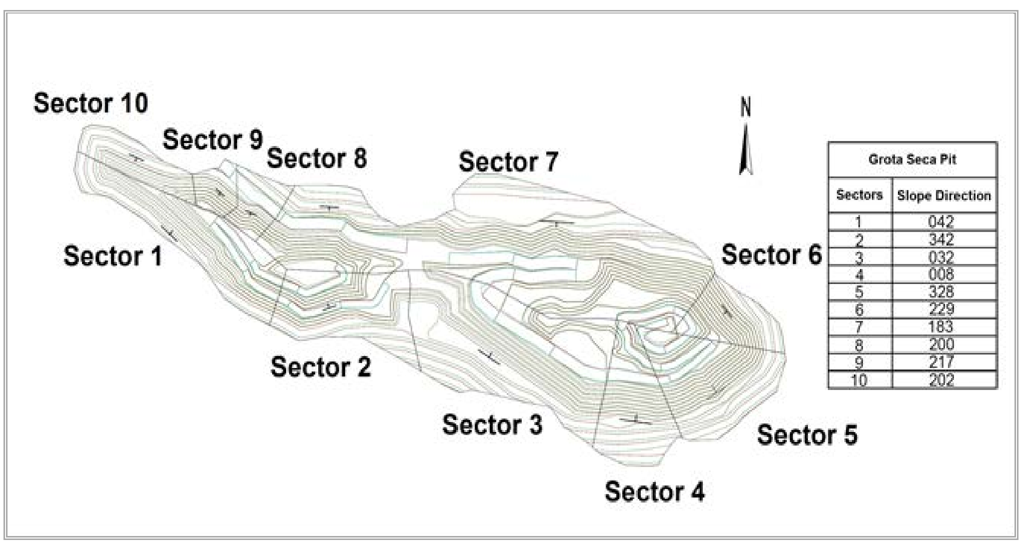


Figure 16-4: Pit Slope Sectors – Grota Seca Pit



Within these sectors, slope analysis was completed. The purpose of the stability analysis was to determine the minimum safety factors of the final pits considering the different types of materials, and geometric and hydrogeological conditions. Slope designs were based on bench angles, inter-ramp angles and overall slope angles. The bench heights were discussed with Belo Sun and AGP prior to the design work initiating.

Kinematic analysis was completed for each section with various configurations. Potential modes of failures examined and considered in the slope criteria. The sectors were examined for the potential of wedge failures and toppling failures. With 10 m high benches, the exhibited factors of safety were quite high. A preference for 20 m heights between safety benches was discussed and examined. The results of that analysis were also favourable.

As a result of the analysis, the design parameters were provided for detailed design of the pits. The geometric sectors that have similar bench and inter-ramp angles were grouped in geotechnical sectors. A maximum inter-ramp height of 150 m was also included to provide sufficient catchment in the event of minor safety bench losses.

The proposed design criteria for mine design are shown in Table 16-2.

Table 16-2: Proposed Geometry for the Final Pit

Class	Sectors	Berms m	Bench		Inter-Ramp "Bench toe-to-toe"	
			Maximum Height m	Maximum Angle °	Maximum Height m	Maximum Angle °
V/IV	ALL	6.5	10	45	50	31
III	1	8.5	20	70	150	52
	2			70		52
	4 and 5			65		48
	3 and 6			85		63
I-II	1	8.5	20	70	150	52
	7			70		52
	2			70		52
	5			75		55
	4			80		59
	3 and 6			85		63

Note: A 20 m wide safety bench is to be included every 150 m vertically.

The studies provide the basis for the design phase regarding the geotechnical stability of the pits in question, allowing for a confidence level sufficient for the characterization and designs executed. The slope stability based on the geometries proposed for the pits offer acceptable stability at the bench face and inter-ramps angles, with safety factors above 1.3.

The studies performed do not provide guidance regarding the geometries to be used during the implementation phase but are sufficient for the design of the final pits at this level of Study.

The boreholes executed were scheduled on the basis of the pits provided by Belo Sun prior to the Study. The pits currently provided by Belo Sun for the development of this study differ from the previous pits of the Preliminary Economic Assessment (PEA). For this reason, some drill holes did not reach the final wall of the pits to a depth sufficient to allow a better geotechnical and structural understanding of these sectors. In order to obtain a design with basic / detailed level it will be necessary to acquire more knowledge of the geometries of the geological discontinuities (structural model) of these regions, for these are the orientations governing the behavior of the rock masses regarding eventual occurrences with geometric potential for slides.

In order to evaluate the hydraulic load profile of the current underground water and load of the final pit, data from previous work on site was used.

The more superficial horizons of the terrain, which includes the soil layer, saprolite, and the intensely fractured and altered rock, accommodate and govern the dynamic of the underground water in the region.

A site investigation program was developed and executed for assessing the connectivity between the pit and the Xingu River, which borders the northern side of Ouro Verde. The studies were conducted primarily in the Ouro Verde pit region, due to the proximity between the pit limits and the Xingu River.

Permeability tests were analyzed together with the rock mass classes, where it would be expected to find higher permeability values for the classes below II-I. However, when analyzing the data obtained from the tests on the fractured section, it was verified that there is not a significant permeability variation, and those found are low and show high homogeneity along the borehole. From the drilling completed, it is noted that the rock mass does not exhibit persistent discontinuities, indicating that apparently there is no connection between the pit area and the Xingu River. Another important characteristic that may be highlighted is that there was not any water supply observed from the rock mass to the interior of the borehole during the drilling process. However, it should be noted that this investigation was executed by means of 10 boreholes, since they are considerably spaced, does not eliminate the possibility of a non-surveyed structure that may connect the river to the pit.

16.2 Open Pit Mining

16.2.1 Introduction

Open pit mining was selected as the method to examine the development of the Ouro Verde and Grota Seca deposits. This is based on the size of the resource, tenor of the grade, grade distribution, and proximity to topography. AGP is of the opinion that with current metal pricing levels and knowledge of the mineralization that open pit mining offers the most reasonable approach for development.

16.2.2 Geologic Model Importation

SRK developed the resource model together with Belo Sun. This model was provided to AGP in March 2015 and forms the basis for the work completed in the Feasibility Study. The resources contained within the model are shown in Table 16-3.

Table 16-3: March 2015 Model - Resources

Classification	Resource Kt	Grade g/t Au	Contained Gold Koz
Measured	44,075	1.07	1,512
Indicated	112,518	0.95	3,444
Measured + Indicated	156,593	0.98	4,956
Inferred	39,767	0.90	1,151

The mineral resources are contained within an open pit shell using the Lerch-Grossman (LG) algorithm. The pit shell is defined using a $1,400/oz gold price, metallurgical recovery of 94% and a cut-off grade of 0.4 g/t Au.

The South Block is not considered in the Study and the resources associated with South Block are not converted or discussed further.

The March 16 2015 resource model is a whole block model in an ASCII format from Gemcom. The ASCII file contained the rock type, density, gold grade, percentage of the block in the very low grade wire frame and classification. The ASCII file was imported into a MineSight model of the same dimensions as the original resource model. MineSight was used for the mining portion of the study to take advantage of the included LG routine for economic pit-shell development. The boundaries for the model are the same as the March 2015 model from SRK. The model is rotated 17° clockwise around the origin.

The specific gravity (SG) for the various lithology types was also imported. The average SG in the model are saprolite (1.36) and rock (2.75). Each block carries its own SG.

The grade in each block is a fully diluted grade. This means that the block has one gold grade for the entire tonnage of the block. No ore percentages are considered in the block model provided. All of the block model items remain the same as in the geologic model.

Only measured and indicated resources were used in the Study. All inferred material was considered as waste with zero grade assigned.

For pit design resources, additional model blocks were removed from the ore calculation where AGP felt they would not actually be mined in practice. These were blocks that were surrounded on all sides by below cut-off material resulting in a diluted grade below the expected cut-off gold grade.

16.2.3 Economic Pit Shell Development

To determine the potential size of the open pit, various input parameters were required. These include estimates of the expected mining, processing and general and administrative (G&A) costs, as well as metallurgical recoveries, pit slopes and reasonable long term metal price assumptions.

For pit design resources, additional model blocks were removed where AGP felt they would not actually be mined in practice. These were blocks that were surrounded on all sides by below cut-off material resulting in a diluted grade below the expected cut-off gold grade.

Table 16-4: Pit Optimization Parameters

Operating Cost	Unit	7 Mt/a
Base	$/t	2.05
Processing Cost	$/t ore	7.68
G&A	$/t ore	0.93
Gold Recovery	%	93.4
Gold Payable	%	99.9
Refining Charges	$/oz	23.60
Royalty	%	1.00

The gold price was varied from $900/oz to $1,200/oz initially at $20/oz increments. Using the LG algorithm, a series of economic pit shells were developed. The tonnes and grade of waste and ore were tabulated and a simple revenue calculation completed to determine net revenue, with which to rank the shells.

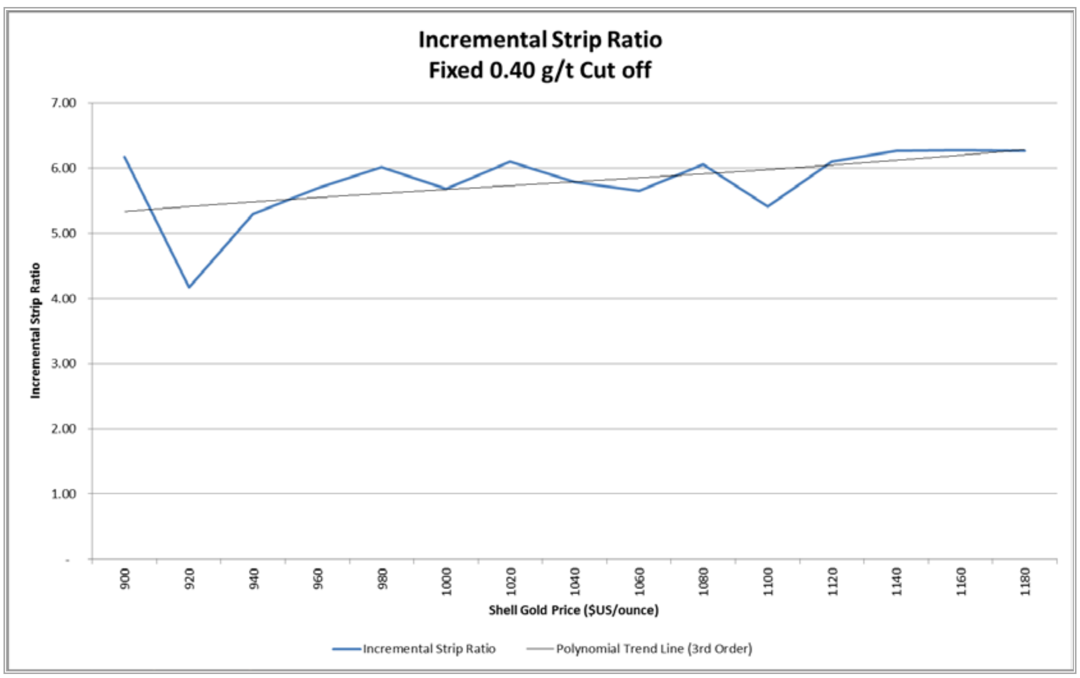
This was done at various gold prices to select the optimal pit shell, which will provide the largest economic return. As expected, as the gold price increased the larger pit shells with their larger resource, but lower average grade, showed the highest net revenue. However, the increase in net revenue was not as great as anticipated due to the increased stripping costs associated with the larger pits. This was a result of the incremental strip ratios and a limited resource of lower grade material.

The net revenue difference between the $900/oz pit shell and the $1,200/oz pit shell using a fixed $1,150 gold price was only $118 million dollars with no consideration for capital. The increased capital would come from increased stripping requirements and also tailings storage. But the overall material movement for the pit shells was 191 Mt. This equates to roughly 6 more years of stripping for an ore tonnage increase of only 23 Mt (an incremental strip ratio of 8.3:1). AGP believed that the larger pit shells were not adding significant value. The variation in net revenue between pits was negligible and the only increase in net revenue was with the gold price. As the gold price rose, the overall net revenue across the span of pit shells increased.

So using a fixed cut off grade of 0.40 g/t Au, a comparison of the incremental strip ratios between the pits was completed. This is shown in Figure 16-5.

Examining the curve of the slope, the $1,020/oz pit seemed to be the inflection point for the strip ratio. Beyond this pit shell, the incremental strip ratios tended to be roughly the same, although there was some oscillation in the actual strip ratios as different pockets of grade were mined.

Figure 16-5: Incremental Strip Ratio Comparison



Deciding on $1,020/oz gold price due to reduced incremental strip ratio resulted in an initial pit shell with 3.9 Moz Au. The larger $1,200 pit shell had 4.2 Moz in the shell, but the net revenue difference was only $45 million dollars out of a total net revenue of $1,914 million dollars (2.4% of total). The additional revenue was not believed to add sufficient value with the larger pit shell.

Based on this, the $1,020/oz pit shell was used as the basis for the Study design.

16.2.4 Dilution Calculation and Orphan Blocks

The model from SRK was a whole block, fully diluted model. This means the grade from the wire frames was diluted over the full volume of the block to arrive at a diluted block grade. SRK completed an internal analysis using the various gold grade domain wireframes to determine their estimate of the amount of internal block dilution within the PEA final pit shapes.

Resources were calculated undiluted and fully diluted. The resource comparison is shown in Table 16-5.

Table 16-5: SRK Block Comparison

Category	Tonnes x1000	Grade g/t Au	Au oz
Fully Diluted Model			
Measured	39,134	1.09	1,374,323
Indicated	67,645	1.00	2,178,161
Measured + Indicated	106,778	1.03	3,552,484
Undiluted Block Model			
Measured	28,497	1.49	1,366,380
Indicated	47,292	1.43	2,175,465
Measured + Indicated	75,789	1.45	3,541,845
Dilution Percentage			
Measured	27%	37%	
Indicated	30%	43%	
Measured + Indicated	29%	40%	

The calculations were based on cut-off grades of 0.37 g/t Au for Ouro Verde and 0.42 g/t Au for Grota Seca.

AGP had completed dilution calculations using the previous model for the PEA. This model used similar wire frames for grade domaining but did not have the most current drillhole database. It was an ore model that required calculation to arrive at each blocks ore percentage. AGP had assumed a dilution thickness of 1.25 m per block side that would be diluted. The calculations with that model resulted in a dilution of 17.2% using an average waste grade of 0.223 g/t Au.

The fully diluted block model in AGP's opinion represents a conservative estimate of diluted grade and tonnes. For this reason no additional dilution is added for the reserves calculation.

The model contains individual blocks with interpolated grades isolated in various parts of both pit areas. AGP believes that operationally these isolated (orphan) blocks may not justify their mining due to their size and potential additional dilution from four sides. To eliminate these blocks, AGP used a mining cut-off grade of 0.37 g/t Au and applied this to the mining model to determine the number of adjacent blocks on a given level that were surrounded by below cut-off material.

The diluted value is calculated for the block using a script within Minesight to calculate the diluted grade with the four sides. Dilution of 1.25 m per side is assumed with the associated waste block grades. The diluted block grade is then calculated and stored in another model.

The entire model was queried for blocks surrounded by four blocks of waste. If the diluted grade for the block was below cut-off it was eliminated from the reserve calculation as ore.

If the block had significant grade (i.e. greater than 1 g/t Au) the block was considered to be mined. In practice these blocks may not be mined but that will be a decision of the short range group.

The grade was then stored in the model and used reporting grades in the pit designs.

16.2.5 Pit Design and Phase Development

Pit designs are developed for both the Ouro Verde and Grota Seca areas of Project. The pit designs are based on ultimate pit shells developed in each area using the $1,020/oz gold price.

Using a series of lower gold price shells developed in the economic pit development and the diluted grades, a series of phases were designed for each pit area. These phases were sized based on targeting tonnage for several years of ore, with sufficient width to accommodate the size of mining equipment envisaged (136 t). This meant haul roads with a minimum width of 28 m to allow proper double lane traffic (larger widths are present in some areas), and a minimum pushback for phase width of 80 m, with normal widths of +100 m. Double lane traffic in this case refers to three times the operating width of the trucks, plus room for berms and ditches. Ramp grades are 10% for uphill loaded configuration in the pits and 8% for uphill on the waste dumps.

Topography and access were also considered as in many instances in Grota Seca pit designs were limited by this. Due to the topography, a second or third phase was not always possible to design with leaving reasonable operating width or the ability to access with a ramp. In those cases, a larger phase was designed than a nested shell would have indicated.

The detailed pit designs were based on the detailed parameters provided by VOGBR as showed in Table 16-2.

Five phases were designed in Ouro Verde with the quarry phase (Phase 4) just a subset of Phase 3. Three phases are in a concentric nature for their design and a satellite pit. Phase 5 is the satellite pit to the southeast of the main Ouro Verde phase designs that comes later in the pit development.

Grota Seca has six phases designed in a “pod” configuration mining select higher-grade portions and working within the topography for access development. The tonnes and grade by pit area and phase are shown in Table 16-6.

Table 16-6: Final Design – Pit Tonnages and Grades by Phase

Phase	Ore Mt	Au g/t	Waste Mt	Total Mt	Strip Ratio
Ouro Verde					
1	8.6	1.16	20.2	28.8	2.34
2	10.0	1.08	41.4	51.3	4.16
3	34.7	1.08	169.6	204.2	4.89
4 – Quarry	0.3	0.73	10.7	11.0	31.20
5 – Satellite	1.6	0.77	6.4	8.0	3.91
Subtotal	55.2	1.08	248.2	303.4	4.50
Grota Seca					
1 (E1)	18.7	1.02	56.4	75.2	3.01
2 (E2)	27.8	0.86	118.7	146.5	4.27
3 (WC1)	4.8	1.11	12.9	17.7	2.70
4 (EC)	1.7	0.80	6.8	8.4	4.09
5 (W)	2.1	1.14	15.7	17.8	7.39
6 (WC2)	7.7	0.91	45.1	52.7	5.88
Subtotal	62.7	0.94	255.6	318.4	4.07
Total	117.9	1.01	503.8	621.8	4.27

The resources for the pit design are based on a lower cut-off grade of 0.37 g/t Au for Ouro Verde and 0.40 g/t Au for Grota Seca. Only measured and indicated resources are reported with inferred resources included in the waste tonnage.

Three main phases were designed for Ouro Verde in a concentric manner. The phases were designed to maximize early revenue.

Phase 4, the quarry pit is a subset of Phase 3. This phase provides the mine with the opportunity to test blast patterns, wall control designs and supplies construction material for roads and site structures.

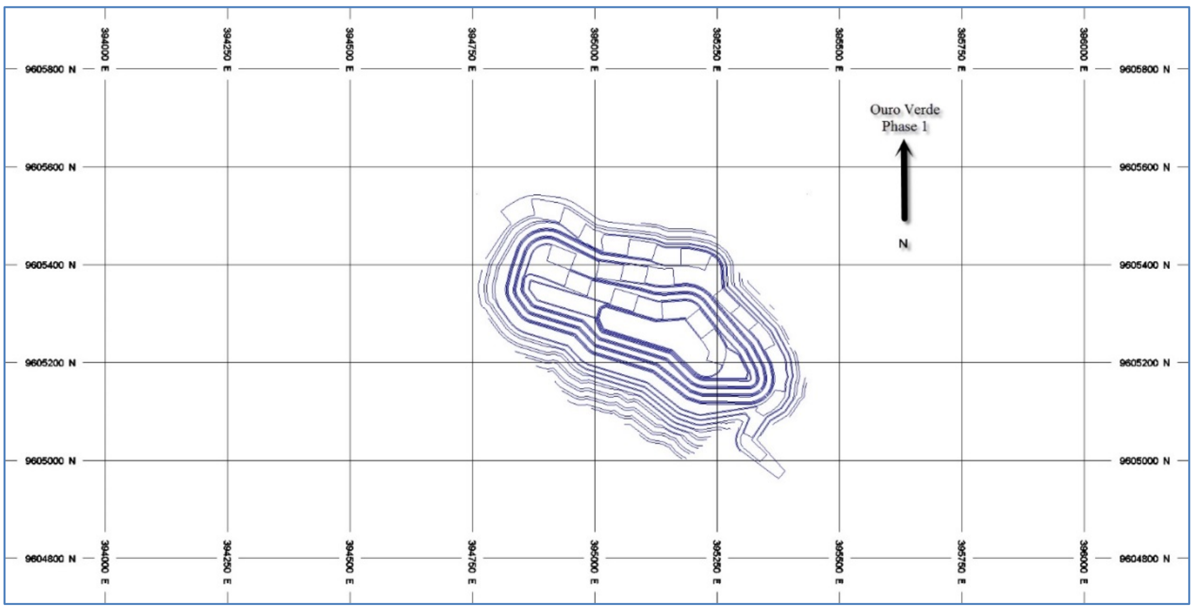
Ouro Verde Phase 5 is a separate satellite pit.

The design phases are described below and with their associated figures for reference.

Ouro Verde – Phase 1

Phase 1 development in Ouro Verde considers the development of two accesses (Figure 16-6). The main access, which enters on the north side of the pit, is double lane, with switchbacks on the north side (footwall) to provide proper access to the mineralized zone and avoid locking the higher grade on the south side within it. A single lane access is developed and maintained for one-way uphill traffic, primarily ore to the mill. This temporary access road shortens the ore haul by 500 m. It is also used to shorten the haul on some of the waste by being able to haul directly to Grota Seca for road construction or use in filling the low-grade stockpile pad. Other waste material can use the double lane route for the main Ouro Verde waste management facility (WMF) or for material to lift the TMF dam.

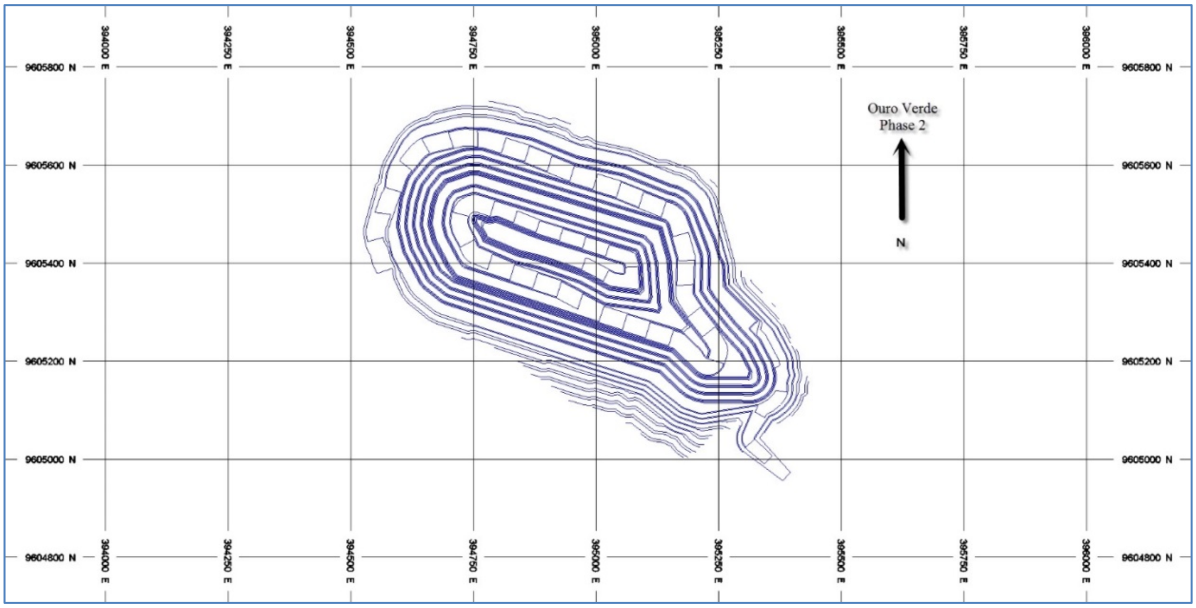
Figure 16-6: Ouro Verde Phase 1



Ouro Verde – Phase 2

Phase 2 in Ouro Verde expands on the development of Phase 1 but cuts off the temporary ore access road as downward development progresses. The phase expands to the northwest with a new access road and also deepens Phase 1. At this time, the ramp is also developed on the south side of the pit to reduce the initial switchbacks.

Figure 16-7: Ouro Verde Phase 2



Ouro Verde – Phase 3

A portion of Phase 3 is mined in Year -1 to act as a source of construction material (Figure 16-8 and Figure 16-9). This will be used to widen roads, build the low grade stockpile and establish the drainage channels in the waste management facilities with rock. The phase expands the pit to final limits and depth for the Study mine plan. It is limited on the north by the Xingu River and at depth by incremental strip ratio. The access for ore and waste exits on the south side as the other phases did for easy access to the WMF and process plant haul road.

Figure 16-8: Ouro Verde Phase 3

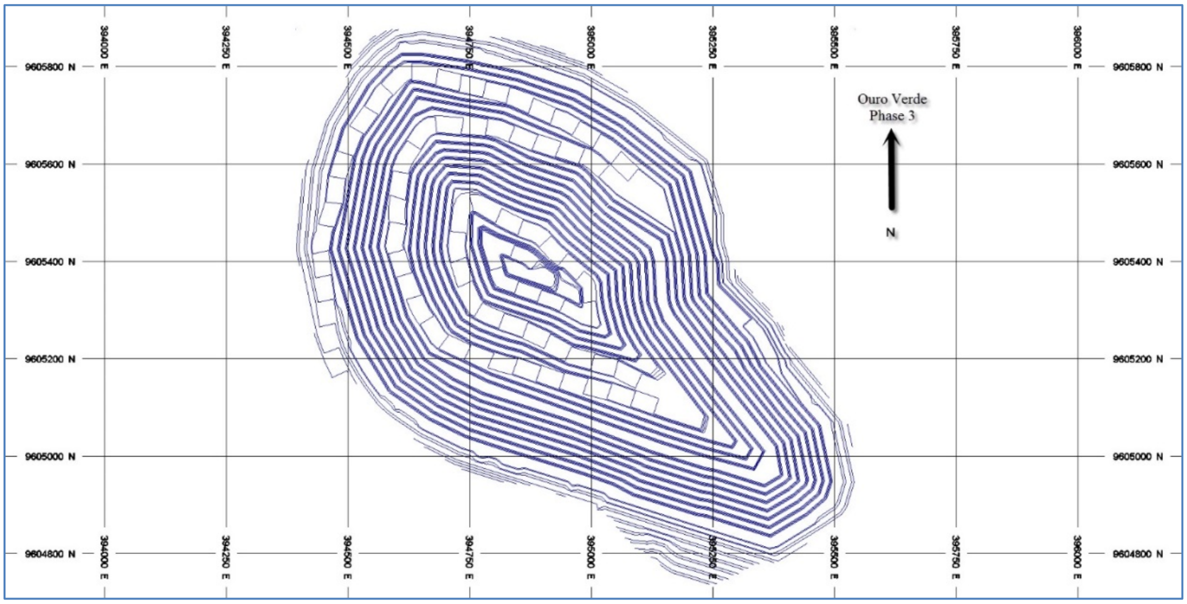
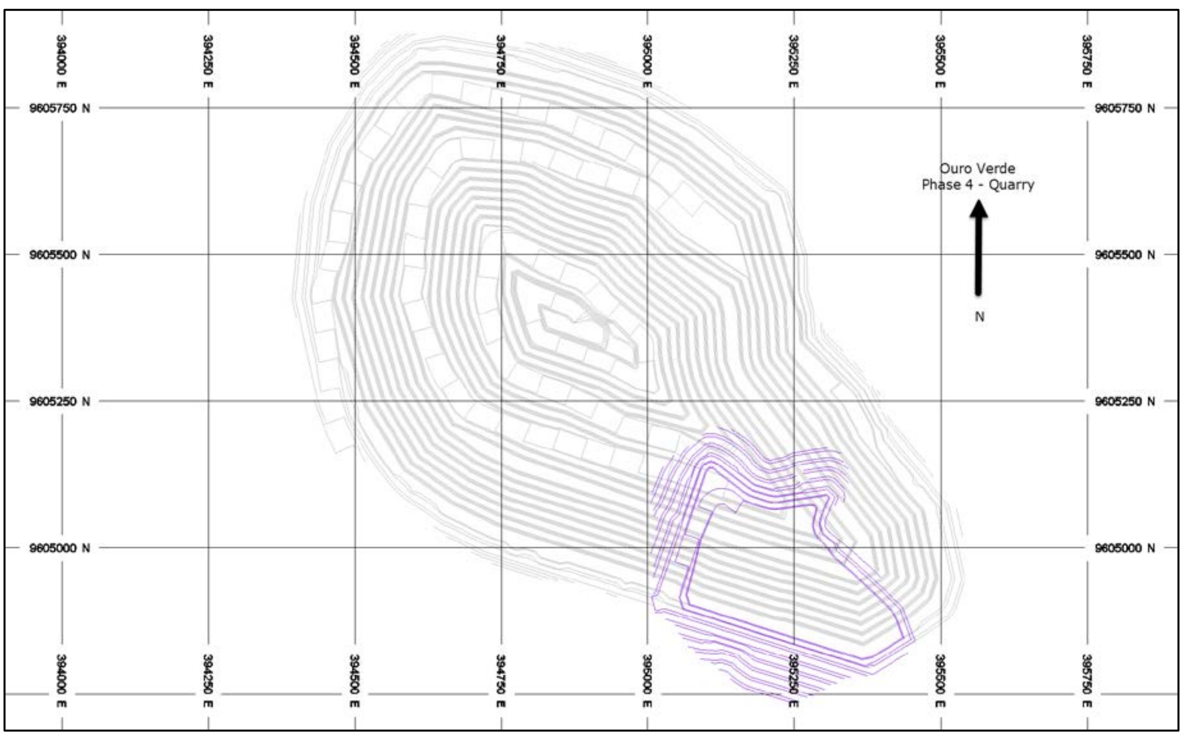


Figure 16-9: Ouro Verde Phase 4 (quarry in purple)



The quarry is outlined in purple with the Phase 3 design in light grey. The quarry is a subset of Phase 3 and uses the same south wall.

Phase 5 is a satellite pit to the south-east of the main Ouro Verde pit, along the south access road.

Figure 16-10: Phase 5 – Satellite Pit

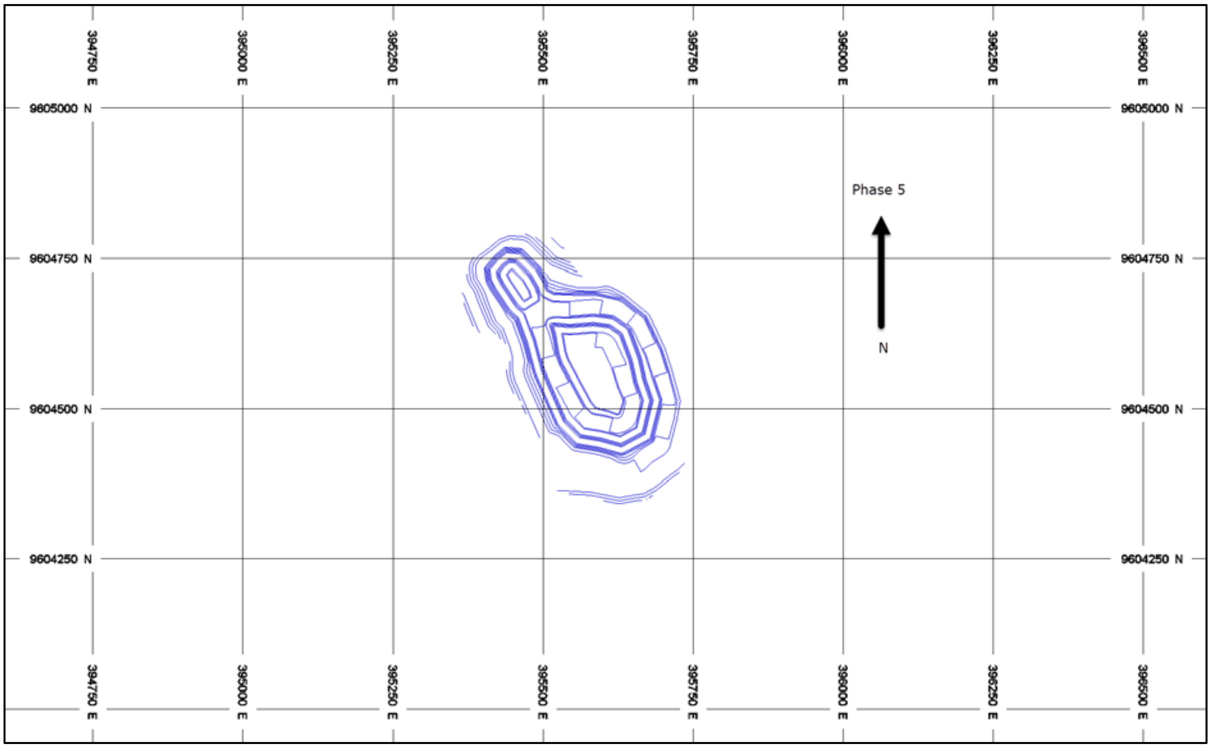
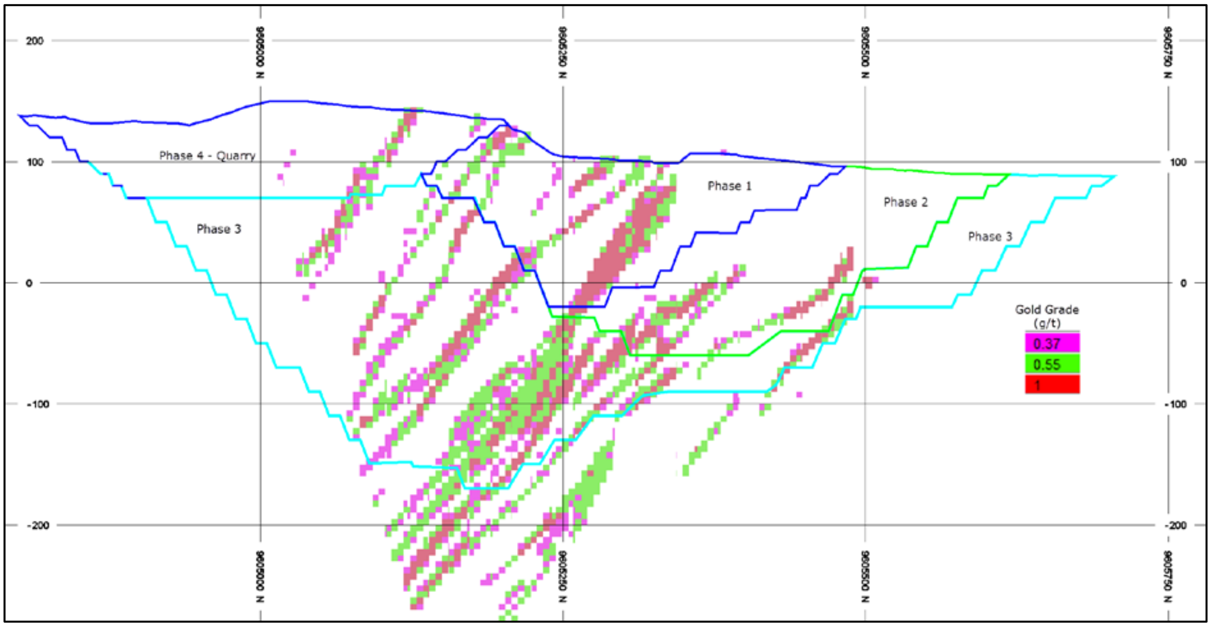


Figure 16-11 shows a representative cross-section through the Ouro Verde pit.

Figure 16-11: Ouro Verde Cross-Section Looking West at Easting 395120

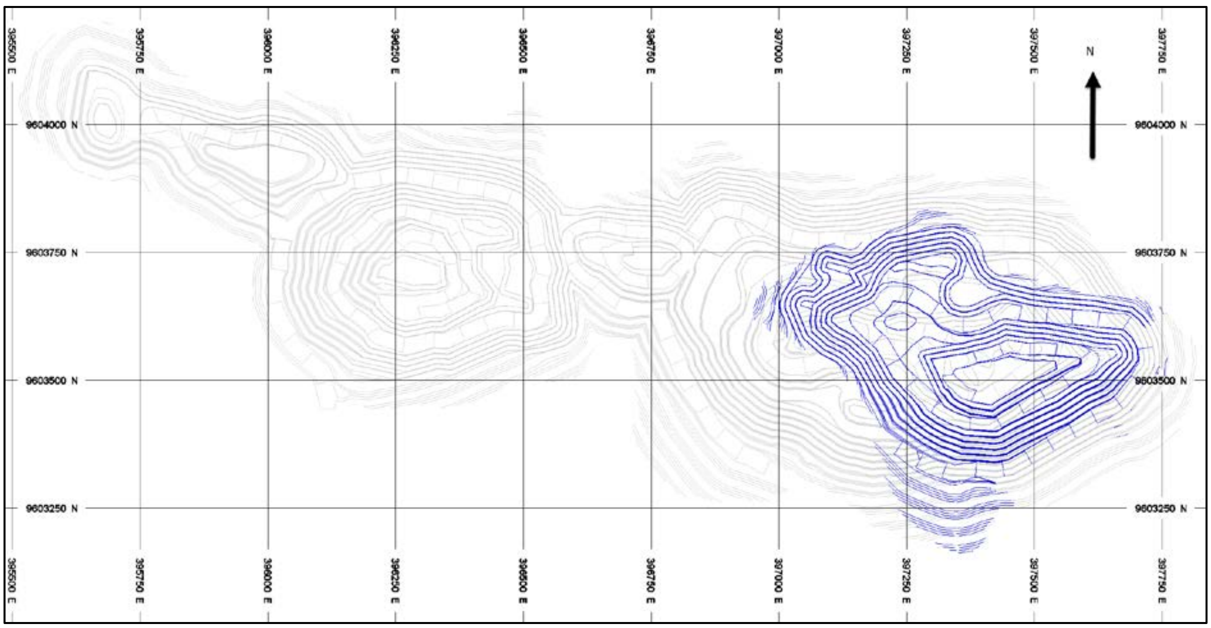


Grota Seca – Phase 1 (E1)

The Phase 1 design, like many of the other Grota Seca phase designs are stand alone as a result of the topography associated with the deposit. Access is from the south and takes advantage of a valley on the south side to reduce strip ratio. The ramp starts on the south side of the deposit and wraps around the steeply dipping mineralized zone.

The current phase discussed is shown in dark blue with the outline of the final Grota Seca pit shown in light grey in the background.

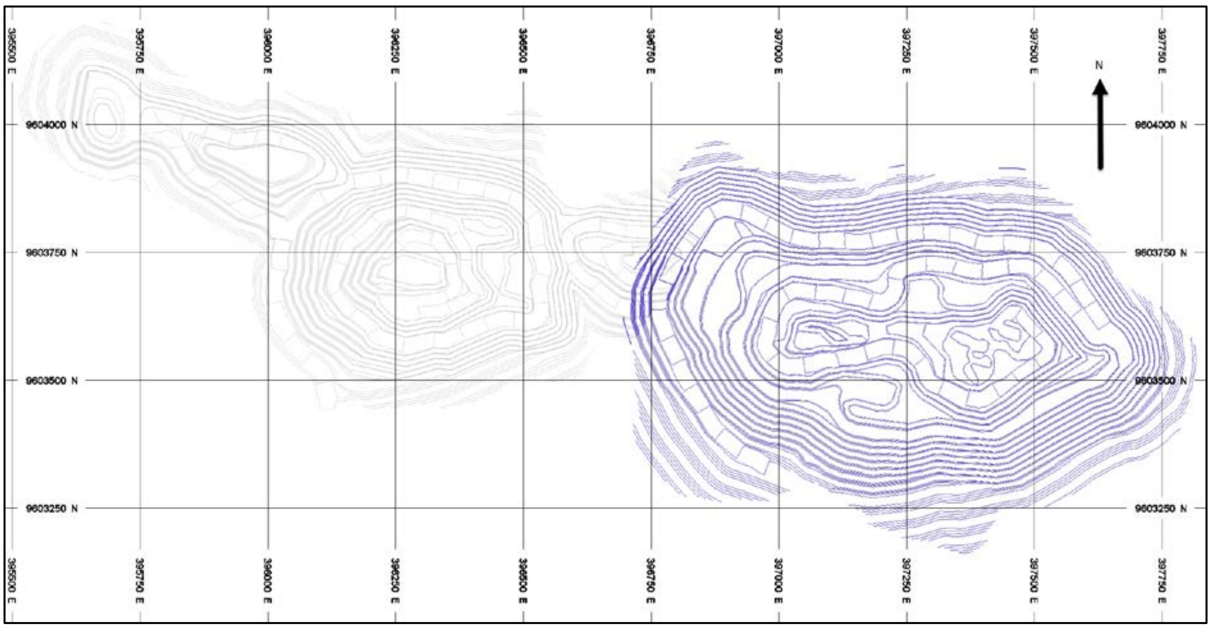
Figure 16-12: Grota Seca Phase 1 (East 1)



Grota Seca – Phase 2 (E2)

Phase 2 is an expansion of Phase 1, but is mined later in the mining schedule due to the lower grade associated with the phase and the initial development tonnages. While it is one of the larger phases, the pre-strip and more difficult terrain pushes it to Year 2 in the schedule. The access for this phase takes advantage of a valley to the west of the Phase 1 access allowing for reduced disturbance during mining.

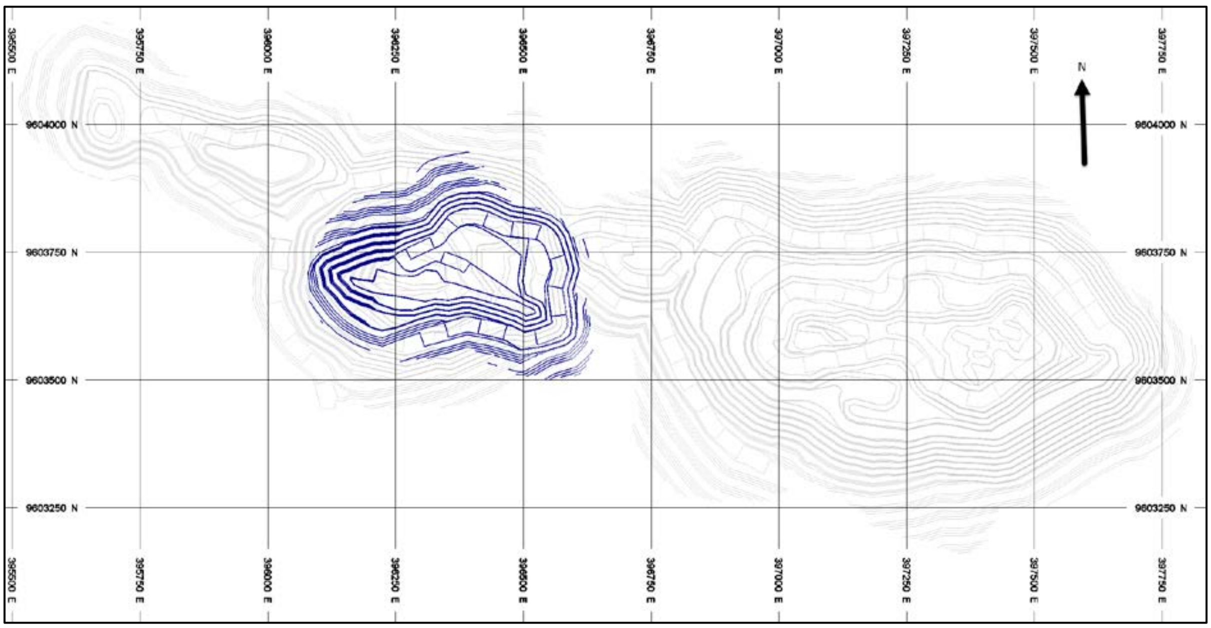
Figure 16-13: Grota Seca Phase 2 (East 2)



Grota Seca – Phase 3 (WC1)

Phase 3 is called West Central 1 (WC1). It is the first of 2 phases mined in the center of Grota Seca. In the same manner as the other Grota Seca phases, local topography plays a role in the access design. A small valley is used to initiate the ramp, which wraps around the pit chasing the higher grade to depth. This is a result of the variable nature of the grade in Grota Seca as well as pockets of higher grade existing.

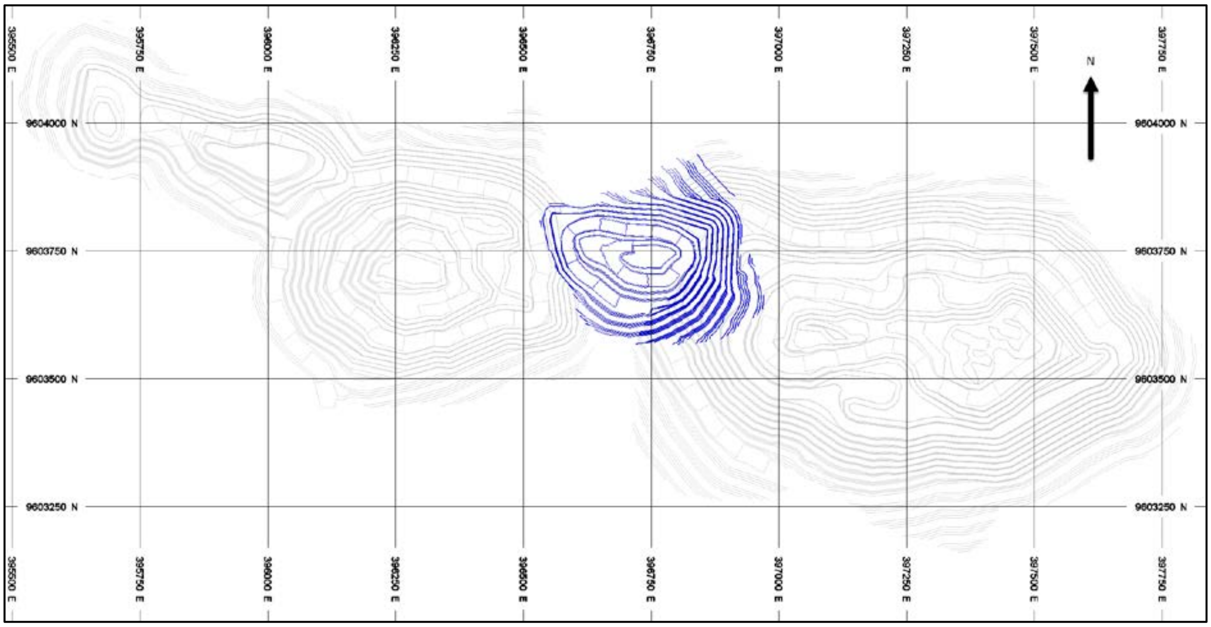
Figure 16-14: Grota Seca Phase 3 (West Central 1)



Grota Seca – Phase 4 (EC)

Phase 4 in Grota Seca is designed between the West Central pit and the East pits. Access is off the East Central pit and then dives after a zone of higher grade.

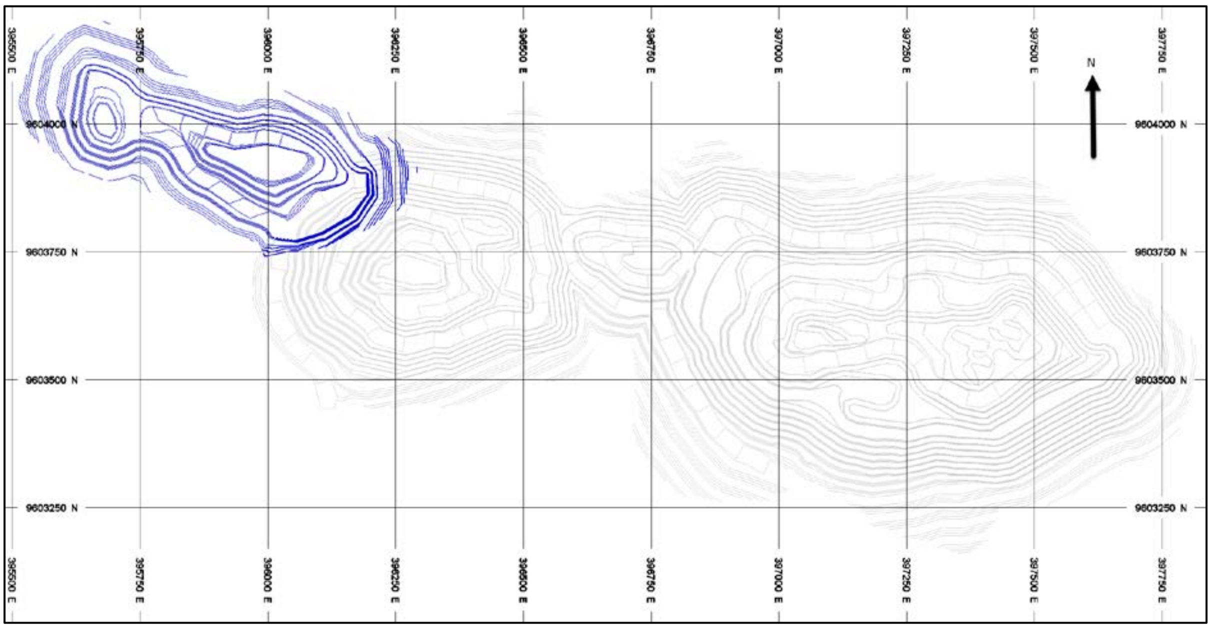
Figure 16-15: Grota Seca Phase 4 (East Central)



Grota Seca – Phase 5 (W)

The most westerly phase in Grota Seca also ties off the West design to save developing a new access ramp and increasing the strip ratio (Figure 16-16). It is extracting a series of higher-grade zones on the west side of Grota Seca. This is mined after Phase 6 is initiated.

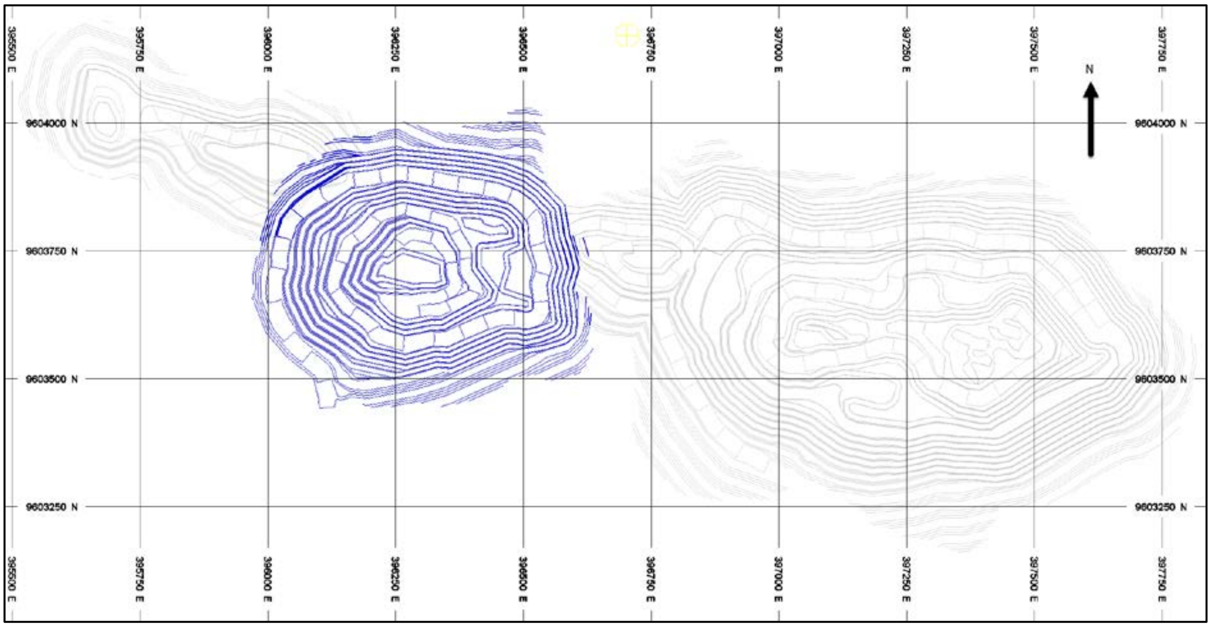
Figure 16-16: Grota Seca Phase 5 (West)



Grota Seca – Phase 6 (WC2)

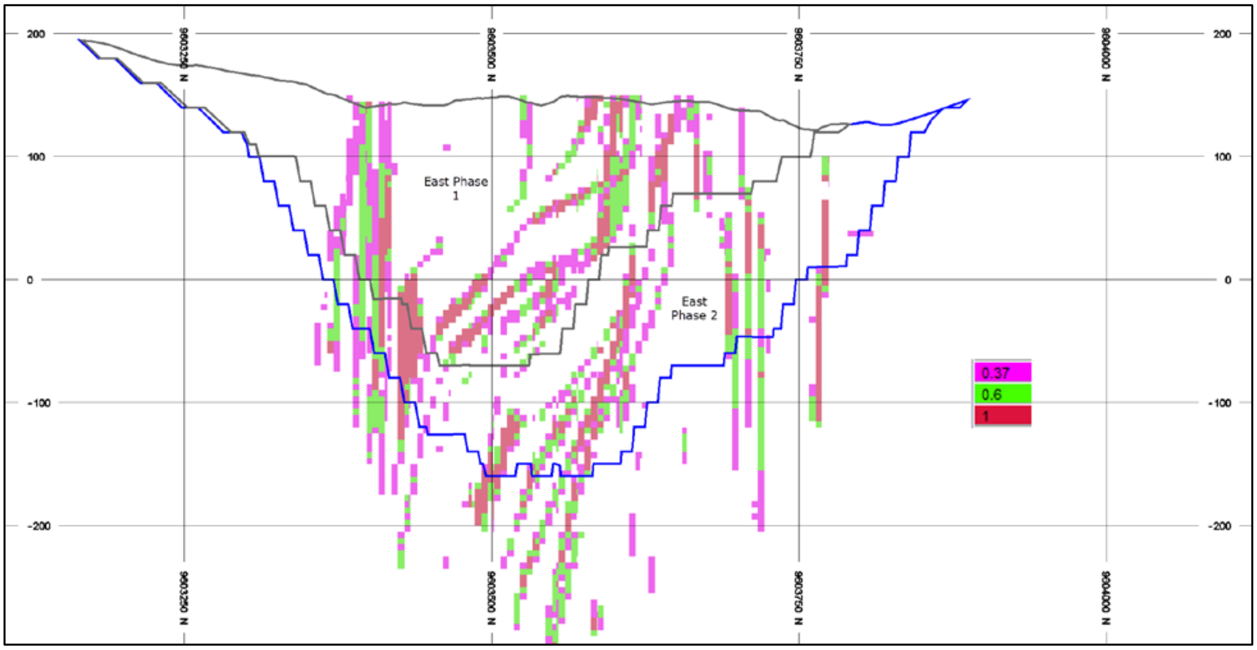
The second phase in the West Central pit (Figure 16-17). This phase was mined prior to Phase 5.

Figure 16-17: Grota Seca Phase 6 (West Central 2)



A representative cross section for Grota Seca East is shown in Figure 16-18. This is where the bulk of Grota Seca's tonnage is mined.

Figure 16-18: Grota Seca East Representative Cross-section Looking West (Easting 397380)



Actual tonnages for each phase for scheduling were determined as high, medium, and low grade. High grade was defined as greater than 1 g/t Au. Medium grade equated to the mining cut-off, which varied by pit depending on recovery but was between 0.55 g/t Au (Ouro Verde) and 0.6 g/t Au (Grota Seca) to 1 g/t Au. The low grade cut-off used also varied slightly by pit due to recovery in each block but was approximately 0.37 g/t Au for Ouro Verde and 0.40 g/t Au for Grota Seca.

The breakdown of tonnes and grade were tabulated by phase then scheduled in the mine schedule.

16.2.6 Feasibility Mine Schedule

The Feasibility Study mine schedule is a staged sequence, providing 3.5 Mt/a initially, then ramping to and maintaining 7 Mt/a for the remainder of the mine life starting in Year 3. The ore tonnage selection is based on three cut-offs:

- Low Grade – Ouro Verde (0.37 g/t Au), Grota Seca (0.40 g/t Au);
- Medium Grade – approximately Ouro Verde (0.55 g/t Au), Grota Seca (0.60 g/t Au);
- High Grade – greater than 1 g/t Au.

The higher value phases (low strip ratio and higher grade) are mined initially. This includes OV Phase 1 and GS West Central Phase 1 as described in Section 16.2.5.

Year -1 starts in Ouro Verde mining the Quarry portion of Phase 3 for construction material to widen and improve the mine roads and raise the main tailings dam. The low-grade stockpile pad is developed and the roads to Grota Seca established.

Ouro Verde Phase 1 and Grota Seca West Central (GS West Central) are initiated in Year 1. GS West Central is the highest grade phase of Grota Seca which is used to help commission the mill and advance into production with early high grade ore. Ouro Verde Phase 1 has higher grade than Grota Seca and lower strip ratio so is also mined to help with mill commissioning and advance into mine production with high grade ore.

Process plant commissioning starts in the last 3 months of the pre-production period with saprolite material being used exclusively as the feed. The commissioning continues into the first quarter of year 1 but the saprolite percentage is reduced to a maximum of 10% of the total feed from the larger percentage in the pre-production period. The highest grade is not sent initially in the commissioning process as the tanks fill with material and the processes are debugged. The first quarter of year 1 has 530,000 t of ore delivered at an average grade of 1.18 g/t Au. The remaining quarters of year 1 have deliveries of 989,900 t of ore each quarter with grades of 1.56, 1.73 and 1.58 g/t Au respectively.

Year 1 has ore coming from OV Phase 1 as OV Phase 2 is pre-stripped. Grota Seca is primarily the GS West Central phase as GS East 1 is being pre-stripped. Average grade to the mill during the first year is 1.56 g/t Au for an annual total of 3.5 Mt ore processed.

Year 2 has a slight emphasis with Grota Seca for ore to the process plant. Ouro Verde is providing approximately 44% of the ore. Ouro Verde Phase 1 is providing the majority of the Ouro Verde ore, as Phase 2 is still ramping up in its output. Grota Seca is sending the majority of the ore from the GS East Phase 1 pit in year 2 with the remainder from GS West Central which finishes this year. The mill receives 6 Mt of ore grading 1.46 g/t Au. The saprolite percentage of total feed is maintained at 10% due to the quantity available.

Grota Seca provides 54% of the ore to the mill in year 3. This is still coming primarily from GS East Phase 1, although GS East Phase 2 is just starting to deliver ore. Ouro Verde Phase 2 comes online and Phase 1 is completed this year. The overall grade for Year 3 to the mill is 1.40 g/t Au for 7 Mt of ore processed.

Stripping levels had been 50 Mt/a in Year 1 then averaged 79 Mt/a for years 2 to 5 with the peak at 81 Mt in year 5. From year 6 onwards, the total production rate declines. This increased stripping in that time period is to help with the development of Phase 3 in Ouro Verde and GS East Phase 2. The stripping requirements then tail off to the end of mining in the open pit in year 13.

The low grade stockpile developed throughout the mine life is reclaimed in years 1, 2, 8, 10 and onwards until exhausted early in year 18.

The mine schedule delivers 116 Mt of ore to the process plant at an average grade of 1.02 g/t Au over the 13 years of mining and eight months of pre-production. Total waste movement is 504 Mt for a LOM strip ratio of 4.27:1.

Ouro Verde delivers 55 Mt of ore grading 1.09 g/t Au with a waste total of 248 Mt. The strip ratio for Ouro Verde is 4.5:1 LOM.

Grota Seca delivers 61 Mt of ore grading 0.95 g/t Au with a waste total of 256 Mt. The strip ratio for Grota Seca is 4.1:1 LOM.

The difference in the Phase tonnages and the Study mine schedule are due to the estimated stockpile losses of 1.97 Mt in the floor of the stockpile over the LOM.

Table 16-7: Feasibility Mine Schedule

Period	Ore to Plant Kt	Grade g/t Au	Direct to Mill Kt	To Stockpile Kt	From Stockpile Kt	Waste Kt	Total Material Kt
PP	148	0.70	20	322	128	10,677	11,019
Yr 1	3,500	1.56	3,218	4,871	283	42,280	50,368
Yr 2	6,000	1.46	5,659	6,249	341	61,350	73,258
Yr 3	7,000	1.40	7,000	6,653	-	65,091	78,743
Yr 4	7,000	1.38	7,000	6,757	-	67,185	80,942
Yr 5	7,000	1.26	7,000	3,819	-	70,175	80,994
Yr 6	7,000	1.26	7,000	4,008	-	47,858	58,866
Yr 7	7,000	1.20	7,000	3,530	-	36,054	46,584
Yr 8	7,000	1.12	5,631	2,961	1,369	31,502	40,093
Yr 9	7,000	1.32	7,000	3,738	-	30,016	40,754
Yr 10	7,000	1.25	5,092	1,937	1,908	16,770	23,799
Yr 11	7,000	1.22	5,815	2,109	1,185	16,262	24,185
Yr 12	7,000	0.87	1,871	898	5,129	6,907	9,676
Yr 13	7,000	0.51	476	309	6,524	1,700	2,485
Yr 14	7,000	0.47	-	-	7,000	-	-
Yr 15	7,000	0.47	-	-	7,000	-	-
Yr 16	7,000	0.47	-	-	7,000	-	-
Yr 17	7,000	0.49	-	-	7,000	-	
Yr 18	1,321	0.49	-	-	1,321	-	
Total	115,969	1.02	69,780	48,162	46,189	503,824	621,766

Note: Total material is the sum of Direct to Process Plant, To Stockpile and Waste only. Stockpile reclaim is not included. Stockpile losses account for the difference in the "To Stockpile" and "From Stockpile" tonnage.

Figure 16-19 to Figure 16-21 show the variation of the plant ore tonnes by year, ore grade to the process plant and mined tonnage by year and phase.

Figure 16-19: Plant Ore Tonnes by Year

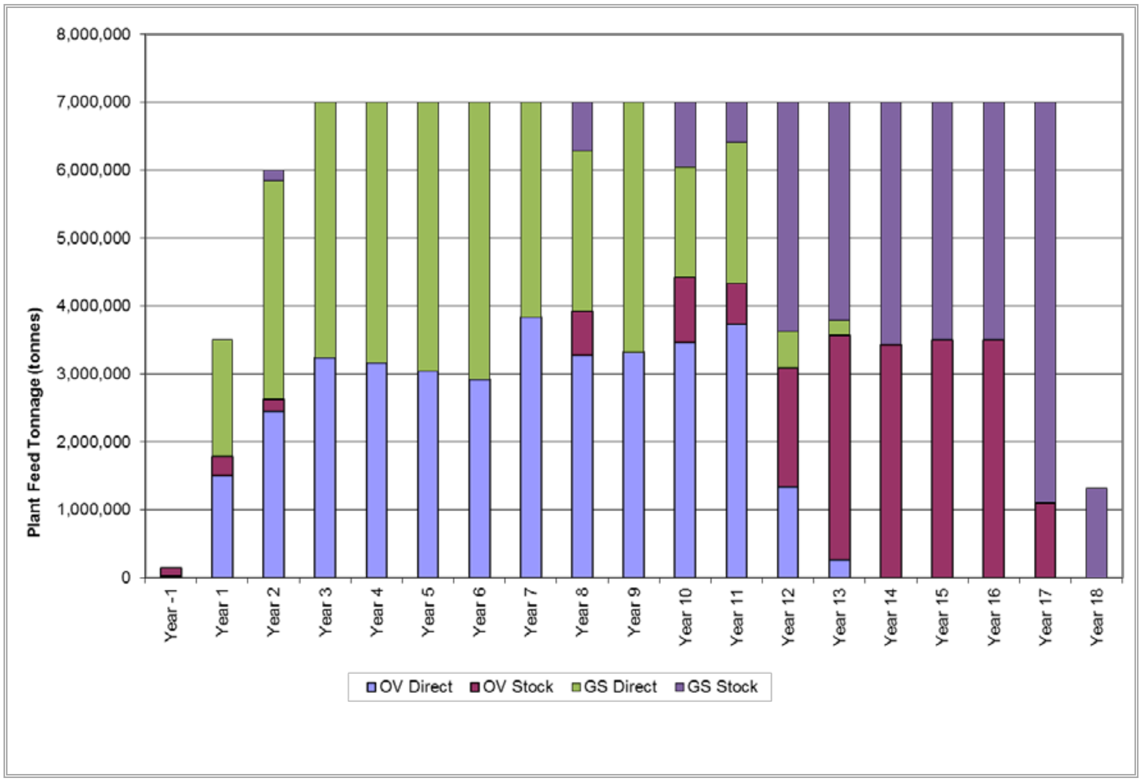


Figure 16-20: Ore Grade to the Process Plant

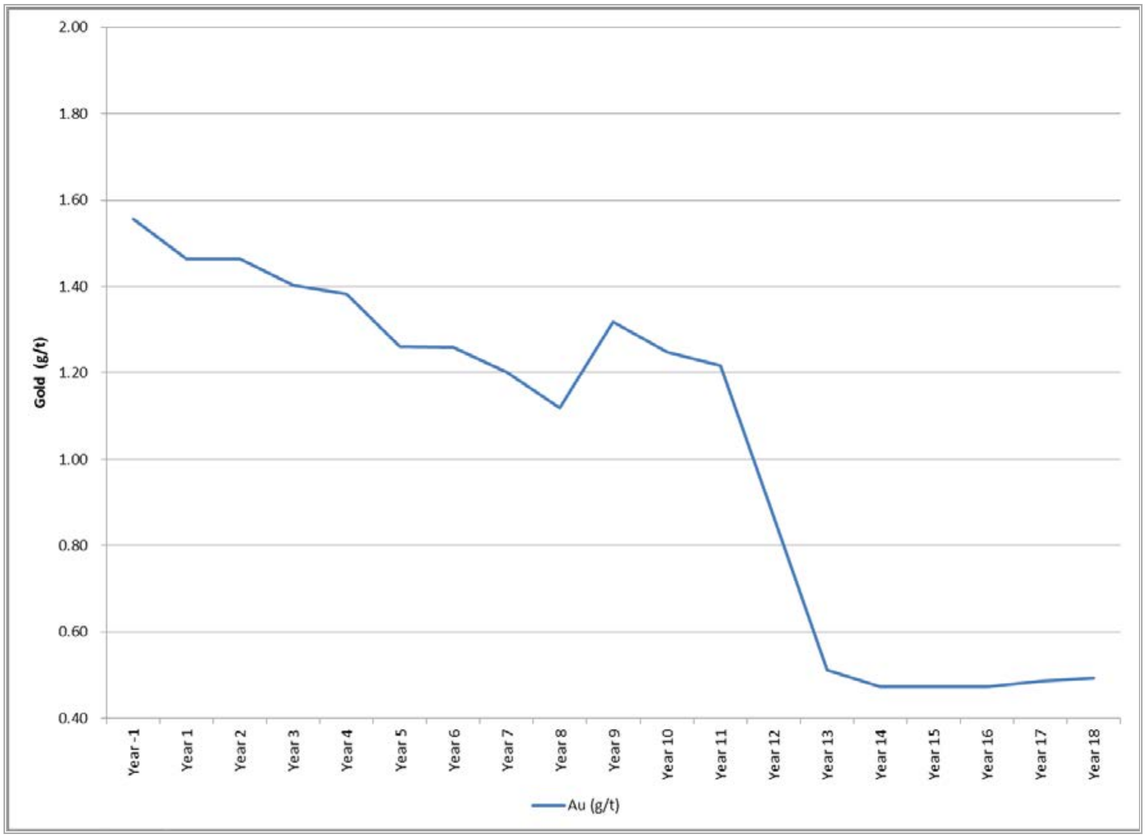
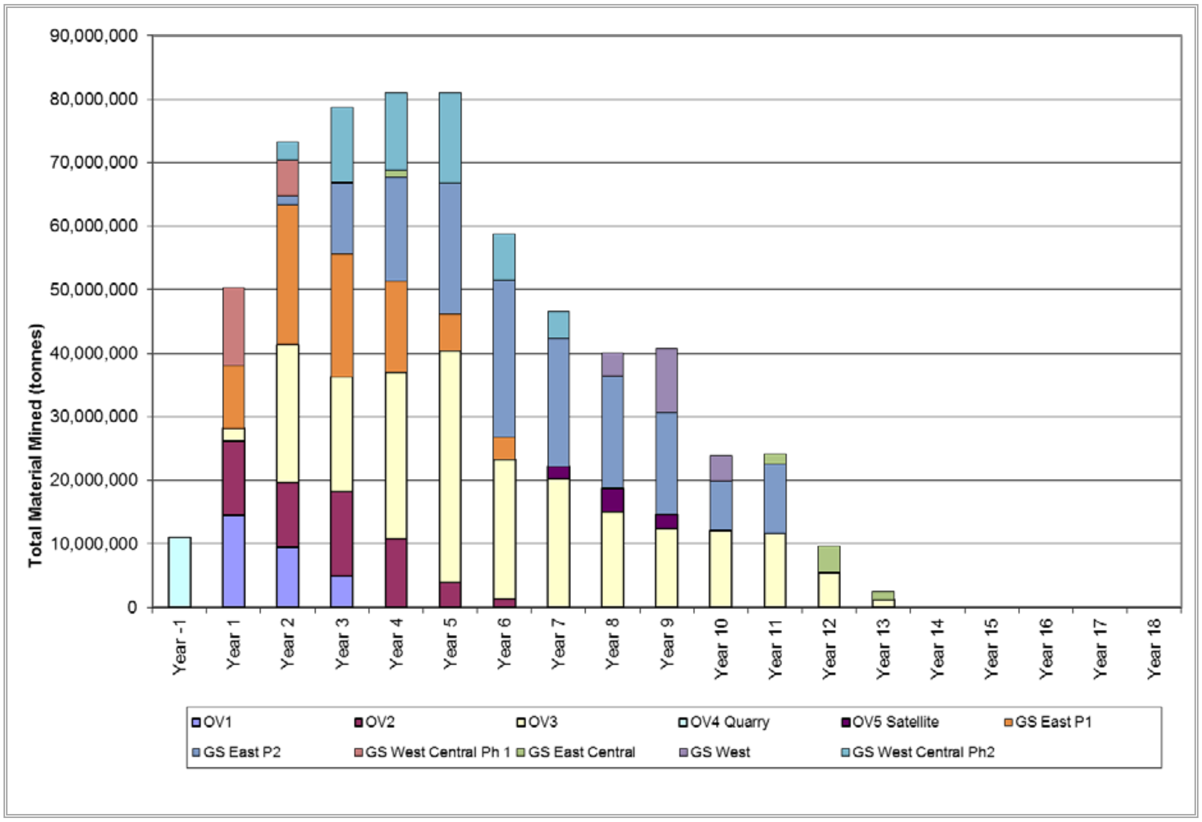


Figure 16-21: Mined Tonnage by Year and Phase



16.2.7 Grade Control

Grade control is an item that was considered from the beginning of the mine planning sequence. A review of other operations in the literature as well as site visits to current operations in similar geologic conditions was completed. The data from this review was incorporated into an analysis of the Ouro Verde and Grota Seca pits and the expected control required.

Due to the nature of the deposit and inclination of the mineralized zones, blast hole sampling was not considered an accurate method of ore definition. Other operations were using a reverse circulation (RC) program in advance of mining on tight inclined drill hole spacing to accurately define the ore/waste contacts. This information was then built into the short range models and used to guide the loading equipment. This practice is widespread in Australia with great success and also in Canada and Brazil. This approach is also taken for the Study.

The method involved using a dedicated grade control drill rig and crew in the pit to drill a series of shallow inclined holes drilled as close as possible orthogonal to the dip of the mineralized zone and sample the material every 1 m to 2.5 m. The smaller sample size is for areas of known mineralization or expected mineralization. The larger sample frequency (2.5 m) is used in waste areas to locate unknown mineralization zones.

The entirety of the pit is drilled with the RC rig with different pattern sizes for both material type and pit area. The holes are inclined at 60° and drilled perpendicular to strike. The pattern spacing for ore is 6 m spacing and 12 m burden. For waste, the pattern spacing is increased to 24 m X 24 m (spacing X burden). Detailed examination of the mineralized zones in each pit area indicated that in Ouro Verde, 75% of the pit area would need to be drilled with the smaller ore pattern. In Grota Seca, with the more numerous and vertical veins, the percentage increased to 90%.

While the amount of drilling is significant (first 5 years average is 333,000 m/a), the effectiveness of the drill rigs in other operations has shown that it will not be a problem to stay ahead of mine operations with the drilling. Operational bottlenecks do occur, but with proper planning in the short range, they can be reduced.

The RC drills (one per pit) will operate for 24 h/d to minimize disturbance and be in advance of mine operations with the information. A three man crew per drill is required; one driller and two drill helpers. In addition, geology will provide guidance throughout the day and be on call if unknown issues arise.

The drill penetration rate is estimated at 19 m/h with setups, sampling, etc. Overall, the cost for the drill without labour will be $188/h or about $9.90/m drilled. From an overall mine operating cost perspective, the RC drill sampling program costs $0.07/t mined. The cost of not sampling and mistaking waste for ore or ore for waste easily is repaid in proper ore: waste definition.

The data from the grade control drilling is then interpreted by the geologist, the ore is then remodelled and the production drilling and blasting designed to mine the ore material separate from the waste.

16.2.8 Waste Management Facility Design

Waste material for this Study has been assumed to be non acid generating (NAG). Internal test work completed by Belo Sun has indicated no potential issues with acid generation or metal leaching due to the low sulphur content of the rocks.

Two types of waste rock are present in the Ouro Verde and Grota Seca pits - saprolite and rock. The saprolite overlies both pits and thus will be moved first in each of the various phases. The saprolite present is tending to be of a sandy nature rather than clay, which makes its handling characteristics somewhat easier to manage.

Mining for the project initiates on a knoll in the Ouro Verde pit where the saprolite is thinnest. This is being referred to as the quarry pit. The intent is to mine in this location to obtain rock for construction as soon as possible. The quarry pit is within Phase 3 of Ouro Verde so is advancing a portion of that phase early for practical reasons. The saprolite mined initially will be placed in what is referred to as the North Dump. It is north of the plant but directly south of the Ouro Verde pit. The saprolite material from the quarry pit will be placed along the sides of the north WMF and not in the valley bottom. This is to leave the bottom area open for rock placement.

Once rock is encountered in the initial mining, the roads to the plant, tailings dam, and Grota Seca will be widened to proper operational width of 28 m, or more, to accommodate the open pit mining equipment. As the road is widened towards the crusher location, the stockpile pad will also be developed. It is anticipated that it will take two months to finish the road to the plant and low-grade stockpile pad and another two months after that to finish all of the road networks for Grota Seca.

The stockpile pad acts as another waste storage area, and is built at the 135 m level and will be used to store low-grade ore on top. The stockpile pad will be a combination of rock and saprolite. A total of 4.7 Mm^3 is required to complete the pad to its initial extent. A further 10 Mm^3 of fill is required to accommodate all of the low grade scheduled to be stored there. The initial stockpile pad will be complete prior to full mill production in Year 1 and full pad completed by the end of year 3. Drainage from the stockpile pad due to rainfall is directed to the east raw water pond and can be used as process water, or if of suitable quality, discharged to the environment.

The north WMF for Ouro Verde has two bases at the lower elevations which join later to become one large facility. The concept for development is the same. Initial saprolite is placed along the edges of the valley until suitable rock is available. The drainage paths present in the existing topography will be backfilled with larger rock from the mining operation. This rock will act as a rock drain for any water that is able to penetrate the WMF and allow the fluids to drain rather than build up pore pressure. The drain then will direct this water to a settling pond at the base of the facility. This water will be used for fugitive dust suppression on the roads as needed or pumped to the TMF. Excess water will be pumped to the TMF or the water management pond near the plant.

Once the drainage has been established at the base of the WMF the saprolite and rock will be mixed in the WMF. Saprolite represents about 6.5% of the total waste material from Ouro Verde. Saprolite is estimated to be 16 Mt versus 232 Mt of rock.

Rock and saprolite from Ouro Verde will also be used to expand the main TMF dam as required. Smaller saddle dams along the north and east side of the TMF will also be provided rock and saprolite from Ouro Verde on an as required basis.

The south WMF is located to the south of Grota Seca and east of the process plant location. It will also be built in the same manner as the north WMF. Saprolite will be placed along the edge of the valley until the rock drain has been established. Once drainage is set the saprolite and rock will be mixed and placed over the drainage pathways. The rock drainage will be blasted rock from the mine and typically the larger size fractions although no special sizing is planned or required.

The saprolite percentage in Grota Seca is slightly lower than Ouro Verde and represents 5.5% of the overall waste material at 14 Mt. The rock portion is 242 Mt.

The design of the WMF considers a swell factor of 30%. While this is typical for rock, the saprolite swell is expected to be less than this and a factor of 15% is assumed. Lifts for the dump are placed every 20 m in height leaving a 10 m wide berm between the lifts. The angle of repose for the material is estimated to be 37.5° and with the configuration, the overall facility slope will be 20°. These parameters for the WMF were provided by VOGBR as part of their geotechnical program.

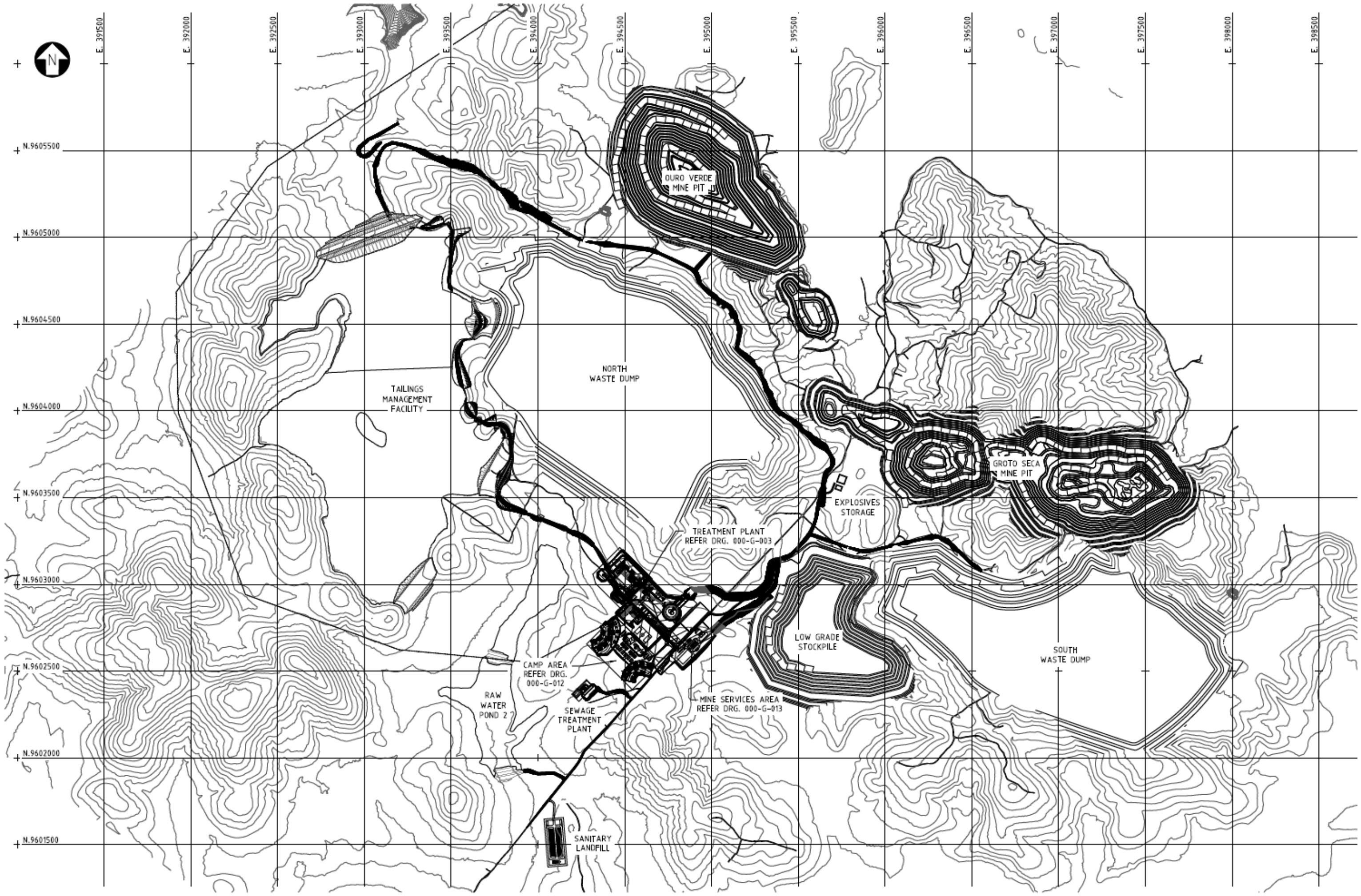
The Ouro Verde WMF will reach a height of 100 m and the top level is expected to be the 190 m level. It will cover an area of 189.0 ha. The Grota Seca WMF will not cross over a topographic high surrounding it. Grota Seca will reach a height of 120 m and the top level will be the 220 m level. It will cover an area of 157 ha.

Both facilities as they are currently designed can accommodate all the waste material. Additional capacity exists with additional lifts if required.

All material in the WMF will be concurrently re-sloped and reclaimed as it reaches final design. This is easily managed, as the height between lifts of the facility is only 20 m, sufficiently short enough for dozers to re-slope the face efficiently.

A layout of the site is shown in Figure 16-22.

Figure 16-22: Site Layout with WMF



17.0 RECOVERY METHODS

17.1 Process Flow Sheet Selection

The Study design of the process plant is based on the metallurgical test work conducted to date combined with industry best practices.

Geological evaluation and metallurgical testing of samples from the Volta Grande ores established that gold is present as free grains within quartz and also as finer grains within diorites. Test work indicated the presence of coarse gold and that the ore is generally non-refractory with respect to whole ore cyanidation. The standard processing route for this type of ore body is gravity concentration followed by cyanidation of the gravity tailings.

A high-level flow sheet is shown in Figure 17-1. Note that a hybrid carbon-in-leach / carbon-in-pulp (CIL / CIP) process consisting of leach tanks upstream of carbon in pulp tanks has been designed. This configuration aims to leverage the advantages offered by both the CIL (reduced capital cost) and the CIP (improved adsorption efficiency) configurations. For simplicity, the circuit is broadly referred to as a CIP circuit.

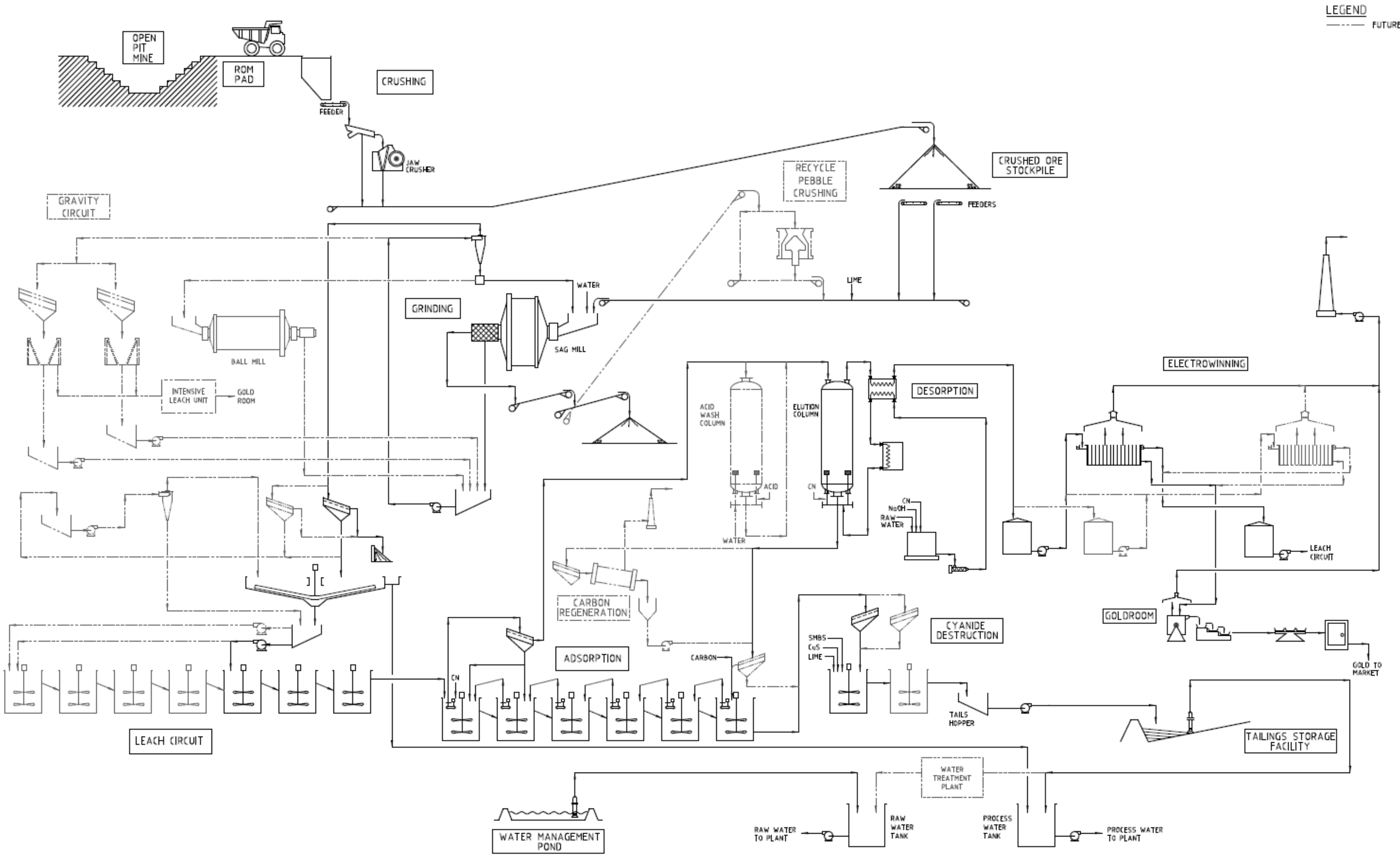
The flow sheet has been designed with an initial start-up capacity of 3.5 Mt/a (Phase 1) and an expansion in Year 3 to 7 Mt/a (Phase 2).

The following steps are included in the flow sheet:

- Primary jaw crushing of run-of-mine (ROM) ore;
- Coarse ore stockpiling to provide buffer capacity ahead of the grinding circuit;
- Single stage semi-autogenous grinding (SAG) milling circuit with trommel screen and cyclones producing P_{80} 75 µm;
- Space and design allowance for a pebble crushing circuit when throughput is increased in Phase 2;
- Space and design allowance for secondary ball milling to be added in Phase 2;
- Space and design allowance for gravity recovery of coarse gold from a portion of the hydro-cyclone (cyclone) feed stream using semi-batch centrifugal gravity equipment in Phase 2;
- Intensive cyanidation of the gravity concentrate and electrowinning of the pregnant leach solution in the elution circuit electrowinning cells when the gravity circuit is installed in Phase 2;
- Thickening of cyclone overflow prior to leaching; In Phase 2, it is proposed to pass the thickener feed through dewatering cyclones to reduce the duty on the installed thickener. This concept requires further development.
- Cyanide leaching and carbon in pulp (CIP);

- Acid washing of activated carbon and Anglo American Research Laboratories (AARL) type elution. In Phase 1, both acid washing and elution processes will take place in the same column;
- Addition of a separate acid wash column in Phase 2;
- Addition of a carbon regeneration kiln in Phase 2;
- Electrowinning of gold from pregnant solution onto stainless steel cathodes with subsequent drying and smelting of sludge in a smelting furnace;
- Detoxification of tailing using the SO_2 / air cyanide destruction process, followed by disposal in the tailings management facility (TMF) and return of decant water to the process plant.

Figure 17-1: Process Plant Overall Process Flow Sheet



17.2 Process Design

The principal process design criteria are presented in Table 17- 1 and Table 17- 2 below. Subsequent sections describe some important design considerations for key areas of the process plant.

Table 17-1: Ore Characterization

Criterion		Units	Phase 1	Phase 2	LOM
Ore Reserves	Ouro Verde	t	1,531,319	49,282,007	53,192,348
	Grota Seca	t	1,618,944	54,957,483	59,597,404
	Saprolite	t	349,737	2,081,986	3,179,327
	Total	t	3,500,000	106,321,476	115,969,079
Gold Head Grade	Ouro Verde	g/t Au	1.57	1.06	1.09
	Grota Seca	g/t Au	1.48	0.91	0.96
	Saprolite	g/t Au	1.87	0.63	0.81
	Total	g/t Au	1.56	0.97	1.02
A X b	Ouro Verde (avg)	-	29.1		
	Grota Seca (avg)	-	32.2		
	Saprolite	-	275		
	85th Percentile	-	27.6		
Bond BW_i	Ouro Verde (avg)	kWh/t	16.7		
	Grota Seca (avg)	kWh/t	15.7		
	Saprolite (avg)	kWh/t	5.3		
	85th Percentile	kWh/t	16.5		
Bond A_i	Ouro Verde (avg)	g	0.548		
	Grota Seca (avg)	g	0.460		
	Saprolite (avg)	g	0.050		

Table 17-2: Process Design Criteria

Criterion		Units	Phase 1	Phase 2
Annual Throughput		t	3,500,000	7,000,000
Crushing Circuit	Annual Operating Hours	h	6,570	6,570
	Availability	%	75	75
	Hourly Throughput	dry t/h	533	1,065
Overall Plant	Annual Operating Hours	h	8,000	8,000
(Post Stockpile)	Availability	%	91	91
	Hourly Throughput	dry t/h	438	875
Gravity Recovery	Ouro Verde	% Au	-	37
	Grota Seca	% Au	-	34
	Saprolite	% Au	-	37
	Total	% Au	-	35
Leach / CIP Recovery	Ouro Verde	% Au	94	92
	Grota Seca	% Au	90	89
	Saprolite	% Au	94	91
	Total	% Au	92	91
Overall Recovery	Ouro Verde	% Au	94	95
	Grota Seca	% Au	89	93
	Saprolite	% Au	94	90
	Total	% Au	92	93
Crusher Feed Size, F_{80}		mm	252	
Mill Feed Size, F_{80}		mm	150	
Grinding Product Size, P_{80}		µm	75	
Grinding Specific Energy	SAG Mill	kWh/t	25.7	12.9
	Ball Mill	kWh/t	-	13.0
	Total	kWh/t	25.7	25.9
Gravity Concentrate Mass Pull		%	-	0.015
Gravity Concentrate Production		t/d	-	2.9
Residence Time	Leach	h	20.2	22.9
	CIP	h	15.0	7.3
	Total	h	35.2	30.2
Number of Tanks	Leach	-	3	7
	CIP	-	6	6

Criterion	Units	Phase 1	Phase 2
Leach Feed	% solids	54.8	53.8
Solution Losses	g/t Au	0.010	0.005
Carbon Regeneration	-	no	yes
Elution Type	-	AARL	
Elution Size	t carbon	10.0	
Frequency of Elution	strips / week	5	10
Cyanide Destruction Process	-	SO_2 / Air Process	

17.2.1 Primary Crushing and Coarse Ore Stockpile

A single C160 jaw crusher (or equivalent) was selected for both Phases 1 and 2.

When treating the initial coarse ROM size distribution, the crushing circuit is predicted to have a capacity of 4 to 4.5 Mt/a allowing a comfortable margin of capacity to treat Phase 1 production. To allow the C160 crusher to accommodate the increased Phase 2 throughput, the ROM size distribution will be decreased. Modelling by Orica produced an optimized blast product distribution with a D_{100} of 650 mm and a D_{80} of 252 mm.

When treating the fine distribution, the crusher is predicted to be capable of processing the expanded throughput of Phase 2. This prediction was confirmed by Metso. In Phase 2, the grinding circuit will require a crusher product with P_{80} <150 mm to prevent the grinding circuit from being SAG mill limited and not meeting the design throughput.

To confirm crusher throughput predictions, it is recommended that a plant trial should be undertaken in first year of production to prove the capacity of the primary crusher. If the 7 Mt/a capacity is not achieved with a finer blast size, a second crusher of equal or smaller size will need to be installed. Layout space will be provided for this potential additional crusher.

17.2.2 Grinding Circuit

Grinding circuit modelling and mill sizing was completed by Orway Mineral Consultants (OMC).

A single stage SAG mill was selected for the grinding duty of 3.5 Mt/a for Phase 1. The grinding circuit capacity will be expanded to 7 Mt/a with the addition of a pebble crusher and a secondary ball mill. The specific energy used for mill sizing was determined from the 85th percentile of the comminution test work results (Bond ball mill work index of 16.5 kWh/t and an A X b of 27.6), which were issued by SGS Chile in December 2013.

The SAG mill has been sized for a specific energy requirement of 25.7 kWh/t based on a F_{80} of 150 mm and a P80 of 75 µm, without the use of a pebble crusher. The SAG mill grate aperture size will be 20 mm. In Phase 2, the SAG mill grate aperture will be increased to 70 mm. A pebble crusher (HP500 cone crusher or equivalent) will be added for the expansion to 7 Mt/a to reduce the SAG mill specific energy to 12.9 kWh/t.

For Phase 2, the total required grinding specific energy is 25.9 kWh/t to grind 7 Mt/a from a F_{80} of 150 mm to a P_{80} of 75 µm. In order to maintain the grinding circuit product size during Phase 2, a secondary ball mill designed with a specific energy of 13.0 kWh/t will be added to the overall grinding circuit.

17.2.3 Gravity Circuit

As the gravity circuit affects the leach / CIP circuit reaction time requirement more than recovery, the decision was made to defer the installation of the gravity circuit until Phase 2 to save on initial capital. To compensate for this, approximately 35 hours of total leaching residence time is provided in Phase 1 with 30 hours provided in Phase 2. The gravity circuit is designed with a 0.015% mass pull and a nominal concentrate production of 2.9 t/d. The concentrate hopper is sized to allow accumulation of gravity concentrate over a weekend with leaching to take place during weekdays. Pregnant leach solution (PLS) from the intense cyanidation reactor (ILR) will be pumped to the pregnant solution tank, which will serve as the collection point for gravity circuit and elution circuit PLS.

17.2.4 Pre-Leach Thickener

The 28 m diameter high rate pre-leach thickener was sized using the Pocock Industrial (Pocock) dynamic thickening test results of 3.86 $m^3/h/m^2$ for an ore blend of 90% bedrock (Ouro Verde plus Grota Seca) and 10% saprolite at a total throughput of 3.5 Mt/a.

It is proposed that when the process plant throughput is expanded to 7 Mt/a in Phase 2, the thickener feed will be pumped through dewatering cyclones with the cyclone overflow reporting to the thickener. Further work is required to substantiate this design concept. If this concept cannot be substantiated, other options include either installing a larger 40 m diameter thickener to meet the expanded duty of 7 Mt/a, or implementing design and layout modifications to allow for the addition of a second 28 m diameter thickener in Phase 2.

17.2.5 Leach / CIP Circuit

The metallurgical test work leaching kinetics were relatively slow, requiring approximately 32 hours to obtain acceptable recoveries. A hybrid circuit configuration was selected to maximize leaching residence time and minimize activated carbon inventory. A total of three leach tanks and six adsorption tanks will be installed in Phase 1. The circuit is designed with a total leaching residence time of approximately

35 hours, with approximately 20 hours in the leach tanks and the remaining 15 hours in the CIP tanks. When the throughput is increased to 7 Mt/a in Phase 2, four additional leach tanks will be installed to maintain a total leach / CIP residence time greater than 30 hours.

17.2.6 Carbon Regeneration Kiln

Installation of the carbon dewatering screen, the regeneration kiln, the carbon quench tank and the carbon sizing screen are deferred to the Phase 2 expansion to 7 Mt/a to decrease the initial capital. Many process plants using high quality water, as will be the case at Volta Grande, can operate for periods of time without carbon regeneration. Most carbon fouling is due to calcium and this can be minimized by acid washing the carbon. As the carbon activity drops, fouled carbon can be bled from the circuit and additional new carbon added.

During Phase 1, make-up carbon will be fed directly into the last active CIP tank. A consumption rate of 0.035 kg/t has been assumed to account for the absence of the regeneration kiln and some carbon fouling. The carbon consumption rate was then assumed to decrease to 0.025 kg/t in Phase 2. In Phase 1, any carbon fines in the fresh carbon will not be removed prior to entering the circuit as there will be no carbon sizing screen. This may result in increased gold losses during Phase 1.

17.2.7 Cyanide Destruction

The SGS 2014 (February and March) batch test work observed that a cyanide destruction residence time of 3.2 hours and an SO_2 addition of 4.5 kg/kg CN^- were required to destroy cyanide to less than 1 ppm CN_{WAD}. A more typical 1 hour residence time and SO_2 addition of 4 kg/kg CN^- has been used for plant design, with the acknowledgement that further test work is required to validate these assumptions. In addition, subsequent amelioration of the cyanide bearing effluent should occur in the TMF by means of ultra-violet (UV) degradation. Dynamic testing should be performed to determine optimal operating conditions and reagent consumption, and the reaction kinetics is expected to improve under increased copper (Cu) levels.

During Phase 1, the cyanide destruction process will be performed in one tank where the SO_2 / air process will be employed to oxidize free and weak acid dissociable (WAD) cyanide species. If required, copper sulphate catalyst will be added. A second cyanide destruction tank will be installed in Phase 2 to maintain the 1 hour residence time. If 1 hour of residence time proves insufficient, larger reactors will be required thereby increasing initial and expansion capital requirements and / or reagent consumption.

17.3 Process Plant Description

This section provides detailed process descriptions for the nominal 3.5 Mt/a processing plant (Phase 1) as well as the changes required for the expansion to a capacity of 7 Mt/a (Phase 2).

17.3.1 Crushing and Crushed Ore Stockpile

The crushing circuit will consist of a jaw crusher and its associated equipment. The jaw crusher will receive a blend of Ouro Verde, Grota Seca and saprolite ore types. The ore blend will contain a maximum of 10% saprolite to avoid material handling and processing plant issues. Haul trucks will dump directly into the ROM bin thereby reducing material re-handling. The ROM bin will be equipped with a static grizzly to prevent rocks >650 mm from entering the bin.. An apron feeder will extract rock from the ROM bin to feed the primary crusher via a vibrating grizzly. Undersize from the grizzly feeder will report directly to the crusher discharge conveyor and oversize will be crushed in the jaw crusher to a P_{80} of 150 mm. The primary crusher area will be equipped with dust suppression water sprays at the ROM bin and coarse ore stockpile. A dust collector will be installed at the jaw crusher.

The crusher discharge conveyor will deliver crushed ore to the coarse ore stockpile. The 30,000 t stockpile will provide a buffer between mining and processing operations. During Phase 1, ore will be withdrawn from the stockpile by one of two variable speed apron feeders, which will adjust speed to maintain the desired SAG mill feed rate. Both apron feeders will operate continuously to achieve the Phase 2 throughput.

For metallurgical accounting and process control purposes, weightometers will be installed on the crusher discharge conveyor and the SAG mill feed conveyor.

Quicklime will be delivered by either dump trailer or in bulk bags. If delivered by dump trailer, it will be reclaimed by a front end loader (FEL) into a covered storage hopper. The quicklime will be metered via a belt feeder onto the SAG mill feed conveyor at a rate of 0.33 kg/t of fresh ore. The quicklime is slaked in the SAG mill. The quicklime addition rate is adjusted in order to maintain the leach tank pH above 10.5 to prevent cyanide hydrolysis.

17.3.2 Grinding Circuit

The Phase 1 grinding circuit will include a single stage SAG mill, cyclone cluster and associated equipment.

Crushed ore, with a F_{80} of 150 mm, will be fed into the single stage SAG mill feed chute at an instantaneous rate of 438 dry t/h. Process water will be added to maintain a mill discharge slurry density of approximately 75% solids w/w. The SAG mill will be a 10.36 m diameter X 6.37 m effective grinding length (EGL) mill with a dual pinion drive with two 7 MW motors. Steel balls will be added to the SAG mill feed conveyor via the reclaim hopper as required.

The product from the SAG mill will discharge through a trommel screen, which will be sized based on the Phase 2 throughput. The screen will be fitted with water sprays to remove fine slimes from the oversize. Pebbles will be conveyed to the pebble stockpile (Phase 1) or the pebble crusher feed conveyor (Phase 2).

Trommel screen undersize will flow into the mill discharge hopper. The slurry will be pumped to the cyclone cluster by a centrifugal slurry pump. A standby cyclone feed pump is included in the design. The cyclone cluster will consist of twelve ports with 4 X 660 mm cyclones in operation. Two additional cyclones will be installed as standby and six ports will be blanked off for future use. In the Phase 2 expansion, the number of operational cyclones will increase to seven plus two dedicated cyclones for feeding the gravity circuit. The cyclones will provide a target grind size of P_{80} 75 µm. The cyclone underflow will return to the SAG mill (or ball mill in Phase 2).

For the Phase 2 expansion case of 7 Mt/a throughput, a secondary ball mill will be added to the grinding circuit. The SAG mill will be operated in open circuit and the ball mill will be operated in closed circuit. The ball mill will discharge to the common mill discharge hopper. Process water will be added to the ball mill discharge to maintain a slurry density of approximately 70% to 75% solids w/w. The ball mill will be a 7.3 m diameter X 12.97 m EGL mill with the same dual pinion drive and two 7 MW motor configuration as the SAG mill. Steel balls will be added to the ball mill by means of a ball bucket.

The cyclone overflow will report to the trash screen en route to the pre-leach thickener. One trash screen will be installed initially, with a second trash screen added in Phase 2.

17.3.3 Pebble Crushing (Phase 2)

The product from the SAG mill will discharge via pebble ports onto a trommel screen. The trommel screen will remove the critical size pebble material from the mill discharge slurry. The trommel screen will also be fitted with water sprays to remove fines from the surface of the pebbles.

The trommel screen oversize will report to the pebble transfer conveyor via the pebble discharge conveyor. In Phase 1, the pebble transfer conveyor will feed the pebble stockpile. Pebbles will be returned to the mill feed conveyor by a FEL via the reclaim hopper. In Phase 2, the pebble discharge conveyor will be equipped with a self-cleaning metal removal magnet and the pebble transfer conveyor feeding the pebble crusher will be equipped with a metal detector. Upon metal detection, the pebble transfer conveyor discharge will be diverted back to the SAG mill, thereby bypassing the pebble crusher. Excess pebbles will overflow from the pebble crusher feed chute onto the SAG mill feed belt. The pebble crusher will be an HP500 (or equivalent) with 355 kW installed power.

17.3.4 Gravity Concentration (Phase 2)

The gravity circuit will be installed during the Phase 2 expansion to 7 Mt/a. The cyclone cluster distributor will have two cyclones dedicated to supplying the gravity circuit with cyclone feed. The underflow and overflow of these two cyclones will combine to supply the gravity circuit. The gravity circuit will consist of two parallel lines each equipped with a trash screen, centrifugal concentrator and gravity tails return pumping equipment.

The gravity trash screen will be remove coarse particles and trash that may affect the efficiency of the downstream centrifugal concentrator. Water will be added to adjust the feed density of slurry to the gravity concentrator. The trash screen oversize will be directed to the gravity tails hopper and returned to the common mill discharge hopper. Trash screen undersize will be directed to the gravity concentrator.

The design capacity of each gravity concentrator is 100% of the fresh feed or 438 t/h. Operation of the gravity concentrator will be semi-batch and the gravity concentrate will be collected in the concentrate storage cone while the gravity tails will report to the gravity tails hopper and be returned to the ball mill discharge hopper. The concentrate storage hopper will be discharged in batches to the ILR.

17.3.5 Intensive Leaching (Phase 2)

Intensive cyanidation will be performed daily on the gravity concentrate produced during the previous day. Gravity concentrate will accumulate in the concentrate storage cone over a 24 hour period and be discharged by gravity into the intensive cyanidation reaction vessel. Intensive cyanidation will use a concentrated solution of cyanide and liquid oxidant to maximize leach kinetics. These intensive leaching conditions will allow accelerated dissolution of coarse gold particles within a period of less than 24 hours. The rinsed solid tails from the intensive cyanidation reaction vessel will be pumped back to the ball mill discharge hopper.

At the completion of a leach cycle, the clarified pregnant solution will be pumped to the elution electrowinning circuit.

The ILR has been sized for the Phase 2 throughput.

17.3.6 Pre-Leach Thickening

Cyclone overflow will report to the trash screen where wood, plastics and other tramp material, that may preg rob or blind the downstream inter-stage carbon screens, will be removed from the slurry stream. In Phase 1, the trash screen underflow product will gravitate to the de-aeration box prior to entering the pre-leach thickener. Flocculant will be added to the pre-leach thickener to help the solids settle. The high rate pre-leach thickener will be 28 m in diameter and will thicken the cyclone overflow to 55% solids w/w prior to feeding the cyanide leach circuit. Thickener underflow will be pumped to the leach feed distribution box via one thickener underflow pump (with one standby spare). Thickener overflow will report to the process water tank.

When the process plant throughput is expanded to 7 Mt/a in Phase 2, it is proposed that the trash screen undersize will be diverted to a collection hopper and subsequently pumped through a dedicated dewatering cyclone cluster. The low solids density cyclone overflow will report to the pre-leach thickener. Cyclone underflow streams from both the dewatering cyclones and the pre-leach thickener will be combined in the leach feed hopper prior to pumping to the leach feed distribution box at 54% solids w/w. The viability of the dewatering cyclone concept has not been proven in this case and further test work is required to ensure the thickener will perform as required (refer to 17.2.4).

A metallurgical sampler will be installed immediately upstream of the leach circuit to collect samples for metallurgical accounting.

17.3.7 Leach Circuit

Pre-leach thickener underflow will be pumped to the leach feed distribution box where it will combine with various internal recycle streams and be directed to the first leach tank. In Phase 1, there will be three leach tanks in series with bypass capabilities on each tank. Transfer of slurry between the tanks will be by gravity. In Phase 2, four additional leach tanks will be added. In the expanded circuit, more leaching will occur prior to the CIP tanks. The leach tanks will be mechanically agitated and air sparged. Cyanide and lime will be added to the leach tanks. Cyanide analysis will be undertaken by sampling and titration to allow for manual control of cyanide addition. pH measuring instrumentation will be installed to allow automatic adjustment of the quicklime addition rate to the SAG mill.

17.3.8 Adsorption Circuit

Slurry will overflow from the final leach tank into the CIP tanks. The CIP circuit will consist of six tanks in series. Each tank will be air sparged, mechanically agitated and contain an inter-stage carbon screen. The leach slurry will proceed by gravity through the series of tanks with the possibility of bypassing any tank in the series for tank maintenance. The mechanically swept wedge wire inter-tank carbon screens will prevent carbon from flowing with the slurry and retain the carbon in each vessel. Granular activated carbon will be added to the final tank in the series, be pumped counter current to the slurry flow via recessed impeller pumps, and be extracted from the first tank in the series. Leached gold will be progressively adsorbed onto the activated carbon in each tank in the series.

Loaded carbon and slurry extracted from the first CIP tank will report to the loaded carbon screen. Water sprays will remove slimes from the surface of the loaded carbon and the screen underflow slurry will return to the CIP circuit. The cleaned loaded carbon will report to the acid wash column.

The CIP tailings from the last CIP tank will report to the carbon safety screen where any carbon will be recovered from the barren slurry. Water sprays will facilitate carbon movement on the screen deck and rinse the carbon (screen oversize) prior to discharge into the carbon collection bin. Collected carbon will be stored for further treatment or disposal. The safety screen underflow will report to the cyanide destruction tanks for detoxification of cyanide prior to final disposal in the TMF.

A metallurgical sampler will be installed to sample the CIP tails prior to cyanide destruction for metallurgical accounting purposes.

17.3.9 Acid Wash, Elution and Electrowinning Circuit

The elution circuit is designed to recover adsorbed gold from the activated carbon. The elution circuit will be a batch AARL type circuit.

The acid washing and elution processes will proceed in the following sequential steps:

1. Carbon transfer from the loaded carbon screen to the acid wash column;

2. Acid wash column drain cycle;
3. Dilute HCl acid pumping through column;
4. Washing of carbon and subsequent neutralization of dilute acid;
5. Elution pre-soak and strip solution heating;
6. Gold and silver elution;
7. Cooling of carbon with water;
8. Transfer carbon to reactivation kiln feed hopper via the carbon dewatering screen.

In Phase 1, acid washing and elution processes will be performed in a single 10 t column. In Phase 2, a second column of equal size will be installed to handle steps 1 to 4 and the initial column will be reserved for the remaining (elution) steps. With the addition of the acid wash column, there is an extra fresh water-consuming step required to transfer the carbon from the acid wash to elution column.

In Phase 1, the elution circuit will typically process one batch of carbon per day, five days per week during day shift. If required, seven day per week operation will be possible as will two-batch per day operation. This higher frequency operation will be required in Phase 2.

17.3.9.1 Acid Wash

Loaded carbon will be recovered on the loaded carbon recovery screen and directed to the acid wash column. Transfer and fill operations of the acid wash column will be controlled manually. All other aspects of the acid wash and pumping sequences will be automated.

Acid washing of the carbon will commence after drain down is complete.

The acid wash solution will be mixed in the dilute acid tank and transferred to the single column (acid wash column in Phase 2). The acid wash process will remove contaminants, such as calcium, from the loaded carbon. After the prescribed acid, the carbon will be rinsed with fresh water. Dilute acid and rinse water will be neutralized and disposed of with the tailings. Acid-washed carbon will then be ready for elution.

17.3.9.2 Pre-Soak and Elution

Sodium hydroxide and sodium cyanide solutions will be pumped from their respective storage tanks and combined with the strip solution that will be pumped from the stripping water tank through inline heat exchangers into the base of the elution column.

The loaded carbon will be pre-soaked in the cyanide / caustic solution to prepare for elution. The carbon will then be eluted with hot strip solution, which will pass through the circuit to the pregnant solution tank. Outgoing strip solution will pass through the recovery heat exchanger to heat the incoming strip solution. The pregnant solution will be collected in the pregnant solution tank where it will be combined with the intensive leach pregnant solution for subsequent electrowinning.

17.3.9.3 Electrowinning

One electrowinning cell will be installed in Phase 1 and a second parallel cell along with a second pregnant solution tank will be added in Phase 2. Direct current will be passed through stainless steel anodes and stainless steel wool mesh cathodes to deposit gold sludge onto the cathodes. Solution discharging from the electrowinning cell will return by gravity to the barren solution tank. The system has been designed for single pass electrowinning. Sludge will be periodically removed from the cathodes in-situ using a pressure washer. The sludge will be collected in the cell sludge collection hopper for filtration.

17.3.10 Carbon Regeneration (Phase 2)

Installation of the carbon dewatering screen, the regeneration kiln, the carbon quench tank and the carbon sizing screen will be deferred to Phase 2. In Phase 2, carbon exiting the elution column will be dewatered over the carbon dewatering screen and report to the regeneration kiln feed hopper. Screen undersize will be collected and dewatered in bags.

Carbon will be fed from the 15 t feed hopper to the regeneration kiln via a screw feeder at a rate of 600 kg/h. A horizontal rotating kiln will be employed for carbon regeneration. Hot carbon exiting the kiln will be quenched in the carbon quench tank. From the quench tank, the regenerated carbon will be pumped to the carbon sizing screen prior to re-entering the CIP circuit. Carbon fines from the carbon sizing screen underflow will be collected and dewatered in bags.

New carbon will be added directly to the carbon quench tank and report to the carbon sizing screen for fines removal prior to entering the CIP circuit.

17.3.11 Gold Room

Gold sludge will be periodically pressure washed from the cathodes in-situ. The sludge will gravitate into the sludge collection hopper from which it will be transferred to the pressure filter pots. Filter cake will be transferred by hand into trays and subsequently placed in a drying oven to remove moisture prior to smelting. Dried sludge will be added to the smelting furnace along with fluxes. During smelting, fumes and dust will be extracted through a bag house and vented to atmosphere. Collected dust will be stored in drums and be periodically returned to the smelting furnace.

Doré bars will be cast, cleaned, weighed and stored in the vault for buyer pickup. Slag from the smelting operations will be returned to the milling circuit. Based on the feed grades and throughput rates, it is anticipated that two gold pours per week will be required in Phase 1, which will increase in Phase 2.

The electrowinning cells will be located within the security area of the gold room. Electrowinning rectifiers, one per cell, will be located in a non-secure area below the cells allowing for maintenance access without breaching gold room security. Rectifier remote indication and controls will be located adjacent to the electrowinning cells for safety.

17.3.12 Tailings Treatment

The carbon safety screen underflow slurry will report to the cyanide destruction tank. In this tank, the SO_2 / air process will be employed to oxidize free and WAD cyanide species. If required, copper sulphate catalyst will be added. The cyanide destruction process is designed to decrease free and WAD cyanide complexes to a final concentration of less than 1 ppm in 1 hour. Additional test work is required to confirm the 1 hour residence time and reagent dosage assumptions.

Air will be sparged into the reactor and sodium metabisulphite (SMBS) and lime will be added to supply SO_2 and provide pH control. Mechanical agitation will be used to ensure optimal gas transfer of oxygen.

Detoxified tailings will be pumped to the TMF. Further amelioration of the cyanide bearing effluent is expected to occur in the TMF by UV degradation.

A WAD cyanide analyser will be installed on the discharge stream to monitor the effectiveness of the cyanide destruction process.

A second cyanide destruction tank will be installed for the Phase 2 expansion to maintain the 1 hour residence time.

17.3.13 Utility Distribution

17.3.13.1 Raw Water

Surface water will be collected and stored in the water management pond, consisting of an upper catchment area and lower basin and used as the main supply of raw water. The raw water supply will also include the pit dewatering streams from Ouro Verde and Grota Seca. Raw water will be stored in the upper catchment area and overflow to the lower basin of the water management pond.

Excess water, particularly during the rainy season, will be discharged from the water management pond into the adjacent watercourse.

Duty and standby pumps will deliver water to either the raw water tank or the water treatment plant. The raw water tank will provide approximately 5 hours of residence time in the expanded case. The raw water tank will be equipped with two distribution pumps (one standby) that will supply the various raw water users including the equipment cooling systems, gravity concentrators, reagent make-up, screen sprays, dust suppression, firewater tank makeup, etc. The raw water tank will overflow as required to maintain the level in the process water tank.

In Phase 1 reclaim water from the TMF will be pumped to the process water tank (PWT).

In Phase 2, a portion of the reclaim water will be pumped to a water treatment facility and the treated water will go the raw water tank. The water treatment plant will produce an effluent that is of comparable quality to that of raw water. Both capital and operation cost allowances have been included for the water treatment plant as the exact treatment requirements have not been determined.

The average raw water requirement for Phases 1 and 2 will be approximately 80 m^3/h and 270 m^3/h, respectively. Of the 270 m^3/h required in Phase 2, approximately 140 m^3/h will be supplied by the treated TMF reclaim water.

A fire water storage tank located at the camp site will provide fire water for both the process plant and camp site needs during the different phases of the Project.

17.3.13.2 Potable and Gland Seal Water

This system will consist of filters that clarify raw water to the required standard for the application. The filtered water storage tank will have a 70 m^3 capacity. Three gland water pumps (one standby) will draw gland water from the filtered water tank and distribute it to users throughout the process plant. A fourth gland water pump will be added in Phase 2.

Potable water from wells will supply the camp and process plant.

17.3.13.3 Process Water

Process water will be used primarily in the grinding circuit as dilution water. Two centrifugal pumps (one standby) will deliver process water to users distributed throughout the process plant. For the Phase 2 expansion, a second duty process water pump will be added. A process water tank (PWT), with a 750 m^3 live capacity, will provide two hours of residence time within the process water system (one hour in Phase 2). This tank will be replenished by the pre-leach thickener overflow and TMF reclaim with make-up water coming from the raw water tank. The event pond and plant cooling system will also provide minor intermittent contributions. Overflow from the PWT will flow by gravity to the thickener area sump pump.

17.3.13.4 Air Distribution

Compressed air provided to the process plant will be divided into two systems:

Low pressure (225 kPa) but high volume (4,170 Nm^3/h) process air will be provided to the leach / CIP and cyanide destruction tanks. This air will provide oxygen to sustain the oxidation reactions occurring in these vessels. The air will be discharged into the bottom of the tanks through spargers. Three blowers (one standby) will provide the low pressure air required. Two additional blowers will be added in Phase 2.

Dried high pressure air will be supplied to the process plant by two compressors rated for 500 m^3/h each. Four receivers will be utilized for compressed air distribution within the process plant area.

17.3.14 Reagents

17.3.14.1 Lime

Quicklime will be added to the grinding circuit via the SAG feed conveyor and hydrated lime will be added to the leach and cyanide destruction circuits.

Quicklime, at 85% CaO, will be delivered either bulk in a 30 t truck or in 1 t bulk bags. The quicklime will be dumped on the concrete pad on the ground and reclaimed to the covered quicklime hopper located adjacent to the SAG mill feed conveyor by a FEL. In the case of bulk bags, a bag breaker will be situated on top of the hopper. A belt feeder will meter quicklime to the SAG mill feed conveyor. The hopper will provide approximately 1 day of storage capacity at the nominal consumption rate.

Hydrated lime, at 68% CaO, will be received in 1 t bulk bags. The bulk bags will be added to the hydrated lime silo via a bag breaker. The silo will be equipped with a rotary valve for dosing lime to the agitated lime mixing tank. Hydrated lime pumps (one duty, one standby) will circulate the lime slurry through a ring main for addition in the leaching and cyanide destruction circuits. The hydrated lime silo will be equipped with a dust collector. Hydrated lime will be added to the cyanide destruction circuit using automated control valves to maintain pH.

17.3.14.2 Flocculant

Dry flocculant will be delivered in 25 kg bags. The bags will be added to the feed hopper by hand. Flocculant will be added from this hopper using an eductor (jet wet mixing system) and raw water. The Phase 1 flocculant mix strength will be 0.25% w/w. Once mixed, the batch will be transferred to a flocculant storage tank having a live capacity of 84 m^3. Parallel standby and duty metering pumps will dose flocculant to the inline mixer where the flocculant will be diluted to 0.025% prior to entering the pre-leach thickener. The flocculant addition to the thickener is expected to be 20 g/t ore and will be controlled by the measured bed depth level and / or the clarity of the thickener overflow.

17.3.14.3 Sodium Hydroxide

NaOH will be delivered as granules in sealed 1 t bulk bags. A batch will be prepared by first adding a controlled volume of raw water to the 5 m^3 mechanically agitated NaOH mixing and storage tank. A bag of NaOH will then be added to the tank via a bag breaker. The 20% w/w mixed solution will be dosed to the elution and intensive leach circuits as well as the cyanide mixing tank. Positive displacement reagent dosing pumps will meter the sodium hydroxide to each user.

17.3.14.4 Hydrochloric Acid

HCl will be delivered in intermediate bulk container (IBC) format as a 32% solution and discharged to the HCl acid mixing and storage tank. The acid will be diluted from 32% to 3% and transferred to the acid wash column by batch using the centrifugal

HCl acid pump. The HCl mixing and storage tank area will be separately bunded and equipped with a sump pump that will pump spillage to the tails hopper.

17.3.14.5 Sodium Cyanide

Sodium cyanide briquettes will be delivered to site in sealed 1 t bulk bags. A concentrated solution of 20% w/w will be prepared in the cyanide mixing tank using process water. Once dissolved, the batch will be pumped to the cyanide storage tank, which will provide 1.25 days capacity. A single positive displacement dosing pump will be used to supply cyanide to the elution and intensive leach circuits while two centrifugal pumps (one standby) will be used to supply the leaching circuit via a ring main.

17.3.14.6 Sodium Metabisulphite

Granular SBMS reagent will be delivered to the site in 1 t bulk bags. Batches of 20% w/v SBMS will be made in the covered SBMS mixing tank by adding a controlled amount of raw water. Mixed batches will be transferred to the covered SBMS storage tank using a centrifugal pump and subsequently dosed to the cyanide destruction circuit using two positive displacement pumps (one standby). The reagent addition rate will be controlled to maintain either an oxidation-reduction potential set point or an ore feed ratio. An extraction fan will remove fumes and dust from the cyanide destruction tanks.

17.3.14.7 Copper Sulphate

Copper sulphate will be delivered in 1 t bulk bags and added to the copper sulphate mixing tank. A controlled volume of raw water will be added to the mix tank (8.3 m^3) to obtain a concentration of 20% w/w copper sulphate in solution. Copper sulphate addition and mixing will take place simultaneously with dosing to the cyanide destruction tank.

17.3.14.8 Activated Carbon

Carbon will be received in 500 kg bulk bags. New carbon will be added directly to CIP Tank 6 in Phase 1 and to the carbon quench vessel in Phase 2. In Phase 2, new carbon will be pumped from the quench vessel, along with the regenerated carbon, to the carbon sizing screen where fines will be screened out. Removal of carbon fines in fresh carbon will only be possible in Phase 2.

17.3.15 Process Discharges

17.3.15.1 Solids and Liquid

All solid process plant waste will be contained in the TMF.

An event pond will capture all untreated process water and slurry spillage. This spillage will be returned to the plant as required.

All slurry entering the TMF will be first treated in the cyanide destruction step. Seepage water will be collected from ponds around the TMF and returned to the TMF. The TMF and the water management pond will have emergency overflows.

17.3.15.2 Gases

Gases containing dust generated by various processes will be treated for dust removal. The following dust and fume systems will be included in the process plant:

1. Primary crusher dust collector and dust suppression sprays;
2. Electrowinning cell and gold room ventilation fans;
3. Combined drying oven and smelting furnace bag house;
4. Lime silo dust collector;
5. SBMS tank evacuation fans.

17.4 Process Control Philosophy

The general philosophy adopted for the Volta Grande Project is as follows:

- Control of process equipment via programmable logic controllers (PLC) viewed from a plant wide control system (PCS) and consideration of an advanced process control expert system;
- Hardwired interlocks for personnel safety;
- Starting and stopping of all process drives and opening and closing of automatic valves from the control room;
- The system is intrinsically safe in that all stop buttons are active no matter what mode the equipment is in;
- Monitoring of all operating conditions on the control system and recording of selected information for data logging and trending;
- Alarm inputs to the control system that are fail safe in operation, e.g. the signal reverts to zero for the fault condition to exist;
- Sequence start and stop facilities in the primary crushing, reclaim, and milling circuits;
- Automated elution sequences.

17.4.1 Gold Room Security

A clean change room, metal detector, and dirty change room will be located at the entrance of the gold room. All ingress and egress of the gold room will be strictly controlled. An alarm system and closed circuit television (CCTV) monitoring will provide security in the interior of the gold room and access to this area will be restricted. All gold products in the gold room will be weighed, stamped and inventoried. Routine maintenance in the gold room will be restricted to days when there will be no smelting.

17.5 Conclusions and Recommendations

17.5.1 Conclusions

The Volta Grande process plant is a straightforward and typical design commonly used in the mining industry. The cyanide destruction, Phase 2 pre-leach thickening and decant return purification areas of the process plant require additional testing and engineering work. Risks to capital increase include:

- Additional cyanide detoxification residence time resulting in larger tank requirements;
- Necessity of a second primary crusher or unforeseen increased mining costs associated with the fine blast size assumed for the expanded throughput case of Phase 2;
- Additional thickener costs if the dewatering cyclone design is determined to be impractical.

Possible capital reductions include simplification of the decant water treatment plant if the TMF decant water is of sufficient quality.

17.5.2 Recommendations

1. Additional investigation is required around the pre-leach thickener with respect to the circuit proposed for the expanded case.
2. Additional continuous cyanide destruction work is required to verify the residence time, reagent consumption and to clarify the circuit configuration.

18.0 PROJECT INFRASTRUCTURE

18.1 General

The Project will comprise the following infrastructure and on-site facilities:

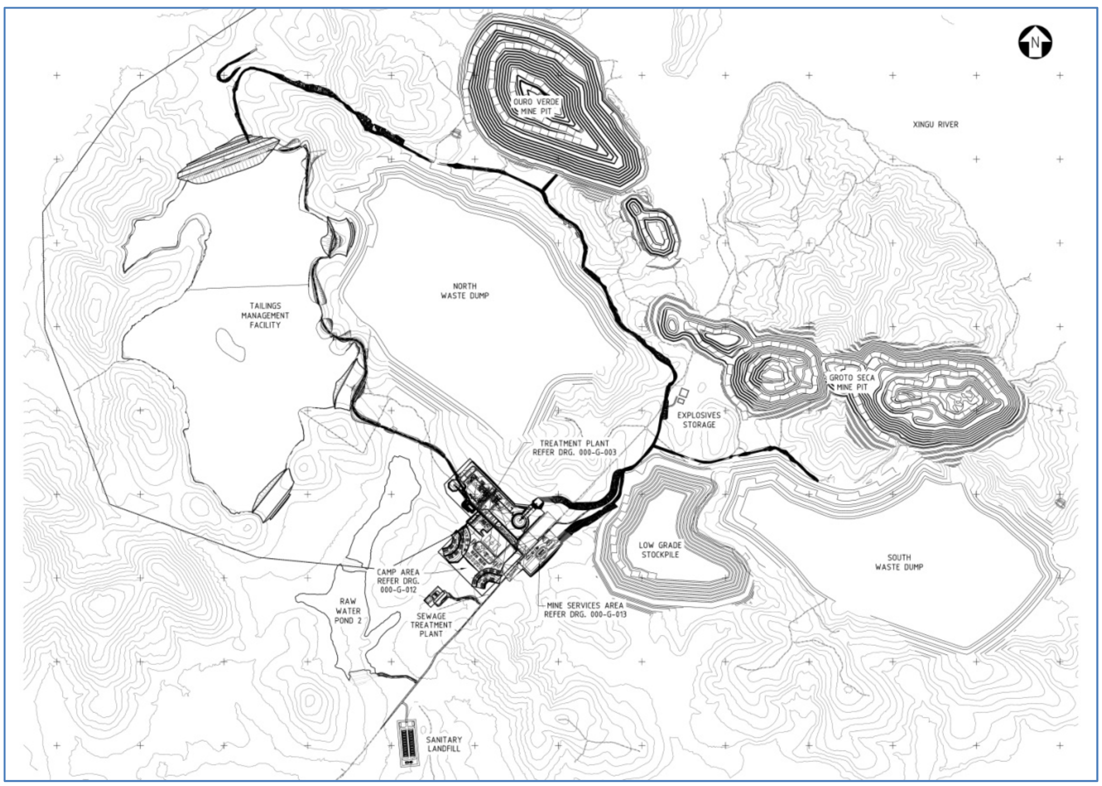
- Grota Seca open pit;
- Ouro Verde open pit;
- Waste management facilities (WMF);
- Tailings management facility (TMF);
- Tailings and reclaim pipelines;
- Mine haul roads;
- Site access roads;
- Fuel management facility;
- Primary crusher;
- Coarse ore stockpile and reclaim;
- Process facilities - crushing, milling, thickening, leaching, carbon stripping, regeneration, refining and reagents systems;
- Site buildings - site administration building, site washrooms, high security building, first aid clinic , gate house, site workshop and warehouse, control room, metallurgical and assay laboratory;
- Mine services buildings - mine truck shop, mine warehouse, tire change facility, truck wash facility, and mine washrooms;
- Camp facilities;
- Main substation;
- Power distribution system;
- Potable water wells, pump and pipeline;
- Water storage and distribution systems;
- Laydown areas;
- Explosives storage facility;
- Sanitary landfill;
- Water management ponds;
- Dam seepage ponds;
- Helicopter pad;
- Water treatment plant (WTP);
- Sewage treatment plant (STP).

In addition there will be various off-site facilities that will be established and maintained by others, which include:

- 230 kV power line from Pimental;
- Site access road from Altamira;
- Xingu river crossing;
- Solid waste management facility;
- Lay down and marshalling areas.

Figure 18-1 shows the Project site plan including infrastructure, open pits, TMF and WMF.

Figure 18-1: Project Site Plan



The site occupies approximately 25 km^2 with most of the area taken up by the open pits to the north, the south WMF to the east and the TMF and north WMF to the north-west.

The process plant plateau and primary crusher area, including ancillary buildings and workshops, are located to the south and west of the open pits.

The layout of the Project site has taken into consideration the natural bowl or valley shaped feature to the north-west of the process plant plateau where the TMF is proposed. This site minimizes the earthworks for constructing the embankments while maximizing the contained tailings storage volume and the close proximity to the process plant minimizes the lengths of tailings pipelines.

The WMF, for overburden and rock waste, have been located as close as possible to the open pits so as to minimize haul distances.

18.2 Roads and Earthworks

18.2.1 Site Access Road

The Project is located approximately 65 km south-east of the city of Altamira.

Access to the site takes 2 hours from Altamira crossing the Xingu River by barge and taking a road (BR-158) to the stretch of river known as the Big Bend (or Volta Grande) where the exploration camp is situated near the west bank of the Xingu River.

The Municipality of Altamira has upgraded the first 32 km of this access road to a higher standard as part of its regional development program. The remaining 33 km section of road to the Project site will be upgraded by the Pará State Government.

The road upgrade work will include widening, straightening, improvements to drainage, new bridges as well as the laying and compaction of a rock base formation suitable for carrying heavy transport loads.

As the completion of the access road is to be undertaken by the Pará State Government, there is no provision in the capital cost estimate for the upgrade.

18.2.2 Site Roads

The site roads have been designed to connect the various facility areas proposed in the master plan for the initial plant construction and for maintenance and operation. Where possible site roads will follow natural ground contours but profiling with cuts and fill will be necessary in some locations to provide uniform grades. Maximum grade will be 10% while the average grade will be 8%. Single lane (track) roads will be 4 m wide. The site access roads will be 6 m wide. The minimum cross fall on roads will be 3%. The minimum turning radius at intersections will be 12 m.

Site roads will be constructed of compacted rock fill (300 mm thick) overlying competent ground. Drainage ditches will be constructed on uphill slopes.

The following roads have been included in the design:

- Tailings discharge access road: 2,460 m long X 4 m wide;
- Sewage treatment access road: 350 m long X 6 m wide;
- Water dike access road: 400 m long X 6 m wide;
- Sanitary landfill access road: 200 m long X 6 m wide.

18.2.3 Earthworks

The earthworks design for the site development provides an optimized layout and encompasses:

- Definition of access and platform limits and elevations;
- Cut and fill volume calculations;
- Plan and profile drawings.

Earthworks design for access to buildings considered the minimum width required for vehicles using the area.

The cut and fill slope parameters adopted for this Project are based on review of the preliminary geotechnical reports.

- Cut batter slopes: 1.0 H : 2.0 V;
- Fill batter slopes: 2.5 H : 1.0 V;
- Ditches: 1 H : 1 V.

For cuts greater than 10 m deep, a 4 m wide bench will be provided at 10 m intervals.

In general, all areas of the Project have been graded to provide adequate surface drainage collection and management thereby minimizing adverse environmental impact. Slopes will be re-vegetated to control erosion.

The earthworks have been designed on the assumption that the in-situ lateritic / saprolitic soils for the most part are suitable to be re-used for engineered fill material.

18.2.4 Drainage

The site drainage system design is based on rainfall data, the individual drainage areas, an appropriate run-off coefficient to determine the volumes of water to be managed and to size the ditches and culverts.

18.3 Primary Crusher and Coarse Ore Stockpile

The primary crusher facility is located at the north-east end of the process plant area.

The primary crusher facility comprises:

- Run-of-mine (ROM) bin (260 t live capacity or 2 mine trucks);
- Primary feeder (1.5 m wide X 9.0 m long);
- Vibrating grizzly (1.4 m wide X 4.8 m long);
- Primary crusher: C160 Jaw crusher – 639 t/h (1,600 mm X 1,200 mm);
- Stockpile feed conveyor: 1,065 t/h (1,200 mm X 140 m long);
- Coarse ore stockpile: 16 hours live capacity (16 m high X 42 m diameter);
- Reclaim apron feeders (3): 438 t/h (1,200 mm X 9.0 m long) each;

- SAG mill feed conveyor: 1,094 t/h (1,200 mm X 245 m long).

The primary crusher facilities will be contained in a reinforced concrete structure cut into the hill north-east of the process plant. The dimensions of the primary crusher structure are approximately 26 m X 9 m wide X 19 m high.

Mine haul trucks will dump the ore directly into the ROM bin. A primary feeder will receive the ore from the bin to feed the jaw crusher via a vibrating grizzly. The crushed material will report to the stockpile feed conveyor, which will deliver the ore to the coarse ore stockpile.

The crushed ore stockpile will be an open and generally conical shaped ore pile with an average angle of repose of 35 degrees. The stockpile will be 16 m high and will have 7,200 t of live capacity, providing a 16 hour buffer between the mining and processing operations for Phase 1 and an 8 hour buffer during Phase 2.

Ore will be withdrawn from the stockpile via two reclaim apron feeders located in a concrete reclaim chamber under the stockpile. The concrete chamber housing the two apron feeders will be 6.7 m wide X 6.9 m high and will be accessible from both northwest and south east ends via 5.6 m diameter corrugated steel tunnels.

A 245 m long SAG mill feed conveyor will receive the crushed ore from the apron feeders and will deliver the material to the SAG mill feed chute.

18.4 Process Plant

The main areas comprising the process plant are:

- Milling area;
- Pebble crushing area (Phase 2);
- Gravity circuit (Phase 2);
- Pre-leach thickener;
- Leaching and CIP area;
- Elution and carbon regeneration;
- Gold room;
- Reagents area.

The milling area is located approximately 140 m north-east from the reclaim stockpile. This will be an open air steel framed structure supported on concrete foundations. The area will contain the grinding circuit, which consists of the following major equipment: single stage SAG mill (10.4 m diameter X 6.4 m effective grinding length (EGL); trommel screen; cyclone cluster; and ball mill (to be installed in Phase 2). The SAG mill and the ball mill will be supported on independent concrete foundations. The pebble crushing area is located between the milling area and the reclaim stockpile and will be installed for Phase 2. The pebble crusher and associated ancillary equipment will be installed in an open steel framed structure supported on concrete spread footings.

The pre-leach thickener will be located south-west of the milling area within a concrete containment area. The high rate thickener will be 28 m diameter and it will be supported on steel columns on concrete piers.

The leaching and CIP area will be located north-west of the milling area. Three leach tanks (16 m diameter X 18 m high) and six CIP tanks (11.5 m diameter X 13.2 m high) will be located in this area. Four additional leach tanks will be added in Phase 2. The tanks will be supported on concrete ring beams and will be located within a concrete containment area. The volume of the containment area is sized to accommodate 110% of the volume of the largest tank in the event of failure. The elution and carbon regeneration area is located north-east of the leaching and CIP area. It will house the 10 t capacity elution column (1.7 m diameter X 10.5 m high), the strip solution heater and strip solution tank (6.7 m diameter X 6.0 m high). A second column will be added for Phase 2 to handle the acid washing part of the cycle and the initial column will be dedicated to the elution steps of the process. The carbon regeneration equipment (carbon dewatering screen, regeneration kiln, carbon quench tank) will be installed in Phase 2.

The gold room will be located north of the leaching / CIP area. It will accommodate the electrowinning cells, drying oven, diesel smelting furnace and safe / vault. The building will be steel framed structure with metal roofing and cladding with a steel mesh. The steel structure will be supported on concrete strip footings. The pregnant and barren solution tanks will be located just outside of the gold room in a concrete containment area.

The reagents area will be located north-west from the leaching / CIP area. Various reagents storage tanks will be located in separate concrete containment areas. All storage tanks, steel structures, and pumps will be supported on a large concrete slab on grade.

18.5 Site Buildings

18.5.1 Workshop/Warehouse Building

The plant workshop / warehouse building will be located south of the milling area. This will be a five bay building, 24.4 m wide X 72.2 m long and will house the main and electrical workshops, main warehouse, warehouse storage and a welding bay. The site workshop / warehouse building will be a tent structure supported on concrete strip footings.

18.5.2 Administration Building

The site administration building will be located south-west from the reclaim stockpile. This building contains offices, meeting room, reception area, mess room and washrooms. The overall building dimensions are 11.7 m X 37.6 m long x 2.7 high. This will be a prefabricated building supported on concrete strip footings.

18.5.3 First Aid Clinic

The first aid clinic building will be located between the site administration building and the site workshop / warehouse building. It will contain the treatment room, ambulance bay, doctor's room, waiting area and rest rooms. This will be a prefabricated building with overall dimensions of 9.2 m X 11.6 m wide X 2.7 m high. The building will be founded on concrete spread footings.

18.5.4 High Security Building

The high security building will be located adjacent to the first aid clinic building. It will house offices and a search area. This will be a single storey prefabricated building, 6.2 m X 13.5 m wide X 2.7 m high. The building will be founded on concrete spread footings.

18.5.5 Metallurgical and Assay Laboratory

The laboratory will be located south-east from the pre-leach thickener area. This will be a prefabricated building with approximate dimensions 30 m X 12.5 m X 4.0 m high. It includes the metallurgical, analytical and fire assay laboratories. The building will also house the sample preparation and receiving areas, instrument room, storage areas and offices. The proposed facility layout is based on the information provided by Jack Stanley. The building will be supported on concrete strip footings.

18.5.6 Lime Storage Shed

The lime storage shed will be located east of the milling area, in an area adjacent to the covered quicklime hopper. The shed will provide a covered storage area for the quicklime needed for the process. This will be a tent structure, approximately 20 m X 10 m wide, supported on concrete strip footings.

18.5.7 Washrooms

Site washrooms will be a prefabricated building located south of the milling area. The building will be 6.8 m X 3.6 m wide and will be supported on concrete spread footings.

18.5.8 Gatehouse

The gatehouse will be located on the main access road from Altamira, just south of the mine services area. This will be a prefabricated building, 6.2 m X 8.5 m X 2.7 m high, supported on concrete spread footings.

18.6 Mine Services Buildings

18.6.1 Mine Truck Shop / Warehouse Building

The mine truck shop / warehouse building will be located in the south-west corner of the mine services area. It will house two heavy vehicle maintenance bays, one tracked vehicle maintenance bay, one light vehicle maintenance bay, a welding bay and a warehouse bay. The building will be a tent structure, 101 m long X 12 m wide. The heavy and tracked vehicle maintenance bays will be 4.9 m high. The remaining bays will be 2.4 m high. The building will be supported on concrete strip footings.

18.6.2 Mine Washrooms

The mine washroom building will be located south of the mine truck shop / warehouse / marshalling area building. This will be a prefabricated building, 6.0 m X 3.0 m X 3.0 m high, supported on concrete spread footings.

18.6.3 Fuel Management Facility

The fuel management facility will be located north-east of the mine truck shop / warehouse building. This facility will be designed and supplied by the fuel supply contractor. The delivery trucks will be connected via flexible hoses to the diesel unloading pumps. The diesel will be transferred to bulk fuel storage tanks within a containment bund. The diesel distribution pumps will transfer the fuel to the mine truck refueling slab. The refueling station will be fitted with containment slabs, kerbs, and bunds. Fire protection will be provided by the site's fire protection system.

18.7 Camp

During construction the camp will accommodate the owner's team, Engineering Procurement Construction Management (EPCM) contractors and contractor staff and labourers.

The camp will provide accommodations for 1,128 people at the peak of construction. The camp buildings will be located south-west of the process plant outside of the main fence surrounding the site and will occupy an area of approximately 250 m X 390 m.

The camp buildings will be prefabricated and transported as 'flat packs' to site for quick assembly on prepared concrete foundations. The structures will be steel framed and insulated interior panels and exterior sheeting panels. Metal doors and windows would be provided. The electrical, plumbing, HVAC and communications systems for each type of building would be installed at site.

The camp buildings will comprise:

- 4 room (single bed) dormitory units (6 off);
- 8 room (2 x double bunk beds) dormitory units (32 off);
- 4 room (2 x double bunk beds) dormitory units (4 off);
- 4 room (2 x double bunk beds) dormitory units (8 off);
- Male washrooms, major (6 off);
- Male washrooms, minor (4 off);
- Female washrooms, minor (4 off);
- Wet mess (1 off);
- Dry mess (1 off);
- Camp administration (1 off);
- Staff laundry and washrooms (2 off);

- Staff washrooms (1 off).

In Phase 1 the camp will accommodate all non-local skilled labour. The expected average camp loading will be around 30%. In Phase 2 all non-local personnel, which previously required camp accommodations will be bussed on a daily basis from the town of Altamira and the villages adjacent to the Volta Grande site (Vila Ressaca and others). Only night shift personnel, managers, line supervisors, vendors, contractors and visitors will be staying at the camp. The expected average camp occupancy during Phase 2 will be 150 people.

18.8 Tailings Management Facility

18.8.1 General

TMF for the Project is designed to contain approximately 116 million tonnes of tailings generated from the process plant over the life of the mine. The TMF will be "zero discharge" with controlled seepage captured downstream of the embankments and returned to the basin by pumps.

The site for the TMF was selected based on its proximity to the process plant. It is in a natural basin which, with the construction of a main dam and saddle dikes, will provide containment for the tailings. The basin has a finite tributary area with no external watercourses; the only natural inflow will be from rainfall. The soils in the basin are impervious bedrock (zero faulting) overlain by saprolite of varying thickness and surface soils of weathered saprolite and colluvium.

Provision of an imported liner was considered but deemed unnecessary due to the nature of the topography and the assumed low permeability of the saprolite generally in the basin. The foundations of the main dam and the saddle dikes will be constructed on the undisturbed saprolite layer.

The current design includes the reduction of residual cyanide in the CIP tailings to approximately 1 ppm CN_{WAD} by the air / SO_2 process before entering the TMF. Empirical data from a similar gold project in Venezuela indicates that the rate of natural degradation of any remaining cyanide species from solar radiation, rain water dilution and biological influences is very effective and rapid. Thus, it is reasonable to infer that the levels of cyanide in the seepage will be well below the regulated level, and perhaps below detection limits.

It is planned to initially construct the main embankment of suitable compacted soil with a vertical drainage layer on the downstream edge of the embankment connected to a horizontal drainage blanket. This construction of the main dam will be done in two stages to bring the crest up to an elevation of 124 m. The Tailings Management Report by VOGBR indicated that there would be three subsequent raisings to achieve the final elevation of 161 m. However, the current project execution plan is based on raising the main dam and constructing the saddle dikes on a continuous basis to provide adequate storage for about one year's tailings production.

The raisings will be built of compacted soil in the upstream section and compacted rock fill in the downstream section with continuity on the vertical and horizontal drainage layers at the interface of the compacted soil and the rock fill. The soil will be obtained from suitable borrow areas in the basin and rock fill will come from mine development waste.

In order to contain the volume of settled tailings (estimated to be 92 million m^3 based on settled density) saddle dikes will be required in topographical depressions around the perimeter of the basin. These dikes will follow the same standards as those used to design the main dam and depending on overall height will be either compacted soil only (up to 18 m) or compacted soil and downstream rock to fill the balance.

To protect the integrity of the main dam and the saddle dikes there will be an emergency overflow constructed on the south side of the basin which will discharge into the water management pond. This overflow facility will be raised to accommodate the main dam and saddle dike raisings.

The main geometric characteristics of the impoundment are presented in Table 18-1.

Table 18-1: Main Characteristics of the TMF

Characteristics	Initial Dam	Final Dam
Mass length (m)	552	779
Crest elevation (m)	124	161
Emergency Overflow elevation (m)	122	159
Total reservoir volume (m^3)	15,543,771	101,634,073

18.8.2 Assumptions

- A topographical base on a 1:1000 scale obtained from a laser aerial survey in November 2011;
- Annual production plan for the Project, provided by AGP;
- Utilization of construction material available on site;
- Construction in stages to optimize capital expenditures;
- Varying solids content for the tailings deposited in the reservoir with time giving a final volume of approximately 92 Mm^3;
- Design according with Brazilian and International Standards.

18.8.3 Geological-Geotechnical Studies

- Field mapping to identify typical soils at the dam foundation, abutments and basin area, the latter to investigate potential borrows areas;
- 27 auger boreholes with a maximum of 10 m of depth for the purpose of characterizing potential borrow areas for construction of the dam;
- 23 percussion boreholes and 17 mixed boreholes, with three infiltration tests scheduled for both borehole types and three water loss tests for the mixed boreholes. The objective of these investigations is the geological-geotechnical

and hydrogeological characterization of the dam foundation and the basin as a whole;

- Five investigation wells for the purpose of collecting disturbed and undisturbed samples for laboratory testing;
- Laboratory testing including grain size distribution, Atterberg limits, specific gravity, moisture content, permeability, settlement, strength parameters and compaction. A total of 35 samples were tested, to both Brazilian and International standards.

18.8.4 Hydrological Studies

- Hydrological studies were prepared to determine design flows for sizing the hydraulic structures, as well as providing support for the water balance of the reservoir;
- Design rainfall based on data from the Altamira monitoring station, operated by the National Water Agency (ANA). A statistical analysis was performed on the data to derive values for maximum daily rainfall for the various return periods. For return periods of 1,000 and 10,000 years the calculated rainfall are 345 mm and 427 mm respectively;
- Characterization of the annual average rainfall regime in the hydrographic basin of interest was made from data consisting of daily rainfall from 11 monitoring stations operated by the ANA;
- Flow characteristics for the area, derived from transfer techniques from the Altamira station, indicate that the long-term average flow (QMLT) in the stream section studied is 0.046 m^3/s;
- In compliance with Brazilian regulations, the Project is required to maintain a minimum flow downstream of the dam once it has been constructed. The calculated value is Q95 = 0.0062 m3/s, which provides a minimum of 6.71 m^3/h as the minimum flow. This flow will be maintained from a drilled well with a dedicated pump located downstream of the main dam close to the existing stream bed.

18.8.5 Emergency Overflow Design

- An emergency spillway system will be provided for each dam and dike raise located at the south end of the basin;
- For the initial and intermediate raises the spillway will be a 2 m rock lined trench cut into natural terrain with the base 2 m below the dam raise crest elevations;
- For the final stage a concrete spillway will be adopted comprised of a channel incorporating a weir at El. 159.0 m, rectangular section in reinforced concrete of 2 meter wide base and 2 m high and a slope of 0.5% with suitable transition and energy dissipation sections;

Table 18-2 provides a summary of the design flow calculation for spillway system for different storm events.

Table 18-2: Summary of the Design Flow Calculation for the Spillway System

Variable	Initial Dam		Final Dam
	TR 1,000 years	TR 10,000 years	TR 10,000 years
Critical duration	24 hours	24 hours	24 hours
Maximum inflow (m³/s)	22,48	28.09	28.76
Maximum outflow (m³/s)	1.58	2.34	1.38
Maximum water level super elevation (m)	122.52	122.64	159.59
Crown elevation (m)	124.00	124.00	161.00
Resulting freeboard (m)	1.48	1.36	1.41

18.8.6 Embankment Design (Dam and Saddle Dikes)

- Investigation at the proposed dam and saddle dike foundations indicated the presence of a colluvium layer with low strength and high permeability. To maintain the integrity of the controlled seepage design, this material will be removed prior to construction of the embankments;
- Seepage analyses using the Finite Element Method were made using the parameters defined from the results obtained in the testing campaign in the field and laboratory to determine permeability coefficients;
- The specific flows obtained from the results of the analyses were 1.95 X 10^{-6} m³/s/m and 7.50 X 10 m³/s/m, respectively in the sections of inclined filter and horizontal filter layer and these are applied to the individual structures to provide the seepage volume to be managed;
- The internal drainage system in the initial dam consists of a vertical sand filter connected to a drainage blanket, composed of a layers of gravel interspersed with a layer of sand. For the raising stages, the transition between upstream and downstream sections is composed of a layer of sand and fine crusher rock. In the contact between the foundation and the substrate a layer of sand and fine crushed rock is planned;
- Stability Analyses were conducted using Limit Equilibrium Method, data from lab and field tests and results of seepage analysis. Table 18-3 summarizes the results;

Table 18-3: Results Obtained from Stability Analyses

Structure	Water Table Condition	Minimum SF	Calculated SF
Initial Embankment	End of Construction – Upstream	1.20	1.21
	End of Construction – Downstream	1.30	1.38
	Normal Water Table	1.50	1.69
	Critical Water Table	1.30	1.48
Intermediary Embankment I (EL.135)	Normal Water Table	1.50	2.04
Final Embankment	Normal Water Table	1.50	1.99

- Monitoring and instrumentation will be provided to record pore pressures in the embankments, movement or settlement of the structures, seepage flows to indicate the performance of the systems.

18.8.7 Tailings Deposition and Water Reclaim

- Tailings slurry from the process plant will be deposited into the basin from spigots on the tailings pipeline across the face of the main dam and allowed to form a beach. To reduce erosion, the upstream face of the dam will be treated with rip-rap;
- As the solids settle, decant water will be collected inside the basin and pumped back to the process plant by floating vertical turbine pumps;
- To maintain the zero discharge design, the water within the tailings basin will be managed to avoid overflows and to maintain a sufficient volume to provide the process with a reliable supply during the “dry season” when evaporation is at a maximum. This will be accomplished by maintaining a depth of water over the tailings at all times;
- However for the first year of operation due to the topography and relatively small volume of tailings expected, it will be necessary to deposit tailings within the basin on the east side to create an accessible pond of decant water.

18.9 Waste Management Facilities

18.9.1 General

Waste management is an integral component of mine development and ongoing mining.

Initially there is a predominance of saprolite waste generated during the pre-stripping stage of both open pits; however, this will diminish when bedrock is exposed and the mine development continues.

Based on the test results on the waste material, the indication is that there is no discernable acid rock drainage (ARD) material.

18.9.2 Ouro Verde and Grota Seca Waste Management Facilities

Each open pit has a dedicated WMF. The geometry of these waste stockpiles generally features 20 m high benches, 10 m wide berms and a dump angle of 1.33 H:1.0V (37.5˚).

The WMF for the Ouro Verde pit, known as the North Dump, is located to the south-east of the pit and adjacent to the TMF. This dump will be developed first as the plan is to use some of the waste rock from this pit development to widen the pioneer roads to haul road width.

Initially, the saprolite from the pre-stripping is placed around the higher areas of the planned waste dump until such time as waste rock is available to be deposited in the lower area to create drainage channels. Once the rock drainage system has been established, both saprolite and waste rock will be mixed on the dump.

The south WMF is located to the south of Grota Seca and east of the plant location. It will be built in the same manner as the North Dump with saprolite placed along the edge of the valley until the rock drain has been established. Once drainage is set, the saprolite and rock will be mixed and placed over the drainage pathways.

It is also the intent to use suitable saprolite and waste rock from Ouro Verde pit to construct the main TMF dam.

The Ouro Verde facility will reach a height of 100 m and the top level is expected to be the 190 m level. It will cover an area of 189.0 ha.

The Grota Seca facility will not cross over a topographic high surrounding it. Grota Seca will reach a height of 120 m and the top level will be the 220 m level. It will cover an area of 157.1 ha.

18.10 Power Supply and Distribution

18.10.1 Incoming High Voltage Transmission Line

A 230 kV overhead transmission line will supply power from Pimental substation to the Volta Grande site. The cost for the HV supply to the site will be borne by the utility on a Build-Own-Operate-Transfer (BOOT) scheme. The transmission line will be 21 km long.

The 230kV overhead line from Pimental will be terminated at the main substation dead-end structure. The line is connected to the main breaker through a motorized disconnect switch. A set of surge arresters, current transformers and voltage transformers will be provided at the line side of the main disconnect switch.

18.10.2 Main Substation

Power will be stepped down from 230 kV to 13.8 kV by means of two 230 / 13.8 kV ONAN / ONAF1 / ONANF2 oil filled transformers. One transformer will be installed during Phase 1 and the second one in Phase 2. Each transformer will be sized to carry the complete plant load, utilizing the forced air rating of the transformer. This will permit one transformer to be taken out of service for maintenance without having to curtail normal operation.

Two feeder breakers will protect the main transformers. Disconnect switches will be provided for isolation and bus selection with key interlock. Instrument transformers provide metering and protection signals to the electronic relays and power meters for the substation. Upon completion of Phase 2 the switching between the two buses will be through a tie breaker with disconnect switches at both ends of the breaker terminals.

The transformers will be connected to the main 13.8 kV switchgear buses (A and B) using cables installed on ladders in a dedicated concrete trench.

During Phase 1 the 13.8 kV switchgear will be single-ended with the capability to be upgraded to double-ended switchgear in Phase 2.

One bus (bus A), one incoming breaker and the bus tie will be installed in Phase 1. The second bus (bus B) and the second incoming breaker will be installed in Phase 2.

Each bus is rated to carry the complete site load upon completion of Phase 2. One equipped spare breaker and one extra space are provided in each bus segment for future expansion.

18.10.3 Power Demand

Table 18-4 lists the anticipated electrical load for the Project as follows:

Table 18-4: Power Requirements

Type of Load	Phase 1	Phase 2
Nameplate Power	24.15 MW	43.73 MW
Installed Load	25.62 MW	46.55 MW
Peak Demand Load	19.42 MW	35.81 MW
Average Load	16.25 MW	31.02 MW
SAG Mill Rated Power (nameplate)	14.00 MW	14.00 MW
SAG Mill Load Factor	0.83	0.84
Ball Mill Rated Power (nameplate)	NA	14.00 MW
Ball Mill Load Factor	NA	0.84
Overall Load Factor	0.76	0.77
Overall Power Factor	0.91	0.92

A large portion of the overall electrical load will be due to the process plant. The process plant is expected to run continuously for 24 hour per day. The load list summaries for Phase 1 (3.5 Mt/a) and Phase 2 (7 Mt/a) are shown in Table 18-5 and Table 18-6 respectively.

Table 18-5: Power Requirements per Area - Phase 1

Process Areas	Nameplate Load kW	Installed Load kW	Load Factor LF	Peak Demand kW	Cosϕ PF	Utilization Factor UF	Operating Load kW
SAG Mill	14,000	15,021	0.83	12,573	0.93	0.95	11,844
Ball Mill	-	-	-	-	-	-	-
Cyclone Feed Pump 1	800	858	0.80	687	0.99	0.91	627
Cyclone Feed Pump 2	800	858	0.80	0	0.99	0	0
Primary Crushing Area	587	613	0.84	515	0.85	0.64	330
Grinding	1,158	1,218	0.65	929	0.84	0.39	360
Pebble Crushing Area	-	-	-	-	-	-	-
Screening / Tailings	969	1,028	0.57	583	0.96	0.64	375
Leach / CIP	1,053	1,113	0.78	872	0.83	0.86	750
Elution / Gold Room / Reagents	708	740	0.74	551	0.81	0.34	187
Site Services	1,872	1,957	0.53	1,045	0.86	0.73	760
Facilities and Buildings	1,004	1,004	0.75	803	0.80	0.50	402
Mine Services	865	865	0.80	692	0.80	0.56	390
Event Pond and Decant Pumps	332	346	0.80	276	0.86	0.82	227
Process Plant - Total	24,147	25,622	0.76	19,420	0.91	0.83	16,251

Table 18-6: Power Requirements per Area – Phase 2

Process Areas	Nameplate Load kW	Installed Load kW	Load Factor LF	Peak Demand kW	Cosϕ PF	Utilization Factor UF	Operating Load kW
SAG Mill	15,000	15,021	0.84	12,573	0.93	0.95	11,945
Ball Mill	15,000	15,021	0.84	12,582	0.93	0.95	11,952
Cyclone Feed Pump 1	1,200	1,288	0.80	1,030	0.99	0.91	941
Cyclone Feed Pump 2	1,200	1,288	0.80	0	0.99	0	0
Primary Crushing Area	587	613	0.84	515	0.85	0.72	371
Grinding and Gravity Circuit	2,422	2,574	0.68	1758	0.88	0.51	891
Pebble Crushing Area	587	614	0.66	409	0.86	0.69	283
Screening / Tailings	1,825	1,950	0.62	1,208	0.98	0.72	874
Leach / CIP	1,611	1,698	0.79	1,340	0.84	0.86	1,156
Elution / Gold Room / Reagents	858	898	0.74	663	0.81	0.38	254
Site Services	2,656	2,780	0.57	1,589	0.86	0.78	1,242
Facilities and Buildings	1,204	1,204	0.80	963	0.80	0.50	482
Mine Services	1,165	1,165	0.80	932	0.80	0.36	332
Event Pond and Decant Pumps	422	440	0.44	352	0.83	0.91	296
Process Plant - Total	43,736	46,556	0.77	35,807	0.92	0.86	31,020

18.10.4 Process Plant and Ancillary Services Power Supply

The main power transformers will be oil filled, with ONAN / ONAF1 / ONAF2 cooling. On load tap changers will be provided on the high voltage side of the transformer.

Where applicable secondary substations will be key interlocked in order to prevent paralleling transformers.

18.10.5 Power Distribution Details

The main distribution voltage will be 13.8 kV and 480 V. The mill motors and the cyclone feed pumps will be fed by 13.8 kV.

The 13.8 kV switchgear will be metal-clad type with fully withdrawable circuit breakers complete with protection, metering and earthing devices.

SAG and ball mills will be powered by wound rotor induction motors (WRIM) and liquid resistance starter (LRS) to reduce the starting impact of the mills.

From the main 13.8 kV switchgear, the 13.8 kV supply will be distributed to the different process plant load centers. Other load centers remote to the process plant will be supplied via auxiliary 13.8kV switchgear.

Standardized 13.8 / 0.480 kV, 1.6 MVA oil filled, pad mounted transformers and 480V motor control centers (MCC) for the various load centers will be provided. Primary crushing and future pebble crushing areas will be supplied via 13.8 / 0.480 kV, 750 kVA transformers.

The following switch room buildings will contain MCC and ancillary equipment:

- Primary crushing area switch room (modular e-house);
- Pebble crushing area switch room (Phase 2);
- Milling and screening switch room hosting two MCC's in Phase 1 and a third one in Phase 2;
- CIP and plant services switch room;
- Reagent switch room;
- High Voltage (13.8 kV) switch room will be adjacent to the milling and screening switch room. The 13.8 kV switchgear, battery and battery charger, UPS, control panels will be installed in this building.

VFD, UPS, PLC and marshalling panels will be installed adjacent to their respective MCC and / or in the cabinets back to the switch room walls.

All switch rooms will be insulated, furnished with air conditioners, fire detection system, lighting and small power.

Primary cabling will be sized according to the maximum continuous forced-cooled ratings of the downstream transformer.

Secondary cabling, switchgear and tie breakers will be sized according to the maximum continuous forced-cooled ratings of the upstream transformer.

CIP / elution and plant services MCC are double-ended in order to facilitate process plant expansion in Phase 2.

Busses are rated so that the maximum expected load does not exceed 80% of the bus rating and then increased to the next standard rating.

18.10.5.1 Overhead Line Power Distribution

Three main runs of 13.8 kV overhead lines supply power to areas remote to the process plant. The main areas fed by the overhead lines are:

- TMF (north-west line);
- Sewage treatment plant, raw water pump station (south and south-west lines);
- Primary crushing area, batch plant, aggregate, mine services and explosive storage (north-east lines);

18.10.5.2 Voltage Selection

Table 18-7 describes the allowable voltage levels for the Project. These levels may vary during the course of the Project based on specific requirements of equipment manufacturers.

Table 18-7: Voltage Levels

Category	Condition	Voltage V	Phase	Frequency
Primary Supply (HV)	Nominal	230,000	3	60
Primary Distribution (MV)	Nominal	13,800	3	60
Low Voltage Distribution	Nominal	480	3	60
Low Voltage Lighting	Nominal	380 / 220	3	60
LV Utilization	Nominal	220	1	60
Switchgear Control Voltage	Nominal	125	DC	-

18.10.6 Power Quality

Power factor correction calculations will be used to determine the requirements for leading reactive power.

Multi-stage capacitor banks will be provided to raise the overall site power factor in order to reduce the kVA billing demand charge. The capacitor banks will be connected to the main 13.8 kV switchgear bus with location subject to the results of load-flow calculations.

Distributed capacitors throughout the facility will be avoided.

A complete site wide harmonic study will be performed during the detailed engineering to define the size and type of the required harmonic filters and confirm if Static VAR compensator (SVC) would be required.

18.10.7 Construction Power Supply

The power demand during construction is estimated to be about 3,000 kVA.

Two 1,600 kVA diesel generators at the site diesel power plant (ODPP) will be provided to supply power to different construction areas, camp, offices, and administration building.

18.10.8 Emergency / Standby Power

Upon completion of the construction, the ODPP will serve as the source of emergency power supply for the process plant.

18.10.9 Switch Rooms and E-Houses

Electrical equipment such as switchgear, secondary substations, MCC, panel boards, UPS, process control system, I/O cabinets, will be housed in the designated air conditioned electrical switch rooms around the process plant in a climate controlled environment.

All areas remote to the process plant will have MCC or switchboards installed in air conditions modular e-houses installed 1.8 m above grade to facilitate cabling.

18.10.9.1 Control Room

The air conditioned process plant control room, which serves as a central operating and monitoring station of the process plant, is located on top of the CIP tanks. It will be a 6 m X 8 m prefabricated building divided into two rooms:

- Server room that houses UPS, patch panels for the server, ethernet switches and fibre optic break out tray (FOBOT);
- Operator's room that houses three PC based operator interface terminals (OIT) for operating and monitoring the entire process plant. A printer for recording all key process and maintenance parameters will also be provided.

18.11 Surface Water Management

The TMF is designed to be a zero discharge facility and the free water level from rainfall and decanted tailings will be managed to avoid overflowing the facility by varying the volume of reclaim returned to the process.

Seepage through the main dam embankment and saddle dikes will be collected in vertical drains in the structures which report to horizontal drains connected to individual seepage ponds where collected solutions are pumped back to the TMF basin.

Run-off from the WMF is collected in sedimentation ponds prior to release to the nearest watercourse.

Water accumulating in the open pits and other areas around site is pumped to the water management pond.

Run-off on the balance of the site, where the land has been disturbed, is also directed to water management pond prior to release to the nearest watercourse.

Further work will be required to confirm a robust site-wide water balance and to model the expected water quality of the management pond and TMF water. The plan is to develop a comprehensive water balance dynamic model. This will involve collecting and interpreting geographic information, building representative models of water movement and balancing the stocks and flows of water in a time-step based dynamic model.

18.12 Utilities

18.12.1 Raw Water Supply

The supply of raw water for the Project will be solely from collecting precipitation, surface run-off and mine dewatering. The raw water will be stored in the lower catchment area of the water management pond, located west of the process plant.

The water management pond has a floating pump to pump to the raw water tank. The raw water tank will be located north-west of the pre-leach thickener and will have a live capacity of 1,400 m^3 (12.5 m diameter X 12 m high). The raw water tank will be equipped with two distribution pumps (one standby) that will supply the various raw water users including the equipment cooling systems, reagent make-up, screen sprays, dust suppression, firewater tank make-up, etc.

18.12.2 Potable Water

Potable water for the site will be from two wells drilled down into the water table. The wells will be located south of the site workshop / warehouse building and will be advanced using an auger drill and lined with slotted casings and screens within a filter media. Potable water from the wells will be distributed to the camp, process plant and various site buildings.

18.12.3 Fire Water

A firewater header system will be provided at the site and will comprise a 300 m^3 capacity fire storage tank fed by the raw water system and two fire water pumps (one main and one jockey pump) and a diesel operated pump for emergency use. The header system will provide firewater to the both process plant and camp for the life of the Project.

18.12.4 Sewage Treatment

Sewage and non-process waste water from the camp, process and ancillary buildings will be collected and transferred to a STP that will be located south west of the camp. The sewage collection system will be a gravity system with pumped rising mains.

The STP will consist of two containerized units. The maximum load will occur during the construction phase. The system comprises the following components:

- Anaerobic digestion;
- Anoxic zone;
- Trickling filter;
- Secondary clarifier;
- Disinfection;
- Solid waste removal.

18.12.5 Sanitary Landfill

The sanitary landfill will be located south of the process plant and adjacent to the main access road. The landfill location was selected for the following reasons:

- Outside the 1 in 100 flood zone;
- Presence of low permeability soil;
- No tree clearing required;
- Undulating contoured profile;
- Close proximity to the road.

The proposed sanitary landfill will use two main landfill methods – trench and area fill method. The trench method will be used for the kitchen (putrescible) waste and the solids generated from the STP. The area fill method will be used for general non-hazardous waste (paper, textile, cardboard, glass, etc.) disposal.

The sanitary landfill will be fully fenced by 1,800 mm high chain wire mesh fence to reduce the loss of materials being blown from the landfill and introduction of native animals scavaging the facility for food.

18.12.6 Off-site Waste Management

Off-site waste contractors will be used to handle the following waste streams:

- Contaminated wastes – materials contaminated by hazardous materials;
- Bio-medical waste;
- Waste oil and oily water separated oils – used engine oil; oil collected from truck wash-down facility, transformer bunds, and mill lube containment bunds;
- Waste cooking oils;

- Ferrous and non-ferrous metals – from mining maintenance and plant;
- Spent grease – from main gears on the grinding mills;
- Used tires – from mining and site vehicles;
- Reagent packaging – cardboard, plastics, and timbers from reagent deliveries.

18.13 Site Information Technology and Telecommunications Systems

18.13.1 General

The Information Technology (IT) and telecommunications systems will be powered by 120 Vac UPS and will be protected from a power failure by the site emergency power supply.

The IT and telecommunications systems will share a common network backbone.

18.13.2 IT Systems

IT systems will include all necessary hardware, software, data, people and procedures required to generate information to support the day to day, short term, and long term activities of Volta Grande users.

The IT system will provide site wide network infrastructure and support for:

- Process control system (PCS);
- Data, video and voice over internet protocol (VOIP) communications system;
- Process closed circuit television (CCTV), site security and access control systems;
- Fire detection and alarm system;
- Laboratory information and management system;
- Offices support systems;
- Management information services and management reporting services;
- Maintenance systems;
- Construction and operations camp.

IT systems will be used for interconnecting of all network devices with each other and with the end users, as well as providing network access to the site from the outside.

The site local area network (LAN) will consist of redundant core switches, routers and redundant copper CAT6 or fibre optic cables. Single mode fibre optic cables will be used.

Radio bridges will be used to provide building-to-building wireless connectivity wherever fibre is not available.

Redundant fibre-optic cable will be used to provide connectivity between core switches and between core and access / distribution switches.

The office automation systems, at a minimum, will include internet, email, unified messaging, file storing and sharing, back-up / archiving, application servers, printing and copying via network and an electronic document management system.

The IT security system protection will include firewalls, data encryption and anti-viruses as a minimum. Most business critical areas shall be additionally protected by intrusion protection devices.

18.13.2.1 Remote Access

The LAN will be connected to the off-site wide area network (WAN) via the main point to point bidirectional satellite and protected by firewalls and various password access rights levels.

Virtual private network (VPN) services will be provided for off-site remote access to the site LAN using standard ethernet connection to support remote diagnostic, engineering and operation of site IT infrastructures and PCS. Security and encryption shall be provided to prevent unauthorized access to the system

18.13.3 Telecommunication System

18.13.3.1 Main Satellite System and Emergency Communications

A point-to-point satellite communication system will be the main medium of communication between the mine site and the outside world.

A very small aperture terminal (VSAT) satellite system or equal on the Ku band will be used for two-way communications of video, voice and data for business applications. Satellite internet, virtual private networks, IP multicast and VOIP will be all done with VSAT.

Satellite internet equipment at the mine site location will consist of a modem, dish, mount, block up converter (BUC), low-noise block down converter (LNB) and feed assembly.

Two-way radios with base station will be used, capable of operating over a 10 km radius of the Project site.

18.13.3.2 Telephone and Fax

The telephone system will employ a VOIP solution, utilizing the IT network.

The Project will use real-time fax transmission on VOIP.

A cellular system is currently available in the area for mobile voice / data communications.

18.13.3.3 Public Telephone, Internet Access and TV for Camp

Public telephone access will be provided by means of designated public phones in booths located in the camp that will be part of the mine site telephone system. Long distance access will be allowed by means of calling cards.

Public internet access will be provided by means of internet kiosks / booths in the camp.

The entertainment systems at the Project site for the camp will consist of multiple satellite TV channels and will be combined into one feed for distribution. The system should be expandable and flexible.

18.13.4 Supervisory System

The main control room serves as a central monitoring station of the process plant and provides overall operator process monitoring and control. PC based operator interface terminals (OIT) with dual screen will be provided for operating and monitoring the process plant. All key process and maintenance parameters will be monitored for trending and alarming on the PCS. PLCs are located throughout the process plant and are networked to the main control room.

Other process plant systems can be integrated with the PCS system to enable access to relevant data as required, such as enterprise resource planning (ERP), documentation management systems (DMS), maintenance management system (MMS), asset management system (AMS), plant information management system (PIMS), power management system (PMS) and laboratory information management system (LIMS).

18.14 Field Instrumentation

An asset management database that supports routines for instrument calibration management system, alarm logging, software to support predictive maintenance, logging of configuration changes in an audit trail will be implemented.

In order to minimize spares inventory, standardization on instrument technologies, manufacturers and model numbers, process connections, measurement ranges, and insertion lengths will be implemented for the Project.

All instruments, equipment and installation materials shall be suitable for the overall climatic conditions with particular attention to site ambient conditions and the setting within the installation.

All final actuation / control devices will in general be pneumatically actuated. Motorized valves may be used in areas outside process plant where instrument air may not be available.

Instrument technologies and equipment models to be used in the process plant should have a proven track record in similar applications.

Ultrasonic technology will be generally used for liquid level measurement applications, as long as there are minimum or no vapours in the open vessel / tank space - i.e. sumps, wells, water tanks, most reagent tanks, pump boxes, leach tanks, acid wash tank and cyanide holding tank.

Radar technology will be used for level, distance, and / or volume measurement of solids, slurries, pastes, particulate materials and liquids in open or closed vessels, in applications where dust or vapour conditions won't make suitable the use of ultrasonic technology.

Radar technology will be used for diesel / oil level measurement applications. Guided-wave radar (rod type) will be used for cylindrical horizontal fuel storage tanks. Guided-wave radar (rope type) will be used for continuous level measurement in lime storage bins.

Conveyor belt scales load cells will be used for mass flow measurement.

In general, nuclear gauges will be specified for the measurement of density and / or percentage solids by weight of all suspended solids slurry streams and concentrate slurries.

Plugged chute detectors will be based on industry proven microwave or RF admittance technologies, depending on application.

Tilt switches will be used for solids high level detection, i.e. stockpiles.

Vibration fork switches will be used for point liquid level detection for local and / or remote alarming, i.e. cyanide holding tank, hydrochloric holding tank, caustic soda holding tank, water and fuel tanks. This technology should also be used for carbon bed level detection.

Capacitance level switches will be used for lime holding tank and flocculant mixing tank high level detection.

Magnetic flowmeters will be used on water, waste water, slurries, acids, caustics, flocculant and other conductive fluids applications.

Thermal mass flow switches will be used for gland seal water and safety showers water low flow alarm.

Vortex flowmeters will be used for air flow measurement applications.

Static pressure transmitters will have two-way valve manifold and differential pressure transmitters will have a five-way valve manifold.

Diaphragm seals will be used on pressure instruments for corrosive, erosive, toxic, and/or slurry services.

All pressure instruments will include a process isolation valve for removal for maintenance without disturbing the process.

pH probes shall be suitable for mining process with harsh, abrasive, heavily soiled media, probe coating, cyanide exposure as required by the application.

All control valves will include bypass and isolation valves for removal for maintenance without disturbing the process.

Cost effective rotary valves (i.e. v-ball and butterfly) that meet or exceed process control functionality and application requirements will be used wherever possible. Globe valves should be used where they best suit the application.

Control valves should be selected to minimize variety and types for economy in purchasing and spare parts inventory wherever possible; however each valve shall be selected and sized to provide best control performance.

On-off valves will be furnished fully assembled complete with actuators, non-contacting proximity switches and local visual position indicators.

Knife gate valves will be full port type for slurry applications. Valve body will be furnished with natural gum rubber sleeves in order to withstand the harsh abrasive duty inherent in mining applications.

Pinch valves should be used on lime slurry applications. Lime is an extremely abrasive and caustic compound and valves may be subject to high duty/high cycling and/or modulating services.

Contacts from devices used for protective systems, process interlocks or alarms will be wired for fail-safe operation.

All instruments will be certified by SINMETRO / ABNT.

All instrumentation and control cables shall be have a PVC jacket, interlocked galvanized steel armour suitable for cable tray installation and oil, chemical and sunlight resistant, and IEC rated.

18.15 Security and Access Control Systems

18.15.1 Site Security and Access Control Systems

A security system will be implemented at the Project site in order to maintain product security, control and log personnel and vehicles two-way access to and from site and detect and respond to any anomalous incidents.

The security system will make use of the common site network infrastructure.

The site security and access control system will include servers, redundant LAN, security management and client workstations, UPS, external storage media, access control software, security management and video recording software, access control devices, security cameras, motion detectors and all necessary hardware / software for a fully functional system.

Two sets of servers with required software and external storage media will be supplied and installed: one in the security equipment room and a second one in the gatehouse.

A security system management workstation will be provided in the security equipment room, while three security client workstations will be provided in the following locations: gatehouse, central control room, and general foreman office.

The access control system servers will include software for application, configuration, and door access control, including programming of access cards, access card readers, door locking devices / contacts / exit buttons. Video management and storage server will be provided with video management software, for system configuration, camera management, user access control and activity logging.

A two way vehicle access controlled electric gate, two-way personnel access controlled turnstile, motion detectors and security cameras will be installed at the gatehouse.

Security cameras and motion detectors will be installed in the gatehouse, camp fenced area entrances, explosives entrance, and explosives fenced area. Security cameras will also be provided for:

- Grinding area;
- Gold room;
- Carbon regeneration plant;
- CIP and cyanide destruction and;
- Primary crusher and ore reclaim tunnel.

Door controllers will be supplied in critical locations (in and out) complete with power supply and ethernet connection, magnetic locks, timed, toggle, lock and unlock door operations, as well as limit switches, access card readers and access cards.

18.15.2 Gold Room Security

All gold products in the gold room and vault will be weighed, stamped and inventoried.

The security systems will consist of video surveillance, access control, detection and personnel security guards.

Security guards will be responsible for managing, checking and inspection of personnel entry or leaving the gold room. At least one security officer will be on duty at all times and two officers will be on duty during the day shift.

The following will be included as a minimum:

- Card / keypad personnel access reader and door lock / sensor at the main entrance / exit door (clean room);
- Door locks / sensors at the gold refinery building security room entrance / exit doors;
- Hand held metal detectors for security guards;
- Surveillance cameras;
- Motion detectors;

- A two key pad lock system requiring dual process plant / security personnel to be present to open any sensitive equipment that could contain gold and or gold solution;
- Safe / vault.

18.16 Fire Alarm and Detection System

The fire detection and alarm system will be capable of automatic and manual operation. The system will notify the process plant and all other building occupants to evacuate in the event of a fire or other emergency, report the event to an off-premises location in order to summon emergency services and activate the fire protection systems to control the spread of fire and smoke. The system design shall comply with minimum levels of protection mandated by the appropriate local building code and insurance agencies.

The fire alarm and detection system will be a microprocessor-based, programmable, electronically-supervised system, based on multiplexing or addressable panel technology, with distributed processing and digital communication capabilities for centralized data acquisition, distribution and control.

The Project fire detection and alarm system will comprise of, but not limited to the following components:

- Main fire alarm command center (FACC) in the gatehouse;
- Redundant downgraded FACC in the main control room;
- Fire alarm control panels (slaves) located in selected areas of the buildings;
- Addressable initiating devices including heat detectors, smoke detectors, manual call points and pull stations, and switches installed as necessary in ducts, electrical rooms, rack rooms, control rooms, warehouse and other rooms, areas or buildings;
- Addressable output devices will include relays with programmable contacts used to activate alarm horns and strobes, public address (PA) speakers, switching fans on and off and for other functions;
- Input / output modules will be provided as necessary to connect conventional devices to the system.

The fire detection and alarm system shall monitor multiple zones concurrently. Any and all alarms with associated data shall be communicated to the master panels over a communication link. Each building will have a minimum of one control panel.

Manual pull stations will be provided at all exits.

The PA system microphones will be located in the main control room and the gatehouse.

Information alarms will be transmitted via network and/or hardwired to the PCS and security and access control system.

18.17 Logistics

18.17.1 General

The Project is located approximately 65 km to the south-east of the municipality of Altamira.

The Project site can be accessed by river from Altamira or by road after crossing the Xingu River at Altamira. The Project involves the delivery of major equipment from various parts of the world including Asia, North America and Europe. For this Project, marine, barge and truck transportation services will be utilized, individually or in combination. Off-site lay down areas, marshalling areas and project warehousing have been identified in the Port of Belem and Altamira areas.

Ground transportation will be determined by the maximum size loads to be delivered to site.

18.17.2 Port of Belem

The preferred port for Project is Belem, as seen in Figure 18-2, situated 800 km north-east of the project site on the Atlantic Ocean. Belem is connected to Altamira via Highway BR155 and BR 230 (Transamazonia Highway) with a ferry crossing at Apanhar to cross the Xingu River. This 800 km represents an average of 14 hours driving time between the port and site.

Figure 18-2: Port of Belem

Belem is the largest port in the state of Pará and the main port for Amazon River traffic. The port can handle 140,000 TEUs of containers per year, 2 Mt/a of liquid bulk and 225,000 t/a containerized goods and merchandise. The port of Belem is a typhoon harbour considered to be medium sized with good shelter characteristics accommodating vessel sizes of over 150 m in length. The water depth varies between 4.9 to 9.1 m with a maximum draft of approximately 7 m. The port provides anchorage of 7 to 9 m.

The Belem port has lifts and cranes ranging up to 100 t including fixed, mobile and floating cranes.

18.17.3 Containerized Cargo and Legal Load Trucking

Standard trucking equipment is available within the state of Pará to meet the general trucking and container transportation requirements of the Project. Larger trucking companies could potentially mobilize the necessary equipment at selected ports, according to arrival schedules.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Market Studies

Belo Sun has not conducted a market study in relation to the gold doré which may be produced by the Project. Gold is a freely traded commodity on the world market for which there is a steady demand from numerous buyers.

19.2 Contracts

There are no refining agreements or sales contracts currently in place that are relevant to this Technical Report.

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Introduction

The Project has been subject to environmental and social studies covering different aspects relevant to the Project, including the completion of an Environmental Impact Assessment (EIA) prepared in accordance with Brazilian regulatory requirements. ERM was retained to review the work completed to date since Belo Sun took over the concession and summarize the relevant environmental, social and regulatory factors related to the proposed Project. In completing this work, ERM has relied on the information and data provided by Belo Sun. ERM has assumed this information and data to be complete and accurate at the time it was undertaken. ERM has only provided commentary on the results presented by others and has not undertaken any primary studies and was not the author of the EIA. ERM completed the review as of January 2015.

20.2 Governing Policies and Commitments

Belo Sun has established a series of policies and commitments with respect to the management of environmental, health and safety, social and community issues. These policies and commitments are appropriate for the exploration stage, however, they will need to be further developed and enhanced to reflect the increasing level of activity and associated Health, Safety, and Environment (HSE) risk as the Project progresses towards construction and into operation. The framework should be developed to include a management program and an Environmental and Social Management System (ESMS) that will provide greater certainty and continuity of control as the Project progresses.

20.3 Regulatory Framework and Permitting Status

This section provides a summary of key regulatory elements that will govern the development, operation, and closure of the Project under Brazilian law, along with the current permitting status of the Project. A detailed list of relevant regulations is provided in the Project's EIA (Brandt, 2012), and it is not the intent of this section to replicate this. ERM has not performed a detailed compliance review in completing this work.

The Brazilian Mining Code (Federal Law Decree No. 227/1967) regulates exploration and exploitation of mineral resources in Brazil. The environmental licensing of the mining projects in Brazil develops in parallel with the mining exploration permitting and exploitation concession.

Belo Sun is currently operating under Licence No. 4115/2010 for drilling activities authorized by SEMA (the Environmental Agency of the Pará State) for areas authorized under exploration permits 805.657-659/1976, 812.559/1976, 805.249/2001, and 850.250/2001. The licence was issued on January 27 2010 with an expiry date of January 27 2012. A renewal application was filed by Belo Sun on August 8 2011 and at the time of writing a response from SEMA on this application was still pending. The application for renewal requests authorization to perform drilling activities in geographic areas covered by Belo Sun's prior exploration permits and new areas authorized under exploration permits 850.250/2001, 850.253/2001, 850.439/2008, and 850.507/2011. According to regulation, Belo Sun is allowed to continue drilling activity in areas authorized under the previous licence until such time as they receive a formal response from SEMA.

Under the Broad Application System, mineral exploitation is licenced in three consecutive phases (Preliminary Licence (LP); Installation Licence (LI); Operating Licence (LO)) under the requirements stipulated in CONAMA Resolution No. 237/1997 and Federal Law LC n. 140/2011, as described below. These requirements are governed by the Brazilian Institute of Environment and Renewable Natural Resources - IBAMA, the State Environmental Agencies or the Municipality Authorities, according to the distribution of competences established by Law. To date, the licencing process for the Project has been under the jurisdiction of the Pará State Environmental Agency, SEMA.

Preliminary Licence (LP)

The first stage of licencing, wherein the licensing agency evaluates the location and design of the Project, confirms its environmental viability, and establishes the basic requirements for the next phases. An Environmental Impact Assessment (EIA/RIMA) was prepared (Brandt, 2012) and served as the basis of an LP issued for the Project by SEMA in February 2014. The Project has been the subject of some controversy and the LP has been the subject of several legal challenges by the MPF (Federal Public Prosecution Service of Brazil) since its issuance, however, remains in force.

Conditions listed in the LP discuss a range of both required and recommended actions to be taken by Belo Sun. Within 1,095 days (until the end of November 2016), these must be completed or be under progress consistent with the development stages and timing of the Project. Overarching themes include:

- Further investigation of potential impacts to nearby Indigenous communities and landscape ecology;
- The development and implementation of programs aimed at supporting local people and communities;
- The development of environmental management plans, including those for water control, waste management and erosion and sediment control;
- Monitoring programs for socioeconomics, health, and flora and fauna; and
- Management programs for road safety, among others.

Belo Sun has established plans to fulfil the obligations of the LP and some work has been initiated. ERM has not evaluated the adequacy of these plans.

Installation Licence

An Installation Licence (LI) is required in order to commence with the construction of the Project. At the time of writing the LI application is under development by Belo Sun and its consultants. The LI application must present details on the design of the proposed project and the environmental and social protection measures that will be implemented. Further, the LI application provides an update on the ongoing environmental and social studies required as part of the LP conditions. The Project has undergone changes since the completion of the EIA and the issuance of the LP. The LI application updates the evaluation of potential environmental and social impacts based on the updated Project footprint. The LI application was not available for ERM review at the time of writing.

Operating Licence

The Operation Licence (LO) authorizes the operation of the enterprise. This will be required when the Project is installed, and after verifying the effectiveness of measures to control environmental conditions established in the previous licences. In the LO restrictions are certain control methods and operating conditions.

20.4 Environmental and Socio Economic Studies

Baseline environmental and socio economic studies have been conducted in the Project area, with Part 10 of the EIA defining the Project's areas of influence across the physical, biological and social dimensions, from November 2010. Much of the baseline data was collected to support earlier phases of the Project's design and the LP application. Further baseline information will need to be collected and studies conducted in order to fill known data gaps and support the final design and future phases of the Project. ERM understands that a number of these studies have been scoped and in some cases have been initiated.

The objectives of the environmental and socio economic studies completed to date were to:

- Characterize the existing physical, biological, and socioeconomic conditions, as well as trends in areas potentially affected by the Project, to understand potential impacts, and develop appropriate mitigation and management measures;
- Characterize the geochemical characteristics of the mineral resource extraction process, and the mine wastes that the Project will generate, to develop an understanding of the factors that could impact the environment;
- Establish the basis upon which monitoring programs that will be implemented during the construction, operation, closure, and post-closure phases of the Project, such that impact predictions can be validated and any unanticipated impacts can be iteratively addressed as necessary as the Project proceeds; and
- Engage through the course of baseline data collection with potentially affected populations to exchange information on the Project, and to provide people the opportunity to express their concerns and preferences with regard to the project development.

The following components have been included in historical baseline studies and / or through the collection of data required to support current operations:

- Meteorology;
- Air quality;

- Noise;
- Water Resources (Hydrology and Hydrogeology);
- Flora and fauna;
- Vegetation and soils;
- Archaeology;
- Public consultation;
- Socio-economic; and
- Land use.

The sections further below summarizes the baseline conditions as presented in the EIA (Brandt, 2012) and supplemented with additional data and reports provided by Belo Sun.

Physical Environment

The Project is in a tropical climate zone with annual average precipitation of 2,300 mm with a monthly average precipitation of 191 mm and an annual net positive water balance. There is significant annual and seasonal variance in precipitation levels. The highest rainfall occurs between December and February with a total of approximately 1,075 mm for the period. The driest period, between August and October, has an average total precipitation of 120 mm. During the period from November to mid June, there is more precipitation than evapotranspiration (ET) with a net water surplus of up to 400 mm in December. Occasionally there is a net water deficit in August, September and October. In mid November the system returns to a positive water balance.

Air quality in the Project area appears to meet primary and secondary standards established by the local regulatory bodies. Primary standards for air quality identify the concentrations of pollutants, if exceeded, which may affect the health of the population. Secondary standards are concentrations of pollutants below which provide the least adverse effect on the welfare of the population, as well as minimal damage to the flora, fauna, materials, and the environment in general. The baseline air quality assessments conducted to date have not considered potentially sensitive receivers. Elevated background noise levels exist in the Project area due to the proximity of farming activities, insect noises (such as crickets), and cattle activity.

The large majority of the mine site (95%) is within the Bacajá Depression, a fairly flat landform with elevation varying between 60 and 270 m and low gradient slopes (less than 10%) formed by hills with convex and flat tops. Soils in the area are predominantly yellow argisols, with some presence of red argisols and red and yellow latossols. The soils generally have low to medium potential for erosion.

The dominant hydrologic features in the area are the Amazon River Basin and the Xingu River Basin. The Project area is crossed by tributaries of the Xingu River Basin. These tributaries are seasonal streams which only carry surface water during the rainy season and generally lack surface flows during the dry season. The mine site, including waste rock storage areas, the tailings management facility and open pits, will be located in eight micro-basins of the Xingu River Basin. There is no historical flow data available for these micro-basins however monitoring campaigns are underway to obtain data representative of the variation in flows in the area. Further baseline data will be required to support the validation of the site-wide water balance.

Local potable use of surface water is concentrated in areas located on the banks of the Xingu River. Other water uses include recreation, fishing and cattle consumption. The local population also uses the Xingu River and its tributaries as a source of food and for navigation. Surface water sampling in the Xingu River indicates high concentrations (relative to national standards) of total suspended solids (TSS), total dissolved solids (TDS), turbidity, mercury, aluminium, iron, copper, and calcium. These concentrations may be attributable to natural background rock types and local small-scale artisanal mining activity. Sampling also indicated high levels of coliform and total bacteria levels at two points, indicating possible human-induced contamination in the River. Water levels of the Xingu River in the vicinity of the Project are expected to change as a result of the Belo Monte Dam which is reaching finalization up-stream of the Project. The dam will result in controlled water flows with a net result being a near constant year-round elevation of water at the Project site similar to the natural low water level conditions (dry season). Belo Sun has confirmed that water will not be abstracted from the Xingu River for the Project's activities.

The dominant aquifer in the Project area is located in weathered layer / saprolite and is the primary source of groundwater for both the Project and local consumption. Groundwater monitoring has been undertaken in the vicinity of the Project and shows in general local groundwater quality meeting CONAMA standards for freshwater Class II (human consumption after treatment, protection of aquatic communities, recreational use, irrigation, and aquaculture). Due to the local geology in the area, some sampling results show elevated concentrations of iron, manganese, and aluminum. There exists the potential for localized impacts to the groundwater in the vicinity of artisanal mining operations due to cyanide, mercury and heavy metals usage in these activities.

An investigation consisting of ten boreholes has been completed to assess the potential for a hydraulic connection between the mine pits and the Xingu River. While these studies did not identify hydraulic connectivity between the proposed pits and the Xingu River, there remains a possibility for connectivity due to the limitations of the study (ten widely spaced boreholes). Studies of groundwater flows and gradients indicate a low likelihood of percolation of Project water to the Xingu River or its tributaries due to low gradients and low permeability of the aquifer. VOGBR reported on auger, percussion, and mixed boreholes used to investigate the subsurface under the proposed locations of the tailings management facility (TMF) and the waste management facilities (WMF). Field tests were undertaken by Geominas to evaluate the permeability of the colluvium, saprolite and bedrock. Permeability Coefficient (k) values of the soils was on the order of 10^{-5} to 10^{-6} cm/s; however, values of 10^{-5} cm/s prevailed. Water loss tests for the bedrock had a large range of k values (10^{-4} to 10^{-8} cm/s), the most frequent values were on the order of 10^{-5}.

Biological Environment

The Project area is located within the Amazon River Basin. It is characterized by rich biodiversity that has been impacted by human settlement, artisanal mining, agriculture and cattle raising. The majority of the Project area has been historically affected by human activities, primarily through clearing for agricultural and grazing activities. Virgin vegetation, where it has been unaffected by agriculture and cattle grazing, is predominantly dense submontane forest.

With the original mine layout, the EIA identified that approximately 125 hectares of the Project area which is classified as Área de Preservação Permanente (APPs) under the Brazilian Forest Code would be disturbed by the Project The Brazilian Forest Code Lei Ordinária nº 12.651/2012) states that activities in APP's may be permitted by the States via Environmental Regularization Programs (Programas de Regularização Ambiental - PRA). The EIA presented a preliminary basis for a reforestation plan. With the progress in project planning, the revised layout and the upcoming LI application, the APP areas to be impacted should be reassessed and the associated reforestation plans defined for the LI request. Given the legislative mandate to restore these important areas this must be closely monitored to provide not only reforestation of the area but also include an emphasis on connectivity, especially given the updated Project layout.

106 flora species were inventoried, including species of conservation concern, state-defined vulnerable species, and threatened species. The fauna investigations conducted for the EIA identified 107 species of phytoplankton, 57 species of zooplankton, 24 species of benthic invertebrates, 108 species of fish, 157 species of insects, 81 species of herpetofauna, 251 species of birds, and 91 species of mammals. Sampling programs have identified two species of fish potentially new to science, two vulnerable turtle species, an endangered bird species (the Golden Parakeet), and two species of mammals potentially new to science. Species potentially new to science have been identified in Project-related ecological studies. This designation is based on the absence of these species in appropriate science databases and they have not been formally described by taxonomists. Belo Sun's environmental consultant, Brandt, viewed at the time of the EIA that an indication of possible new species in the Project area is a positive aspect, in that there is a chance to finance research of taxonomy and contribute to the knowledge of science. A relevant concern is the possibility that these potentially new species are geographically restricted and thus could be unduly impacted by the Project. The EIA author expressed the probability of this to be very low because, in their experience in the Amazon, the distribution of species is usually not restricted to a few hectares such as the Project area. Importantly, none of these potentially new species was located within the defined Project area.

Socio Economic Environment

The Project area is located approximately 65 km from Altamira, in the Senador José Porfírio municipality. In 2013 there were five distinct communities within the Project's Direct Area of Influence (DAI), as defined by the EIA, namely Vila Ressaca, Galo de Ouro and Ouro Verde and two communities within the Indirect Area of Influence (IAI), namely Itata, and Ilha da Fazenda. The DAI is the area where the principal effects of the Project are expected to occur.

With limited transportation infrastructure, the potentially affected communities are relatively isolated. There are less than 1,000 inhabitants combined in these five communities; 46% of this local population was located in Vila Ressaca. Household surveys undertaken by consultants on behalf of Belo Sun (Integratio) indicate that in August 2012, 182 inhabitants of those five communities were artisanal miners, many of whom relocated from other areas of Brazil. The large majority of the households (93%) also practice some form of subsistence farming.

There were three main artisanal mining sites in the Project's direct area of influence: Grota Seca, Galo de Ouro and Ouro Verde. In June 2013, SEMA and the State Police of Pará closed and ceased these artisanal mining sites, so the number of inhabitants who are practising artisanal miners has substantially decreased. Observations by the company indicate that many of those artisanal miners have since left the area. Baseline social data will need updating because of the closing of the artisanal mines, although ERM understands some artisanal waste rock processing still occurs on the Project site.

Housing and living conditions are relatively poor across the Project area. Education and medical facilities are also limited. Belo Sun has developed a series of social investment programs designed to improve the living conditions of individuals in the neighbouring communities. As part of these programs Belo Sun provides teachers with materials for local schools, contributes to the staffing of medical personnel for the local clinic and has built a police station in Vila Ressaca. Additionally, Belo Sun has developed a series of capacity building programs designed to develop the skill set of individuals living adjacent to the Project and increase their chances of employment either with Belo Sun or elsewhere. There is little data on local health conditions and economic relationships between the communities in the Project area and in particular regarding the likely host communities for households being resettled away from the mine site.

No formal agreements have been negotiated with local communities. A Resettlement Framework and preliminary Action Report was developed at early stages of the Project planning for the relocation of the communities in the DAI, however a formal and agreed Resettlement Plan has not yet been completed. ERM understands that stakeholder discussions and supporting studies are ongoing with respect to resettlement options, including a scenario where resettlement does not occur or does not occur prior to the commencement of mining activities. If a decision is made not to resettle these communities it will be necessary to complete a benefit impact analysis with all stakeholders taking into consideration all relevant regulatory statutes. The Study does not include details and budgets associated for resettlement.

There are two Indigenous territories near the Project site: the territory of Paquiçamba which is 12.58 km from the Project; and the territory of Arara de Volta Grande do Xinguch is 16.51 km from the Project. Belo Sun applied to the National Foundation of the Indian *Fundação Nacional do Índio* (FUNAI) to begin the formal engagement process with these communities and an engagement plan presented by Belo Sun was approved by FUNAI on October 30, 2014. Details regarding the implementation of this plan are under discussion between these parties.

Cultural heritage assessments indicate that there has been mining activity in the area since the 1950s and archaeological studies and safeguarding have been ongoing since the 1970s. Over 15 archaeological sites have been identified in the Project Area, located mainly in elevated areas on the banks of the Xingu River and to a lesser extent along its tributaries. In general, these sites are pre-colonial and the objects found therein are predominantly ceramic and / or lithic (chipped and polished).

20.5 Environmental Standards

In accordance with good industry practice and as there is the potential for Belo Sun to seek debt financing to construct and operate the Project through the international lending community, Belo Sun retained ERM in 2013 to undertake an initial Gap Assessment of the Project (as defined at the time) with the Equator Principles, International Finance Corporation's Performance Standards and World Bank Environmental, Health and Safety Guidelines. The Gap Assessment included:

- Review of the EIA prepared by Belo Sun in support of the LP;
- Review of existing public consultation and disclosure processes;
- Identification of existing or potential performance gaps or areas of risk; and,
- Recommended actions and future work needed to align the Project with IFC Performance Standards.

At the time of the Gap Assessment, ERM did not identify any "fatal flaws" or material risks associated with the Project or the Project's ability to align with the IFC Performance Standards and EHS Guidelines. However, the Gap Assessment did identify priorities issues that if not addressed early in the subsequent stages of Project planning could become material risks. ERM recommends that Belo Sun update this gap assessment to support future work as a matter of good industry practice and to provide flexibility in the event international financing is pursued.

20.6 Environmental and Socio Economic Risks

The Project is a conventional open pit mining operation accessible by river and road with all associated processing on site. The processing will include cyanide leaching, with a tailings storage facility on site. There are two planned open pits, the Ouro Verde and Grota Seca. The Belo Monte Dam, located approximately 20 km away from the Project site is the planned source for electrical power.

Inherent in a project of this nature is the introduction of environmental and socio economic risk. Belo Sun has prepared and submitted an EIA / RIMA as part of their application for the LP. While preliminary and subject to ongoing study, the EIA / RIMA serves as the basis used to characterize environmental and socio-economic risk and to identify mitigation and control measures required for the Project.

Table 20-1 presents a summary of key environmental and socio economic risks as a result of the Project and the mitigation measures and controls contemplated. This table is not intended to be exhaustive rather highlight those risks requiring particular note and attention.

Table 20-1: Environmental and Socio Economic Risk Summary

Area	Potential Risk Description	Mitigation and Control Measures
Geology	▪ Acid rock drainage (ARD) and / or metal leaching (ML) from waste rock and/or processed ore tailings resulting in impacts to surface or groundwater resources	▪ Available studies indicate a low risk for ARD from waste rock materials and a moderate risk from the waste saprolite material (representing approximately 6.4% of waste material). Waste rock and saprolite will be stored on surface in two WMFs. Any materials identified as acid generating will be encapsulated within the WMF reducing the ARD risk. Run-off and leachate is planned to be intercepted by sedimentation ponds for reuse on-site. ▪ During construction and operations the TMF will function as a zero discharge facility under normal conditions. Under extreme storm conditions the TMF pond will discharge via a spillway. The TMF pond will fully submerge the tailings material resulting in a low ARD/ML risk. ▪ Further testing of materials will be required to validate initial conclusions regarding the potential for acid rock drainage and/or metal leaching.
Soils	▪ Loss of productive soils by construction of the mine footprint through direct and indirect impacts. Direct impacts are caused by the footprint itself and indirect impacts are from soil erosion, compaction, and alteration of drainage as a result of the footprint. ▪ Contamination of area soils by spills of fuels, oils, lubricants and process chemicals.	▪ Minimize the footprint of the Project and preferentially locate infrastructure in previously disturbed areas. Soils will be salvaged where practicable and stored for later rehabilitation of disturbed areas at closure. ▪ A Soil Management Plan and Erosion Monitoring and Control Program will be developed to support Project execution. Further characterization of soils will be required to define the extent and volume of

Area	Potential Risk Description	Mitigation and Control Measures
		different soil types in order to establish the soil management practices that will need to be deployed during construction, operation and closure phases. ▪ Soil contamination will be minimized by ensuring that vehicles are properly maintained, maintenance is carried out at designated locations which are properly designed with liners, berms, etc., and cleaning of spills is done in a timely manner.
Groundwater	▪ Reduction in the availability of groundwater for local users ▪ Impacts to the quality of groundwater as a result of infiltration from mine wastes (tailings management facility, waste rock facilities)	▪ Water will be intercepted on-surface and collected in sedimentation ponds within the area of the Project and used for dust suppression, mining and processing. Groundwater that will be intercepted by the mining pits will be pumped to the ponds. ▪ Investigations have been undertaken to characterize the subsurface permeability below the TMF dam. Prior to dam construction the moderately permeable colluvium material will be removed to reduce the potential of tailings pore water migrating under the dams. Additional modeling needs to be performed to validate the adequacy of the current TMF design for groundwater protection and environmental protection of area receptors and determine if further mitigation is required. ▪ A similar risk is noted for the WMF. Most seepage will be directed to sedimentation ponds. An unknown proportion will infiltrate into the underlying saprolite. The rate of infiltration

Area	Potential Risk Description	Mitigation and Control Measures
		and the potential impact to downstream aquifers should be further evaluated to confirm no negative impact to area receptors.
Hydrology	▪ Disruption of the natural flow patterns of surface run-off and tributaries to the Xingu River due to the Project footprint along with the collection and use of surface waters for mining and processing resulting impacts to local flora and fauna	▪ Minimize the footprint of the Project. A preliminary site-wide water management plan that maximizes the use of recycled water and does not require water from the Xingu River has been developed. Water will be returned to local tributaries in quantities to maintain minimum in-stream flows. ▪ Further refinement and validation of the water balance and subsurface permeability will be required to confirm that proposed pumping sites will be sufficient to support mine operations and maintain minimum stream flows.
Water Quality	▪ Release of poor quality water from Project site to surface waters ▪ Deposition of airborne pollutants from mining operations, ore processing, tailings deposition and road use into adjacent surface water resulting in adverse	▪ Water that comes into contact with surface infrastructure (including WMF areas but excluding site access roads and corridors) will be intercepted and directed to the sedimentation ponds. ▪ Sedimentation ponds will form an integrated part of the site-wide water balance and the collected water will be used in dust suppression and ore processing. ▪ Any excess water beyond pond capacity will overflow by gravity via a spillway to the receiving environment. ▪ Ditching and vegetation will be used to control run-off along site access roads and corridors.

Area	Potential Risk Description	Mitigation and Control Measures
		Water quality monitoring will be required during operations. ▪ During the construction and operation phases the TMF will be operated as a zero discharge facility during normal conditions. A cyanide destruction circuit has been incorporated into the design of the processing plant and water quality in the TMF will be regularly monitored. ▪ Belo Sun has committed to meeting the requirements of the International Cyanide Management Code (ICMC) for all aspects of the mine including standards for sourcing, transporting and managing cyanide and cyanide solutions generated during ore processing. ▪ Further work is required to confirm a robust site-wide water balance and to model the expected water quality of pond water and the water in the TMF. ▪ This modeling needs to confirm that discharges from the sedimentation ponds can meet surface discharge requirements without further treatment. The Study does not include a provision for additional treatment. ▪ Dust impacts are expected to be localized in nature. Standard dust control measures will be used. Water will be applied to roads and infrastructure areas when necessary to control dust and tailings will be deposited sub-aqueously.

Area	Potential Risk Description	Mitigation and Control Measures
Air Quality	▪ Release of airborne pollutants from mining operations, mineral processing and road use resulting in changes to air quality and potential impacts to local receptors including flora, fauna, and people	▪ Equipment will be purchased with catalytic convertors and will be maintained for optimum performance. Line power from the Belo Monte Dam will be used instead of on-site diesel-electric power except where impracticable. Point source emissions from the ore processing facilities will meet local regulatory requirements.
Biodiversity	▪ Changes to the landscape and wildlife as a result of the Project physical footprint and interactions with the receiving environment including impacts to new or unique species ▪ Impacts to areas designated for permanent protection (APPs) ▪ Increased human pressures as a result of the presence of the workforce and in-flux of job-seekers to the area.	▪ Project layout has considered the biodiversity impacts and has sought where possible to locate project components on land areas already altered and affected by human activities. ▪ Monitoring programs will be developed to further understand the biodiversity characteristics as part of the LP conditions, and the findings from these should be used to inform mitigation measures. Additional surveys to confirm the taxonomy of and document the range and habitat requirements for the new to science species documented during the EIA studies should be prioritized along with additional surveys for the known endangered species and other species of conservation interest in the biodiversity monitoring programs. ▪ Approximately 125 hectares of APPs are scheduled to be impacted and a reforestation plan is to be developed as part of the LI. Close attention should be paid to the APPs and species of conservation interest, including how habitat loss caused by the Project is calculated

Area	Potential Risk Description	Mitigation and Control Measures
		with respect to new mine layouts.
Socio Economic and Land Use	▪ Increases in social issues as a result of the presence of local communities and/or an influx of workers and job seekers including domestic violence, alcoholism, prostitution, and sexually transmitted infections ▪ Conflicts over land and natural resources as a result of changing populations	▪ Belo Sun will need to expand the scope of the social baseline to fully capture the socio economic situation of the communities adjacent to the Project, including their health, and adequately assess the potential impacts on their livelihood. Additionally, Belo Sun should consider the potential cumulative impacts to those communities in the area of influence, particularly in light of the Belo Monte Dam. ▪ Belo Sun should develop a Social Management System (ESMS) that outlines the benefits, potential risks and impacts to neighboring communities; identifies all stakeholders; and includes a Stakeholder Engagement Plan by which Belo Sun will engage with the communities in the area of influence and communicate Project-related information. Belo Sun's capacity building programs, which the Company has begun to implement, should be included under this ESMS. ▪ Communities adjacent to the Project have already been in contact with Project staff and are familiar with the original plan to relocate the communities in the DAI. As such, expectations in the area are high and Belo Sun will need to continue to engage stakeholders as a review of resettlement options progresses. Belo Sun should consider the potential benefits and impacts to local

Area	Potential Risk Description	Mitigation and Control Measures
		communities as the mine development proceeds prior to resettlement, or if resettlement does not occur, to ensure suitable mitigation and management of impacts occurs to protect these populations and their livelihoods.
Cumulative Impacts	▪ Close proximity of the Project and the Belo Monte Dam Project result in cumulative synergistic and additive environmental and socio-economic effects including biodiversity	▪ A cumulative impact assessment is required under the LP conditions, which should consider the Project and other development projects, such as the Belo Monte Dam also need to be further assessed. ERM understands this work has not yet commenced.

20.7 Waste Management

This section briefly describes the management of wastes where they may interact with the receiving environment based on the design of the facilities described in other sections of the Report.

Site Contact Water

The general site arrangement for the Project has been designed to protect surface water quality either by diverting it prior to contacting waste materials or by directing contact water to sedimentation ponds prior to release to the receiving environment.

Sedimentation ponds will be constructed in strategic locations to capture surface run-off from site infrastructure and seepage from waste rock. Water accumulating in the open pits will be pumped to the water management pond. The water collected in the pond will be integrated into the site wide water balance. With this source of water, it is not expected that freshwater from the Xingu River, or from groundwater sources, will be required to meet the demands for mining or processing which reduces the risk for environmental impacts. The water management pond has been constructed to allow for polishing of the contact water prior to discharge or pumping to the process plant.

Further work will be required as engineering advances to ensure a robust water balance. It is recommended that a site wide water quality model be established. This model should be used to validate an assumption made in the Study that excess water that will discharge from the water management pond will be suitable for discharge without treatment beyond sedimentation and that the water in the TMF will meet the requirements under the ICMC and will also be suitable for discharge during extreme storm events (10,000 year return event) without further treatment. Monitoring programs will need to be implemented in the field to validate these predictions.

Waste Management Facilities

Each open pit will have a dedicated WMF. The waste material will consist of waste bedrock and waste saprolite. Details on the design of these stockpiles including the associated peripheral and internal drainage systems are provided in Section 18.

To date characterization of the waste bedrock and saprolite has been undertaken on a limited number of samples and incorporates testing directed under Brazilian legislation CONAMA 2005 and CONAMA 2011 including testing of materials under ABNT NBR 10004. This testing principally deals with the classification of solid material based on parameters that leach from the material. Twenty two waste rock samples were analyzed by the Resíduo Lixiviação (leachate waste) and Resíduo Solubilização (solubilized waste) methods; six were not dangerous and inert, 16 were not dangerous and non-inert. The not dangerous and inert samples were mostly saprolite samples. Of the 16 samples classified as not dangerous and non-inert, arsenic was the parameter that exceeded guidelines most frequently (n = 12), with an average exceedance 30 times the Resíduo Solubilização guideline (0.01 mg/L). An assessment of the characterization program was undertaken by ERM. Overall, ARD potential of waste bedrock is expected to be low and the ARD potential of waste saprolite is expected to be moderate. As the volume of waste saprolite is expected to be 6.4% of total waste material and acid generating materials are to be encapsulated within the WMF the overall ARD potential is low. The solubilized waste and free draining leach column studies completed by Belo Sun suggest that arsenic could be a parameter of concern in the contact water leaching through the WMF.

Seepage waters from the WMF will report to the water management pond to prevent uncontrolled discharge to the receiving environment. As stated above, a water quality model has not been developed to predict the expected water quality that may discharge from these ponds to the receiving environment. Water seeping through the WMF will be captured and directed through French drains. The French drains will be built in the main water courses under the WMF and will seep toward the water management pond. Polished water from the water management pond will supply the process plant with make-up water. Excess water in the water management pond will overflow via an engineered spillway into the local water courses. Free draining leach columns and Resíduo Solubilização results indicated a potential for arsenic as a parameter of concern; the risk of untreated discharge from the seepage ponds needs to be further assessed. Additional ML / ARD testing of samples that are proportionally representative of the materials to be excavated will better quantify the ML / ARD risks and reduce uncertainties. The cost for water treatment has not been included in the Study.

Although much of the precipitation seeping through the waste dumps will be captured and directed through the French drain, some seepage will enter the aquifer in the underlying saprolite and bedrock. As this contact water exfiltrates it will have the potential to impact local groundwater. Therefore, it is recommended that two additional studies be undertaken: 1) confirm the proportion of seepage entering groundwater; and 2) use a contaminant transport model to confirm that exfiltrating seepage does not negatively impact the local aquifers.

Tailings

The whole tailings generated in the process plant will be treated with a cyanide destruction process prior to discharge into the TMF. The cyanide destruction process is part of the commitment to the ICMC. Refinement of the cyanide destruction process through dynamic testing will optimize the reagent consumption and should reduce concentrations of reagents compared to current test results. During construction and operation phases and under normal conditions the TMF will be a zero discharge facility. During operations the main and saddle dams will be raised on a schedule that will provide sufficient freeboard to prevent discharge except in extreme storm events. Details on the design of the TMF including the schedule for dam construction are provided in Section 17. This design results in a low risk to the receiving surface water environment during normal operations.

Belo Sun has established an Independent Tailings Review Board (ITRB). The ITRB last undertook a review of the TMF design and the tailings characterization program in 2013, prior to the initiation of the Study. Belo Sun should seek to engage the ITRB to provide further input into the future stages of engineering to confirm the suitability of the design inclusive of environmental considerations during normal and upset conditions. The ITRB report contained recommendations across three broad categories: tailings characterization, additional site characterization, and additional facility design specifics. Belo Sun has undertaken some additional tailings characterization and additional facility design specifics. However, site characterization has not progressed. Major items still to be addressed include:

- Tailings density and impact to the TMF storage stage curve;
- Site stratigraphy and impact on seepage and embankment stability;
- Embankment stability and seepage;
- Mass, water, chemical and energy balances; and
- Closure options.

Characterization of the tailings undertaken by Belo Sun incorporates testing requirements directed under Brazilian legislation CONAMA 2005 and CONAMA 2011 including testing of materials under ABNT NBR 10004. This testing principally deals with the classification of solid material based on parameters that leach from the material. Six tailings samples were analyzed by the Resíduo Lixiviação (leachate waste) and Resíduo Solubilização (solubilized waste) methods; all six were not dangerous and non-inert, arsenic was the parameter that exceeded guidelines most frequently (n = 5), with an average exceedance 40 times the Resíduo Solubilização guideline (0.01 mg/L). In addition to the above tests, the post-cyanide destruction metallurgical process decant water was tested (AMEC 2013), the total copper content in the Ouro Verde sample was 17.2 mg/L. This very high concentration was a result of adding copper sulphate to complex the ferric-cyanide species; dynamic testing will optimize reagent use and result in lower concentrations of reagents in the process decant water. The ITRB report suggests further quantification of the potential composition of the tailings is necessary to determine if additional water treatment is required prior to discharge into the TMF.

In 2014, ERM undertook a review of the tailings characterization program. Overall, the ARD potential of tailings was predicted as low, mostly due to the presence of slaked lime in tailings. Strict maintenance of a water cover over the tailings has been considered by Belo Sun as an added mitigation to the generation of ARD. Ongoing water balance work will be necessary to demonstrate that this can be achieved in the dry season.

Seepage analysis from the main dam of the TMF has been performed by VOGBR and calculated flows obtained for the vertical filter, blanket drain, and foundation underdrain were predicted. The report did not indicate how much this value may change as the hydraulic head in the TMF increased as it filled or if the analyses took into account the entirety of the TMF or focused solely around the dams. The chemical composition of the seepage has not been determined but is likely to be similar to the metallurgical process decant water as a mixture of slurry supernatant and TMF water will be entrained with the tailings as they settle. Seepage under the TMF dam will be collected in a down gradient pond and pumped back to the TMF to prevent discharge to the environment.

Current uncertainty as to the chemical composition of the TMF pore water also limits an assessment of potential impacts to groundwater. Although proposed facility design will inhibit seepage from the TMF, some pore water will infiltrate into the subsurface.

Tailings samples have been classified as Class IIA, not dangerous and non-inert. The ITRB report indicated that a liner may be required for some Class IIA materials. The TMF is designed without a liner and contaminant transport modeling is recommended to validate the adequacy of the current design for environmental protection.

Other Wastes

The primary goals of the waste management program are to collect, classify and segregate waste for appropriate reuse, recycling or disposal. Classification of waste will be undertaken according to ABNT NBR 10.004/2004. Waste types have been sorted by project phase and activity. Details on the treatment of the waste materials have not advanced beyond the conceptual phase.

20.8 Closure and Reclamation

The principal goal of Closure and Reclamation (C&R) is to identify environmental, social, regulatory and financial risks of the mine post closure and to establish measures to avoid or minimize the potential for negative impacts. These measures are initiated during the mining planning process and continue into and through operations, closure and post-closure phases. More specifically, the objectives of Closure and Reclamation are to:

- Achieve chemical, physical, and biological stability in accordance with applicable regulations and standards, as soon as practicable;
- Protect the health and safety of the public;
- Avoid or minimize long term environmental impacts;
- Restore disturbed land and watercourses as soon as possible and as close to pre-development conditions, as practicable;
- Minimize long term site and facility monitoring and maintenance requirements; and
- With input from consultations with local communities, government agencies, and other stakeholders, develop an end land-use plan which is beneficial to the local communities and is sustainable.

A conceptual level Closure and Reclamation Plan (C&RP), or by its Portuguese acronym PRAD, was developed in support of the EIA report. This C&RP identified specific aspects that would need to be considered to achieve Closure and Reclamation objectives, including:

- Communications and community engagement in advance of closure;
- Update and implementation of socio economic programs;
- Equipment disassembly and demolition of structures;
- Potential for reuse of Infrastructure;
- Identification and remediation of any contaminated sites and other environmental liabilities;

- Reclamation Plans for disturbed areas including re-contouring, re-vegetation, reforestation and implementation of post-mining drainage control;
- Post-mining water management and treatment; and
- Post closure monitoring.

Studies have not yet advanced beyond the conceptual stage and are not required to support the current level of permitting. The long term fate of the open pits and the TMF are particularly important considerations for mines of this nature; engineering and environmental studies must be advanced as part of the next phase of the Project.

The C&RP is conceptual in nature. For the purposes of the Study, Belo Sun has included an allowance of $50 million dollars for closure and reclamation applied at the time of mining cessation. ERM has not reviewed the basis of this allowance or provided an opinion as to its reasonableness. No financial bonding has been provided by the Project since bonding is not required under Brazilian law.

20.9 ERM Comments

ERM was retained to review the work completed to date and summarize the relevant environmental, social, and regulatory factors related to the proposed Project. In completing this work, ERM has relied on the information and data provided by Belo Sun and its other consultants and which ERM has assumed to be accurate at the time of its completion. No primary studies have been conducted by ERM. Belo Sun has advised that the Project as presented in the Study complies with the applicable Brazilian regulations and laws, including those related to the protection of the environment and ERM has not sought to validate compliance.

It is recommended that future studies consider the following comments provided by ERM as a result of this review.

- Emphasis should be placed on addressing the requirements of the LP, to consider the potential impact that changes in mine design since submission of the EIA may have on future permitting requirements and to complete the work required to enhance the existing environmental and social baseline dataset and fill known data gaps to support future stages of Project planning and execution.
- As there is potential for Belo Sun to seek debt financing to construct and operate the Project through the international lending community, it is recommended that IFC Performance Standards and World Bank Environmental, Health and Safety Guidelines continue to be used as a benchmarking tool. An updated gap assessment is recommended to assess the current level of alignment of the Project as defined by the Study and to provide input into planning for the next stages of study. The more advanced the Project the more difficult it may become to fill gaps remaining since the assessment undertaken by ERM in 2013.
- The findings from additional monitoring programs to further understand the biodiversity characteristics of the area should be used to inform mitigation measures. Additional surveys to confirm the taxonomy of and document the range and habitat requirements for the new to science species documented during the EIA studies should be prioritized along with additional surveys for the

known endangered species and other species of conservation interest in the biodiversity monitoring programs.

- Approximately 125 hectares of APPs are scheduled to be impacted and a reforestation plan is to be developed as part of the LI. Close attention should be paid to the APPs and species of conservation interest, including how habitat loss caused by the Project is calculated with respect to new mine layouts.
- Further studies regarding ARD / ML are required to confirm that risk is low and no further mitigation required. In particular, additional testing should include mineralogical assessment of waste rock by X-ray diffraction accompanied by Rietveld refinement, laboratory kinetic tests and field kinetic tests of waste rock material.
- The water balance updated for the Study should be further refined. The updated balance should take into account seasonal variability within the sedimentation ponds and the TMF. Water losses due to infiltration into the subsurface under the WMF and the TMF should also be included. The water balance should also include storage stage curves of the TMF and surface ponds to confirm their capacity to handle storm events.
- A water quality model should be developed to accompany the site wide water balance to predict the quality of waters in the sedimentation ponds and in the TMF. This is needed to validate an assumption of the Study that water can be discharged to the environment from the water management pond after sedimentation, that the TMF water meets ICMC requirements and that during extreme storm events TMF water can be discharged to the environment.
- Based on the hydrogeological studies completed to date, the potential for groundwater impacts is uncertain. A contaminant transport model should be developed to further evaluate the potential for impacts from the TMF and impacts to area receptors, including the Vila Ressaca area and determine if further mitigation is required.
- Gaps in tailings characterization, site characterization and facility design have also been identified by the ITRB which will need to be filled to confirm the level of environmental risk is acceptable.
- Benefits, risks and impacts to communities adjacent to the Project will need to be reassessed in light of changes to the mine plan since completion of the EIA. This assessment needs to consider the potential cumulative effects with the Belo Monte Dam. Updated resettlement plans will need to be finalized and disclosed to all neighbouring communities as part of a consultation program. Belo Sun must fully consider the potential benefits and impacts to Vila Ressaca and Galo. Belo Sun must include all stakeholders when completing the cost benefit analysis. If the decision is made not to resettle, Belo Sun must consider potential regulatory implications and ensure that suitable measures are adopted to protect the populations and their livelihoods.
- The establishment of more detailed management and monitoring programs will need to be developed during the next stage of Project planning.

- The existing planning for closure and reclamation is currently at a conceptual stage. Further planning and costing is required to support future stages of the Project and validate the assumptions made in the Study. Emphasis should be placed on defining the required technical studies needed to inform the evolution of the C&RP over the life of the Project such that the end goals are met. Particular attention should be placed on the fate of the open mine pits and the management of water post-closure, including the potential need for water treatment.

21.0 CAPITAL AND OPERATING COSTS

21.1 Capital Costs

21.1.1 Summary

This section outlines the capital costs for the 3.5 Mt/a Project.

The capital cost estimate (estimate) includes all the direct and In-direct costs along with the appropriate project estimating contingencies for all the facilities required to bring the Project into production, as defined by this Study. All equipment and material are assumed to be new. The labour rate build up is based on the statutory laws governing benefits to workers in effect in Brazil at the time of the estimate. Brazilian import tariffs have been applied. The estimate does not include any allowances for scope changes, escalation and exchange rate fluctuations. The execution strategy is based on an engineering, procurement and construction management (EPCM) implementation approach and horizontal (discipline based) construction contract packaging. The capital cost estimate has a predicted accuracy of ±15%.

Table 21-1 shows the Level 1 summary of total capital costs for the 3.5 Mt/a Project (Phase 1) including mine, process plant, tailings management facility (TMF), on-site and off-site infrastructure and Project in-directs for the major areas.

The capital cost for the Phase 1 of the Project is estimated to be $264 million dollars expressed in 4th quarter 2014 price levels exclusive of duties and taxes.

Table 21-1: Capital Cost Summary 3.5 Mt/a Plant by Main Area

Cost Category	Main Area Code	Cost Without Duties / Taxes $
In-direct Costs	000 Construction In-directs	25,001,506
	300 Infrastructure	1,039,997
	500 Management Costs	17,565,004
	600 Owners Project Costs	23,916,715
	700 Owners Operations Costs	34,585,877
In-direct Costs Total		102,109,099
Direct Costs	100 Process plant	65,056,340
	200 Reagents & Plant Services	17,872,863
	300 Infrastructure	34,562,542
	400 Mining	20,698,934
Direct Costs Total		138,190,679
Contingency	900 Contingency	23,437,816
Total Capital 3.5 Mt/a Plant		263,737,595

Table 21-2 shows the Level 1 summary of the capital cost estimate broken down by primary discipline for the Phase 1 expressed in 4th quarter 2014 price levels excluding duties / taxes.

Table 21-2: Capital Cost Summary - By Primary Discipline

Cost Category	Primary Discipline Code	Cost $
In-direct Costs	A General	14,895,631
	B Earthworks	593,260
	B Earthworks TMF	1,039,997
	C Concrete	1,372,254
	E Tankage	2,757,850
	F Mechanical	1,137,749
	H Electrical & Inst	1,571,133
	M Buildings	1,144,597
	O Owners Costs	25,445,747
	P EPCM Costs	17,565,004
	Q Mining Pre-production Capital	31,653,008
	O Plant Pre-production Capital	2,932,869
In-direct Costs Total		102,109,099
Direct Costs	A General	317,472
	B Earthworks	15,685,244
	B Earthworks TMF	4,159,988
	C Concrete	9,489,183
	D Steelwork	11,383,125
	E Plate Work	3,769,704
	E Tankage	4,223,602
	F Mechanical	28,816,622
	F Mechanical Bulks	586,779
	G Piping	10,166,537
	H Electrical & Inst	22,202,358
	M Buildings	10,895,265
	Q Mining Costs	16,494,800
Direct Costs Total		138,190,679
Contingency	R Contingency	23,437,816
Total Cost - Phase 1		263,737,595

The sustaining capital cost for the Project is provided in Table 21-3 and reflects additional capital expenditures after the Project is in operation to expand the process plant to 7 Mt/a throughput (Phase 2), procure new / replacement mining equipment, replacement of light vehicles / office equipment, increasing the storage capacity for TMF. The total sustaining capital cost for the Project during the production years 1 to 18 is $166 million dollars expressed in 4th quarter 2014 price levels excluding duties / taxes.

The major expenditures in the sustaining capital include the expansion of the process plant, procure / replacement of the mine fleet, raising of the TMF dams.

Table 21-3: Capital Cost Summary Sustaining – Years 1 to 18

Cost Cat	Main Area Code	Cost $
In-direct Costs	000 Construction In-directs	820,160
	500 Management Costs	4,885,747
	600 Owners Project Costs	4,080,489
In-direct Costs Total		9,786,396
Direct Costs	100 Treatment Plant	31,389,147
	200 Reagents & Plant Services	4,972,606
	300 Infrastructure	3,627,945
Direct Costs Total		39,989,698
Contingency	900 Contingency	5,221,152
Total Cost - Expansion Phase 2		54,997,246
In-direct Costs	300 Infrastructure	12,304,237
	800 Deferred Capital	857,916
In-direct Costs Total		13,162,153
Direct Costs	300 Infrastructure	49,216,949
	400 Mining	37,410,000
Direct Costs Total		86,626,949
Contingency	900 Contingency	11,218,786
Total Cost - Sustaining Capital		111,007,889
Total Cost - Expansion and Sustaining Capital		166,005,135

Closure costs have been estimated by Belo Sun and are presented in Table 21-4 along with the salvage value which has been estimated in part by Lycopodium for the plant and mining equipment and the balance of assets salvage value has been estimated by Belo Sun.

Table 21-4: Closure and Salvage Value Costs

Cost Category	Main Area Code	Cost $
In-direct Costs	820 Mine Closure Costs	50,000,000
	831 Plant & Mine Equipment Salvage Value	-25,000,000
	832 Balance of Assets Salvage Value	-25,000,000
Total Cost - Mine Closure and Salvage Value Costs		0

21.1.2 Estimate Responsibility

This capital cost estimate reflects the joint efforts of Lycopodium, Belo Sun and specialist consultants retained by Belo Sun - AGP, VOGBR Transglobal and Dalben. Lycopodium was responsible for compiling the submitted data into the overall estimate but did not review or validate the inputs from Belo Sun or its other consultants. Table 21-5 outlines the responsibilities of each company for input of information into the capital cost estimate.

Each consultant provided input to the capital cost estimate appropriate to a ±15% accuracy estimate, including all related In-direct costs and allowances.

Table 21-5: Capital Cost Estimate Responsibility

Company	Responsibilities
AGP	Design and estimates for the open pit mines, mine haul roads, and mining equipment.
DALBEN	Design and estimates for the connection of Project to the Pimental 230 kV Substation.
VOGBR	Design and estimates for tailings dams, waste dumps, raw water storage pond and overall site water balance.
LYCOPODIUM	Design and estimates for the ore crushing and handling facilities; processing plant; ancillary buildings; tailings treatment and pumping system; sewage plant; power distribution network; construction and permanent camp; lay down areas; on-site access and related infrastructure. Pricing of first fills and spares.
TRANSGLOBAL	In-country freight costs.
BELO SUN	Owner's cost closure costs and balance of asset salvage value.
L&M	Duties and taxes (included in the financial model).

The process plant expansion cost component of the sustaining capital costs was estimated by Lycopodium, VOGBR estimated the cost for raising the TMF dams, AGP estimated the mining costs and Belo Sun estimated the closure / environmental rehabilitation costs.

21.1.3 Work Breakdown Structure

The Work Breakdown Structure (WBS) for the Project was developed jointly by Belo Sun and Lycopodium and included four WBS organization levels and a series of discipline codes.

The WBS for levels 1 and 2 is shown in Table 21-6.

A listing of discipline codes adopted in the estimate can be found in Table 21-2.

Table 21-6: Capital Cost Work Breakdown Structure

Main Area Code - Level 1	Area Code - Level 2
000 Construction In-directs	001 Construction Contractor In-directs
	010 Site Construction In-directs - General
	020 Site Construction Facilities
	050 Construction Accommodation
	070 Vendor Reps and Contractor Services
100 Process plant	101 Process Plant - General
	120 Feed Preparation
	130 Milling
	140 Screening / Tailings
	160 Leaching
	170 Desorption
	180 Refining
	190 Other Plant Areas
200 Reagents & Plant Services	201 Reagents & Plant Services - General
	210 Reagents
	230 Water Services
	240 Plant Services
	250 Air Services
	260 Fuels
	270 Electrical Services
300 Infrastructure	301 Infrastructure - General
	310 Environmental

Main Area Code - Level 1	Area Code - Level 2
	320 Utilities & Services
	330 Power Supply
	340 Tailings Management Facility
	350 Plant Buildings
	380 Camp
	397 Community
400 Mining	401 Mining-General
	420 Mine Establishment
	430 Mining Pre-Production
	440 Mining Consultants
	450 Mine Service Area
	470 Mine Mobile Equipment
500 Management Costs	501 EPCM - Home Office
	520 EPCM – Site
	540 Specialist Consultants
	550 Specialist Consultants Other
600 Owners Project Costs	601 Owners Costs – General
	620 Plant & Admin Pre-Production
	630 Admin Pre-Production Other
	640 Spare Parts
	650 Fees / Taxes / Duties
	660 Land & Crop Compensation
	670 Plant Mobile Equipment
	680 Plant Mobile Equipment Other
700 Owners Operations Costs	701 Owners Operations Costs-General
	710 Working Capital
800 Deferred Capital	801 Sustaining Capital - Plant
	820 Mine Closure Costs
	830 Salvage Value

Main Area Code - Level 1	Area Code - Level 2
900 Contingency	910 Project Contingency
	920 Owners Contingency

21.1.4 General Assumptions

The following assumptions have been adopted in compiling the capital cost estimate:

- All equipment and materials are new;
- The labour rate build-up is based on the statutory laws governing benefits to workers in effect at the time of the estimate;
- All costs are expressed in Q4 2014 dollar.

21.1.5 Estimate Support Documents

Table 21-7 defines the level of development of key documents for the Study used to develop the estimate.

Table 21-7: Key Documents Level of Development

Item	Feasibility
Site-based Investigations	
Geographical location	Defined
Topographical survey	Completed
Geotechnical investigation	Preliminary investigation completed
Hydrological survey	Completed
Power survey	Completed
Project Team site visit	Completed
Process Design	
Bench-scale test work	Completed
Pilot plant test work	Not required
Process design criteria	Issued for feasibility design
Process flow diagrams (PFD)	Issued for feasibility design

Item	Feasibility
Piping and instrumentation diagrams (P&ID)	Not prepared
Equipment lists	Issued for feasibility design
Mass balance	Issued for feasibility design
Equipment datasheets	Issued for major equipment
Line list	Not prepared
Valve list	Not prepared
Facilities Design	
Site plan	Issued for feasibility design
Overall plant layout	Issued for feasibility design
Mechanical general arrangements	Issued for feasibility design
Plant 3D models	Issued for feasibility design
Structural general arrangements	Defined and modelled
Piping general arrangements	Not prepared
Electrical single line diagrams	Issued for feasibility design
Capital Cost Estimate	
Plant site and roads bulk earthworks	Quantity take-off , owner mining operations self perform
Plant site and roads detailed earthworks	Quantity take-off , budget quotes for rates
Tailings management facility (TMF)	Quantity take-off and rates by VOGBR, the rates were validated by Lycopodium
Concrete foundations	Quantity take-off
Structural Steel	Quantity take-off
Concrete supply and installation rates	Budget quotes

Item	Feasibility
Steel supply and installation rates	Budget quotes for supply and installation rates
Mechanical equipment (major) supply	Budget quotes
Mechanical equipment (balance) supply	Budget quotes and Lycopodium database
Mechanical equipment installation	Lycopodium database for install hours, quotes for install rates
Plate work including shop tanks supply	Quantity take-off for plate work and liners, quotes for supply rates
Plate work installation	Lycopodium database for install hours, quotes for install rates
Field erected tankage	Quantity take-off , budget quotes for rates
Process piping/valves	Factored of area mechanical equipment costs
Overland piping	Quantity take-off , budget quotes for rates
Electrical equipment supply	Budget quotes / Lycopodium database
Instrumentation supply	Budget quotes / Lycopodium database
Electrical and instrumentation installation	Lycopodium database for install hours, quotes for install rates
Pre-fabricated buildings	Budget quotes for supply and install
Tent Buildings	Budget quote for supply
Engineering, procurement, and construction management (EPCM) costs	Estimated from first principals, based on deliverables or time base personnel
Owners Costs	Estimated from first principals, based on scope of supply or time base personnel
Mining Costs	Estimated from first principals, based on scope of supply or time base personnel
Contractor in-direct cost	Estimated from first principals, based on scope of supply and contractor quotes

Item	Feasibility
Office equipment / furniture	Allowance made for each facility
First fill and opening stocks	Estimated from first principals, based on quantity take-off and supplier quotes
Pre-production labour	Estimated from first principals based on organisation chart and mobilization plan
Vendor representatives	Based on assessment of the days required during construction and commissioning
Freight costs	Based on quotes sea freight and land transport rates and assessment of freight volumes
Spares	Assessment made of requirements for commissioning, operating and insurance spares. Supply costs quoted
Mobile vehicles / plant and equipment	List prepared of quantities for each type and quotes for supply
Catering and janitorial services	Rates based on quotes, assessment made of man-days
Fencing and security	Quantities assessed for different types of fencing and Lycopodium database used for supply and install costs
Miscellaneous costs	Assessment and allowances based on Lycopodium's experience and database

21.1.6 Basis of Estimate

The basis of estimate is described below.

21.1.6.1 Equipment Quotation Requests

For all major equipment, technically compliant budget quotes obtained from established vendors were used after proper adjudication. These quotes were benchmarked against pricing obtained for similar equipment on recent Lycopodium projects. Pricing for minor equipment was obtained from budget quotes from local vendors and information from the Lycopodium equipment pricing database. A list of budget equipment quotes is provided in Table 21-8.

Table 21-8: List of Budget Equipment Quotes

Item	Package #	Description	Comment
Mechanical Equipment			
5	5034-5002	Pebble crusher	Budget Price
6	5034-5003	Ball mill	Budget Price
7	5034-5004	Jaw crusher	Budget Price
8	5034-5005	SAG mill	Budget Price
9	5034-5006	Rock breaker	Budget Price
10	5034-5008	Mill liner handler	Budget Price
11	5034-5011	Wet vibrating screens	Budget Price
12	5034-5012	Inter-tank screens	Budget Price
13	5034-5017	Cranes	Budget Price
14	5034-5019	Slurry pumps	Budget Price
15	5034-5025	Agitators	Budget Price
16	5034-5026	Thickener	Budget Price
17	5034-5027	Gravity Concentrator	Budget Price
18	5034-5028	Cyclone cluster	Budget Price
19	5034-5029	Sampler	Budget Price
20	5034-5033	Strip solution heater	Budget Price
21	5034-5037	Intense cyanide reactor	Budget Price
22	5034-5038	Sewage treatment plant	Budget Price
23	5034-5039	Kiln	Budget Price
24	5034-5040	Conveyors	Budget Price
25	5034-5041	Potable water plant	Budget Price

21.1.6.2 Budget Quotation Requests for Fabrication and Construction Works

A preliminary contracting plan was prepared showing the type of supply and construction packages envisaged for the Project. Essentially the contracting plan was established to maximize the use of local contractors and is based on the award of horizontal discipline contract packages, as described below.

- Plant site and road earthworks – 2 packages - bulk earthworks and detailed earthworks;
- TMF earthworks – 1 package;
- Plant structural concrete – supply and install – 1 package;
- Building concrete – supply and install – 1 package;
- Pre-fabricated buildings – supply and install – 2 packages, one for the camp and one for the site buildings;
- Structural steel supply – 1 package;
- Plate work and shop tankage supply – 1 package;
- Field erected tankage supply and install – 1 package;
- Structural, mechanical and piping (SMP) installation – 1 package including plate work and mechanical bulks;
- Electrical and instrumentation (E&I) – 1 package including part supply of cable, cable trays, lighting and small power.

Once the Study design was sufficiently advanced budget quotation requests (BQR) were prepared for the above contract packages and issued to local Brazilian contractors and also off-shore suppliers to obtain pricing. Lycopodium and Belo Sun held follow up meetings in Brazil with the local contractors to assess their capability and to make sure the scope of work was understood and to answer any queries. This engagement process was important to evaluate the budget quotations, assess productivity and to ultimately derive the unit rates to be used in compiling the capital cost estimate.

The capital cost estimate is therefore based on a defined contracting strategy and the unit rates were derived from feedback from the market. Following analysis of the contractor unit rates they were benchmarked and adjusted if required using Lycopodium's database for similar type projects.

21.1.6.3 Earthworks

Quantities for bulk earthworks, site roads, ponds, and structural pads were derived from the 3D model incorporating the current plant site layout and the local topography. All excavation is in rippable material. Borrow material for engineered fill will be from crushed and screened mine waste available during construction.

The earthworks costs were based on the assumption that Belo Sun will self perform the bulk earthworks at the plant site and for site roads. Budget quotations were obtained from reputable local civil contractors for both bulk and detailed earthworks for different types of earthmoving work. The unit rates were benchmarked against Lycopodium in-house data based on actual costs from previous projects. These rates were then adjusted to take into account the fact that Belo Sun will self perform the bulk earthworks scope and that local contractors will perform the details earthworks scope.

The TMF costs are based on a local contractor performing the earthworks scope with the material for the starter dam being borrowed from the inside the TMF area. The subsequent lifts will be constructed with mine waste.

Allowance has also been made in the estimate for the detailed earthworks and TMF contractor mobilization and demobilization of labour, equipment and facilities and for contractor management and general operating costs for the estimated duration of the work.

21.1.6.4 Concrete

The vast majority of the concrete foundations, walls, equipment rafts and slabs on grade were modelled based on preliminary sizing and available in-house data from similar projects. All foundation sizing is based on an assumed native soil bearing capacity of 300 kPa with maximum allowable settlement of 20 mm. The concrete quantities were derived from a take-off from the 3D model plus allowances for the portions that were not fully modelled. The final quantities were benchmarked against actual take-offs from previous Lycopodium projects.

The unit rates are based on budget quotes obtained from established local contractors and include the costs of supplying the concrete, reinforcing steel, formwork and placing and curing the concrete. The quotes were based on detailed material take-offs identifying the concrete quantities broken down by type - slabs, walls, foundations, rafts, suspended slabs, etc. The contractors were also issued typical concrete drawings and details together with specifications and snapshots from the 3D model showing the concrete structures. The unit rates obtained from the local contractors were assessed and compared with the Lycopodium in-house rates database for similar projects.

Allowance has also been made in the estimate for the concrete contractor mobilization and demobilization of labour, equipment and facilities and for contractor management and general operating costs for the estimated duration of the work.

21.1.6.5 Structural Steel

All the major structures in the process plant were modelled based on preliminary sizing and benchmarked against previous Lycopodium projects. This includes major load carrying members, secondary steel, primary bracing, stairs, handrails, treads and grating. Tertiary steel, horizontal bracing, girts, connection plates were not modelled and were estimated through allowances. The final material take-off plus allowances for the members that were not modelled were compared against actual take-offs from previous Lycopodium projects.

Competitive budget quotations were obtained for the supply and fabrication of steelwork from both local contractors and from off-shore Asian based fabricators experienced in this type of work. These quotes were based on detailed material take-offs identifying the steel by type: light, medium, and heavy. Typical steel drawings, specifications, and snapshots from the 3D model were also sent to the fabrication contractors so that they could visualize the types of structures involved. The supply rates obtained from the contractors were evaluated against similar projects and selection made based on costs and capability. Installation rates for structural steel work were obtained from local contractors and compared against Lycopodium's database for similar type work.

21.1.6.6 Plate Work and Tankage

This scope includes the supply and installation of steel tanks, bins, hoppers, and chutes. The plate work and tankage quantities were estimated using sizing provided in the mechanical equipment list. A preliminary design was undertaken for each tank in order to select appropriate plate thicknesses to develop tank tonnages. The plate work quantities for major bins and hoppers were developed from actual take-offs from projects completed by Lycopodium in the last few years. Lining materials were quantified and priced separately.

The plate work supply unit rates are based on budget quotations received from both local Brazilian and overseas contractors with proven capabilities on similar projects. Special allowances were made to take into account the complexity of some of the bins and chutes, which historically are underestimated by contractors. The final unit rates adopted in the estimate are a combination between the quotes received from the contractors and benchmarked data from previous Lycopodium projects. Lycopodium estimated the installation of plate work items based on experience form similar sized project. Labour installation prices were obtained for local Brazilian contractors.

The field erected tankage costs are based on budget quotations received from local Brazilian contractors with proven capabilities on similar type work. Allowance has also been made in the estimate for contractor mobilization and demobilization of labour, equipment and facilities and for contractor management and general operating costs for the estimated duration of the work.

21.1.6.7 Mechanical Equipment

The quantities and size of the mechanical equipment were taken from the detailed mechanical equipment list developed for this Study. Budget quotations for major equipment were obtained from local and international vendors (see Table 21-7). Technical and commercial evaluation and final selection was made by the engineering and procurement personnel working on the Study. Costs for minor items were developed through a combination of budget quotes and information from the Lycopodium's in-house database.

The equipment installation hours were developed from in-house data adjusted for local conditions and labour productivity together with information supplied by the equipment vendors. Final installation costs include provisions for the retrieval of the equipment from storage location, handling, placing, installation and commissioning of the equipment. Allowance in the estimate has been made for heavy lift cranes for the crushers, apron feeders and SAG mill erection.

Allowance has also been made in the estimate for the SMP contractor mobilization and demobilization of labour, equipment and facilities and for contractor management and general operating costs for the estimated duration of the work.

21.1.6.8 Plant Pipework and Valves

Piping general arrangements were not produced for this Study and the pipework was not modelled. The supply and installation costs for in-plant piping and valves were factored as a percentage from the mechanical equipment supply and installation costs. These factors were developed by plant area (crushing, milling, leaching, CIP, etc.) and benchmarked against previous projects executed by Lycopodium.

21.1.6.9 Overland Piping

Overland piping consists of raw water supply lines, TMF pipelines which were sized based on preliminary engineering. Detailed take-offs based on the overall site plan were developed for the overland piping scope. The costs adopted in the estimate were based on Lycopodium's recent in-house data for overland piping.

21.1.6.10 Electrical and Instrumentation

Budget quotes were obtained for major electrical and instrumentation equipment from international and local vendors. Quantities for cable, cable trays and other bulk items were developed from the general arrangement drawings produced for this Study. Detailed material take-offs and specifications were sent to local suppliers for pricing. The supply and installation costs for the electrical and instrumentation equipment and bulks were based on Lycopodium in-house database. Allowances were included for retrieval from storage, handling, placing, installation, and commissioning of the equipment and bulk items.

Allowance has also been made in the estimate for the E&I contractor mobilization and demobilization of labour, equipment and facilities and for contractor management and general operating costs for the estimated duration of the work.

21.1.6.11 Buildings

A building list showing the size and type of construction of all process and ancillary buildings was developed for this Study.

Budget quotes were obtained from local and international suppliers for the pre-fabricated buildings (administration building, camp buildings, first aid clinic, high security building, laboratory, control rooms, plant and mine washrooms, gatehouse, etc.). Vendor quotes were also obtained for all the tent type buildings (plant workshop / warehouse, mine truck shop / warehouse, lime storage shed). These quotes were evaluated against data available from previous Lycopodium projects.

Allowance has also been made in the estimate for the building contractor mobilization and demobilization of labour, equipment and facilities and for contractor management and general operating costs for the estimated duration of the work.

21.1.6.12 Labour Rates and Crew Rates

Base labour rates for different trades and classifications have been obtained from Brazilian contractors. Payroll mark-ups and burdens for social charges and uplifts have been included taking into consideration site conditions, work exposure and existing legislation.

Equipment rental rates were added to the direct labour rates to derive the “All-In” crew rates per discipline used in the estimate. Table 21-9 provides a summary of the average crew rates per discipline of work.

Table 21-9: Crew Rates

Crew	Base + Fringes Rate $/h	Equipment Rental Rate $/h	"All-In" Rate $/h
General Work	12.00	5.00	17.00
Concrete	8.55	1.15	9.70
Steelwork	29.26	13.44	42.70
Plate work and shop tankage	29.26	13.44	42.70
Field erected tankage	30.19	4.37	34.56
Mechanical equipment	29.26	13.44	42.70
Pipework	29.26	13.44	42.70
Electrical and instrumentation	25.00	7.50	32.50
Buildings	12.00	5.00	17.00

21.1.6.13 Contractor’s In-directs

Contractors’ in-directs are not included in the “All-In” crew rates and cover the costs for mobilization and demobilization of labour, equipment and contractor facilities to and from the Project site. Other items included in contractor in-directs are the establishment of the temporary site facilities and utilities for each contractor, maintenance of temporary facilities and equipment, construction management and supervision support, health, safety, security and environment (HSE) support, site administration support and project expenses (miscellaneous minor licences and permits) and for contractors’ fees and overhead. The contractor In-direct costs were developed for each discipline contract package taking into account the complexity of the scope of the work, equipment requirements, and duration of the work along with the availability of local qualified labour.

21.1.6.14 Productivity

Productivity factors (PF) were applied to direct field labour hours in order to compensate for lower labour productivity on the job site. The following factors can contribute to poor field productivity: difficult access to the Project site, weather conditions, inexperienced work force, and lack of experienced supervision personnel. All these factors are necessary to adequately transform construction drawing details and specifications into effective construction shift objectives, efficiently deliver material and equipment to work areas, and effectively utilize and maintain construction equipment and power tools on the job site. The PF for this estimate were based on information obtained from local contractors and Lycopodium's experience in executing projects of this type and size. Table 21-10 summarizes the PF adopted for the capital cost estimate. The productivity values shown in the table are compared to the standard US Gulf Coast productivity rates and are considered to be conservative for the Project. Where the PF is 1.0 the estimate is based on the local Brazilian installation rates.

Table 21-10: Productivity Factor

Discipline	PF	Comments
Earthworks	1.0	local quote used
Concrete	1.0	local quote used
Steelwork	2.0	
Plate work and shop tankage	2.5	
Field erected tankage	1.0	local quote used
Mechanical	2.5	
Pipework	2.5	
Electrical and instrumentation	2.5	
Architectural (buildings)	1.0	local quote used

21.1.6.15 Engineering, Procurement and Construction Management Services

A detailed deliverables based estimate was developed for the EPCM services required for execution of the Project. Engineering, drafting, project management and project controls hours were estimated for each engineering discipline and deliverable type task. The in-country project and procurement support, construction management and commissioning services were estimated on a time basis as per the schedule prepared for the Project. Allowances for construction offices, catering and accommodation for EPCM site based personnel were also included in the capital costs.

21.1.6.16 Vendor Commissioning

Vendor construction and commissioning attendance costs were estimated for each equipment package. The site hours for each package were derived based on the complexity of equipment, information received from the respective vendors, and in-house database from previous Lycopodium projects. An allowance for other vendor representative expenses (flights, catering and accommodation) was also included in the capital cost estimate.

21.1.6.17 Spares

The capital cost estimate includes an allowance to cover costs of commissioning, operating and insurance spares for process plant and equipment. An assessment of the insurance spares was made for each type of equipment and prices used were obtained from the vendor quotes. Commissioning and operating spare costs were based on Lycopodium's experience and database for similar type projects.

21.1.6.18 First Fill Inventory and Opening Stocks

Quantities for first fills inventory and opening stocks have been calculated based on consumption and delivery schedule. This inventory consists of reagents and consumable items purchased and stored on site at the onset of operations. First fill and opening stock items include sodium cyanide, quick lime, hydrated lime, activated carbon, hydrochloric acid, sodium metabisulphite, copper sulphate, flocculant, gold room reagents, lubricants and an initial charge of grinding media. This inventory ensures adequate consumables are available for the first stage of operation. Opening stocks have also been allowed for crusher liners, screen panels and SAG mill liners. Budget quotations were obtained for these reagents and consumables and the costs incorporated into the capital cost estimate.

21.1.6.19 Exchange Rates

Quotes for equipment, goods and materials, fabrication and construction costs obtained in foreign currencies are expressed in the estimate are based on the foreign exchange rates shown in Table 21-11.

Table 21-11: Exchange Rates

Dollar	Other Currency	
1.0 USD =	1.1378	CAD (Canadian Dollars)
1.0 USD =	3.1000	BRL (Brazilian Real)
1.0 USD =	33.462	THB (Thai Baht)
1.0 USD =	0.6371	GBP (British Pound)
1.0 USD =	0.7917	EUR (Euro)
1.0 USD =	11.105	ZAR (South Africa Rand)
1.0 USD =	1.104	AUD (Australian Dollar)

21.1.6.20 Freight

Freight costs inclusive of ex-works packaging and handling, road freight to an export port and sea freight costs from various countries of origin were obtained from reputable transport and logistics companies experience at project specific type freight.

Land freight costs including port clearance costs, handling and road freight costs to site for different types of vehicles and loads were obtained from Transglobal, an experienced Belem based transport and logistics company, with current experience at transporting goods both within the Pará State and also inland freight from other States in Brazil.

Freight costs for majority of the imported equipment was estimated as 12% of the supply costs (6% for sea freight and 6% for land freight) of the respective equipment item delivered to site.

For mobile equipment and some construction bulks sourced in Brazil (earthworks, concrete and field erected tankage) the freight costs were included in the supply costs. The land freight costs of the remaining bulks (piping and electrical) being sourced in Brazil were estimated as 10% of the supply costs. Building freight was based on an assessment of the volume and the number of trucks required and the rate was obtained from the Belem based transport and logistics company.

Freight costs for structural steelwork and plate work is based on importation from south-east Asia at a rate of $800/t for sea freight to which a bulking factor was applied depending on the item to account packaging volume and container utilisation. A further 6% of the ex-works cost of goods has been allowed for land freight costs from port to site.

Freight quotes were obtained for certain major equipment items (SAG mill, jaw crusher and thickener). These quotes were evaluated against the available sea freight and in-land freight rates from the transport and logistics companies and either adopted or adjusted as applicable.

21.1.6.21 Owner's Costs

Belo Sun provided the estimate of owner's costs including the owner's project team, pre-production process plant and administration labour and expense costs, environmental and social costs, project insurance and commissioning and training costs.

Owner's costs also include for mobile equipment, pre-production costs, first fill and opening stocks, maintenance tools and equipment, office furniture, and software. These costs were estimated by Lycopodium based on the scope established by Belo Sun.

21.1.6.22 Duties and Taxes

Belo Sun appointed L&M to estimate the duties and taxes for the Project. These costs are excluded from the capital costs, however are included in the financial model presented in Section 22. L&M used the detailed estimate prepare by Lycopodium which was broken down into supply costs, sea freight, in-land freight, install costs and contingency on a area, facility and primary discipline basis to calculate local, state and federal taxes and also import duties on a line item basis.

21.1.6.23 Other Consultants

Costs included in the estimate for transmission line, mining fleet, mine pre-stripping, mine pre-production costs, mining consultant costs, TMF dam, waste management facilities (WMF) and water management ponds (WMP) have been supplied by Belo Sun's other consultants – Dalben, AGP and VOGBR. These costs include all construction In-direct costs, labour burdens and contractors' overheads.

21.1.7 Contingency

The purpose of contingency is to make specific provision for uncertain cost items within the Project scope. Contingency does not cover scope changes, escalation or exchange rate fluctuations. The unforeseeable items covered by contingency are often referred to "unknown unknowns" within the scope of the Project. These can arise due to:

- Labour productivity variations due to contractors not providing or not having access to labour with the required level of skills as assumed in the various direct cost estimates;
- Labour rates or construction equipment rental rates being different from the base assumptions adopted in the capital cost estimate;
- Equipment and bulk material cost variations from the budgetary pricing submitted for the capital cost estimate.

Contingency is an integral part of an estimate and has been applied to all parts of the estimate, direct costs, In-direct costs, owners' costs, etc. The contingency has been derived jointly by Belo Sun and Lycopodium on a discipline basis, taking into consideration scope definition, material supply costs and installation costs.

Table 21-12 provides a summary of the contingency breakdown per discipline for the 3.5 Mt/a Project which has an average contingency of 11.4% amounting to $24.2 million dollars.

Table 21-13 provides a summary of the contingency breakdown per discipline for the 7 Mt/a expansion and sustaining capital which has an average contingency of 8.7% amounting to $17.5 million dollars. It is noted that no contingency has been applied to the mine closure cost which results in a lower overall contingency than for the 3.5 Mt/a Project.

Table 21-12: 3.5 Mt/a Project Contingency Breakdown

Cost Category	Primary Discipline Code	Subtotal Cost $	Contingency Cost $	Total Cost $	Contingency %
In-direct Costs	A General	14,895,631	2,201,538	17,097,169	14.8
	B Earthworks	593,260	118,652	711,912	20.0
	B Earthworks TMF	1,039,997	156,000	1,195,996	15.0
	C Concrete	1,372,254	274,451	1,646,705	20.0
	E Tankage	2,757,850	551,570	3,309,420	20.0
	F Mechanical	1,137,749	227,550	1,365,298	20.0
	H Electrical & Inst	1,571,133	299,291	1,870,424	19.0
	M Buildings	1,144,597	228,919	1,373,516	20.0
	O Owners Costs	25,445,747	2,622,742	28,068,489	10.3
	P EPCM Costs	17,565,004	1,756,500	19,321,504	10.0
	Q Mining Working Capital	31,653,008	-	31,653,008	0
	O Plant Working Capital	2,932,869	-	2,932,869	0
In-direct Costs Total		102,109,099	8,437,212	110,546,311	8.3
Direct Costs	A General	317,472	47,621	365,093	15.0
	B Earthworks	15,685,244	2,347,324	18,032,568	15.0
	B Earthworks TMF	4,159,988	623,998	4,783,986	15.0
	C Concrete	9,489,183	1,138,702	10,627,885	12.0

Cost Category	Primary Discipline Code	Subtotal Cost $	Contingency Cost $	Total Cost $	Contingency %
	D Steelwork	11,383,125	1,138,313	12,521,438	10.0
	E Platework	3,769,704	489,928	4,259,633	13.0
	E Tankage	4,223,602	422,360	4,645,962	10.0
	F Mechanical	28,816,622	2,559,605	31,376,227	8.9
	F Mechanical Bulks	586,779	64,546	651,324	11.0
	G Piping	10,166,537	1,371,753	11,538,289	13.5
	H Electrical & Inst	22,202,358	2,664,283	24,866,642	12.0
	M Buildings	10,895,265	1,307,432	12,202,696	12.0
	Q Mining Costs	16,494,800	824,740	17,319,540	5.0
Direct Costs Total		138,190,679	15,000,604	153,191,283	10.9
3.5 Mt/a Capital Total				263,737,595	100.0

Table 21-13: 7 Mt/a and Sustaining Capital Contingency Breakdown

Cost Category	Primary Discipline Code	Subtotal Cost $	Contingency Cost $	Total Cost $	Contingency %
In-direct Costs	A General	820,160	123,024	943,184	15.0
	O Owners Costs	4,080,489	488,924	4,569,412	12.0
	P EPCM Costs	4,885,747	488,575	5,374,322	10.0
In-direct Costs Total		9,786,396	1,100,522	10,886,918	11.2
Direct Costs	C Concrete	2,018,932	242,272	2,261,204	12.0
	D Steelwork	1,194,722	119,472	1,314,197	10.0
	E Plate work	1,971,817	256,336	2,228,153	13.0
	E Tankage	2,167,223	216,722	2,383,945	10.0
	F Mechanical	10,236,762	1,608,532	20,845,295	8.4
	F Mechanical Bulks	313,389	34,473	347,862	11.0
	G Piping	6,488,305	850,996	7,339,301	13.1
	H Electrical & Inst	6,598,548	791,826	7,390,374	12.0
Direct Costs Total		39,989,698	4,120,629	44,110,328	10.3
7 Mt/a Expansion Capital Total		49,776,094	5,221,152	54,997,246	10.5
In-direct Costs	B Earthworks TMF	12,304,237	1,845,636	14,149,873	15.0
	O Owners Costs	857,916	120,108	978,024	14.0
In-direct Costs Total		13,162,153	1,965,744	15,127,897	14.9

Cost Category	Primary Discipline Code	Subtotal Cost $	Contingency Cost $	Total Cost $	Contingency %
Direct Costs	B Earthworks TMF	49,216,949	7,382,542	56,599,492	15.0
	Q Mining Costs	37,410,000	1,870,500	39,280,500	5.0
Direct Costs Total		86,626,949	9,253,042	95,879,992	10.7
Sustaining Capital Total		99,789,103	11,218,786	111,007,889	11.2
7 Mt/a and Sustaining Capital Total		149,565,197	16,439,938	166,005,135	11.0

21.1.8 Exclusions and Qualifications

The capital cost estimate is based on the following exclusion and qualifications:

- Cost of financing and interest during construction is excluded;
- Costs related to the upgrade of the access road from Altamira to the Project site are excluded and assumed to be undertaken and paid for by Pará State government;
- Sunk costs are excluded;
- The estimate excludes duties and taxes and these costs are included in the financial model;
- Land acquisition and crop compensation costs are excluded;
- The estimate has made no allowance for additional metallurgical test work;
- The estimate has made no allowance for future exploration costs;
- The estimate has made no allowance for any environmental requirement not identified in this Study;
- The estimate has made no allowance in costs for changes in market conditions impacting equipment and bulk costs;
- The estimate has made no allowance for cost impacts due to currency exchange fluctuations;
- Escalation beyond 4th quarter 2014 is excluded;
- The estimate is based on leased mining equipment and the capital costs include for 20% of the unit purchase cost;
- The estimate is based on Belo Sun operating the quarry to produce concrete aggregate and sheeting / road base material and appropriate costs have been allowed in the estimate;
- The estimate is based on Belo Sun undertaking the bulk earthworks at process plant site, camp and mine services area and appropriate costs have been allowed in the estimate;
- The estimate is based on Belo Sun constructing site roads;
- The main HV power line and HV sub-station costs are excluded from the estimate and will be performed as a build own operate transfer (BOOT) type contract;
- Fuel storage and dispensing costs are excluded from the estimate and will be provided by the fuel vendor;
- The estimate is based on light vehicles, cranes, forklifts, buses and the emergency generator being leased and the capital costs include for 20% of the unit purchase cost;

- The estimate is based on operating spares being held on consignment and no capital costs have been allowed;
- The estimate is based on importing structural steelwork and plate work from Thailand and appropriate sea freight costs have been allowed in the estimate;
- The estimate allows for the Belo Sun providing labour and supervision to receive, offload and warehouse if required, materials and goods delivered to site;
- The estimate allows for a 1,128 man camp for use during the construction phase which will later be reduced in size when the majority of the operations staff will be bussed back and forth to Altamira;
- The estimate assumes that equipment bundling will occur;
- The estimate has made no allowance for design criteria changes, scope or schedule changes, changes in Brazilian tax law or force majeure events.

21.1.9 Accuracy of Estimate

The capital cost estimate for the 3.5 Mt/a Project was developed to provide an estimate suitable for a Feasibility Study phase including cost to design, construct and commission the facilities. The estimate produced is described as a Class 3 with an expected accuracy of ±15%. This classification is based on the AACE international standard.

21.2 Operating Costs

Introduction

Direct cash operating costs for the Project have been estimated under three functional headings: mining; process plant and general and administrative (G&A). The operating costs have been estimated by the following parties:

- Mining – AGP and Belo Sun.
- Process Plant – Lycopodium and Belo Sun.
- G&A – Lycopodium and Belo Sun.

The life of mine overall operating cost for the Project is $18.72/t of ore processed based on an owner operated mine fleet. As shown in Table 21-14 this average operating cost is a sum of the mine, process and general and administrative (G&A) costs. The life-of mine (LOM) operating cost, in terms of cost per ounce of gold, is $618.

Table 21-14: Life of Mine Operating Cost Summary

	LOM	
	$/t ore	$/oz
Mining	10.62	350
Process Plant	7.26	240
G&A	0.84	28
Total	18.72	618

The operating cost estimates are expressed in fourth quarter, 2014 terms and are expected to be accurate within ±15%. Unit rates for cost items that have been received from Brazilian sources are converted via the USD:BRL exchange rate of 1:3.1, as per the first quarter of 2015.

Sources of general data and assumptions used as the basis for estimating the process operating costs are listed below:

- The process design criteria of this Study;
- The production rate of 3.5 Mt/a later expanding to 7 Mt/a of ore;
- Manpower requirements were developed by AGP, Belo Sun and Lycopodium. Labour rates were provided by HR Consultare;
- The unit cost of electrical energy is $56.40/MWh;
- The unit cost of diesel fuel is $0.595/L.
- Brazilian taxes on materials have been excluded.

21.2.1 Mine Operating Costs

Mine operating costs were developed from base principles using local vendor rates on equipment.

Key inputs into the mine operating cost estimate are fuel, labour, and repair and maintenance costs. Electrical power was not a consideration as all the mine equipment is diesel powered. Labour costs for the various job classifications were obtained for Belo Sun by a Brazilian consultant reviewing other operations. These rates were used and included the appropriate burden for each category to cover items such as health care, vacation and federal holidays. The mine labour is based on a 12 h shift schedule.

The mine staff labour remains constant for the mine life after the initial recruitment in the pre-production period (Year -1). This level plateaus at 47 staff in year 3, including mine operations, mine maintenance, mine engineering and geology. When mining is complete the staff is reduced starting in year 12. The training foreman is no longer required after year 2.

Hourly employee manpower levels in the mine operations and mine maintenance departments fluctuate with production requirements.

The open pit mine includes two separate pits - Ouro Verde and Grota Seca. They are designed to be mined with proven technology and equipment. The saprolite overlain on the deposits will require no drilling and blasting.

Major equipment requirements are shown for a couple of points in the mine life in Table 21-15. The column for year 3 is included because it is the point in the mine schedule where the ore rate rises from 3.5 Mt/a to 7 Mt/a in an effort to maintain produced gold ounces per year constant. The year 7 column indicates the peak in haul truck requirements. These higher truck requirements are maintained until year 12 then taper off to the end of the mine life in year 13 and end of stockpile reclaim in year 18.

Table 21-15: Major Mine Equipment Requirements

Equipment	Unit	Capacity	Year -1	Year 3	Year 7
Production Drill	mm	200	2	10	10
Front-End Loader	m^3	18	3	3	2
Hydraulic Shovel	m^3	22	-	3	3
Breaker Loader	m^3	6.3	-	1	1
Haulage Truck	t	136	9	35	42
Tracked Dozer	kW	433	4	4	4
Grader	kW	233	3	3	3
Support Backhoe	kW	350	2	2	2

Mine engineering and general mine operating costs are included in the mine operating cost. This covers the mine operations department, both supervision and staff and the mine engineering and geology costs. Those costs include dispatch maintenance fees, ore control supplies, and consulting fees for training annually.

Support equipment costs were determined using a percentage applied to either the truck hours or the loading hours. These percentages resulted in the need for 4 large track dozers, 4 graders and 2 support backhoes. Their tasks include cleanup of the shovel / loader faces, roads, dumps and blast patterns. The graders will maintain the ore and waste haul routes. In addition, water trucks have responsibility for patrolling the haul roads and controlling fugitive dust for safety and environmental reasons.

The equipment rates applied, less the labour costs are shown in Table 21-16. All rates include consumables such as fuel, tires, drill steel, bits and required maintenance parts. Fuel consumption is estimated from basic principles and, where possible, with the Caterpillars FPC software (FPC) as a check. Operating and maintenance labour is calculated separately.

Table 21-16: Major Equipment Hourly Operating Rates

Equipment	Hourly Rate $/h
Production Drill	263
Front-End Loader – 18 m^3	342
Hydraulic Shovel – 22 m^3	434
Haulage Truck – 136-t	167
Tracked Dozer	130
Grader	69
Support Backhoe	93

Overall, the cost for the grade control drill without labour will be $188/h or about $9.90/m drilled.

The sampling cost for the RC drilling program is carried in the plant operating cost. The drilling cost is included in the mine operating cost shown under grade control.

Leasing of the mining fleet was included in the operating cost estimate. The leasing terms were based on 20% down payment, 5 year term and interest assumed at 5.06% for the Study. The entire major mine equipment was leased and the majority of the support equipment where it was considered reasonable. If the equipment had a life greater than the five year lease term, then the sixth year onwards of the lease does not have a lease payment applied. In the case of the mine trucks, with an approximate 10 year working life, the lease would be complete and the trucks would just incur operating costs after that time. For this reason, the operating cost would vary annually depending on the equipment replacement schedule and timing of the leases.

The mining cost is calculated by year to account for changing haulage routes and the resulting equipment requirements. The LOM (years 1-18) average cost for total material moved are shown in Table 21-17 as $/t total material and as $/t ore. It is also shown for several key years to show the variation due to equipment in use at those times.

Table 21-17: Open Pit Mine Operating Costs ($/t Total Material)

Open Pit Operating Category	Unit	Year 1	Year 3	Year 7	LOM Cost
General Mine and Engineering	$/t	0.06	0.04	0.06	0.06
Drilling	$/t	0.12	0.16	0.17	0.15
Blasting	$/t	0.24	0.29	0.30	0.27
Loading	$/t	0.23	0.21	0.21	0.22
Hauling	$/t	0.46	0.51	0.78	0.63
Support	$/t	0.14	0.10	0.16	0.16
Grade Control	$/t	0.09	0.07	0.08	0.07
Leasing Costs	$/t	0.41	0.40	0.22	0.29
Total (Material)	$/t	1.75	1.78	1.98	1.84

Table 21-18: Open Pit Mine Operating Costs ($/t Ore)

Open Pit Operating Category	Unit	Year 1	Year 3	Year 7	LOM Cost
General Mine and Engineering	$/t	0.57	0.28	0.28	0.32
Drilling	$/t	1.80	1.81	1.13	0.86
Blasting	$/t	3.45	3.31	1.99	1.57
Loading	$/t	3.30	2.37	1.40	1.26
Hauling	$/t	6.70	5.76	5.19	3.65
Support	$/t	2.08	1.11	1.09	0.90
Grade Control	$/t	1.25	0.79	0.53	0.40
Leasing Costs	$/t	6.00	4.51	1.46	1.66
Total (Ore)	$/t	25.39	20.06	13.18	10.62

21.2.2 Process Plant and G&A Operating Costs

21.2.2.1 Introduction

The process plant operating costs for the Project have been developed according to typical industry standards and norms applicable to the gold processing plant producing doré.

Quantities and cost data were compiled from a variety of sources including:

- Metallurgical test work;
- Supplier quotations;
- Advice from Belo Sun;
- Lycopodium data; and
- First principle estimates.

21.2.2.2 Qualifications and Exclusions

The operating cost estimates include all direct costs associated with the Project to allow production of doré. Each cost estimate is presented with the following exclusions:

- Process plant operating costs battery limits are the run-of-mine (ROM) bin ahead of the primary crushing circuit to the tailings dam, as well as the gold bullion in the safe. All costs associated with areas beyond the battery limits of the Study are excluded.
- All mining and exploration costs, except for laboratory assays;
- All taxes and import duties;
- Any impact of foreign exchange rate fluctuations, other than BRL to USD;
- Any business interruption costs;
- Any escalation from the date of the estimate;
- Political risk insurance;
- First fill and opening stocks costs (included in the capital cost estimate);
- TMF, rehabilitation or closure costs (included in sustaining capital);
- Land lease or other compensation costs;
- Product costs (transportation, refining, marketing, insurance);
- Licence fees or royalties (included in cash flow model);
- No contingency allowance.

21.2.2.3 Exchange Rates, Estimate Date and Escalation

Process operating costs are estimated on a pricing basis as of the fourth quarter of 2014. Unit rates for cost items that have been received from Brazilian sources are converted via the USD:BRL exchange rate of 1:3.1, as per the first quarter of 2015. Exchange rates used in this report are summarized in Table 21-11.

Escalation of operating costs from the time of the estimate is not considered for the Project.

21.2.2.4 Operating Cost Accuracy

The expected order of accuracy for the operating cost analysis is in the range of ±15%.

21.2.2.5 Plant Design Parameters and Development of Estimate

Operating costs have been developed according to the process design criteria - initial nominal ROM throughput of 3.5 Mt/a in year 1 (Phase 1), and expansion during year 2 to 7 Mt/a for years 3 through 18 (Phase 2).

For both throughput rates, Lycopodium calculated operating cost estimates for the three major ore types: Ouro Verde (OV), Grota Seca (GS) and saprolite (Sap). Fixed and variable cost items of the operating cost by ore type are subdivided into the major cost categories, as described in Sections 21.2.2.6 to 21.2.2.11.

The production schedule operating cost analysis for the Project is presented in sub-section 21.2.2.12. A total of 6 individual estimates (operating cost by ore type) were used as the basis for determining the operating cost estimate for the production years of the Project using the mine plan provided.

21.2.2.6 Cost Categories

The operating cost estimate includes five major categories:

1. Process plant labour;
2. Operating consumables;
3. Power;
4. Maintenance;
5. G&A.

A description of each cost category is provided in the following sections.

21.2.2.7 Process Plant Labour

The process plant labour is divided into the following areas: management, operations, metallurgy, laboratory and maintenance. The process plant labour includes a combination of day and shift work. The estimated annual process plant labour cost is $2.36 million dollars.

Wages and Salaries

Table 21-19 summarizes the labour rotation schedule along with the salary for each position. Wages and salaries have been provided by HR Consultare. These salaries were provided inclusive of overheads costs. Overhead costs include provisions for the following items: health plan and medication examinations; life insurance; holidays; overtime; termination fees; social charges for Instituto National de Seguro Social (INSS) and Fundo de Garantia de Tiempo de Servico (FGTS) respectively; as well as uniforms and personal protective equipment.

Table 21-19: Process Plant Labour Salaries and Compensation

	Employees	Number of Teams	Total Number Employees	Rotation	Base Annual Salary $	Overhead Costs %	Annual Labour Costs $/y	Total Annual Labour $/y
Plant Manager	1	1	1	5 x 2	71,729	44	127,349	127,349
Operations								
General Foreman	1	1	1	5 x 2	37,974	45	68,855	68,855
Shift Foreman*	1	4	5	4 x 4	18,987	57	43,744	218,719
Control Room Operator	1	4	4	4 x 4	13,502	58	31,987	127,950
Crushing Operator	1	4	4	4 x 4	9,283	60	22,944	91,776
Milling Operator	1	4	4	4 x 4	9,283	60	22,944	91,776
Leach/CIP Operator	1	4	4	4 x 4	9,283	60	22,944	91,776
General Labourer (Helper)	2	4	8	4 x 4	3,797	66	11,188	89,500
Goldroom Operator	2	2	4	5 x 2	9,283	60	22,944	91,776
Metallurgy								
Senior Metallurgist	1	1	1	5 x 2	37,974	45	68,855	68,855
Plant Metallurgist	1	1	1	5 x 2	14,768	48	28,640	28,640
Met Technician	1	2	2	4 x 4	13,502	51	27,370	54,739
Mill Clerk	1	1	1	5 x 2	13,502	49	26,446	26,446

	Employees	Number of Teams	Total Number Employees	Rotation	Base Annual Salary $	Overhead Costs %	Annual Labour Costs $/y	Total Annual Labour $/y
Laboratory								
Chief Lab Chemist	1	1	1	5 x 2	50,632	44	90,790	90,790
Senior Assayer	1	1	1	5 x 2	18,987	55	42,445	42,445
Fire Assay Technician	2	2	4	4 x 4	13,502	58	31,987	127,950
Sample Prep. Technician	2	2	4	4 x 4	6,329	62	16,614	66,454
Wet Laboratory Technician	2	2	4	4 x 4	6,329	62	16,614	66,454
General Labourer (Helper)	2	2	4	4 x 4	3,797	66	11,188	44,750
Maintenance								
Maintenance Planner	1	1	1	5 x 2	13,502	49	26,446	26,446
Maintenance Trainer**	0	1	0	5 x 2	0		0	
Mechanical Supervisor	1	1	1	5 x 2	23,206	55	51,200	51,200
Millwrights	2	2	4	4 x 4	13,502	58	31,987	127,950
Welders	2	2	4	4 x 4	9,283	60	22,944	91,776
Pipe Fitters	1	2	2	4 x 4	7,595	61	19,327	38,653
Trades Assistants	2	2	4	4 x 4	6,329	62	16,614	66,454
Mobile Equipment Operator	1	2	2	4 x 4	9,283	60	22,944	45,888
Electrical / IT Supervisor	1	1	1	5 x 2	23,206	55	51,200	51,200

	Employees	Number of Teams	Total Number Employees	Rotation	Base Annual Salary $	Overhead Costs %	Annual Labour Costs $/y	Total Annual Labour $/y
Electricians	2	2	4	4 x 4	13,502	58	31,987	127,950
Instrument Technicians	1	2	2	4 x 4	14,768	57	34,700	69,401
Maint. General Labourer	2	2	4	4 x 4	3,797	66	11,188	44,750
Total Process Plant Labour			87		500,415	53	1,056,383	2,358,668

*One Shift Foreman per shift plus one relief.
**Maintenance Trainer hired for Year 1 only, with compensation equal to Maintenance Planner

Process Plant Operations

The daily operation of the mill is under the control of the process plant manager and the general foreman. There is a total of four operations shift crews staffed by local labour, to cover back-to-back 12 hour shifts.

Each shift crew includes:

- One shift foreman to direct the day to day plant operation;
- Once control room operator;
- One crusher operator to oversee the stockpile reclaim area;
- One milling operator responsible for the milling and pre-leach thickener areas;
- One leach / CIP operator to maintain the leach, CIP, carbon regeneration kiln and cyanide detoxification area;
- Two gold room operators responsible for stripping, electrowinning and gold room areas;
- Two general shift labourers to provide relief for daily activities and reagent preparation.

Metallurgy

The daily metallurgical performance of the plant is monitored by both a senior metallurgist and a plant metallurgist, who are also responsible for metallurgical accounting. The metallurgists work closely with geologists and mining engineers to ensure that the plant operates at maximum productivity. The metallurgy group also includes one mill clerk on day shift two metallurgical technicians on shift work to provide relief for sampling programs and daily activities.

Laboratory

The chief chemist and senior assayer oversee daily operations and assure quality and efficiency. The laboratory is also staffed with two shift crews. Each laboratory shift crew comprises two fire assay technicians, two sample preparation technicians, two wet laboratory technicians and two general labourers. The laboratory staff is responsible for all tasks in the sample preparation area such as reception, crushing, splitting and pulverizing, as well as all fusion, cupellation and atomic absorption analysis.

Maintenance

A maintenance trainer will be hired for plant start-up and the first year of production. A maintenance planner will be recruited early in the project to ensure capture of all critical equipment data and preventative maintenance requirements and incorporation into Belo Sun’s maintenance planning system. From year 2 and onwards, the maintenance planner will assume the duties of the maintenance trainer.

One mechanical supervisor and one electrical supervisor will be responsible for overseeing the daily maintenance activities. There will be a total of two maintenance team shift crews staffed by local labour. Four millwrights, four welders, two pipe fitters, four trade assistants, two mobile equipment operators, four electricians, two instrument technicians and four general labourers will be divided between the two shift rotations. The maintenance team will be supplemented by appropriately skilled contract labour to undertake major tasks such as relining the crusher.

21.2.2.8 Consumables

The consumables category covers all of the wear parts and consumable materials in the process plant. Consumables include liners for equipment such as crushers and mills, grinding media, screen decks, and other relevant items, chemical reagents as well as diesel fuel.

Consumption rates and pricing for comminution consumables and reagents are summarized Table 21-20 to Table 21-23 respectively and have been based on the following:

- Comminution consumables (crusher liners, mill liners and grinding media) were evaluated for each ore type due to the difference in equipment operating conditions at the 3.5 Mt/a and 7 Mt/a production rates. Crusher liner, SAG mill liner, ball mill liner as well as steel ball consumption rates are based Lycopodium calculations. Costs are based on vendor quotations;
- Laboratory test work results are used, wherever possible to determine the reagent consumption rates. In the absence of test work data, reagent consumption rates are assumed based on first principle calculations, Lycopodium experience and generally accepted practice within the industry;
- Flocculant consumption of 0.02 kg/t is based on test work performed by Pocock Industrial and pricing is supplied by vendors;
- The quicklime consumption rate of 0.33 kg/t for the leach circuit is based on test work. The hydrated lime consumption rate of 0.26 kg/t (Phase 1) and 0.27 kg/t (Phase 2) in the cyanide destruction area is based on first principle calculations and Lycopodium experience. Costs are based on vendor quotations;
- The Phase 1 plant total sodium cyanide (NaCN) consumption is 0.39 kg/t, which includes the leach / CIP circuit and elution circuit (285 kg/strip) cyanide requirements. The Phase 2 plant total sodium cyanide consumption is 0.33 kg/t, which includes the intensive cyanidation (163 kg/batch), leach / CIP circuit and elution circuit (285 kg/strip) cyanide requirements. The cyanide requirement calculations consider the test work consumption and concentration, as well as an estimated residual CN_{WAD} level of 100 ppm in the tails solution. Total process plant cyanide addition was modified to maintain a concentration of 350 mg/L NaCN in the first tank. The cyanide reagent price is based on vendor quotations;
- Sodium metabisulphite (SMBS) consumption rates of 0.53 kg/t (Phase 1) and 0.55 kg/t (Phase 2) are based on first principle calculation and Lycopodium experience and pricing is supplied by vendors;
- Activated carbon consumption due to breakage and abrasion is estimated to be 0.035 kg/t in Phase 1. In Phase 2, carbon consumption rates are expected to

decrease to 0.025 kg/t with the addition of the regeneration kiln. Consumption rates have been based on Lycopodium experience and the price has been supplied by a vendor;

- Elution and gold room reagent consumption rates are based on first principles calculation and Lycopodium experience and the price is supplied by vendors;
- Diesel fuel consumption rates for the mobile equipment, elution heater, smelting furnace and carbon regeneration kiln are based on first principles calculations and Lycopodium experience;
- Antiscalant consumption rates and water treatment plant consumables are based on Lycopodium experience;
- Laboratory costs are allocated on a per sample basis. These costs (exclusive of labour costs) are included in the G&A cost category.

Table 21-20: Summary of Major Comminution Consumables

Item	Supplier	Price $/Unit	Supplier Unit	Annual Consumption By Ore Type						
				3.5 Mt/a			7 Mt/a			Unit
				OV	GS	Sap	OV	GS	Sap	
Jaw Crusher										
Fixed Jaw	Metso	8,935	set	6.6	5.3	1.3	15.1	11.8	2.0	set/y
Swing Jaw	Metso	7,231	set	5.3	3.9	0.7	11.2	8.5	2.0	set/y
Upper Cheek Plate	Metso	2,712	set	2.0	1.3	0.0	3.9	3.3	0.7	set/y
Lower Cheek Plate	Metso	1,819	set	3.3	2.6	0.7	7.9	5.9	1.3	set/y
Mill Liners										
SAG Mill – Liners	Outotec	3,054	tonne	0.25	0.22	0.05	0.12	0.10	0.01	kg/t
Ball Mill – Liners	Outotec	1,615	tonne	-	-	-	0.08	0.07	0.03	kg/t
Steel Balls										
SAG Mill – Balls (125 mm)	Magotteaux	1,370	tonne	1.56	1.39	0.31	0.77	0.66	0.04	kg/t
Ball Mill – Balls (50 mm)	Magotteaux	1,290	tonne	-	-	-	0.90	0.84	0.31	kg/t
Pebble Crusher										
Mantle and Bowl (HP500)	Metso	8,238	set	-	-	-	11.6	9.2	6.0	set/y

Table 21-21: Summary of Major Reagent and Fuel Consumables

Consumable Costs	Supplier	Price $/Unit	Supplier Unit	Annual Consumption		
				3.5 Mt/a	7 Mt/a	Unit
Reagents						
Quicklime	ICAL	241	tonne	0.33	0.33	kg/t
Hydrated Lime	ICAL	244	tonne	0.26	0.27	kg/t
Sodium Hydroxide	Sumatex	761	tonne	0.03	0.03	kg/t
Hydrochloric Acid	Quimil	160	tonne	0.10	0.10	kg/t
Cyanide	Proquigel	2,480	tonne	0.39	0.33	kg/t
Flocculant	BASF EUROPE	4,500	tonne	0.02	0.02	kg/t
Activated Carbon	PICA	3,708	tonne	0.035	0.025	kg/t
Sodium Metabisulphite	BASF EUROPE	770	tonne	0.53	0.55	kg/t
Copper Sulphate	Microsal	1,809	tonne	0.00	0.00	kg/t
Fuel						
Diesel Fuel	-	595	kL	0.23	0.31	L/t

Table 21-22: Summary of Major Consumable Costs

Item	Unit	Annual Cost By Ore Type					
		3.5 Mt/a			7 Mt/a		
		OV	GS	Sap	OV	GS	Sap
Comminution Consumables	X $1,000	10,221	9,105	2,067	19,253	17,061	3,592
Reagents	X $1,000	6,149	6,149	6,306	11,100	11,100	11,415
Diesel Fuel	X $1,000	473	473	473	1,309	1,309	1,309
Other Consumables	X $1,000	518	484	317	1,047	961	591
Total Consumables Cost	X $1,000	17,361	16,212	9,163	32,710	30,432	16,908
Comminution Consumables	$/t	2.92	2.60	0.59	2.75	2.44	0.51
Reagents	$/t	1.76	1.76	1.80	1.59	1.59	1.63
Diesel Fuel	$/t	0.14	0.14	0.17	0.19	0.19	0.19
Other Consumables	$/t	0.15	0.14	0.09	0.15	0.14	0.08
Total Consumables Cost	$/t	4.96	4.63	2.62	4.67	4.35	2.42

21.2.2.9 Electricity

The plant electricity consumption is determined based on the installed power, excluding standby equipment. For 3.5 Mt/a (Phase 1), the SAG mill accounts for 14,000 kW of the total plant connected power of 24,147 kW. For 7 Mt/a (Phase 2), the grinding mill installed power will be 28,000 kW and the total plant connected power will increase to 43,736 kW. Electrical load factors and utilization factors are applied to the installed power to arrive at the annual average power draw, which is then multiplied by total hours operated per annum and the electricity price to obtain the plant power cost. Table 21-23 provides a summary of the process power costs.

Electricity is provided from the local grid.

Table 21-23: Summary of Process Power Costs

Item	Unit	Annual Consumption / Cost By Ore Type					
		3.5 Mt/a			7 Mt/a		
		OV	GS	Sap	OV	GS	Sap
Grinding Mills Consumption	MWh/y	102,146	96,700	50,710	206,067	194,772	101,420
Other Equipment Consumption	MWh/y	38,597	38,597	38,597	62,382	62,382	62,382
Total Process Consumption	MWh/y	140,743	135,297	89,307	268,450	257,154	163,802
Grinding Mills Cost	X $1,000	5,761	5,454	2,860	11,622	10,985	5,720
Other Equipment Cost	X $1,000	2,177	2,177	2,177	3,518	3,518	3,518
Total Process Power Cost	X $1,000	7,938	7,631	5,037	15,141	14,503	9,238
Grinding Mills Cost	$/t	1.65	1.56	0.82	1.66	1.57	0.82
Other Equipment Cost	$/t	0.62	0.62	0.62	0.50	0.50	0.50
Total Process Power Cost	$/t	2.27	2.18	1.44	2.16	2.07	1.32

21.2.2.10 Maintenance

Maintenance material costs are estimated by applying factors to the ex-works mechanical equipment cost in each area of the process plant. This is done to cover the cost of all maintenance materials and contract labour requirements, with the exception of crusher and mill wear parts, which are included in the consumables allowance. The factors applied are based on Lycopodium's database and experience, and are average costs over the LOM. As such, actual spares costs may be lower during the initial years but rise later. An overall factor of 4% is applied to the mechanical equipment supply cost ex-works. The estimated annual maintenance cost for process plant and mobile equipment is $1.38 million dollars, or $0.39/t at 3.5 Mt/a. The maintenance cost will decrease to $2.10 million dollars, or $0.30/t at 7 Mt/a. The maintenance costs are summarized in Table 21-24.

Mobile Equipment

The operating costs for mobile equipment are estimated and include diesel fuel, tires and maintenance parts. The fuel costs are included in the consumables cost center while the other operating costs are included in the overall maintenance materials cost center.

Table 21-24: Summary of Maintenance Costs

Item	3.5 Mt/a				7 Mt/a			
	Mechanical Supply Ex-Works $	Maint. Factor %	Total Cost $/y	Total Cost $/t	Mechanical Supply Ex-Works $	Maint. Factor %	Total Cost $/y	Total Cost $/t
Plant Equipment Subtotal	29,936,187	4.1	1,218,600	0.35	48,148,732	4.0	1,943,273	0.27
Mobile Equipment			131,105	0.03			131,105	0.02
General Maintenance Allowance			30,000	0.01			30,000	0.01
Total Maintenance Cost			1,379,705	0.39			2,104,377	0.30

21.2.2.11 G&A Costs

This category covers the General G&A costs required for running the operation, which have been provided by Belo Sun.

The estimated annual G&A cost is $5.39 million dollars, or $1.54/t of ore at 3.5 Mt/a. Since these are fixed costs, the G&A will reduce to $5.43 million dollars, or $0.78/t at 7 Mt/a. Table 21-25 summarizes the three components of this cost category namely G&A expenses, G&A labour and laboratory expenses, which are based on the following:

- Office rental; administrative consumables; communications; computer hardware and software; community support; insurances; legal fees; miscellaneous office travel and accommodation expenses; training sessions; first aid consumables; camp housing costs; catering; travel costs (from Altamira to site); vehicle pick-ups as well as other administrative costs. The G&A costs for 3.5 Mt/a make provisions for $1.11 million dollars in camp housing (room and board) costs, which are based on and average camp occupancy of 125 people. In this stage of the Project, travel costs from Altamira to site are $97,374 based on 117 on-shift employees using the camp. At 7 Mt/a, the camp housing is no longer applied and the travel costs from Altamira to site will increase to $421,630. The on-shift employees will be bused for safety considerations onsite, including traffic flow. G&A expenses are described in Table 21-26.
- Salaries and overheads are applied to the following administration areas: administration; security; as well as safety, health and environment. The G&A labour cost category include mostly day work for the administration staff; with the exception of security staff whom perform shift work. G&A salaries are described in Table 21-27.
- Laboratory consumables are included in the G&A costs. Unit costs of sample analysis are supplied by Belo Sun regarding sample preparation, fire assays and atomic absorption analytical testing. Laboratory staffing is included in the process plant labour cost category.

Table 21-25: Summary of G & A Costs

G&A Operating Costs	3.5 Mt/a		7 Mt/a	
	$/y	$/t	$/y	$/t
Expenses	2,408,694	0.69	2,456,210	0.35
G&A Labour	1,670,061	0.48	1,670,061	0.24
Laboratory Expenses	1,308,046	0.37	1,308,046	0.19
Total G&A Cost	5,386,802	1.54	5,434,317	0.78

Table 21-26: G&A Cost Calculation

Item	Units	3.5 Mt/a $/y	7 Mt/a $/y
G&A Expenses			
Off-site			
Belem Office Expenses			
Sub-total		34,839	34,839
Altamira Office Expenses			
Sub-total		33,032	33,032
On Site			
Office Costs			
Communications	Monthly	13,548	19,355
Computer Hardware	Monthly	11,613	13,548
Computer Software	Monthly	11,613	13,548
General Liability Insurance	Annual	677,419	967,742
Banking Charges	Monthly	1,355	1,935
Legal Fees	Monthly	13,548	19,355
Consultants	Annual	132,661	189,516
First Aid / Medical Costs	Monthly	13,548	19,355
Miscellaneous Travel Costs	Monthly	10,839	15,484
Conferences	Monthly	30,606	43,723
Entertainment	Monthly	5,419	7,742
Safety Equipment	Monthly	27,097	38,710
Training Equipment	Monthly	81,290	116,129
Recruiting	Monthly	27,097	38,710
Staff Relocation	Monthly	13,548	19,355
Environmental Lab	Annual	4,516	6,452
Community Relations	Annual	106,129	151,613
Subtotal		1,181,848	1,682,271
Housing			

Item	Units	3.5 Mt/a $/y	7 Mt/a $/y
Room and Board (Camp)	Daily	897,702	0
Travel (Altamira to site)	Weekly	97,374	421,630
Meals Allowance	Daily	117,448	237,986
Subtotal		1,112,524	659,616
Vehicles			
Sub-total		46,452	46,452
Sub-total - G&A Expenses		2,408,694	2,456,210
G&A Labour & Overhead			
Sub-total - Labour		1,670,061	1,670,061
Laboratory Consumables and Expenses			
Sub-total - Laboratory		1,308,046	1,308,046
Total G&A Costs		5,386,802	5,434,317

Table 21-27: G&A Labour Salaries and Compensation

	Empl.	Number of Teams	Total Number Empl.	Rotation	Base Annual Salary $	Overhead Costs %	Annual Labour Costs $/y	Total Annual Labour $/y
Belem Office								
Government Relations Manager	1	1	1	5 x 2	105,484	43	185,843	185,843
Altamira Office								
Community Relations Manager	1	1	1	5 x 2	16,877	48	32,296	32,296
Site Management								
General Manager	1	1	1	5 x 2	71,729	44	127,349	127,349
Executive Secretary	1	1	1	5 x 2	18,987	47	35,952	35,952
Administration								
Purchasing Superintendent	1	1	1	5 x 2	23,206	46	43,263	43,263
Plant Maint. Superintendent	1	1	1	5 x 2	50,632	44	90,790	90,790
Buyer/Contracts	1	1	1	5 x 2	10,970	50	22,059	22,059
Warehouse Supervisor	1	1	1	5 x 2	23,206	46	43,263	43,263
Warehouse Clerks	1	3	3	4 x 4	7,595	61	19,327	57,980
HR Manager	1	1	1	5 x 2	50,632	44	90,790	90,790
HR Officer	1	1	1	5 x 2	23,206	46	43,263	43,263
IT Technician	1	1	1	5 x 2	10,970	50	22,059	22,059
Janitorial	8	1	8	5 x 2	3,797	61	9,629	77,033
Controller	1	1	1	5 x 2	10,970	50	22,059	22,059
Accountant	1	1	1	5 x 2	23,206	46	43,263	43,263
Secretary	1	1	1	5 x 2	9,283	51	19,134	19,134

	Empl.	Number of Teams	Total Number Empl.	Rotation	Base Annual Salary $	Overhead Costs %	Annual Labour Costs $/y	Total Annual Labour $/y
Security								
Security Supervisors	1	1	1	5 x 2	14,768	56	33,690	33,690
Security Staff	3	4	12	4 x 4	13,502	57	31,064	372,766
Safety, Health & Environment								
SHE Manager	1	1	1	5 x 2	71,729	44	127,349	127,349
Environmental Technicians	1	1	1	5 x 2	13,502	49	26,446	26,446
Environmental Labour	2	1	2	5 x 2	3,797	61	9,629	19,258
Safety Technician	2	1	2	5 x 2	13,502	49	26,446	52,892
Safety Clerk	1	1	1	5 x 2	9,283	51	19,134	19,134
Nurses	2	1	2	5 x 2	13,502	57	31,064	62,128
Total G&A Labour			47		614,338	47	1,155,163	1,670,061

21.2.2.12 Production Schedule Operating Cost Analysis

Operating costs are developed according to the process design criteria including an initial nominal ROM throughput of 3.5 Mt/a in Year 1 (Phase 1) and expansion to 7 Mt/a from Year 3 to Year 18 (Phase 2); average gold feed grade of 1.02 g/t over the 18 year LOM and an overall gold recovery of 93.1%.

The annual operating costs are calculated for the 18 year LOM, according to the final production schedule prepared by provided by AGP and summarizes the process plant capacity and metal production based on the three major ore types.

Production schedule operating costs are as of the fourth quarter of 2014. Unit rates for cost items that have been received from local sources are converted via the USD:BRL exchange rate of 1:3.1, as per the first quarter of 2015. The operating cost estimate includes all the cost items relevant to processing the ore by crushing and grinding, leach / CIP, electrowinning and smelting to produce gold doré. Fixed and variable cost items are subdivided into the major cost categories: process plant labour, operating consumables, power, maintenance, as well as general and administration (G&A). The operating costs listed by major category are presented in Table 21-28.

During the first year of operation at 3.5 Mt/a (Phase 1), the total annual operating cost (process plant + G&A) is $32.64 million dollars, or $9.33/t of ore processed. During Phase 2, when the plant is expanded to 7 Mt/a, the total annual operating costs (process plant + G&A) will decrease to $8.07/t. The majority of these costs are attributed to power, reagents and grinding media/liners. Labour and G&A costs are fixed.

For the 18 year production schedule, the total process plant operating cost is $841 million dollars, which equates to $7.26/t of ore processed. With inclusion of G&A costs, the total operating cost is $938 million dollars, which equates to $8.10/t of ore processed.

Table 21-28: Summary of Production Schedule Operating Cost Estimate

Item	Unit	Phase 1 3.5 Mt/a Year 1	Transition 6 Mt/a Year 2	Phase 2 7 Mt/a Yrs 3-18	Total Production
Process Plant Labour	$/t	0.67	0.39	0.35	0.37
Operating Consumables	$/t	4.57	4.30	4.46	4.46
Power	$/t	2.14	2.09	2.12	2.12
Maintenance	$/t	0.39	0.34	0.31	0.32
Total Plant Operating Cost	$/t	7.79	7.11	7.25	7.26
G&A Operating Cost	$/t	1.54	0.91	0.82	0.84
Total Operating Cost	$/t	9.33	8.02	8.07	8.10

22.0 ECONOMIC ANALYSIS

22.1 Introduction

This summary details the results of the economic analysis based on the Study.

The financial analysis for the Project was completed by L&M with input provided from the following:

- AGP - Responsible for the open pit design, mine plan and production schedule, capital and operating costs for the mine;
- Lycopodium - Responsible for the process plant design, process selection, capital and operating costs for the process plant and infrastructure;
- L&M - Responsible for estimating the tax burden and tax benefits according to the Brazilian tax legislation and potential benefits, as assumed by Belo Sun management, and which shall be negotiated with the Government of the State of Pará;
- Belo Sun – Responsible for providing the market assumptions including the gold price projections and all the remaining information needed to complete the financial analysis.

The main tool used for the analyses is an Excel-based discounted cash-flow model developed by L&M. The purpose of this model is to assess the key economic metrics and to identify and assess the key value drivers of the Project integrating the investment and operating costs at this phase of the Project.

22.2 Main Assumptions and Parameters

The following sub-sections summarizes the main assumptions used in the financial analysis including the mine production plan, product logistics, capital and operating expenditures, revenues, taxation, royalties for the Project and other general parameters.

22.2.1 Production

The periodization of the construction and production plans is based on Project years. The construction period for the Phase 1 begins in year -2, month -24. The first output of salable gold (bullion) from Phase 1 is planned to begin in month -3.

The feed rate averages 16.9% in the first three months (year -1), 60.6% in the first quarter of year 1, reaching the full design capacity of the Phase 1 (3.5 Mt/a) in the second quarter of year 1, reflecting the planned ramp up curve for the Phase 1 of the process plant. The start-up of Phase 2 is planned to start in the second quarter of year 2, and the total feed for year 2 should be 6 Mt. From year 3 to year 18 the process plant will operate at the full capacity of 7 Mt/a. The end of the mining activities is planned to the first quarter of year 18.

Primary ore reserves amount to approximately 116 million tonnes at an average gold grade of 1.02 g/t Au through the mine-of- life (LOM), which amounts to about 3.79 Moz of gold. The LOM is approximately 17.2 years.

The metallurgical recovery for the contained gold is expected to be 93.1% which results in 3.524 Moz after processing.

The contract return practiced by the refinery is 99.9% which results in 3.52 Moz of delivered gold.

The extraction is done via traditional open pit mining methods through a shovel / backhoe-truck system, front-end loaders and bulldozers. All primary ore and waste is assumed to require drilling and blasting.

Tables 22-10 and 22-11 summarize the annual feed to the process plant with the respective mineral grades, masses of ore and waste mined and the total material moved, plant production, gold content recovered, product in process inventories, gold payable after the refining process and the metal delivered.

22.2.2 Capital Investment

The initial capital cost amounts to $298 million dollars including an allowance for contingencies. Values in Brazilian Reais were converted to US dollars at the rate BRL:USD = 3.1.

Table 22-1 and Table 22-2 summarize the initial capital cost expenditure by commodity and disbursement schedule.

Table 22-1: Capital Cost Summary

Initial Capital Costs X $1,000				
Commodity	Net of Tax / CIF $	Non Recoverable Taxes $	Recoverable Taxes $	Total $
General	17,462.3	1,155.6	1,802.8	20,420.7
Earthworks	18,744.5	1,125.1	817.6	20,687.2
Earthworks TMF	5,980.0	355.8	259.7	6,595.5
Concrete	12,274.6	674.8	492.5	13,441.8
Steelwork	12,521.4	4,270.6	1,697.6	18,489.6
Platework	4,259.6	533.9	142.9	4,936.4
Tankage	7,955.4	386.2	566.4	8,908.0
Mechanical	32,741.5	4,161.4	503.6	37,406.6
Mechanical Bulks	651.3	57.9	12.5	721.7
Piping	11,318.9	2,078.2	406.2	13,803.3
Electrical & Inst	26,737.1	2,345.5	696.1	29,778.6
Buildings	13,576.2	2,289.2	1,264.2	17,129.7
Mining Costs	36,651.3	1,009.9	1,868.3	39,529.5
Owners Costs	28,068.5	1,618.7	1,616.3	31,303.5
Working Capital	14,000.0	0	0	14,000.0
EPCM Costs	19,321.5	572.4	1,059.0	20,953.0
Total	262,264.1	22,635.1	13,205.8	298,105.1

The capital expenditure for the operations period includes both the construction of Phase 2 to expand the capacity of the process plant and the sustaining capital to maintain the planned level of activities until the end of the Project life.

The value of the expansion capital estimation is $63 million dollars. Table 22-2 presents the breakdown by commodity, the non recoverable and the recoverable taxes for expansion capital. The sustaining capital amounts to $125 million dollars. This value does not include $50 million dollars for closure costs and an equivalent value of $50 million dollars for salvage value of the mining, processing and infrastructure equipment.

Details for the sustaining capital expenditures are presented in the Table 22-3 while Table 22-4 summarizes the annual total capital expenditure during operations.

Table 22-2: Expansion Capital Summary

Expansion Capital X $1,000				
Commodity	Net of Tax / CIF $	Non Recoverable Taxes $	Recoverable Taxes $	Total $
General	943.2	0	0	943.2
Concrete	2,261.2	124.0	90.5	2,475.7
Steelwork	1,314.2	445.2	177.9	1,937.3
Platework	2,228.2	290.0	70.6	2,588.7
Tankage	2,383.9	99.8	106.9	2,590.7
Mechanical	20,845.3	2,585.7	170.8	23,601.8
Mechanical Bulks	347.9	35.3	5.9	389.1
Piping	7,339.3	1,288.3	419.0	9,046.6
Electrical & Inst	7,390.4	667.3	136.3	8,194.0
Owners Costs	4,569.4	189.3	250.1	5,008.8
EPCM Costs	5,374.3	167.6	310.0	5,851.9
Total	54,997.2	5,892.5	1,738.1	62,627.8

Table 22-3: Sustaining Capital Summary

Sustaining Capital X $1,000				
Commodity	Net of Tax / CIF $	Non Recoverable Taxes $	Recoverable Taxes $	Total $
Earthworks TMF	70,749.4	4,209.2	3,072.7	78,031.2
Piping	219.4	41.9	4.4	265.6
Mining Costs	39,280.5	2,290.4	4,237.3	45,808.2
Owners Costs	978.0	89.1	109.0	1,176.1
Closure Costs	50,000.0	0	0	50,000.0
Salvage Value	(50,000.0)	0	0	(50,000.0)
Total	111,227.2	6,630.6	7,423.3	125,281.2

Table 22-4: Total Capital Expenditure on Operations

Expansion and Sustaining Capital X $1,000				
Year	Net of Tax / CIF $	Non Recoverable Taxes $	Recoverable Taxes $	Total $
1	16,181.3	948.6	1,466.7	18,596.6
2	63,399.3	6,411.4	2,625.2	72,435.9
3	7,106.6	417.9	573.0	8,097.5
4	5,802.9	341.9	432.4	6,577.2
5	5,261.1	310.3	373.9	5,945.4
6	6,835.9	402.2	543.8	7,781.8
7	4,790.6	303.0	325.0	5,418.6
8	3,706.7	219.7	206.2	4,132.6
9	6,546.0	388.9	316.3	7,251.1
10	6,554.1	389.3	317.2	7,260.6
11	7,417.5	439.7	410.3	8,267.4
12	7,879.2	466.6	460.1	8,806.0
13	6,049.5	359.9	262.7	6,672.2
14	6,049.5	359.9	262.7	6,672.2
15	6,133.5	364.8	271.8	6,770.1
16	6,049.5	359.9	262.7	6,672.2
17	0	0	0	0
18	516.7	50.2	57.6	624.5
	166,279.8	12,534.4	9,167.6	187,981.8

22.2.3 Operating Costs

The average unit cost for the on-site operational activities in pre-tax base is $618/oz of ore processed. The unit cost, including refining and transport, royalties and non recoverable taxes (import duty, ICMS and ISS) amounts to $671/oz. Recoverable taxes PIS and CONFINS must be paid at the time of purchase of inputs, services and other resources, although they can be recovered later on the operations. The total unit cost per ounce of gold produced, including recoverable taxes, is $707/oz of ore processed.

Table 22-5 shows the unit costs per activity on the site and the refining and transportation costs, including non-recoverable and recoverable taxes.

The annual average of all pre-tax operating costs between years 2 and 18 (full capacity operation period), amounts to $127 million dollars. The LOM annual projections of the operating costs are shown in the Table 22-11.

Table 22-5: Operating Costs Summary

Operations - Unit Costs	$/oz
Mining	350
Processing	240
G&A	28
Other Operating Costs	0
On-site Operating Costs Before Taxes	618
Costs Beyond Mine	
Refining & Transport	12
Total Operating Costs Before Taxes	630
Royalty (CFEM)	12
Other Non Recoverable Taxes	29
Total Operating Cost	671
Recoverable Taxes	37
Total Cash Cost	707

22.2.4 Revenue

The projections of the net revenue are based on the quantity of gold to be delivered (3,524.1 Koz LOM), at a long term gold price of $1,200/oz. External services for treatment and refining are fixed at $0.30/oz while the transportation of the gold doré bars from site to refinery is fixed at $12/oz. The refining and transportation costs are deducted from the gross revenue. It is considered a contract return of 99.9% for the gold contents.

The royalties paid by Belo Sun to the government (CFEM) are also deducted from the gross revenue and is detailed in Section 22.2.5. The LOM average unit cost of the government royalty is $12/oz.

The annual average of the net revenue is $251 million dollars from year 3 (full production) to year 18. Annual projections are shown in Table 22-10 and Table 22-11.

22.2.5 Royalties

Royalty paid to the Federal Government – CFEM: (Compensação Financeira pela Exploração de Recursos Minerais).

The Federal Constitution of Brazil has established that the States, municipalities, Federal District and certain agencies of the federal administration are entitled to receive royalties for the exploitation of mineral resources by holders of mining concessions (including extraction permits). The royalty rate for gold is currently 1% arising from the sale of the mineral product, less the sales taxes of the mineral product, transportation and insurance costs.

22.2.6 Taxation

The tax planning for the Project was developed by L&M taking into consideration the existing tax laws applied to capital costs, operating costs, sales of gold and profits.

The work was developed from the basic taxes applicable to various activities of the Project and the tax benefits provided for by the legislation of each level of government, whether at the Federal, State or municipal level.

An important premise that comes from setting most of the tax benefits is the total export of the gold production. The results presented in this economic analysis are accounted for the tax benefits provided for mainly export companies and also those benefits targeted to new investments in the State of Pará:

- RECAP - Suspension of PIS and COFINS on the acquisitions of machinery, instrumentation and equipment in the construction phase. The rules and the granting of the benefit are determined by the Secretaria da Receita Federal do Brasil (SRF).
- GOLD LAW - The State of Pará has a large incentive program applicable to companies investing in the mining sector in the State. It is highlighted that currently existing laws benefiting the mineral industries of iron, nickel and copper provide exemption and / or deferral of ICMS during the construction and operation phases. In this Study equivalent tax benefits on ICMS, granted to mining companies, which are investing or are operating in the segments of iron ore, nickel and copper in Pará have been considered and are part of a Fiscal Stability Agreement that Belo Sun management intends to negotiate with the State Government. More specifically the benefits include:
    - Construction phase – Deferral of ICMS levied on imports of machinery and equipment and of the ICMS DIFAL on acquisitions of machinery and equipment from other States.
    - Operation phase - Deferral of ICMS levied on the consumption of electrical energy and diesel oil used in the production.
- DRAWBACK - Suspension of PIS and COFINS on imported inputs and raw materials. The tax regime of Drawback consists of the suspension of payment of PIS and other taxes due, in customs clearance of inputs (raw materials, intermediate products and packaging materials), for a maximum period of up to 1

(one) year, provided that the products resulting from the manufacturing process are effectively exported.

- PREPON-EX - Suspension of PIS and COFINS on purchases of inputs and raw materials including energy and fuels to be consumed in the production process for companies that exports the minimum of 60% of its production.
- SUDAM: Given its location and characteristics, the Project is considered eligible for the tax incentive conceded by Amazon Development Superintendence (SUDAM). The incentive consists of the reduction of 75% of the income tax due by the Project for a ten-year period for new investments in the area of Legal Amazonia and has to be approved by SUDAM, prior to 31 December 2018 (See Ordinance N. 2,091 of December 28 2007, issued by the Minister of National Integration and Amendments).

22.2.7 All In Sustaining Costs

Table 22-6 details the expenditures in the operations phase of the Project in accordance with the definition of All-In-Sustaining Costs (AISC) as proposed by the World Gold Council's Guidance Note of June 27 2013. Unit costs per ounce reflect the varying costs of producing gold over the LOM.

Table 22-6: All In Sustaining Costs

All-In Sustaining Costs	$/oz
On-site Costs Before Taxes	618
Other Operating Costs	0
Non Recoverable Taxes	28
Import Duty	0
ICMS	24
ISS	4
Recoverable Taxes	37
PIS/COFINS	37
IPI	0
Costs Beyond Mine	12
Refining & Transport	12
Royalties (CFEM)	12
(=) CASH OPERATING COST	707
INCOME TAXES AND INCENTIVES	23
Income Taxes	133
IRPJ	98
CSLL	35
Tax Incentives and Compensations	(111)
IRPJ SUDAM Incentive	(68)
Compensations / Refund	(43)
(=) ALL-IN COSTS	730
CAPITAL EXPENDITURES ON OPERATIONS	49
Sustaining/ Expansion Capital, Salvage	33
Mine Closure	14
WC Movements	(4)
Non Recoverable Taxes	4
Import Duty	1
IPI	0
ICMS	1
ISS	2
Recoverable Taxes	3
PIS/COFINS	3
AISC	779

22.2.8 Evaluation Date, Escalation and Others

The evaluation base date is the beginning of year -2. All financial modeling and analysis work is based in terms as of Q1 2015 using real, ungeared, post-tax discount rates and excludes any financing assumptions. The exchange rate adopted to convert values in Brazilian Reais to US dollars is BRL:USD = 3.1.

22.3 Financial Analysis

Based on the assumptions adopted, the post-tax net present value (NPV) amounts to $665 million dollars, at a discount rate of 5%. The internal rate of Return (IRR) is 26% and the 10 years average EBITDA (from year 3 to year 12, full production period) is $149 million dollars. The payback after the start-up of the operations is 3.9 years.

On the analysis of the pre-tax cash flow, NPV rises to $942 million dollars and the IRR to 37%. All direct and indirect taxes on profits, capital and operational expenditures, royalties and tax benefits are excluded in this analysis. Table 22-7 summarizes the financial results.

Based on the assumptions used in this Study the project is economically viable, presenting, according to the assumptions adopted, a significant positive NPV and an IRR higher than the discount rate adopted.

Table 22-7: Financial Results Summary

Financial Analysis	Unit	Post Tax	Pre-Tax (1)
NPV@5%	$ Million	665	942
IRR	%	26%	37%
EBITDA(2)	$ Million	148	158
Payback(3)	Years	3.9	2.9

(1) Excluded Direct and Indirect Taxes
(2) Full production years 3 to 12
(3) Undiscounted, after the start-up

22.4 Sensitivity Analysis

The sensitivity analyses show the impact of the variation of gold prices, operating and capital costs upon the Project NPV and IRR. The analysis encompasses the following range of variation in the key inputs:

- Gold price: ±20%;
- Operating costs: ±20%;
- Capital costs: ±20%.

In assessing the sensitivity of the Project returns, each of these parameters is varied independently of the others. Scenarios combining beneficial or adverse variations simultaneously in two or more variables will have a more marked effect on the economics of the Project than will the individual variations considered. The sensitivity analysis has been conducted assuming no change to the mine plan or schedule.

Table 22-8 presents the results of the sensitivity analysis for Project NPV and Figure 22-1 illustrates these effects for each of the critical variables. Table 22-9 and Figure 22-2 present the same for the IRR. NPV results are reported at a discount rate of 5%.

22.4.1 Sensitivity Analysis – NPV

Figure 22-1: Sensitivity for NVP

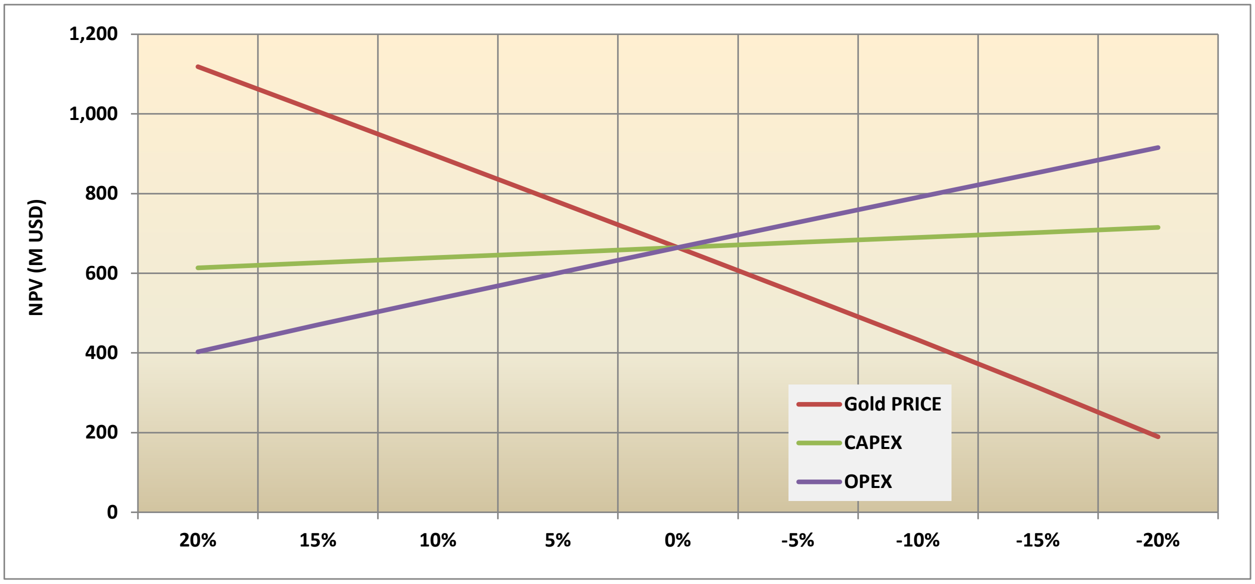


Table 22-8: Sensitivities for NVP

Δ%	Gold Price		Operating Cost			Capital Cost	
%	$/oz	NPV @ 5% $	$/t ore	$/oz	NPV @ 5% X $1,000	Total X $1,000	NPV @ 5% X $1,000
20%	1,440	1,118.6	24.25	741.6	403.0	357.7	613.7
15%	1,380	1,005.8	23.26	710.7	470.6	342.8	626.4
10%	1,320	893.1	22.28	679.8	535.8	327.9	639.1
5%	1,260	779.1	21.14	648.9	600.4	313.0	651.8
0%	**1,200**	**664.5**	**20.16**	**618.0**	**664.5**	**298.1**	**664.5**
-5%	1,140	548.9	19.33	587.1	727.9	283.2	677.2
-10%	1,080	432.4	18.35	556.2	790.9	268.3	689.7
-15%	1,020	312.7	17.37	525.3	853.0	253.4	702.3
-20%	960	189.8	16.39	494.4	915.4	238.5	715.0

22.4.2 Sensitivity Analysis – IRR

Figure 22-2: Sensitivity for IRR

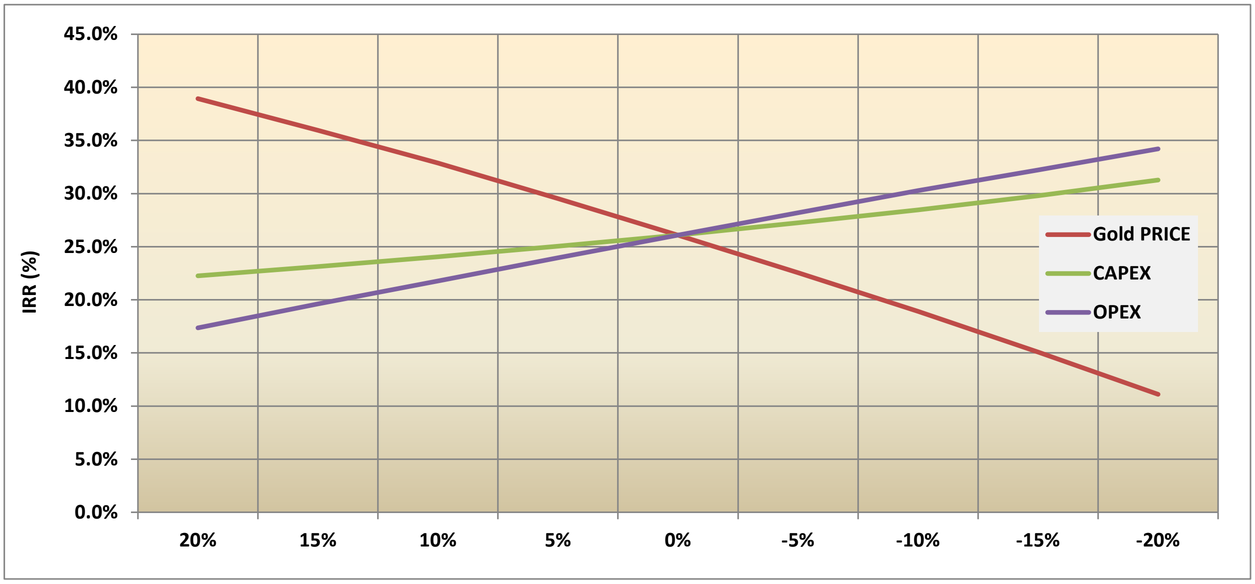


Table 22-9: Sensitivities for IRR

Δ%	Gold Price		Operating Cost			Capital Cost	
%	$/oz	IRR %	$/t ore	$/oz	IRR %	Total X $1,000	IRR %
20%	1,440	38.9%	24.25	741.6	17.4%	357.7	22.3%
15%	1,380	35.9%	23.26	710.7	19.6%	342.8	23.1%
10%	1,320	32.9%	22.28	679.8	21.8%	327.9	24.1%
5%	1,260	29.5%	21.14	648.9	23.9%	313.0	25.0%
0%	**1,200**	**26.1%**	**20.16**	**618.0**	**26.1%**	**298.1**	**26.1%**
-5%	1,140	22.5%	19.33	587.1	28.2%	283.2	27.2%
-10%	1,080	18.9%	18.35	556.2	30.3%	268.3	28.5%
-15%	1,020.0	15.1%	17.37	525.3	32.2%	253.4	29.8%
-20%	960	11.1%	16.39	494.4	34.2%	238.5	31.3%

Table 22-10: Projections - Production Flow

LOM CF Annual Projections		Project Year->	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
OPERATING ASSUMPTIONS																						
MINING																						
Material Movement																						
Direct to Mill Ore	(000t)	**69,780.4**	-	20.0	3,217.3	5,659.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	5,631.1	7,000.0	5,091.7	5,814.7	1,870.5	476.1	-	-	-	-	-
Mine to Stockpile	"	**48,162.2**	-	322.4	4,870.6	6,249.5	6,652.9	6,756.9	3,818.9	4,008.4	3,530.2	2,960.6	3,738.3	1,937.5	2,108.7	898.5	308.8	-	-	-	-	-
From Stockpile to Mill	"	**46,188.7**	-	127.6	282.7	341.0	-	-	-	-	-	1,368.9	-	1,908.3	1,185.3	5,129.5	6,523.9	7,000.0	7,000.0	7,000.0	7,000.0	1,321.5
Waste Tonnes Mined	"	**503,823.9**	-	10,676.8	42,279.7	61,349.6	65,090.5	67,184.7	70,175.2	47,858.0	36,053.5	31,501.6	30,016.0	16,769.6	16,261.9	6,907.0	1,699.8	-	-	-	-	-
Ore Mined	(000t)	**117,942.5**	-	342.4	8,087.9	11,908.5	13,652.9	13,756.9	10,818.9	11,008.4	10,530.2	8,591.7	10,738.3	7,029.2	7,923.3	2,769.0	784.9	-	-	-	-	-
Stripping Ratio		**4.27**	-	31.18	5.23	5.15	4.77	4.88	6.49	4.35	3.42	3.67	2.80	2.39	2.05	2.49	2.17	-	-	-	-	-
Total Material Mined	(000t)	**667,955.1**	-	11,146.8	50,650.3	73,599.1	78,743.4	80,941.6	80,994.1	58,866.4	46,583.7	41,462.2	40,754.3	25,707.1	25,370.6	14,805.5	9,008.7	7,000.0	7,000.0	7,000.0	7,000.0	1,321.5
Ore fed to milling	(000t)	**115,969.1**	-	147.6	3,500.0	6,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	7,000.0	1,321.5
Gold head grade	(g/t)	**1.02**	-	0.70	1.56	1.46	1.40	1.38	1.26	1.26	1.20	1.12	1.32	1.25	1.22	0.87	0.51	0.47	0.47	0.47	0.49	0.49
Gold content	(koz)	**3,788.0**	-	3.3	175.0	282.3	315.5	311.1	283.9	283.2	270.5	251.6	296.7	280.9	273.8	194.9	115.3	106.5	106.5	106.5	109.6	21.0
Ore Reserve	(000t)	**-**	**115,969.1**	**115,821.5**	**112,321.5**	**106,321.5**	**99,321.5**	**92,321.5**	**85,321.5**	**78,321.5**	**71,321.5**	**64,321.5**	**57,321.5**	**50,321.5**	**43,321.5**	**36,321.5**	**29,321.5**	**22,321.5**	**15,321.5**	**8,321.5**	**1,321.5**	**-**
Reserve Tail	(%)	**-**	100.0%	99.9%	96.9%	91.7%	85.6%	79.6%	73.6%	67.5%	61.5%	55.5%	49.4%	43.4%	37.4%	31.3%	25.3%	19.2%	13.2%	7.2%	1.1%	0.0%
PROCESSING																						
Metallurgical recovery	(%)	**93.1%**	0.0%	88.7%	90.6%	94.4%	94.3%	94.3%	94.0%	93.9%	94.0%	93.8%	94.2%	94.2%	94.1%	92.6%	89.8%	89.1%	89.1%	89.1%	87.7%	0.0%
Au content after processing	(kOz)	**3,526.6**	0.0	2.9	158.5	266.6	297.5	293.4	266.8	266.1	254.3	235.9	279.4	264.7	257.7	180.4	103.5	94.9	94.9	94.9	96.1	0.0
Avg WIP	"		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gold to refining (produced)	"	**3,526.6**	-	2.9	158.5	266.6	297.5	293.4	266.8	266.1	254.3	235.9	279.4	264.7	257.7	180.4	103.5	94.9	94.9	94.9	96.1	-
REFINING																						
Contract return	(%)	**99.9%**	0.0%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	0.0%
Au content after refining	(kOz)	**3,524.1**	0.0	2.9	158.4	266.4	297.3	293.2	266.6	265.9	254.1	235.7	279.2	264.5	257.5	180.3	103.4	94.8	94.8	94.8	96.0	0.0
Avg WIP	"		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gold to clients	"	**3,524.1**	-	2.9	158.4	266.4	297.3	293.2	266.6	265.9	254.1	235.7	279.2	264.5	257.5	180.3	103.4	94.8	94.8	94.8	96.0	-

Table 22-11: Projections - Cash Flow Statement

LOM CF Annual Projections		Project Year->	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CASH FLOW																							
NPAT		**934,565.0**	0.0	(18,914.1)	(880.8)	65,553.0	68,542.4	64,004.1	47,534.9	75,150.8	80,066.3	77,593.2	109,875.2	114,643.3	108,995.8	66,512.6	19,674.7	16,744.2	14,308.7	11,232.7	12,751.3	1,176.7	0.0
D&A add back	(000USD)	**471,239.4**	0.0	6,138.7	54,163.5	46,383.9	49,914.9	35,745.5	34,039.2	26,772.1	23,733.5	17,252.7	19,628.8	19,655.1	20,900.4	18,417.1	13,721.4	14,782.4	16,845.2	22,453.6	24,792.3	5,899.0	0.0
OPEX Indirect taxes	(000USD)	**(130,164.7)**	**0.0**	**(1,057.5)**	**(8,103.1)**	**(11,426.1)**	**(12,918.3)**	**(13,520.6)**	**(12,908.1)**	**(10,284.4)**	**(8,933.3)**	**(8,099.3)**	**(7,989.6)**	**(6,227.2)**	**(6,187.7)**	**(4,727.8)**	**(3,811.3)**	**(3,402.0)**	**(3,439.7)**	**(3,358.1)**	**(3,139.3)**	**(631.1)**	**0.0**
Recoverable Federal Taxes	"	**(130,164.7)**	0.0	(1,057.5)	(8,103.1)	(11,426.1)	(12,918.3)	(13,520.6)	(12,908.1)	(10,284.4)	(8,933.3)	(8,099.3)	(7,989.6)	(6,227.2)	(6,187.7)	(4,727.8)	(3,811.3)	(3,402.0)	(3,439.7)	(3,358.1)	(3,139.3)	(631.1)	0.0
Income Tax Incentives & Compensations	(000USD)	**393,836.2**	0.0	0.0	6,465.2	20,474.6	27,251.9	32,971.8	24,487.7	38,714.0	41,246.3	39,972.2	33,529.8	40,921.0	37,539.8	25,374.5	5,040.3	4,187.3	3,764.6	3,788.7	3,672.5	4,434.1	0.0
IR SUDAM Incentive	"	**241,355.6**	0.0	0.0	3,565.4	11,291.1	15,028.6	18,183.0	13,504.2	21,349.6	22,746.1	22,043.5	31,214.6	32,569.1	30,964.7	18,895.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Federal Taxes Compensation/ Refun	"	**152,480.6**	0.0	0.0	2,899.8	9,183.4	12,223.3	14,788.8	10,983.5	17,364.4	18,500.2	17,928.7	2,315.3	8,351.9	6,575.1	6,478.8	5,040.3	4,187.3	3,764.6	3,788.7	3,672.5	4,434.1	0.0
CAPEX	(000USD)	**(472,086.9)**	**(60,722.1)**	**(223,535.8)**	**(26,558.5)**	**(77,196.4)**	**(9,694.0)**	**(6,182.0)**	**(4,410.0)**	**(8,418.0)**	**(5,075.8)**	**(3,364.0)**	**(9,416.7)**	**(7,270.2)**	**(7,869.4)**	**(5,503.8)**	**(3,187.4)**	**(6,369.5)**	**(6,892.5)**	**(6,672.2)**	**41.8**	**954.9**	**5,254.5**
Development Capex	"	**(298,105.1)**	(60,722.1)	(237,382.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net of tax/ CIF	"	**(262,264.1)**	(53,421.6)	(208,842.6)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non Recoverable Taxes	"	**(22,635.1)**	(4,610.6)	(18,024.5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recoverable Taxes		**(13,205.8)**	(2,689.9)	(10,515.9)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sustaining/ Expansion Capital, Salvag	"	**(137,981.8)**	0.0	0.0	(18,596.6)	(72,435.9)	(8,097.5)	(6,577.2)	(5,945.4)	(7,781.8)	(5,418.6)	(4,132.6)	(7,251.1)	(7,260.6)	(8,267.4)	(8,806.0)	(6,672.2)	(6,672.2)	(6,770.1)	(6,672.2)	25,000.0	24,375.5	0.0
Net of tax/ CIF		**(116,279.8)**	0.0	0.0	(16,181.3)	(63,399.3)	(7,106.6)	(5,802.9)	(5,261.1)	(6,835.9)	(4,790.6)	(3,706.7)	(6,546.0)	(6,554.1)	(7,417.5)	(7,879.2)	(6,049.5)	(6,049.5)	(6,133.5)	(6,049.5)	25,000.0	24,483.3	0.0
Non Recoverable Taxes		**(12,534.4)**	0.0	0.0	(948.6)	(6,411.4)	(417.9)	(341.9)	(310.3)	(402.2)	(303.0)	(219.7)	(388.9)	(389.3)	(439.7)	(466.6)	(359.9)	(359.9)	(364.8)	(359.9)	0.0	(50.2)	0.0
Recoverable Taxes		**(9,167.6)**	0.0	0.0	(1,466.7)	(2,625.2)	(573.0)	(432.4)	(373.9)	(543.8)	(325.0)	(206.2)	(316.3)	(317.2)	(410.3)	(460.1)	(262.7)	(262.7)	(271.8)	(262.7)	0.0	(57.6)	0.0
Mine Closure		**(50,000.0)**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(25,000.0)	(25,000.0)	0.0
WC movements	(000USD)	**14,000.0**	0.0	13,847.1	(7,961.8)	(4,760.5)	(1,596.4)	395.2	1,535.4	(636.2)	342.8	768.6	(2,165.6)	(9.5)	398.1	3,302.1	3,484.7	302.7	(122.4)	0.0	41.8	1,579.4	5,254.5
Free Cash Flow	(000USD)	**1,197,388.9**	(60,722.1)	(237,368.7)	25,086.3	43,788.9	123,096.9	113,018.8	88,743.8	121,934.5	131,037.0	123,354.9	145,627.5	161,721.9	153,379.0	100,072.5	31,437.8	25,942.3	24,586.2	27,444.7	38,118.7	11,833.5	5,254.5
Average CF periods	(Avg period)		0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5
Project NPV@5%	(000 USD)	**664,542.1**	(58,473.9)	(221,444.8)	21,766.3	36,914.9	98,831.5	86,419.1	64,626.0	84,568.1	86,553.5	77,599.3	87,248.1	92,276.7	83,348.9	51,791.6	15,495.5	12,178.0	10,991.8	11,685.4	15,457.4	4,654.5	2,054.2
IRR	(%)	**26.1%**																					
Payback	(years)	**3.9**																					
Exchange Rate	(BRL/USD)		3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10

23.0 ADJACENT PROPERTIES

There are no adjacent properties to the Project that are considered relevant to this Technical Report.

24.0 OTHER RELEVANT DATA AND INFORMATION

Not applicable.

25.0 INTERPRETATION AND CONCLUSIONS

25.1 General

The Project has been investigated at a feasibility level and this Technical Report provides a summary of the results and findings from each major area of investigation and study including but not limited to resource exploration; metallurgical sampling and testing; resource estimation; mine design; process design; infrastructure design; environmental assessment; capital and operating cost estimates; and economic analysis. The extent and level of investigation and study for each of these areas is considered to be consistent with that normally associated with feasibility level studies for resource development projects.

Based on the accumulative findings from the various technical areas of the Study the economic analysis performed shows the Project is financially viable and should advance to the execution phase.

25.2 Property, Access, History, Deposit Types, Exploration, Drilling, Sampling, Data Verification, Mineral Resource, Adjacent Properties (Sections 4, 5, 6, 7, 8, 9, 10, 11, 12, 14 and 23 – QPs Dr. Oy Leuangthong, Dr. Jean-François Couture and Dr. Lars Weiershäuser)

Exploration work by Belo Sun was professionally managed and used procedures consistent with generally accepted industry best practices. After review, SRK is of the opinion that the exploration data collected by Belo Sun are sufficiently reliable to interpret with confidence the boundaries of the gold mineralization for the Project's North and South Block deposits.

SRK, in collaboration with Belo Sun, constructed a mineral resource model for the North Block of the Volta Grande project comprising four main gold deposits - Ouro Verde, Grota Seca, Junction and Greia. Within each deposit, up to 4 grade domains were defined on the basis of geological, mineralogical and grade attributes: very low grade, low grade, medium grade and high grade domains. Sub-domains within low, medium and high grade zones were used to recognize slight differences in spatial continuity orientations. SRK estimated gold grades into a block model, informed by capped gold composites using an ordinary kriging estimator. Average specific gravity values of 2.75 and 1.36 were assigned to fresh rock and saprolite blocks, respectively.

The mineral resource model for the South Block was prepared by Belo Sun and was audited by SRK in September 2013. Three zones were identified for mineral resource modeling: Pequi, Grande and Itatá. Belo Sun estimated gold grades into a block model using capped gold composites via ordinary kriging. There has been no change to the mineral resource model for South Block since 2013.

SRK considers that the mineral resources for the North Block of the Volta Grande gold project have been estimated in conformity with the generally accepted CIM Estimation of Mineral Resource and Mineral Reserves Best Practices Guidelines. The mineral resources are classified in accordance with the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014). The gold mineralization in the Volta Grande gold deposits is amenable for open pit extraction. Open pit mineral resources are reported at a cut-off grade of 0.40 g/t Au and 0.50 g/t Au within a conceptual pit shell for the North and South Block, respectively.

Relative to the October 2013 model, the March 2015 Measured and Indicated mineral resources for the North Block have increased by 3% in contained metal while the Inferred mineral resources have decreased by 43%. The primary reason for this change is attributed to the introduction of the LG and VLG domains, introduction of search restrictions to limit the influence of higher grade samples, and the reporting to fully diluted block grades. In 2013 the mineral resources were reported on the basis of partial block grades.

25.3 Mineral Reserves and Mining Method (Sections 15 and 16 – QP Mr. Gordon Zurowski)

Mining studies have been completed using the resource estimate as of March 16 2015 and include the following aspects:

- Pit optimization utilized the Lerch-Grossman algorithm to determine the ultimate pits limits;
- Final pits have been designed for Volta Grande in both the Ouro Verde and Grota Seca areas. Bench and overall pit slope designs were based on recommendations by the geotechnical consultants (VOGBR);
- Mineral Reserves have been determined from mineral resources by taking into account geologic, mining, processing, legal and environmental considerations and are therefore classified in accordance with the 2010 CIM Definition Standards for Mineral Resources and Mineral Reserves;
- Proven Mineral Reserves amount to 41.76 million tonnes at an average grade of 1.07 g/t Au. Probable Mineral Reserves amount to 74.21 million tonnes at an average grade of 0.98 g/t Au. Total estimated Mineral Reserves amounts to 115.97 million tonnes at an average grade of 1.02 g/t Au. Inferred Mineral Resources have not been converted to reserves and instead treated as waste for mine planning purposes;
- Waste storage areas close to the pits were designed in accordance with geotechnical recommendations;
- Mining will be completed with size appropriate equipment in the form of 136-tonne haulage trucks matched to 22 m^3 hydraulic shovels and 18 m^3 front end loaders. Support for dilution control will be the responsibility of large backhoes in delineating ore waste contacts. Support equipment such as dozers, graders and water trucks will assist the mining operation;
- Grade control will be provided by a separate fleet of reverse circulation drills working in advance of the active mine faces;
- Estimates of both mine capital and operating costs are made. Capital costs consider owner-operator mining and include a provision for pre-production

mining. Replacement and additional equipment purchase costs have been included over the life of Project. The mining fleet is assumed to be leased;

- The mining operating cost estimate is dominated by equipment operating costs (fuel, tires, labour and maintenance, leasing). Blasting, administration / management and services have also been included.

25.4 Mineral Processing, Metallurgical Testing and Recovery Methods (Sections 13 and 17 – QPs Mr. Aron Cleugh and Mr. George Wahl)

Metallurgical testing has been carried out on the Volta Grande ore body compatible with the level normally associated with Feasibility studies and in accordance with industry standards.

The process plant has been designed with a Phase 1 capacity of 3.5 Mt/a and a Phase 2 expansion to 7 Mt/a in year 3. The process plant will recover gold with a conventional and robust flow sheet utilizing crushing, grinding, gravity recovery with intensive leach, leach / CIP, AARL recovery, EW, carbon regeneration, and cyanide detoxification. An overall LOM gold recovery of 93% has been established and is well supported by the test work.

25.5 Site Infrastructure and Related Capital Costs (Section 18 – QP Mr. Stefan Gueorguiev)

Site infrastructure facilities in support of the mining and processing of the Volta Grande ore body have been developed to take into consideration the local topographic features, water courses and access. The level of detail and planning is commensurate with that normally associated with Feasibility level.

There is adequate space for the intended facilities and there are no known adverse conditions that could affect the design or types of foundations for the heavy structures. The layouts of equipment and building sizes including camps and maintenance facilities will be compatible with other similar sized mines in remote areas.

25.6 Tailings Management Facility, Waste Management Facilities and Surface Water Management (Sections 18.7 and 18.9 – QP Mr. Paulo Franca)

The tailings management facility (TMF) for the Project is designed to contain 92 Mm^3 of tailings generated from the process plant over the mine life. It is planned that the dam embankment will be initially made of compacted soil, constructed in a single stage up to the elevation 122 m, followed by multiple raisings to the final elevation, 166 m.

The raisings will be built of compacted soil, in the upstream section and compacted rock fill in the downstream section, to allow utilization of waste material from the open pits. The soil will be obtained from borrow areas in the reservoir. Seven saddle dikes will have to be built in topographical depressions in the TMF reservoir area to guarantee tailings confinement.

The design of the waste management facilities (WMF) is based on a swell factor of 30% for rock and 15% for saprolite. Lifts for the dumps are placed every 20 m in height leaving a 10 m wide berm between the lifts. The angle of repose for the material is estimated to be 37.5° and with the configuration, the overall facility slope will be 20°. These parameters for the facility were provided by VOGBR as part of their geotechnical program.

The Ouro Verde WMF will reach a height of 100 m and the top level is expected to be the 190 m level. It will cover an area of 189 ha containing 248 Mt of waste material. The Grota Seca facility will reach a height of 120 m and the top level will be the 220 m level. It will cover an area of 157 ha containing 257 Mt of waste material.

Sediment control dikes will be built downstream of the WMF to control run-off.

There is no significant concern for the WMF, however, ERM is recommending that acidity potential of the waste material be verified for the next phase of the Project.

The TMF is designed to be a zero discharge facility and the free water level from rainfall and decanted tailings will be managed to avoid overflowing the TMF by varying the volume of reclaim returned to the process plant.

Seepage through the main dam embankment and saddle dikes will be collected in vertical drains in the structures which report to horizontal drains connected to individual seepage ponds where collected solutions are pumped back to the TMF basin.

Run-off from the WMF is collected in sedimentation ponds prior to release to the nearest watercourse via the water management pond (WMP).

Water accumulating in the open pits and other areas around site is pumped to the WMP, where as required, is recycled back to the process plant.

25.7 Market Studies (Section 19 – QP Mr. Alexandre Luz)

The market studies for gold dore have not been conducted, and neither have contracts been investigated, as gold is generally sold on the open market.

25.8 Environmental Studies, Permitting and Social or Community Impact (Section 20 – Mr. Derek Chubb)

During the Study Belo Sun retained ERM to prepare a summary report on the environmental, social studies and management plans previously prepared for the Project.

An Environmental Impact Assessment (EIA) was prepared for the Project and submitted to the state environmental regulatory authority (SEMA). Following approval received in December 2013, the Project received its Preliminary License (LP) in February 2014.

The LP established the conditions for achieving the next major permitting requirement, the Installation License (LI), and Belo Sun has been given 1,095 days to address the conditions of the LP. These conditions include a number of studies, management plans, and environmental and social programs designed to mitigate impacts and risks associated with the Project.

At the time of issuing the Study the LI application has been submitted to SEMA. The LI application must present details on the design of the Project and the environmental and social protection measures that will be implemented. The LI application provides an update on the ongoing environmental and social studies required as part of the LP conditions. The Project has undergone changes since the completion of the EIA and the issuance of the LP. The LI application updates the evaluation of potential environmental and social impacts based on the updated Project footprint.

25.9 Cost Estimating, Economic Analysis and Recommendations (Sections 21 and 22 – QPs Mr. Stefan Gueorguiev, Mr. Aron Cleugh and Mr. Alexandre Luz)

The capital cost estimate includes all the direct and indirect costs along with the appropriate project estimating contingencies for all the facilities required to bring the Project into production, as defined by this Study. All equipment and material are assumed to be new. The labour rate build up is based on the statutory laws governing benefits to workers in effect in Brazil at the time of the estimate. Brazilian import tariffs have been applied. The estimate does not include any allowances for escalation, exchange rate fluctuations or project risks. The execution strategy is based on an engineering, procurement and construction management (EPCM) implementation approach and horizontal (discipline based) construction contract packaging. The capital cost estimate has a predicted accuracy of ±15%.

The Phase 1 capital cost for the Project is $263,737,595 expressed in 4th quarter 2014 price levels exclusive of duties and taxes.

The major expenditures in the sustaining capital include the expansion of the process plant, procure / replacement of the mine fleet, raising of the TMF dams and closure / environmental rehabilitation costs.

The total sustaining capital cost, not including closure cost or salvage value, for the Project during the production years 1 to 18 is $166,005,135 expressed in 4th quarter 2014 price levels excluding duties / taxes.

This capital cost estimate reflects the joint efforts of Lycopodium Minerals Canada, Belo Sun and specialist consultants retained by Belo Sun - AGP, VOGBR and Dalben. Lycopodium was responsible for compiling the submitted data into the overall estimate but did not review or validate the inputs from Belo Sun or its other consultants.

The Project operating cost has been based on actual pricing and build-up of staff compliment to support the operations. The estimates for Process, Mining and G&A have been developed with good operational rigor including pre-operational Owner related cost. Table 25-1 provides a summary of the life-of-mine (LOM) operating cost costs for the Project for Phases 1 and 2 combined.

Table 25-1: LOM Project Operating Costs

Area	$/t Ore	$/oz
Mining	10.62	350
Process	7.26	240
G&A	0.84	28
Total	18.72	618

In the economic analysis, the compilation of the operating, sustaining, capital, taxes, royalties and other associated costs reflects the mine development and operating scenario as an owner operated facility.

Summary economic parameters for the Project are included in Table 25-2.

Table 25-2: Project Summary Economic Parameters

Summary Criteria		
Phase 1 Throughput	3.5 Mt/a	
Phase 2 Throughput	7 Mt/a	
Average Annual Gold Production	205,155 oz/a	
Mine Life	17.2 years	
Discount Rate	5%	
Gold Price	$1,200/oz	
Results	**After Tax**	**Before Tax**
Initial Capital Costs	$298 M	$264 M
Expansion Costs	$63 M	$55 M
Sustaining Costs	$125 M	$111 M
LOM Cash Cost	$618 oz/a	$618 oz/a
All-In-Sustaining Cost (AISC)	$779 oz/a	
Net Present Value (NPV)	$665 M	$942 M
Internal rate of Return (IRR)	26%	37%
Payback	3.9 years	2.9 years

Based on the results of the Study, the Project is financially viable and should advance to the execution phase.

26.0 RECOMMENDATIONS

26.1 General

Based on the results of the Study, it is recommended that Belo Sun proceed with basic engineering for the Project together with some additional investigations and studies leading to a project execution decision. The recommendations and associated budget, shown in Table 26-1, are described in the sub-sections that follow.

Table 26-1: Project Development Budget

Activity	Estimated Cost $
Basic Engineering	4,800,000
Test Work	200,000
Exploration	8,700,000
Geotechnical Investigations	1,000,000
Environmental / Community Programs	300,000
Total	15,000,000

26.2 Geology

SRK has recommended a work program that includes structural geology investigations, infill and delineation drilling and geology and mineral resource modelling. The aim of the structural geology investigations is to study the controls on the distribution of the higher grade (HG) gold mineralization in the Ouro Verde area primarily from archived core with the aim of determining the timing of gold mineralization and attendant hydrothermal alteration relative to regional deformation, the kinematics of controlling structures and the preferential orientation and distribution of higher grade gold mineralization. Further, the aim of the study should be to understand the distribution and kinematic of late structures and their impact on the geometry of the auriferous zones. Infill and step-out drilling is recommended to improve the delineation of gold mineralization in the Junction and Greia areas where controls of gold mineralization are particularly poorly understood compared to other areas of the Volta Grande project. Geology and mineral resource modelling efforts should focus on improving the delineation of the high grade domains in Ouro Verde and Grota Seca, on improving the delineation of resources in the Greia area, and on refining the medium grade (MG) domains based on knowledge gained from the structural investigation. Furthermore, additional core drilling is recommended in the South Block to increase confidence in the continuity of mineralization and to attempt to increase resources in this area.

The proposed work program comprises four components:

- Structural geology investigations to study the controls on the distribution of the higher grade gold mineralization throughout the deposits;
- Infill and step-out drilling to improve the delineation of gold mineralization in the Junction and Greia areas;
- Geology and mineral resource modelling focusing on the HG domains and redefinition of MG domains;
- Infill and step-out drilling with the potential to improve size and confidence of the mineral resources in the South Block.

SRK is of the opinion that a better understanding of the controls on the distribution of the higher grade auriferous veins is required to improve the confidence in the lateral continuity of the gold mineralization throughout the Volta Grande gold deposit. The continuity of the gold mineralization in the Junction and Greia areas is also poorly understood. It is expected that the confidence in the continuity of the gold mineralization in the Junction and Greia areas will also benefit from the proposed field structural geology study. The proposed work program includes field investigations and subsequent geological modelling.

Borehole density is relatively high in the main areas of the Ouro Verde and Grota Seca deposits; however, the geology and resource model would benefit from additional core drilling in the Junction and Greia areas. The design of the drilling program should consider the results of the proposed structural geology study. SRK considers that additional drilling is warranted to:

- Infill the Junction area to improve the confidence in the mineralization model;
- Infill gaps within and to the west of the Greia area with the potential to improve classification and expand mineral resources.

The gold mineralization in the Junction area has been tested at a wider drilling spacing. The gold mineralization in this area exhibit an apparent shift in orientation, possibly caused by lack of data and causing uncertainty in the confidence of the geological interpretation. SRK considers that approximately 10,000 m of core drilling is required to tighten the borehole spacing and improve the confidence in the continuity of gold mineralization in the Junction area.

The Greia area currently represents a relatively small portion of the Volta Grande mineral inventory. SRK believes that additional core drilling in the Grea area has the potential to expand the extent of the gold mineralization and increase mineral resources. SRK considers that approximately 10,000 metres of step-out and infill core drilling should target the Greia area.

The layout of the proposed drilling at Junction and Greia should integrate the findings of the proposed structural geology study. Finally at the conclusion of the proposed drilling program, the geological model should be revised with the view of improving the delineation of the grade domains considered for resource modelling with a particular emphasis on the MG and HG domains at Ouro Verde, Grota Seca, Junction and the Greia area.

The South Block currently represents a relatively small portion of the Volta Grande mineral resources. SRK believes that additional drilling has the potential to extend the areas of gold mineralization with positive impact on the mineral resources in this the South Block. SRK considers that approximately 15,000 m of step-out and infill core drilling should target the South Block area.

The cost of the recommended work program is estimated at approximately $8.7 million dollars and comprises approximately $5.1 million dollars and approximately $3.6 million dollars for work recommended in the North Block and South Block, respectively.

26.3 Site Investigations

Additional geotechnical investigations are required around the process plant, primary crusher and mine services area for the purposes of confirming design criteria for earthworks and foundations and for optimizing technical solutions and costs.

The investigations will comprise boreholes, in-situ tests, sampling and laboratory tests.

26.4 Metallurgy

To complement the results of the Study, additional metallurgical characterization and test work of the Ouro Verde and Grota Seca deposits is recommended as follows:

- Additional continuous cyanide detoxification testing by the SO_2 / air process to verify residence time and reagent requirements and to clarify the circuit configuration;
- Additional investigation of Phase 2 pre-leach thickener operation;
- Additional rheology testing with increasing amounts of saprolite mixed with the Ouro Verde and Grota Seca rock;
- Material flow property testing of the Ouro Verde and Grota Seca rock with saprolite;
- Detailed final tailings characterization including multi element scan by ICP.

26.5 Site Infrastructure

It is recommended that future engineering and design work include:

- Finalization of project design criteria and operating parameters in line with latest metallurgical test work data;
- The water balance updated for the Study should be further refined. The updated balance should take into account seasonal variability within the water management pond and the TMF. Water losses due to infiltration into the subsurface under the WMF and the TMF should also be included. The water balance should also include storage stage curves of the TMF and surface ponds to confirm their capacity to handle storm events;

- Finalization of user requirements for all ancillary facilities to enable final design criteria to be developed;
- Preparation of detailed material take-offs for all disciplines;
- A detailed logistics study including on and off-shore shipping;
- Constructability reviews with the intention of finalizing requirements for lay-down and contractor areas and camp requirements leading to the further refinement of the construction schedule.

26.6 Tailings and Waste Disposal

The following investigations are required as part of basic engineering to confirm the TMF design parameters:

- Validation of the geological-geotechnical conditions, strength parameters and tailings characteristics (especially density, void ratio and acidity);
- The production plan should be validated to confirm storage volume requirements;
- A water quality model should be developed to accompany the site wide water balance to predict the quality of waters in the sedimentation ponds and in the TMF;
- A contaminant transport model should be developed to further evaluate the potential for impacts from the TMF and impacts to area receptors.

26.7 Capital and Operating Costs

Project viability is sensitive to capital and operating costs. It is recommended that during the next phase of the Project these costs be further developed and refined. Key aspects for further analyses include:

- Competitive bidding, evaluation and selection of an EPCM contractor;
- Engagement with fuel suppliers to finalize costs for supply and on-site storage and distribution of fuel;
- Engagement with contractors for more detailed construction rates including productivities, labour rates, indirect costs and mark-ups;
- Engagement with suppliers of reagents for more detailed pricing for long term supply of reagents;
- Labour study of the Project area to address medium term impact on construction and longer term impact on operations;
- Solicitation of firm pricing for major Project components (process equipment, mining fleet and infrastructure;
- Development of a control budget to an accuracy of ±10% including all direct and indirect costs components of the Project.

26.8 Environmental

ERM recommended that Belo Sun continue with the following environmental / socio community initiatives:

- Emphasis should be placed on addressing the requirements of the LP in order take into consideration the potential impact that changes in mine design since submission of the EIA;
- It is recommended that IFC Performance Standards and World Bank Environmental, Health and Safety Guidelines continue to be used as a benchmarking tool;
- An updated gap assessment is recommended to assess the current level of alignment of the Project as defined by the Study and to provide input into planning for the next stages of Study;
- Additional surveys should be completed to confirm the taxonomy and habitat requirements for the new to science species documented during the EIA studies along with additional surveys for the known endangered species and other species of conservation interest in the biodiversity monitoring programs;
- Further studies regarding ARD / ML are required to confirm that risk is low and no further mitigation required;
- Gaps in tailings characterization, site characterization and facility design have also been identified by the ITRB which will need to be filled to confirm the level of environmental risk is acceptable;
- Benefits, risks and impacts to communities adjacent to the Project will need to be reassessed in light of changes to the mine plan since completion of the EIA. Updated resettlement plans will need to be finalized and disclosed to all neighbouring communities as part of a consultation program;
- The establishment of more detailed management and monitoring programs will need to be developed during the next stage of Project planning;
- Further planning and costing is required to support future stages of the Project and validate the assumptions made in the Study. Emphasis should be placed on the Closure and Reclamation Plan (C&RP).

27.0 REFERENCES

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AGP 2014: Couture, J.F., Jones, L., Leuangthong, O., Taylor, J., Weiershäuser, L. And Zurowski, G., 2014: Volta Grande Projct, Pará, Brazil, Preliminary Economic Assessment, NI43-101, AGP Mining Consultants Inc., 31 March 2014.

28.0 CERTIFICATE OF AUTHORS

28.1 Mr. Derek Chubb, P. Eng.

I, Derek Christopher Chubb, P. Eng., of Toronto, Canada, as a QP of this technical report titled “Feasibility Study, NI 43-101 Volta Grande Project, Pará, Brazil” with an effective date of March 30, 2015 (the “Technical Report”) do hereby certify the following statements:

I am a Senior Partner with Environmental Resources Management Inc. (ERM), with a business address at Toronto, Ontario.

- I have graduated from McMaster University with a Bachelor of Chemical Engineering. I am a member in good standing of the Professional Engineers Ontario (PEO), Registration # 90328121.
- I have practiced my profession in the field of environmental management continuously since 1992.
- I have read the definition of “qualified person” set out in National Instrument43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purpose of NI 43-101.
- My relevant experience includes the preparation of Technical Reports on base and precious metal deposits over the last seven years.
- I have conducted a site visit of the property.
- I am responsible for authoring Sections 1.20, 20, 25.8 and 26.8 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Toronto, Ontario.

“Original Document Signed and Sealed”

Derek Chubb, P. Eng.

28.2 Mr. Aron Cleugh, P. Eng.

I, Aron Cleugh, P. Eng., of Mississauga, Ontario, as a QP of this technical report titled “Feasibility Study on Volta Grande Project, Pará, Brazil, NI 43-101 Technical Report” with an effective date of 8 May 2015 (the “Technical Report”) do hereby certify the following statements:

- I am a Lead Metallurgist at Orway Mineral Consultants Canada Ltd. (a Lycopodium subsidiary), with a business address at 5060 Spectrum Way Mississauga, Ontario, Canada L4W 5N5.
- I graduated from the University of Toronto with a Bachelor of Applied Science degree in Metallurgy and Materials Engineering in 2000. I have practiced my profession in the mining industry continuously since graduation. My relevant experience includes the metallurgical design and operation of base and precious metal recovery plants.
- I am a member in good standing of the Association of Professional Engineers of Ontario, Registration # 100186066.
- I have read the definition of “qualified person” set out in National Instrument 43-101 (NI 43-101 or the Instrument) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements of a “qualified person” for the purposes of NI 43-101.
- I have not had prior involvement with the project that is the subject of this Technical Report.
- I have not visited the Property, and I have not witnessed the metallurgical test work that is the subject of this Technical Report.
- I am responsible for authoring Sections 1.13, 1.17, 13, 17, 21.2.2, 25.4 and 26.4 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read National Instrument 43-101 and Form 43-101F1, and the sections of the Technical Report for which I am responsible have been prepared in compliance therewith.
- As of the effective date of the 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.

Signed and dated this 8th day of May 2015, at Mississauga, Ontario.

“Original Document Signed and Sealed”

Aron Cleugh, P. Eng.

28.3 Dr. Jean-Francois Couture, PhD, P. Geo.

I, Jean-François Couture, PhD, P.Geo., of Toronto, Ontario, as a QP of this technical report titled "Feasibility Study on Volta Grande Project, Pará, Brazil, NI 43-101 Technical Report" with an effective date of 8 May 2015 (the "Technical Report") do hereby certify the following statements:

- I am a Corporate Consultant (Geology) with SRK Consulting (Canada) Inc., with a business address at Suite 1300, 151 Yonge Street, Toronto, Ontario, M5C 2W7.
- I am a graduate of the Université Laval in in Québec City with a BSc in Geology in 1982. I am a graduate of the Université du Québec à Chicoutimi in 1986 and 1994 with an MScA in Earth Sciences and a PhD in Mineral Resources, respectively.
- I am a member in good standing of the Association of Professional Geoscientists of Ontario, Registration #0197 and l'Ordre des Géologues du Québec, Registration OGQ#1106.
- I have practiced my profession in the mining industry continuously since 1982.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience includes the design and execution of exploration programs for base and precious metal deposits, the research of base and precious metals deposits, and the completion of several independent technical reports on base and precious metals exploration and mining projects worldwide.
- I have not conducted a site visit of the property.
- I am responsible for authoring Sections 1.4 to 1.12, 1.14, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 23, 25.2 and 26.2 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Toronto, Ontario.

"Original Document Signed and Sealed"

Jean-François Couture, PhD, P. Geo.

28.4 Mr. Paulo Franca, AusIMM

I, Paulo Ricardo Behrens da Franca, Civil and Geological Engineer, of Brazil, as a QP of this technical report titled “Feasibility Study, NI 43-101 Volta Grande Project, Pará, Brazil” with an effective date of 8 May 2015 (the “Technical Report”) do hereby certify the following statements:

- I am a Consultant with VOGBR Recursos Hídricos & Geotecnia Ltda, with a business address at Rua Barão Homem de Melo, 4554, 8° andar, Belo Horizonte, Minas Gerais, Brasil.
- I have graduated from the the Universidade Federal de Ouro Preto (Brazil) and hold a Geological Engineer title (1986), a graduate of the Escola de Engenharia Kennedy (Brazil) and hold a Civil Engineer title (1989). I also hold a Master of Science degree in Mining Engineering, from Queen´s University (Canada), obtained in 1995.
- I am a member in good standing of Australasian Institute of Mining and Metallurgy (AusIMM) Registration # 311775. I also hold an AusIMM Chartered Professional Accreditation under the Discipline of Geotechnics.
- I have practiced my profession in the mining industry continuously since 1986.
- I have read the definition of “qualified person” set out in National Instrument43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purpose of NI 43-101.
- My relevant experience includes the preparation of Technical Reports on base and precious metal deposits over the last seven years.
- I have conducted a site visit of the property.
- I am responsible for authoring Sections 18.8, 18.9, 25.6, 26.3 and 26.6 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Belo Horizonte, MG, Brasil.

“Original Document Signed and Sealed”

Paulo Franca, AusIMM.

28.5 Mr. Stefan Gueorguiev, P. Eng.

I, Stefan Gueorgiuiev, P.Eng, of Mississauga, Ontario, as a QP of this technical report titled “Feasibility Study on Volta Grande Project, Pará, Brazil, NI 43-101 Technical Report” with an effective date of 8 May 2015 (the “Technical Report”) do hereby certify the following statements:

- I am currently employed as a Senior Project Manager in the consulting firm Lycopodium Minerals Canada Ltd. located at 5060 Spectrum Way, Mississauga, Ontario, Canada, L4W 5N5.
- This certificate accompanies the report, dated May 8 2015, and titled “Feasibility Study, NI 43 101 Volta Grande Project, Pará, Brazil” (the Technical Report).
- I graduated with a Bachelor of Science degree in Civil / Structural Engineering from the University of Architecture and Civil Engineering, Sofia, Bulgaria in 1991 and a Master of Project Management degree from the Pennsylvania State University, Behrend College, Erie Pennsylvania in 2010.
- I am in good standing as a member of the Professional Engineers of Ontario (#90417163), the Association of Professional Engineers and Geoscientists of Alberta (#92555), and the Association of Professional Engineers and Geoscientists of Saskatchewan (#31311).
- I have practiced my profession continuously since my graduation. My relevant experience includes consulting and managing mining projects in various stages of the execution cycle from scoping, pre-feasibility and feasibility studies through detailed design, construction, and commissioning. I have been involved in gold, iron ore, diamond, and tar sands mining projects in North America, South America, Europe, and West Africa.
- I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
- My relevant experience includes the preparation of Technical Reports on base and precious metal deposits over the last seven years.
- I am independent of the Issuer and related companies applying all of the tests in section 1.5 of National Instrument 43-101.
- I am responsible for authoring Sections 1 (part), 2, 3, 18.1 to 18.7, 18.10, 18.12 to 18.17, 21.1, 24, 25 (part), 26 (part) and 27 of this Technical Report.
- I have not visited the Volta Grande Project site.
- As of the date of the certificate, to the best of my knowledge, information and belief, the Technical Report contains the necessary scientific and technical information to make the Technical Report not misleading.

Signed and dated this 8th day of May 2015, at Mississauga, Ontario.

“Original Document Signed and Sealed”

Stefan Gueorguiev, P. Eng.

28.6 Dr. Oy Leuangthong, Ph.D, P.Eng.

I, Oy Leuangthong, Ph.D, P.Eng, of Toronto, Ontario, as a QP of this technical report titled "Feasibility Study on Volta Grande Project, Pará, Brazil, NI 43-101 Technical Report" with an effective date of 8 May 2015 (the "Technical Report") do hereby certify the following statements:

- I am a Principal Consultant (Geostatistics) with SRK Consulting (Canada) Inc., with a business address at Suite 1300, 151 Yonge Street, Toronto, Ontario, M5C 2W7.
- I have graduated from the University of Toronto with B.A.Sc. (Honours) in Civil Engineering in 1998. I am a graduate of the University of Alberta in 2003 with a PhD in Mining Engineering.
- I am a member in good standing of the Professional Engineers of Ontario, Registration #90563867.
- I have practiced my profession in the mining industry continuously since 2003.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience includes research in resource modelling and geostatistics, teaching activities in mine planning, resource estimation and advanced geostatistics, and since 2010 geostatistical support and modelling for exploration projects in the Americas, Australia, and West Africa
- I have not conducted a site visit of the property.
- I am responsible for authoring Sections 1.14, 14, 25.2 and 26.2 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Toronto, Ontario.

"Original Document Signed and Sealed"

Oy Leuangthong, Ph.D, P.Eng.

28.7 Mr. Alexandre Luz, AusIMM

I, Alexandre Luz, Mechanical Engineer, of Alameda Casa Branca, 749, Ap12, São Paulo, SP, Brasil, CEP: 01408-001, as a QP of this technical report titled "Feasibility Study, NI 43-101 Volta Grande Project, Pará, Brazil" with an effective date of 8 May 2015 (the "Technical Report") do hereby certify the following statements:

- I am a Director with L&M Assessoria Empresarial (www.lmadvisory.com), with a business address at Rua Montevidéu, 285/701, Belo Horizonte, MG, Brasil, CEP 30315-560.
- I have graduated from the Mackenzie University. I am a member in good standing of the Association of Professional: The Australasian Institute of Mining and Metallurgy, AusIMM, Registration 316588.
- I have practiced my profession in the mining industry continuously since 1999.
- I have read the definition of "qualified person" set out in National Instrument43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience includes the preparation of Technical Reports on base and precious metal deposits over the last seven years.
- I have conducted a site visit of the property.
- I am responsible for authoring Sections 1.19, 1.21, 1.22, 19, 21 (part), 22, 25.7, 25.9 and 26.1 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Belo Horizonte, MG, Brasil.

"Original Document Signed and Sealed"

Alexandre Luz, AusIMM.

28.8 Mr. George Wahl, P. Geo.

I, George H Wahl, P Geo., of Courtenay, British Columbia, as a QP of this technical report titled "Feasibility Study, NI 43-101 Volta Grande Project, Pará, Brazil" with an effective date of 8 May 2015 (the "Technical Report") do hereby certify the following statements:

- I am a principal consultant with 3660788 Canada Inc, with a business address at 2434 Seabank Road, Courtenay, British Columbia.
- I have graduated from the University of Waterloo and Western University. I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia, Registration #41229.
- I have practiced my profession in the mining industry continuously since 1985.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience includes the preparation of Technical Reports on base and precious metal deposits over the last twenty five years.
- I have conducted a site visit of the property.
- I am responsible for authoring Section 13.2.3 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Courtenay, British Columbia.

"Original Document Signed and Sealed"

George Wahl, P. Geo.

28.9 Dr. Lars Weiershäuser, Ph.D, P.Geo.

I, Lars Weiershäuser, Ph.D, P.Geo, of Toronto, Ontario, as a QP of this technical report titled "Feasibility Study on Volta Grande Project, Pará, Brazil, NI 43-101 Technical Report," with an effective date of 8 May 2015 (the "Technical Report") do hereby certify the following statements:

- I am a Senior Consultant (Geology) with SRK Consulting (Canada) Inc., with a business address at Suite 1300, 151 Yonge Street, Toronto, Ontario, M5C 2W7.
- I graduated from the South Dakota School of Mines and Technology in 2000, with a MSc in Geology. I obtained a PhD in Geology, from the University of Toronto in 2005.
- I am a member in good standing of the Association of Professional Geoscientists of Ontario, Registration #1504.
- I have practiced my profession in the mining industry continuously since 2000.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience includes the preparation of Technical Reports on base and precious metal deposits over the last seven years.
- I have conducted a site visit of the property.
- I am responsible for authoring Sections 1.4 to 1.12, 4, 5, 6, 7, 8, 9, 10, 11, 12, 23, 25.2, and 26.2 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May 2015, at Toronto, Ontario.

"Original Document Signed and Sealed"

Lars Weiershäuser, Ph.D, P.Geo.

28.10 Mr. Gordon Zurowski, P. Eng.

I, Gordon Zurowski, P.Eng of Stouffville, Ontario, as a QP of this technical report titled "Feasibility Study, NI 43-101 Volta Grande Project, Pará, Brazil" with an effective date of the 8th of May 2015 (the "Technical Report") do hereby certify the following statements:

- I am a Principal Mining Engineer with AGP Mining Consultants Inc. with a business address at 132 Commerce Park Dr., Unit K, Suite 246, Barrie, Ontario, L4N 0Z7.
- I am a graduate of the University of Saskatchewan, B.Sc. Geological Engineering, 1989.
- I am a member in good standing of the Association of Professional Engineers of Ontario, Registration #100077750.
- I have practiced my profession in the mining industry continuously since graduation.
- I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101 or the Instrument) and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purpose of NI 43-101.
- My relevant experience includes the design and evaluation of open pit mines for over 20 years.
- I conducted a site visit of the property October 21-23, 2012.
- I am responsible for authoring Sections 1.15, 1.16, 15, 16, 18.9, 21.2.1, 25.3 of this Technical Report.
- I am independent of the issuer as defined by Section 1.5 of the Instrument.
- I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- As of the effective date of the Technical Report, to 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.

Signed and dated this 8th day of May, 2015, at Stouffville, Ontario

"Original Document Signed and Sealed"

Gordon Zurowski, P. Eng.

APPENDIX A – LEGAL TITLE OPINION

Belo Horizonte, December 7th, 2012.

To:

BELO SUN MINERAÇÃO LTDA.

Mr. Mark Eaton
meaton@belosun.com

Mr. Helio Diniz
hdiniz@forbesmanhattan.com.br

Mr. Carlos Cravo
ccosta@forbesmanhattan.com.br

(*via e-mail, only*)

RE: TITLE OPINION OF BELO SUN MINERAÇÃO LTDA. - VOLTA GRANDE PROJECT

Dear Sirs/Madames:

In our capacity of Brazilian counsel to Belo Sun Mining Corp. ("**BELO SUN CORP.**"), we are hereby providing this legal opinion to you, as to title of BELO SUN CORP.'s Brazilian subsidiary BELO SUN MINERAÇÃO LTDA. ("**BELO SUN**" or the "**Company**") to gold and copper mineral rights located in the State of Pará, Brazil, in the region called *Volta Grande do Xingu* (the "**Volta Grande Project**").

It is important to highlight that BELO SUN holds other mining properties which are not related to the Volta Grande Project and, thus, are not covered in this legal opinion.

This opinion exclusively analyzes the regulatory mining aspects concerning the Mineral Rights referred to in item 1.1.1 bellow. The scope of this opinion does not address any other analysis concerning the Mineral Rights, including as to technical, commercial or financial aspects. Moreover, we did not express any opinion concerning the regularity of any company nor issues related to social, corporate, contract, labor, tax or other legal aspects.

Note that our opinion is based on the veracity and validity of all information and documents provided by BELO SUN. Furthermore, this opinion speaks only as of its date.

For the purpose of this letter, we have examined only the specific documents and files which are expressly referenced herein and the Mining Register (*Cadastro Mineiro*) released by the Brazilian Mining Regulatory Authority (the "**DNPM**" - *Departamento Nacional de Produção Mineral*) for public consultation on its website.

We have not examined any clearance certificates, whether issued by the DNPM or by any other public authority including judicial authority. Moreover, we have not accessed the Mineral Rights process files at DNPM.

This opinion may not be used or relied upon by, or published or communicated to, any person other than the addressees hereto for any purpose whatsoever without our prior written consent in each instance, except that a copy of this opinion may be furnished without our prior written consent to any (i) of your successors, (ii) of your legal advisors, and (iii) legislative, administrative, regulatory or judicial body.

Finally, and regarding the generality of the foregoing, this opinion is given only in relation to matters covered by Brazilian law currently in force, taking into account, whenever applicable, the most recent understanding of the relevant authorities, doctrine and precedents, and we do not purport to express any opinion in relation to matters subject to the laws of any other jurisdiction.

I. TITLE

1.1. Mineral Rights

1.1.1 For the purpose of this opinion, we have examined the mineral rights represented by the DNPM's files number listed on the chart below (the "**Mineral Rights**"), which we understand are the titles that comprise the Volta Grande Project:

#	Mineral Right DNPM #	Location. City or District of Pará State	Mineral	Area (ha)	Process Phase/Status	Title Holder	Expiration date	Note
1.	850.214/2004	Altamira and Vitória do Xingu	Gold	696.60	Public Tender	N/A	N/A	On December, 22, 2006, BELO SUN has applied for an exploration permit in the public tender process. No decision from the DNPM has been received to date. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Application, including in public tenders. Applicants will have priority over the mineral right area according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force. According to the Company's management, BELO SUN is the only applicant in the public tender process, for this reason, it is likely that the Company shall become the new titleholder of such mineral right.
2.	850.092/2001	Anapu and Senador José Porfírio	Gold and Copper	1,000.01	Public Tender	N/A	N/A	On March, 28, 2011, BELO SUN has applied for an exploration permit in the public tender process. No decision from the DNPM has been received to date. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Application, including in public tenders. Applicants will have priority over the mineral right area according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force. According to the Company's management, BELO SUN is the only applicant in the public tender process, for this reason, it is likely that the Company shall become the new titleholder of such mineral right.
3.	850.632/2008	Pacajá	Gold	2,088.17	Public Tender	N/A	N/A	On May, 31[t], 2012, BELO SUN has applied for the exploration permit in

#	Mineral Right DNPM #	Location. City or District of Pará State	Mineral	Area (ha)	Process Phase/Status	Title Holder	Expiration date	Note
4.	850.633/2008	Pacajá	Gold	1.72	Public Tender	**N/A**	N/A	the public tender process. No decision from the DNPM has been received to date. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Application, including in public tenders. Applicants will have priority over the mineral right area according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force.
5.	850.633/2008 "A"	Pacajá	Gold	2,168.26	Public Tender	**N/A**	N/A	
6.	850.635/2008	Pacajá	Gold	3,598.74	Public Tender	**N/A**	N/A	
7.	850.636/2008	Pacajá	Gold	7,007.65	Public Tender	**N/A**	N/A	
8.	850.637/2008	Pacajá	Gold	9,007.66	Public Tender	**N/A**	N/A	
9.	850.639/2008	Pacajá	Gold	7,091.39	Public Tender	**N/A**	N/A	
10.	850.313/2010	Senador José Porfírio and Vitória do Xingu	Gold	1,359.04	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on April 22, 2010. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Permit Application such titleholder priority right shall be valid and in force.
11.	850.013/2011	Anapu and Pacajá	Gold	8,139.23	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on January 13, 2011. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force.
12.	851.668/2011	Senador José Porfírio	Gold	10,38	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on December 9, 2011. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force.

#	Mineral Right DNPM #	Location. City or District of Pará State	Mineral	Area (ha)	Process Phase/Status	Title Holder	Expiration date	Note
13.	850.265/2012	Anapú and Senador José Porfírio	Gold	5,081.59	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on March 20, 2012. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force.
14.	850.266/2012	Senador José Porfírio	Gold	283,92	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on March 20, 2012. On November 08, 2012, the DNPM rejected BELO SUN's application. On November 12, 2012, BELO SUN submitted to DNPM the proper appeal (reconsideration request) which is pending DNPM's decision.
15.	850.624/2012	Senador José Porfírio	Gold	25.12	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on June, 11, 2012. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Application such titleholder priority right shall be valid and in force.
16.	850.625/2012	Senador José Porfírio	Gold	145.97	Exploration Permit Application	**BELO SUN**	N/A	
17.	850.626/2012	Anapú	Gold	109.48	Exploration Permit Application	**BELO SUN**	N/A	
18.	850.692/2011	Anapú and Senador José Porfírio	Gold	1,284.54	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on June 16, 2011. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Permit Application such titleholder priority right shall be valid and in force.
19.	850.693/2011	Anapú and Senador José Porfírio	Gold	8,656.74	Exploration Permit Application	**BELO SUN**	N/A	
20.	850.694/2011	Senador José Porfírio	Gold	8,070.12	Exploration Permit Application	**BELO SUN**	N/A	
21.	850.695/2011	Anapú and Senador José Porfírio	Gold	2,992.62	Exploration Permit Application	**BELO SUN**	N/A	
22.	850.703/2011	Anapú	Gold	7,649.94	Exploration Permit Application	**BELO SUN**	N/A	

#	Mineral Right DNPM #	Location. City or District of Pará State	Mineral	Area (ha)	Process Phase/Status	Title Holder	Expiration date	Note
23.	851.220/2012	Senador José Porfírio	Gold	565,32	Exploration Permit Application	**BELO SUN**	N/A	Exploration Permit Application submitted to DNPM by BELO SUN on November 12, 2012. DNPM's approval is pending. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the Exploration Permit Application. Applicants will have priority over the mineral right area in a "first come first served" basis according to the date their application was submitted and until the DNPM's decision over the Exploration Permit Application such titleholder priority right shall be valid and in force.
24.	850.249/2001	Altamira	Gold	1,730.86	Exploration Permit	**BELO SUN**	February 5, 2012	On November 21, 2011, BELO SUN requested the extension of the Exploration Permit for a 3 (three) year term. The request is under DNPM's analysis. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the extension requests. During the period of analysis of the request by the DNPM, the mineral right remains fully valid and in force even though the Exploration Permit's term has expired.
25.	850.439/2008	Senador José Porfírio	Gold	324.98	Exploration Permit	**BELO SUN**	April 15, 2012	On January 24, 2012, BELO SUN requested the extension of the Exploration Permit for a 3 (three) year term. The request is under DNPM's analysis. The Brazilian Mining Code does not define a time frame for the DNPM to analyze and approve the extension requests. During the period of analysis of the request by the DNPM, the mineral right remains fully valid and in force even though the Exploration Permit's term has expired.
26.	850.312/2010	Altamira and Senador José Porfírio	Gold	9,884.05	Exploration Permit	**BELO SUN**	December, 30, 2013	The Exploration Permit was granted to BELO SUN by the DNPM on December 30, 2010.
27.	850.311/2010	Altamira and Senador José Porfírio	Gold	7,731.66	Exploration Permit	**BELO SUN**	June 21, 2014	The Exploration Permit concerning these mineral rights were granted to BELO SUN by the DNPM on June 21, 2011.
28.	850.315/2010	Senador José Porfírio	Gold	8,750.81	Exploration Permit	**BELO SUN**	June 21, 2014	
29.	850.316/2010	Senador José Porfírio	Gold	3,114.04	Exploration Permit	**BELO SUN**	June 21, 2014	
30.	850.507/2011	Senador José Porfírio	Gold	311.99	Exploration Permit	**BELO SUN**	June 28, 2014	The Exploration Permit was granted to BELO SUN by the DNPM on June 28, 2011.

#	Mineral Right DNPM #	Location. City or District of Pará State	Mineral	Area (ha)	Process Phase/Status	Title Holder	Expiration date	Note
31.	850.253/2001	Senador José Porfírio	Gold	481.83	Exploration Permit	**OCA MINERAÇÃO LTDA.**	June 28, 2014	The Exploration Permit was granted to Oca Mineração Ltda. ("OCA") by the DNPM on June, 28, 2011. OCA is a 100% (one hundred percent) subsidiary of BELO SUN. On July 26, 2011, OCA filed a request before the DNPM applying for the transfer of this mineral right to BELO SUN. The request is under DNPM's analysis. According to Brazilian Mining legislation, in order to be considered lawful and also to have legal effectiveness, the transfers and assignments of mining properties shall be filed before DNPM for approval and register. It is worth emphasizing the risk, even remote, of DNPM's opposition to the transfer. The assignor, or the legal agent, shall continue to be liable for any right or covenant regarding the mining title up to the regular register of the full assignment or transfer. According to the Company's management, the transfer request was properly filled before the DNPM, for this reason, it is likely that BELO SUN shall become the new titleholder of such mineral right. We do not foresee any reason why DNPM may deny the approval for the transfer of this Exploration Permit.
32.	850.696/2011	Anapu	Gold	8,448.89	Exploration Permit	**BELO SUN**	August 5, 2014	The Exploration Permits concerning these mineral rights were granted to BELO SUN by the DNPM on August 05, 2011.
33.	850.697/2011	Anapu	Gold	9,728.63	Exploration Permit	**BELO SUN**	August 5, 2014	
34.	850.698/2011	Anapu	Gold	7,937.24	Exploration Permit	**BELO SUN**	August 5, 2014	
35.	850.699/2011	Anapu and Senador José Porfírio	Gold	7,995.43	Exploration Permit	**BELO SUN**	August 5, 2014	
36.	850.700/2011	Anapu and Pacajá	Gold	9,246.10	Exploration Permit	**BELO SUN**	August 5, 2014	
37.	850.701/2011	Anapu	Gold	9,900.00	Exploration Permit	**BELO SUN**	August 5, 2014	
38.	850.702/2011	Anapu and Senador José Porfírio	Gold	8,358.97	Exploration Permit	**BELO SUN**	August 5, 2014	
39.	850.314/2010	Senador José Porfírio	Gold	1,654.62	Exploration Permit	**BELO SUN**	October 3, 2014	The Exploration Permit concerning this mineral right was granted to BELO SUN by the DNPM on October 3, 2011.

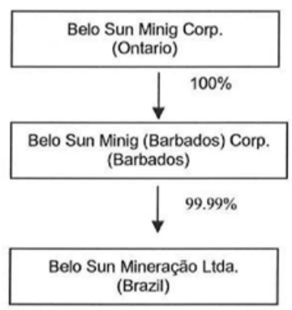
#	Mineral Right DNPM #	Location. City or District of Pará State	Mineral	Area (ha)	Process Phase/Status	Title Holder	Expiration date	Note
40.	850.250/2001	Altamira and Senador José Porfírio	Gold	1,256.96	Exploration Permit	**BELO SUN**	July, 5, 2014	The extension of the Exploration Permits was granted by the DNPM on July, 5, 2011.
41.	850.977/2006	Altamira	Gold	2,311.62	Exploration Permit	**BELO SUN**	July, 5, 2014	
42.	805.657/1976	Senador José Porfírio	Gold	522.02	Mining Concession Application	**BELO SUN**	N/A	On December 05, 2012, BELO SUN timely applied for the mining concession related to these mineral rights. No decision from the DNPM has been received to date. The Brazilian Mining Code does not define a time frame for the DNPM to analyze the application and grant the mining concession. However, no exploitation activity shall be performed by BELO SUN in such areas prior to DNPM's approval and issuance of the respective mining concession. Also, in order to execute exploitation activities BELO SUN must obtain the proper environmental licenses before SEMA as referred to in item 1.3.14 below. Note that, according to the Company's management, the areas comprised by the Mining Concession Applications #805.657/1976, 805.658/1976, 805.659/1976 and 812.559/1976 contain 100% (one hundred per cent) of the geological resources concerning the Volta Grande Project defined to date.
43.	805.658/1976	Senador José Porfírio	Gold	552.02	Mining Concession Application	**BELO SUN**	N/A	
44.	805.659/1976	Senador José Porfírio	Gold	645.07	Mining Concession Application	**BELO SUN**	N/A	
45.	812.559/1976	Senador José Porfírio	Gold	637.30	Mining Concession Application	**BELO SUN**	N/A	

1.2. Corporate Structure

1.2.1. BELO SUN is a limited liability company organized and existing under the laws of Brazil, in the State of Minas Gerais, with its Articles of Association duly registered at the Registry of Companies of the State of Minas Gerais.

1.2.2. The current quotaholders holding all of the registered and issued capital of BELO SUN are: Belo Sun Mining (Barbados) Corp. with 159,999,999 (one hundred fifty nine million, nine hundred ninety nine thousand, nine hundred ninety nine) quotas and Forbes Empreendimentos Minerais Ltda. with 1 (one) quota.

1.2.3. Additionally, it is important to highlight that, according to the Company's management, Belo Sun Mining (Barbados) Corp. is a 100% (one hundred percent) subsidiary of BELO SUN CORP., a Canadian-based mineral exploration company with a portfolio of properties focused on gold projects in Brazil, as presented in the following chart:



1.3. Environmental Aspects

1.3.1. **Environmental Licensing**. The Brazilian Environmental Law sets forth that mining activities such as exploration or drilling activities which involve deforestation or the use of water resources and exploitation activities require specific environmental licenses and thus must be subject to the licensing procedure before the competent authority.

1.3.2. Note that in case of mineral rights which are in application for exploration phase and application in public tender processes, no environmental licenses are required.

1.3.3. According to the Brazilian Environmental regulation the licensing authority is shared by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) and the State environmental agencies, as these entities are part of the

National Environment System (SISNAMA[1]). In the State of Pará the licensing authority is the State Environmental Agency (the "**SEMA**" – Secretaria de Estado de Meio Ambiente). The main directions for the execution of the environmental licensing are set forth by Federal Law #6,938/81, and by CONAMA's Administrative Rule #1/86 and #237/97 (the Environment National Council).

1.3.4. Broadly speaking, environmental licensing is the administrative procedure by which the competent environmental agency licenses the location, installation, operation and expansion of enterprises and activities using environmental resources considered to be potentially or effectively polluting or those that, in some way, may cause environmental deterioration. It is precisely through the licensing process that the environmental authority establishes the conditions, limits and measures for controlling and utilizing natural resources, authorizing the installation and operation of a given enterprise or company.

1.3.5. There are three types of environmental licenses that shall be obtained by mining companies, including BELO SUN, in order to operate:

(i) Preliminary License ("Licença Prévia – LP") – it is required in the preliminary planning phase of the activity/enterprise. In this first phase of the environmental licensing process, the environmental authority evaluates the location and the conception of the enterprise, certifying its environmental feasibility and setting forth the basic requirements which shall be complied with in the phases that follows. Such analysis comprises the examination of the environmental impact study ("**EIA-RIMA**" – "Estudo de Impacto Ambiental" and "Relatório de Impacto Ambiental") prepared by the entrepreneur;

(ii) Installation License ("Licença de Instalação – LI") – it is the second phase of the environmental licensing process, in which the executive projects of pollution control and the compensatory measures are analyzed and approved. This license specifies the obligations of the entrepreneur related to measures aiming at decreasing the environmental impacts of the project with the use of the best applicable technology to prevent and control the pollution. If all its conditions are complied with enterprise, the next step is obtaining the Operation License.

(iii) Operation License ("Licença de Operação – LO") – it is the third and final phase of the environmental licensing process. It authorizes the operation of the company, once verified the effective fulfillment of the conditions of the two previous mandatory licenses, including the environmental control measures and conditions prior to operation.

1.3.6. **BELO SUN's Licenses**. As regards the environmental licensing concerning the Volta Grande Project the Brazilian environmental regulation establish that such

[1] In 1981, Federal Law # 6.938 was enacted, establishing the National Environment Policy, mechanisms for its formulation and application, and also established the National Environment System – *SISNAMA*. This system is composed by all environmental bodies and entities of federal, state and local governments responsible for the protection and improvement of environmental quality.

licensing procedure must be executed before SEMA do to the specifications of the Project and considering the extension of its environmental impacts (Federal Law #6,938/81, article 10 and CONAMA's Administrative Rule, article 5).

1.3.7. In compliance with such regulation, in specific with regards to the rules referred to in item 1.3.3 above (environmental license for exploration activities), BELO SUN has received the Operation License for exploration # 4115/2010 (the "**Operation License**") issued by SEMA on 01.27.2010 to carry out the drilling activities with regards to the Exploration Permits # 805.657/1976, 805.658/1976, 805.659/1976, 812.559/1976, 850.249/2001 and 850.250/2001.

1.3.8. Such Operation License was valid up to January 27, 2012. BELO SUN filed the proper renew request before SEMA on August 8, 2011, within the statutory period required by law. The request is under SEMA's analysis. No decision from SEMA has been received to date. During the period of analysis, the Operation License # 4115/2010 remains fully valid and in force even though it's original term has expired.

1.3.9. Furthermore according to the documents provided by the Company, the renewal application included the request for the respective environmental license to perform drilling activities with regards to the exploration of Mineral Rights # 850.253/2001, 850.439/2008 and 850.507/2011, in addition to Mineral Rights # 805.657/1976, 805.658/1976, 805.659/1976, 812.559/1976, 850.249/2001 and 850.250/2001 – already covered by the Operation License # 4115/2010.

1.3.10. It is worth mentioning that pursuant to the Company's management, the exploration works in the Volta Grande Project at the date hereof have not involved deforestation or the use of water resources in a significant quantity. Thus, no environmental authorization has been required at the Federal level (IBAMA) given that all environmental impacts, including deforestation and usage of water resources, are properly addressed in the licensing procedure held by SEMA and have been comprised in the scope of the Operation License.

1.3.11. As per the terms and conditions of the Operation License, BELO SUN shall: (i) within 60 (sixty) days from the date of its issuance, present a social inclusion proposal providing for the support to social projects connected to precarious social aspects identified in the areas related to the Volta Grande Project; and (ii) within 365 from the date of the operation license issuance, present the annual report of environmental information to SEMA. The Company has duly fulfilled both conditions.

1.3.12. Note that the operation licenses are only valid if the Company complies with the above mentioned technical conditions and with environmental legal provisions. In case of default of such obligations, public authorities may fine the Company. So far, according to the Company's management and based on the documentation provided by BELO SUN, the Company has fulfilled all obligations concerning the environmental licenses and has not received any notifications regarding environmental issues.

1.3.13. As regards to the exploration works of the Mineral Rights # 850.312/2010, 850.311/2010, 850.315/2010, 850.316/2010, 850.696/2011, 850.697/2011, 850.698/2011, 850.699/2011, 850.700/2011, 850.701/2011, 850.702/2011, 850.314/2010, 850.977/2006 and 850.253/2001 since they have not involved drilling activities yet, as informed by Company's management, no operating license has been requested in connection to them. It should also be noted that it is not necessary to hold environmental licenses for the mining rights in the exploration application phase or in the public tender process.

1.3.14. Furthermore, it is important to note that BELO SUN has already requested the Preliminary License before SEMA, necessary for the development of the Project to exploitation activities. On February 27, 2012 the request was filed with SEMA and is under analysis up to date. The Preliminary License requested will be necessary to carry out the exploitation of mineral rights # 805.657/1976, 805.658/1976, 805.659/1976, 812.559/1976 whenever the respective mining concessions are approved and issued by the DNPM. In accordance with CONAMA's Administrative Rule #237/1997 (article 14), SEMA has 1 (one) year from the date of the Preliminary License request to conclude the process analysis, however such term is not mandatory and there are no penalties for SEMA in case it does not comply with it.

1.3.15. Also with regard to the Preliminary License requested by BELO SUN, it is important to mention the public hearing held by SEMA on September 13, 2012. The execution of such public hearing is established by the Federal environmental regulation (*CONAMA's Administrative Rules #01/1986 and #09/1987*) and by the Law #5.887/1995 of the State of Pará. The public hearing is part of the standard preliminary licensing process and involves the analysis of the EIA/RIMA submitted by BELO SUN. Thus, the execution of such public hearing indicates that the environmental licensing procedure has been conducted according to the applicable regulation.

1.3.16. Note that, as required by Law #5.887/1995 (article 103), SEMA invited the officials from both the Federal and the Pará State Public Prosecutor Offices to participate in the public hearing held on September 13, 2012. The formal invitation of the Public Prosecutor Office is mandatory and must be submitted by SEMA at least 45 (forty five) days prior to the public hearing date.

1.3.17. According to the Company's representatives, upon the receipt of such invitation the Federal Public Prosecutor Office initiated an internal administrative process of investigation into the environmental aspects concerning the Volta Grande Project in connection with the licensing process. On September 18, 2012, the Brazilian in-house counsel to BELO SUN, Mr. Mauro Barros, has contacted the Federal Public Prosecutor Office and was advised that the investigation is a standard internal administrative procedure and that in the ordinary course of the investigation process the Federal Public Prosecutor has requested information from the following government agencies: (i) SEMA, requesting the summary report of the EIA-RIMA; (ii) the DNPM, requesting information regarding the mining claims that comprise the

Volta Grande Project; (iii) FUNAI, the public authority concerned with issues relating to indigenous communities, requesting information regarding any matters relating to local indigenous communities that should be considered as part of the environmental licensing process; and (iv) the Brazilian National Institute of the Environment and Renewable Natural Resources (IBAMA), requesting its analysis of the joint impact of the Volta Grande Gold Project and the nearby Belo Monte dam.

1.3.18. Based on the information received from these requests, the Public Prosecutor Office will determine if it has any issues relating to the environmental licensing of the Volta Grande Project. No further decision has been made by the Federal Public Prosecutor Office to date.

1.3.19. Pursuant to the Company's management, the EIA-RIMA concerning the Volta Grande Project addresses the synergy of the impacts of both the Volta Grande Project and the Belo Monte Project and includes an analysis of the aspects related to the indigenous lands located in the region of the Project. Thus, SEMA shall examine the EIA-RIMA to determine if additional studies are required in order to issue the Preliminary License for the Volta Grande Project. The issuance of the Preliminary License should confirm the environmental feasibility of the Volta Grande Project and provide the guidelines for obtaining the Installation License, which is required to develop the Volta Grande Project.

1.3.20. As declared by the Company's representatives SEMA should hold a second public hearing in the Project's local community called "Vila Ressaca". It is important to note that SEMA elected to hold this second hearing in order to fulfill applicable legal requirements and not specifically to answer any request presented by the local community or Public Prosecutors. The second hearing, which was previously scheduled to October 24, 2012, was postponed by SEMA and has not been rescheduled to date.

1.3.21. **Garimpeiros**. Company's management also informed that irregular small-scale miners ("*Garimpeiros*") operate minor mining activities in some areas comprised by the Volta Grande Project. Such mining activities are illegal and the Company has notified and had meetings with the DNPM, the Brazilian Federal Public Prosecutor and the SEMA in order to inform the presence of *Garimpeiros* and also requested the *Garimpeiros* removal from the Mineral Rights' areas, as informed by the Company's representatives.

1.3.22. It should be noted that despite the fact that *Garimpeiros*' activities are illegal, BELO SUN does not have the power to remove the *Garimpeiros* from the Volta Grande Project by its own, since only the competent public authorities are legitimated to do so.

1.3.23. Furthermore, according to Brazilian Environmental Law, the liability for environmental damages does not necessarily require the specific company's default; thus, Public Bodies may claim the BELO SUN's liability for environmental damages eventually caused by *Garimpeiros.* However, considering the fact that BELO SUN has all environmental licenses concerning its activities, has passed through environmental inspections of public bodies and has formally and expressly informed the competent authorities about the presence of *Garimpeiros*, in the event of a claim concerning the environmental liability with regards to *Garimpeiros'* activities on the Mineral Rights' areas, BELO SUN may judicially dispute, although we can not assess the chances of success.

1.3.24. According to the Brazilian law, Public Authorities may also fine defaulting mining companies for noncompliance with technical conditions of environmental permits or for causing environmental damages. Such fines can vary from R$500 to R$50,000,000 according to, among other aspects, the severity of the damages and the conduct and possible relapse of the violator that caused the damage. It should be noted that as to the date hereof, according to Company's management and files, BELO SUN has not received any notice or summons regarding eventual environmental liabilities pursuant to the Volta Grande Project, and, again, considering the fact that BELO SUN has all environmental licenses concerning its activities, has passed through environmental inspections of public bodies and has formally and expressly informed the competent authorities about the presence of *Garimpeiros*, in the event of a claim concerning the environmental liability with regards to *Garimpeiros'* activities on the Mineral Rights' areas, BELO SUN may judicially dispute, although we can not assess the chances of success.

1.4. Regulatory Mining Aspects

1.4.1. Pursuant to the Brazilian Constitution (article 176, first paragraph), the exploitation and use of mineral resources shall occur always under a specific federal authorization or concession and only Brazilian citizens or companies organized under Brazilian laws with headquarters and administrative body located in the country may be entitle to practice such activities and, therefore, explore mining rights in Brazil.

1.4.2. In addition to the Constitution, mining rights in Brazil are also governed by the Decree-Law # 227, of February 28th, 1967 (the "**Mining Code**"), the Decree # 62.943, of June 2nd, 1968 and further rules enacted by the DNPM, which is the governmental agency in charge for the control of the exercise of mining activities throughout the national territory.

1.4.3. **TAH**. Under the exploration regime, which is carried out by means of a specific title named "Alvará de Pesquisa" (Exploration Permit), the mining right-holder shall pay to DNPM the Annual Tax per Hectare ("**TAH**") until the submission of the final exploration report. TAH is charged in the amount of: (i) R$2.36 (two Reais and thirty-six cents) per hectare, during the effectiveness of the authorization in its original term and (ii) R$3.58 (three Reais and fifty-eight cents) per hectare, if the authorization term had been already extended. In case of default DNPM may apply admonition penalty and fines up to R$2,386.17 (two thousand, three hundred and eighty-six Reais and seventeen cents). If the penalties are not duly paid, DNPM may even cancel the exploration permit (Mining Code, articles 20, II, and 63).

1.4.4. **DIPEM**. The holder of an exploration permit shall present to DNPM, every year, until April 30th, a Declaration of Investments in Mineral Exploration ("DIPEM"). The declaration shall contend information on the investments applied in the area object of the exploration permit during the respective year. In case the DIPEM is not presented, DNPM may apply admonition penalty and fines up to R$2,386.17 (two thousand, three hundred and eighty-six Reais and seventeen cents). If the penalties are not duly paid, DNPM may even cancel the exploration permit. (DNPM Act # 259/04).

1.4.5. **CFEM**. As regards the mining titles in exploitation phase, which is not applicable to the Mineral Rights considering their current stage, the mining company shall pay a tax called Financial Compensation for the Exploitation of Mineral Resources ("CFEM"), levied over the net revenues resulting from the sale of raw or improved mineral, at a rate of: (i) 3% (three percent) for manganese, potassium, rock salt and aluminum ore; (ii) 2% (two percent) for iron ore, fertilizers, coal and other mineral substances; (iii) 1% (one percent) for gold; and (iv) 0,2% (zero point two percent) for precious stones, cuttable gemstones, carbonates and precious metals. According to DNPM Act # 439, article 2, any defaulting party shall not be able to apply (i) for the extension of Exploration Permit terms; (ii) for temporary interruption of the exploitation; (iii) for DNPM's approval of company mergers, acquisitions or spin-offs, as well as mining rights assignments and transfers (Federal Law # 7,990/89, articles 1 and 6, Federal Decree # 01/91, article 15 and Federal Law # 8,001/90).

1.4.6. We have not examined any clearance certificates, whether issued by the DNPM or by any other public authority including judicial authority. Moreover, we have not accessed the Mineral Rights process files at DNPM. As informed by the Company's representatives, BELO SUN is in compliance with the mining regulations related to the Mineral Rights, including the payment of the TAH or any other fees, as applicable, furthermore, CFEM tax is not due in the current stage of Volta Grande Project.

1.5. Surface Rights

1.5.1. **Landowners**. In Brazil, surface rights are distinct from mining rights and must be acquired separately. The landowner has no title to the minerals contained in the soil or in the sub-soil. The Mining Code (article 27) grants to the titleholder of an exploration permit the right to enter in the mineral right area and execute the exploration activities by means of a private agreement with the surface owner or by means of a judicial authorization, issued through a specific lawsuit, under which the local court will guarantee the access to the area by the exploration permit holder and define the amount of the indemnification and rent to be paid to the surface owner.

1.5.2. With regards to the royalties and other encumbrances that shall be paid to the landowner in case of exploration, the mining right-holder shall indemnify the environmental damages and pay compensation for the use of the land, which values shall be agreed by the parties or will be determined by the judge. Furthermore, in the event of exploitation, the mining right-holder will be subject to the payment of royalties to the landowner at the rate of at least 50% (fifty percent) of CFEM tax.

1.5.3. Furthermore, it is worth mention that the payments referred to in item 1.5.2 above (indemnification, compensation for the use of the land and royalties) are not applicable if the title-holder is also the owner or possessor of the land in which the mining activities take place as described in item 1.5.9 bellow.

1.5.4. It should be noted that the Brazilian legislation does not consider possessors as the lawful surface owners of a real estate property. However, in case the possessors remain in the possession of the properties during a long period – up to 15 (fifteen) years - without challenge from alleged owners, they may judicially claim ownership and become the surface owners of such areas by means of a judicial decision granted in a lawsuit with this specific purpose ("*ação de usucapião*").

1.5.5. According to the Company's management and the real estate valuation report prepared by *Vaz de Mello Consultoria em Avaliações Perícias* in June, 2010, the area covered by Exploration Permits # 805.657/1976, 805.658/1976, 805.659/1976 and 812.559/1976, which contain the mineral resources currently known by the Company, is comprised by 3 (three) farms: "*Fazenda Ouro Verde*", "*Fazenda Galo de Ouro*" and "*Fazenda Ressaca*" ("the **Farms**"), which are under the dominion of possessors ("*possuidores*") since 1960's.

1.5.6. Pursuant to the information provided by the Company's management, the surface rights and land owners related to the other mineral rights have not been identified by BELO SUN yet since the exploration activities currently held by BELO SUN in such areas do not involve fieldwork activities.

1.5.7. It should be noted that the registry of lands' ownership in some regions of the North of Brazil – including the Volta Grande Project lands – has been for several decades and still is precarious and sometimes possessors – that does not have the registry of the lands and therefore are not the title holders of the properties - remain in the peaceable possession of lands for a long period, without the challenging of such possession, and even may become the lawful landowners of such real estate properties.

1.5.8. Furthermore, according to the Company's management, the real estate registry in the region comprised by the Volta Grande Project is also precarious and currently it is not possible to legally define who are the registered owners of the Farms, especially considering the peaceable possession of the possessors of such land areas.

1.5.9. **Possession Rights Agreements.** In order to obtain possession of the area comprised by the Mineral Rights which contain the resources currently known by the Company (Exploration Permits # 805.657/1976, 805.658/1976, 805.659/1976 and 812.559/1976) BELO SUN executed formal agreements with the possessors concerning the assignment and transfer of the Rights of Possession and the Acquisition of the Improvements existing on the Farms (*"Escritura Pública de Cessão e Transferência de Direitos de Uso e Possessórios, de Compra e Venda de Benfeitorias e Outras Avenças" or "the* ***Agreements****").*

- **Fazenda Ouro Verde**. On May 15, 2012, BELO SUN executed the *"Escritura Pública de Cessão e Transferência de Direitos de Uso e Possessórios, de Compra e Venda de Benfeitorias e Outras Avenças"* with *Mr. Geisel José Uchoa Tenório*, the only legitimate possessor of the area.

- **Fazenda Galo de Ouro**. On May 15, 2012, BELO SUN executed the *"Escritura Pública de Cessão e Transferência de Direitos de Uso e Possessórios, de Compra e Venda de Benfeitorias e Outras Avenças"* with *Mr. William Paz Aragão*, the only legitimate possessor of the area.

- **Fazenda Ressaca**. On May 22, 2012, BELO SUN executed the *"Escritura Pública de Cessão e Transferência de Direitos de Uso e Possessórios, de Compra e Venda de Benfeitorias e Outras Avenças"* with *Mr. Henrique Gomes Pereira* and his *wife Mrs. Conceição de Maria Pereira Gomes*, the only legitimate possessors of the area.

1.5.10. The Agreements were registered before the Public Notary Authority of the State of Pará and have legal effectiveness against third parties.

1.5.11. According to the terms of the Agreements, the possessors (i) assign and transfer to BELO SUN the Rights of Possession and the Improvements pertaining to the Farms; (ii) provide to BELO SUN immediate and free access to the Farms' areas; (iii) undertake the obligation to gradually - in a period of up to 12 (twelve) months - vacate the Farms and interrupting any activity that has being performed in the areas, including the *Garimpeiros*' activities; and (iv) waive the right to receive any amount of money regarding the upcoming royalties.

1.5.12. On the other hand, in order to enable the implementation of the Agreements, BELO SUN shall pay to the possessors the sum of money expressly established in the Agreements.

1.5.13. **Limitations on acquisition and lease of Real Estate properties located in rural areas by foreigners**. In Brazil, the acquisition or lease of Rural Real Estate properties by foreigners and by Brazilian companies controlled by foreigners (as provided in the Legal Opinion issued by the *Brazilian General Attorney Office* ("**AGU**") published in the Brazilian Federal Gazette under the quotation *AGU/LA 01/2008*, as of August 23, 2010, which is binding to all public administration bodies and executive branches) is governed by Federal Law # 5.709/1971 and Decree # 74.965/1974.

1.5.14. According to Federal Law # 5.709/1971, the acquisition of a Real Estate Property in Rural Areas by such entities is subject to the prior approval of INCRA – *Brazilian National Institute of Agrarian Reform and Colonization*. In addition, Federal Law # 5.709/71 establishes that such entities are solely allowed to acquire a rural property in Brazil if the main purpose of the transaction is related to the implementation of "agricultural, cattle-raising, industrialization or colonization projects" in the acquired real estate. Said projects must be related to the purpose of the foreign company and shall be previously authorized by the Ministry of Agriculture, the regional administrative bodies and also, in case of industrial projects, by the Ministry of Industry and Commerce. The applicable rules also establish limitations regarding the length of the land that can be acquired or leased.

1.5.15. It is worth mentioning that Federal Law #5.709/71 has several concepts likely to be challenged by all interested parties. Since the text of the law explicitly imposes restrictions to foreigners and Brazilian companies controlled by foreigners for acquisition and leasing of rural properties, other types of operations involving rural properties, in principle, would not be subject to the restrictions and procedures set forth by law. However, it should be noted that there is still a lack of certainty about the understandings and extension of the restrictions in this matter. Due to the lack of certainty and multiple interpretations of the law, in practice, the registration of any operation involving rural estate properties in Brazil by foreigners or Brazilian companies controlled by foreigners will depend of the discretion of Real Estate Registry Offices, provided that it may still be subject to challenge by interested parties until there is a final decision from the Brazilian judiciary or the National Congress.

1.5.16. Therefore, as regards to the Volta Grande Project, BELO SUN will have to submit to the procedures above in order to secure its rights of possession and, eventually, its rights of title to the Farms.

1.5.17. **Royalties**. It is worth mentioning that upon the start of exploitation works, royalties equivalent to 50% (fifty percent) of the CFEM (financial contribution for mining exploration) tax will be due to eventual lawful surface owners. The CFEM rate for gold is of 1% (one percent) and for copper and tantalite is of 2% (two percent) and its calculation base is the net revenue from the sale of the mineral product, understood as the total of sales less taxation, transportation and insurance expenses. The rate varies according to the mineral product.

1.5.18. Nevertheless, according to Brazilian Law, royalties to surface owners are payable only during the mining exploitation phase. Thus, considering that the Volta Grande Project's Mineral Rights are currently in the phases of Exploration Permit and Exploration Application and that BELO SUN has acquired all rights of possession over the Farms, pursuant to item 1.5.11 above, no royalties are due.

1.5.19. **Environmental Restrictions**. Finally, it is important to emphasize that according to the Company's management and the real estate valuation report prepared by *Vaz de Mello Consultoria em Avaliações Perícias* in June, 2010, the Mineral Rights are not located within environmental conservation units nor within its' buffer zones.

1.5.20. **Interference with indigenous lands**. In accordance with the DNPM database – Mining Register - 8 (eight) areas are partially located in indigenous areas (Mineral Rights # 850.692/2011, 850.693/2011, 850.694/2011, 850.695/2011, 850.316/2010, 850.699/2011, 850.702/2011 and 850.314/2010). According to the Brazilian legislation, the practice of mining activities in indigenous areas is subject to the National Congress authorization (Brazilian Constitution, article 231, third paragraph). Therefore, prior to the beginning of the exploration activities in such areas BELO SUN must obtain the specific National Congress authorization. Also, as mentioned on item 1.3.19 above, the environmental licensing procedure concerning the Volta Grande Project - by means of the EIA-RIMA - must includes an analysis of the aspects related to the indigenous lands located in the region of the Project.

1.5.21. **Agrarian reform and land settlement**. According to the DNPM database – Mining Register - 19 (nineteen) areas are totally or partially located in areas allocated for agrarian reform settlement by the National Institute for Colonization and Agrarian Reform (INCRA - Instituto Nacional de Colonização e Reforma Agrária) (Mineral Rights # 850.214/2004, 850.635/2008, 850.637/2008, 850.639/2008, 850.313/2010, 850.013/2011, 850.266/2012, 850.703/2011, 805.657/1976, 805.658/1976, 805.659/1976, 850.249/2001, 850.312/2010, 850.311/2010, 850.696/2011, 850.697/2011, 850.700/2011, 850.701/2011 and 850.977/2006). Under Brazilian mining regulation, there are no restrictions to mining activities in areas destined to the agrarian reform, however a representative of INCRA and, depending on the stage of the agrarian reform settlement, the owners of the land, shall also be involved in the negotiation for access to the land and in the environmental licensing procedure by means of the public hearing or answering eventual information request presented by SEMA.

II. OUR LEGAL OPINION

2.1. In light of Section I above and in relation to Volta Grande Project, we are of the opinion that as of the date hereof:

a) The Volta Grande Project comprises 45 (forty-five) mineral rights as listed in the chart exposed in the item 1.1.1 above.

b) BELO SUN is the lawful and exclusive titleholder/applicant of 4 (four) applications for mining concession which were timely presented before the DNPM on December 05, 2012. No decision from the DNPM has been received to date, thus, no exploitation activity shall be performed by BELO SUN in such areas prior to the DNPM's approval and issuance of the respective mining concession. According to the Company's management, the areas comprised by the Mining Concession Applications #805.657/1976, 805.658/1976, 805.659/1976 and 812.559/1976 contain 100% (one hundred per cent) of the geological resources concerning the Volta Grande Project defined to date.

c) BELO SUN is the lawful and exclusive titleholder of 18 (eighteen) exploration permits - including 1 (one) exploration permit that will be transferred from Oca Mineração Ltda. (100% subsidiary of BELO SUN) to BELO SUN, upon DNPM's approval. Those mineral rights are fully valid, regular, free of any lien or encumbrance, and are not being threatened to be somehow reduced (by overlapping or any other legal grounds), cancelled, revoked or forfeited and there are no administrative or judicial proceedings with the purpose of defeating, impairing, detrimentally affecting or reducing the right, title and interest of these mineral rights.

d) BELO SUN is the applicant of 14 (fourteen) exploration permit applications in priority regime, which are under analysis of the DNPM. According to the Company's management, BELO SUN has presented all required documentation in the application files. We do not foresee any legal reasons that could prevent BELO SUN from being granted by the DNPM the respective title and permit to explore the respective mineral rights.

e) BELO SUN has submitted proposals for 9 (nine) exploration permit application in public tender, which are under the analysis of the DNPM.

f) To the best of our knowledge, BELO SUN is in compliance with the mining regulations related to the Mineral Rights, including the payment of the Annual Fee per Hectare (*Taxa Anual por Hectare – TAH*) or any other fees, as applicable, furthermore, CFEM tax is not due in the current stage of Volta Grande Project.

g) BELO SUN has received the Operation License for exploration # 4115/2010 issued by SEMA on 01.27.2010 to carry out the drilling activities with regards to the mineral rights # 805.657/1976, 805.658/1976, 805.659/1976, 812.559/1976, 850.249/2001 and 850.250/2001. Such Operation License was valid up to January 27, 2012. BELO SUN filed the proper renewal request before SEMA on August 8, 2011, within the statutory period required by law. The request is under SEMA's analysis. No decision from SEMA has been received to date. During the period of analysis, the Operation License # 4115/2010 remains fully valid and in force even though it's original term has expired.

h) Pursuant to the Company's management, the exploration works in the Volta Grande Project at the date hereof have not involved deforestation or the use of water resources in a significant quantity. Thus, no environmental authorization has been required at the Federal level (IBAMA) given that all environmental impacts, including deforestation and usage of water resources, are properly addressed in the licensing procedure held by SEMA and have been comprised in the scope of the Operation License. It should be noted that it is not necessary to hold environmental licenses for the mineral rights in application for exploration phase and application in public tender processes.

i) Although the Company does not have any mining concession yet and, therefore, does not currently perform any exploitation activity, BELO SUN has already requested the Preliminary License to SEMA. The Preliminary License will be necessary to carry out the exploitation of mineral rights # 805.657/1976, 805.658/1976, 805.659/1976, 812.559/1976 whenever the respective mining concessions are approved and issued by the DNPM.

j) Also with regard to the Preliminary License requested by BELO SUN that was a public hearing held by SEMA on September 13, 2012. As required by Law # 5.887/1995 (article 103), SEMA invited the officials from both the Federal and the Pará State Public Prosecutor Offices to participate in such public hearing.

k) According to the Company's management, upon the receipt of such invitation the Federal Public Prosecutor Office initiated an internal administrative process of investigation into the environmental aspects concerning the Volta Grande Project in connection with the licensing process. The investigation is a standard internal administrative procedure and in the ordinary course of the investigation process, the Federal Public Prosecutor has requested information from the government agencies as regards the mining claims that comprise the Volta Grande Project, the matters relating to local indigenous communities that should be considered as part of the environmental licensing process and the analysis of the joint impact of the Volta Grande Project and the nearby Belo Monte dam. According to the Company's representatives, based on the information received from these requests, the Public Prosecutor Office will determine if the Public Prosecutor Office has any issues relating to the environmental licensing of the Volta Grande Project. No further decision has been made by the Federal Public Prosecutor Office to date.

l) Also according to the Company's management, the EIA-RIMA concerning the Volta Grande Project addresses the synergy of the impacts of both the Volta Grande Project and the Belo Monte Project and includes an analysis of the aspects related to the indigenous lands located in the Project's site. Thus, SEMA shall examine the EIA-RIMA to determine if additional studies are required in order to issue the Preliminary License for the Volta Grande Project. The issuance of the Preliminary License should confirm the environmental feasibility of the Volta Grande Project and provide the guidelines for obtaining the Installation License, which is required to develop the Volta Grande Project.

m) As declared by the Company's representatives SEMA should hold a second public hearing in the Project's local community called "Vila Ressaca". According to the Company's management, SEMA elected to hold this second hearing in order to fulfill applicable legal requirements and not specifically to answer any request presented by the local community or Public Prosecutors. The second hearing, which was previously scheduled to October 24, 2012, was postponed by SEMA and has not been rescheduled to date.

n) The execution of such public hearings indicates that the environmental licensing procedure has been conducted according to the applicable regulation. The investigation proceeding itself does not imply any irregularity or particular concern regarding environmental licensing procedure.

o) BELO SUN may be liable for environmental damages eventually caused by *Garimpeiros*' activities in the area of Volta Grande Project. It should be noted that as to the date hereof, according to Company's management and files, BELO SUN has not received any notice or summons regarding eventual environmental liabilities pursuant the Volta Grande Project. Moreover, since BELO SUN has informed the competent public authorities of such irregular *Garimpeiros*' activities and is in compliance with all its environmental obligations, any liability of BELO SUN concerning *Garimpeiro's* activities may be judicially disputed by the Company.

p) BELO SUN has acquired the possession of the areas comprehended by the Mineral Rights which contain the resources currently known by the Company (exploration permits # 805.657/1976, 805.658/1976, 805.659/1976 and 812.559/1976) by means of a formal agreement executed with the possessors concerning the assignment and transfer of the rights of possession and the acquisition of the improvements existing on the Farms - "*Escritura Pública de Cessão e Transferência de Direitos de Uso e Possessórios, de Compra e Venda de Benfeitorias e Outras Avenças*". However, in order to secure its rights of possession and, eventually, its rights of title to the Farms, BELO SUN will have to submit to the procedures mentioned in items 1.5.13 to 1.5.16 above.

q) According to the Company's management and the real estate valuation report prepared by *Vaz de Mello Consultoria em Avaliações Perícias* in June, 2010, the Mineral Rights are not located within buffer zones of environmental conservation units;

r) In accordance with the DNPM database 8 (eight) areas are partially located in indigenous lands (mineral rights # 850.692/2011, 850.693/2011, 850.694/2011, 850.695/2011, 850.316/2010, 850.699/2011, 850.702/2011 and 850.314/2010). According to the Brazilian legislation, the practice of mining activities in indigenous areas is subject to the National Congress authorization (Brazilian Constitution, article 231, third paragraph). Therefore, prior to the beginning of the exploration activities in such areas BELO SUN must obtain the specific National Congress authorization. Also, as mentioned on item 1.3.19 above, the environmental licensing procedure concerning the Volta

Grande Project - by means of the EIA-RIMA - must includes an analysis of the aspects related to the indigenous lands located in the region of the Project.

s) Also according to the DNPM database 19 (nineteen) areas are totally or partially located in areas allocated for agrarian reform settlement by the National Institute for Colonization and Agrarian Reform (INCRA - Instituto Nacional de Colonização e Reforma Agrária) (mineral rights # 850.214/2004, 850.635/2008, 850.637/2008, 850.639/2008, 850.313/2010, 850.013/2011, 850.266/2012, 850.703/2011, 805.657/1976, 805.658/1976, 805.659/1976, 850.249/2001, 850.312/2010, 850.311/2010, 850.696/2011, 850.697/2011, 850.700/2011, 850.701/2011 and 850.977/2006). Under Brazilian mining regulation, there are no restrictions to mining activities in areas destined to the agrarian reform, however a representative of INCRA and, depending on the stage of the agrarian reform settlement, the owners of the land, shall also be involved in the negotiation for access to the land and in the environmental licensing procedure by means of the public hearing or answering eventual information request presented by SEMA.

Finally, and regarding the generality of the foregoing, this opinion (i) speaks only of the Volta Grande Project and does not encompass or purport to cover any other mineral right, project or activity of BELO SUN, and (ii) is given only in relation to matters covered by Brazilian law, and we do not purport to express any opinion in relation to matters subject to the laws of any other jurisdiction.

This opinion may not be used or relied upon by, or published or communicated to, any person other than the addressees hereto for any purpose whatsoever without our prior written consent in each instance, except that a copy of this opinion may be furnished without our prior written consent to any (i) of your successors, (ii) of your legal advisors, and (iii) legislative, administrative, regulatory or judicial body.

Sincerely,

Azevedo Sette Advogados

Azevedo Sette Advogados

Brazilian law firm registered with the Brazilian Bar Association – Minas Gerais Section under no. 213

APPENDIX B – ANALYTICAL QUALITY CONTROL DATA AND RELATIVE PRECISION CHARTS

Time series plots for Blank Samples Assayed by Acme Santiago, Chile between June and August 2014.

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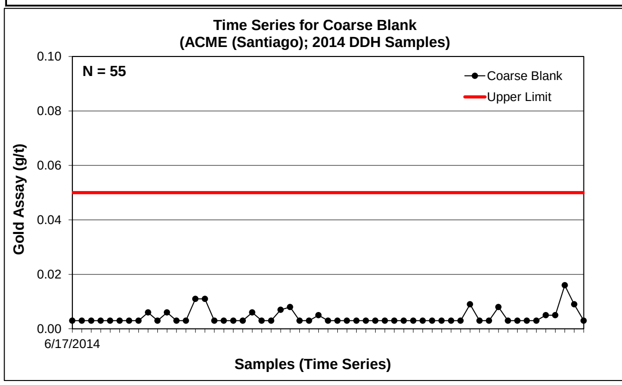
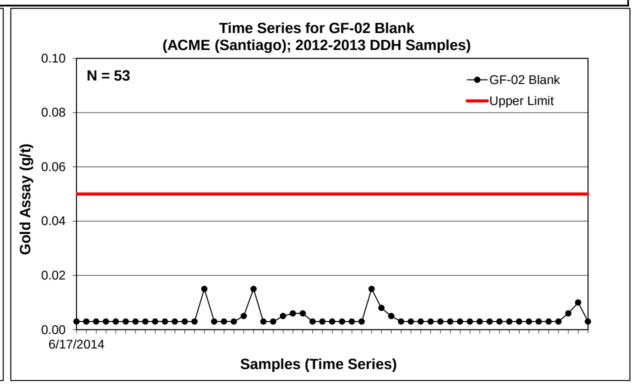
Project	Volta Grande
Data Series	2014 Blanks
Data Type	DDH Samples
Commodity	Au in g/t
Laboratory	ACME (Santiago)
Analytical Method	Fire Assay - AAS Finish
Detection Limit	0.005 g/t Au

Statistics	**Coarse Blank**	**GF-02 Blank**
Sample Count	55	53
Expected Value	0.005	0.005
Standard Deviation	-	-
Data Mean	0.004	0.004
Upper Limit (10xDL)	0%	0%

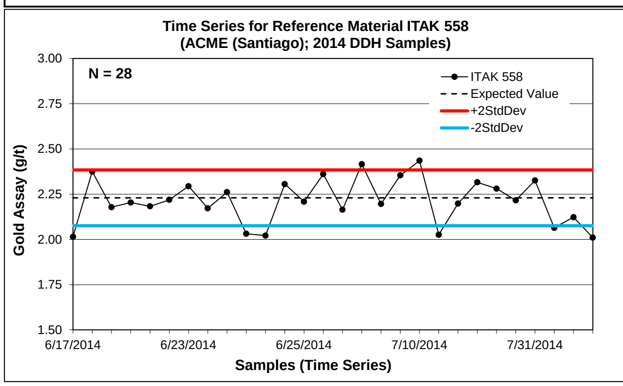


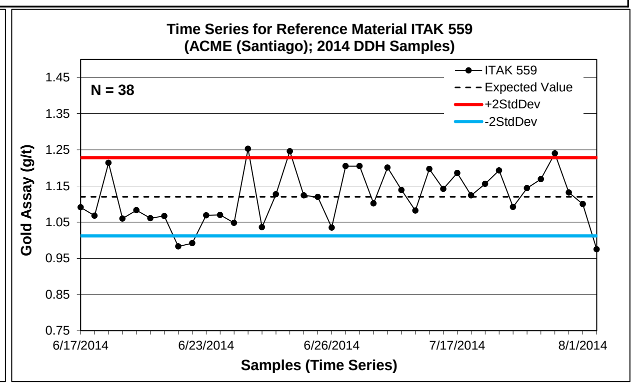


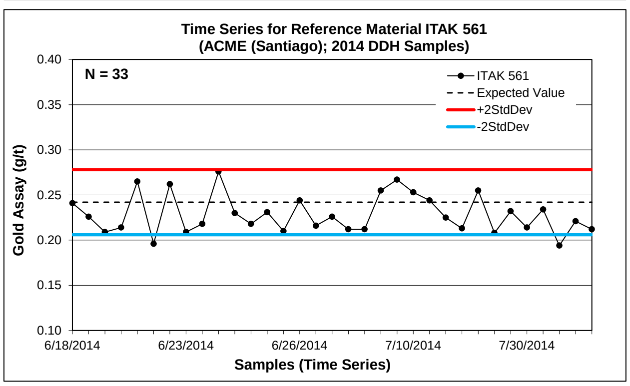
Time series plots for Certified Reference Materials (Standards) Samples Assayed by Acme Santiago, Chile between June and August 2014.

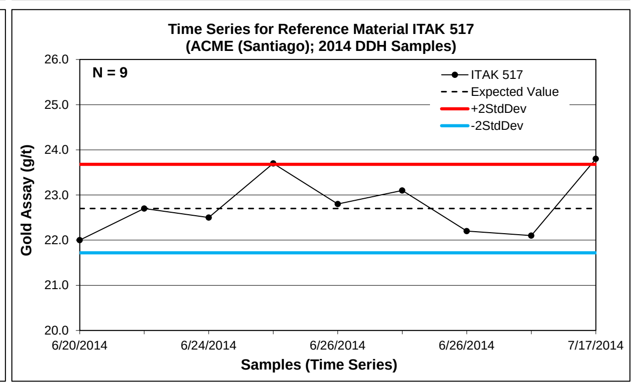
Project	Volta Grande
Data Series	2014 Standards
Data Type	DDH Samples
Commodity	Au in g/t
Laboratory	ACME (Santiago)
Analytical Method	Fire Assay - AAS Finish
Detection Limit	0.005 g/t

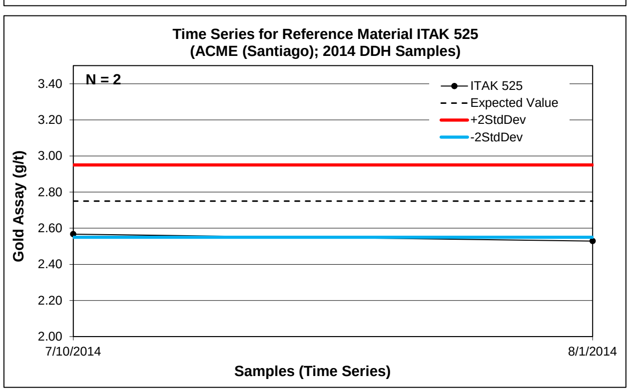
Statistics	**ITAK 558**	**ITAK 559**	**ITAK 561**	**ITAK 517**	**ITAK 525**
Sample Count	28	38	33	9	2
Expected Value	2.23	1.12	0.24	22.70	2.75
Standard Deviation	0.08	0.05	0.02	0.49	0.10
Data Mean	2.21	1.12	0.23	22.77	2.55
Outside 2StdDev	29%	16%	6%	22%	50%
Below 2StdDev	6	3	2	0	1
Above 2StdDev	2	3	0	2	0









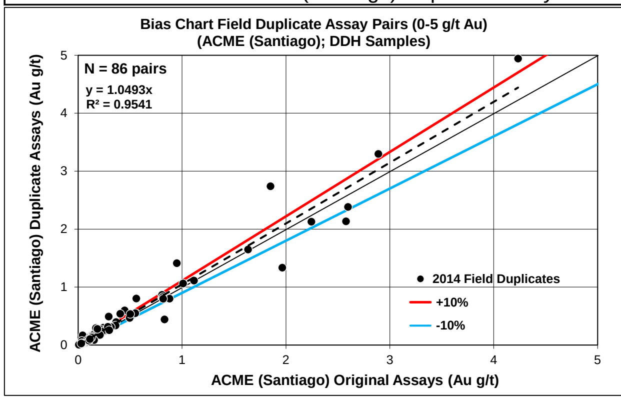


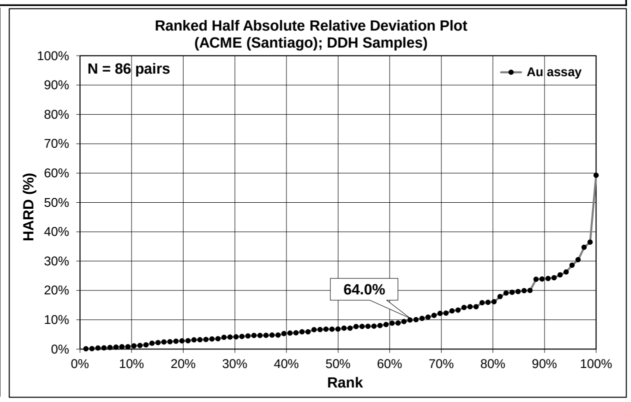
Bias Charts and Precision Plots for Field Duplicate Samples Assayed by Acme Santiago, Chile.

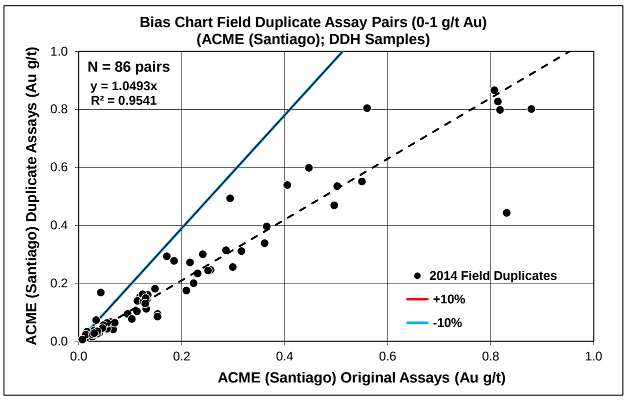
srk consulting

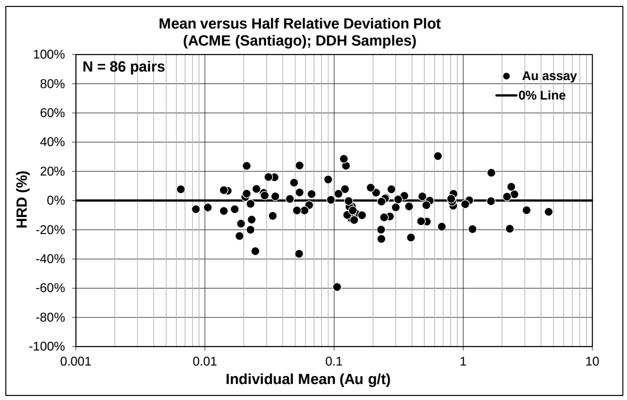
Project	Volta Grande
Data Series	2014 Field Duplicates
Data Type	DDH Samples
Commodity	Au in g/t
Analytical Method	Fire Assay - AAS Finish
Detection Limit	0.005 g/t
Original Dataset	ACME (Santiago) Original Assays
Paired Dataset	ACME (Santiago) Duplicate Assays

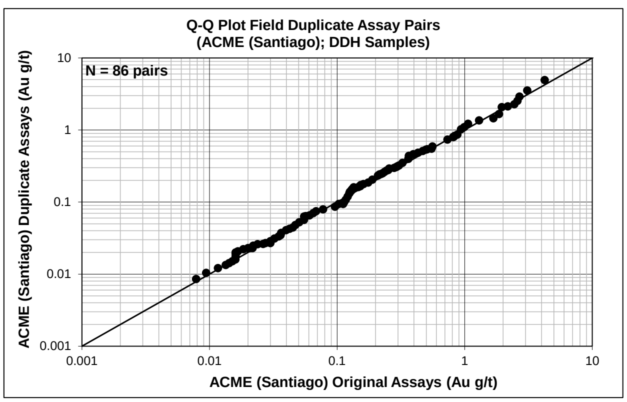
Statistics	**Original**	**Field Duplicate**
Sample Count	86	86
Minimum Value	0.007	0.006
Maximum Value	4.23	4.94
Mean	0.432	0.454
Median	0.131	0.149
Standard Error	0.081	0.087
Standard Deviation	0.752	0.808
Correlation Coefficient	0.9768	
Pairs ≤ 10% HARD	64.0%	

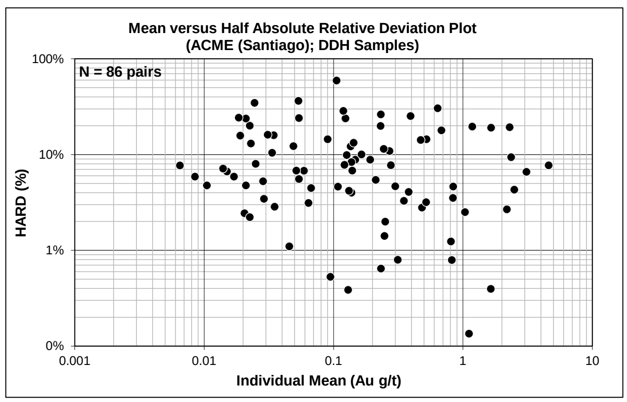






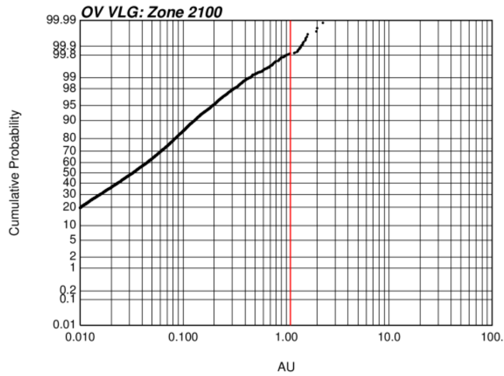


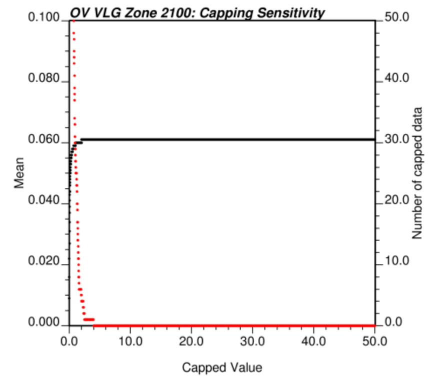


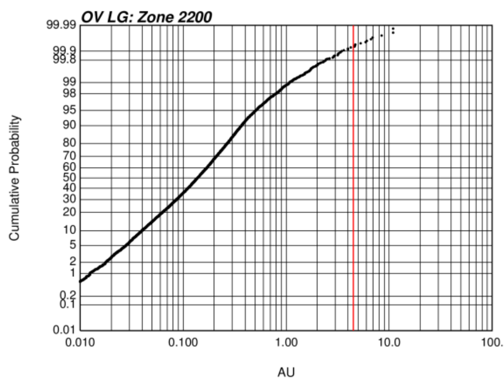


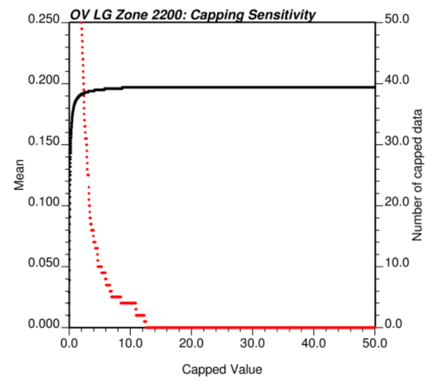
APPENDIX C – SRK CAPPING CHECK PLOTS

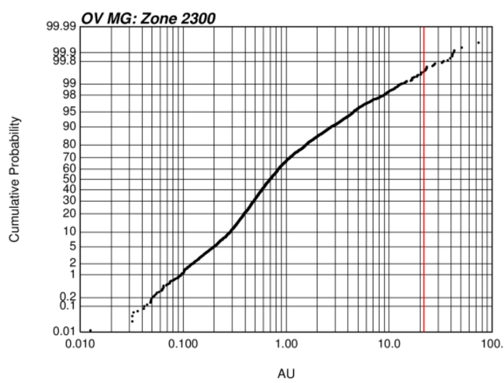
Ouro Verde: Capping by Fresh Domains

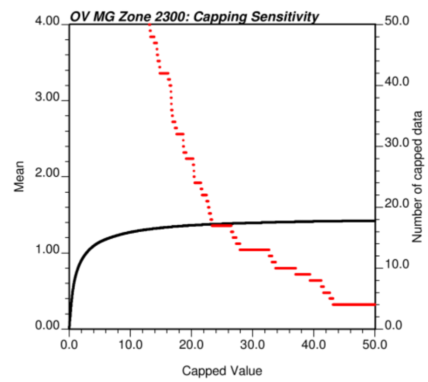


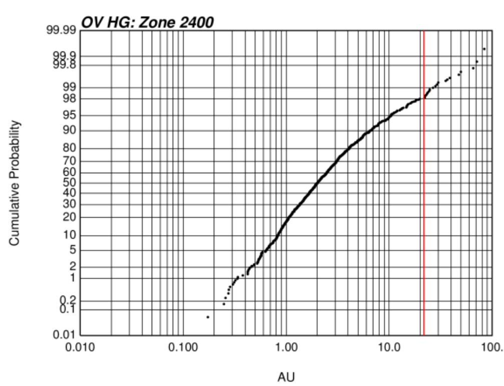


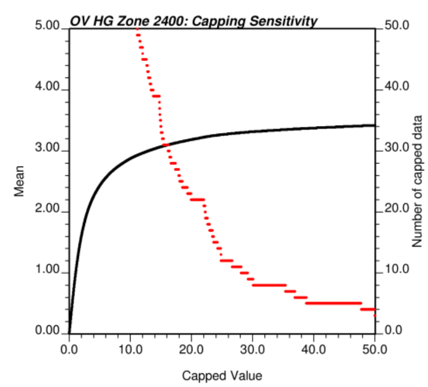




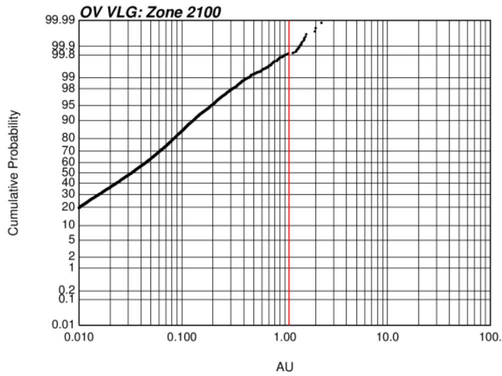


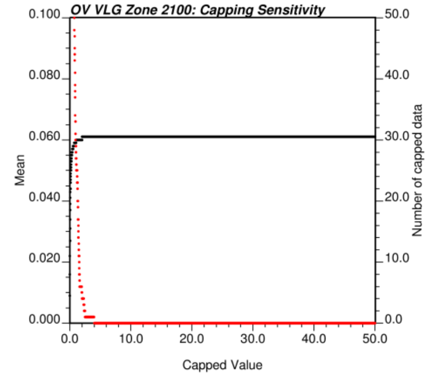


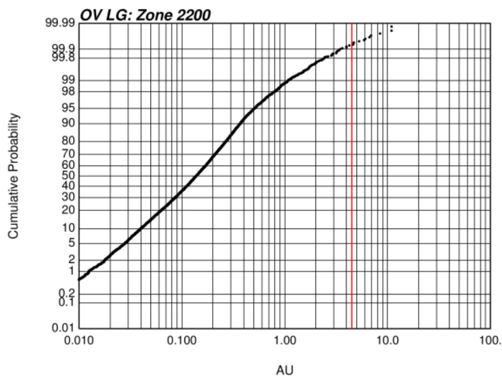


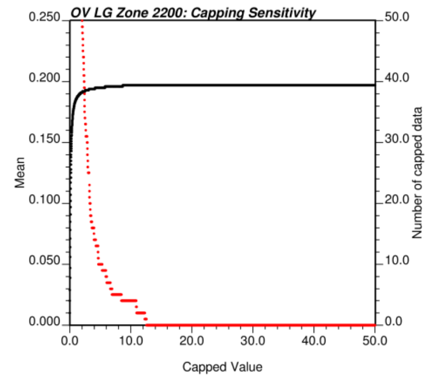


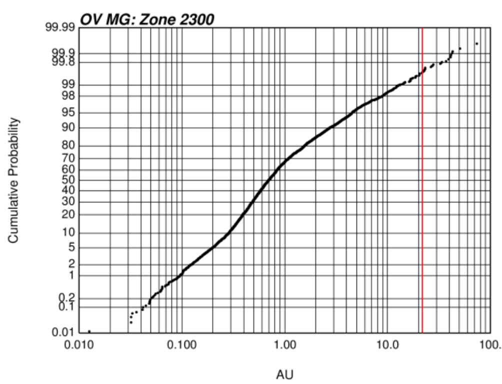
Ouro Verde: Capping by Fresh Domains

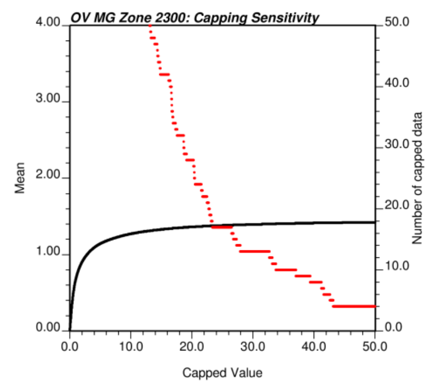


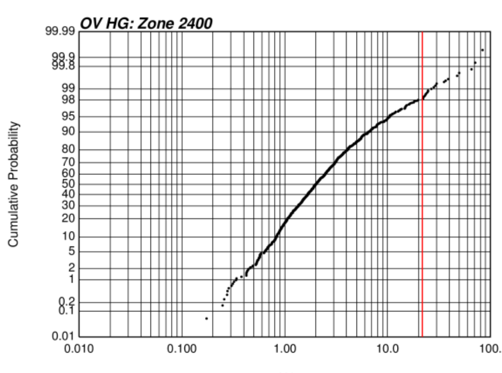


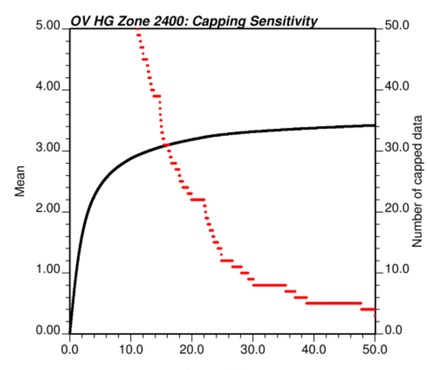




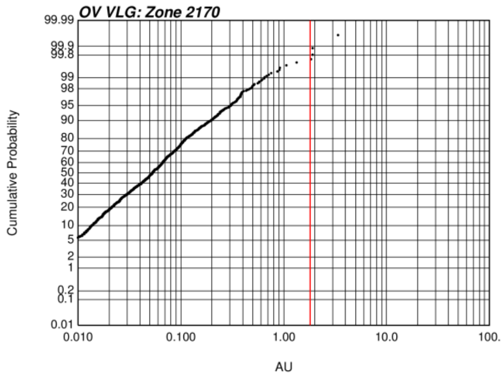


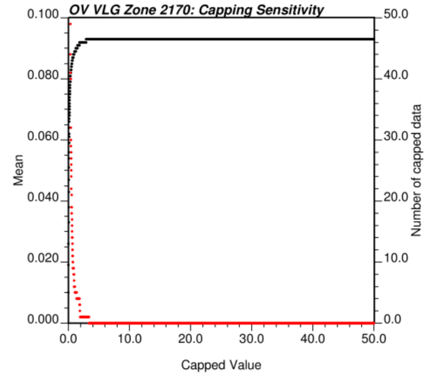


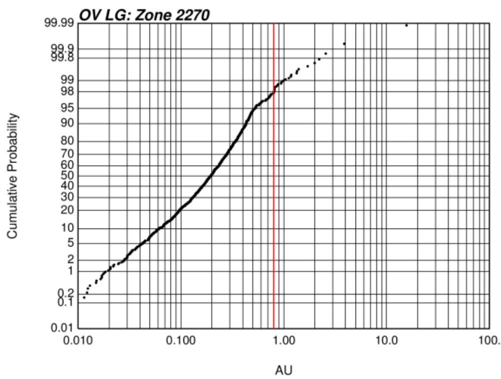


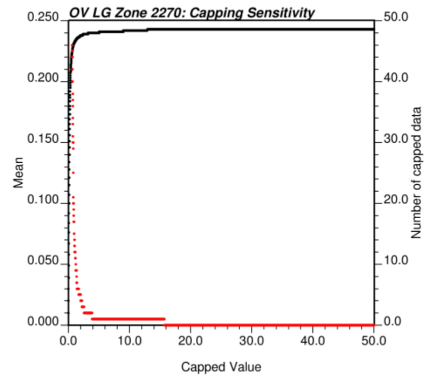


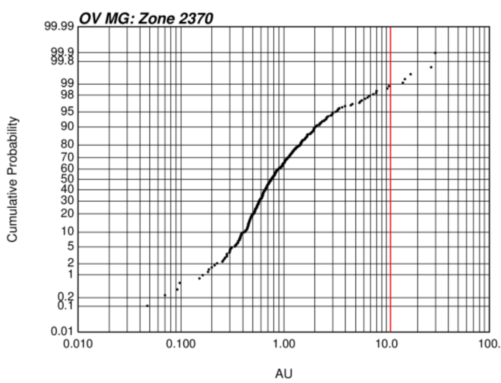
Ouro Verde: Capping by Saprolite Domains

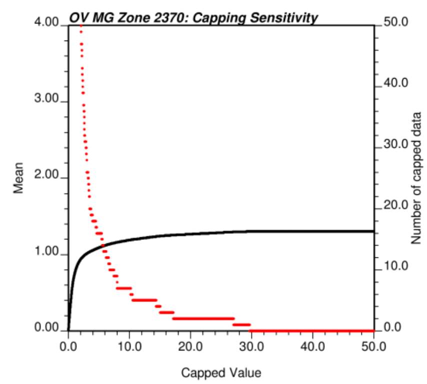


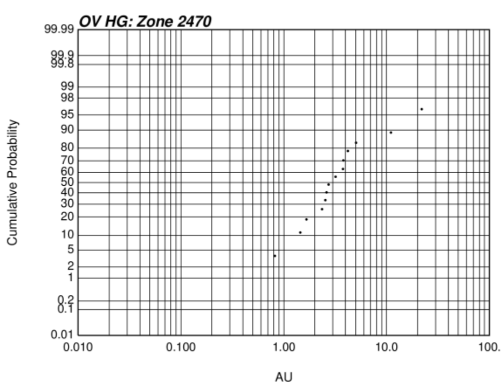


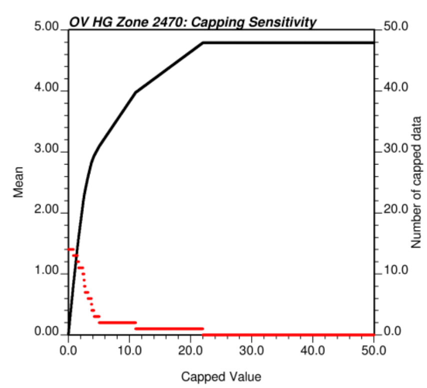




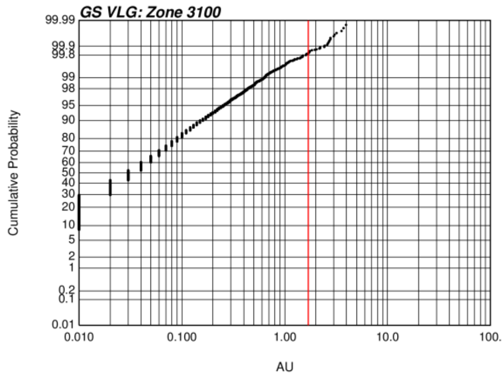


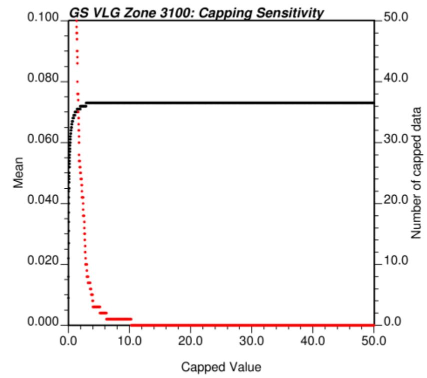


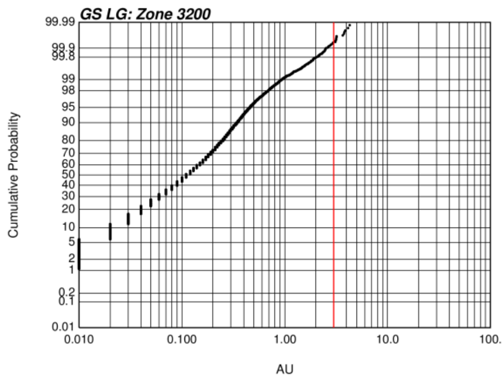


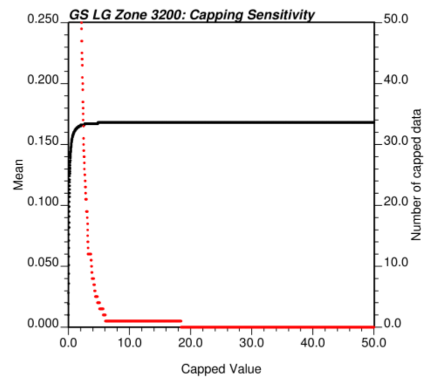


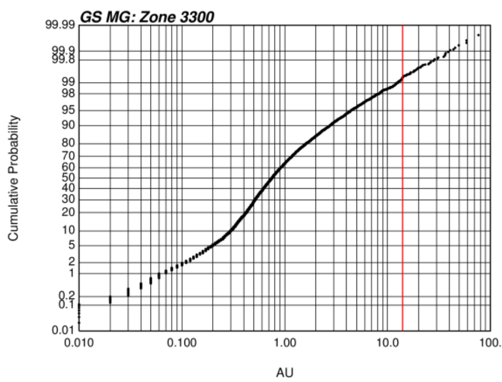
Grota Seca: Capping by Fresh Domains

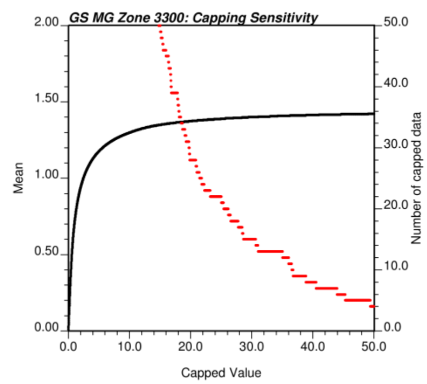


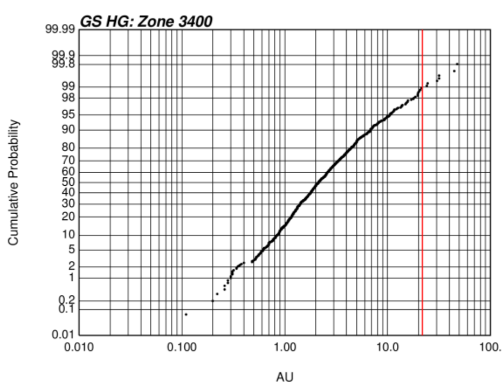


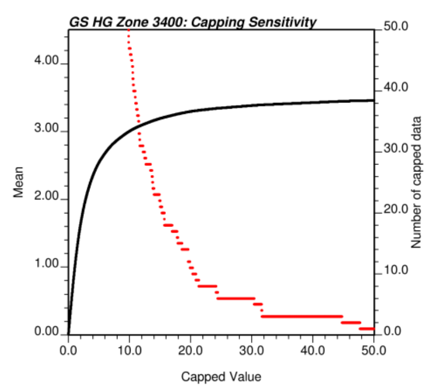




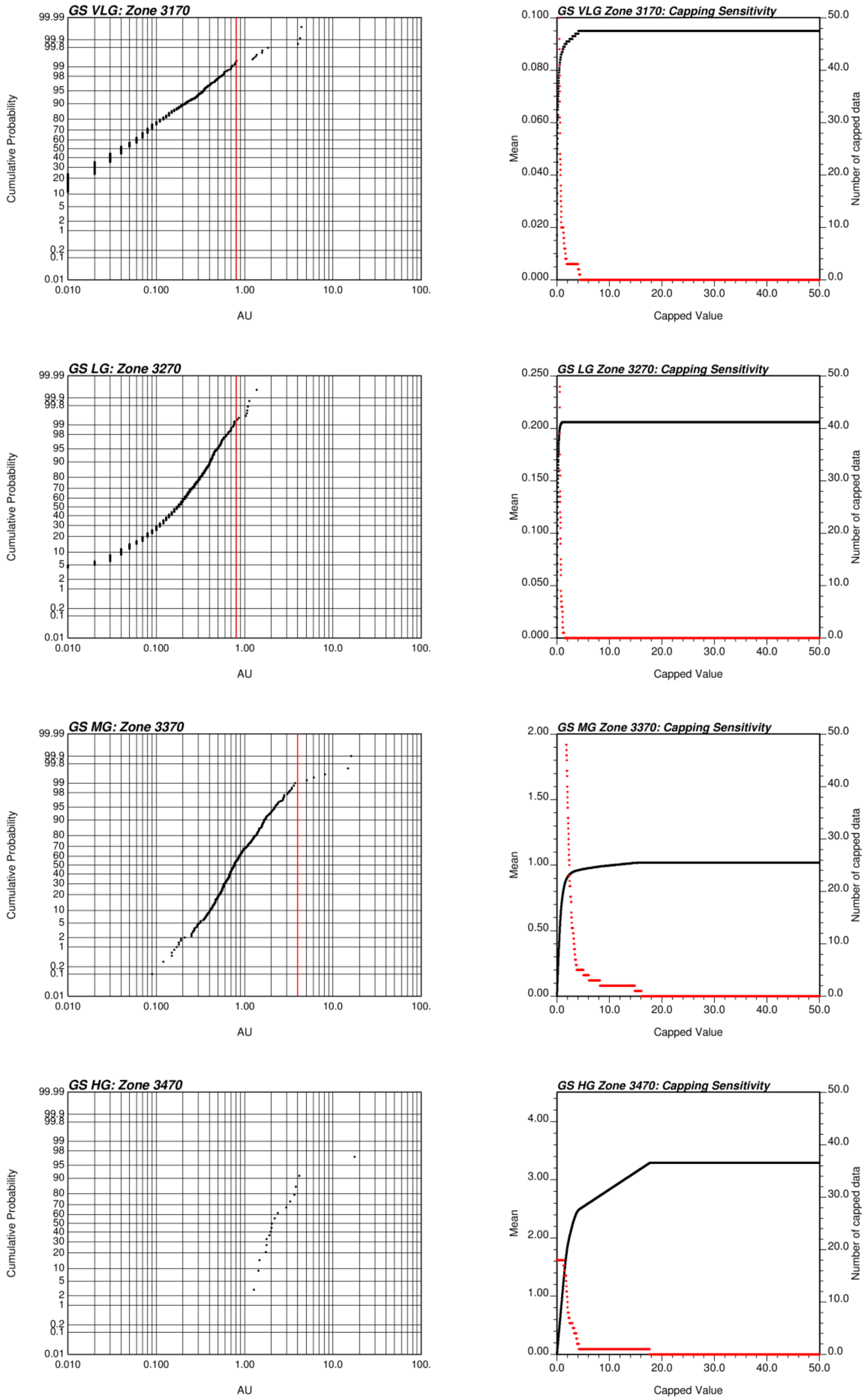




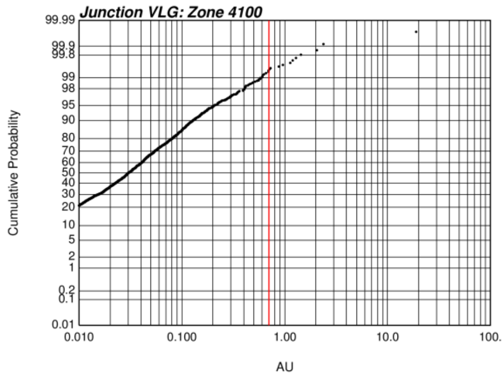


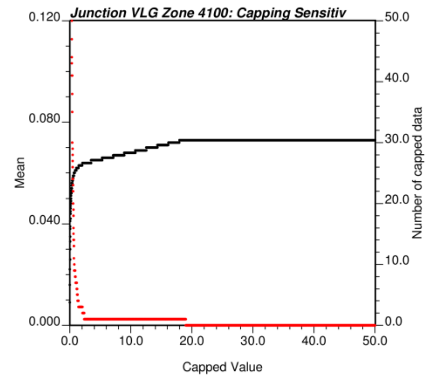


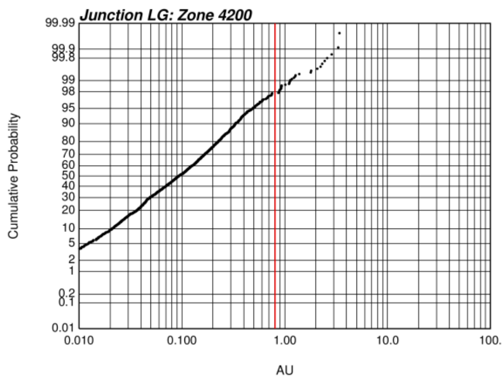
Grota Seca: Capping by Saprolite Domains

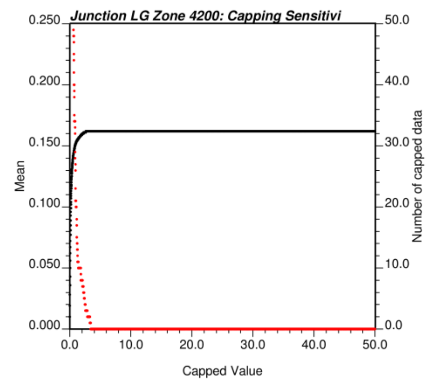


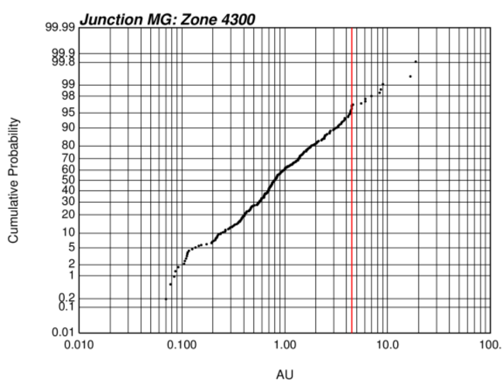
Junction and Greia: Capping by Fresh Domains

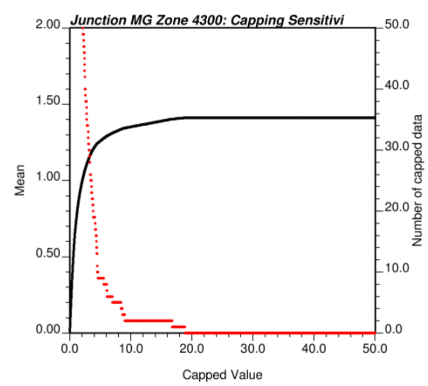


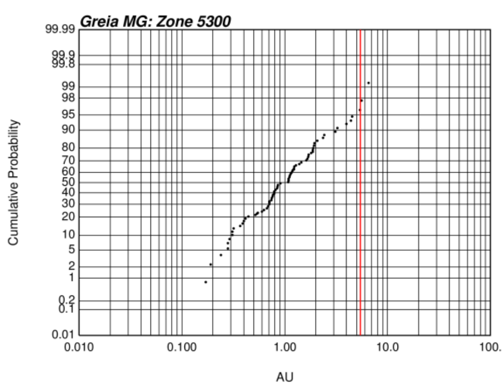


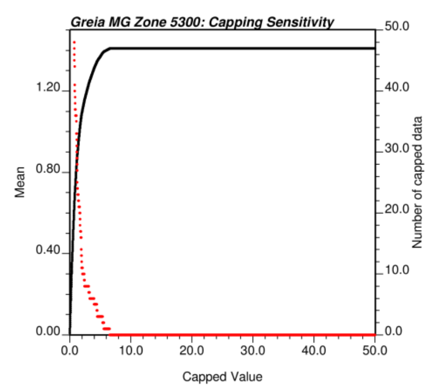




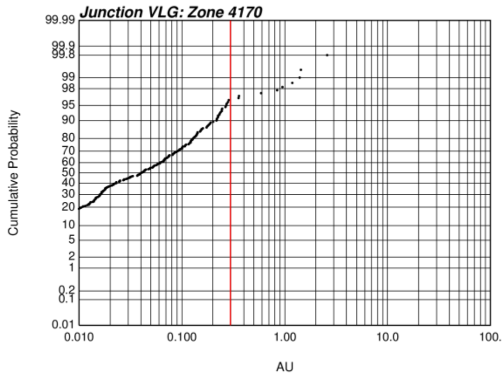


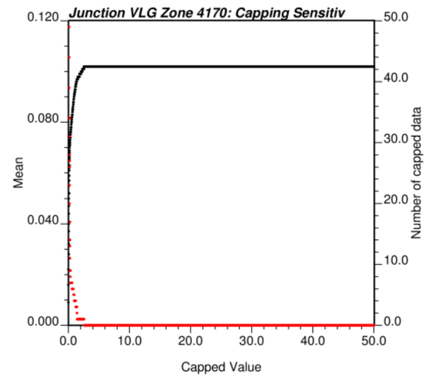


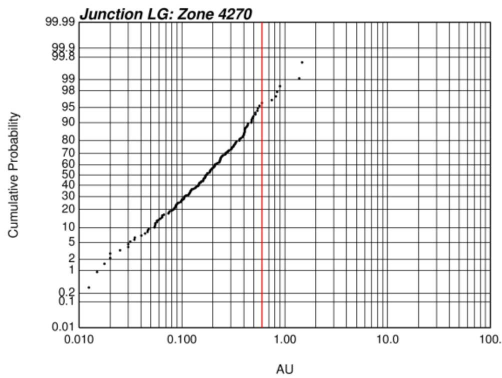


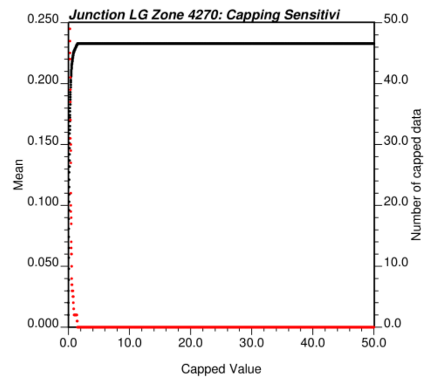


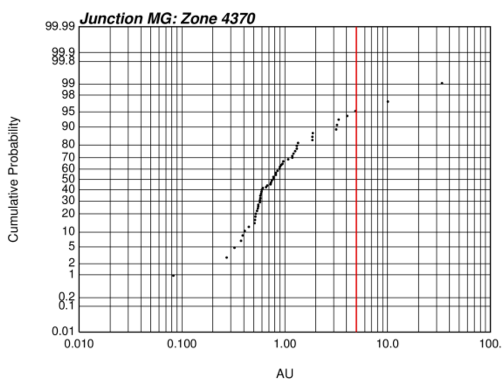
Junction and Greia: Capping by Saprolite Domains

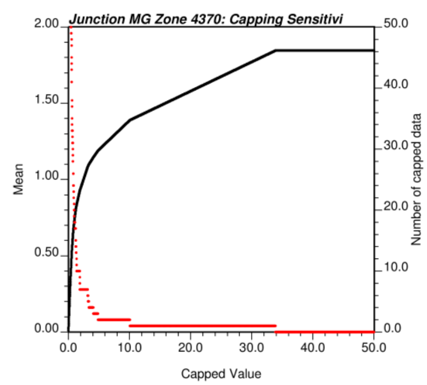


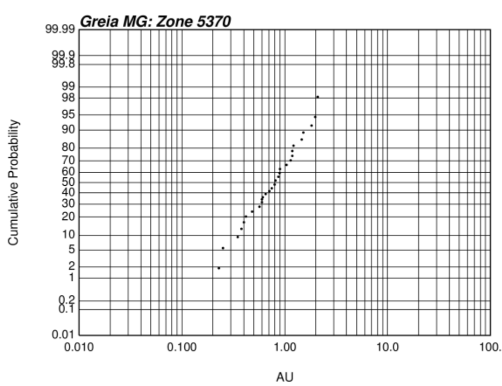


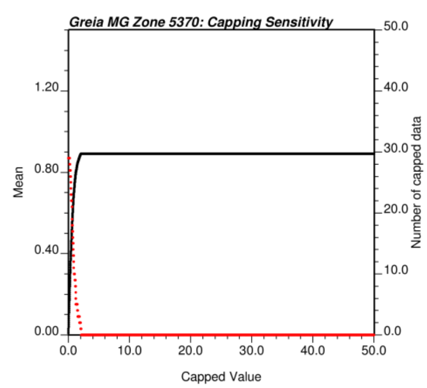






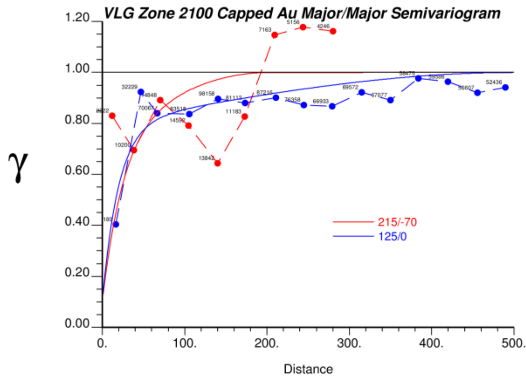


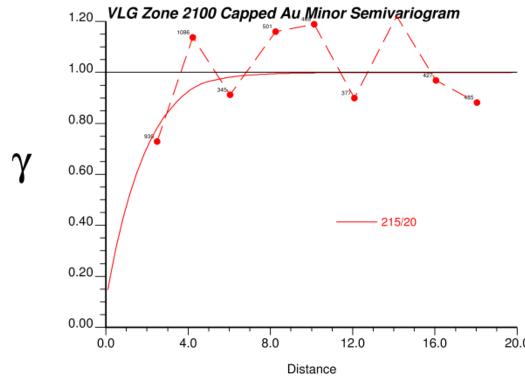


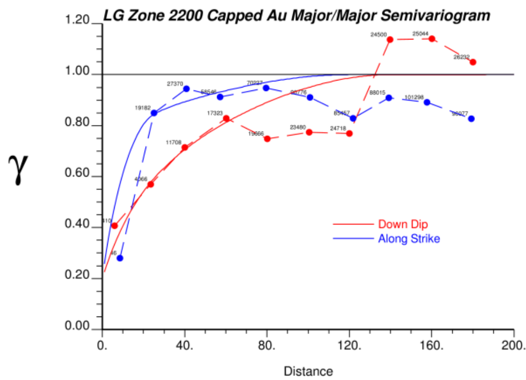


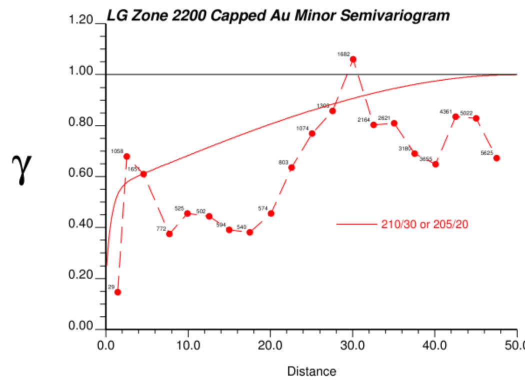
APPENDIX D – BELO SUN VARIGRAM MODELS

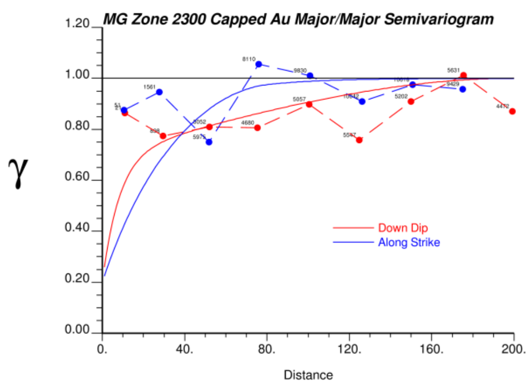
Ouro Verde Capped Au Variograms

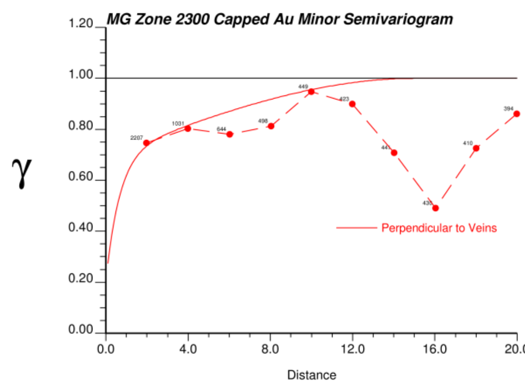


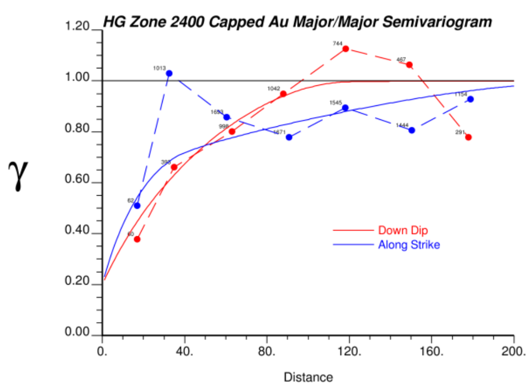


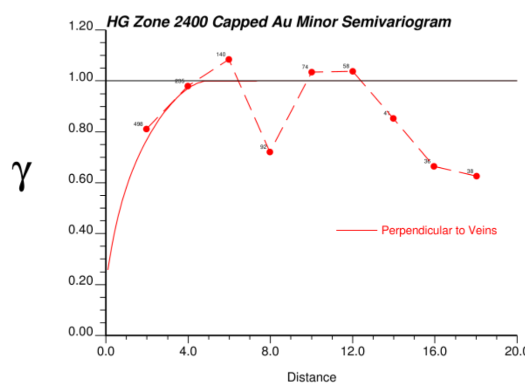




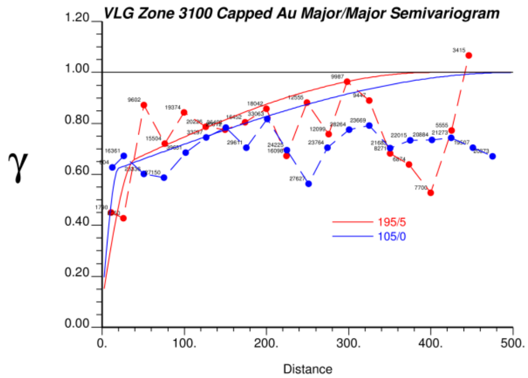


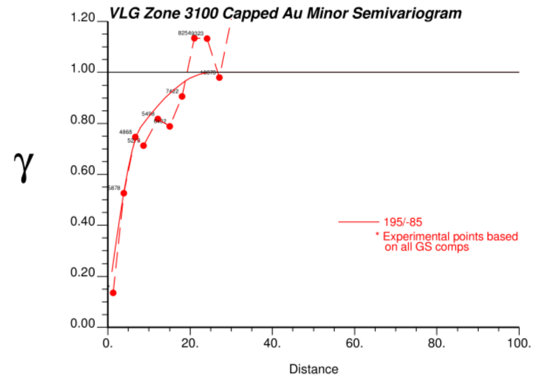


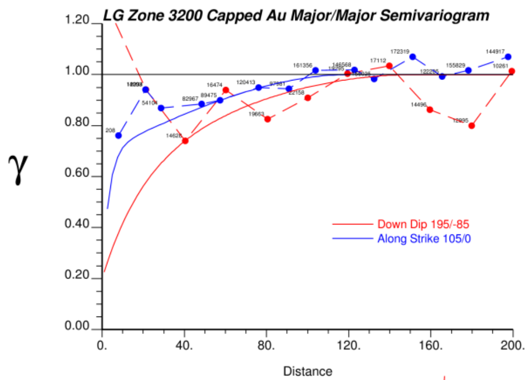


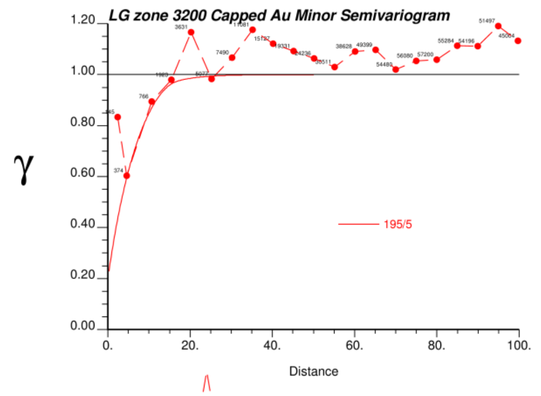


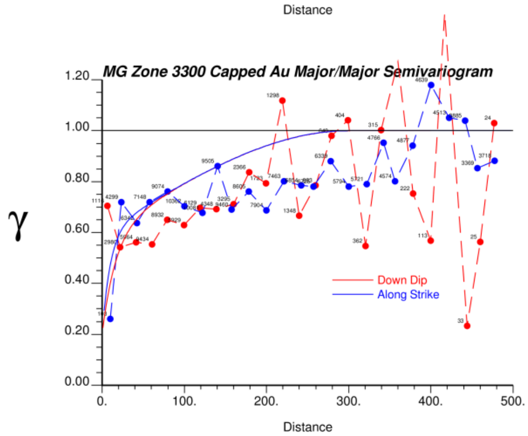
Grota Seca Capped Au Variograms

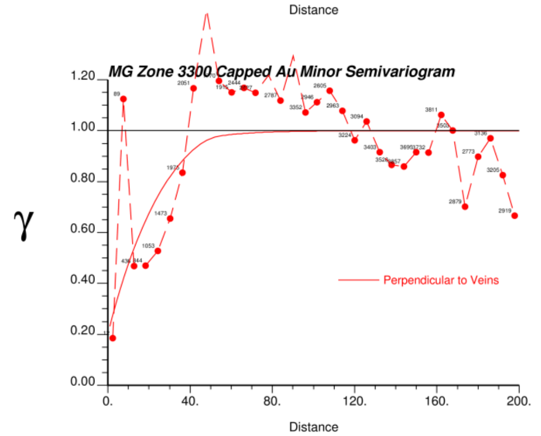


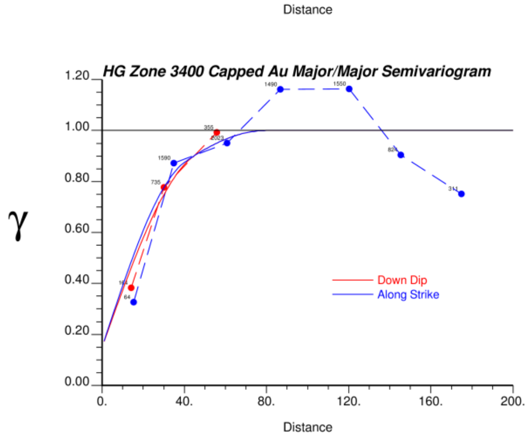


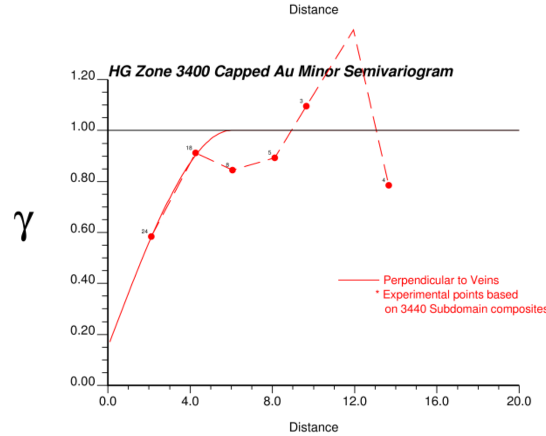




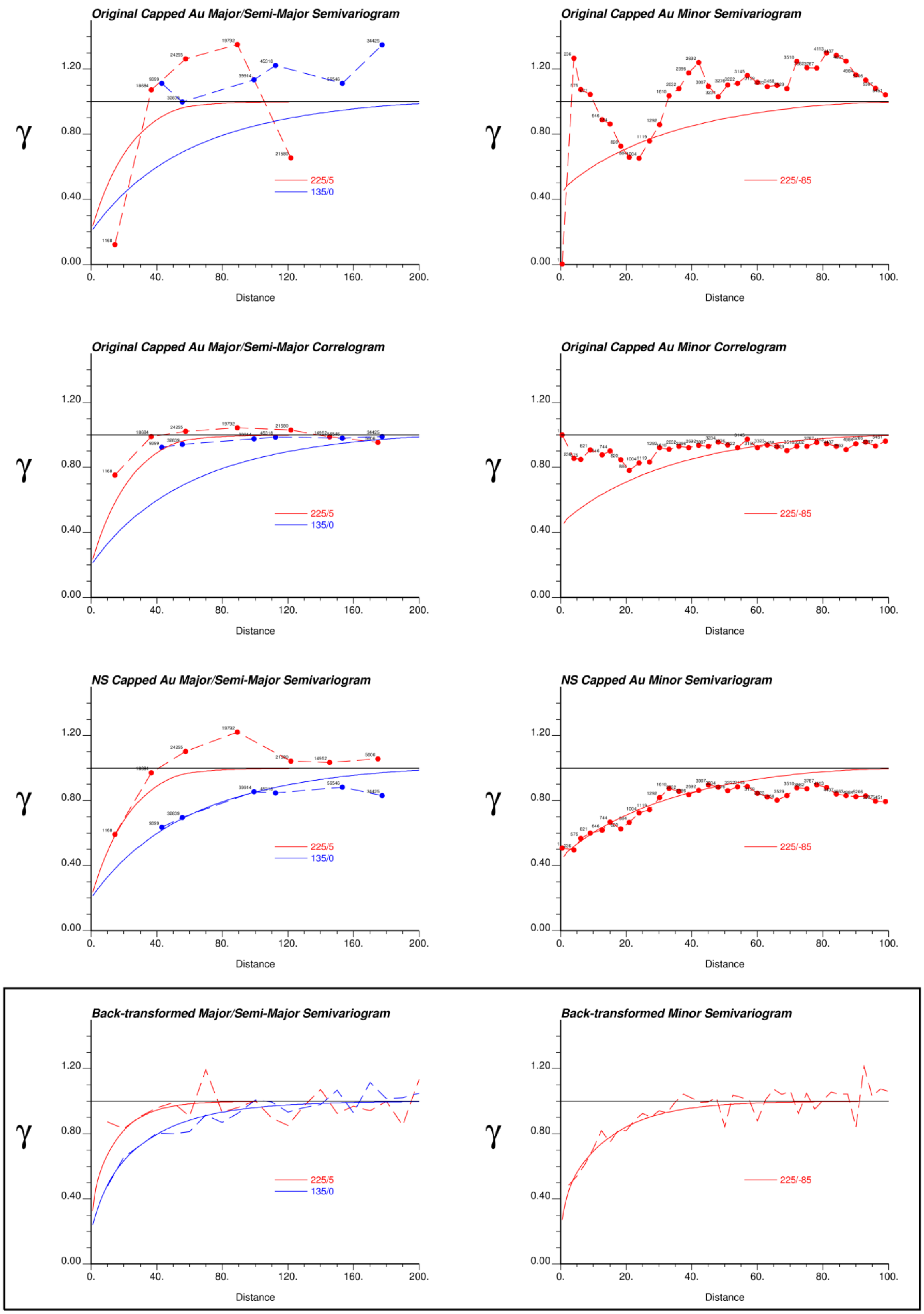




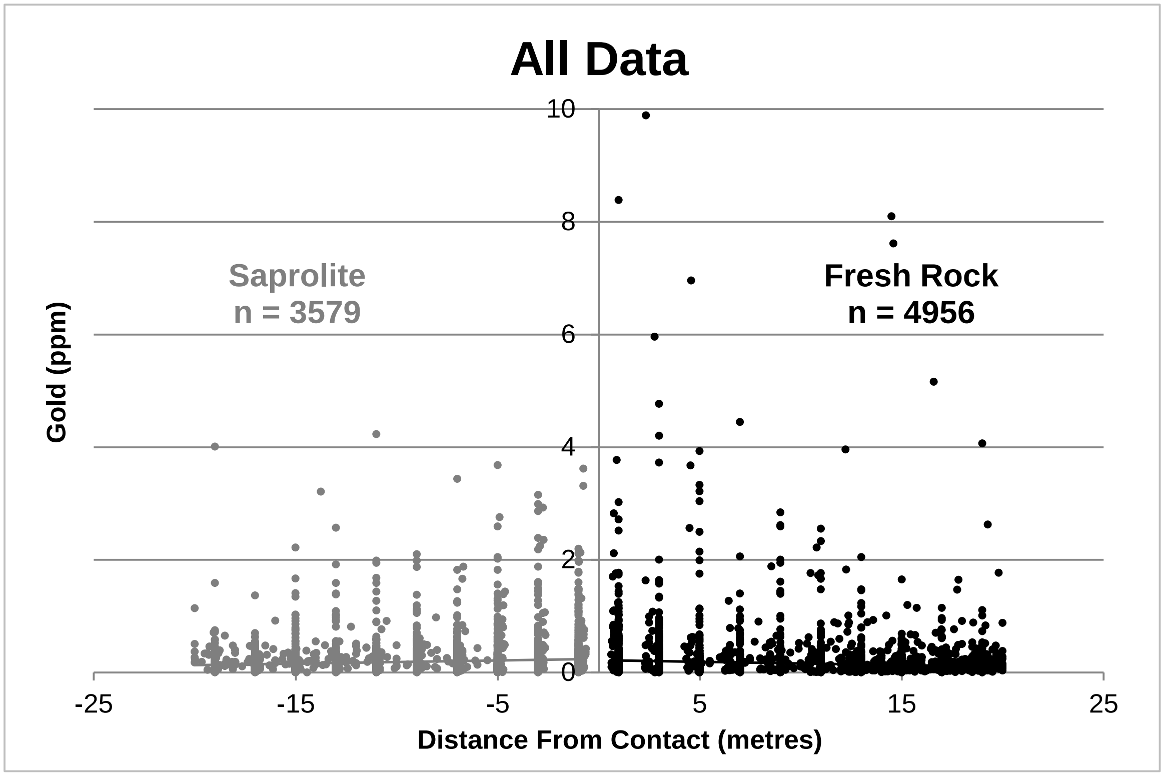


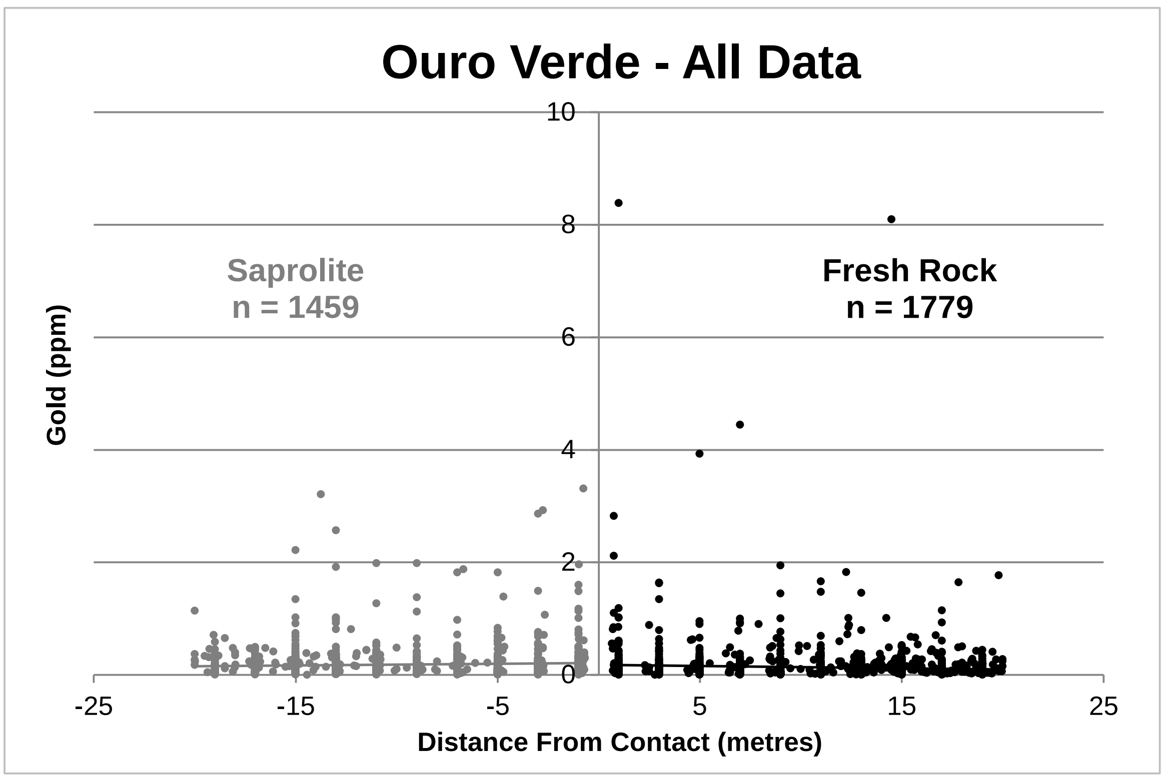


Junction ALL-VLG-backtr Zone 4000 Capped Au

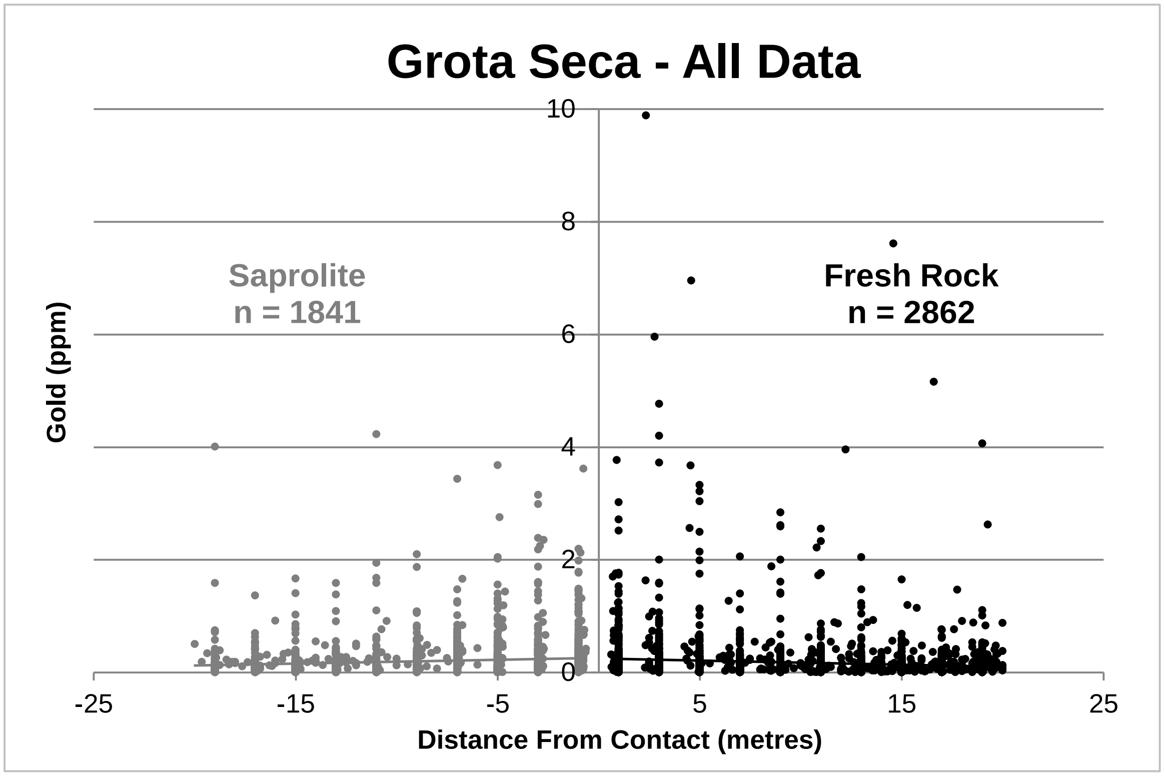


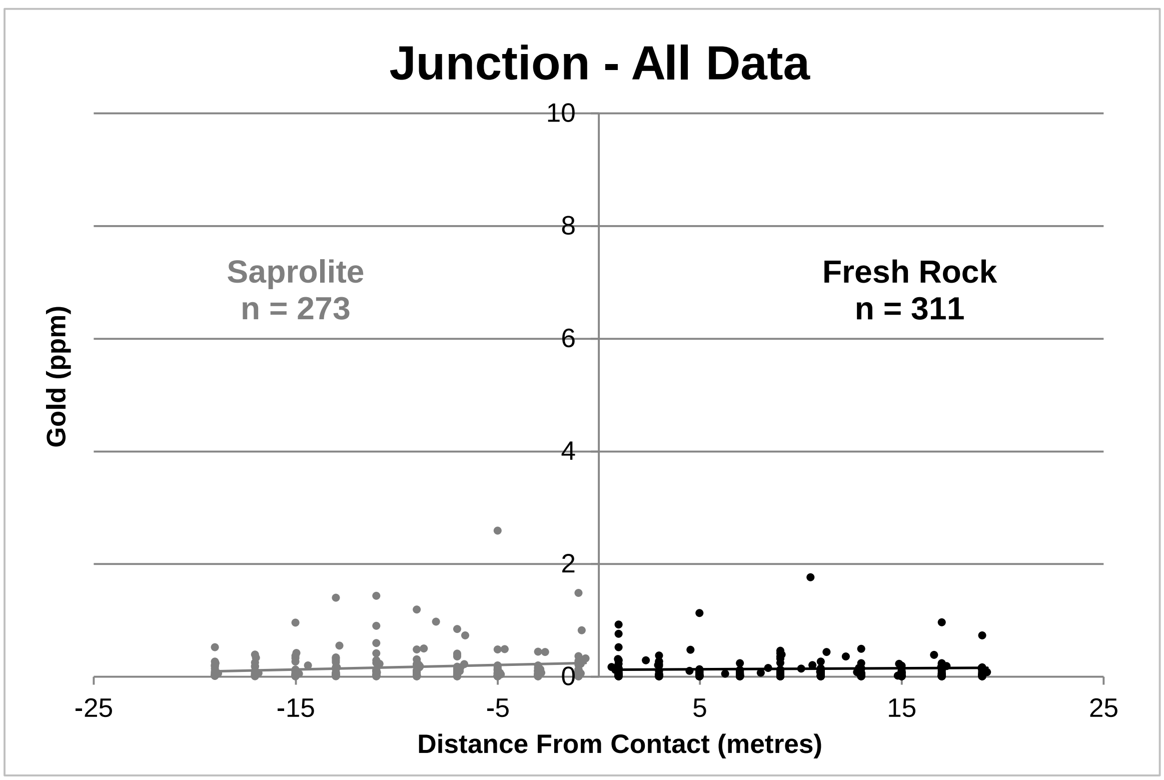
APPENDIX E – CONTACT PLOTS BETWEEN FRESH ROCK AND SAPROLITE



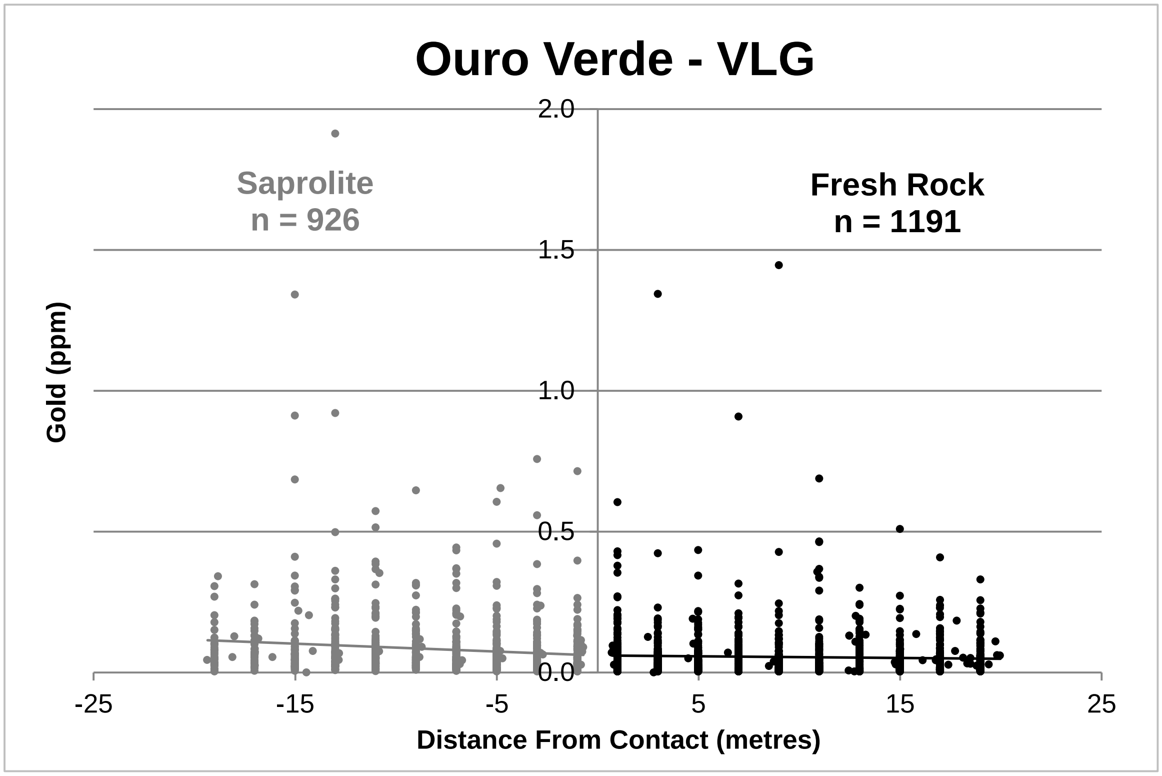


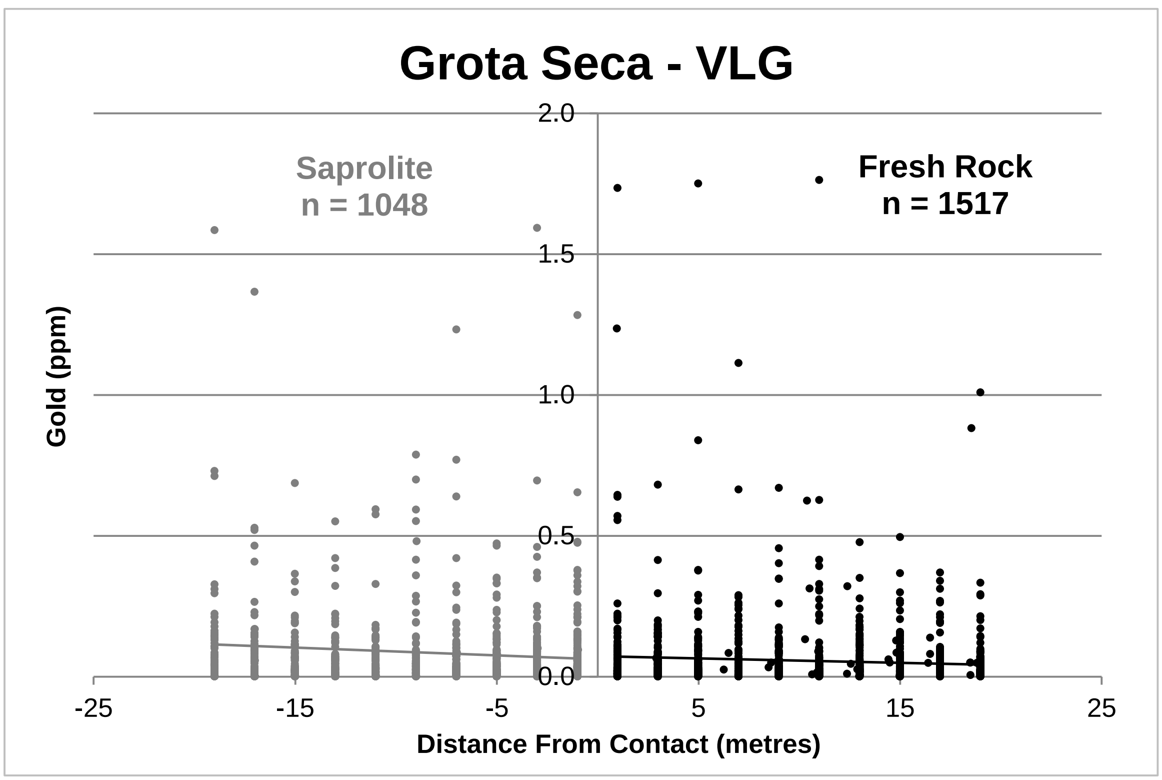
Contact Plot of Composites from All Grade Domains from All Deposits (top) and Ouro Verde (bottom) within 20-metre Boundary of Saprolite-Fresh Domains



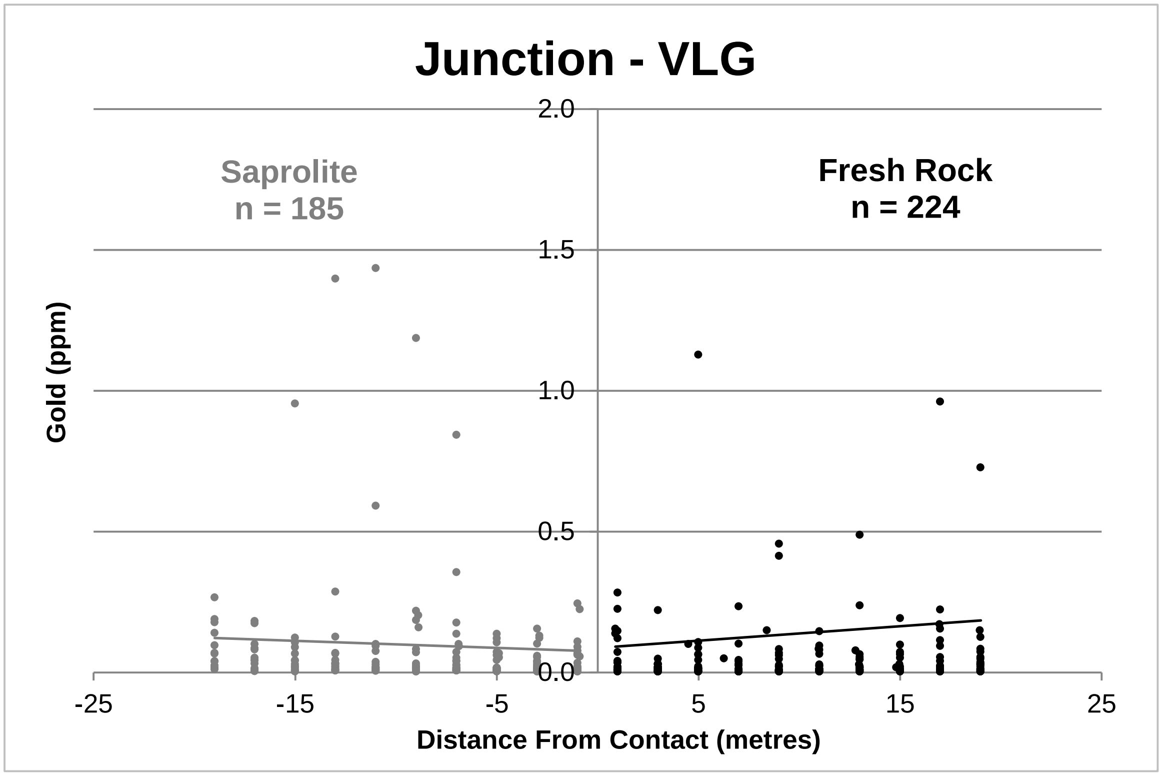


Contact Plot of Composites from All Grade Domains from Grota Seca (top) and Junction (bottom) within 20-metre Boundary of Saprolite-Fresh Domains

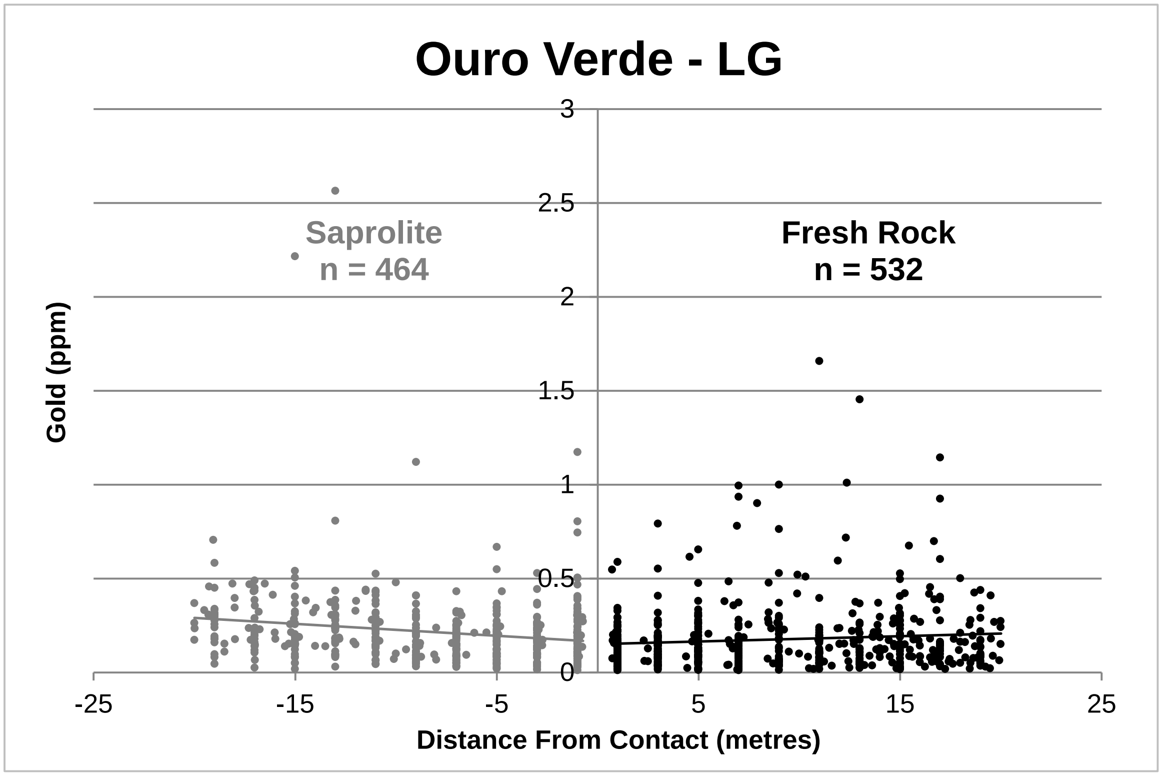


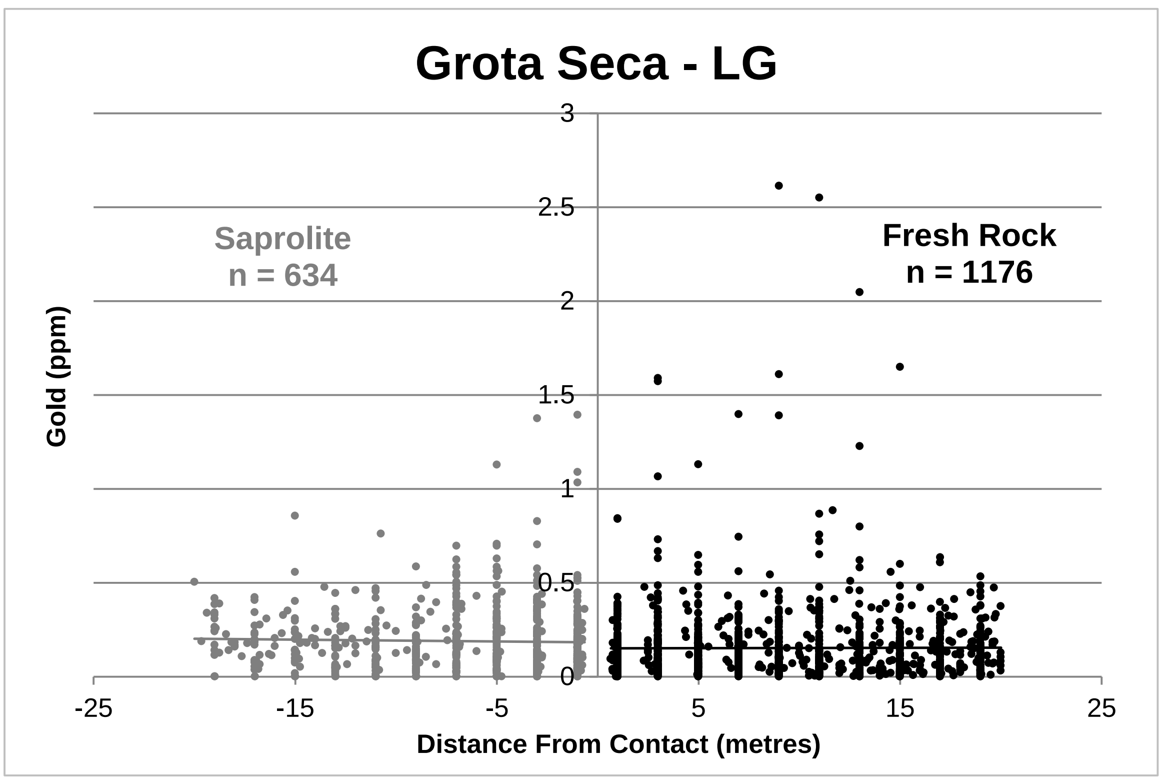


Contact Plot of Composites from VLG Domain from Ouro Verde (top) and Grota Seca (bottom) within 20-metre Boundary of Saprolite-Fresh Domains

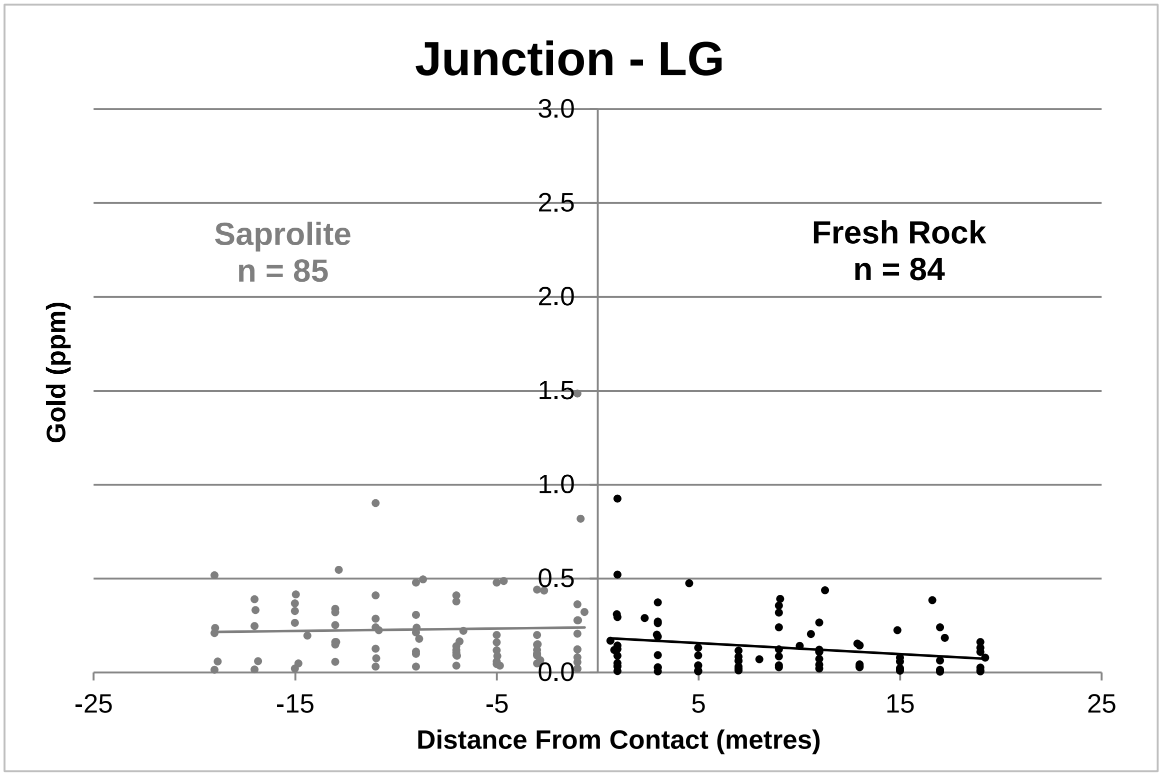


Contact Plot of Composites from VLG Domain from Junction within 20-metre Boundary of Saprolite-Fresh Domains

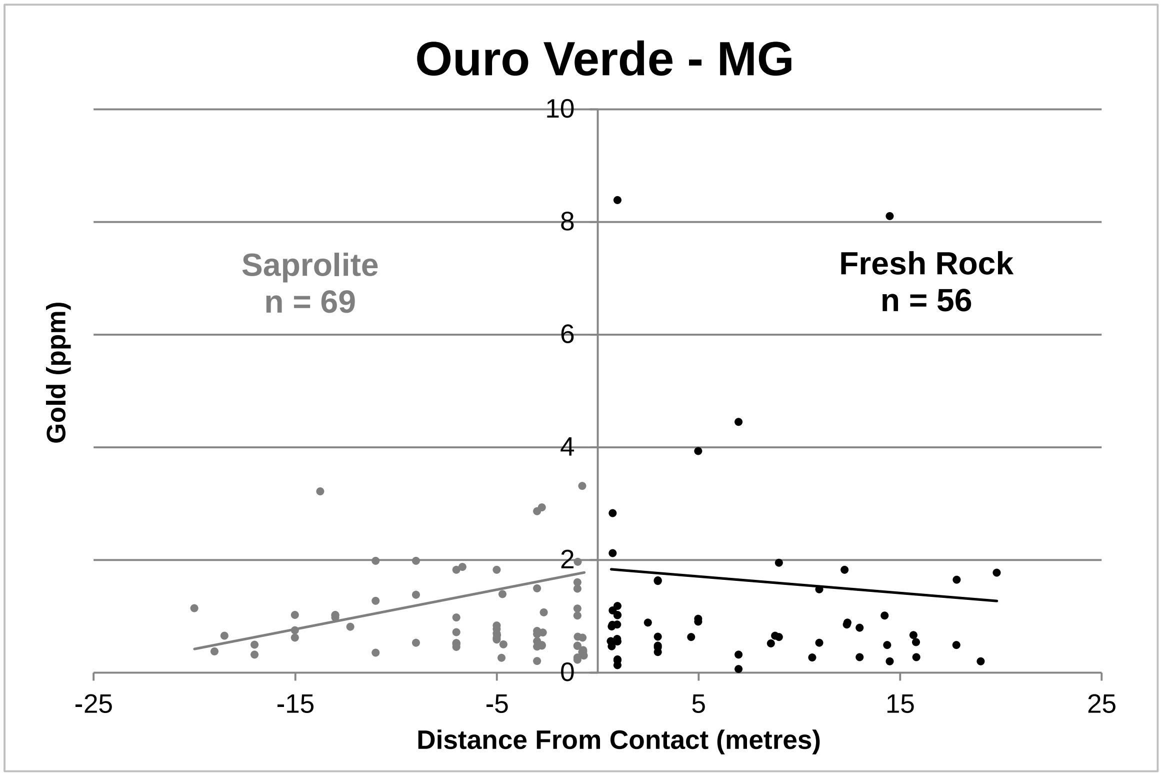


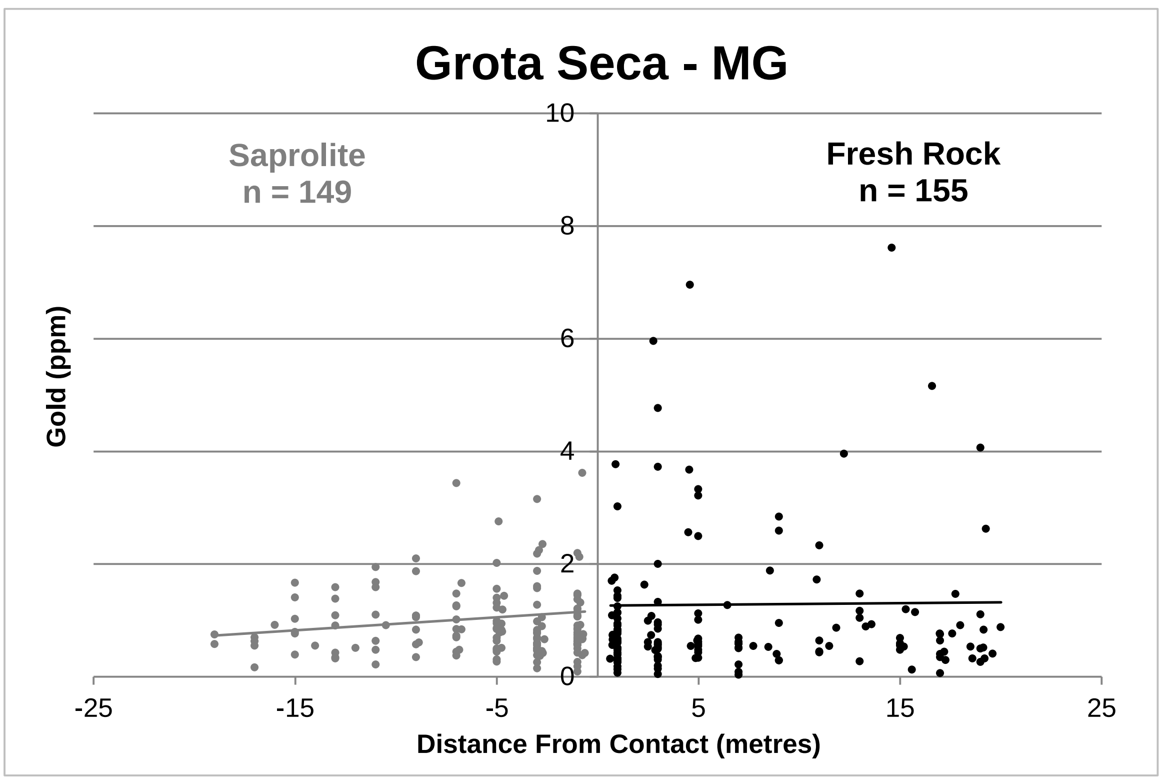


Contact Plot of Composites from LG Domain from Ouro Verde (top) and Grota Seca (bottom) within 20-metre Boundary of Saprolite-Fresh Domains

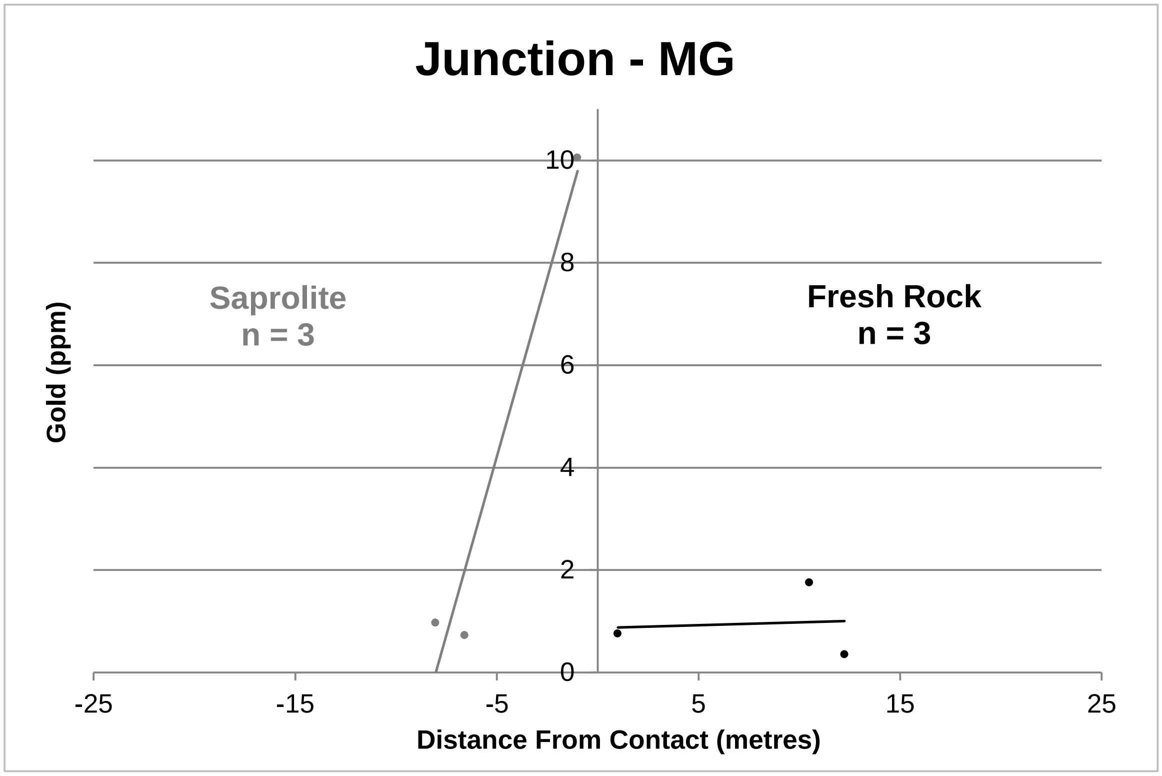


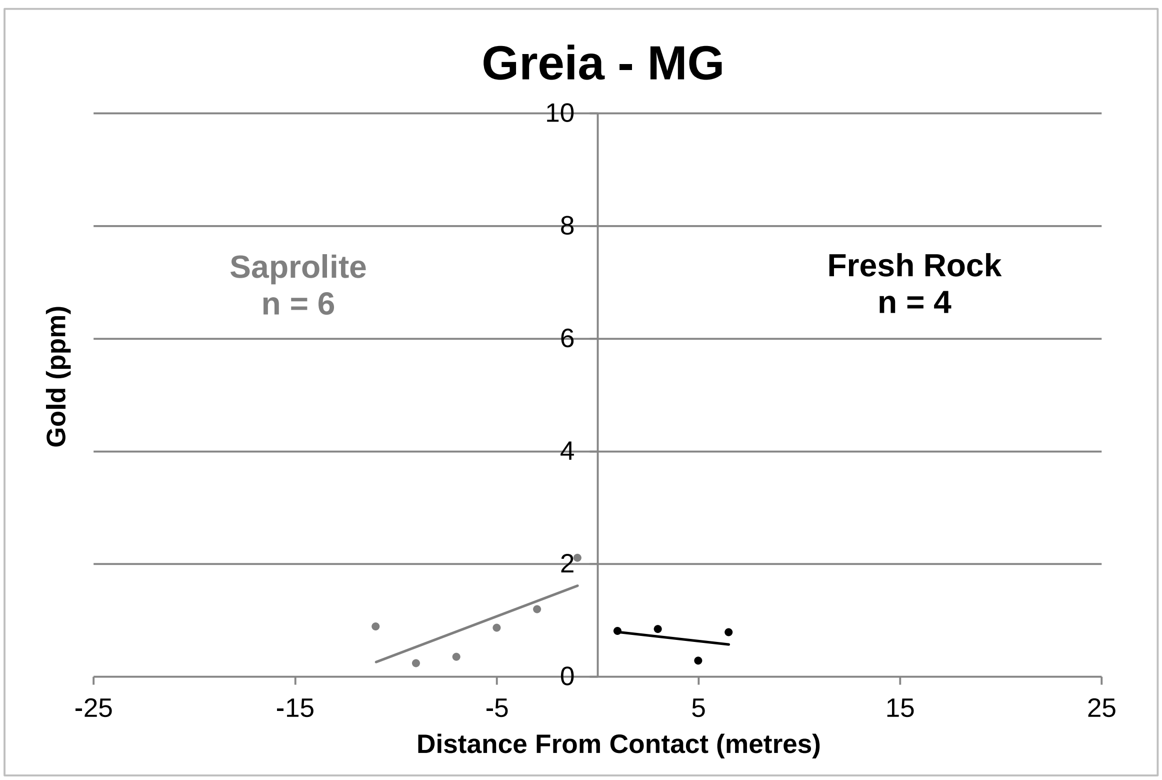
Contact Plot of Composites from LG Domain from Junction within 20-metre Boundary of Saprolite-Fresh Domains



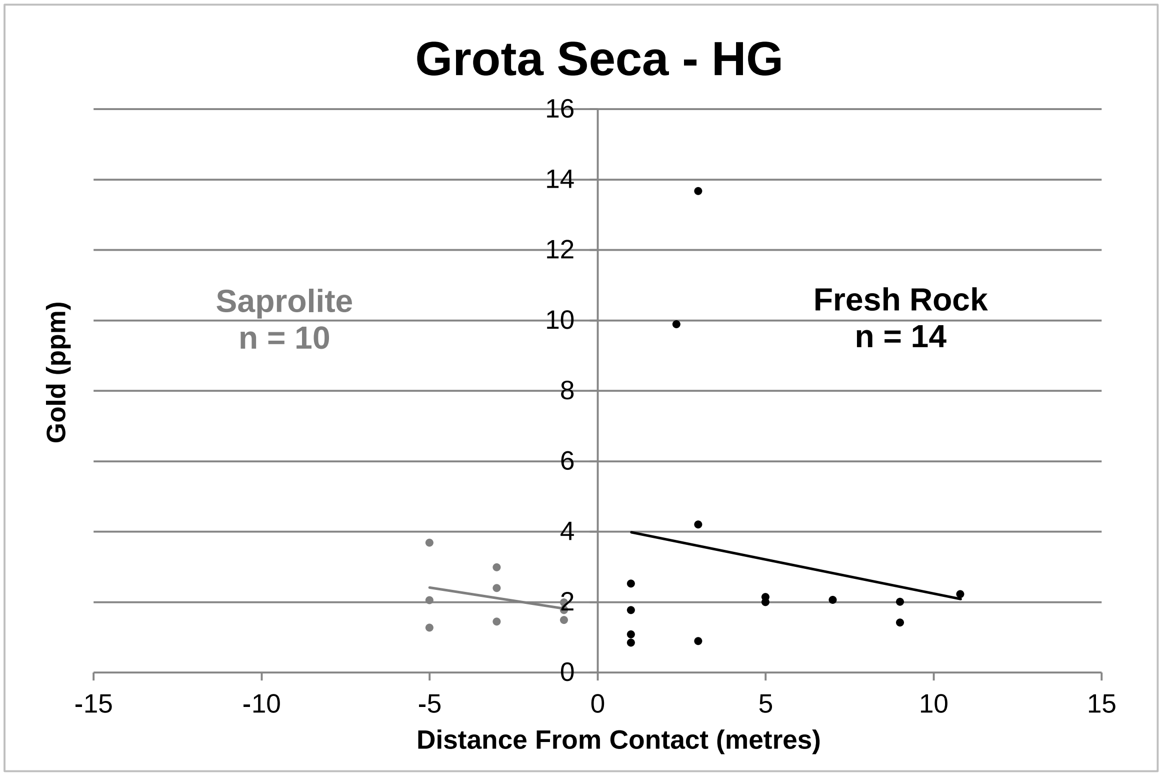


Contact Plot of Composites from MG Domain from Ouro Verde (top) and Grota Seca (bottom) within 20-metre Boundary of Saprolite-Fresh Domains





Contact Plot of Composites from MG Domain from Junction (top) and Greia (bottom) within 20-metre Boundary of Saprolite-Fresh Domains



Contact Plot of Composites from HG Domain from Grota Seca within 20-metre Boundary of Saprolite-Fresh Domains