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TECHNICAL REPORT ON THE TITIRIBI PROJECT

DEPARTMENT OF ANTIOQUIA, COLOMBIA

LATITUDE 5° 56' 15" NORTH
LONGITUDE 76° 01'WEST

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Prepared For:

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GLOSSARY OF SELECTED TERMS

Term	Definition
Ordinary Kriging	A statistical weighted average process whereby the grade of a block is estimated by weighted average from surrounding assay or composite samples. The weights are established to minimize the error of the estimate.
Nugget (as used in variography)	Variance of samples taken at the same location or with zero separation between the two samples.
Range (as used in variography)	Distance at which the variogram model reaches a constant value.
Spherical Model	A form of equation used to approximate the variogram function for input to other tools such as kriging.
Sill	The total variance of widely spaced samples, approximately equal to the variance of the statistical population in general.
Stope	An underground excavation from which ore is being extracted.
Variogram	A statistical tool that measures how similar samples are likely to be with various separation distances. The plot of a variogram shows variance versus distance between samples.
Variography	A statistical analysis technique where statistics are calculated as a function of the spatial location of the data points.

LIST OF ABBREVIATIONS

AAS or AA	Atomic Absorption Spectroscopy
Ag	Silver
Au	Gold
CIM	Canadian Institute of Mining Metallurgy and Petroleum
Cu	Copper
DDH	Diamond Drill Hole
g	grams
GPS	Global Positioning System
GRG	Gravity Recoverable Gold
gpt or g/t	grams per tonne
ITR	Independent Technical Report
kg	kilogram
km	kilometers
km^2	square kilometer
m	meters
m^2	square meters
m^3	cubic meters
Ma	million years
Mo	Molybdenum
Mt	million tonnes
NSR	net smelter return
ppm	parts per million
OK	Ordinary Kriging
QA/QC	Quality Assurance/Quality Control
tonnes or t	metric tonnes
tpy or tpa	tonnes per year

1.0 EXECUTIVE SUMMARY

1.1 BACKGROUND

Behre Dolbear & Company (USA), Inc. (Behre Dolbear) was retained by Brazil Resources, Inc. (Brazil Resources) to prepare an Independent Technical Report (ITR) on the Titiribi Project (Project), Department of Antioquia (Province), Colombia, compliant to Canadian National Instrument (NI) 43-101. This report constitutes an update of the ITR, *Technical Report on the Titiribi Project Department of Antioquia Colombia* 2013 by the authors (Mr. Joseph A. Kantor and Dr. Robert E. Cameron) for Sunward Resources, the prior owner of the project. This was an update to the ITR published in 2012, which in turn was an update to the 2011 ITR when the Mineral Resources present at the Project were first reported. Behre Dolbear assigned Mr. Joseph A. Kantor and Dr. Robert E. Cameron, both Qualified Professionals as recognized under NI 43-101, to undertake the project. Mr. Kantor and Dr. Cameron are the authors of this report and the previous 2011, 2012, and 2013 reports.

This updated report is required, as Brazil Resources announced in August 2016 that it had entered into an agreement to purchase the project from NovaCopper. NovaCopper purchased the project from Sunward Resources Limited (Sunward). NovaCopper did not undertake any additional exploration drilling or other technical work during their tenure. However, this updated report reflects changes in metal prices and updated resource estimations based upon modified resource parameters. Much of this new report relies heavily on previously completed NI 43-101 Technical Reports, prepared by the authors in 2011, 2012, and 2013, particularly as historic data and background information has not changed.

Brazil Resources is the holder of 100% of the Project in Colombia, free of royalties. The Project hosts several gold-copper exploration properties in a historic gold mining district located near the small town of Titiribi, Department of Antioquia (Province). The Titiribi Mining District is located approximately at latitude 5°56’15”N and longitude 76°01’W and is about 70 kilometers (km) southwest of Medellin, Colombia. Historic production in the Titiribi Mining District has occurred over hundreds of years and is estimated at 1.5 to 2.0 million ounces of gold equivalent (Emmons, 1937). The Project lies between the elevations of 1,200 meters to 2,200 meters.

Sunward held 5 concessions and 4 exploration licenses that totaled about 3,919 hectares or about 9,684 acres that have been consolidated by Resolution 0117702, signed December 2, 2010, into one Mineral Title (Concession Contract L5085) with an exploration term of 3 additional years, and is valid for 30 years (starting 2007), and renewable for 20 more years. Brazil Resources holds Concession Contract #L5085 expiring April 18, 2043 and is in the process of acquiring 3 Concession Contracts (QF1-08011, OHM-08011, and QHR-08001) covering gaps in the original 9 concessions and licenses.

The Cerro Vetas-NW Breccia-Chisperos complex is a bulk tonnage gold and copper porphyry deposit directly related to several interconnected Cerro Vetas diorite porphyry centers but also hosted in the immediate contact aureoles and adjacent breccias. Chisperos hosts intrusive and contact aureole mineralization. Mineralization hosted in the Cerro Vetas diorite porphyry is disseminated and fracture controlled. The principal metallic minerals are native gold, chalcopyrite, pyrite, and magnetite. Gold values within the Cerro Vetas diorite porphyry normally correlate well with copper content and magnetite. The largest diorite intrusive occurs within the Cerro Vetas zone with smaller plugs and dikes found within the NW Breccia and Chisperos zones. The diorite porphyry hosts typical porphyry copper alteration with a barren to weakly mineralized pro-grade potassic core, surrounded by a well-mineralized phyllic zone, and a weakly mineralized retrograde argillic zone. The outermost propylitic alteration zone is widespread. Interpretation of geophysical and drill hole data suggests that potential higher-grade gold-copper zones exist as a domed contact-related shell in the intrusive where brecciated diorite with xenolithic fragments of sedimentary rocks was intercepted in drilling. This higher-grade domed shell is, at least in part, coincident with the phyllically altered intrusive-sedimentary contact breccia.

A second style of mineralization is gold-only mineralization developed in diatreme breccia in the NW Breccia and Chisperos zones. At NW Breccia, a separate diorite plug hosts gold and copper mineralization while the diatreme breccia hosts both gold-only and gold-copper mineralization. The reason for separate gold-only and gold-copper zones in the diatreme breccia is unknown but may be related to proximity to diorite dikes.

Similar to the NW Breccia, Chisperos hosts gold-copper mineralization in diorite plugs and dikes, gold-only mineralization in diatreme breccia, but also hosts substantial epithermal, lower-temperature generally gold-only mineralization within parallel to sub-parallel mineralized zones that are both stratigraphically and structurally controlled and hosted in a sedimentary-volcanic rock sequence. The near vertical diorite plugs and dikes consistently strike east-northeast and appear to emanate from the principal stock at the Cerro Vetas zone with all intruding structural weaknesses developed in the earlier diatreme breccia. Northwest-striking, steeply dipping faults are theorized to be the channel ways for auriferous hydrothermal fluids that mineralized shallow-dipping, favorable stratigraphic hosts; the Amaga Formation/basement contact; diatreme breccia; and possibly shallow-dipping bedding-plane fault zones.

The Cerro Vetas, NW Breccia, and Chisperos zones host NI 43-101 guideline-compliant resources. Exploration during 2013 discovered copper-dominant and gold-copper mineralization at the Maria Jo prospect, a portion of which may be an extension of the Cerro Vetas and Chisperos zones and a portion related to a separate but related Cerro Vetas style intrusive body.

Further exploration potential exists to expand the known resources at Cerro Vetas-NW Breccia-Chisperos particularly along the alignment of magnetic highs hosting the Cerro Vetas, Maria Jo, and Junta mineralized zones. Drilling at Maria Jo has intersected intervals of copper-dominant and gold-copper mineralization related to a diorite intrusive where surface exposures are lacking due to a thin veneer of post-mineral gravel. Several other prospects lie a few kilometers to the south and southeast of the Cerro Vetas-NW Breccia-Chisperos complex. The Junta property hosts mineralized stock-like diorite porphyry intrusive, as does the Porvenir property; the Candela property hosts thick zones of mineralized hornfels and diorite porphyry. The Margarita and Rosa properties are very early-stage targets.

Through February 2013, 270 diamond drill holes, totaling 144,778.51 meters have been drilled at the Project, including 184 diamond drill holes, totaling 106,250.06 meters at Cerro Vetas, NW Breccia, and Chisperos. At the peripheral targets at Junta, Porvenir, Candela, Maria Jo, Rosa, and Margarita, 86 holes, totaling 38,528.45 meters of core, have been drilled. The 16 holes drilled in 1998 by Gold Fields have not been used in the resource estimation but are counted in the total of 270 diamond drill holes. Since February 2013, no new drilling has been undertaken at the Project.

As no new drilling has been undertaken since the writing of the last NI 43-10 Technical Report, this updated report relies heavily on the previously completed work. The authors opine that the previous work, undertaken by Sunward, followed industry best standards and proper chain of custody. All diamond drill core was diligently logged and documented.

Quality Assurance/Quality Control (QA/QC) data is extensive and all industry recognized procedures have been followed. The authors' previous review of standard and blank assay data shows little bias. Duplicate assays of higher-grade gold intervals demonstrate some minor concerns due to suspected coarse gold and coarse-grained sulfide-hosted gold. There is a minor negative bias during re-assaying of pulps that may be related to heavier minerals gravitating toward the bottom of the pulp envelope. For the 2013 update, the authors coordinated a verification program that included quartering specific core intervals and a program of re-assaying 87 pulp samples from the Project area. The results generally verified the original assays but demonstrated some concerns with suspected coarse gold-nugget effect and some concerns with possible mislabeling original pulp envelopes.

In 2012, TJ Metallurgical Services, located in Scotland, developed a suitable test work program (Phase 3) that would identify an optimized process flow sheet and determine the key metallurgical design parameters. The United Kingdom laboratory of Wardell Armstrong International (WAI) was selected and 3 samples weighing 270 kilograms (kg) to 300 kg from Cerro Vetas, NW Breccia, and Chisperos were sent to the Cornwall laboratory. Results include:

- For all the samples, around 10% to 12%, of the gold, was recoverable to a gravity concentrate. The gold was not liberated and was generally locked with sulphides but was amenable to cyanidation. For Cerro Vetas, 57% was recoverable to a copper concentrate and 13% to a pyrite concentrate. For NW Breccia and Chisperos, the majority was associated with pyrite and was also amenable to cyanidation.
- Samples of Cerro Vetas and NW Breccia were sent for test work at FLS-Knelson (FLS). FLS reported that for Cerro Vetas and NW Breccia there was a significant GRG (Gravity Recoverable Gold) element in both samples of 39.8% and 64.8%, respectively. More importantly, they stated that the introduction of a Knelson circuit and a cyanidation circuit would lead to an additional gold recovery of 1.2% to 1.8% and 4.0% to 5.6% for Cerro Vetas and NW Breccia, respectively. Chisperos was not tested.
- Locked Cycle flotation tests on Cerro Vetas samples indicate that a saleable copper concentrate can be produced with a copper recovery of 90% and a gold recovery of 77%. The flotation of a pyrite concentrate recovers a further 6% of the gold. The best results indicate a 21.7% copper concentrate grade with up to 41.8 grams of gold per tonne.
- Locked Cycle flotation tests indicate that over 90% of the gold can be recovered to a pyrite flotation concentrate for both NW Breccia and Chisperos. A 6-test optimization program showed that it was not necessary to re-grind the pyrite flotation concentrate to achieve high gold recoveries and an average gold recovery of 91.7% with a cyanide consumption of 5.2 kg/tonne was achieved.
- The environmental characterization tests did not report any issues with regard to acid generation.

Brazil Resources is active in community affairs focusing upon dialogue and training on responsible mining; updates on the Project status, support for the local home for the elderly, support for 4 local productive initiatives, and support for local cultural and sports events.

1.2 RESOURCES

The authors are of the opinion that, based on a cutoff of 0.3 grams of gold per tonne, the mineral deposits covered by this review, hold approximately 51.6 million tonnes (Mt) of Measured Mineral Resources averaging 0.49 grams of gold per tonne and 0.17% copper, and Indicated Mineral Resources of 234.2 Mt of which 132.4 Mt averages 0.48 grams of gold per tonne and 0.16% copper and 101.8 Mt averaging 0.54 grams of gold per tonne with only traces of copper (Table 1.1). In addition, the Project has approximately 207.9 Mt of Inferred Mineral Resources of which 70.8 Mt averages 0.43 grams of gold per tonne and 0.05% copper, and 137.1 Mt averaging 0.52 grams of gold per tonne with only minor traces of copper (Table 1.2). These Mineral Resources conform to the definitions in the *2014 CIM Definition Standards – for Mineral Resources and Mineral Reserves*. No Reserves conforming to CIM standards have been estimated for this report, as Brazil Resources has not advanced evaluation work to a point of developing mine plans, production schedules, and economic analysis. Also, no Resources have been estimated for the mineralization at Junta, Maria Jo, Candela, and Porvenir, as an estimation would be premature at these early stage exploration targets.

TABLE 1.1
TITIRIBI MEASURED AND INDICATED MINERAL RESOURCE
(0.3 G/T CUTOFF AS OF 14 SEPTEMBER 2016)

Area	Class	Million Tonnes	Au (g/t)	Cu (%)	Contained Metals				Au Equivalence[1]	
					Au (kg)	Au (million oz)	Cu (tonnes)	Cu (million lbs)	(g/t)	(million oz)
Cerro Vetas	Measured	51.6	0.49	0.17	25,380	0.82	88,486	195.1	0.78	1.29
	Indicated	132.4	0.48	0.16	63,949	2.06	208,317	459.3	0.74	3.17
Chisperos	Indicated	62.1	0.48	-	30,077	0.97	-	-	0.48	0.97
NW Breccia	Indicated	39.7	0.62	-	24,541	0.79	-	-	0.62	0.79
Total Measured + Indicated		**285.8**	**0.50**	**-**	**143,947**	**4.63**	**296,804**	**654.4**	**0.68**	**6.22**

[1]Gold Equivalence estimated using $1,300 per ounce gold at 83% recovery and $2.90 per pound copper at 90% recovery.

TABLE 1.2
TITIRIBI INFERRED MINERAL RESOURCE
(0.3 G/T CUTOFF AS OF 14 SEPTEMBER 2016)

Area	Class	Million Tonnes	Au (g/t)	Cu (%)	Contained Metals				Au Equivalence[1]	
					Au (kg)	Au (million oz)	Cu (tonnes)	Cu (million lbs)	(g/t)	(million oz)
Cerro Vetas	Inferred	70.8	0.43	0.050	30,326	0.98	65,323	77.9	0.51	1.16
Chisperos	Inferred	51.1	0.45	-	23,110	0.74	-	-	0.45	0.74
NW Breccia	Inferred	86.0	0.56	**-**	47,775	1.54	-	-	0.56	1.54
Total Inferred		**207.9**	**0.49**	-	**101,211**	**3.25**	**35,232**	**77.9**	**0.51**	**3.44**

[1]Gold Equivalence estimated using $1,300 per ounce gold at 83% recovery and $2.90 per pound copper at 90% recovery.

The authors would also note that the Inferred Resource estimates have a great amount of uncertainty as to their existence and economic and legal feasibility. It cannot be assumed that all or any part of an Inferred Mineral Resource will ever be upgraded to a higher category. Under Canadian NI 43-101 Guidelines, estimates of Inferred Mineral Resources may not form the basis of feasibility or pre-feasibility studies or economic studies except for a preliminary economic assessment or scoping study. Investors are cautioned not to assume that any or all of the Inferred Mineral Resources exist or are economically or legally mineable.

1.3 RECOMMENDATIONS

1.3.1 Geologic, QA/QC, and Exploration Recommendations

- The known deposits and early stage exploration projects have focused upon magnetic highs with coincident gold-copper soil anomalies. In 2012, Behre Dolbear recommended a preliminary drill test at a magnetic high that did not host geochemical anomalies, along the Cerro Vetas-Junta structural zone. This recommendation resulted in the discovery of significant copper-dominant and gold-dominant mineralization at the margins of, but north of, the magnetic high and now termed the Maria Jo prospect. The authors would recommend further exploration drilling at Maria Jo, focused along the Cerro Vetas-Junta structural trend, and over the magnetic high, which is presumably a diorite intrusive center.

- The relationship between magnetic highs, intrusive centers, and mineralization is well established. An unexplored magnetic high occurs about 700 meters southeast of the Junta magnetic high along the trend of the Cerro Vetas-Maria Jo-Junta magnetic highs. This trend suggests a common source along a controlling deep-seated structural weakness. Although there are no geochemical anomalies related to this un-named and unexplored magnetic feature, the analogy with Maria Jo, where the causative intrusive and mineralized contact aureole are covered by post-mineral gravel, is plausible. If additional geologic mapping cannot find the source of the magnetic high, Behre Dolbear recommends that some initial exploration drill holes be drilled in and peripheral to the magnetic high.

- Future geologic studies focus on a more in-depth study of small-displacement faults that are not depicted on the present geologic plan and cross sectional maps, but appear to be important structural-mineralizing controls, particularly at Chisperos.

- QA/QC procedures are good; however, it is recommended, in the future, that:
    - More diligence be paid to explain outlier results on standards to ensure that the standard used was correctly recorded in the database.
    - More care is needed in reviewing outlier results (duplicate or re-assay) and outliers should be repeated, as necessary, to determine if erratic results are caused by coarse gold, error in sample identification, etc.
    - Greater emphasis should be placed on additional re-run assays on higher-grade assays as they have an inordinate effect on grade.

1.3.2 Resource and Modeling Recommendations

If additional infill drilling is contemplated at the Chisperos and the NW Breccia areas, additional variography work should be completed and the detailed three-dimensional geologic models updated.

1.3.3 Social and Cultural Recommendations

- Brazil Resources should continue Sunward's social and community relations programs. These programs have established "lines of communication" with the local and surrounding communities concerning mining and the Titiribi Project along with aiding the local elderly population, and supporting cultural and sporting events.

- If a decision has been made to move forward with the Project, it is recommended that more formal social and community programs should be established. Each program should be developed to address stakeholder concerns and needs to be sustainable.

2.0 INTRODUCTION

Behre Dolbear & Company (USA), Inc. (Behre Dolbear) was retained by Brazil Resources, Inc. (Brazil Resources) to prepare an Independent Technical Report (ITR) on the Titiribi Project (Project), Department of Antioquia (Province), Colombia, compliant to Canadian National Instrument (NI) 43-101. This report constitutes an update of the ITR, *Technical Report on the Titiribi Project Department of Antioquia Colombia* 2013 by the authors (Mr. Joseph A. Kantor and Dr. Robert E. Cameron) for Sunward Resources, the prior owner of the project. This was an update to the ITR published in 2012, which in turn was an update to the 2011 ITR when the Mineral Resources present at the Project were first reported. Behre Dolbear assigned Mr. Joseph A. Kantor and Dr. Robert E. Cameron, both Qualified Professionals as recognized under NI 43-101, to undertake the project. Mr. Kantor and Dr. Cameron are the authors of this report and the previous 2011, 2012, and 2013 reports.

Brazil Resources announced on September 1, 2016 that it had acquired, through its wholly-owned subsidiaries, a 100% interest in the properties, free of royalties, from Sunward Investments, a subsidiary of NovaCopper, who in turn had purchased the property from Sunward Resources Limited (Sunward). The Project hosts several gold-copper exploration properties in a historic gold mining district located near the small town of Titiribi. Titiribi is located about 70 km southwest of Medellin, Colombia.

The authors visited the Project in 2011, 2012, and 2013. As no additional drilling or other technical work has been undertaken since the writing of the last report in 2013, the authors have not made a new site visit. In 2011, the authors visited the principal deposits at Cerro Vetas, NW Breccia, and Chisperos, observed drilling and sampling techniques, and examined rock exposures and drill sites at Junta, Margarita, and Porvenir. In 2012, the authors focused upon the examination of mineralized cores from Cerro Vetas, NW Breccia, Chisperos, and the peripheral target at Junta. During the 2013 site visit, the authors reviewed all technical aspects including but not limited to geology; exploration results; drill cores from the Cerro Vetas, NW Breccia, Maria Jo, Junta, and Candela; QA/QC; geologic cross sectional and plan modeling; and resource block modeling procedures and techniques. Special emphasis was placed upon a more rigorous three-dimensional geological modeling procedure; metallic screen assay results; QA/QC; and resource modeling.

2.1 UNITS, DEFINITIONS, AND ABBREVIATIONS

The metric system is used throughout this report and the currency used is the United States dollar (US$) unless specifically stated otherwise.

3.0 RELIANCE ON OTHER EXPERTS

This report updates the 2013 NI 43-101 ITR and draws heavily from the previously published NI 43-101 Technical Reports, also written by the authors, as no new data has been collected. The previous NI 43-101 Technical Reports used information provided by Sunward staff members during the 2011, 2012, and 2013 site visits. The authors independently evaluated the provided information and wrote all sections of this report, except where noted. The authors express their appreciation for the following Brazil Resources personnel with their assistance in gathering up-dated information for our review.

- Garnet Dawson, CEO, Brazil Resources
- Maria Jose Mejia Lara, Country Manager

The authors were provided with documents relating to concessions, resolutions, certificates of mineral registration, certificates of good standing, and legal opinions from Brazil Resources' legal counsel (Dentons, Cardenas & Cardenas) that all titles (concessions) are in force and free of any liens and encumbrances. The authors are not qualified to express a legal opinion with respect to the property titles and current ownership and possible encumbrance status, and therefore, have relied on Brazil Resources for this information and disclaim direct responsibility for such titles and status data.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 LOCATION

The Titiribi Mining District is located at approximately latitude 5°56’15”N and longitude 76°01’W and is about 70 km southwest of Medellin, Colombia (Figure 4.1). The Project lies within a rectangle defined by 1293400N to 1293900N and 930000E to 930500E (Magna Sirgas) and between elevations of 1,200 meters to 2,200 meters. Colombia updated the Bogota National Grid to the regional Magna Sirgas Grid to correspond better to the South America International Grid. In 2012, all Project coordinates were converted to the Magna Sirgas Grid.

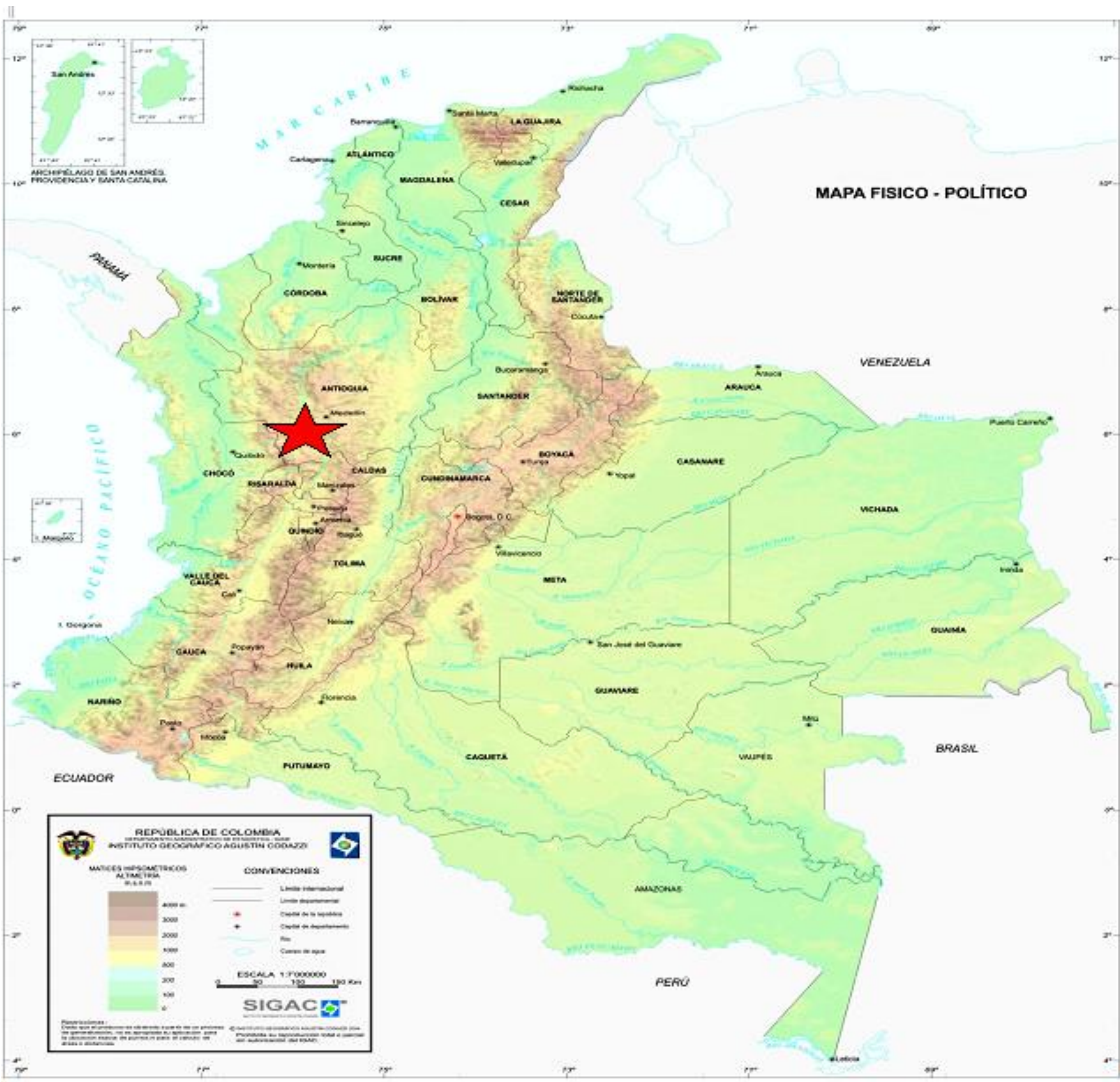


Figure 4.1. Generalized location map of the Titiribi Project in Colombia (Source: Sunward, 2011)

Originally, Sunward held 5 concessions and 4 exploration licenses that total about 3,919 hectares or about 9,684 acres. The exploration licenses consisted of L4982, L4983, L4984, and L5085; and the concessions consisted of H5820, H5820B, H5949, H5949B, and H5963. Based upon Resolution 0117702 of December 2, 2010, the 9 licenses and concessions were consolidated into 1 Mineral Title (Concession Contract # L5085) with an exploration term of 3 additional years, which is valid for 30 years (starting 2007), and renewable for 20 more years.

Brazil Resources holds the Concession Contract #L5085, which expires on April 18, 2043. Three additional Concession Contracts (QF1-08011, OHM-08011, and QHR-08001) are in process, which would obtain mineral rights covering small gaps between the original 9 concessions.

Figure 4.2 is a map showing the Titiribi Concession as well as the two applications that were submitted to cover small fractional gaps.

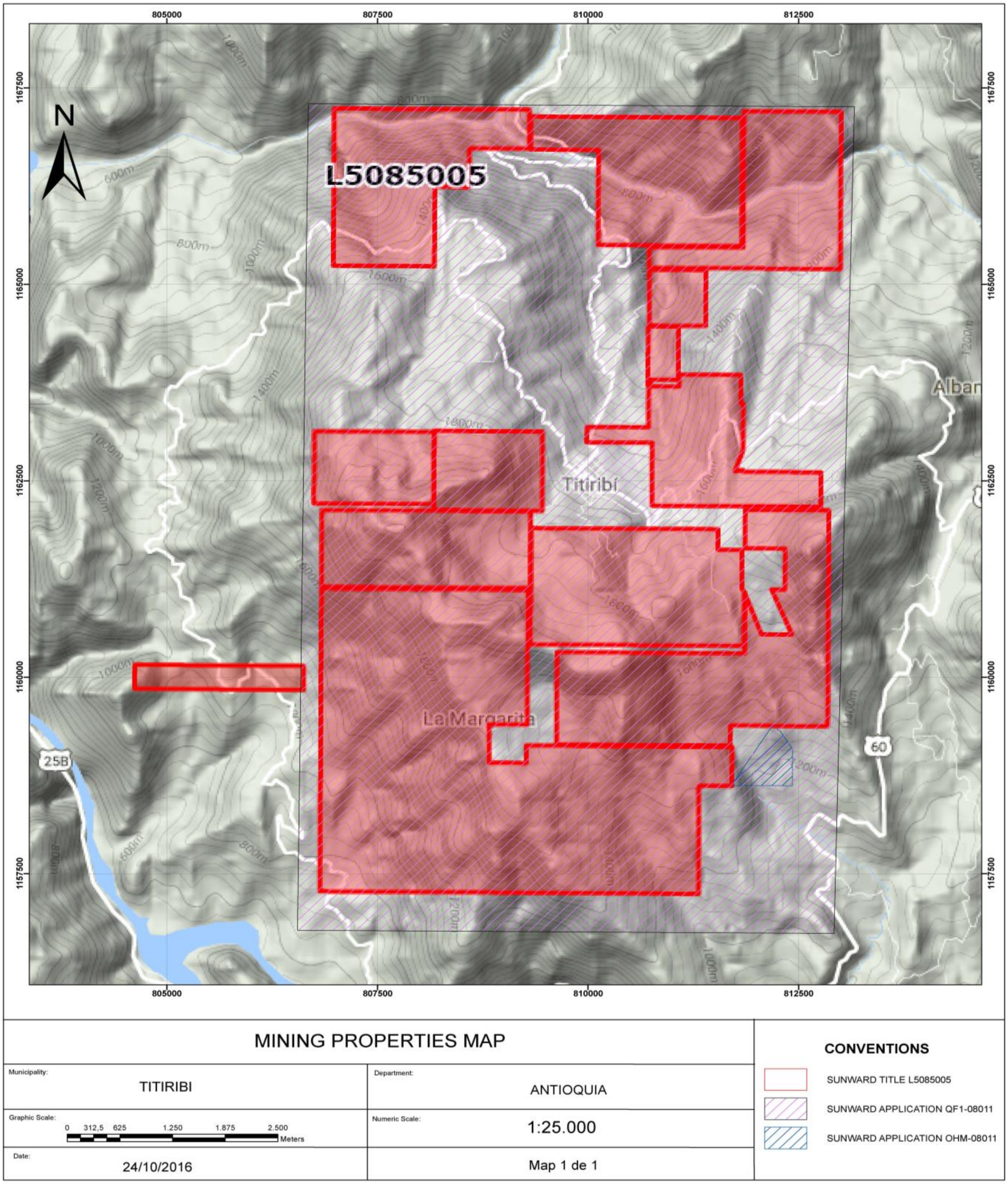


Figure 4.2. Titiribi Concession and Concession Contract Applications covering small gaps (Source: Brazil Resources, 2016)

4.2 PROJECT TENURE

Modern exploration on the Project commenced in 1992 with Muriel Mining South America (Muriel) acquiring a significant land position in the district. Muriel entered into several joint ventures. In 2009, Gold Plata Resources Limited (GRL) (formerly Muriel) entered into a joint venture with Sunward. Sunward subsequently reached an agreement with Gold Plata Mining International Corporation (GMIC), parent company to GRL, to earn up to 80% of the Project. A revised agreement (September 2010) allowed Sunward to take a 100% interest in the Project and to acquire the 2% net smelter return (NSR), in exchange for the issuance of 6.0 million shares of Sunward. On November 24, 2010, Sunward announced it had acquired 100% of the shares of GRL, the holder of 100% of the Project, free of royalties pursuant to the revised September 2010 agreement.

NovaCopper acquired the Titiribi Project on June 19, 2015, as part of its acquisition of Sunward Resources. Brazil Resources announced on September 1, 2016 that it had completed a share purchase agreement with NovaCopper, Inc., pursuant to which it acquired Sunward Investments Limited, a subsidiary of NovaCopper, which owned 100% of the Titiribi Gold-Copper Project. Brazil Resources paid 5 million shares and 1 million warrants exercisable at $3.50 per share for 2 years in exchange for Sunward Investments.

4.3 PERMIT TENURE

All disclosures concerning permits, exploration, and mining codes; rules, regulations, and fees are based upon a title opinion prepared by Colombian counsel and commissioners. No attempt was made to confirm the legality of licenses conferring the rights to mine, explore, and produce gold and copper and other metal products and accordingly, the authors disclaim any responsibility or liability in connection with such information or data. The authors are not qualified to express any legal opinion with respect to the property titles and current ownership, Colombian mining and exploration concession rules, and possible encumbrance status, and therefore, disclaim direct responsibility for such titles and property status representations.

4.4 PERMIT SURFACE FEES

During the exploration, evaluation, and construction stages, concessions require an annual fee or "canon" as set out in Article 230 in the Colombian Ley de Minas (Mining Law). The authors are not qualified to express any legal opinion with respect to the surface access agreements, and therefore, disclaim direct responsibility for such surface access representations.

4.4.1 Surface Rights and Access Agreements

In Colombia, there is no need to have surface ownership to access the sub-soil mineral rights. The Mining Law provides for mining rights and the expropriation of the surface, in case it is required, since mining is considered to be in the public's interest. Brazil Resources currently holds surface agreements for the on-site office and core storage. New land access agreements will need to be re-established.

To re-establish surface agreements, Colombian mining law allows for two choices:

1) either negotiate a new agreement and fees directly with owners or
2) request the local authority (the mayor's office), to legally set the agreement fee to be signed with the owners.

Surface agreements are needed when the nature of exploration work (drilling, drilling pads, access roads, trenches, etc.) do not allow the surface owner to have full utilization of the land. No native title claims exist over the Project area.

4.5 NATURE AND EXTENT OF TITLE

The concessions are held 100% by Brazil Resources, through its wholly-owned subsidiary, Sunward Resources Sucursal Colombia. The concessions are issued under the terms of the Colombian Ley de Minas (2001) under Article 14 and Article 15.

> ***Article 14. Mining Title.*** *"Mining title" whereby "the right to explore and exploit the mines of State's ownership by means of a contract of mining concession, duly awarded and registered at the National Mining Register."*
>
> ***Article 15. Nature of the Rights of the Beneficiary.*** *"The concession contracts all other titles emanated from the State which are referred in the above Article, do not transfer to the beneficiary the right of ownership over minerals in situ but to establish, in an exclusive and temporal manner within the area granted, the existence of minerals in a quantity and quality that can be usable, and take possession by means of its extraction or capture of them and to impose on third parties' properties with necessary easements for an efficient exercise of such activities."*

There is no differentiation in the law regarding foreigners or foreign companies operating in Colombia, as described in Article 18 and Article 19 of the Mining Code.

> ***Article 18. Foreigners.*** *The natural persons and foreign corporate persons acting as proponents or contractors of mining concessions will have the same rights and obligations as Colombian natives. The mining and environmental authorities cannot, in their field of competence, demand from them any additional or different requirements, conditions and formalities, save those expressly appointed in this Code.*
>
> ***Article 19. Foreign Companies.*** *The foreign corporate persons will be able to, through a representative domiciled in Colombia, present and transact proposals. For the execution of the concession contract, a branch, affiliate or subsidiary should be established, domiciled in the national territory. This requirement will also be demanded from such persons in order that they dedicate to the exploring and exploiting of mines of private ownership, as owners of the corresponding right or as operators or contractors of the owners or successful bidders. They should duly assure before the granting authority, the liabilities contracted in this country, either with the guarantee of the work's or service's beneficiary or an endorsement of a banking institution or an insurance company that might be operating in Colombia.*

4.6 PROPERTY BOUNDARIES

The property boundaries of each of the concessions are stated as Bogotá National Observatory Grid (Bogotá Sector) coordinates. It should be noted, however, that Colombia updated the Bogota National Grid to the regional Magna Sirgas Grid to correspond better to the South America International Grid. In 2012, all Project coordinates were converted to the Magna Sirgas Grid.

4.7 ROYALTIES, AGREEMENTS, AND ENCUMBRANCES

4.7.1 Royalties

Under Article 227 of the Colombian Mining Code (Law 685), production of non-renewable natural resources generates a royalty payment that may consist of a percentage (fixed or progressive) of the exploited gross product, sub-products, and by-products, payable in cash or in kind. Presently, precious metals (gold and silver) incur a gross royalty of 4% to the Colombian government. However, the payment is based on 80% of the PM fix on the London Bullion Market for an effective rate of 3.2%. The royalty on copper is 5%.

> ***Article 227. Royalties.*** *In conformity with Articles 58, 332 and 360 of the Political Constitution, every exploitation of non-renewable natural resources of state ownership generates royalties as a compulsory counter-benefit. This consists in a percentage, fixed or progressive, of the exploited gross product, object of the mining title, and its sub-products, calculated or measured on the mine head, payable in currency or in kind. It will also cause royalties the reception of minerals coming from natural sources that are technically considered mines.*
>
> *In the case of private owners of the subsoil, those should pay no less than 0.4% of the value of the production calculated or measured on the mine head, payable in currency or in kind. Those funds will be collected and distributed in conformity with the dispositions of Act 141 of 1994. The Government will rule whatever is pertaining to the matter.*

The Project is not subject to other royalties (Brazil Resources, 2016).

4.8 ENVIRONMENTAL LIABILITIES

The current environmental liabilities consist of the need to rehabilitate areas of cleared vegetation created during the construction of access roads, trails, and drill pads. All programs are covered by Environmental Management Plans, which are monitored by the Ministry of Environment (Corantioquia) who carry out regular site inspections. Brazil Resources management has plans for re-vegetation of affected areas, water monitoring, and controls for slope failure and mass movements.

Although not environmental in nature, there are two potential liabilities pending.

- In 2013, Corantioquia notified Sunward Colombia that it had failed to obtain a water permit. In 2015, Sunward Colombia received an inquiry notice from Corantioquia along with the violations. Sunward Colombia's counsel has submitted a letter to Corantioquia opposing the violations. A decision is pending and the penalty amount is unknown at this point. Brazil Resources' actions will depend upon the results of the pending decision.

- One civil suit with the La Zulia Farm is pending at the 5th Civil Court in Medellin. A civil claim against the Company, whereby two claimants seek compensation for a breach of the Mining Easement Agreement executed on July 25, 2012 regarding the "La Zulia" property in Titiribi, Antioquia. At the time of this report, the process is currently in the evidentiary hearing stage.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 ACCESSIBILITY

Titiribi Township, with a population of approximately 15,000 people, is located approximately 70 km southwest of Medellin (3.2 million people), in the Department of Antioquia (Province), on the northwestern margin of Colombia's Central Cordillera and is near the Cauca River. Access is by paved road from Medellin to the historic town of Titiribi. The Project area is only a few kilometers from Titiribi and access is by gravel and dirt roads. Site access is generally by four-wheel drive, ATV, mule, and horse because of the steep nature of the terrain. Access to the area is available year round, but some parts of the Project area can become inaccessible during wetter months.

5.2 CLIMATE

The Project is located at an elevation from 1,200 meters to 2,200 meters above sea level. The highest peak is at Cerro Vetas. The climate is mild and sub-tropical. The average annual temperature is 21°C. The region is entirely vegetation covered and is mostly pasture and crop lands. Rainfall averages about 1,500 millimeters (mm) annually. Running water is abundant but flow rates fluctuate seasonally. Rainfall has a bimodal distribution with the wettest months in March to May and again from September to December.

5.3 LOCAL RESOURCES

Titiribi Township predominantly supports farming and ranching and contains local services with basic amenities. Titiribi has modern communication facilities, a local hospital offering basic medical facilities, and all essential services to support small- to medium-scale mining operations. A large and educated workforce is available in Medellin.

5.4 INFRASTRUCTURE

No large-scale mining infrastructure is available in the area. Small-scale and artisanal mining is commonplace in the region and historically well developed at the El Zancudo Mine some 3 km north of Titiribi. Medellin, approximately 70 km northeast, is a city of 3.2 million people and has a well-developed infrastructure, including 2 airports.

A large port (Buenaventura) is located about 500 km to the west and a hydroelectric power station is available via the National Grid (at 500 kilovolts [kV]) some 3 km distant from the license boundary. Local electrical infrastructure is restricted to domestic supply from a low-tension grid.

The area is well serviced by roads.

As the Project is still in an exploration stage, it is premature to discuss mining personnel, potential tailings storage areas, potential waste disposal areas, potential heap leach, and processing plant sites. However, it would be expected that such sites would likely be out of the view of the town of Titiribi.

5.5 PHYSIOGRAPHY

The topography is steep to abruptly mountainous and is dissected by steeply incised, active drainages typical of the central Colombian Andés. The area was once covered by jungle but has long since been cleared to make way for pasture land for cattle grazing and coffee plantations. The Project area has moderate to steep relief, elevations range from about 1,200 meters to 2,200 meters above sea level. The series of hills and valleys dominate the geomorphology and many appear to be related to geologic structures.

Soil development, typically saprolitic, is poor to moderate but vegetation is generally thick with grasses to moderately sized trees. A network of small paths and fence lines identifying land ownership cuts the Project area. General land use is agricultural and ranching: principally coffee, sugar cane, and dairy and beef cattle. Artisanal mining, including precious metals and coal, continues to form a limited part of the regional economy. Figure 5.1 is a photo looking southwest at the town of Titiribi and the project lands above the town. Cerro Vetas is mostly beyond the tree-covered peak in the foreground. Chisperos is partially on the far right side of the photo. Figure 5.2 is a three-dimensional view looking southeast outlining the Titiribi townsite; Cerro Vetas-NW Breccia-Chisperos to the southwest of Titiribi; Maria Jo (a new gold-copper discovery immediately south of Titiribi; and several of the other exploration targets.

Figure 5.1. Town of Titiribi and Chisperos (looking south); Cerro Vetas on the upper right (Source: Behre Dolbear, 2011)

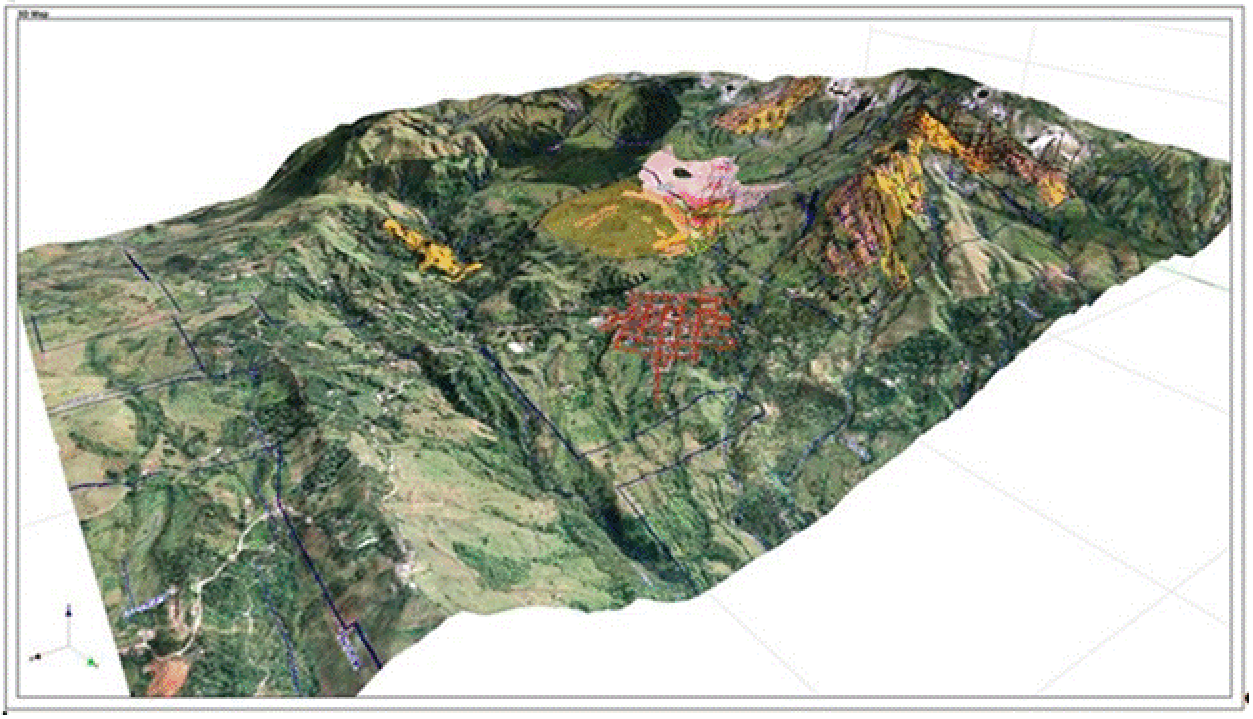


Figure 5.2. Three-dimensional view of Titiribi and the gold-copper deposits and exploration areas, looking southeast (Source: Sunward, 2013)

6.0 HISTORY

6.1 OVERVIEW

Historical gold production in Colombia, since the Spanish conquest in 1537 until the start of the California gold rush, is estimated to be between 29.0 million ounces and 35.0 million ounces, making the country the largest gold producer of the Spanish empire and the second in South America, after the much larger Brazil (Restrepo, 1883). Approximately 75% of this gold production came from the Departments of Antioquia (Province) and Caldas. Colombian gold production, between 1514 and 1934, had been estimated at 49.0 million ounces (Emmons, 1937). Two-thirds of that estimated historic gold production was from placer operations. The Banco de la Republica (Shaw, 2000) estimated subsequent Colombian production through 2000 at 30.0 million ounces.

Prior to the historic production, there was a long period of undocumented pre-historic production. Farmers, potters, gold miners, and goldsmiths of the Quimbaya culture (500 BC to 1600 AD) occupied the Middle Cauca region surrounding the Project area for 2,000 years before the Spanish conquest. The culture was noted for some of the finest gold workmanship in Colombia and was part of the greater Chibcha culture that occupied the present day countries of Colombia, Panama, and Costa Rica (Andrew, 2011).

6.2 EARLY HISTORY OF THE EL ZANCUDO/TITIRIBI DISTRICT

Mining has been carried out in this district since 1793. During the 1800s and early 1900s, production of polymetallic ores containing gold, silver, zinc, lead, copper, antimony, and arsenic came from at least 14 principal mines within a 3 km radius of Titiribi. One of the early companies was Sociedad de Minas de Antioquia, formed in 1828. The most important company was the Sociedad de El Zancudo, formed in 1848. Peak production was from 1885 to 1930 and roasters recovered the gold. The Sociedad de El Zancudo (El Zancudo) reported production of 129,325 ounces of gold and 958,570 ounces of silver. El Zancudo exploited rich polymetallic fault-related veins and replacement deposits in particular at the contact between the basal conglomerate of the Amaga Formation and the basement schists and in favorable stratigraphic hosts within the conglomerate, schist, and Oligocene-age sediments. The favorability of these stratigraphic horizons may be very likely due to bedding plane or thrust faults that allowed porosity and permeability for mineralizing hydrothermal solutions. Total production from the Titiribi District has been estimated at 1.5 million to 2.0 million ounces of gold equivalent (Emmons, 1937). As these estimates were made when the mines were in production, individual gold, silver, and base metal production estimates are not available.

High-grade ores were hand-cobbed and roasted; lower-grade ore was crushed in stamp mills. The sands were concentrated by gravity on Wilfley tables and the fines by flotation. Free gold was panned from the concentrates at some mines. At some mines, the concentrate was smelted using locally available coal resulting in a precious metal matte and slag. The mattes were refined through progressive oxidation. After 1910, hydrometallurgical processes were introduced to treat the primary matte by sulfidization to recover silver, leaving a gold-bearing residue that was treated by cyanide.

Over recent years, the slags from various historic operations have been processed by crushing, grinding, followed by agitation in cyanide tanks, and Merrill Crowe precipitation using zinc powder.

In the Project area, there has been some historic production, mostly from the Chisperos area. The total production is unknown, but is included in the regional production estimates.

6.3 RECENT TITIRIBI PROJECT HISTORY

Muriel Mining S.A. (Muriel) initiated work in 1992, focusing upon the Otra Mina, Cateadores, Chisperos, Muriel, and Cerro Vetas areas of the Titiribi District. Numerous adits were re-opened, cleaned, advanced, and sampled. Muriel entered into two joint ventures; first with a junior company, Ace Resources Limited (ACE) of Vancouver, British Columbia, and then with Gold Fields of South Africa Limited (Gold Fields).

ACE started a large-scale soil sampling program of the Project area on lines spaced 400 meters apart. The result of this effort, utilizing multi-element geochemistry, was the outlining of several anomalies. "Ground-truthing" via geologic mapping led to the interpretation that some anomalies were related to porphyry systems. ACE also conducted the first ground-based magnetic and Induced Polarization (IP)/Resistivity surveys across the original wide-spaced soil lines. Although ACE defaulted on their option, their efforts defined several initial targets.

Gold Fields continued the exploration efforts started by ACE and focused on the porphyry-style targets. In 1998, Gold Fields completed a detailed 80-meter spaced soil and geophysical survey resulting in better definition of the Cerro Vetas porphyry target. Outcrop is minimal and is generally confined to drainages, ridge tops, and road cuts. Soil sampling is useful but is less than optimal due to "soil creep." Trenching is banned in the area. Targets are thus defined by a combination of geophysics, soil sampling, and geologic mapping. In 1998, Gold Fields started a 2,500-meter diamond-drilling program centered in the Cerro Vetas target area. Drilling was designed to test the IP chargeability anomalies associated with pyrite-gold mineralization interpreted to rim the postulated porphyry intrusive body. Drill hole DDT5 was the first hole to intersect weak porphyry-style mineralization.

Gold Fields subsequently drilled four additional holes on the northern margin of the porphyry intrusive and two other holes were drilled to the west testing a coincident soil anomaly and strong magnetic high. Based upon their drilling, they interpreted Cerro Vetas as a multi-phase, monzonitic porphyry intrusive with a pro-grade potassic core overprinted by retrograde argillic alteration.

Gold Fields opted out of the joint venture. Gold Plata Mining (formerly Muriel) then in 2006 entered into a joint venture with Debeira Goldfields (DBGF). This joint venture drilled an additional 16 drill holes; 13 into the Chisperos target and 3 holes into Cerro Vetas. In 2008, DBGF vended its right in the Project to Windy Knob Resources (WKR). Exploration by WKR included the acquisition and review of LandSat imagery culminating in the delineation of over 30 targets in the concessions. They collaborated with AngloGold Ashanti Colombia S.A. to fly a geophysical survey over the Project area; and undertook soil sampling at the Candela prospect; diamond drilling at Cerro Vetas; and diamond drilling (3 holes) at Candela resulting in the discovery of gold mineralization. In 2009, WKR relinquished the Project and Gold Plata Mining entered into an acquisition agreement on the Project with Sunward Resources.

Sunward initiated an aggressive exploration and development program. Through February 2013, 270 diamond drill holes, totaling 144,778.51 meters, have been drilled at the Project with 184 diamond drill holes, totaling 106,250.06 meters at Cerro Vetas, NW Breccia, and Chisperos. At the peripheral targets at Junta, Porvenir, Candela, Maria Jo, Rosa, and Margarita, 86 holes, totaling 38,528.45 meters of core, have been drilled. The 16 holes drilled in 1998 by Gold Fields have not been used in the resource estimation nor have been counted toward the total of the 270 diamond drill holes.

Sunward did not undertake any additional drilling between February 2013 and its sale to NovaCopper in June 2015. Similarly, NovaCopper did not undertake any exploration drilling within the Project since June 2015. Brazil Resources acquired the Project on September 1, 2016 and is in the planning stage for additional exploration drilling.

7.0 GEOLOGIC SETTING AND REGIONAL MINERALIZATION

7.1 REGIONAL GEOLOGY

The following discussion on regional geology is taken directly from the 2013 NI 43-101 Technical Report.

The geology of western Colombia is very complex. Radiometric data (Aspden, et al., 1987) from western Colombia combined with geologic mapping, suggest that there have been five main plutonic episodes, ranging from Triassic to Tertiary in age. It is likely that the variation of the convergence angle of the oceanic plate, relative to the continental plate, was an important factor for the timing and spatial distribution of the plutons. On a regional scale, "major breaks in activity are probably best attributed to either low-angle/parallel convergence or periods of accretion along the convergent margin" (Aspden, et al., 1987).

The western Colombian Andés consist of four sub-parallel mountain ranges separated by intermontane depressions. The ranges and depressions are generally north-south. From east to west, the mountain ranges are the Eastern, Central, and Western Cordillera and the Pacific Coast Range. The Magdalena Valley separates the Eastern and Central Cordillera. The Cauca-Patia graben-type depression separates the Central and Western Cordillera. The Project is located on the northwest margin of the Central Cordillera. The Pacific Coast, or Serrania de Baudo, extends from the Panamanian border to approximately 5° North Latitude, and is separated from the Western Cordillera by the Atrato-San Juan depression.

Recent analysis of seismic reflection profiles indicates the Paleozoic basement and clastic sedimentary sequences in the southern portion of the Cauca-Patia depression underwent thrust and fold-style deformation both prior to and following porphyry intrusions (Shaw, 2000).

A suggested three-phase geologic history of the Cauca-Patia depression is:

- The Cauca-Patia structural graben, as a coastal margin-intermontane basin, begins receiving clastic sedimentation from the emerging Central and Western Cordilleras.
- The depression continues to be caught up in a zone of foreland compression, responding to the collision of Cretaceous oceanic terranes along the Colombian Pacific margin.
- Finally, as an arc-axial depression or zone of weak extension, it marks the thermal axis of Miocene calc-alkaline magmatism.

The Central Cordillera consists of a pre-Mesozoic basement of faulted and folded Paleozoic-age rocks within a metamorphic belt consisting of both continental and oceanic character and remnants of Precambrian rocks. Numerous Mesozoic batholiths and stocks intruded this rock package. The western edge of the Paleozoic schist belt is defined, regionally, by the Romeral Fault (McCourt, et al., 1984), a suture of lowermost-Cretaceous age along which the Jurassic oceanic basalts and related ophiolitic rocks of the Amaime terrane (Aspden and McCourt, 1986) or Romeral terrane (Cediel, et al., 2003) were accreted. In the Project area, the mélange of Romeral terrane contains mega-scale blocks and fragments of the oceanic allochthon and crustal slivers of autochthonous Paleozoic metamorphic rock that formed the continental margin at the time of oceanic terrane accretion. Following accretion, the Romeral terrane was unconformably overlain by autochthonous Oligocene siliciclastic sedimentary sequences. The region was once again compression deformed in the early-middle Miocene and again in the middle-late Miocene. In the late Miocene, both the Romeral terrane and the Oligocene siliciclastic sediments were syn-tectonically intruded by a series of mineralized and altered stocks, dikes, and sills and associated extrusive equivalents, which return K-Ar whole rock dates ranging from 8 Ma to 6 Ma (Andrew, Internal Sunward Document, 2011 and Kedahda, Internal Muriel Mining Report, 2003). Following the intrusion and extrusion of Miocene intrusives and syn-mineral volcanics, there was a period of continued volcanism dominated by dacitic-andesitic dikes, tuffs, and ash. Figure 7.1 shows the generalized structural geology of

Colombia. Figure 7.2 shows the geology in Antioquia Province. Titiribi is the block of yellow color in the southern part of the map. Note that on this scale, none of the intrusive rocks are mapped. Figure 7.3 is an enlargement of the regional geology in the vicinity of Titiribi. Titiribi is in the center of the enlargement.

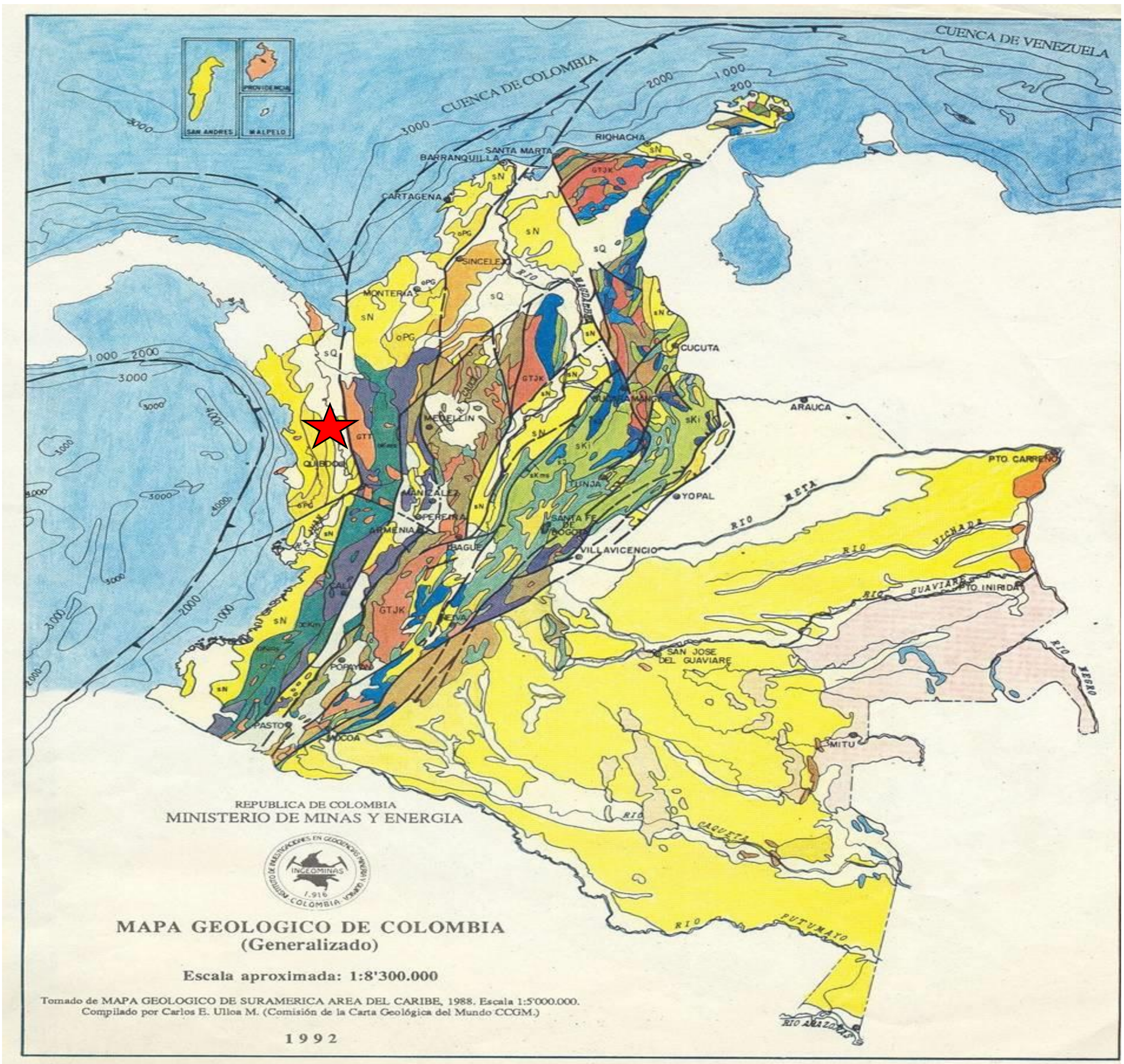


Figure 7.1. Geology of Colombia showing the location of the Titiribi Project (Source: Sunward, 2011)

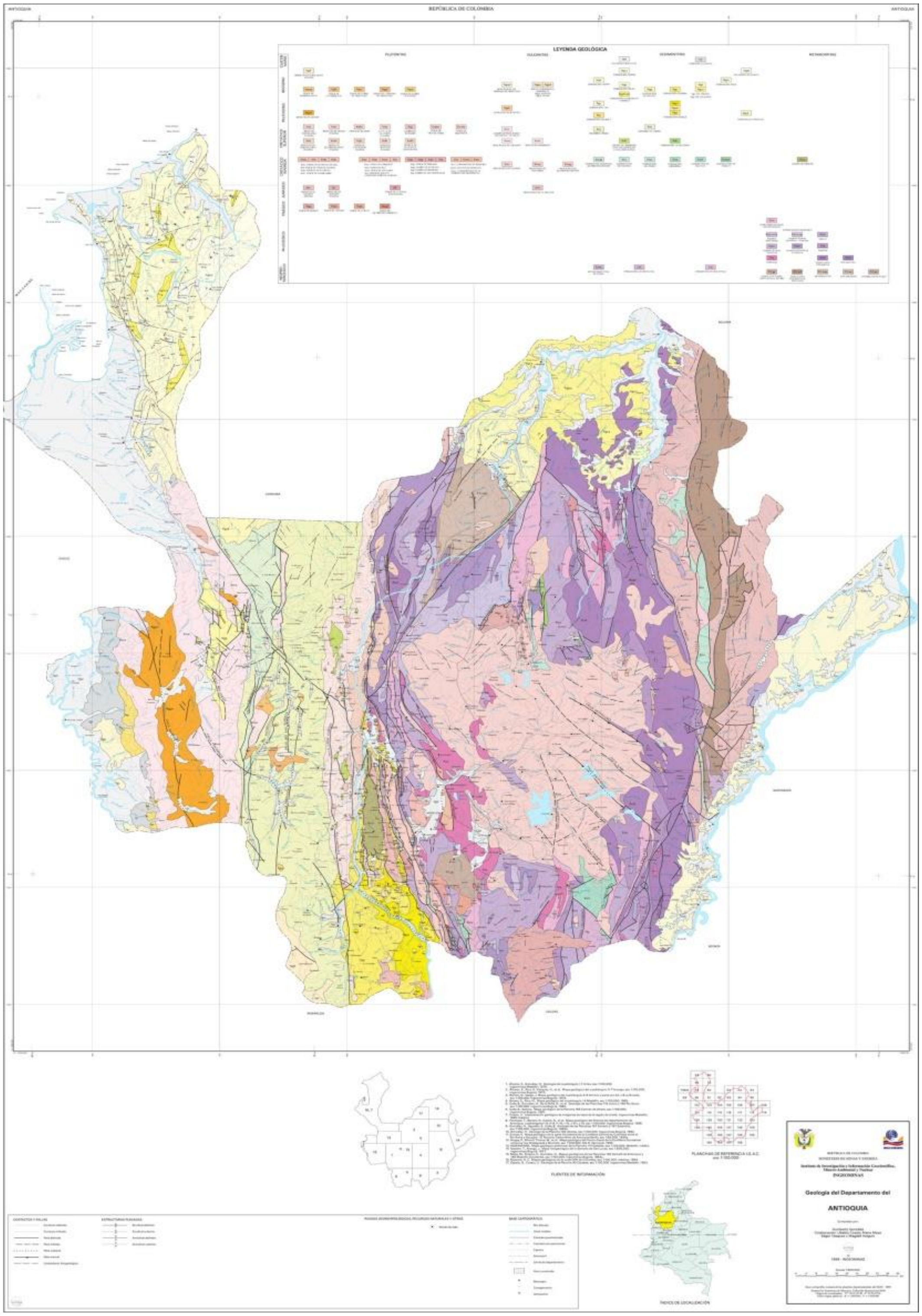


Figure 7.2. Geology of Antioquia Province (Source: Sunward, 2011)

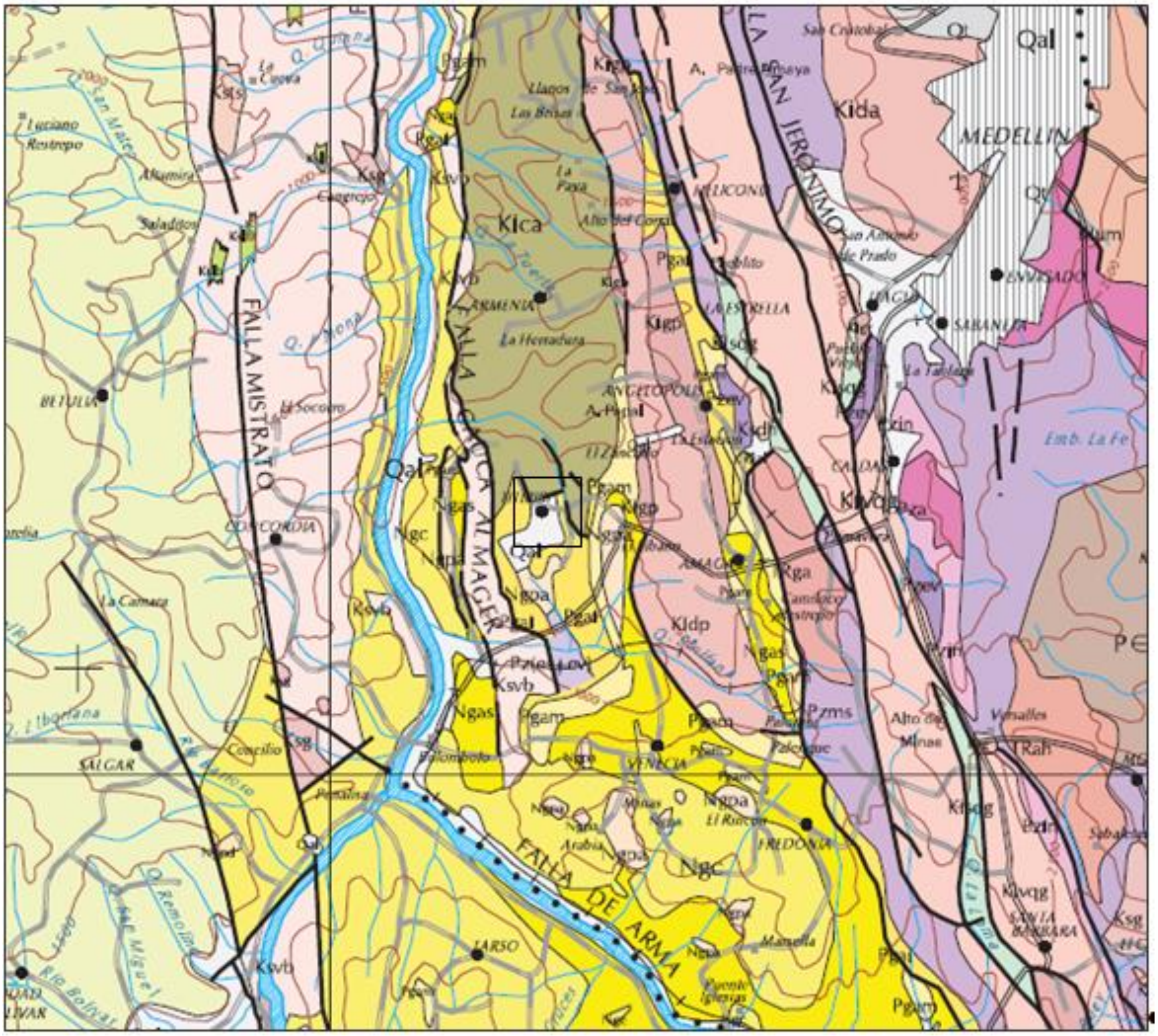


**Figure 7.3. Enlargement of the regional geology in the vicinity of Titiribi
Titiribi is located within the squared area at the center of the figure
(Source: Behre Dolbear, 2011)**

7.2 LOCAL GEOLOGY

The following discussion concerning the local geology is taken in large part directly from the 2013 NI 43-101 Technical Report, which was written by the same authors of this report. As there is no new geologic information, the interpretations, based on geologic mapping and extensive studies of the drill core, remain unchanged from the 2013 interpretations. These conclusions were based upon extensive communications between Sunward, the former exploration operator, and Behre Dolbear. Brazil Resources' staff agrees with these conclusions.

The local geology is dominated by multiple intrusives of the Cerro Vetas porphyry system. The intrusive complex is a cluster of separate intrusives of Miocene age, some of which may be connected at depth. The intrusive rocks are generally locally porphyritic diorite and monzonite but other closely related phases are likely. The porphyry system of stocks, plugs, and dikes intrude a lower plate Paleozoic to Cretaceous basement complex and an upper plate Oligocene to Miocene sedimentary sequence. The porphyries also intrude a diatreme breccia that may be an earlier precursor to younger porphyries. The Oligocene-Miocene Amaga Group consists of folded and faulted sequences of siliciclastic sedimentary rocks dominated by marine-continental quartz pebble conglomerates, sandstone, green, black, and red shale, and coal. The Amaga Group overlies the highly tectonized Paleozoic to Cretaceous basement meta-sediments rocks consisting of chloritic, sandy, and graphitic schist of the Jurassic to early-Cretaceous Arquia Complex and the Paleozoic Cajamarca-Valdivia Group. The genesis and age of a suspected lahar-type unit in the basement rocks is unknown. Both the basement rocks and overlying Amaga Group sediments are intruded by sills and dikes and locally overlain by coeval andesitic volcanic rocks of the Combia Formation.

The local detailed geology, particularly the basement stratigraphy and structure, is very complex as there are few recognizable marker horizons; the units have been tectonically displaced by multiple large shear and fault zones, which themselves have been intruded by younger magmas.

7.2.1 Basement Rocks

The basement rocks consist of Arquia Complex, Cajamarca-Valdivia Group, and the Quebradagrande Formation. The late-Jurassic to early-Cretaceous Arquia Complex schists are dark green and hard with intervals of black, pyritic, graphitic schist, and are possibly equivalent to the Cajamarca-Valdivia Group. The Cajamarca-Valdivia Group is most common east of the La Junta-Cerro Vetas fault near the Zancudo Mine. Schistosity is north-south to northwest and dipping steeply to the west.

The Quebradagrande Formation is basaltic to andesitic volcanic rocks and low-grade meta-sedimentary rocks. Some units may have been ultramafic originally. They form much of the basement in the western part of the Project area and are mostly Cretaceous in age. They are dark green to black; often porphyritic with hornblende phenocrysts; locally are pyritic and nearly universally chloritized. The green to black basaltic rocks have been intersected in nearly all of the drilling at Chisperos, Cerro Vetas, and Candela. The contact with the overlying Amaga Formation is discordant and regionally dips northeast at approximately 40°.

7.2.2 Breccia

During the early stages of exploration, many different types of breccias were logged based upon multiple lithologies encountered. Over time, the various breccia units have been consolidated as it was recognized that a major difference related to the lithology of the fragments, rather than the genesis of the breccia. The three major types of breccias include fault breccia, intrusive and hydrothermal contact breccia, and diatreme breccia. A fourth type of breccia, logged as a mylonite breccia, is more likely to be a lahar unit in the basement volcanic package.

Correlation from hole to hole of the various styles of breccia is difficult as original fragment content varies and intrusive contact alteration modifies the appearance. Fragments in some breccias are rounded due to shearing and/or intrusion. Some may be fluidized pebble dikes. Some breccias are characterized by angular to slightly rounded rock and mineral fragments of various sizes down to rock flour. Many fragments are quartz. Mineralization in all the various breccias is disseminated and fracture controlled. Some breccias show locally intense shearing. In some mineralized breccia, halos of alteration surround clasts. In some cases, breccia fragments are mineralized; in others, the matrix is mineralized; and in still others, both fragments and matrix are mineralized, thus, demonstrating various ages for breccia units. Breccia units rarely outcrop.

7.2.2.1 "Mylonite" Breccia

The authors opine that the "mylonite" breccia is a pre-mineral basement volcano-sedimentary unit that has its origins as a lahar-type unit. It contains both angular and semi-rounded fragments, most commonly of volcanic origin. Commonly, there are small quartz-rich fragments, the origin of which is unknown and locally, the lahar contains very large disconnected blocks, many meters across, of pre-mineral Amaga granodiorite. The matrix appears to have originally been a dark-colored mud and shows flow features surrounding the larger fragments leaving the appearance of being mylonitic or schistose. Figure 7.4 is an example of un-mineralized lahar. There is a preponderance of fragments, many of which are sub-rounded. There is no destruction of the larger fragments that would be expected in a mylonite zone. The "mylonite breccia" or lahar has been regionally metamorphosed. It is brecciated at the contact zone with intrusive diorite.

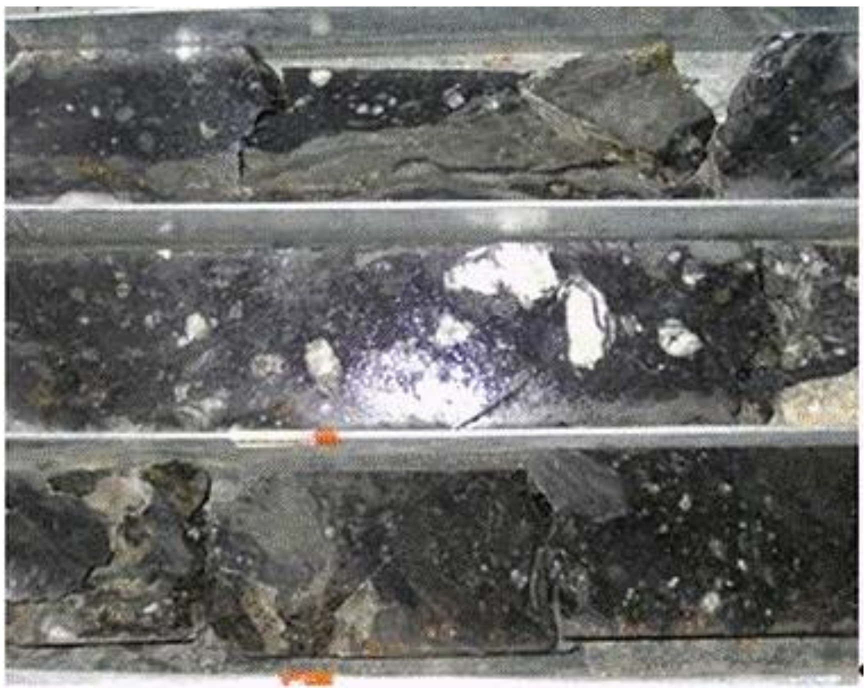


Figure 7.4. Barren lahar from 128 meters to 132 meters in CV054 (Source: Behre Dolbear, 2012)

7.2.2.2 Diatreme Breccia

The first true breccia to develop is the diatreme intrusive breccia that likely formed due to early explosive activity above dioritic magma. Diatreme breccia occurs throughout the Cerro Vetas, NW Breccia, and Chisperos areas intruding both basement and the overlying sedimentary package. The largest, single block was originally designated the NW Breccia. The NW Breccia hosts mafic and ultramafic fragments while at Cerro Vetas and Chisperos there appears to be fewer ultramafic fragments but more mafic fragments. In most areas, the diatreme breccia bodies appears dike-like and are parallel to, sub-parallel to, and intruded by locally mineralized diorite dikes. As diorite dikes cut diatreme breccia, the diatreme breccia is pre-mineral and has become a good host for mineralization, and as they occupy the same structural weakness as the younger diorite, the authors speculate that they formed as explosive vents above the diorite. Furthermore, at Chisperos, diatreme breccia is cut by parallel and sub-parallel northwest striking, northeast dipping faults that control mineralization not only in diatreme breccia but also along the contact between basement volcanoclastic sediments and Amaga conglomerate. This clearly demonstrates that diatreme breccia is an early, pre-mineral feature. At shallow depths, diatreme breccia hosts fragments of younger, Amaga age sediments, demonstrating some collapse into the crater or fissure; however, at depth, the breccia is dominated by volcanic and volcanoclastic sediments and at further depth, particularly at Chisperos, diorite dikes intrude diatreme breccia. In a larger sense, the diatreme breccia locations are partially controlled by the deep-seated structural weakness caused by the Cauca-Romeral shear zone. Younger Cerro Vetas diorite intrusions are also structurally controlled by the deep-seated Cauca-Romeral shear zone.

Photographs of the hornblende-rich mafic porphyry fragments in the diatreme breccia are shown in Figure 7.5. The authors speculate that such fragments may have origins in the Quebradagrande Formation as coarse hornblende crystal-rich porphyries as described in this unit and the Quebradagrande Formation is widely exposed to the west of the property. However, compared to diatreme breccia at NW Breccia, there are fewer mafic and ultramafic fragments in the Chisperos diatreme breccia.

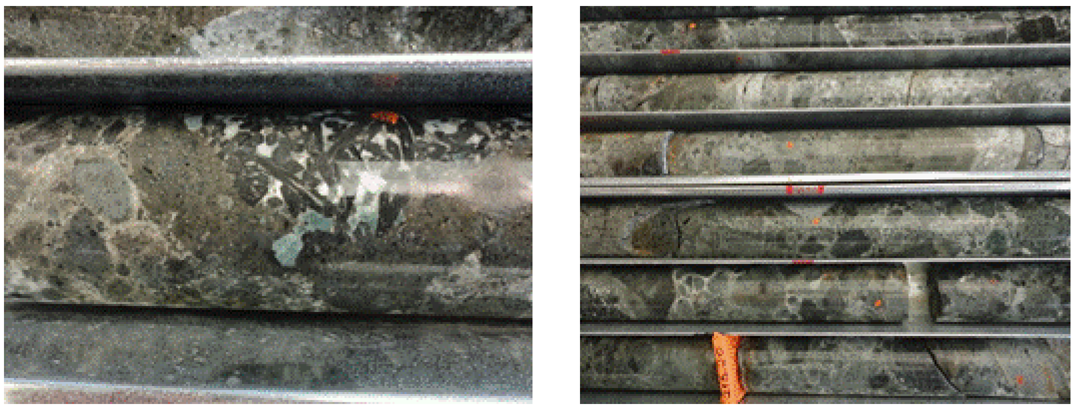


Figure 7.5. Photographs of Chisperos diatreme breccia in core; note very large hornblende crystals in the photograph on the left (Source: Sunward, 2012)

7.2.2.3 Intrusive and Hydrothermal Contact Breccia

It is speculated that multiple types of contact breccia developed during intrusion of the Cerro Vetas porphyry, in the margins adjacent to and within the intrusive, and were excellent passageways for hydrothermal alteration and mineralization. The breccias occur on all sides of the main Cerro Vetas intrusive. Most Cerro Vetas drill holes intersect these breccias. Much of the better-mineralized contact breccia occurs in the phyllic alteration zone of the Cerro Vetas porphyry. The authors opine that the contact breccia hosts at least two, but probably three different breccia types. The first is true contact breccia consisting mostly of brecciated, altered, and mineralized wall rock, while the second type is true intrusive breccia consisting mostly of diorite fragments. A third breccia style demonstrates multiple phases of mineralization and includes fragments of diorite and wall rock. Fluidized features associated with rounded fragments often with higher-grade mineralization are likely vertical hydrothermal fluidized pebble dikes.

7.2.2.4 Fault Breccia

Fault breccia occurs commonly throughout the deposits, except for local areas, fault displacement appears small. Some breccia appears to form along bedding planes while others host small amounts of gouge. One fault, offsetting basement and younger sediments near the intrusive contact between Cerro Vetas and NW Breccia, appears to have been the structural weakness followed by a wide linear diorite dike. At Chisperos, northwest-striking, steeply dipping faults are theorized to be the channel ways for auriferous hydrothermal fluids that mineralized shallow dipping, favorable stratigraphic hosts: the Amaga Formation/basement contact; diatreme breccia; and possibly shallow-dipping bedding-plane fault zones. These northwest-striking faults are not depicted on the plan geologic and cross sections because of their limited displacement and uncertainty of continuity.

7.2.3 Amaga Formation

The Amaga Formation is divided into 3 members: the lower, middle, and upper members. On a regional basis, the Amaga Formation attains stratigraphic thicknesses up to plus 1,400 meters, but in the Candela, Margarita, and Cerro Vetas areas, only 50 to 75 stratigraphic meters of the lower member is preserved as diapirically domed roof pendants or west-verging thrust slices, resting upon the basement complex. The middle and upper members have been eroded away and are not present in the project area. The Amaga Formation sediments form important hosts for stratiform replacement-style, contact-zone, and reverse-fault-hosted mineralization in the Independencia and Otra Mina sectors in the northeastern part of the Titiribi District.

7.2.3.1 Amaga Formation (Lower Member)

The lower member of the Amaga Formation sediments forms the most extensive outcrops in the project area, especially to the west of the Junta fault and to the east of the Candela-Porvenir fault. The basal member is a coarse- to medium-grained conglomerate that lies unconformably on the older graphitic schists in the basement rocks. Above the basal conglomerate is a series of white and grey sandstone units with interbedded carbonaceous beds, carbonaceous sandy mudstone, and gray claystone. In the upper part of the lower unit is a violet colored claystone with thick interbeds of sandstone. At Titiribi, only 50 meters to 75 meters of the stratigraphic section remains of the regionally present 200 meters. Figure 7.6 is the basal member conglomerate from drill hole MJ-6 (Maria Jo) at 234 meters. The conglomerate has been an outstanding host to high-grade bedding and shear-hosted veins throughout the district.

Figure 7.6. Photo of the basal quartz pebble conglomerate of the Amaga from drill hole MJ-6 (Maria Jo) at 234 meters (Source: Behre Dolbear, 2013)

7.2.3.2 Amaga Formation (Middle Member)

The middle member of the Amaga Formation regionally is about 200 meters to 250 meters thick and consists of white, argillaceous, and ferruginous sandstones interbedded with an alternating series of at least 5 separate coal seams, up to 2.5 meters in thickness. The middle member is exposed east of Titiribi and north of Amaga. The middle unit has been eroded away at the Titiribi Project.

7.2.3.3 Amaga Formation (Upper Member)

The upper member is up to 1,000 meters thick and consists of well-cemented cream, green, and brown colored sandstones and locally thin conglomerate and coal seams.

7.2.4 Combia Formation

The Combia Formation is divided into two members. The lower member is dominantly volcanic and consists of agglomeratic breccias, basalt, and andesite dikes. The upper member is dominantly volcanoclastic consisting of poorly consolidated sand, gravel, and muds.

The Combia Formation has been considered as late Miocene to Pliocene age (20 Ma to 6 Ma) and outcrops over the entire strip of land between the Junta and Candela-Porvenir faults. The Combia Formation has been intersected in the many drill holes in the Chisperos, Cerro Vetas, and Candela areas. In the Chisperos and Cerro Vetas areas, both the volcanic and sedimentary units are present as a series of crystal tuffs, lithic tuffs, and conglomerate units consisting of quartz pebbles and re-worked Cretaceous basement rocks and Amaga Formation.

7.2.4.1 Combia Formation (Lower Member)

Lower member agglomerates are volcanic rocks of andesitic composition; the crystal and lithic tuffs are composed of crystalline fragments of augite, hornblende, biotite, quartz, kaolinized feldspar, and variable proportions of volcanic glass and fragments of volcanic rock. Chemically, the basalt flows are generally feldspar-rich. Flow tops are often auto-brecciated and amygdaloidal with amygdules locally filled with chalcedony.

7.2.4.2 Combia Formation (Upper Member)

The upper member consists of interstratified conglomerate, sedimentary breccia, fine to medium-grained sandstone, and reddish to cream colored argillite that unconformably overlie both the Combia Formation lower member and the Amaga Formation.

7.3 INTRUSIVE ROCKS

There are three principal intrusive rocks. From oldest to youngest, they are the pre-mineral Amaga granodiorite stock, syn-mineral Cerro Vetas diorite porphyry, and post-mineral andesite porphyry. The andesite porphyry's extrusive equivalents are andesitic tuffs and ash.

7.3.1 Amaga Granodiorite (Pre-Mineral)

This unit is a medium- to coarse-grained granodiorite that intrudes the Paleozoic basement rocks, but in turn, has been cut by intrusive breccias and the younger mineralized Cerro Vetas intrusive. The granodiorite has been intersected in many drill holes and generally exhibits some effects of shearing. Compositionally, the Amaga stock is mostly granodioritic but also includes diorite to tonalite phases. Locally, large blocks of Amaga granodiorite are caught up in the mud flows of the basement lahar.

7.3.2 Cerro Vetas Diorite Stock (Syn-Mineral)

The gold-copper mineralized Cerro Vetas diorite porphyry stock is exposed in road cuts and has been penetrated in many drill holes at Cerro Vetas. The diorite porphyry intrudes Paleozoic basement volcanic, schistose and lahar-style rocks; Amaga granodiorite; diatreme breccia; lower member of the Amaga Formation; and the volcanic and sedimentary units of the Combia Formation. The diorite ranges in composition from diorite to quartz diorite to monzonite and consists of biotite, hornblende, feldspar, and quartz, and is enriched in magnetite. It ranges from stock-like to plugs and wide dikes that may taper at depth. Based upon its geometry and the present level of exposure, it might be the roots of a larger intrusive. It has intruded along the northwest-southeast-trending Cauca-Romeral fault but the main dike-like intrusive bodies are aligned in an east-northeast to west-southwest direction paralleling several faults and tensional structures developed within the Cauca-Romeral fault zone.

Mapping, drilling, and geophysical surveys suggest similar diorite intrusives at Junta, Maria Jo, Porvenir, and Candela with magnetic highs aligned along the Cauca-Romeral fault trend. Initial drilling and road cut exposures confirm the presence of mineralized diorite and/or mineralized hornfels.

7.3.3 Dacite-Andesite Intrusives (Post-Mineral)

These intrusives are generally dikes and mineralogically range from dacite to andesite. The dacite is light colored consisting of quartz, plagioclase, biotite, and opaque minerals. The andesite dikes are more common in the southern part of the Project, are dark grey, and consist of plagioclase, hornblende, biotite, opaque minerals, and rare quartz. Neither the dacite nor the andesite dikes are mineralized and neither hosts any hydrothermal alteration.

7.4 STRUCTURAL GEOLOGY

Pre-existing structures, particularly the Cauca-Romeral fault zone, have created zones of weakness first occupied by diatreme breccias and later by the mineralized Cerro Vetas stock, plugs, and dikes. It is also likely that faulting along bedding planes played a crucial part in ground preparation for the high-grade base and precious metal veins and replacement deposits that were historically mined in the Titiribi District. The authors opine that the structural diagram, shown in Figure 7.7, originally proposed by the Sunward geologic staff, is a reasonable representation of the pre-curser structural preparation model for the Cerro Vetas stock, plugs, and dikes. The major northwest-southeast trend is the deep-seated Cauca-Romeral fault zone and the tensional openings in the northeast-southwest direction were the tensional zones of weakness followed by diatreme breccias and the Cerro Vetas intrusive bodies. The regional north and northeast-trending structural blocks also are sub-parallel to the tension faults.

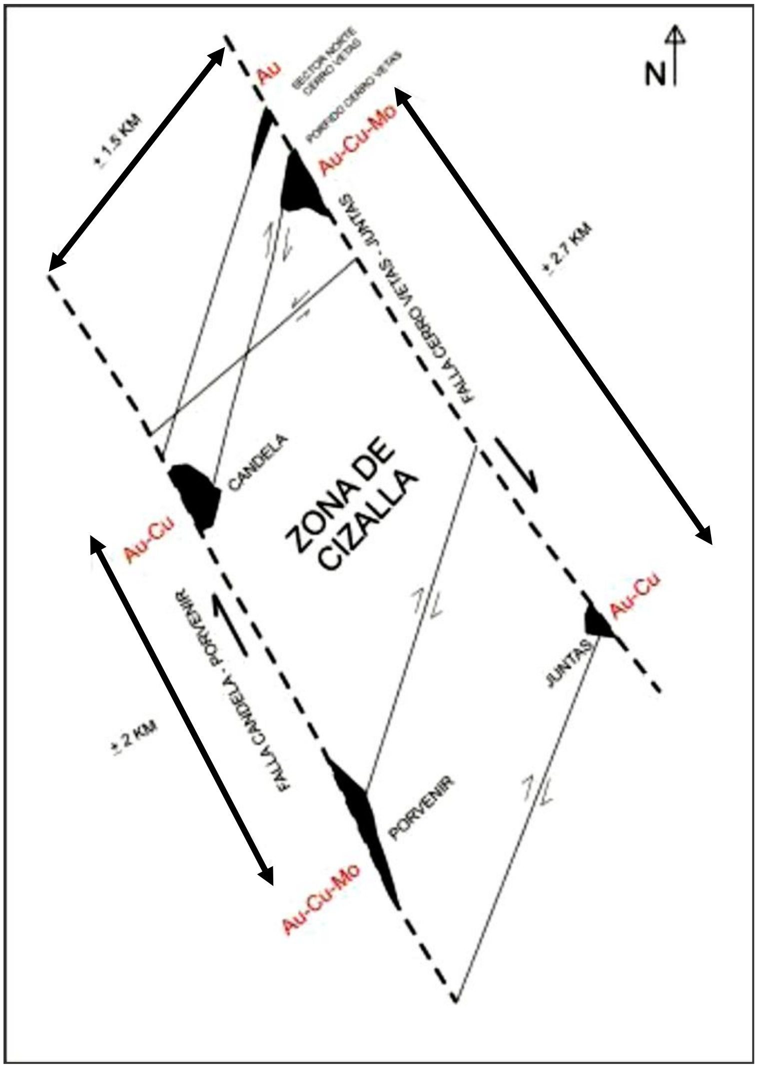


Figure 7.7. Structural interpretation for the emplacement of the Cerro Vetas stock, dikes, and other intrusive bodies in the district (Source: Andrew, Sunward Internal Report, 2011)

7.5 REGIONAL MINERALIZATION TRENDS

The Cerro Vetas porphyry gold-copper system and its nearby genetically related deposits and prospects are part of a regionally significant mineralized belt. Gold mineralization is related to a series of magmatic intrusive systems ranging in age from Jurassic, Cretaceous, Paleocene (Paleocene, Eocene, and Oligocene) to Neogene (Miocene and Pliocene). Figure 7.8 shows the relationship between intrusive or the "magmatic period" to the distribution of gold deposits in Colombia. The distance between Sta. Marta on the north to the El Oro District on the south is approximately 1,200 km. The Project is in the Middle Cauca region and may ultimately be related to the Antioquia Batholith. Figure 7.9 shows the Miocene and Pliocene-age gold deposits and their spatial relationship to Neogene plutons. Titiribi is near the northern end of the Neogene-aged deposits. The distance between the Buritica deposit on the north and La Concepcion deposit on the south is approximately 600 km.

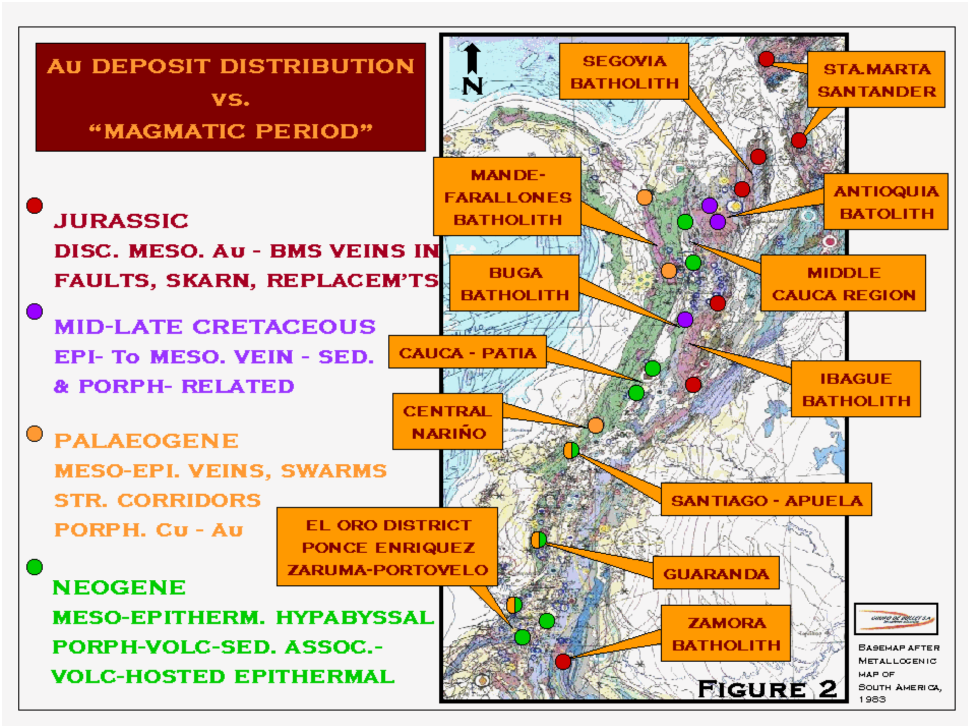


Figure 7.8. **Gold deposit distribution versus "Magmatic Period" (Source: Shaw, 2000)**

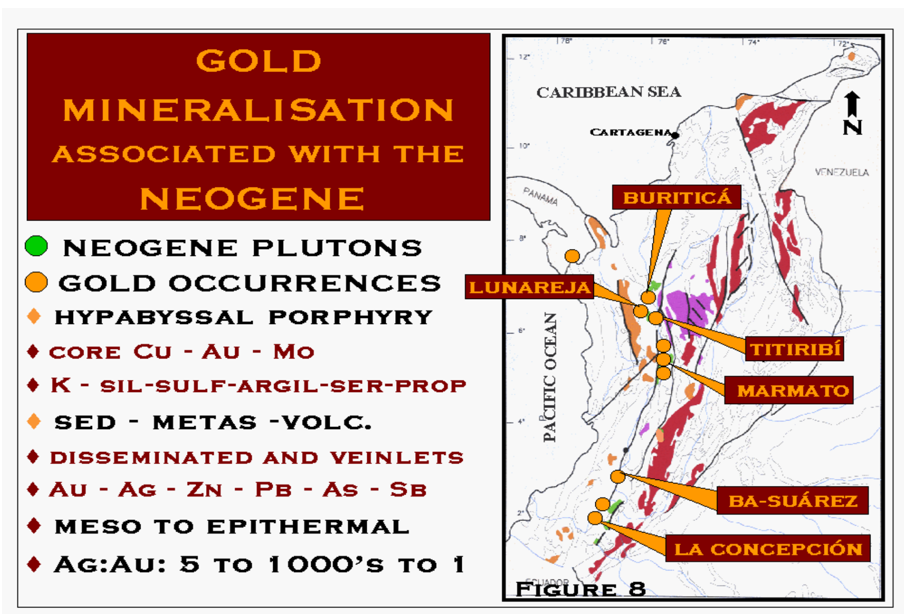


Figure 7.9. **Major gold occurrences in the Neogene and their relationship to Neogene plutons (Source: Shaw, 2000)**

7.6 PROJECT MINERALIZATION – GENERAL

The Project contains several separate mineralized areas, and although all appear related to a large Miocene gold-copper porphyry system, each is spatially related to a separate intrusive center. The Project contains one bulk tonnage gold-copper porphyry system consisting of the Cerro Vetas, NW Breccia, and Chisperos zones and several separate porphyry-style occurrences. The Cerro Vetas, NW Breccia, and Chisperos complex includes multiple gold-copper-bearing intrusive centers surrounded by contact aureoles hosting gold-dominant mineralization. Cerro Vetas is a bulk-tonnage gold and copper deposit with most mineralization directly related to the Cerro Vetas diorite porphyry, related breccias, and its immediate contact aureole. Gold-dominant mineralization occurs in the NW Breccia, northwest of the main Cerro Vetas porphyry. At Chisperos, higher-temperature gold-copper mineralization is hosted in and adjacent to diorite dikes and as structurally and stratigraphically controlled, gold-dominant low-temperature epithermal vein mineralization, surrounded by thick intervals of lower-grade sediment-volcanic, hosted mineralization.

The Cerro Vetas-NW Breccia-Chisperos system hosts NI 43-101 guideline-compliant resources. Most of the nearby exploration prospects have intersected copper and gold mineralization but the data is currently insufficient to estimate resources. The Maria Jo occurrence is adjacent to the Cerro Vetas and Chisperos zones and hosts zones of copper-dominant and gold-copper mineralization. Junta hosts near-surface supergene enriched mineralization in a stock-like porphyry intrusive and in structurally controlled breccia. Candela hosts thick zones of promising mineralized hornfels and diorite porphyry and Porvenir has encountered encouraging mineralization. Margarita and Rosa are still in early stages of exploration and the very limited drilling campaign has failed to encounter any significant mineralization.

7.7 CERRO VETAS-NW BRECCIA-CHISPEROS GOLD-COPPER PORPHYRY DEPOSIT

The Cerro Vetas-NW Breccia-Chisperos gold-copper porphyry deposit consists of three adjacent zones of mineralization that are geologically related, but host three different styles of mineralization based upon the presence of diorite, diatreme breccia, favorable host stratigraphy, and a contact aureole.

7.7.1 Cerro Vetas

The Cerro Vetas diorite porphyry cores the Cerro Vetas gold-copper porphyry deposit. The centrally located diorite porphyry stock intruded along the northwest-southeast-trending Cauca-Romeral fault zone but dikes emanating from the stock are controlled by a series of tensional east northeast-west southwest-striking faults. Diatreme breccia and the younger diorite intruded along these older zones of weakness. The intrusive bodies that domed pre-existing shallow dipping structures are vertical to steeply eastward dipping at 70° to 80°. The Cerro Vetas diorite porphyry intrudes the basement Paleozoic rocks, the older Amaga granodiorite stock, the Amaga-Combia volcano-sedimentary sequence, and the diatreme breccia units. The Cerro Vetas diorite porphyry is fine to medium grained and locally exhibits typical porphyry copper alteration. The intrusive is multiple-phase with different grain sizes, slightly different mineralogy, and various intrusive breccias. The bulk of the central stock-like diorite intrusive is about 550 meters to 600 meters wide. Figure 7.10 shows the generalized surface geology and drill hole map for the Cerro Vetas-NW Breccia-Chisperos system. The Cerro Vetas diorite porphyry and related dikes are colored orange. The pinkish red-hachured unit is diatreme breccia. All of the Amaga and Combia units are combined and shown in green. Basement rock, as a small exposure in a drainage, is shown in dark red. The NW Breccia zone is to the north and northwest and the Chisperos zone is immediately to the east of the main Cerro Vetas stock. Drill hole traces are also shown. Bedrock is exposed in only about 5% of the area as rock outcrop sare generally confined to drainages, ridge tops, or new man-made road cuts. Thus, much of the geologic map is interpreted by drill hole data and it changes as new drill data is acquired.

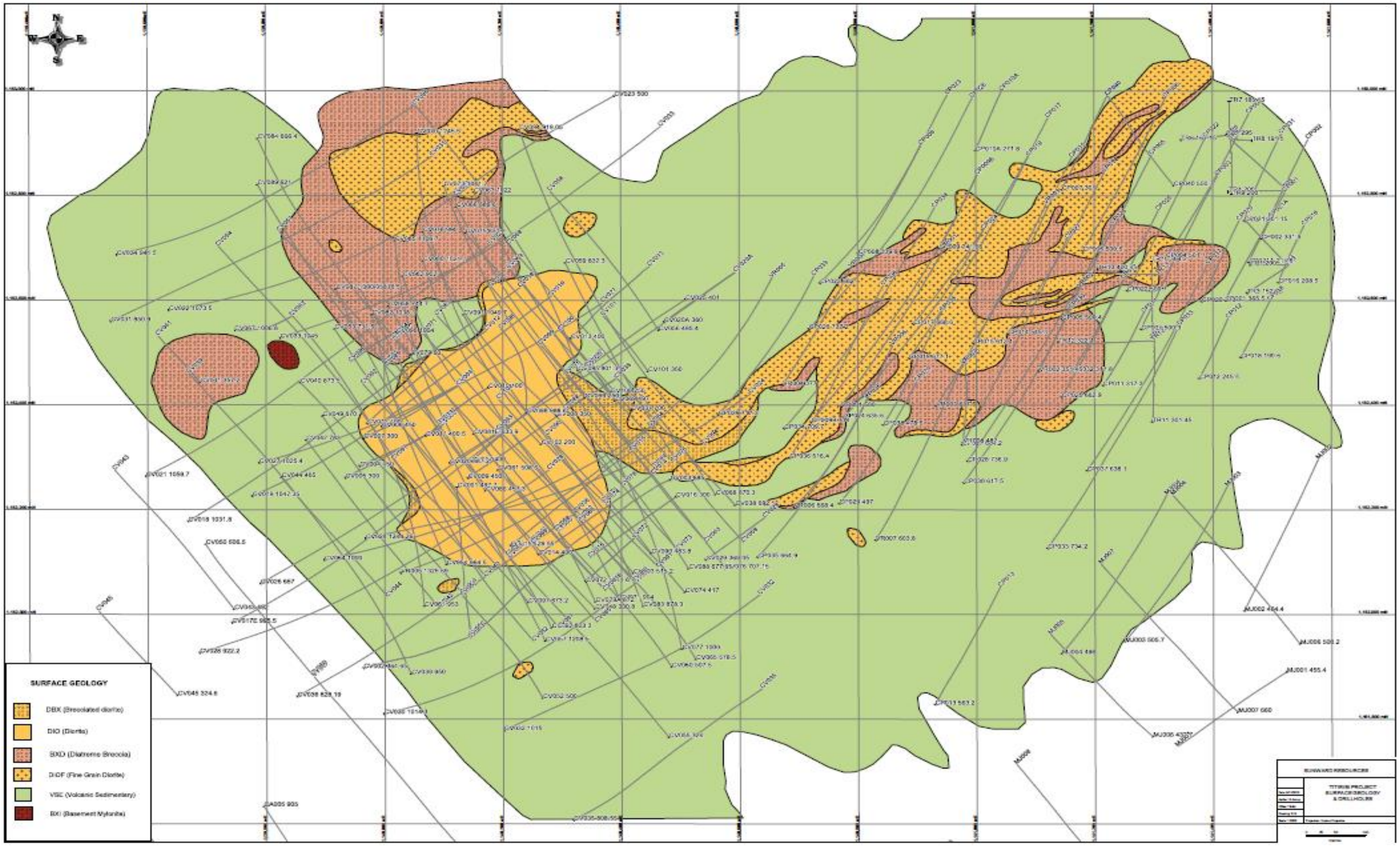


Figure 7.10. Cerro Vetas, NW Breccia and Chisperos geology-drill hole location map; Cerro Vetas is on the southwest side of the figure; NW Breccia on the north and northwest; Chisperos to the northeast (Source: Sunward, 2013)

The Cerro Vetas diorite is marked as a magnetic high on the magnetic and magneto-telluric surveys. It is one of several distinct magnetic highs. Figure 7.11 clearly shows the alignment of magnetic highs that parallel the Cauca-Romeral fault zone and their spatial relationship to known mineralization and exploration targets.

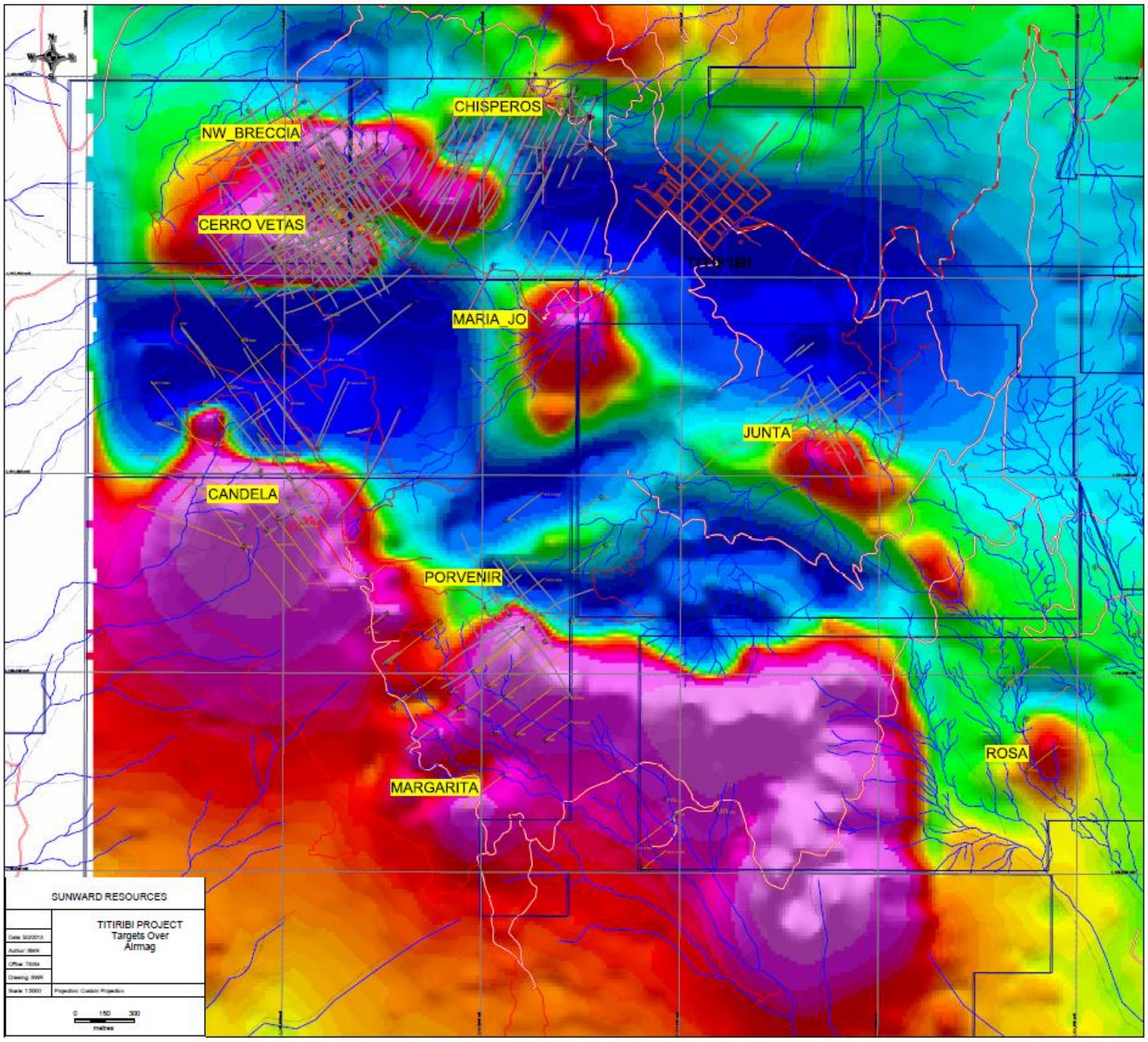


Figure 7.11. Airborne magnetic map outlining magnetic highs, geochemical anomalies and the project targets
(Source: Sunward Internal Report, 2011)

7.7.2 NW Breccia

This zone is dominated by diatreme breccia that is intruded on the south by the main Cerro Vetas diorite. A small diorite plug-like body intrudes the diatreme breccia on the north. Diatreme breccia in this area is unusual; based upon multi-element scans, it is relatively high in nickel and chrome. The high background value of nickel and chrome is due to the presence of ultramafic fragments. Gold values have a very positive correlation with nickel and chrome values, suggesting that ultramafic fragments are very favorable host rocks. The fragments are quartz-rich and mafic or ultramafic. The authors opine that these hornblende-rich mafic rocks may be derived from the basement Quebradagrande Formation. Where the diatreme breccia is in close proximity to diorite, it hosts gold and copper mineralization. However, much of the diatreme breccia hosts gold mineralization but virtually no copper.

7.7.3 Chisperos

At Chisperos, diorite dikes intrude diatreme breccia and both follow pre-existing east northeast-west southwest tensional zones of weakness. The near vertical diorite plugs and dikes consistently strike east northeast-west southwest and appear to emanate from the principal stock at the Cerro Vetas zone. Locally at depth, the uppermost portion of some diorite dikes intrude into the diatreme breccia and in other locations, the diorite intrudes to the present level of erosion. Both intrude basement rocks and the overlying Amaga-Combia sedimentary-volcanic units. The diatreme breccia hosts mafic fragments including very coarse-grained hornblende- and biotite-rich mafic porphyry, but generally contains few ultramafic fragments compared to the diatreme breccias in the NW Breccia zone. Both gold-dominant and gold-copper mineralized zones are present. Generally, gold-copper zones relate to the presence of diorite dikes and their immediate contact area. Gold-dominant zones are hosted in diatreme breccia and in the sedimentary-volcanic sequence where it is low-temperature and higher-grade zones often contain free gold. Much mineralization at Chisperos is structurally and stratigraphically controlled. Based upon studies of obvious vein mineralization in oriented core, the predominant controls of vein mineralization are in a northwest-southeast direction. Other zones of mineralization are concordant to bedding and have a northwest strike and dips 40° to 50° northeast. It is theorized, based upon oriented core studies, that several parallel to sub-parallel steeply dipping faults that extend from the basement meta-basalt have acted as feeders focusing the hydrothermal alteration and depositing sulfide and gold mineralization in (a) parallel zones in the crystalline and lithic tuffs of the Combia Formation; (b) at the contact between Amaga conglomerate and basement rocks; (c) in basement schistose rocks; and (d) in diatreme breccia. It is believed that there are two sets; both being sub-vertical with one striking northwest-southeast and the other east northeast-west southwest. The northwest-southeast direction is dominant and is sub-parallel to the Cauca-Romeral fault zone direction. The authors suggest that in the stratigraphically controlled mineralization, bedding plane faults or shallow angle shearing may be an important structural control. Furthermore, the contact between Amaga conglomerate and basement rocks may be a low-angle thrust fault that is part of the set of low-angle faults.

Zones of bedding-controlled mineralization in volcanoclastic sediments pass apparently uninterrupted through diatreme breccia that cuts through the sediments. Mineralized diorite dikes cut through diatreme breccia. Thus, an important age relationship can be established. Early diatreme breccia is pre-low-angle thrust and pre-northwest-striking hydrothermal feeder faults, as mineralization related to those faults also mineralizes the breccia and mineralization along the low-angle faults passes uninterrupted through the diatreme breccia.

7.8 ALTERATION

A reasonably well-defined alteration zoning pattern at the Cerro Vetas-NW Breccia-Chisperos deposit was recognized by the Sunward geologists. The core of the Cerro Vetas diorite intrusive exhibits potassic alteration and is roughly circular to slightly elongated in a northeast-southwest direction and apparently tops out at an elevation of about 1,950 meters above sea level. The potassic alteration consists of secondary biotite, K-spar, quartz, magnetite, and pyrite as disseminations, veins, and fracture fillings. The potassic core is at best very weakly mineralized. The potassic core of the intrusive is fine-grained but grain-size increases outward. A second but much less defined potassic core is present in a plug-like diorite in the NW Breccia. At Cerro Vetas, a well-developed phyllic zone of minor quartz-sericite-pyrite veinlets and sericite selvages on feldspars with disseminated, stockwork, and veinlet chalcopyrite, and veinlet magnetite hosts much of the potentially economic gold-copper mineralization. Pyrite content in the diorite porphyry is low. The phyllic zone is developed above and surrounding the potassic core. However, on the southwest side of the Cerro Vetas intrusive, the phyllic zone is very thin. The phyllic zone appears to be widest above the core zone and tapers on all sides at depth. Erosion has removed a portion of the uppermost phyllic zone. The phyllic alteration zone is superimposed over the outer margin of the diorite and a contact breccia that consists of intrusive and intruded rocks. A well-developed but narrow argillic zone with similar mineralization to the phyllic zone borders the phyllic zone. Surrounding the argillic zone is a halo of a propylitic alteration zone with intense silica-flooded hornfels nearest the intrusive passing outward into widespread areas of green chloritic rocks. Strong to weak silicification accompanies much of porphyry style alteration, particularly in the potassic zone. At Chisperos, near the surface, propylitic (chlorite-dominant) alteration in the diatreme breccia predominates. However, at deeper levels, potassic alteration in diorite intrusives is very evident.

7.9 MINERALIZATION

Mineralization hosted in the Cerro Vetas diorite porphyry is disseminated and fracture controlled. The principal metallic minerals are native gold, chalcopyrite, pyrite, and magnetite. Gold values within the Cerro Vetas diorite normally correlate well with copper content and magnetite. The largest diorite intrusive occurs within the Cerro Vetas zone with smaller plugs and dikes found within the NW Breccia and Chisperos zones. At Cerro Vetas, interpretation of geophysical and drill hole data suggests that higher-grade gold-copper zones exist as a domed saucer-shaped contact breccia-related shell in the intrusive where brecciated diorite with xenolithic fragments of sedimentary rocks were intercepted in drilling. This higher-grade domed shell is, at least in part, coincident with the phyllically altered intrusive-sedimentary contact breccia. The contact breccia can be sub-divided into three lithologic types but the boundaries are not distinctive. The first is true contact breccia consisting mostly of brecciated, altered, and mineralized wall rock, while the second type is mineralized intrusive breccia consisting mostly of diorite fragments. A third breccia style demonstrates multiple phases of mineralization and includes fragments of diorite and wall rock. Fluidized features associated with rounded fragments, often with higher-grade mineralization, are likely near-vertical hydrothermal fluidized pebble dikes.

Within the Cerro Vetas diorite, there are many examples of multiple phases of mineralization as veins of quartz-magnetite-chalcopyrite are cut by younger grey quartz (possibly with extremely fine-grained pyrite)-magnetite, which in turn are cut by quartz-sericite-magnetite veins. In general, there is a strong positive correlation between gold and copper values and little correlation between gold and pyrite. High metal values are often accompanied by large amounts of magnetite; however, the reverse is also true in the magnetite-rich but gold-copper poor potassic zone.

Figure 7.12 shows multiple-stages of cross-cutting quartz-magnetite vein mineralization from drill hole CV018 at 393 meters (assay interval contains 0.5 grams of gold per tonne and 0.25% copper). Figure 7.13 is intrusive breccia with (a) fragment hosting margins rich in magnetite (by magnet); (b) a fragment with quartz-magnetite veins cutting diorite; (c) a diorite fragment with potassic altered core with typical K-spar and small clots of magnetite; and (d) a breccia with matrix rich in magnetite from drill hole CV038 at 208 meters (assay interval contains 0.3 grams of gold per tonne and 0.23% copper). Figure 7.14 is a diorite breccia with matrix heavy with magnetite from drill hole CV028 at 45 meters (assay interval contains 1.9 grams of gold per tonne and 0.24% copper). Figure 7.15 is diorite from the contact breccia zone from CV053 from 98 meters (assay interval contains 1.5 grams of gold per tonne and 0.06% copper). Figure 7.16 is a possible fluidized pebble dike from hole CV099 at 208.5 meters (assay interval contains 1.08 grams gold per tonne and 0.56% copper). Figure 7.17 is diorite breccia with alteration halos on fragments from hole CV98 at 292 meters (assay interval contains 0.268 grams gold per tonne and 0.120% copper).

Figure 7.12. Multiple-stage mineralization from drill hole CV018 at 393 meters (assay interval contains 0.5 grams of gold per tonne and 0.25% copper) (Source: Behre Dolbear, 2011)

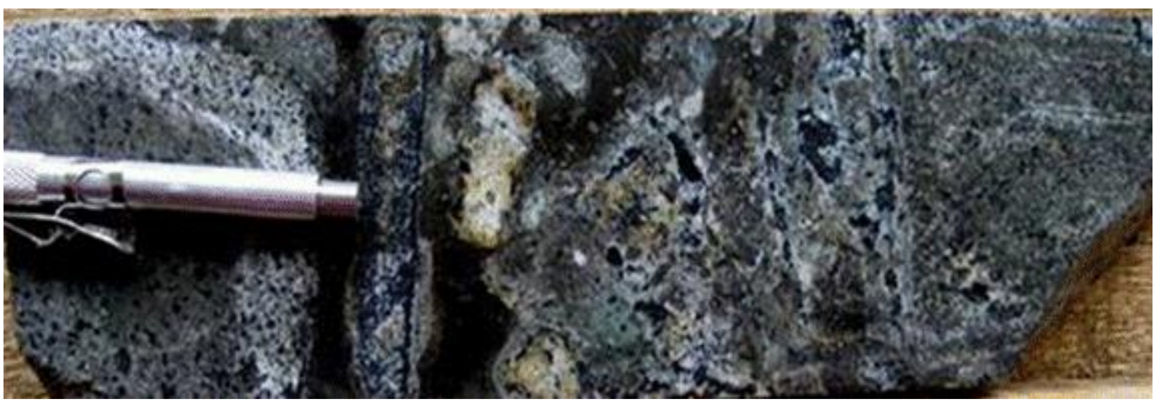


Figure 7.13. Intrusive breccia with magnetite-rich fragments, magnetite-rich matrix from drill hole CV038 at 208 meters (assay interval contains 0.3 grams of gold per tonne and 0.23% copper) (Source: Behre Dolbear, 2011)

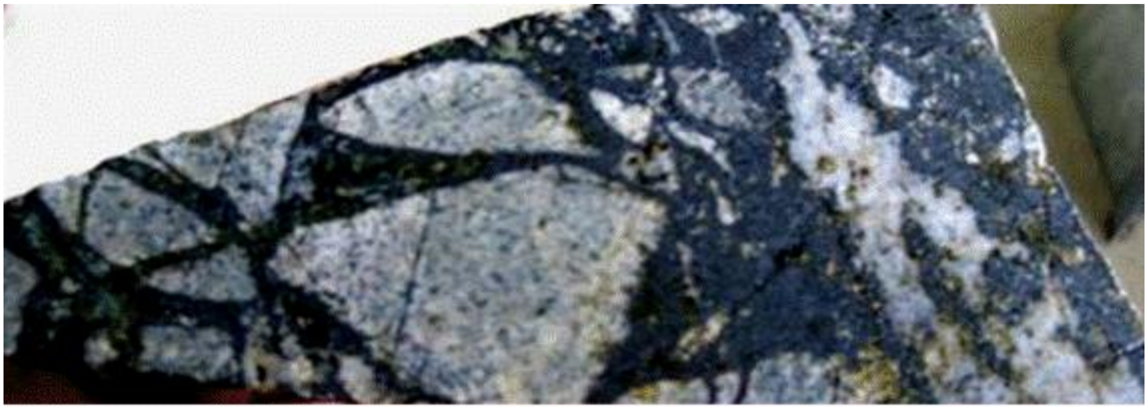


Figure 7.14. Diorite breccia with magnetite matrix from drill hole CV028 at 45 meters (assay interval contains 1.9 grams of gold per tonne and 0.24% copper) (Source: Behre Dolbear, 2011)

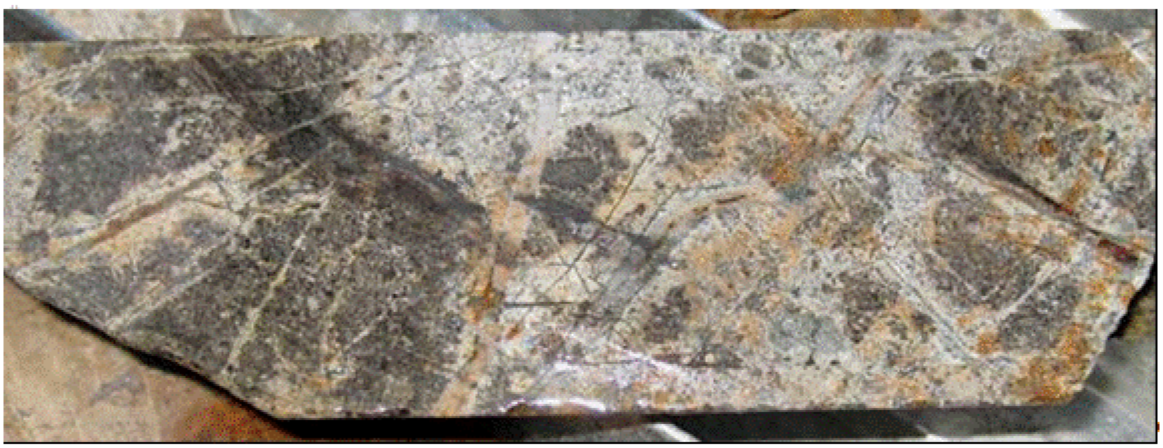


Figure 7.15. Stockwork contact breccia from CV053 at 98 meters (assay interval contains 1.5 grams of gold per tonne and 0.06% copper) (Source: Behre Dolbear, 2012)

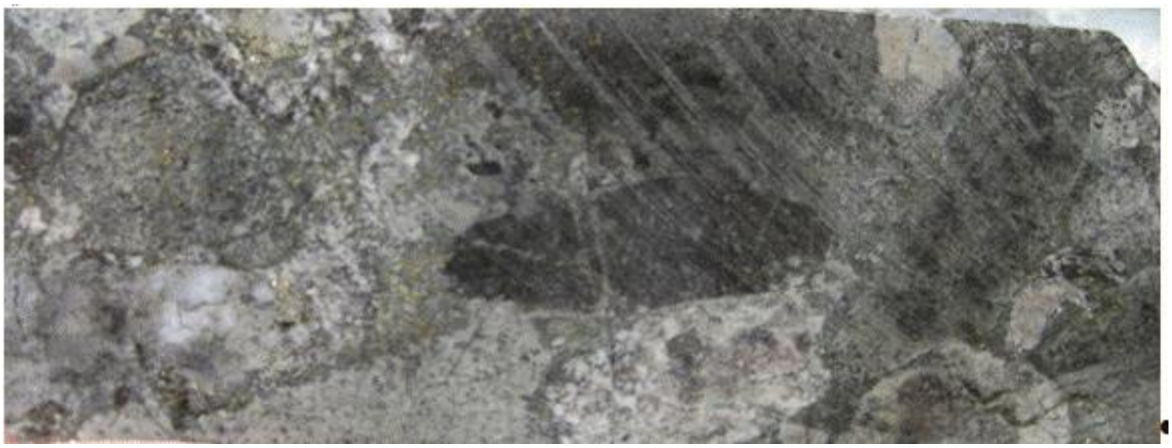


Figure 7.16. Possible fluidized pebble dike from hole CV099 at 208.5 meters (assay interval contains 1.08 grams gold per tonne and 0.56% copper) (Source: Behre Dolbear, 2013)

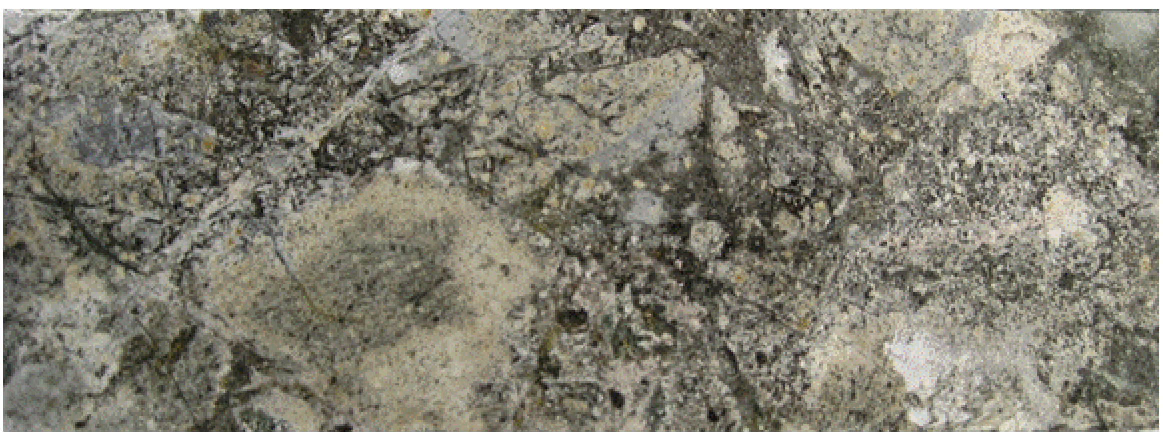


Figure 7.17. Diorite breccia with alteration halos on fragments from hole CV98 at 292 meters (assay interval contains 0.268 grams gold per tonne and 0.120% copper) (Source: Behre Dolbear, 2013)

A second style of mineralization is gold-only mineralization developed in diatreme breccias in the NW Breccia and at Chisperos. At NW Breccia, a separate diorite plug hosts gold and copper mineralization while the diatreme breccia hosts both gold-only and gold-copper mineralization. The reason for separate gold-only and gold-copper zones in the diatreme breccia is unknown but may be related to proximity to diorite dikes.

Chisperos hosts gold-copper mineralization in diorite plugs and dikes, gold-only mineralization in diatreme breccia, and also hosts substantial epithermal, lower-temperature generally gold-only mineralization within parallel to sub-parallel mineralized zones that are both stratigraphically and structurally controlled and hosted in a sedimentary-volcanic sequence. Northwest-striking, steeply dipping faults are theorized to be the channel ways for auriferous hydrothermal fluids that mineralized shallow dipping, favorable stratigraphic hosts: the Amaga Formation/basement contact; diatreme breccia; and possibly shallow-dipping bedding-plane fault zones.

At Chisperos, although there is some disseminated and stockwork mineralization in wide mineralized zones, most of the higher-grade mineralization is in narrow, sulphide-rich veins consisting mostly of pyrite and occasionally sphalerite. Pyrite occurs in at least three paragenetic settings, including as very fine-grained auriferous and argentiferous grains, laminations along bedding, and as coarser-grained veins. Sphalerite is the second-most common sulphide and occurs as massive crystalline aggregates and isolated grains mostly in veins and veinlets. Sphalerite is generally associated with higher grades of gold-silver mineralization. Arsenopyrite is present but only locally common. Metallurgical studies show that pyrrhotite is present and although magnetite and magnetite-ilmenite are present, they may be less prevalent than at Cerro Vetas. Gangue minerals in the mineralized veins include calcite, quartz with restricted occurrences of dolomite, sericite, adularia, and possibly barite. The vein textures are clearly low-temperature epithermal, with fine drusy crystals, cockscomb structures, open-space filling, and crustiform banding. Other evidence of the low-temperature origin is the presence of stibnite, laumontite, and chalcedony. Surrounding these narrow higher-grade, sulphide-rich zones is much lower grade rock; and thus, the thin high-grade veins carry the entire zone. The Chisperos lower-temperature epithermal style of mineralization is common in the historic mines, such as in the "Mina El Cateador" gallery, the old Zancudo Mine and the Otra Mina.

Figure 7.18 is diatreme breccia from Chisperos hole CP014 at 29.5 meters (assay interval contains 0.7 grams of gold per tonne). Figure 7.19 shows bleached diatreme breccia from CP014 at 32 meters (assay interval contains 1.2 grams of gold per tonne). Note that in both samples, the fragments are mostly acidic intrusive or sub-volcanic and sulphides occur in matrix and in fragments. These samples may be intrusive or breccia pipe rather than diatreme breccia.

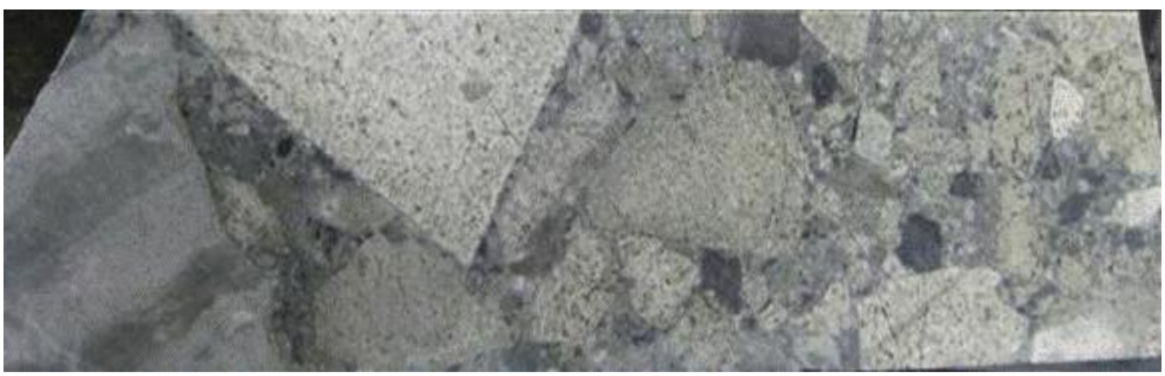


**Figure 7.18. Diatreme breccia from CP014 at 29.5 meters (assay interval contains 0.7 grams of gold per tonne)
(Source: Behre Dolbear, 2012)**

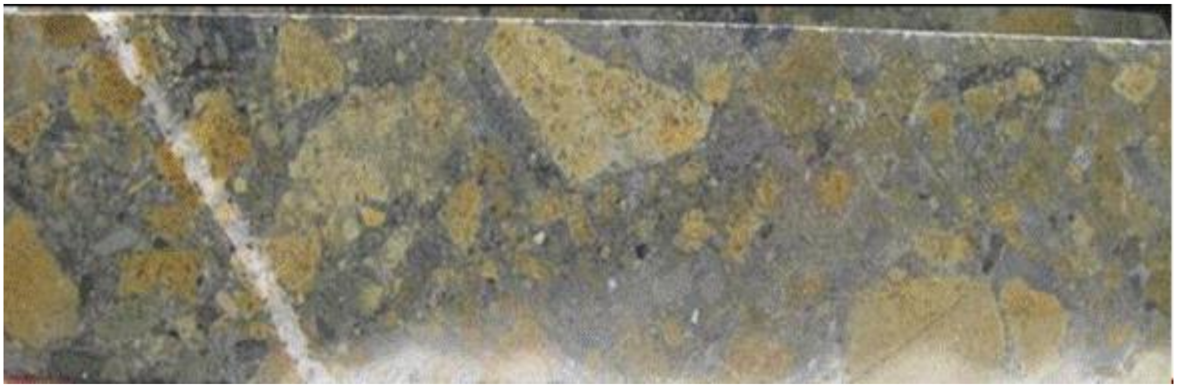


Figure 7.19. Bleached, iron stained diatreme breccia from CP014 at 32 meters (assay interval contains 1.2 grams of gold per tonne) (Source: Behre Dolbear, 2012)

Exploration during 2013 discovered thick zones of copper-dominant and gold-copper mineralization at the Maria Jo prospect that may be an extension of the Cerro Vetas and Chisperos zones. Similarly, the Maria Jo mineralization may be related to an intrusive outlined by as a yet un-drilled magnetic high. Figure 7.20 shows clots of coarse-grained chalcopyrite in basement metamorphic rocks from the newly discovered Maria Jo zone from hole MJ003 at 335 meters and contains 0.422 grams of gold/tonne and 0.516% copper.

Figure 7.20. Clots and fracture filling chalcopyrite in basement metamorphic complex from hole MJ003 at 335 meters (assay interval contains 0.422 grams of gold/tonne and 0.516% copper) (Source: Behre Dolbear, 2013)

Base and precious metal mineralogy is simple. Gold occurs as fine- to coarse-grained native metal, associated with chalcopyrite and less so with pyrite. Figure 7.21 is a polished thin section of a sample that is a chalcopyrite-rich, biotite-altered breccia with a 130-micron grain of gold intimately associated with chalcopyrite (Geosure, 2010). Disseminated chalcopyrite is typically very fine-grained but when in fractures and veinlets, chalcopyrite is coarser grained, as seen in Figure 7.20. Within the Cerro Vetas diorite porphyry, typically gold grades track copper grades. Sphalerite is coarse-grained compared to chalcopyrite and pyrite, and often occurs in thin, multi-directional veins with pyrite. Sphalerite is more common in the lower-temperature epithermal veins in Chisperos than in the Cerro Vetas reflecting metal zoning in the contact aureole. All other sulphide minerals, such as bornite, pyrrhotite, and arsenopyrite, are uncommon to rare. Mineralogic studies on bulk metallurgical samples have identified magnetite/ilmenite, chalcocite, and galena as other metallic minerals present at Cerro Vetas.

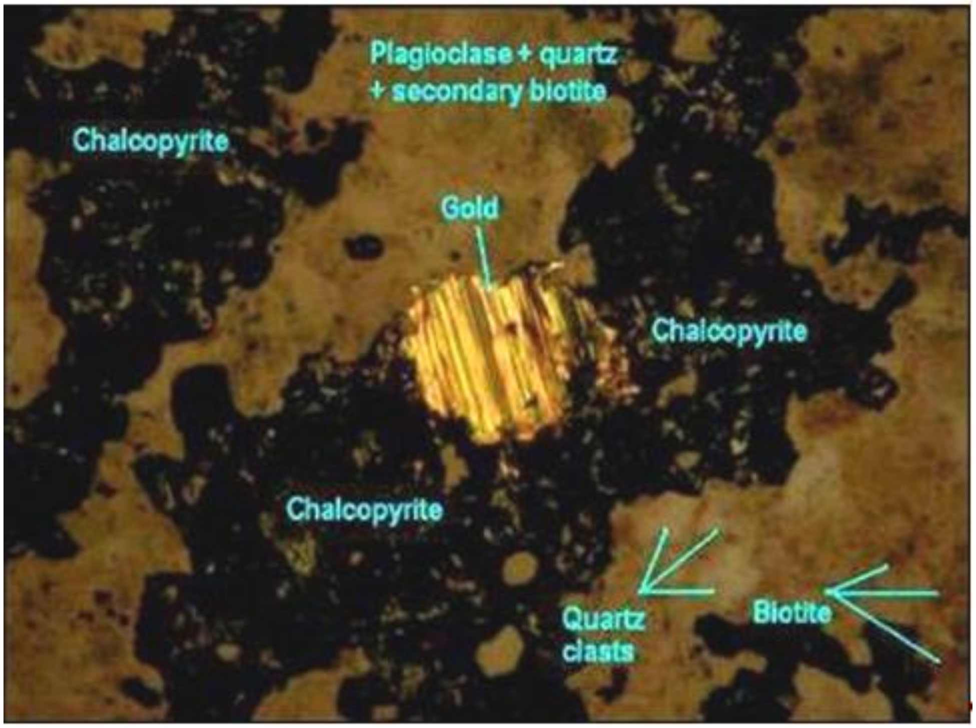


Figure 7.21. Polished thin section showing 130-micron gold grain with chalcopyrite (Source: Geosure, 2010)

7.10 GEOLOGIC SECTIONS, PLANS, SECTION GRADE, AND PLAN GRADE MAPS

Saprolitic soils mask most areas where the intrusive and the volcano-sedimentary section outcrop. Outcrop is generally confined to drainages and ridge tops. Occasionally, man-made road cuts expose relatively un-weathered bedrock. Along some 4-wheel drive and pack trails, rains have concentrated magnetite where the bedrock is nearly totally saprolitic, suggesting the presence of diorite bedrock. With the general lack of bedrock exposures, geologic interpretations are based almost entirely on drilling. Note that all core drilling is oriented. Downhole photography is routinely utilized aiding in the three-dimensional understanding of structures.
Figure 7.22 is a generalized surface geologic map of the Cerro Vetas-NW Breccia-Chisperos porphyry system, including the base geologic section lines. Cerro Vetas is the left side of the figure, NW Breccia is to the north, and Chisperos is to the east.

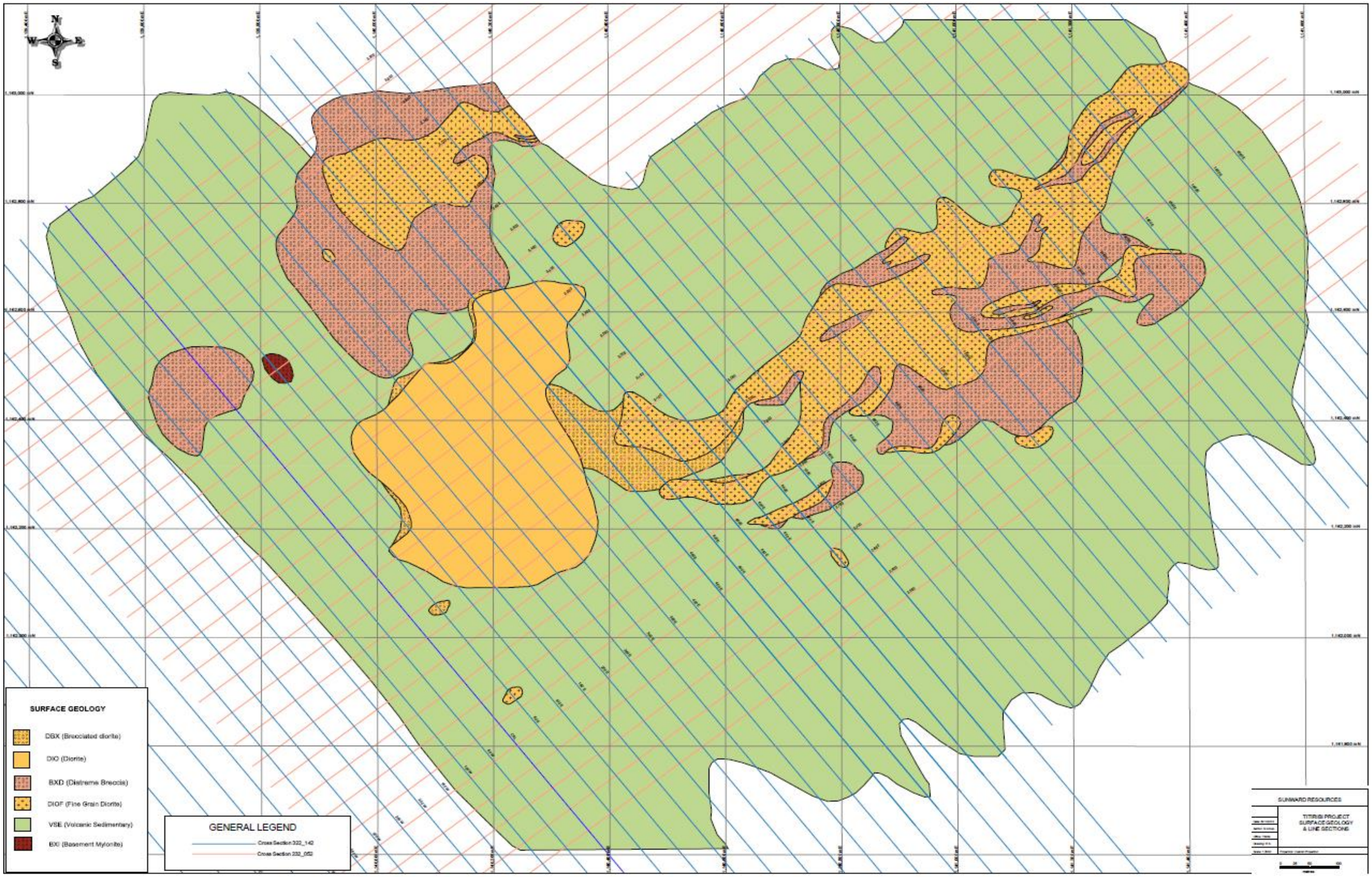


Figure 7.22. Surface geology map of the Cerro Vetas-NW Breccia-Chisperos porphyry system with the section line grid (Source: Sunward, 2013)

Figure 7.23 is cross section 300 east, looking northeast through the Cerro Vetas and NW Breccia zones. The lower plate basement rock includes basalt, graphitic schist, and mylonite breccia that the authors interpret as a lahar unit. Upper plate undifferentiated Amaga and Cambia Formations are shown in green and yellow. The Cerro Vetas stock-like body in the center of the section and diatreme breccia to the northwest (part of the NW Breccia zone) intrude upper and lower plate rocks. The Cerro Vetas potassic core is shown in orange cross-hatching. A narrow Cerro Vetas type dike intrudes the diatreme breccia.

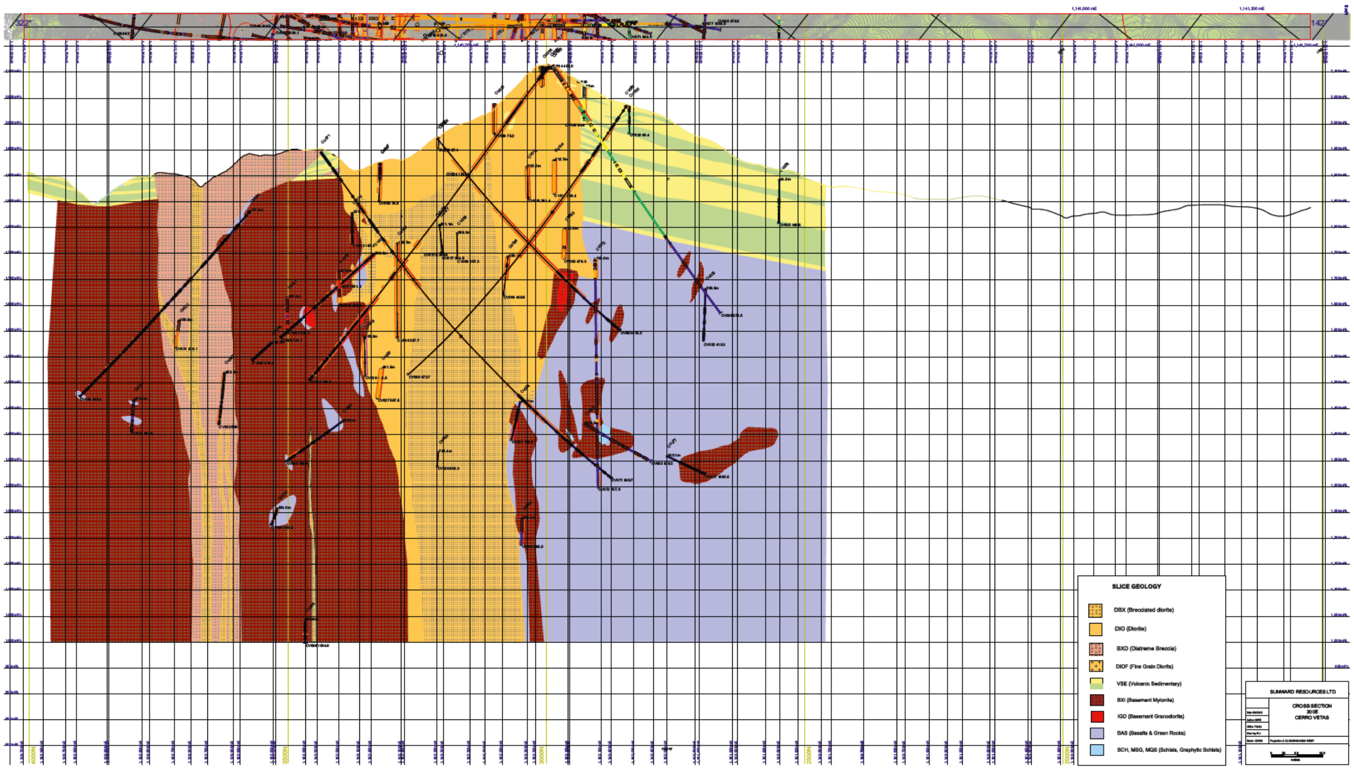


Figure 7.23. Cross section 300 east, looking northeast through Cerro Vetas and NW Breccia (Source: Sunward, 2013)

Figure 7.24 is cross section 400 east, looking northeast through the Cerro Vetas and NW Breccia zones. The geology is very similar to section 300 east, but in the NW breccia zone, the Cerro Vetas type intrusive into diatreme breccia is now a plug or narrow stock-like body.

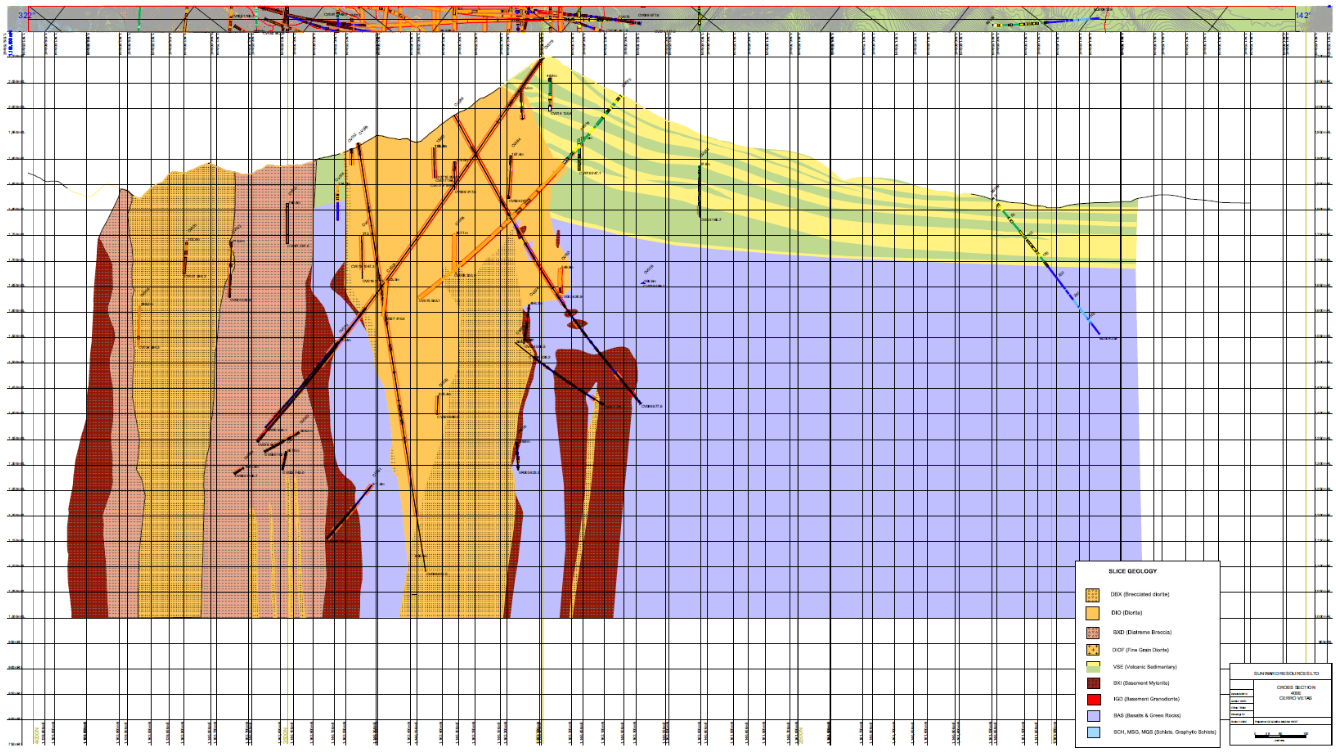


Figure 7.24. Cross section 400 east, looking northeast through the Cerro Vetas and NW Breccia zones (Source: Sunward, 2013)

Figure 7.25 is cross section 1050 east, looking northeast through the Chisperos zone. A Cerro Vetas type plug or narrow stock-like body intrudes into a diatreme breccia and both intrude upper and lower plate rocks.

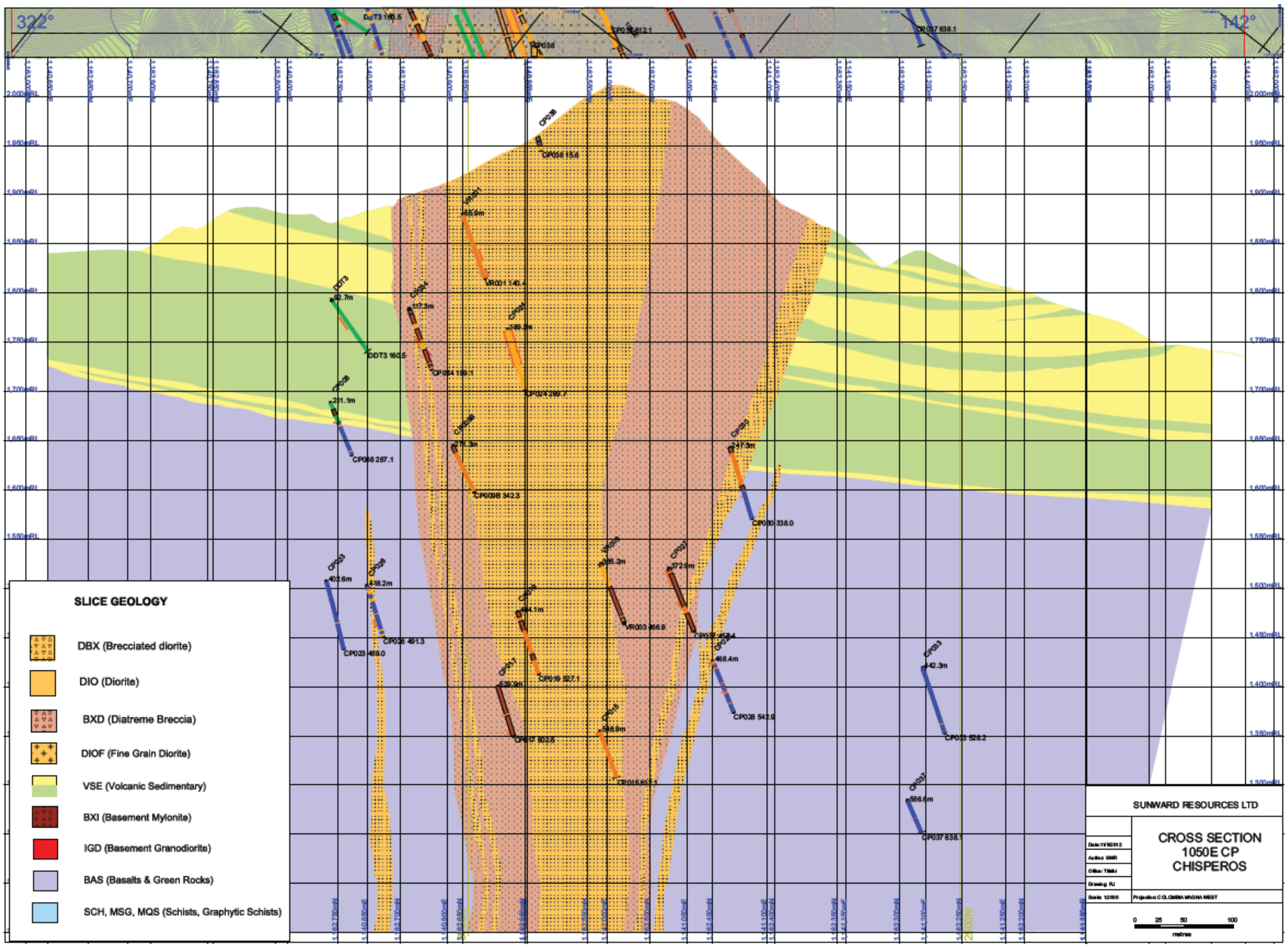


Figure 7.25. Cross section 1050 east, looking northeast through the Chisperos zone (Source: Sunward, 2013)

Figure 7.26, Figure 7.27, and Figure 7.28 are plan geologic maps at elevations of 1,950 meters above sea level, 1,650 meters above sea level, and 1,350 meters above sea level, respectively. Figure 7.26 shows Cerro Vetas diorite (DIO and DIOF) intruding upper plate rocks and diatreme breccia (DXB). In the core of the Cerro Vetas stock is the top of the potassic alteration zone. Figure 7.27 shows the Cerro Vetas stock with a central core of potassically-altered diorite; and Cerro Vetas diorite dikes and plugs intruding diatreme breccia. Basement units include the lahar, basalt, and graphitic schist while the upper plate is undifferentiated sedimentary and volcanic rocks. Note the narrow zones of hydrothermal and intrusive breccia (DBX) that locally surround the Cerro Vetas stock. Also, note the large blocks of pre-mineral Amaga granodiorite (IGD) within the lahar. The age relationship between the lahar and basement basalt is uncertain as large blocks of each float within the other. Figure 7.28 also demonstrates the relationship between the Cerro Vetas stock, plugs, and dikes, diatreme breccia, and the basement rocks. Note that on the northeast side, the northwest orientation of schist and graphitic schist (SCH) may be reflective of northwest-striking structures that appear to control mineralization in the upper and lower plate rocks.

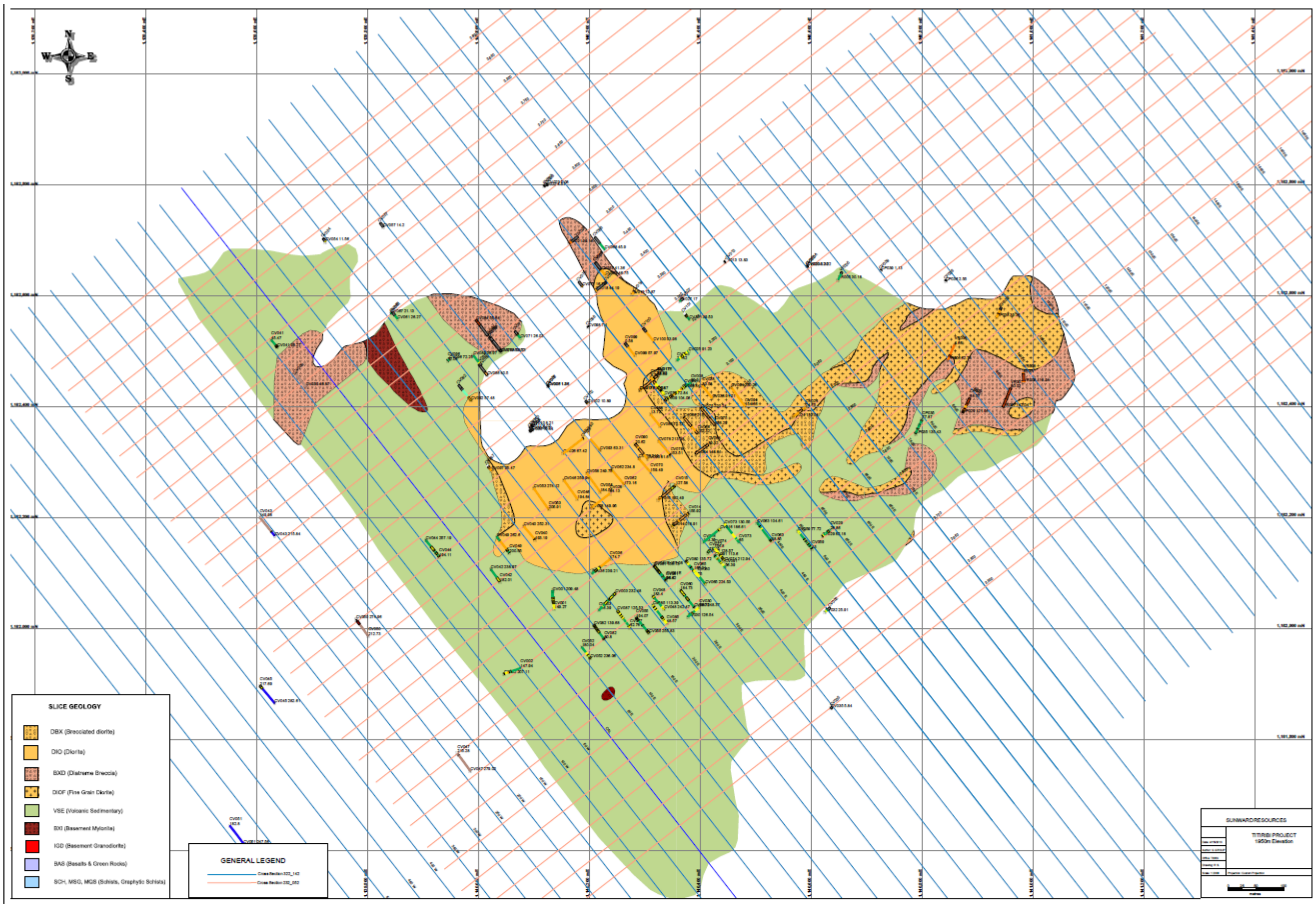


Figure 7.26. Plan geology map of the 1,950 meters above sea level elevation (Source: Sunward, 2013)

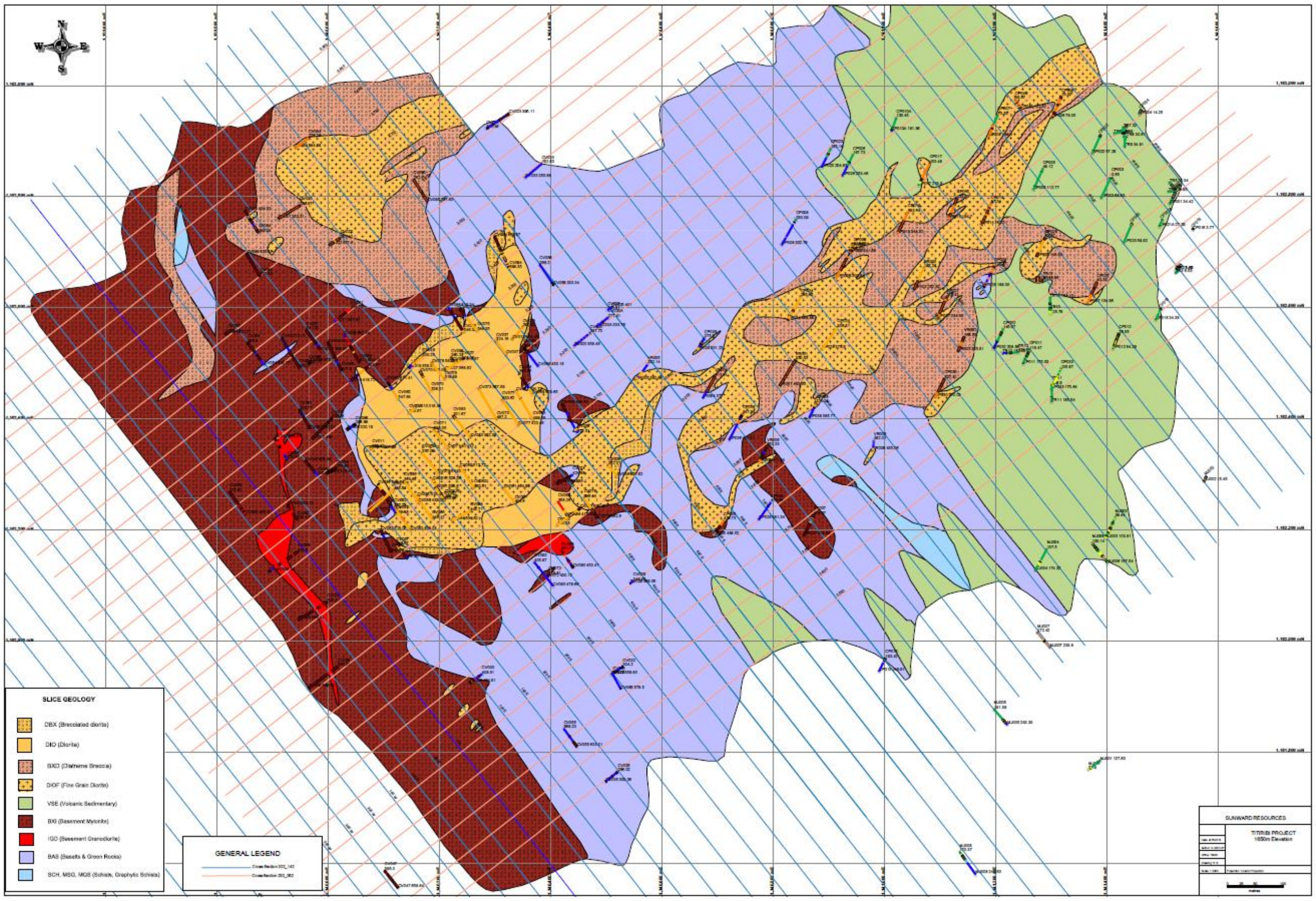


Figure 7.27. Plan geology map of the 1,650 meters above sea level elevation (Source: Sunward, 2013)

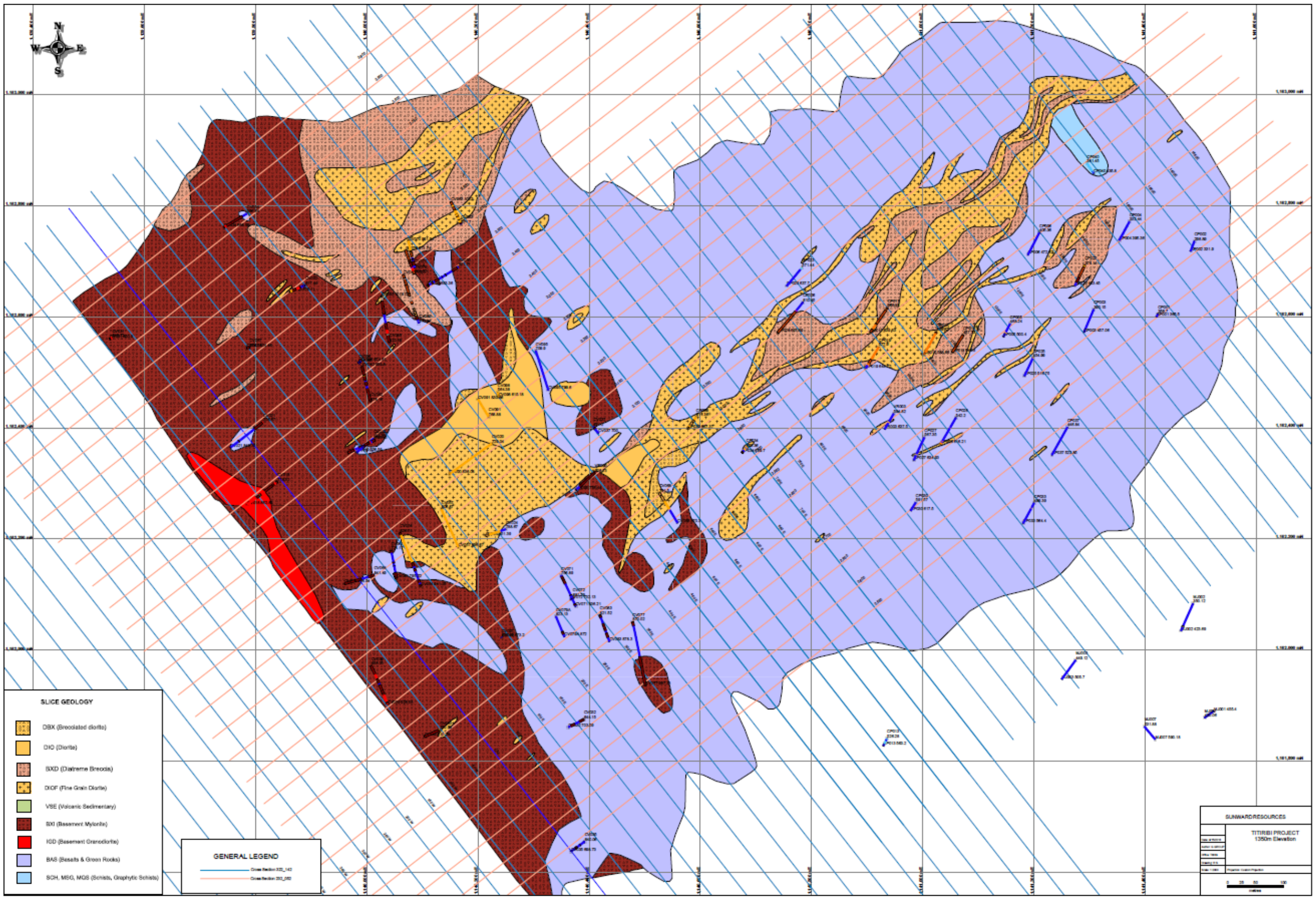


Figure 7.28. Plan geology map of the 1,350 meters above sea level elevation (Source: Sunward, 2013)

Figure 7.29, Figure 7.30, and Figure 7.31 are gold grade block models plan maps for elevations of 1,950 meters above sea level, 1,650 meters above sea level, and 1,350 meters above sea level, respectively. Figure 7.32 is the copper grade block model for the elevation of 1,650 meters above sea level. All gold blocks are for grades ≥ 0.30 grams of gold per tonne classified as Measured and Indicated Resources. All copper blocks are for grades ≥ 0.1% copper. Blocks of Inferred Resources are not depicted. Figure 7.29 shows the top of the barren potassic core centrally located within the mineralized zone hosted in Cerro Vetas diorite. Figure 7.30 shows the increased size of the barren potassic core at depth at Cerro Vetas and the northwest striking structural and stratigraphic controls of mineralization at Chisperos. Figure 7.31 depicts the shift of mineralization into the NW Breccia at depth and shows the continued control by small structures and stratigraphy on mineralization at Chisperos. Figure 7.32 clearly shows copper mineralization hosted in the Cerro Vetas diorite and in the peripheral contact zone and defines the barren potassic core of the intrusive.

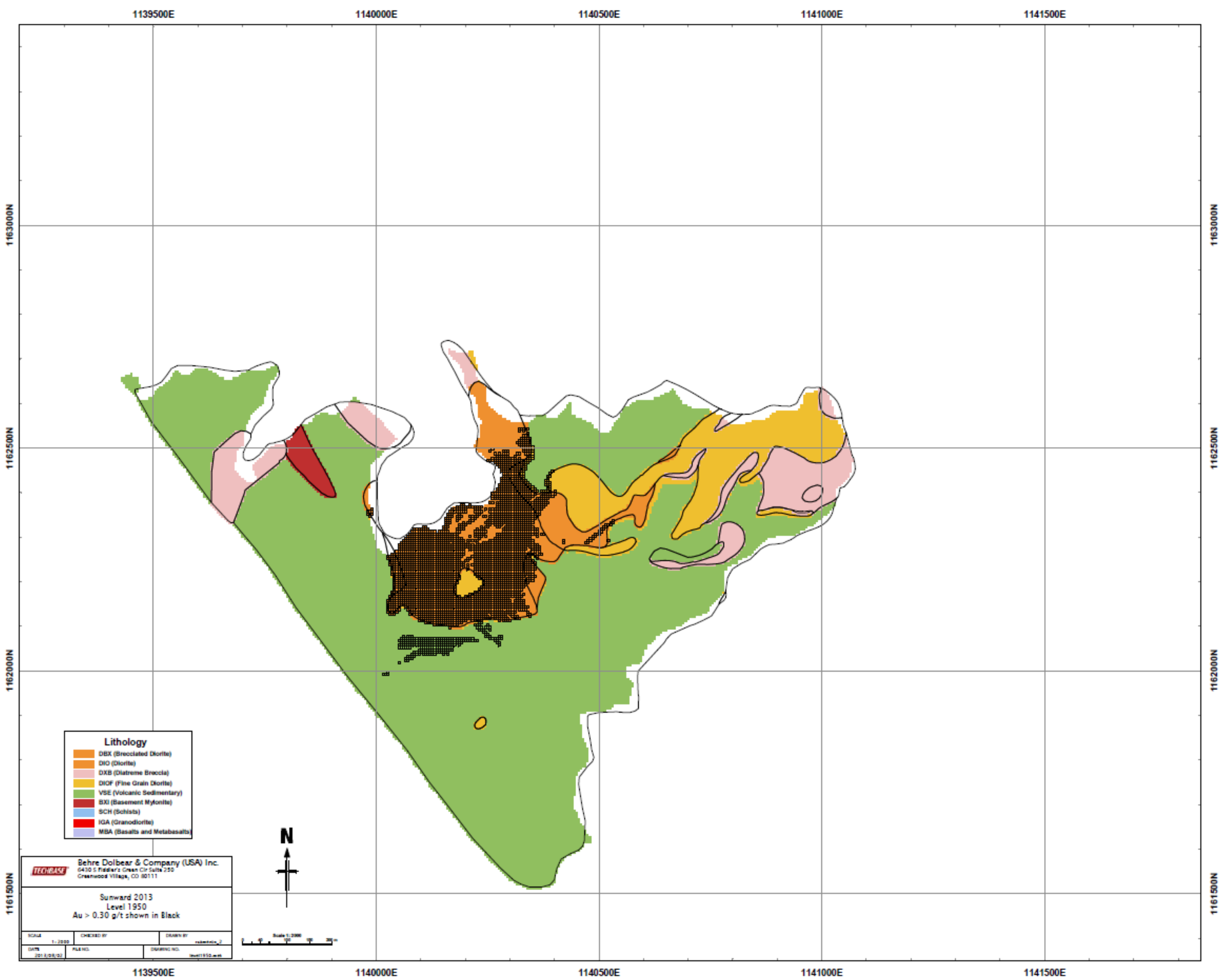


Figure 7.29. Gold grade blocks for elevation 1,950 meters above sea level (Source: Behre Dolbear, 2013)

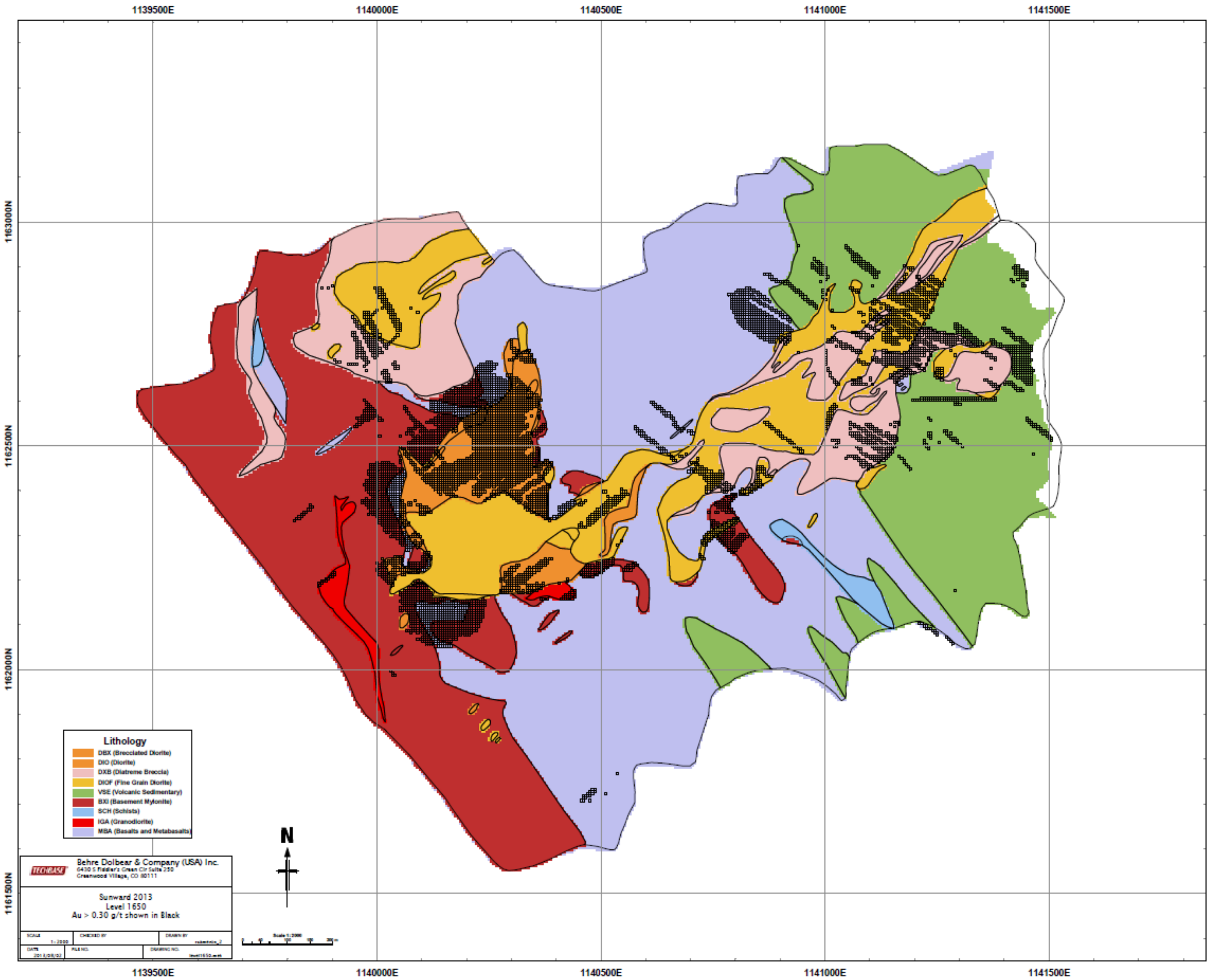


Figure 7.30. Gold grade blocks for elevation 1,650 meters above sea level (Source: Behre Dolbear, 2013)

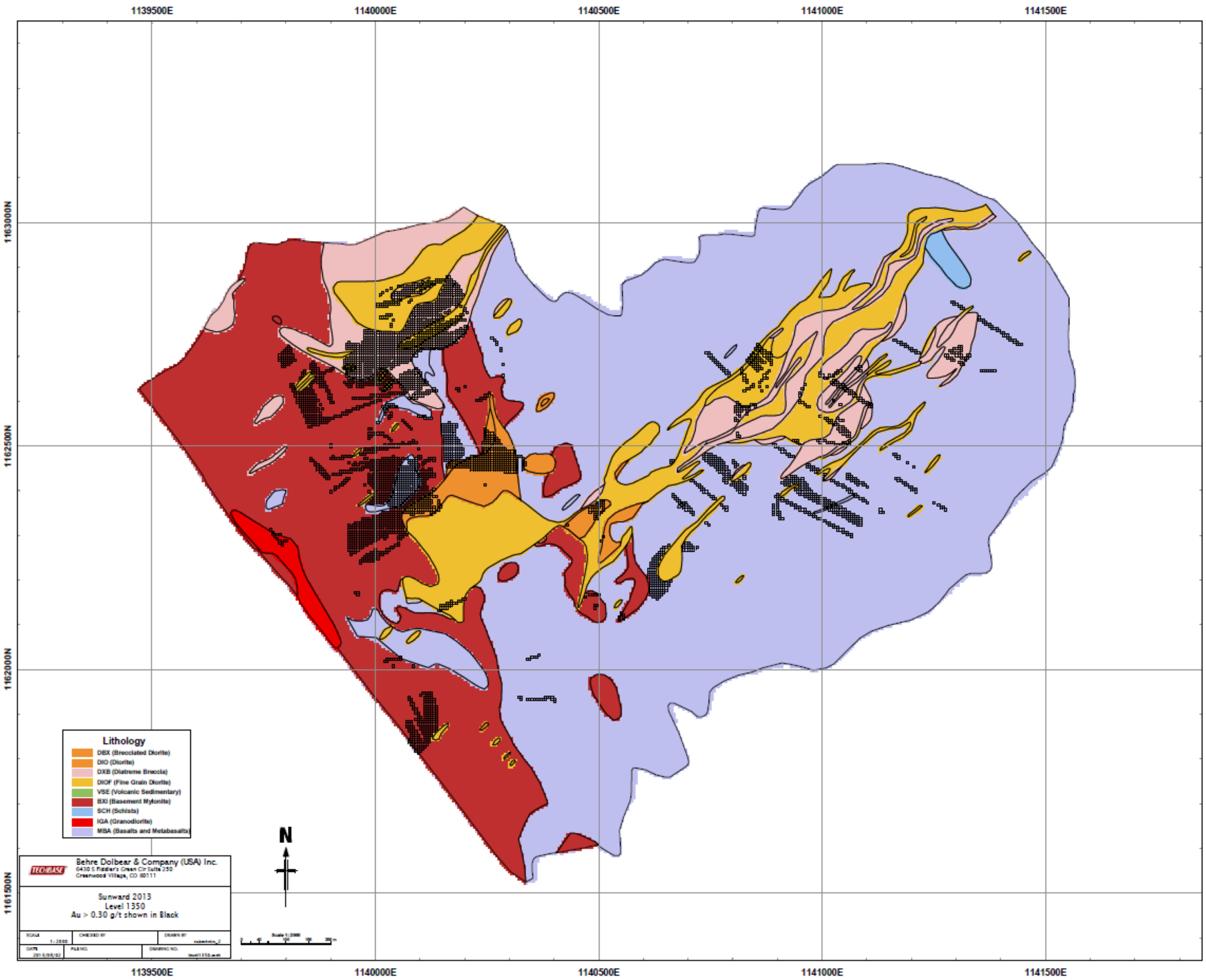


Figure 7.31. Gold grade blocks for elevation 1,350 meters above sea level (Source: Behre Dolbear, 2013)

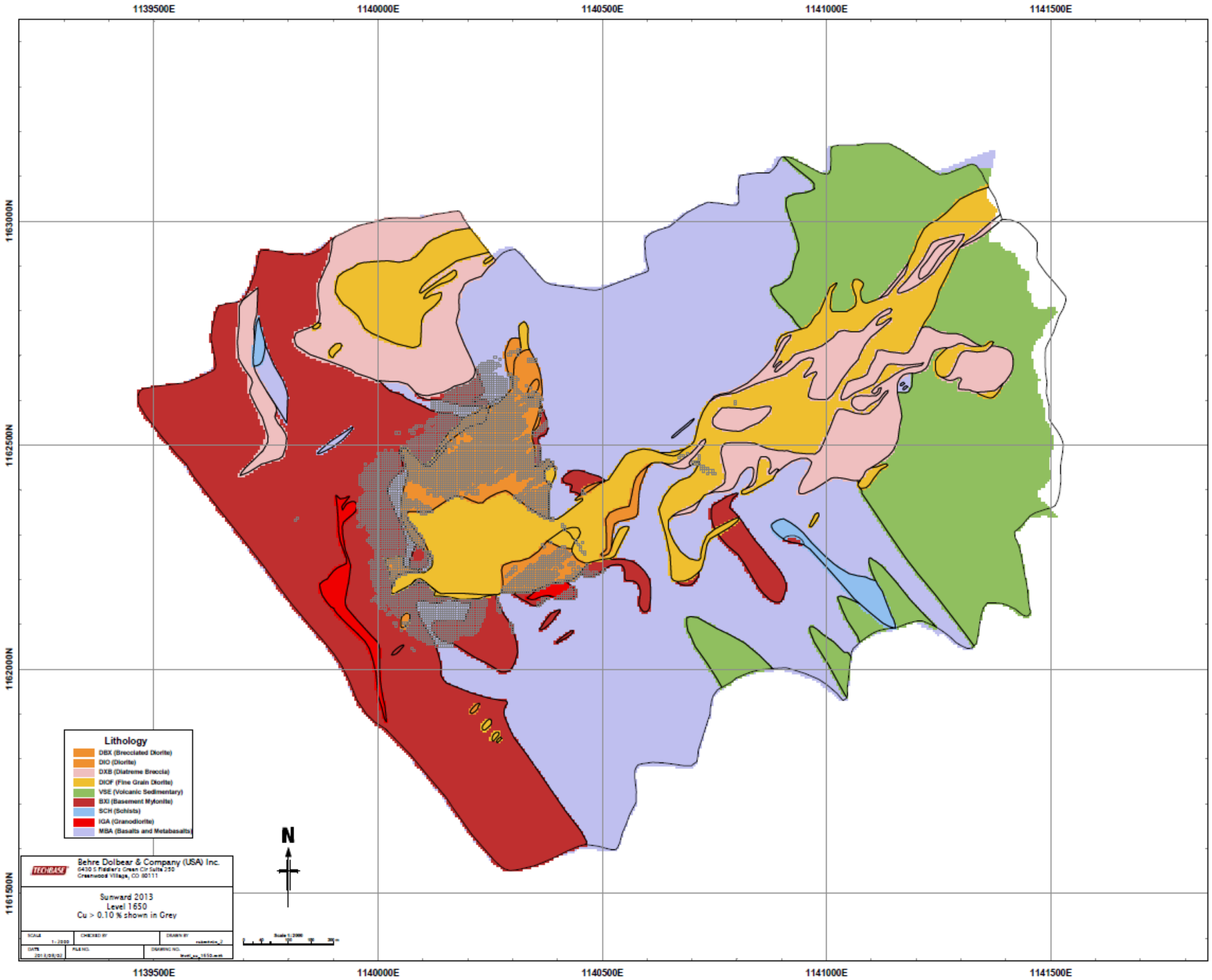


Figure 7.32. Copper grade blocks for elevation 1,650 meters above sea level (Source: Behre Dolbear, 2013)

Figure 7.33 to Figure 7.35 are gold grade block models for sections 300 East, 400 East, and 1050 East, respectively. All blocks are for grades ≥ 0.30 grams of gold per tonne classified as Measured and Indicated Resources. Blocks of Inferred Resources are not depicted. Note in Figure 7.33 and Figure 7.34, the distribution of gold blocks forms a shell partially surrounding the barren core of the Cerro Vetas diorite intrusive. In Figure 7.34, note the general overall boundary of mineralized blocks is tabular dipping westward. This mineralization is controlled by small displacement structures that are not shown. In Figure 7.35, gold mineralization at Chisperos is hosted mostly in diorite breccia and the basement complex and commonly is controlled by host rock and/or small structures.

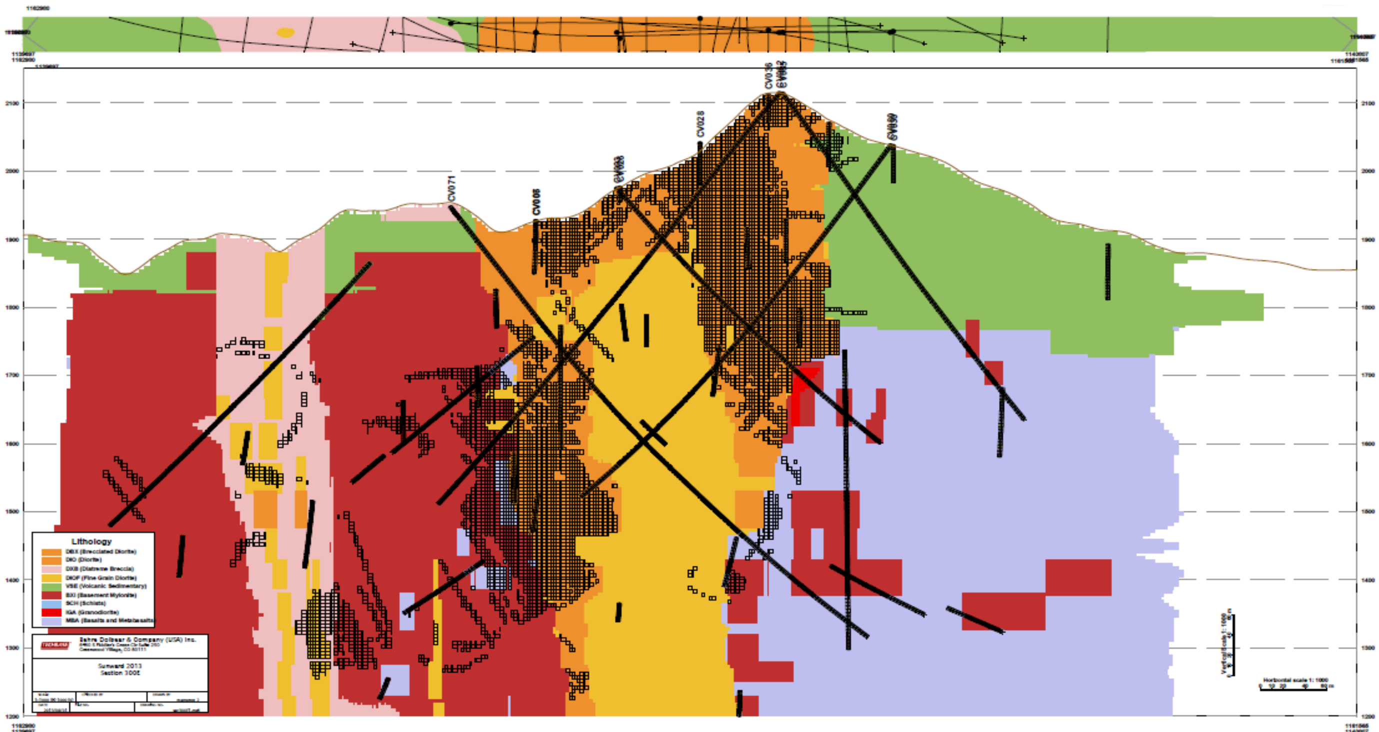


Figure 7.33. Gold block model for section 300E across Cerro Vetas and NW Breccia (Source: Behre Dolbear, 2013)

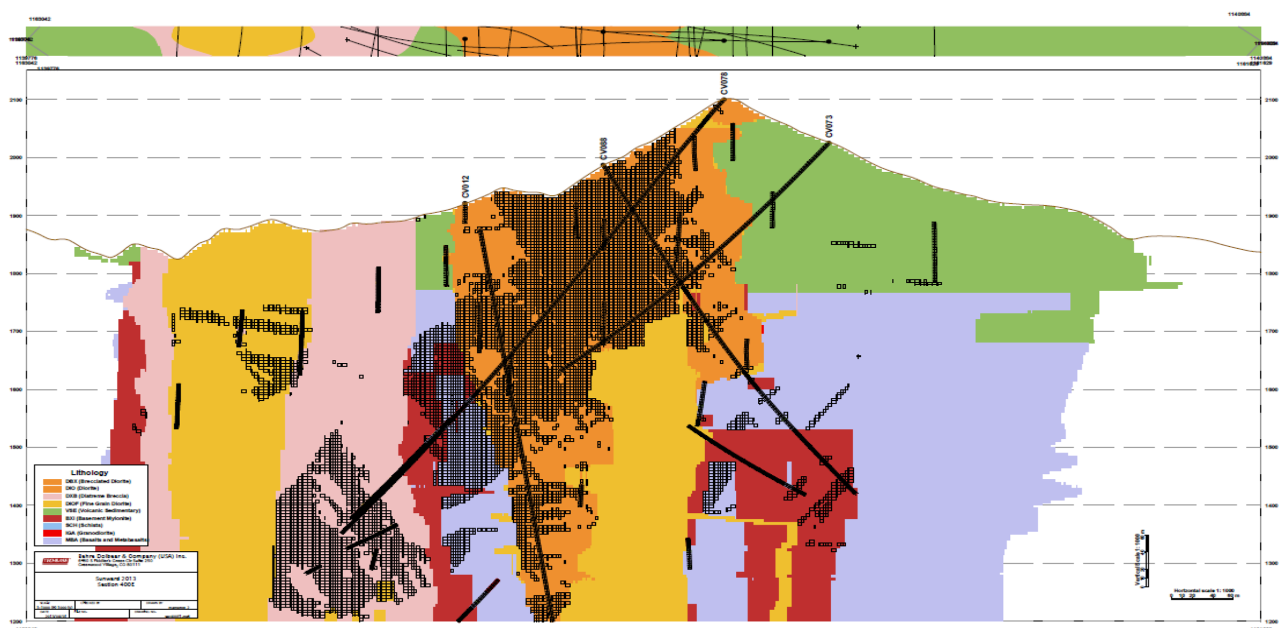


Figure 7.34. Gold block model for section 400E across Cerro Vetas and NW Breccia (Source: Behre Dolbear, 2013)

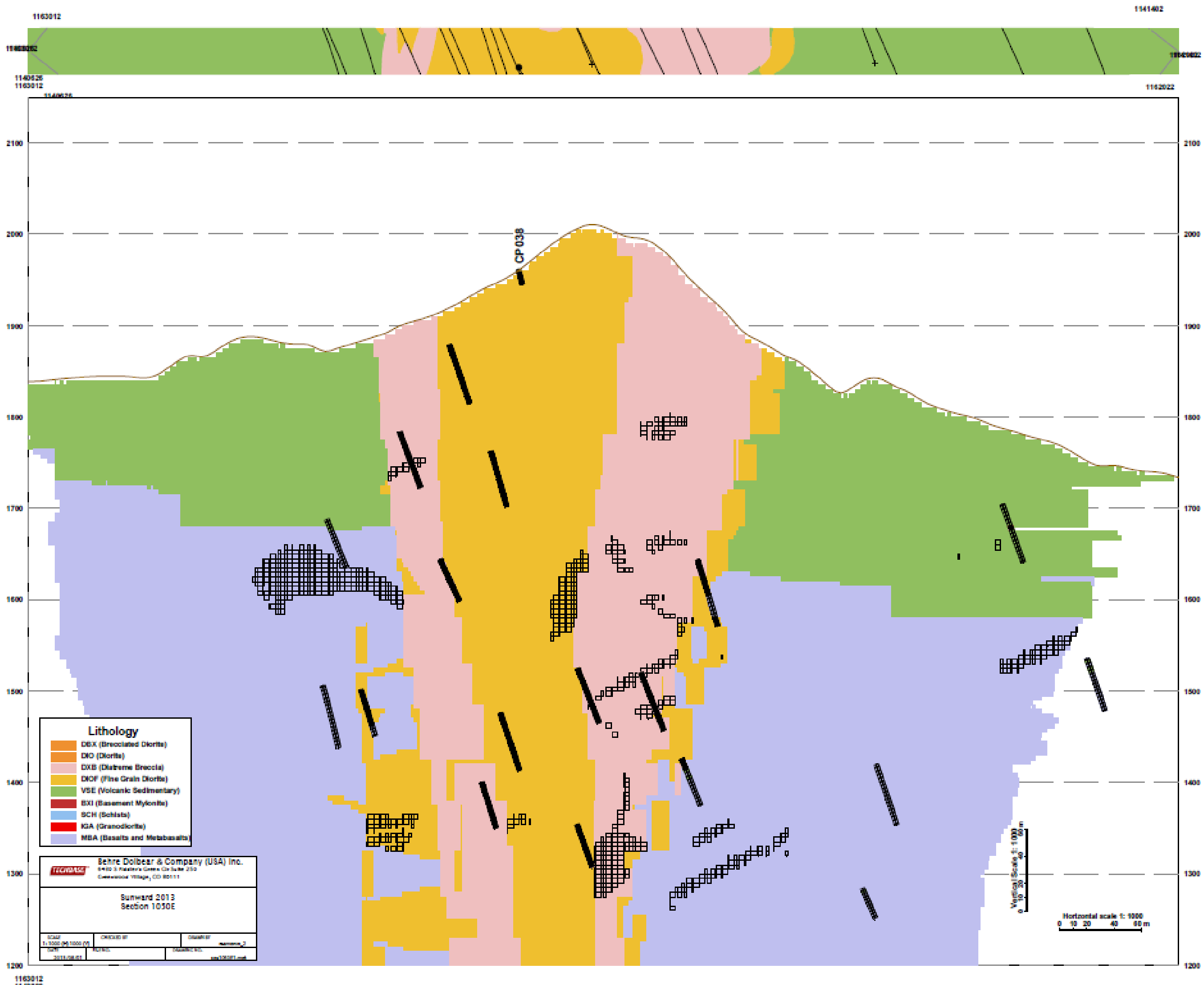


Figure 7.35. Gold block model for section 1050E across Chisperos (Source: Behre Dolbear, 2013)

8.0 DEPOSIT TYPES

All of the deposits and prime exploration targets are related to a cluster of gold-copper-bearing Miocene-age porphyry intrusives. The intrusive bodies have been emplaced along pre-existing zones of weakness related to the intersection of the northwest-southeast-trending Cauca-Romeral fault zone, tension faults related to the same, and regional northerly striking fault zones. These zones of weakness were first intruded by diatreme breccia, which in turn, were intruded by the Cerro Vetas stock, plugs, and dikes. The largest porphyry gold-copper deposit is the Cerro Vetas-NW Breccia-Chisperos complex, where the principal diorite stock is centrally located at Cerro Vetas. Dike swarms at Chisperos emanate from the Cerro Vetas stock and another smaller diorite plug occurs at NW Breccia. Copper-gold mineralization occurs in and immediately adjacent to intrusive dioritic stocks, plugs, and dikes. Gold-dominant mineralization occurs in diatreme breccia, sediments, and volcanic rocks that are within the contact aureole of the diorite. Another postulated intrusive center with significant copper-dominant and gold-copper mineralization in the contact aureole was discovered during the 2012-2013 drilling campaign at Maria Jo. The Junta prospect, to the southeast of Maria Jo, and along the same structural feature as Cerro Vetas and Maria Jo, hosts disseminated and fracture-controlled gold-copper mineralization in a stock-like intrusive body while Porvenir and Candela hosts mineralization in the intrusive and its contact aureole.

Mineralization is either gold-copper, gold dominant, or copper-dominant. The most significant gold-copper deposit is the bulk-tonnage porphyry gold and copper mineralization typified by the Cerro Vetas intrusive. Gold and copper mineralization within the porphyry system is disseminated, fracture filling, and stockwork. Similar mineralization occurs in various breccia types as mineralized fragments and/or mineralized matrix, and in the contact zone hosted by the volcano-sedimentary section. The system has a high chalcopyrite to pyrite ratio. Gold mineralization is relatively coarse and intimately related to chalcopyrite. The Cerro Vetas intrusive exhibits typical but restricted porphyry copper-style alteration. A relatively barren prograde potassic core is superimposed by a well-developed retrograde mineralized phyllic zone that in turn is surrounded by a thin retrograde mineralized argillic zone and then a widespread propylitic alteration zone. On all sides of intrusive-wall rock contact, a contact breccia has developed. The phyllic zone overlaps the intrusive and the contact breccia. The saucer-shaped phyllic zone is widest above and on the sides of the Cerro Vetas intrusive and thins at depth. Most of the significant gold-copper mineralization is associated with the phyllic alteration-contact breccia zone. Both the potassic core and phyllic zone host a high content of magnetite.

Other intrusive bodies, as small plugs and dikes, occur near the Cerro Vetas stock at NW Breccia and Chisperos. At NW Breccia, a sub-group of gold-only mineralization occurs in a diatreme breccia. There is an unusual association in the diatreme breccia with anomalous nickel and chrome. This association is undoubtedly due to high background values of nickel and chrome in mafic and/or ultramafic basement rocks brought up from depth. It is likely that particular mafic rocks are also favorable reactive host rocks susceptible to contact related mineralization. Gold-dominant diatreme breccia dikes also occur in Chisperos where they are mineralized when near plugs and dikes of diorite.

The second style of gold-dominant mineralization is low-temperature epithermal veins and disseminations that are peripheral to and in the contact aureole of the principal Cerro Vetas intrusive center and other smaller plugs and dikes. Some deposits, such as the Chisperos, host predominantly vein and fracture filling and some disseminated gold with minor copper mineralization. Hydrothermal fluids follow high-angle faults depositing gold mineralization in the high-angle faults and spread out along the Amaga conglomerate-basement contact and in receptive volcano-sedimentary and diatreme breccia hosts, or in a series of parallel to sub-parallel zones of weakness, possibly formed by bedding-plane or relatively low-angle thrust faults.

Central to the Chisperos zone is a series of possibly interconnected diatreme breccias that are very similar to the diatreme breccia in the NW Breccia zone. High-level diorite dikes, perhaps above more stock-like intrusives, have intruded into the throats of the diatreme breccias.

At Cerro Vetas and other deposits, there is a clear relationship between magnetic highs, gold-copper-molybdenum geochemical anomalies and underlying mineralized dioritic intrusives. At Maria Jo, a large magnetic high caused by a suspected buried diorite body, with zones of copper-dominant and gold-copper mineralization in its contact aureole, is surficially covered by post-mineral gravel. Maria Jo is the only deposit or occurrence without a surface geochemical signature.

Since only about 5% of the area outcrops, mostly in drainages, ridge tops, and man-made road cuts, the best pre-drilling exploration tools are geochemical sampling and geophysics, particularly since trenching is not allowed as an exploration tool. Figure 8.1 depicts the generalized gold-copper porphyry model used at Titiribi.

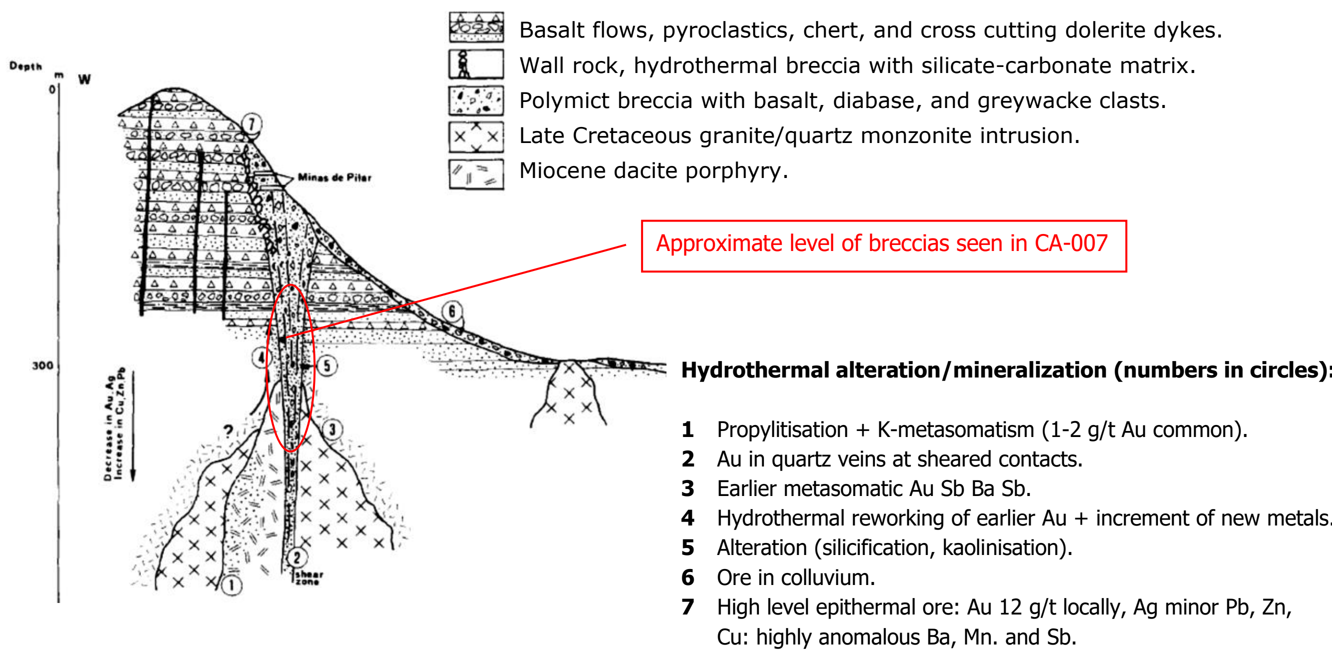


Figure 8.1. Generalized porphyry model
(Source: Andrew, Sunward Internal Report, 2011)

9.0 EXPLORATION

Aside from geologic mapping, there has been extensive multi-element geochemistry in soil sampling grids and rock chips, as well as multiple campaigns of geophysical surveying. Over the past several years, diamond drilling has been the principal exploration tool.

9.1 GEOPHYSICAL SURVEYS

The following geophysical surveys were completed.

- **1997-1998:** Zonge Engineering performed a survey covering Cerro Vetas and Chisperos. This survey included ground magnetics, IP, resistivity, and controlled source audio frequency magneto-telluric (CSAMT). The survey was done over eight lines in a north-northwest and south-southeast direction (3 over Chisperos and 5 over Cerro Vetas) with each about 2 km in length; and 7 cross lines in north-northeast and south-southwest direction only over Cerro Vetas with each line about 600 meters in length. The line spacing for the long north-northwest and south-southeast lines in Chisperos was 200 meters and in Cerro Vetas it was 400 meters and the line spacing for the cross lines in Cerro Vetas was 200 meters. The station interval for all surveys was 2 meters.

- **2008:** AngloGold completed an airborne geophysical survey over the entire license area under a services contract with WKR and GPR. This survey included magnetic, multi-spectral radiometric (U, Th, K) and a LASER altimeter survey corrected with DGPS. The survey was done with 64 lines in a north-south direction and 10 tie lines in an east-west direction. The lines were 100 meters apart with an average terrain clearance of 115 meters. The magnetic and the LASER data were collected at 1-meter intervals and the radiometric data at 10-meter intervals.

- **2010:** A ground magnetic survey over the southern part of the area was done by KTTM Geophysics. This survey was along a North 52°-North 232° direction parallel to the soil sampling lines and natural source audio-frequency magneto telluric (NSAMT) survey lines and was done using a GEM system "Overhauser" magnetometer. The survey used 200-meter line spacing and a 10-meter station interval.

- **2010:** A NSAMT (natural source audio-frequency magnetotelluric) survey was performed by Zonge Engineering over the southern area of the Titiribi Project. This survey was intended to locate drill targets in the southern areas in conjunction with the soil geochemical survey. The survey used 200-meter line spacing and 20-meter station interval.

- **2010:** Mr. Robert Ellis, consulting geophysicist from Ellis Consulting, was engaged to review all geophysical information and interpret the available information. Figure 9.1 shows the Ellis three-dimensional magnetic susceptibility solid with a large domal feature at Cerro Vetas with a high magnetic susceptibility, overlying what was inferred to be either a low-silica diorite or a metamorphic core feature.

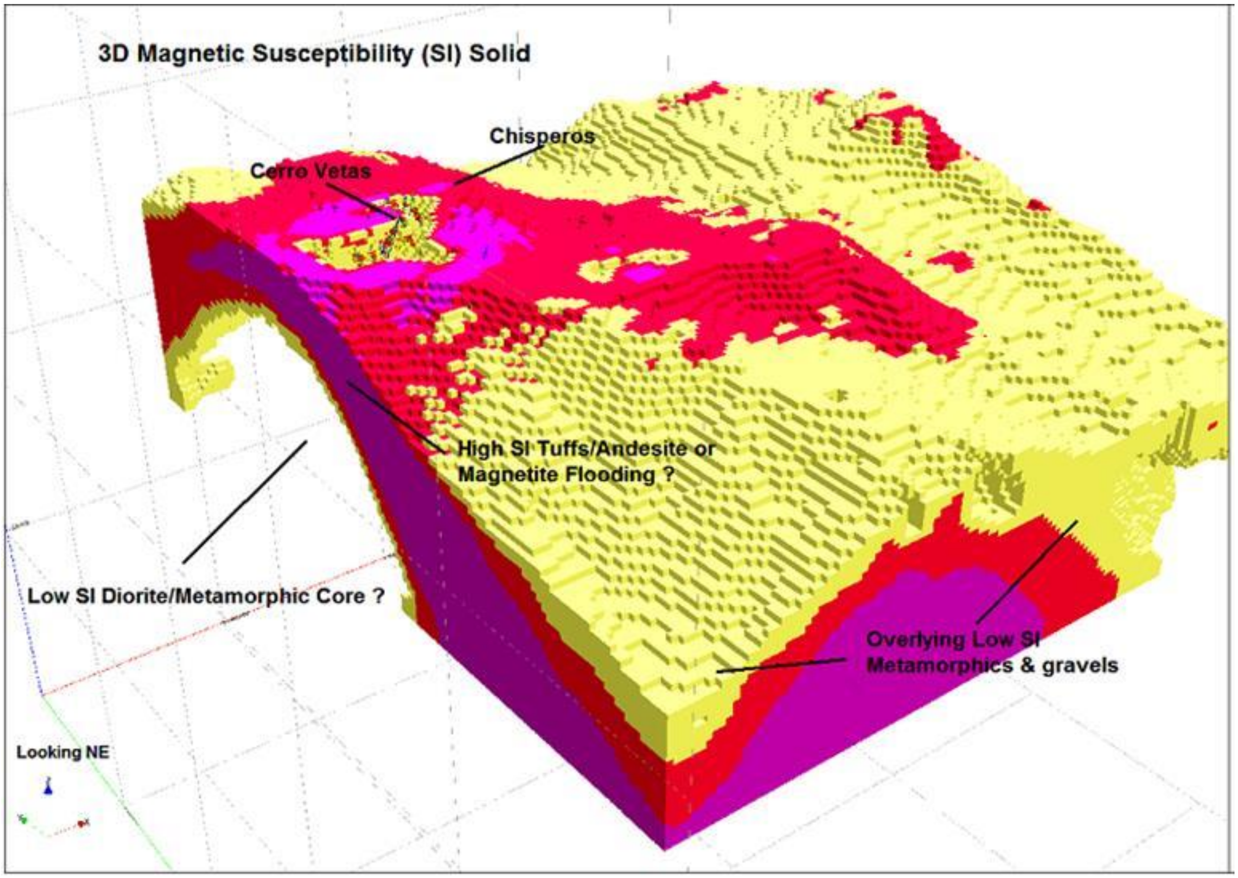


Figure 9.1. Three-dimensional magnetic susceptibility solid from the inversion of the total field aeromagnetic data (View is looking to the northeast) (Source: Ellis, 2011)

Additional controls on Cerro Vetas zone mineralization were hypothesized by the Sunward staff based upon an in-house review of the geophysical interpretations and a reasonable understanding of district-wide mineralization controls. As low-angle structures control higher-grade mineralization district-wide, it was hypothesized that pre-existing low-angle structures were domed and now dip outward from the central stock. Drilling across these outward structures has confirmed the presence of zones of high-grade mineralization that are coincident with the well mineralized phyllic alteration halo that surrounds and dips away from the barren potassic core of the Cerro Vetas intrusive.

Proprietary enhancement of magnetic data suggests that large structural-magnetic anomalies occur at depth in several areas. Some come to surface near known intrusive centers. One possibility is that larger stock-like bodies exist at moderate depths and that the known mineralized smaller stocks and dikes are plumes off of a larger intrusive body at depth. This is in no way to suggest larger mineralized bodies occur at depth, but perhaps suggest that the parent magma bodies to the Cerro Vetas-Maria Jo-Junta-Candela-Porvenir suite of diorite porphyries perhaps can be located with geophysical tools.

9.2 REMOTE SENSING

High resolution, multi-spectral panchromatic (spatial resolution < 6 centimeter (cm)) satellite imagery of the Titiribi region has been used to create a lineament map of the region. The imagery was purchased from Digital Globe®. The imagery was used by Sunward to map out linear features to enhance their geologic understanding of the Project area. Many linear features follow drainages and drilling has shown small displacement fault contacts follow many drainages. LandSat® studies were also completed. Such remote sensing studies are designed to help decipher the sub-surface geology since outcrop exposure is poor.

9.3 GEOCHEMISTRY

Multi-element soil sampling grids have played a very important part in planning drilling locations. Anomalous gold and copper are a direct indication of sub-surface mineralization; however, soil creep has shifted anomalies downhill from their source. At Maria Jo, downhill soil creep of barren soil covers near surface mineralization. Nonetheless, the use of copper, gold, and other metals and their zoning patterns has proved quite useful in delineating target areas.

Over the years, several soil sampling campaigns were completed. In 2009, after Sunward re-interpreted the previous geophysical surveys, a systematic soil sampling program was completed. A network of 46 lines bearing 052°, covering an area of 12.58 square kilometer (km^2) with line and sample spacing of 100 meters by 40 meters, respectively, was completed. A total of 3,152 samples were collected. In part, the lines were the same as used on the 200-meter by 20-meter geophysical grid. However, for in-fill lines and sample points, control was via GPS. Soils from the "B" horizon were generally collected but on some very steep slopes, soils were very poorly developed and "C" horizon samples were collected. The average depth to the "B" horizon was 0.5 meters to 0.8 meters. About 3 kilograms (kg) to 4 kg of soil were collected at each site and a photographic record of the color, texture, and description of each sample was recorded. Maps of the soil colors were created to determine if iron-rich soil zones could be outlined. Holes were backfilled, samples shipped to Medellin for sample preparation, and then they were shipped to the Inspectorate Laboratory in Reno, Nevada for multi-element analysis. Quality Control was assured as in each batch of 142 samples, a blank and a standard was included (44 control samples in total).

The Cerro Vetas, NW Breccia, and Chisperos anomalies were previously well established but four new anomalies were identified. The anomalies are closely aligned with geophysical anomalies, and all the major geochemical anomalies are now, by virtue of drilling, related to at least anomalous gold-copper mineralization in intrusives and/or their contact aureoles.

In addition, rock and channel samples have been collected in numerous locations. Although the authors have not been on-site to observe the sampling method, from the description, the surface sampling program appears to have been completed in a professional manner and there is little reason to suspect any bias. The good correlation with geophysical anomalies reflects on a well-run sampling and analytical campaign. Figure 9.2, Figure 9.3, and Figure 9.4 are the gold-, copper-, and molybdenum-in-soil geochemical signatures over the entire area, respectively. Note that on the west side of the copper-in-soil geochemical map, a large copper anomaly exists. Little exploration has occurred over this anomalous area; however, exploration at Candela suggests that portions of the anomaly may overlie diorite intrusive found deep in the angled drill holes.

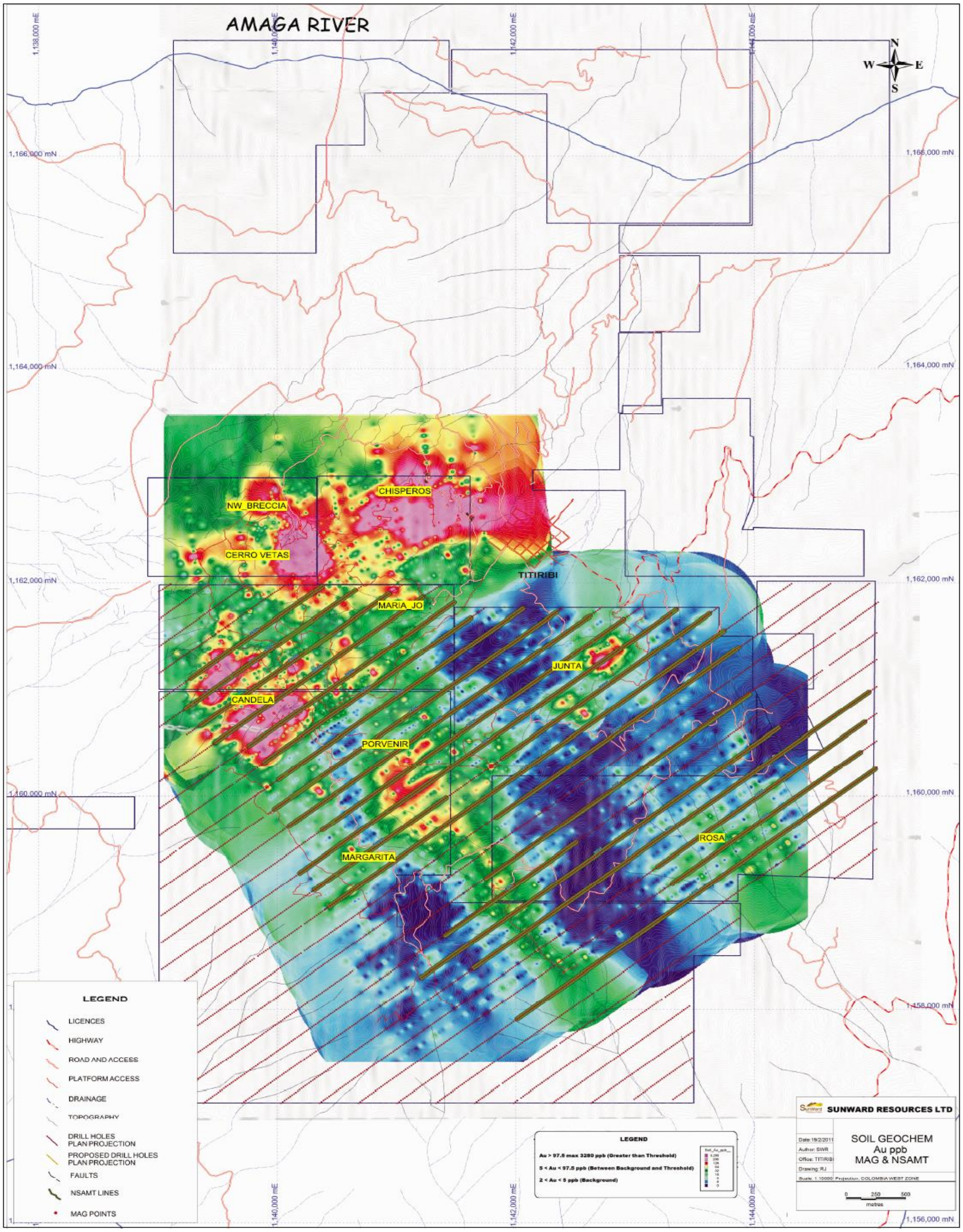


Figure 9.2. Gold-in-soil geochemical anomaly map (Source: Sunward Internal Reports, 2013)

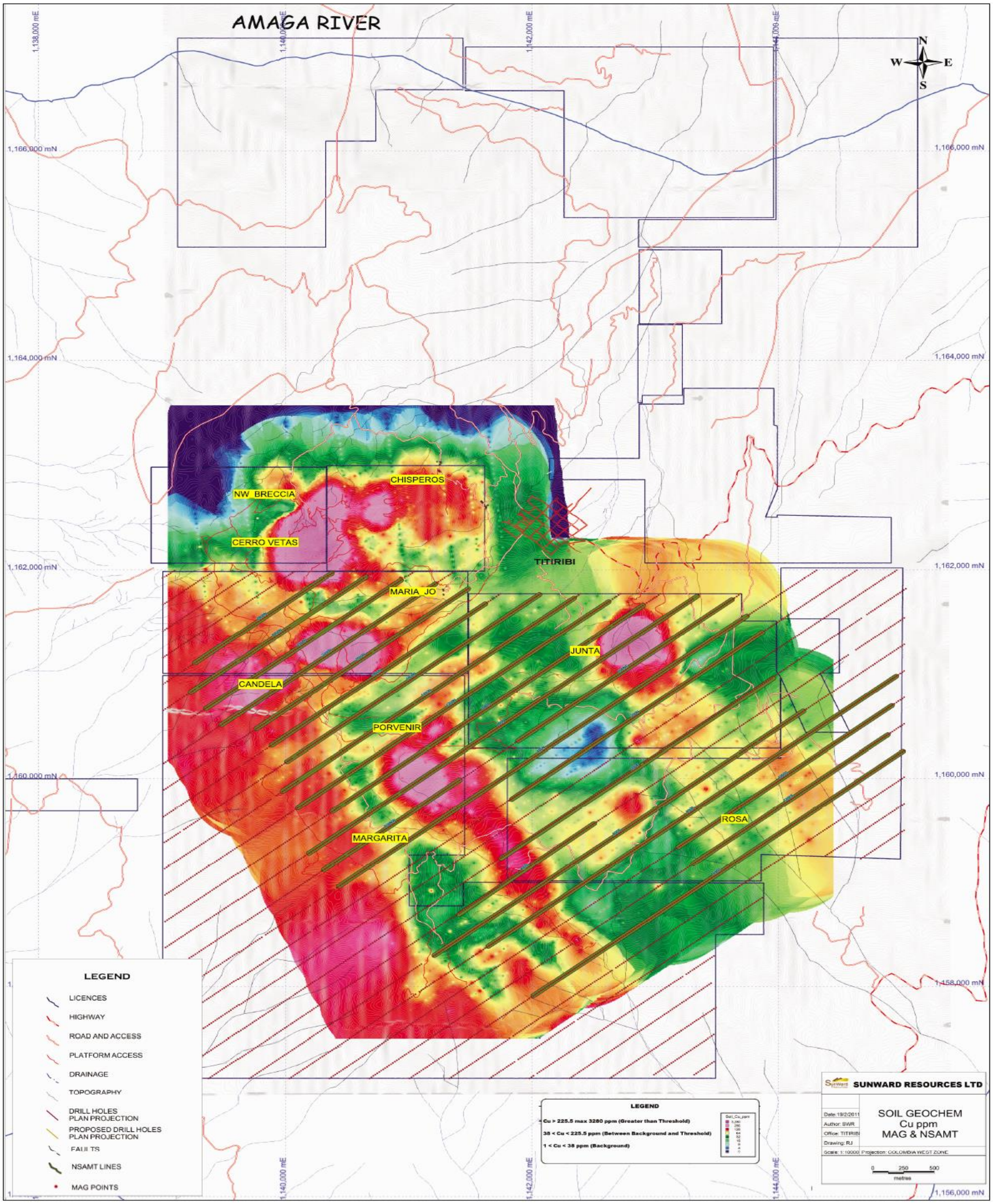


Figure 9.3. Copper-in-soil anomaly map
(Source: Sunward Internal Report, 2011)

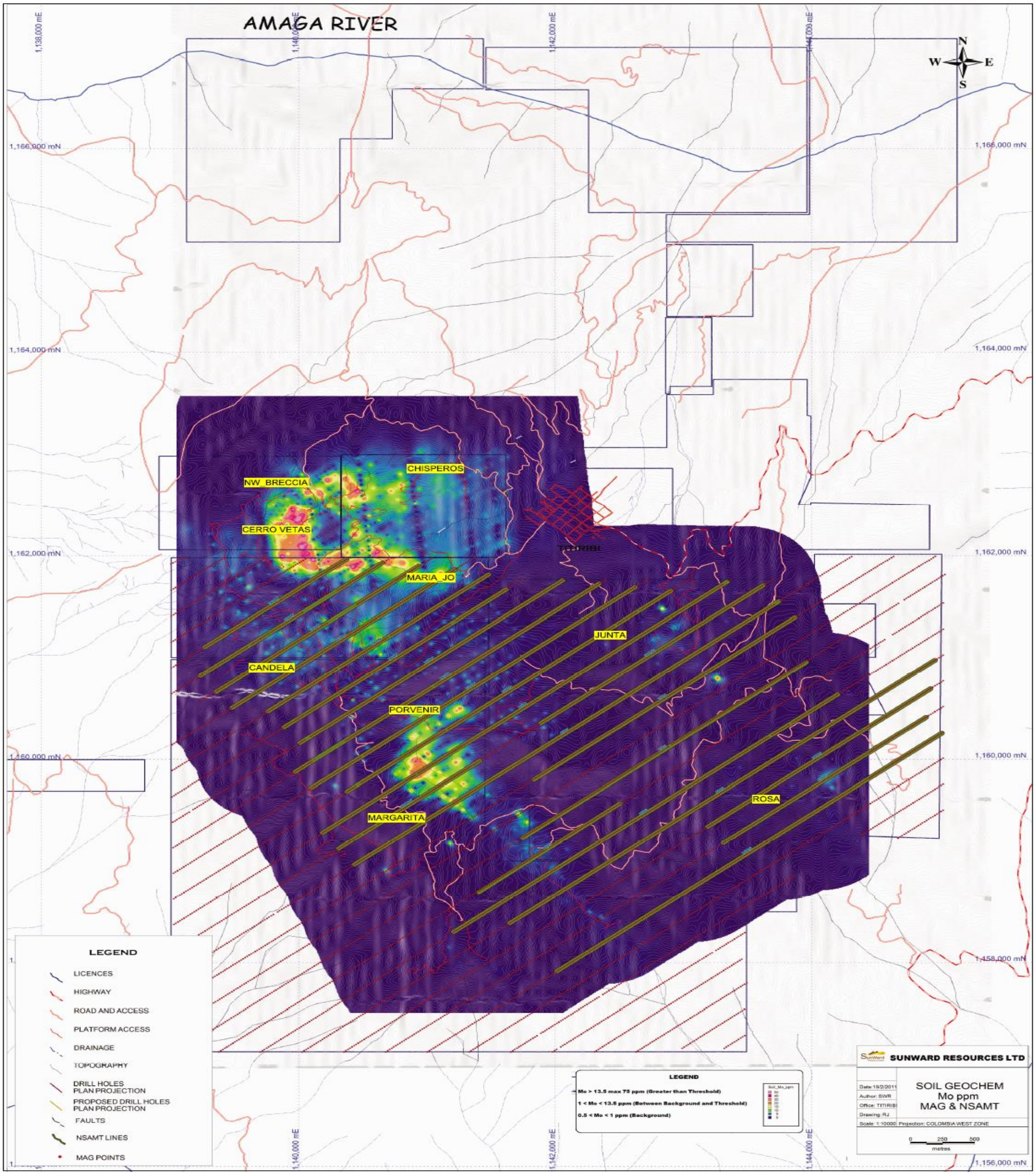


Figure 9.4. **Molybdenum-in-soil anomalies**
(Source: Sunward Internal Report, 2011)

9.4 ADDITIONAL EXPLORATION TARGETS

The results of the geochemical, geophysical, and remote sensing tools along with detailed geologic mapping have identified the Candela, Margarita, Porvenir, Junta, and Rosa prospects as prime targets, in addition to the already established Cerro Vetas-NW Breccia-Chisperos deposit. Based solely on a strong magnetic anomaly, Maria Jo was added to the target list. Drilling at Maria Jo has encountered significant gold-copper mineralization in an area covered by a thin veneer of post-mineral gravel and soil. Figure 9.5 is an overlay of geophysical and geochemical anomalies that define the primary exploration targets. Exploration drilling has returned promising gold-copper mineralization at Maria Jo; structurally limited mineralization at Junta and widespread but to date, low-grade values at Candela and Porvenir. A minimal drill campaign at Rosa and Margarita has failed to intersect promising mineralization.

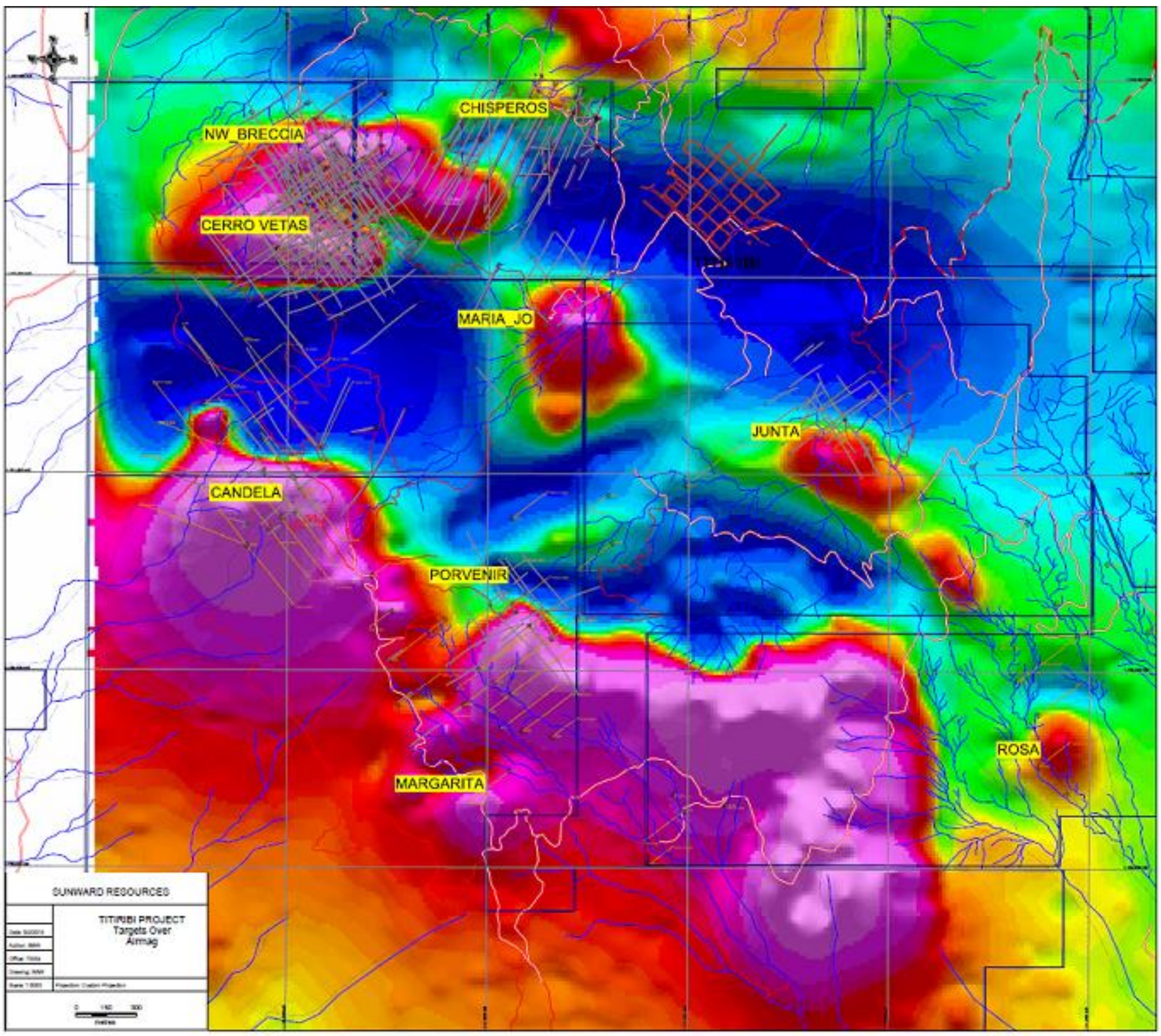


Figure 9.5. Overlay of geophysical and geochemical anomalies on target areas (Source: Sunward Internal Report, 2013)

9.4.1 Maria Jo

Maria Jo is a prospect recommended for drilling by the authors, and initially drill tested during the 2012-2013 drilling campaign. Although there is no soil geochemical anomaly, a strong magnetic anomaly suggested the possibility of a buried stock-like intrusive. The magnetic anomaly, shown in Figure 9.5, lies on trend about halfway between the Junta and Cerro Vetas stocks. Drilling has established the presence of diorite dikes beneath a thin veneer of post-mineral gravel and barren soils developed from downhill creep. Mineralization uncovered to date is unusual for the Project, in that it is hosted in the intruded rocks but is copper-dominant over long intervals although narrow intervals of copper-gold and gold dominant zones exist. Quartz-sphalerite-gold and quartz-sphalerite-chalcopyrite-gold fills the fractures and veinlets. Silver appears to track with copper. In drill hole MJ-003, the 239-meter interval, from 160.5 meters to 399.5 meters, averages 0.18% copper and 0.158 grams of gold per tonne and in drill hole MJ-006, the 55.5-meter interval from 220 meters to 275 meters averages 0.20% copper and 0.289 grams of gold per tonne. Note that all mineralized intervals are measured downhole, along the length of the core, and are not true widths. An example of a gold-dominant interval includes a 5.12-meter zone from 193.64 meter to 198.76 meter in drill hole MJ-004 that averages 1.649 grams of gold per tonne but only 0.015% copper. Interestingly, the copper-dominant zones appear to be hosted in the basement metamorphosed basalt units rather than diorite. Initial drill results are quite interesting as the contact aureole hosts strong copper mineralization compared to the contact aureole at Chisperos. Diorite intersected in drilling appears to be dike-like and the main stock-like intrusive to the southeast (based upon magnetic surveys) has not yet been drill tested. Figure 9.6 shows the location of the Maria Jo drilling (in the center of the figure) in relation to the surrounding deposits and targets. Figure 9.7 is a Maria Jo geology/drill hole location map with the diorite stock location based upon the magnetic survey data. Figure 9.8 is a cross section from 074° to 254° depicting zones of mineralization, sedimentary and basaltic sections, and a diorite dike.

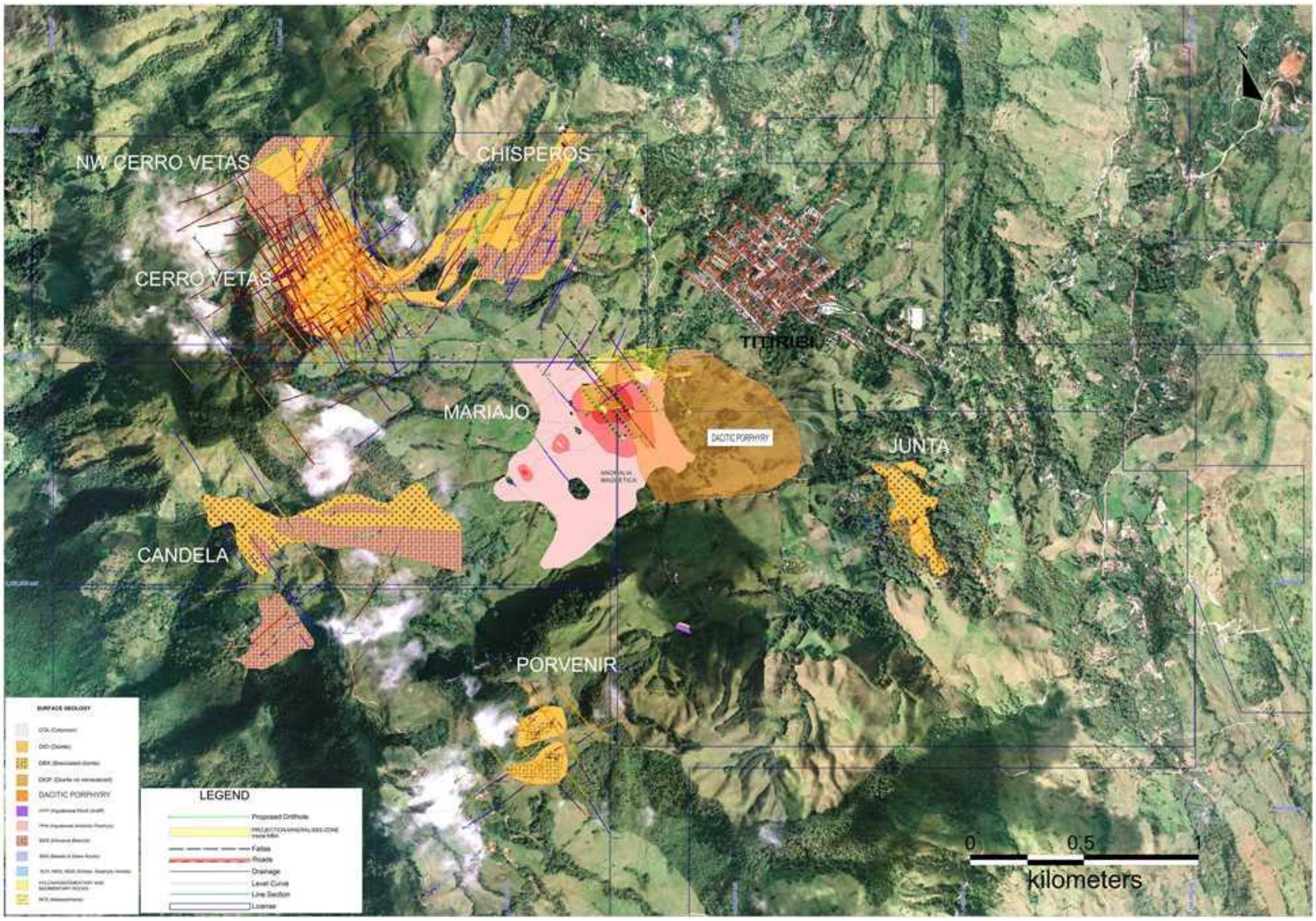


Figure 9.6. Maria Jo drilling and projected Maria Jo diorite stock (Source: Sunward, 2013)

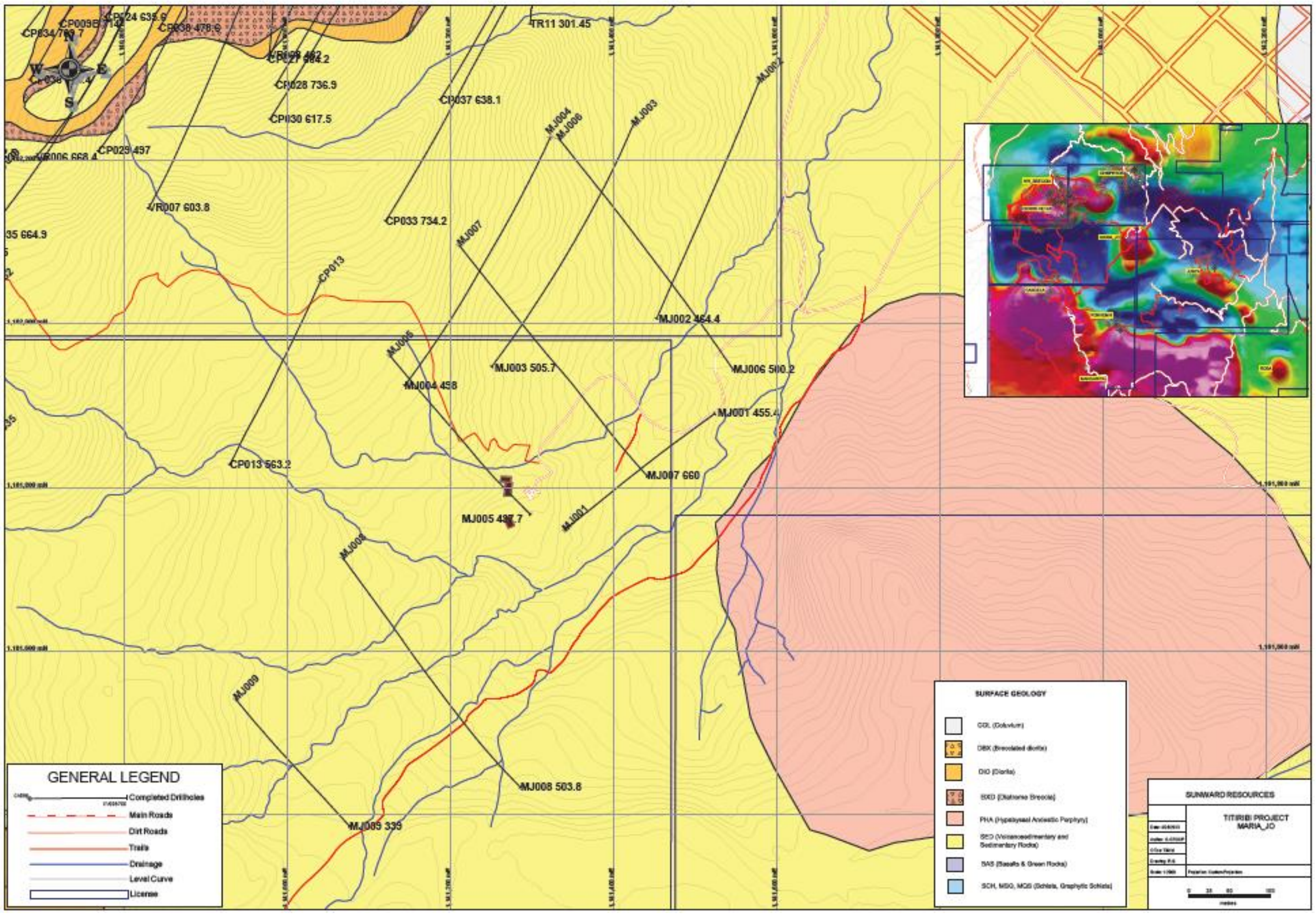


Figure 9.7. Maria Jo geology/drill hole location map (Source: Sunward, 2013)

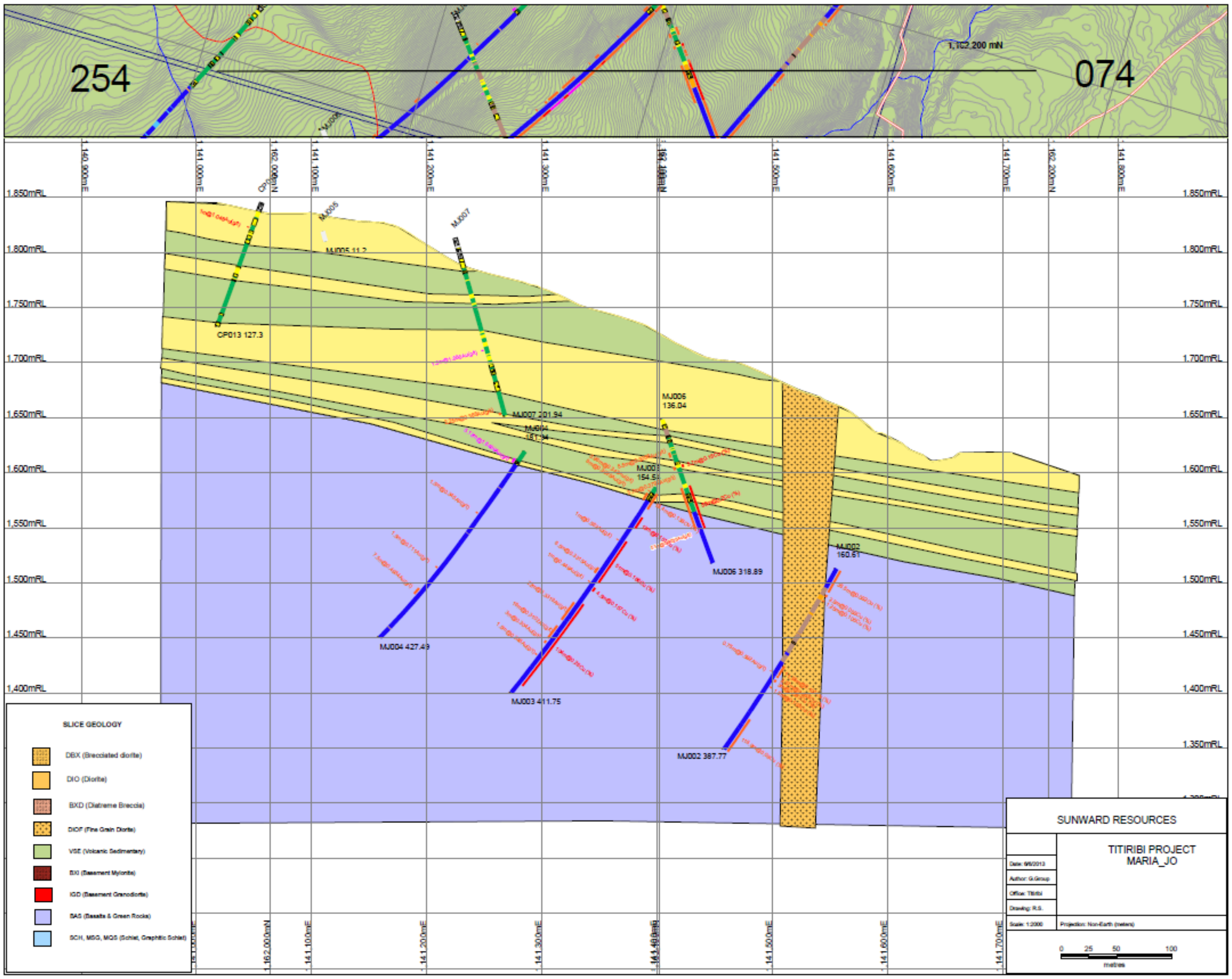


Figure 9.8. Maria Jo geologic section from 074° to 254° (Source: Sunward, 2013)

9.4.2 Junta

Junta is located about 2,000 meters southeast of Cerro Vetas and Chisperos. Geochemical sampling resulted in a circular gold-, copper-, and silver-in-soil anomaly directly over a magnetic high. A zinc halo surrounds the gold and copper anomaly. The anomalies are slightly elongated in a northwest-southeast direction and are parallel to the Cerro Vetas-Junta fault. Follow-up detailed mapping at Junta outlined a diorite intrusive that might have been intruded along the intersection of north-northeast, northeast, and northwest-striking faults. It is also possible that one or more of these fault sets have offset the dioritic intrusive.

In 2012, a significant near-surface intercept of approximately 44 meters containing 0.78 grams of gold per tonne and 0.41% copper (0 meters to 43.7 meters) was returned from hole JT009. Included in this interval is a higher-grade zone with nearly 16 meters averaging 1.39 grams of gold per tonne and 0.63% copper. Copper oxides and supergene-enriched chalcocite occur on fractures in this well-mineralized interval. In 2013, the most significant drill intercepts include 34 meters from 34.5 meters to 68.5 meters at a grade of 1.139 grams of gold per tonne and 0.059% copper in hole JT-012. A second important intercept was 42.5 meters from 125 meters to 167.5 meters at a grade of 0.574 grams of gold per tonne and 0.13% copper, also from drill hole JT-012. Note that all mineralized intervals are measured downhole, along the length of the core, and are not true widths. The Junta intrusive may be at a higher structural level than elsewhere in the district, as mineralization is associated with enhanced levels of volatile elements, silver values up to 10 grams per tonne, and a higher proportion of primary bornite in addition to chalcopyrite. These promising intercepts, unfortunately, appear to be rather restricted as most holes have encountered generally very low-grade mineralization. Figure 9.9 is the Junta geology/drill hole map and Figure 9.10 is a cross section along the 750N section.

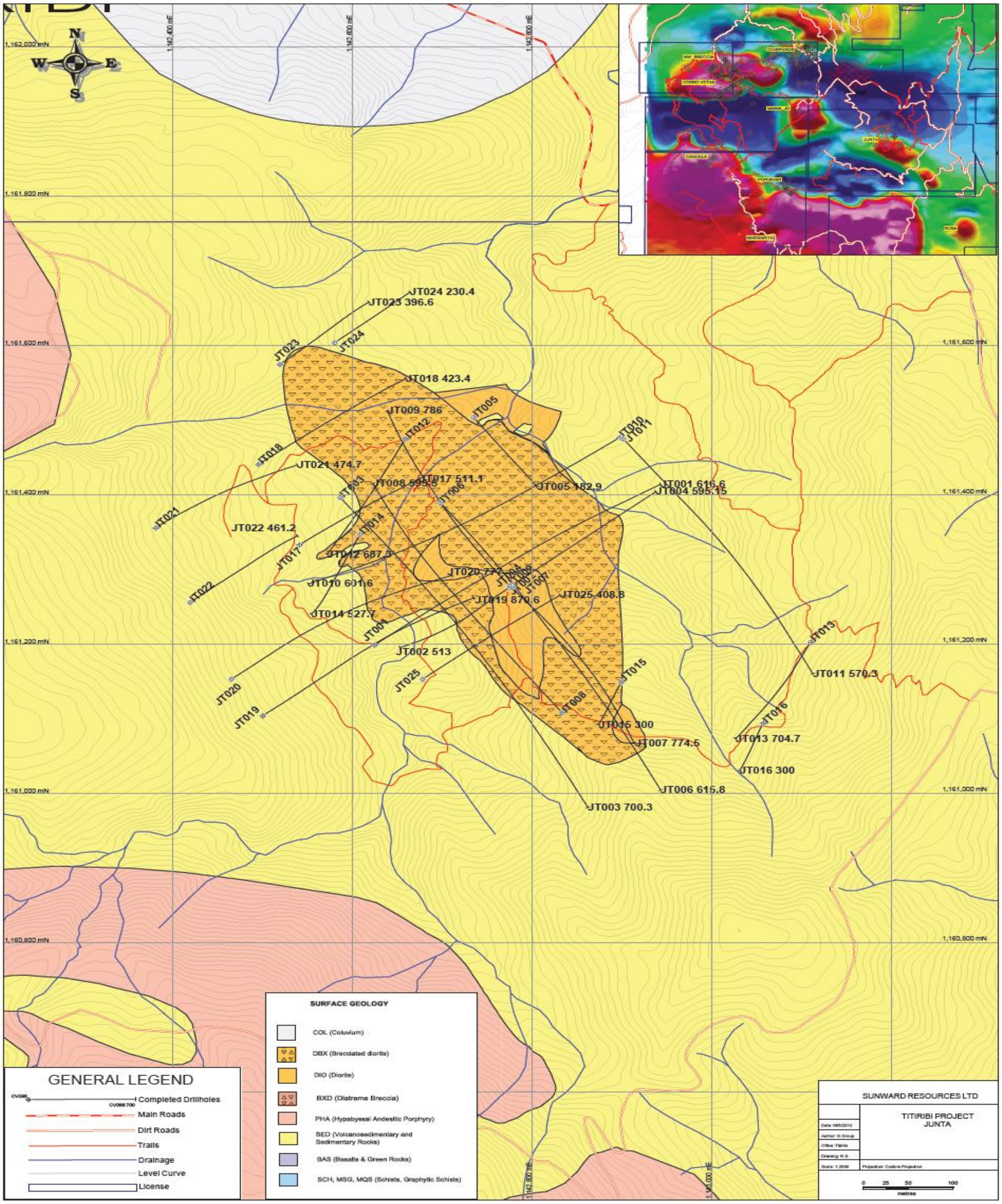


Figure 9.9. Junta geology/drill map
(Source: Sunward, 2013)

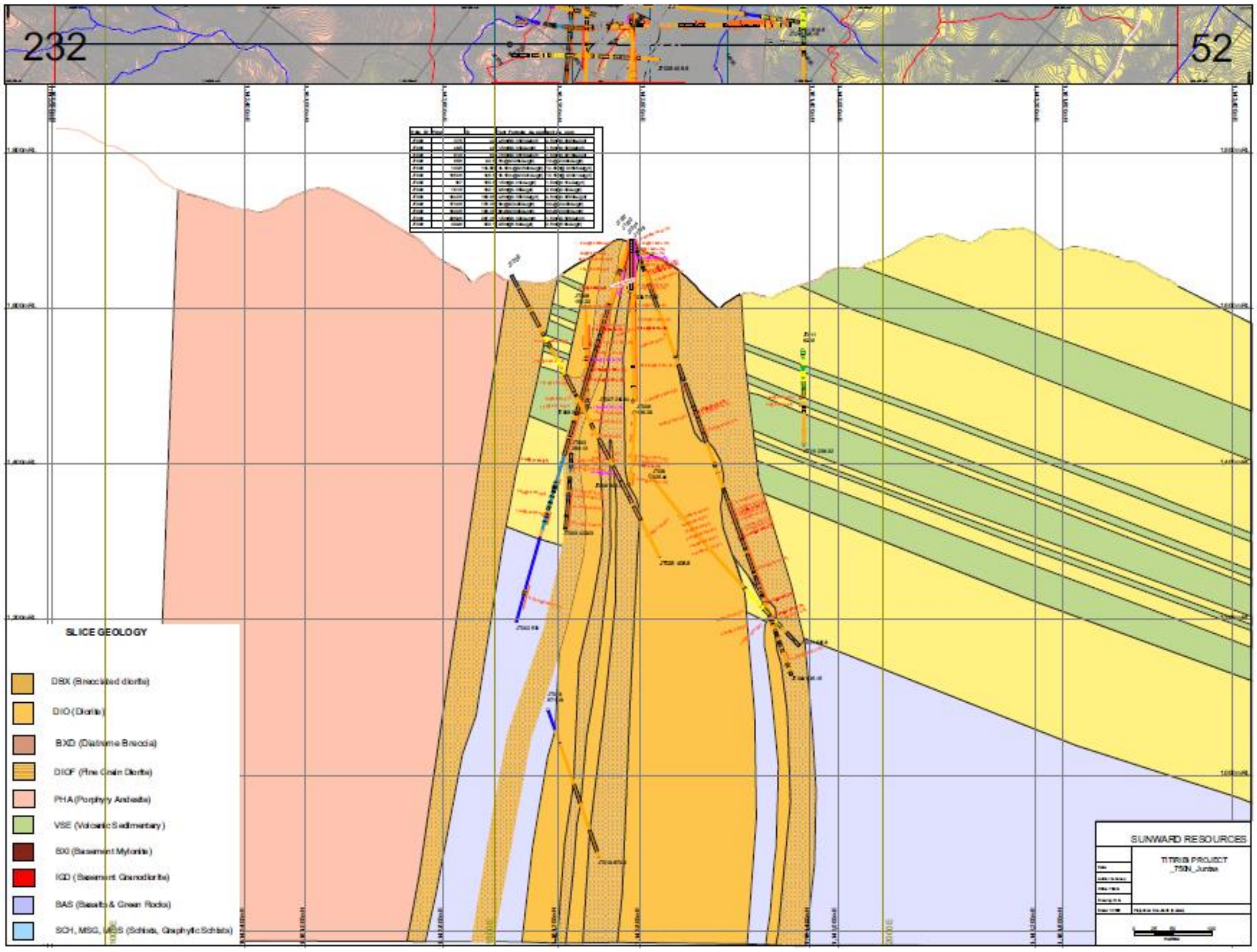


Figure 9.10. Junta geologic cross section along 750N (Source: Sunward, 2013)

9.4.3 Candela

Candela is located about 1,000 meters south of Cerro Vetas. The Candela zone is host to coincident gold-in-soil and geophysical anomalies. Anomalous gold values occur in a wide aureole of silicified hornfels with pyrite, stockwork quartz veining peripheral to a zone of parallel to sub-parallel diorite dikes. The diorite dikes host gold-copper mineralization. The strongest gold values occur in diatreme breccia, one of which appears to be pipe-shaped based upon surface exposures and drilling data. Gold, silver, and polymetallic base metal mineralization (chalcopyrite, sphalerite, and galena) are exclusively found in the diatreme breccia. Drilling has encountered a second and texturally different diorite dike that is devoid of mineralization and may be post-mineral.

Although at an early exploration stage, Candela appears very similar to the Cerro Vetas-NW Breccia-Chisperos complex with gold, copper, and magnetite mineralization in diorite dikes and peripheral gold and base metal mineralization in diatreme breccia and the contact aureole of the diorite. Figure 9.11 is the geology/drill hole map for Candela. Figure 9.12 is cross section 2150N.

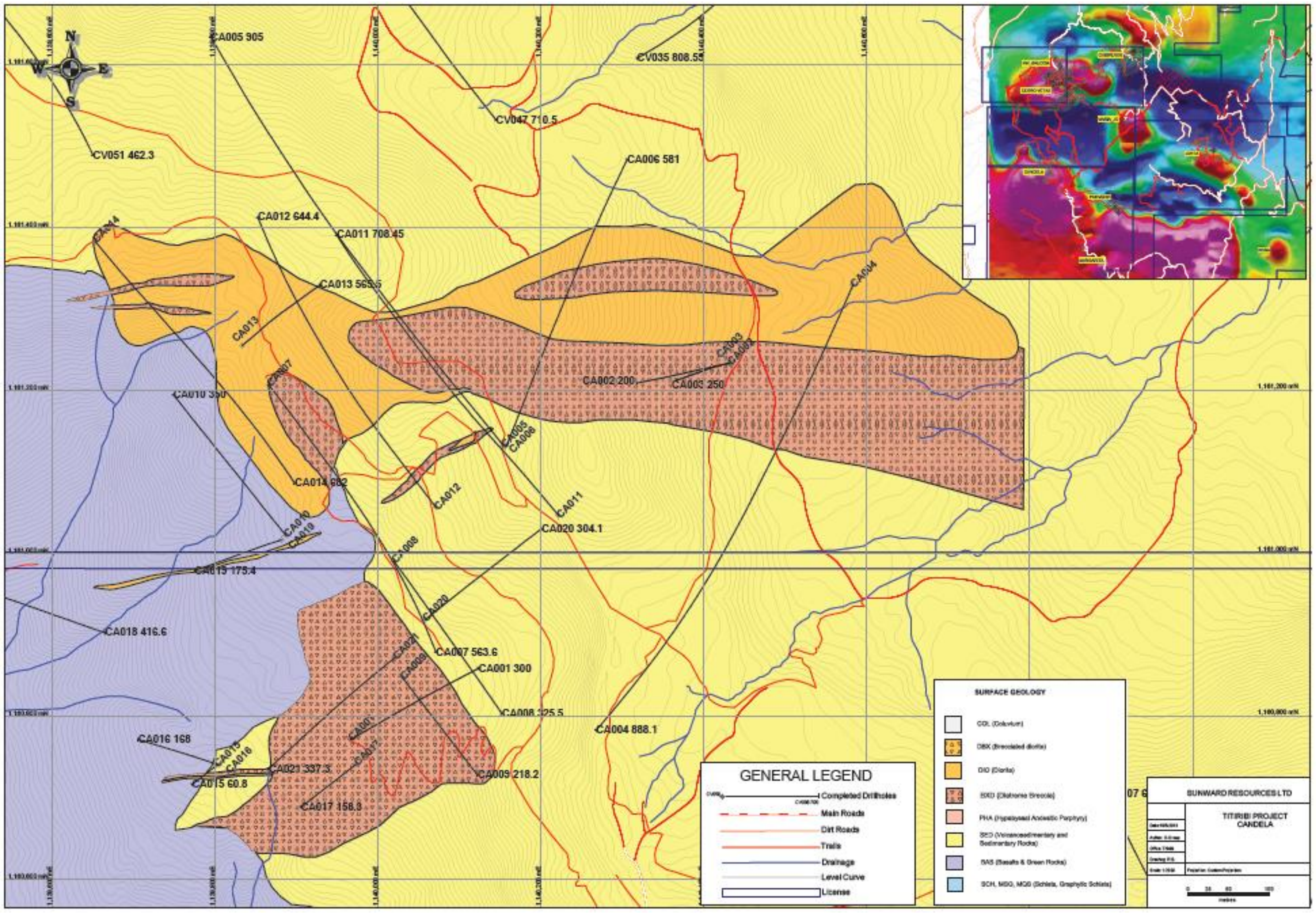


Figure 9.11. Candela geology/drill hole map (Source: Sunward, 2013)

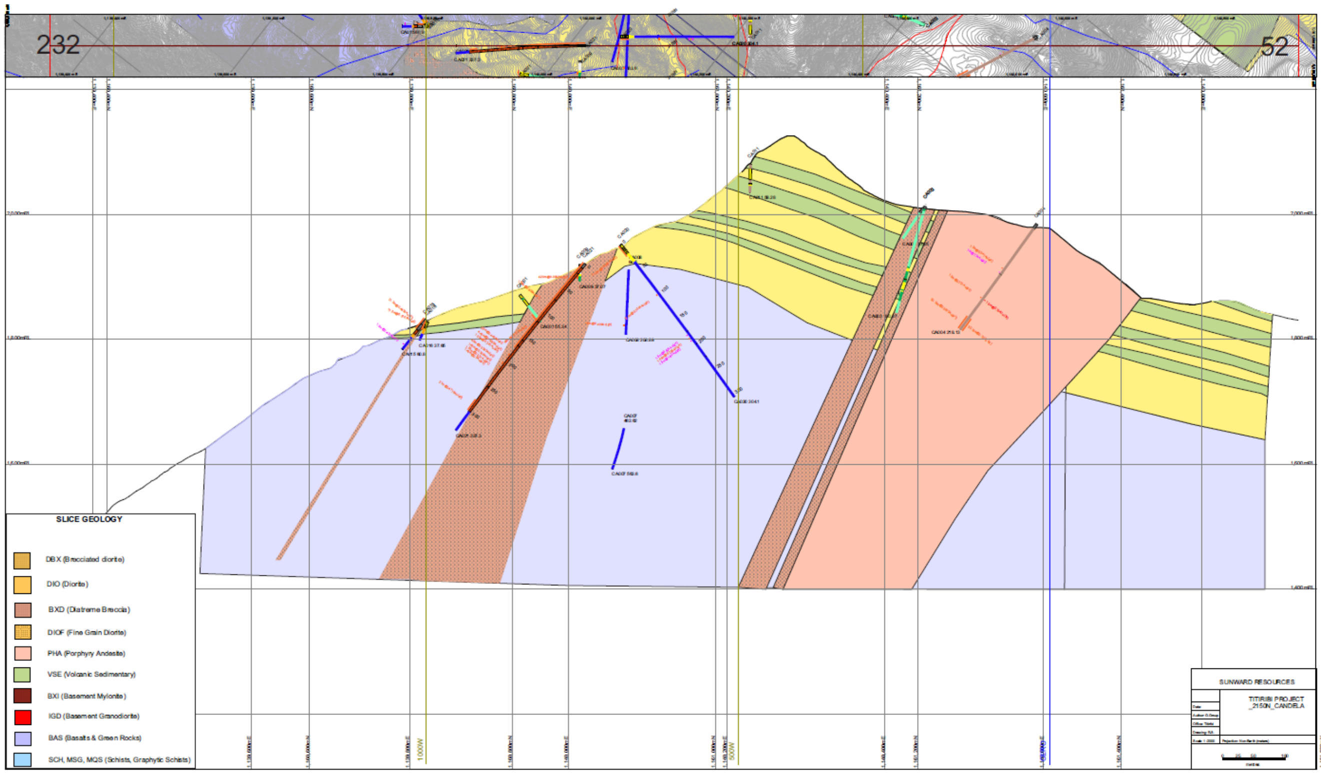


Figure 9.12. Candela geology section 2150N (Source: Sunward, 2013)

9.4.4 Porvenir

Porvenir is located about 2,000 meters south-southeast of Cerro Vetas. The target at Porvenir is based on favorable soil geochemical results superimposed over a small magnetic anomaly. There is good correlation between gold-, copper-, and molybdenum-in-soil anomalies, which correspond in part to the Candela-Porvenir fault. At the headwaters of the Guamo drainage, a strongly argillized diorite porphyry is exposed. Some malachite occurs in fractures in the drainage area. Drilling, to date, has identified two small diorite intrusive bodies; one fine-grained and one medium-grained. The fine-grained diorite is host to weak gold-dominant mineralization with generally low copper values within a phyllically-altered zone. Figure 9.13 is the Porvenir geology map/drill hole location map.

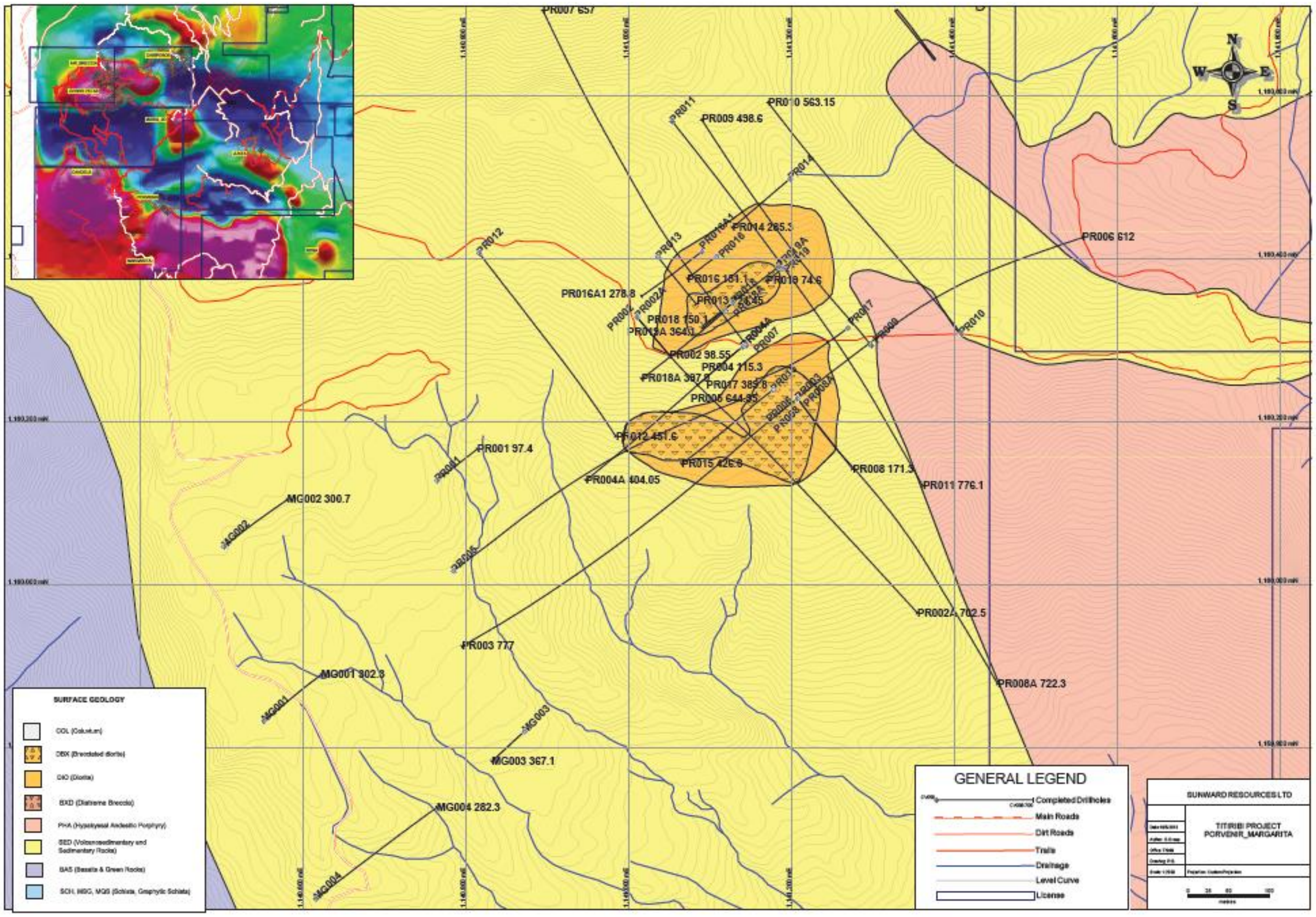


Figure 9.13. Porvenir geology and drill hole location map (Source: Sunward, 2013)

9.4.5 Rosa

Scattered weak gold-in-soil values, in the vicinity of a small magnetic anomaly, mark the Rosa target. During 2013, two holes were drilled testing IP/Resistivity anomalies and both intersected barren graphitic schist. The core is very fresh with little evidence of any hydrothermal alteration.

9.4.6 Margarita

The Margarita target is also based upon a small magnetic anomaly with scattered gold-in-soil anomalies. Four holes were drilled in 2013 testing resistivity anomalies. The volcano-sedimentary sequence and the metamorphic basement hosting barren graphitic schist were encountered.

9.5 EXPLORATION POTENTIAL

The authors opine that exploration potential to expand the known mineralization, within the existing Project area, is specifically interesting in the following areas:

- Along the trend of diorite dikes at Chisperos.
- Near a diorite plug in the NW Breccia that has seen limited drilling.
- Between Cerro Vetas and Maria Jo.
- Between Chisperos and Maria Jo.
- Within the Maria Jo intrusive (not yet drill tested) and in its contact aureole, and in particular along the trend hosting Cerro Vetas and Junta.
- In shallow supergene-enriched areas at Junta.
- In near-surface mineralized areas of Candela.
- The untested magnetic anomaly southeast of Junta along the trend of the Cerro Vetas-Maria Jo-Junta magnetic anomalies.

10.0 DRILLING

10.1 DIAMOND DRILLING

All drilling on the property has been by diamond drilling. Drills are moved from site to site manually. This is a labor intensive practice but it avoids the need for bulldozer-built roads, as there are strict environmental guidelines for drilling. Core size is typically NQ (NTW and NQ3) although rarely, due to drilling difficulty, holes are reduced in size to BQ (BTW and BQ3). All diamond drill core has been oriented (as has all the diamond drilling by Sunward, DBGF, and WKR) and Sunward diligently collected a large amount of data on the orientation of vein zones on the property.

10.2 PRE-SUNWARD DRILLING

The initial drilling in 1998 by Gold Fields was based upon the Muriel and ACE exploration efforts and follow-up exploration by Gold Fields. Gold Fields completed a 3,057 meter coring program (DDT1-DDT16) designed to test IP chargeability anomalies associated with the pyrite-gold association that they interpreted to rim the porphyry body. It is unknown whether any QA/QC procedures were followed. In 2008, WKR drilled one twin hole to DDT4. Major assay variances were discovered between the "paired" holes and could not be rectified. Further work is necessary to determine if the DDT series of holes can be used in resource estimations. As this drilling is historic, with unknown QA/QC procedures and perhaps unresolved questions on assays, these holes have not been utilized by the authors' resource estimation.

Exploration on the Titiribi Project recommenced, in 2006, under the joint venture between GRL and DBGF and consisted of 16 diamond drill holes with 3 at Cerro Vetas (CV001-CV003) and 13 at Chisperos (TR1-TR13). Two of the 3 holes at Cerro Vetas encountered mineralized zones with porphyritic textures and significant alteration. The third hole was not mineralized and is currently interpreted as being outside the margin of the deposit. Most of the Chisperos holes encountered mineralization. All drilling between 2006 and 2008 was contracted to Terramundo Drilling S.A. In 2008, drilling continued at Cerro Vetas with holes CV004-CV017.

10.3 SUNWARD DRILLING THROUGH FEBRUARY 2013

The Sunward drilling commenced in December 2009 and terminated in February 2013. During this period, 89 holes totaling 67,700.8 meters were drilled at the combined Cerro Vetas and NW Breccia area; and 49 holes totaling 25,402.85 meters drilled at Chisperos. Additionally, 18 holes totaling 8,051.55 meters were drilled at Candela; 25 holes totaling 13,989.1 meters were drilled at Junta; and 25 holes totaling 10,991.3 meters were drilled at Porvenir. Finally, 2 holes totaling 552.1 meters, 4 holes totaling 1,252.4 meters, and 9 holes totaling 4,364.2 meters were drilled at Rosa, Margarita, and Maria Jo, respectively. All holes were diamond drill core holes.

During the various Behre Dolbear site visits, many hundreds of meters of core were examined. Core recoveries were excellent, averaging over 98.5%. In many holes, except for the very top of the holes, core recovery was nearly 100%. Since the 2006 drilling campaign started, all coring has been oriented; thus, allowing for many measurements for the orientation of intersected veins.

Little information is available for the pre-Sunward drilling contractors. Sunward utilized the following contractors:

- **AK Drilling International SAS (AK Drilling)** is headquartered in Péru. Their rigs include 3 portable Hydracore 2000 rigs and 2 track-mounted Sandvik 710 rigs. The Hydracore are lightweight, easy to move, and leave a small footprint. They can drill about 300 meters to

400 meters of HQ and 500 meters to 700 meters of NQ-size core. The Sandvik rigs are heavier and require larger drill pads but can drill 500 meters to 700 meters of HQ size and 800 meters to 1,200 meters of NQ-size core. AK Drilling completed core holes at Candela, Margarita, Rosa, Maria Jo, Porvenir, Chisperos, Junta, and Cerro Vetas-NW Breccia.

- **Codrilco** is the new corporate name of GE and DE Enterprise (Grant Thorpe) and is headquartered in Medellin, Colombia. Codrilco uses a LF-70 drill, manufactured by Longyear, and has good depth capability and is skid-mounted. Codrilco also used a Gopher rig that is used for short holes of only about 200 meters. Codrilco completed core holes at Porvenir, Maria Jo, and Cerro Vetas-NW Breccia.

- **Logan Drilling Colombia, SAS (Logan)** is a Canadian company. Duralite, an eastern Canadian company, manufactured their rigs. A Duralite D800 and a Duralite D1000 were utilized along with an A5 manufactured by Fordia.

- **Terra Colombia SAS (Terra)** utilized a LF-70 drill rig and drilled at Porvenir and elsewhere.

10.4 PROJECT DRILLING STATISTICS

Table 10.1 summarizes the total number of holes and meters drilled at each project area. Table A1.1 in Appendix 1.0 is a drill hole summary with all holes drilled at the Project. Including the Gold Fields drill holes, through February 2013, 270 diamond drill holes totaling 144,778.51 meters, have been drilled at the Project. Except for the Gold Fields drill holes (DDT1-DDT16), all Cerro Vetas and NW Breccia holes through CV102 and all Chisperos drill holes (TR1-TR13, CP001-CP040, and VR001-VR008) were used in the 2013 resource estimation.

TABLE 10.1
SUMMARY OF ALL TITIRIBI PROJECT DRILLING

Project	Years	Number of Drill Holes	Total Meters
Gold Fields (DDT1-DDT16)	1998	16	3,057.51
Cerro Vetas (CV001-CV003)	2007	3	1,547.35
Cerro Vetas (CV004-CV017)	2008	14	5,430.75
Cerro Vetas (Sunward) (CV017E-CV044)	2010 – July 2011	29	23,525.70
Cerro Vetas (Sunward) (CV045-CV073)	July 2011 – February 2012	29	22,448.10
Cerro Vetas (Sunward) (CV074-CV102)	February 2012 – February 2013	31	21,727.00
Chisperos (TR1-TR13)	2006 – 2007	13	3,110.80
Chisperos (Sunward) (CP001-CP013)	2010	14	5,694.66
Chisperos (Sunward) (VR001-VR008)	2010	8	4,945.84
Chisperos (Sunward) (CP014-CP027)	November 2011 – March 5, 2012	14	7,282.10
Chisperos (Sunward) (CP028-CP040)	March 5, 2012 – February 2013	13	7,480.25
Candela (CA001-CA003)	2008	3	750.00
Candela (Sunward) (CA004-CA014)	2011 – February 2012	11	6,431.75
Candela (Sunward) (CA015-CA021)	February 2012 – February 2013	7	1,620.50
Junta (Sunward) (JT001-JT011)	2012 – January 2012	11	6,551.65
Junta (Sunward) (JT012-JT025)	January 2012 – February 2013	14	7,073.50
Porvenir (Sunward) (PR001-PR013)	2011– January 2012	16	7,413.85
Porvenir (Sunward) (PR014-PR019)	January 2012 – February 2013	9	2,518.50
Rosa (Sunward) (RO001-RO002)	January 2012 – February 2013	2	552.10
Margarita (Sunward) (MG001-MG004)	January 2012 – February 2013	4	1,252.40
Maria Jo (Sunward) (MJ001-MJ009)	January 2012 – February 2013	9	4,364.20
Total		**270**	**144,778.51**

10.5 DRILL HOLE SURVEYING

All rigs were lined up by compass and checked by a geologist before drilling commenced. On drill hole completion, collars were obtained by using total station surveying equipment. Also, on completion of drilling, all holes were surveyed downhole.

All work performed by DBGF, WKR, GPR, and Sunward were recorded in the Bogota 1975/Colombia West 3W coordinate system and stored in the digital database. Historic data had been converted into the Colombia West Grid. In 2013, all survey data was converted to the Magna Sirgas coordinate system that allows for all of South America to be on the same grid (Sunward staff, 2013). Compared to the Colombia West Grid, the new Magna Sirgas Grid is about 5 meters to 10 meters different horizontally with only a very small elevation change.

Early downhole surveying was performed in the most part using a Reflex Act1, then a Reflex Act2 unit by FlexIt MultiSmart™ from 2006 into 2008. However, the magnetite-rich portions of the deposit likely were affecting the tool. Thus, in late 2008, several holes were re-surveyed with a north-seeking gyroscope and the differential between the 2 instruments was evident and all new surveys, since late 2008, were switched to a Devicore™ gyroscopic tool. A downhole measurement was taken every 10 meters. Adjustments in old holes were made on all points affected by large amounts of magnetite.

10.6 LOGGING PROCEDURES

Since 2006, all logging procedures have been nearly identical. Only the protocols on the prior Gold Fields procedures are unknown. After the core was washed and cleaned of all drilling lubricants, it was placed in metal core trays marked with "Start" and "Finish" and arrows pointing downhole. The tray was marked with the drill hole details and wooden core blocks were placed at the end of each run with the depth of the hole marked. Each core box was securely tied shut and transported, by truck or mule, to the core logging and/or core storage shed (Figure 10.1). Core was oriented at intervals assigned by the supervising geologist. The intervals were determined by ground conditions but do not exceed 20 meters. Downhole photography was utilized to aid in deciphering fracture, joint, and vein orientation. All core was logged geotechnically and lithologically. Logging by a technician includes the notation of core recoveries, RQDs, weathering, and oxidation state. In addition, core size, rig number, driller's name, casing depth, bit number, start and finish depths of each shift, cementing, water use, moving time, and weather were recorded. After all the non-geologic items were logged, the geologist began logging lithology, structure, alteration, mineralization, and other comments. All geotechnical logs were checked by a geologist. All logging entries were entered directly onto a laptop computer. No paper copies were produced. All of the historic paper copy data were re-entered into the digital database. Driller's record recovery but a technician was on every rig and verified the percent recovery.

Figure 10.1. Core logging building in foreground and logging and storage building in the background (Source: Behre Dolbear, 2011)

The geologist placed a large dot, in marking pen, on the core every 1.5 meters, and a magnetic susceptibility measurement was taken by technicians. Logging occurred directly onto a laptop. The data was uploaded into the geological database.

Core was photographed before cutting and after the sample numbers had been assigned to show the sample numbers with relation to the core. Each box of core was photographed twice; once dry and again wet.

10.7 ORIENTED CORE

Core was oriented using the DeviCore™ Core Orientation system, a high-accuracy instrument based on advanced state of the art electronic sensor technology that provides data for a core analyst to accurately determine the dip and strike of bedding, foliation, cleavage, healed or broken joints, veins, contacts, and shears.

The DeviCore™ system consists of an electronic sensor well protected in a probe. The main components are:

- DeviTool-DeviDip™ EMS probe.
- Instrument barrel.
- Control device PDA and software.

The EMS probe is an electronic inclinometer. It continuously records all sensor data (inclination and tool face) at pre-set time intervals and stores this information in its internal memory. The EMS probe is set and activated by the control device in the beginning of an oriented coring operation. Then it is placed inside the inner tube and stays on board during drilling, as long as oriented core is needed. During drilling, measurements are taken and stored in the DeviTool-DeviDip™ EMS probe memory. After the run, data from the EMS probe is downloaded to the control device for further analysis. All communication with the EMS probe is via a PDA and cable modem. A reference mark is placed on the core barrel and as the core is removed, a mark is placed on the core that will represent the actual bottom side of the core.

10.8 RELIABILITY OF CORE

The authors opine that core reliability is very high. Core recovery is nearly 100%. The core is quite representative because of the excellent recovery and as drill hole spacing is relatively even over the areas drilled. The authors noticed a very small number of holes where the hole tops returned poor recovery. All data was entered directly in a digital system, thus, avoiding transcribing errors.

11.0 SAMPLE PREPARATION, ANALYSES, QA/QC, AND SECURITY

11.1 GENERAL COMMENTS

As there has been no additional drilling undertaken on the Project since Sunward completed their drilling campaign in February 2013, the authors' assessment of sample preparation, analyses, QA/QC, and security remains unchanged from our previous 2013 NI 43-101 Technical Report. The following discussion relies heavily on the authors' assessment in the 2013 NI 43-101 Technical Report.

11.2 GOLD FIELDS PROCEDURES

Data is not available concerning sample preparation, analyses, QA/QC, and security for the Gold Fields core; thus, the Gold Fields data has not been used in the Sunward or Brazil Resources resource estimate. All of the DBGF, WKR, and Sunward sample preparation procedures, analyses, QA/QC, and security are essentially identical; however, DBGF utilized only a very limited QA/QC program that did not included standards and blanks.

11.3 DBGF PROCEDURES

QA/QC data associated with the DBGF drilling program in 2006-2007 is not available. GPR, who managed the exploration program in those years, utilized only a very limited QA/QC program but did not include standards and blanks. The laboratory QA/QC had been reviewed by Sunward and was found to be adequate. The authors agree since there are so few DBGF drill holes involved and the grades involved are similar to the Sunward drill holes.

11.4 SUNWARD SAMPLE PREPARATION PROCEDURE

All samples were under the control of Sunward's technical personnel from the time the holes were cored until the samples were received in Medellin for sample preparation. Each batch had at least one duplicate sample and standards and blanks were inserted randomly by Sunward personnel within the numbering sequence. During the most recent exploration drilling campaign (2012-2013), the duplicates were ¼-core samples. Blanks, standards, and duplicate samples were inserted into the sample stream, on average, every 18th sample.

Sample preparation for the assaying campaign was undertaken in Medellin. For all labs, the procedure called for sawing the core in half, crushing the sample to 80% minus 10 mesh. Through a riffle splitter, a split was obtained with 1 portion (pulp) pulverized to 80% to 85% minus 150 mesh and the remainder was returned to Sunward as a coarse reject and stored onsite

11.5 SUNWARD'S ANALYTICAL PROCEDURES

During the various drilling campaigns, Sunward utilized four certified laboratories: ACME, Inspectorate, SGS, and ALS. All of these laboratories are industry-recognized laboratories and when they undertook the analyses, they all operated under the then current ISO Guidelines. Inspectorate's Canadian and United States laboratories were ISO 9001:2008 certified and met ISO and ASTM requirements. ALS (Reno) was certified to standards within ISO 9001:2008 and had received accreditation to ISO/IEC 17025:2005 from the Standards Council of Canada for fire assay gold by atomic absorption (AA). ACME (Vancouver) had also received formal approval of its ISO/IEC 17025:2005. ACME's Medellin Colombia facility also held an ISO 9001 Registration Certificate. SGS also holds ISO 9001:2008 and ISO/IEC 17025:2005 certification. The authors did not inspect the sample preparation facilities.

Each year a different laboratory was chosen to be the lead laboratory for the various exploration targets with the other laboratories used for duplicate assays and check assays. All of the laboratories used similar sample preparation methods and analytical methods. During the last drilling campaign (2012-2013), the majority of the samples were analyzed by ACME. The normal ACME sample preparation procedure is shown in Figure 11.1.

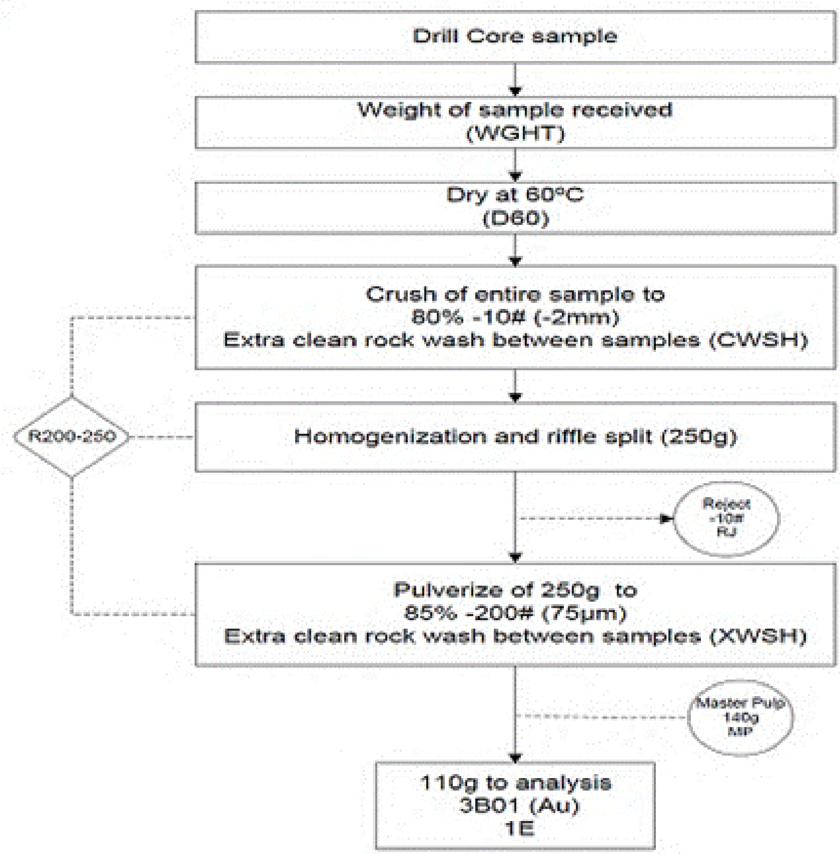


Figure 11.1. Acme sample preparation and analytical protocol flow chart (Source: Sunward, 2013)

The ACME pulps were sent to the ACME Laboratory in Vancouver, British Columbia. The Inspectorate pulp samples were shipped to the Inspectorate Laboratory in Reno-Sparks, Nevada. ALS samples were sent to their Reno-Sparks, Nevada facility. SGS samples were shipped to Vancouver, British Columbia.

Sample analyses utilized a Four-Acid Digestion; precious metals by fire assay fusion with ICP-ES, ICP MS, AA, and gravimetric finish. All laboratories use similar procedures for precious metal and multi-element assaying procedures.

All laboratories utilize an internal QA/QC procedure and those results were made available to Sunward. Acme's internal QA/QC includes (taken from Acme internet site):

> *"Blanks (analytical and method), duplicates and standard reference materials inserted in the sequences of client samples provide a measure of background noise, accuracy and precision. QA/QC protocol incorporates a granite or quartz sample-prep blank(s) carried through all stages of preparation and analysis as the first sample(s) in the job. Typically an analytical batch will be*

> *comprised of 34-36 client samples, a pulp duplicate to monitor analytical precision, a -10 mesh reject duplicate to monitor sub-sampling variation (rock and drill core), a reagent blank to measure background and an aliquot of Certified Reference Material (CRM) or In-house Reference Material to monitor accuracy."*

Coarse gold and a minor nugget effect has been recognized, particularly in the Chisperos zone and portions of Cerro Vetas. When coarse gold was suspected, a coarse gold (metallic screen) sample preparation procedure was utilized for the metallic screen analyses, a 1,000-gram split was pulverized to 90% minus 150 mesh.

11.6 QA/QC PROCEDURES

The core samples were generally 1.5 meters to 2 meters in length. The maximum sample length was 2 meters. Samples may have deviated from the 2-meter standard, if there was a change in lithology. A small sticker was placed on the core for the start and finish of each interval to be sawn. Core was sawn along the "sampling line" that is slightly offset from the orientation line with half sent off for assay and the other retained for future reference. On average, the assay split weighed between 3 kg and 7 kg.

Samples were placed in bags printed with the sample numbers and a "ticket" with the sample number placed inside the bag. The sample was weighed, recorded, and placed in a transport bag. Ordinarily, 5 samples fit in a transport bag. The samples were secured until delivered to the sample preparation facility in Medellin. Through February 2012, a standard and blank was inserted into the sample stream every 40 samples with the blank following the standard. From March 2012 through February 2013, on average, after every 18th sample, a standard and blank was added to the sample stream and a ¼-core duplicate program was started. Also, about 8% of all pulps were re-assayed.

In 2011, the authors watched some of the broken, gougy core being split by hand. The technician manually collected about half of the larger rocks and then scooped up about half of the fine material. No jewelry was worn by the technicians. Those same procedures were followed in 2012 and 2013.

All logging and sampling procedures were to industry standards, as were the surface collar, downhole surveys, and oriented core procedures. All data was logged directly on to laptop computers.

Density measurements were made on a periodic schedule every few meters in each hole. A sawn slice of core was weighed and placed in a set volume of water and the water displacement measured.

The primary laboratory, as a matter of routine internal control, prepared a duplicate for each 30 samples from coarse rejects and a duplicate from every 20 pulp samples.

Assays were reported on a batch-by-batch basis with the following batch acceptance/rejection criteria used.

- Automatic batch failure, if the reference material assay is greater than the three standard deviation limit.
- Automatic batch failure, if two consecutive reference material assays are greater than two standard deviations limit on the same side of the mean.
- Automatic batch failure, if the field blank is over a pre-set limit.

11.6.1 Blanks and Standards

Field blanks were comprised of cuts of barren granodiorite from a dimension stone cutting company based in Medellin. Many different international certified standards were purchased from several reference material companies. There is a minimum amount of data on the WKR standards so the results were inconclusive; however, with the expanded standard list used by Sunward and the much greater number of samples, there was enough information to produce performance charts. Performance charts were produced for all standards, blanks, re-assay, and duplicate samples. Results for standards and blanks were excellent. Results for re-assay and duplicate sample assays were also good but did contain a limited number of outliers that may have been caused by a coarse gold nugget effect or errors in sample identification.

11.6.1.1 Blank Samples

Of the 5,945 blanks inserted into the sample stream from all project areas, only 8 samples reported values greater than 0.10 ppm gold. About 99.87% returned values of less than 0.1 ppm gold. These results clearly demonstrate minimal contamination concerns. Only one sample indicates a possible contamination but since the blank is from a local granodiorite dimension stone source, it is possible that the assay value reflects an erratic trace of gold in the granodiorite. Figure 11.2 charts the assay results on blank standards.

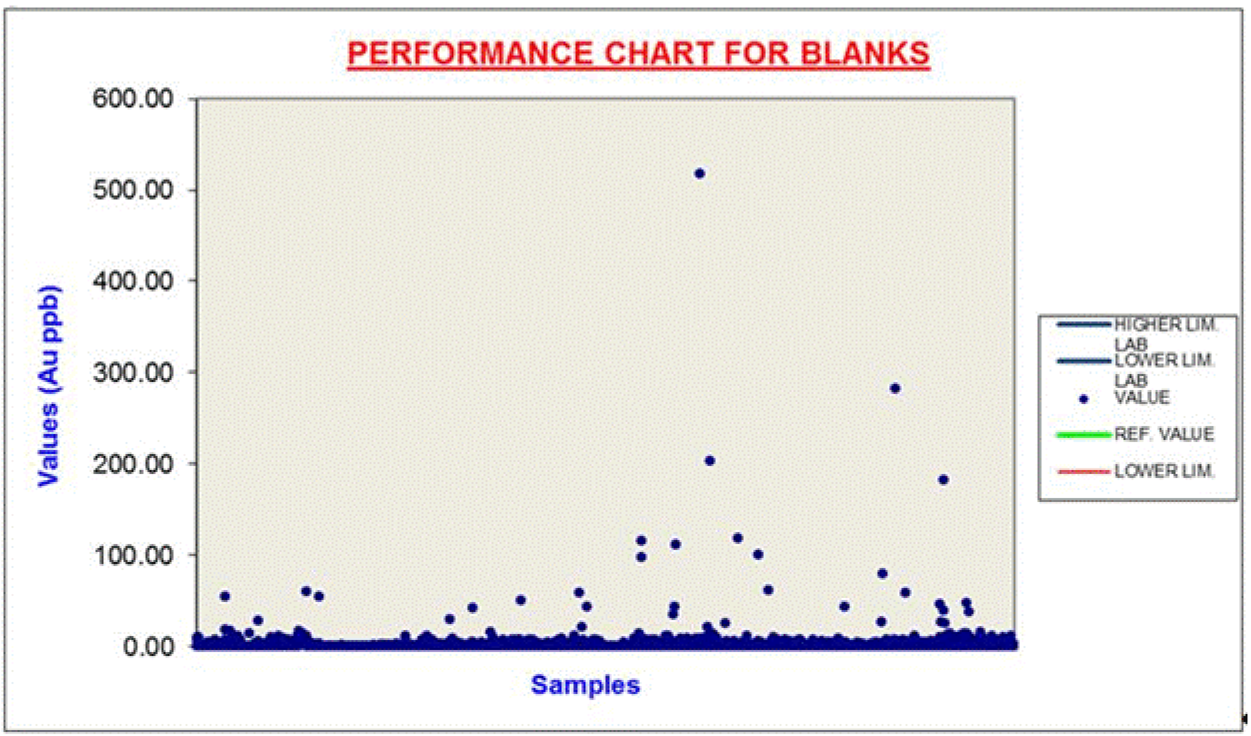


Figure 11.2. Assay results on 5,945 blank samples (Source: Sunward, 2013)

11.6.1.2 Gold Standards

Twenty-eight different certified gold standards were utilized by Sunward during their exploration drilling campaigns. Seventeen were Oreas standards and 11 were Rocklabs. Both companies supply standards to the mineral exploration industry. In all, 5,797 gold standard samples were assayed. In nearly all cases, the percent of standard sample assays reporting within the acceptable limits was above 95%. In most cases, the out-of-bound samples were slightly outside acceptable limits. However, a small number of standards reported a value so different from the accepted value that sample-labeling error is most probable. Overall, assay results on gold standards show excellent results. Table 11.1 summarizes the results on the gold standard assays.

TABLE 11.1
SUMMARY OF GOLD STANDARD ASSAY RESULTS

Standard I.D.	Reference Value in Gold (ppm)	Number of Times Used	% Within Accepted Range	Comments
Oreas 16b	2.21	101	96.0	Results acceptable. Not used in 2012-2013
Oreas 2Pd	0.885	286	97.2	Results acceptable. Used during 2012-2013
Oreas 43P	0.0731	66	97.0	Results acceptable. Not used in 2012-2013
Oreas 45P	0.054	225	99.6	Results acceptable. Not used in 2012-2013
Oreas 5Pb	0.098	189	95.2	Results acceptable. Not used in 2012-2013
Oreas 50C	0.836	739	98.0	Results acceptable. Used during 2012-2013
Oreas 50Pb	0.841	68	94.1	Results marginally acceptable. Not used in 2012-2013
Oreas 52c	0.346	621	98.9	Results acceptable. Not used in 2012-2013
Oreas 52Pb	0.307	89	96.6	Results acceptable. Not used in 2012-2013
Oreas 60Pb	2.57	106	95.3	Results acceptable. Not used in 2012-2013
Oreas 68a	3.89	177	99.4	Results acceptable. Used exclusively in 2012-2013
Oreas 151A	0.043	398	99.5	Results acceptable. Used in 2012-2013
Oreas 153A	0.311	99	96.0	Results acceptable. Used in 2012-2013
Oreas 501	0.204	151	98.0	Results acceptable. Used exclusively in 2012-2013
Oreas 502	0.491	196	98.5	Results acceptable. Used exclusively in 2012-2013
Oreas 503	0.658	161	97.5	Results acceptable. Used exclusively in 2012-2013
Oreas 504	1.48	99	96.0	Results acceptable. Used exclusively in 2012-2013
Rocklabs KH 1	0.85	94	98.9	Results acceptable. Not used in 2012-2013
Rocklabs OxA71	0.0849	198	96.5	Results acceptable. Used in 2012-2013
Rocklabs OxA89	0.0836	415	98.8	Results acceptable. Used in 2012-2013
Rocklabs OxF100	0.804	20	100	Results acceptable. Used in 2012-2013
Rocklabs SE 29	0.597	17	94.1	Results marginally acceptable. Not used in 2012-2013
Rocklabs SE 44	0.606	97	94.8	Results marginally acceptable. Not used in 2012-2013
Rocklabs SF 45	0.848	94	95.7	Results acceptable. Not used in 2012-2013
Rocklabs SF 57	0.848	499	99.8	Results acceptable. Used in 2012-2013
Rocklabs SK 21	4.048	18	88.89	Results marginally acceptable. Not used in 2012-2013
SK 52	4.107	371	97.8	Results acceptable. Used in 2012-2013
SK 62	4.075	203	98.5	Results acceptable. Used in 2012-2013

11.6.1.3 Gold Re-Assays

Sunward conducted a vigorous re-assay program through 2012. In 2013, Sunward's focus was on duplicate sample assaying by utilizing a ¼-core sample split. Through February 2012, 3,226 samples have been re-assayed. The average gold value of the original samples was 430 parts per billion (ppb) while the assay value of the re-assay sample was 413 ppb. Figure 11.3 is a scatter diagram on the results of re-assaying original pulp samples. Results were generally quite good; however, there were a number of outliers likely representing intervals hosting coarse gold. A very small number of the outliers were very poor comparisons but are likely errors in sample identification. Re-assaying of higher-grade samples has been limited.

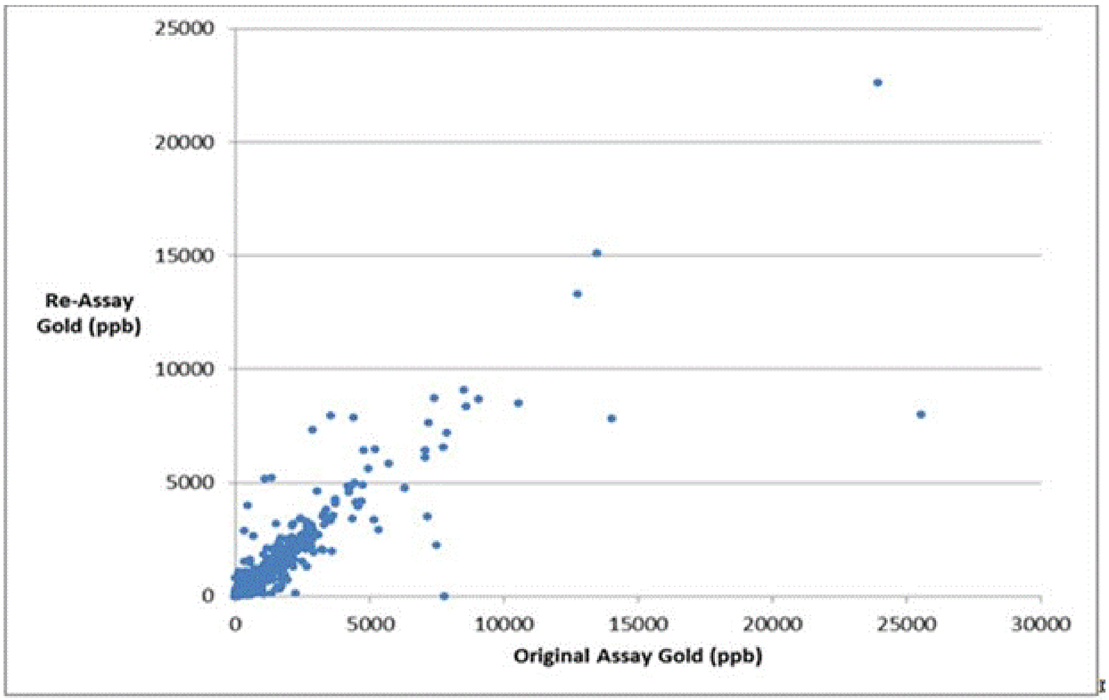


Figure 11.3. Scatter diagram for re-assaying original pulp samples for gold (Source: Sunward, 2013)

11.6.1.4 Duplicate Splits (¼-core)

During the 2012-2013 drilling campaign, Sunward initiated a duplicate split sampling program by taking a ¼-core. There were 732 duplicate (¼-core) samples; the average grade of the original samples was 66 ppb gold and the duplicate average was 65 ppb gold. As can be seen in Figure 11.4, above about 500 ppb gold, there is scatter on the assay values. This is to be expected as the original sample is from a ½-split of the core and the duplicate is a ½-split of the remaining core. Some scatter may be due to a coarse gold (nugget) effect. Except for two samples, the results are to be expected.

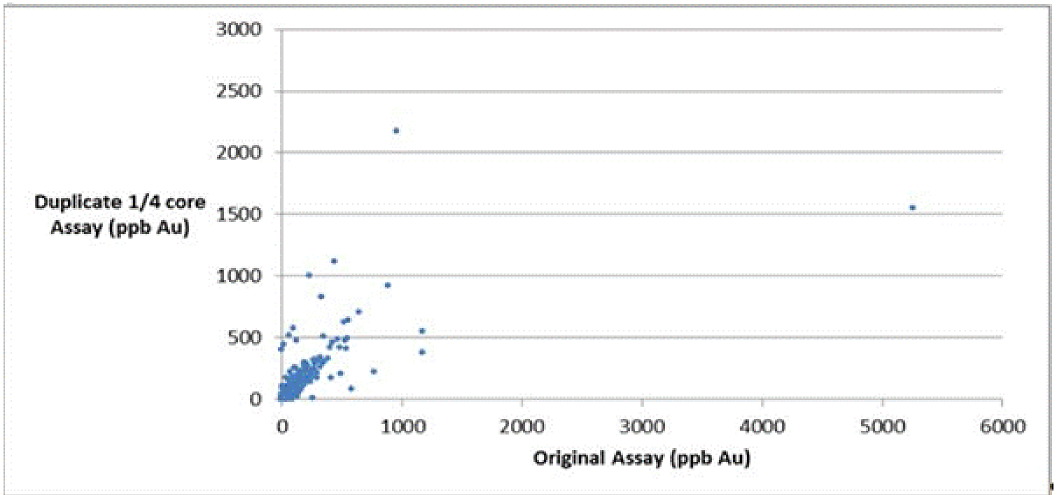


Figure 11.4. Assay results for duplicate samples comparing original sample to a ¼-split sample (Source: Sunward, 2013)

11.6.2 Copper Standards

Eleven different Oreas copper standards have been utilized by Sunward during their exploration drilling campaigns. In all, 1,120 copper standard samples were assayed. Only 15 samples (1.3%) were slightly to marginally outside the acceptable limit and only 1 sample result was well outside the acceptable limit. Assay results on copper standards show excellent results (Table 11.2).

TABLE 11.2
SUMMARY OF COPPER STANDARD ASSAY RESULTS

Standard I.D.	Reference Value in Copper (ppm)	Number of Times Used	% Within Accepted Range	Comments
Oreas 50C	7,420	734	98.4	Results acceptable. Used in 2012-2013
Oreas 50Pb	7,440	68	98.5	Results acceptable. Not used in 2012-2013
Oreas 52C	3,440	614	99.0	Results acceptable. Used in 2012-2013
Oreas 52Pb	3,338	89	95.5	Results acceptable. Used in 2012-2013
Oreas 68A	392	177	96.6	Results acceptable. Used exclusively in 2012-2013
Oreas 151A	1,660	360	99.4	Results acceptable. Used in 2012-2013
Oreas 153A	7,120	98	95.9	Results acceptable. Used in 2012-2013
Oreas 501	2,710	151	99.3	Results acceptable. Used exclusively in 2012-2013
Oreas 502	7,550	196	98.5	Results acceptable. Used exclusively in 2012-2013
Oreas 503	5,660	161	94.4	Results acceptable. Used exclusively in 2012-2013
Oreas 504	11,400	99	97.0	Results acceptable. Used exclusively in 2012-2013

11.6.3 Duplicate Copper Assays

A large number of original pulp samples were re-assayed for copper (2,425). The average of the original assays was 1,029 ppm copper while the average of the re-assay value was 1,043 ppm copper. Figure 11.5 is a scatter diagram comparing the original copper assay with the re-assay of the original pulp. Results are excellent except for a very small number of outliers that may reflect an error in sample identification.

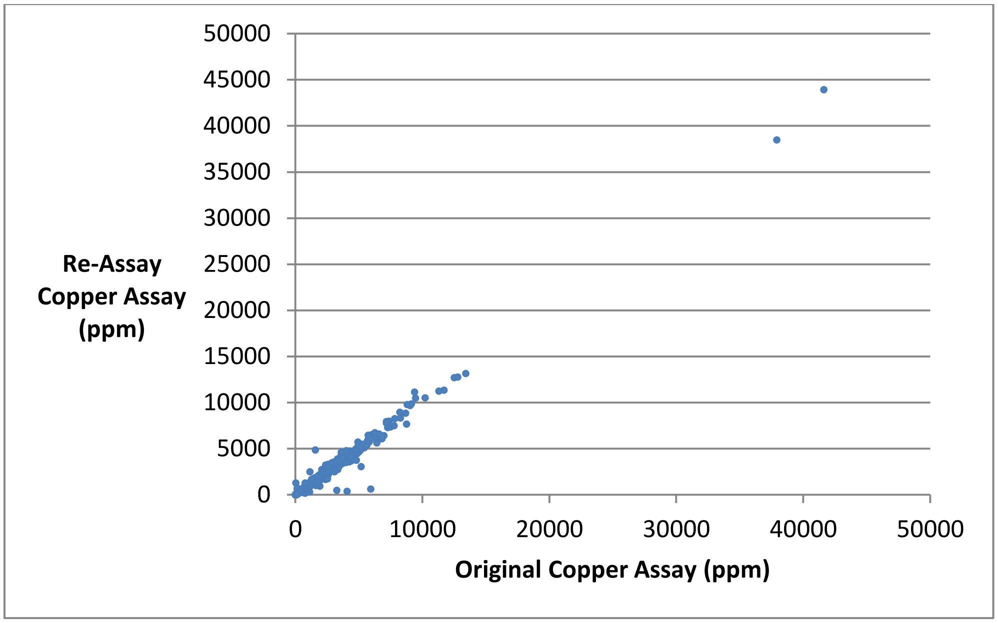


Figure 11.5. Copper re-assay results on original sample pulps (Source: Sunward, 2013)

The duplicate sampling program (732 intervals) utilizing the ¼-core was also undertaken for copper assays. The average copper value of the original samples was 380 ppm copper and the average of the duplicate splits was 371 ppm copper. Figure 11.6 is a scatter diagram comparing the two sets of assay data. The correlation is good, although there is moderate scatter in the higher-grade samples. All of the moderate scatter are from the Maria Jo and Junta areas where the copper mineralization is coarse-grained and forms as clots (see Figure 7.20). The two samples that returned unacceptable comparisons are both from Cerro Vetas; suggesting a database entry or assay error, since copper mineralization is very fine-grained.

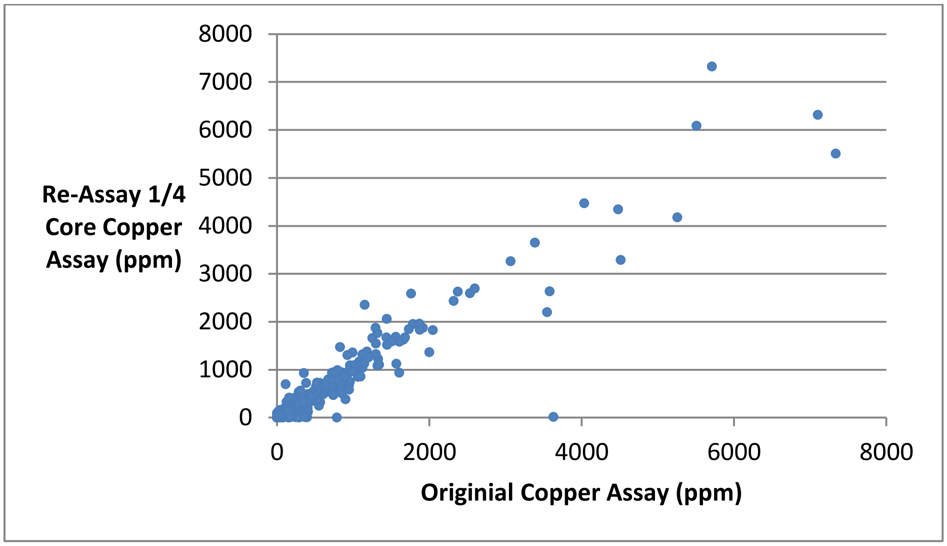


Figure 11.6. Scatter diagram comparison of original copper assays and duplicate (¼-core splits) assay results (Source: Sunward, 2013)

11.6.4 Analytical Laboratory to Laboratory Comparison

A vigorous cross check between the 4 principal laboratories was undertaken during the 2012-2013 drilling campaign for both gold and copper. Cross checking copper values between the various laboratories showed a nearly perfect sample to sample correlation. Cross checks for gold were also outstanding.

The average value for the comparative assays of 968 Cerro Vetas sets from Inspectorate and Acme was 546 ppb gold and 536 ppb gold, respectively. Figure 11.7 is the scatter diagram comparing the two principal laboratories, Inspectorate and Acme.

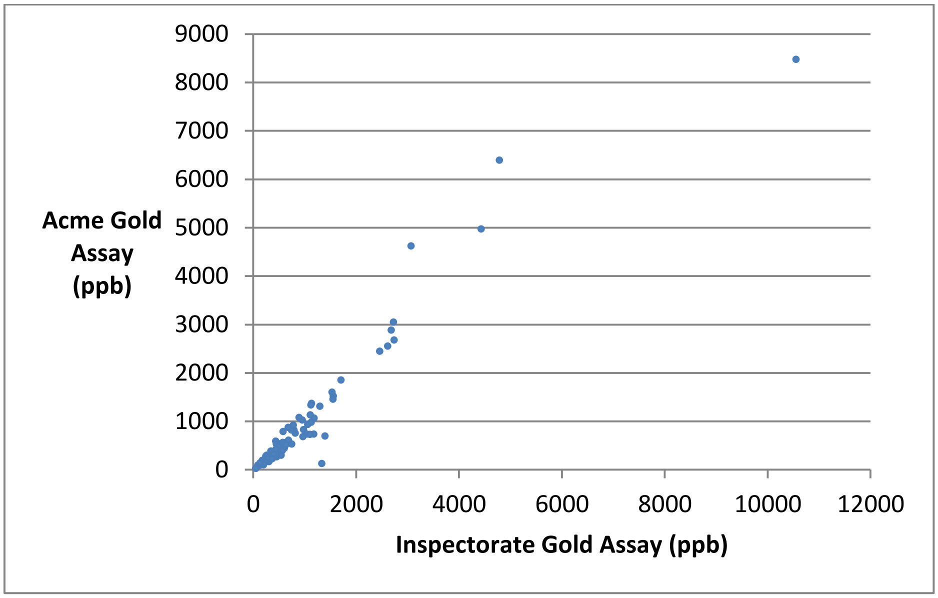


Figure 11.7. Comparison between Inspectorate and Acme Laboratories (Source: Sunward, 2013)

The average value for the comparative assays of 566 Junta and Cerro Vetas sets from Inspectorate and ALS was 630 ppb gold and 624 ppb gold, respectively. Figure 11.8 is the scatter diagram comparing these two laboratories.

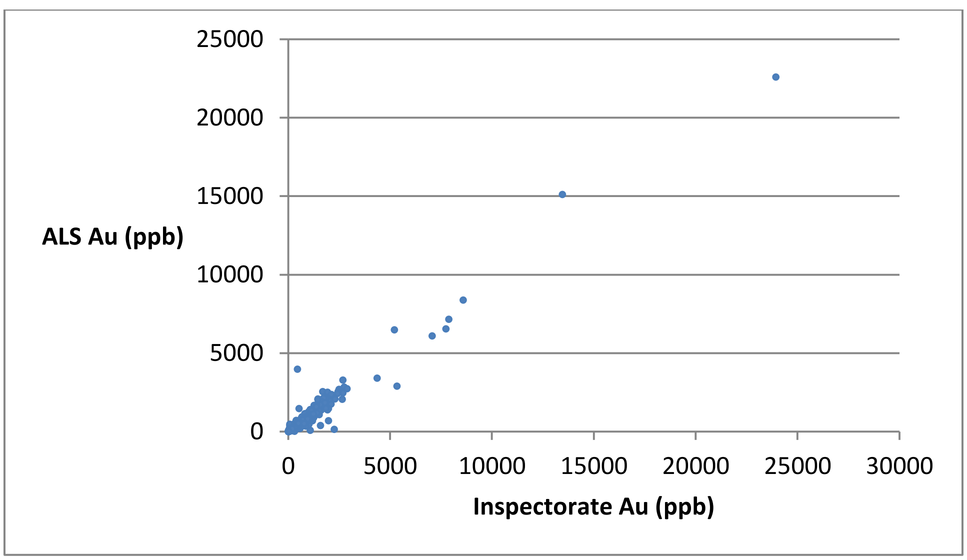


Figure 11.8. Comparison between Inspectorate and ALS Laboratories (Source: Sunward, 2013)

The average value for the comparative assays of 28 Cerro Vetas (CV069) sets from SGS and ALS Laboratories was 789 ppb gold and 755 ppb gold, respectively. Figure 11.9 is the scatter diagram comparing these two laboratories.

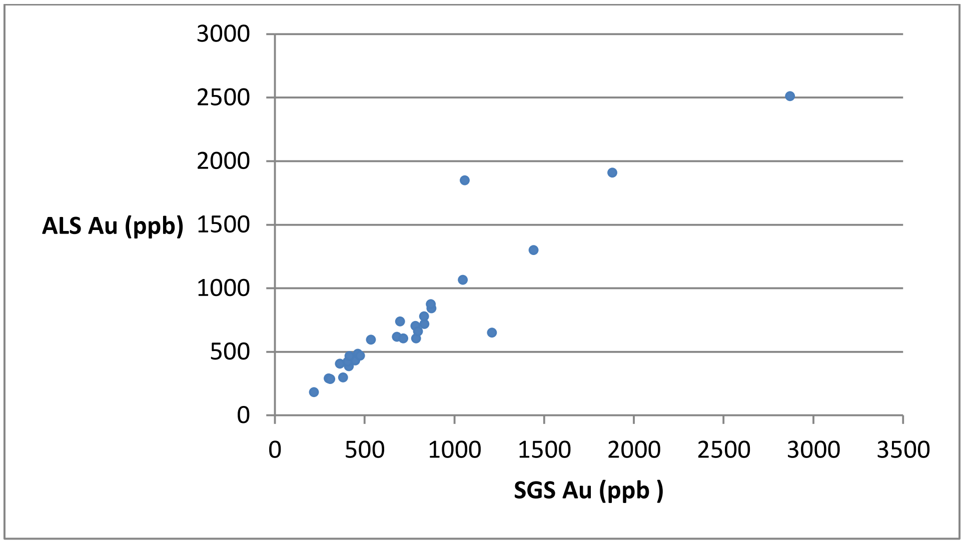


Figure 11.9. Comparison between SGS and ALS Laboratories (Source: Sunward, 2013)

The average value for the comparative assays of 305 Porvenir sets from Acme and ALS Laboratories was 243 ppb gold and 208 ppb gold. Figure 11.10 is the scatter diagram comparing these two laboratories.

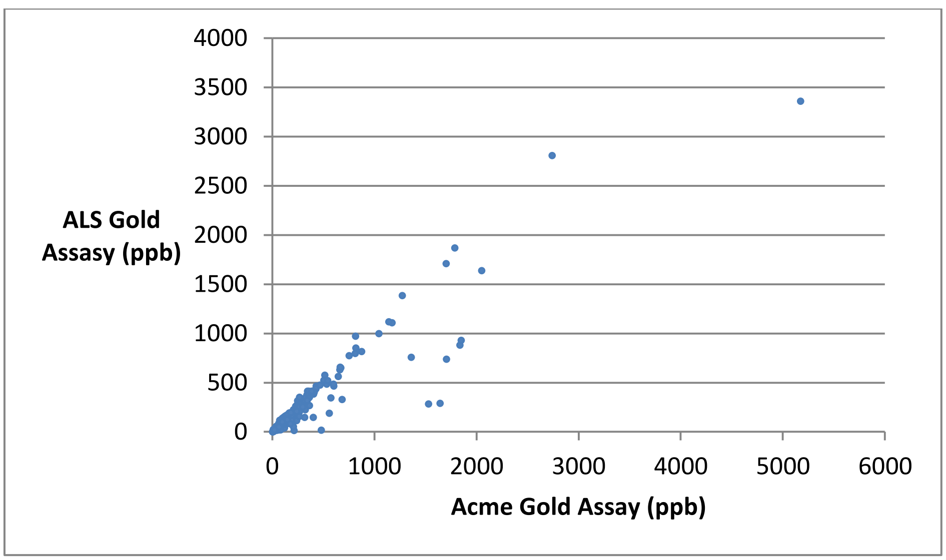


Figure 11.10. Comparison between Acme and ALS Laboratories (Source: Sunward, 2013)

The comparison between each laboratory set is excellent with nearly all of the outlier values being higher-grade samples, possibly reflecting a nugget effect. A few samples with poor correlation may reflect an error in sample identification.

12.0 DATA VERIFICATION

The project has had a rigorous and "fail-safe" procedure established to ensure the security and accuracy of the database. Although the entire Sunward technical staff has access to the database, only one person, the Database Manager, was permitted to make changes or additions to the database. All data was electronically entered including all drilling, logging, geotechnical, surface and downhole surveys, magnetic susceptibility, sample numbers, density, assay information, etc. The assay data was electronically transferred. All back-up assay data, such as the commercial laboratory and standard and blank assay results were electronically filed. Geologists or geological technicians checked all driller's records, recovery, RQD, etc. Only certain codes could be entered into the geological logging record. The logging form was designed by the entire in-house team. Drill logs were directly entered into a computer. All historic paper copies were converted to electronic files. There have been no paper copies of the drill logs since 2008. All data had been on an FTP server and had been backed up once a month. The entire database has been transferred to Brazil Resources. All drill core, coarse rejects, and pulps are securely stored onsite. While drilling campaigns were ongoing, the technical staff periodically inspected the sample preparation facilities in Medellin.

12.1 THE AUTHORS' VERIFICATION

The Master Database contains all the sample data including repeats and duplicates and other QA/QC samples. The authors carefully compared at least 33 pages of assay certificates to the digital database. As expected, there were no errors or omissions. The authors also spent a lot of time reviewing and evaluating the original versus the metallic screen gold assays, gold and copper re-assays and duplicates, and gold and copper standard assays and blanks.

Behre Dolbear detected a few minor concerns on how a "no-assay" data point was entered into the database. These minor concerns have been rectified. Also, a number of examples exist where Behre Dolbear suspects that pulps or coarse rejects have been mislabeled based upon the uncommon examples of poor correlation between check or duplicate assays.

A total of 7 intervals from 6 different core holes, 4 from Cerro Vetas and 2 from Chisperos, were selected by the authors for quartering and re-assaying as a duplicate check. The gold and copper assays of the ¼-core from the Cerro Vetas holes matched reasonably well with the original ½-core split assays. In the 5 sets containing significant copper mineralization, the original copper values are slightly higher suggesting the possibility of a slight bias. However, via visual inspection of the core, copper minerals (and by analogy the corresponding gold values) are extremely fine-grained and disseminated and purposeful bias is doubtful. Copper values from the two Chisperos holes matched well for the ¼-split and original assay but the gold values were dissimilar. The sampled intervals were re-checked to ensure the two sets of samples were from the same interval. The core from CP022 does contain obvious sulfide-rich (pyrite) veins that could account for some bias in sampling. Another explanation for the dichotomy of results from the two Chisperos holes is the coarse nature of the gold mineralization at Chisperos. Table 12.1 shows the results of the original assays (½-split) and the duplicate (¼-split). Figure 12.1 to Figure 12.5 show portions of the Cerro Vetas core intervals (before quartering) from holes CV098 (354.5 meters to 356.0 meters), CV098 (534.5 meters to 536.0 meters), CV099 (97.5 meters to 99.0 meters), CV073 (523.5 meters to 524.5 meters), and CV094 (635.0 meters to 636.33 meters), respectively. Figure 12.6 and Figure 12.7 shows portions of the Chisperos core intervals (before quartering) from holes CP022 (347.0 meters to 348.5 meters) and CP040 (140.5 meters to 141.5 meters), respectively.

TABLE 12.1 ORIGINAL GOLD-COPPER ASSAYS VERSUS ¼-CORE SPLIT GOLD-COPPER ASSAYS						
Drill Hole	**From**	**To**	**Original Gold Assay (ppb)**	**Duplicate ¼-core Gold Assay (ppb)**	**Original Copper Assay (ppm)**	**Duplicate ¼-core Copper Assay (ppm)**
CV098	354.50	356.00	148	114	721	666
CV098	534.50	536.00	2,220	2,101	6,704	5,586
CV099	97.50	99.00	438	366	2,727	2,308
CV073	523.50	524.50	918	741	1,286	1,142
CV094	635.00	636.33	603	722	2,803	2,418
CP022	347.00	348.50	922	113	7	11
CP040	140.50	141.50	1,049	361	70	82

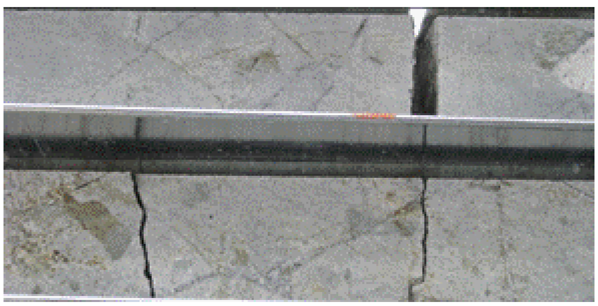


Figure 12.1. CV098 – highlighting a portion of the interval 354.5 meters to 356.0 meters (Source: Behre Dolbear, 2013)

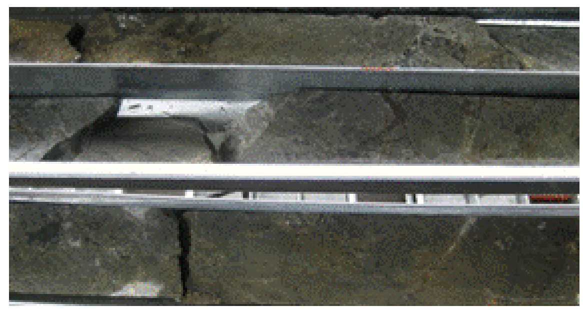


Figure 12.2. CV098 – highlighting a portion of the interval 534.5 meters to 536.0 meters (Source: Behre Dolbear, 2013)

Figure 12.3. CV099 – highlighting a portion of interval 97.5 meters to 99.0 meters (Source: Behre Dolbear, 2013)

Figure 12.4. CV73 – highlighting interval 523.5 meters to 524.5 meters (Source: Behre Dolbear, 2013)

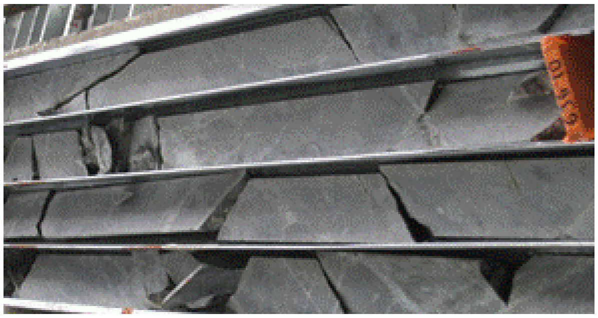


Figure 12.5. CV 94 – highlighting a portion of the interval 635.0 meters to 636.3 meters (Source: Behre Dolbear, 2013)

Figure 12.6. CP022 – highlighting a portion of 347.0 meters to 348.5 meters, with obvious pyrite veins (Source: Behre Dolbear, 2013)

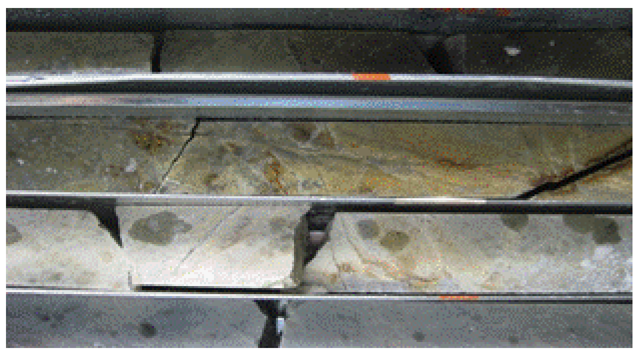


Figure 12.7. CP 40 – highlighting a portion of the interval 140.5 meters to 141.5 meters (Source: Behre Dolbear, 2013)

The authors also selected a group of 87 assay pulp intervals from throughout the Project area for re-assaying. The correlation results for copper were excellent with only one pulp sample returning a slightly different assay. A scatter diagram for the copper results is shown in Figure 12.8. The correlation results for gold were mixed with 76 pulps returning excellent correlation and 11 returning marginal or questionable results. Figure 12.9 is a scatter diagram for the re-assaying of the 87 pulps. The 11 pulp samples, along with their respective original coarse rejects, were re-assayed for gold. The assay results are shown in Table 12.2 and includes the original assay, ALS 1st duplicate assay, ALS 1st duplicate re-run check assay, ALS re-run assay on a 2nd duplicate (for 11 samples), ALS 2nd duplicate re-run assay, ALS coarse reject assay, and coarse reject check assay re-runs.

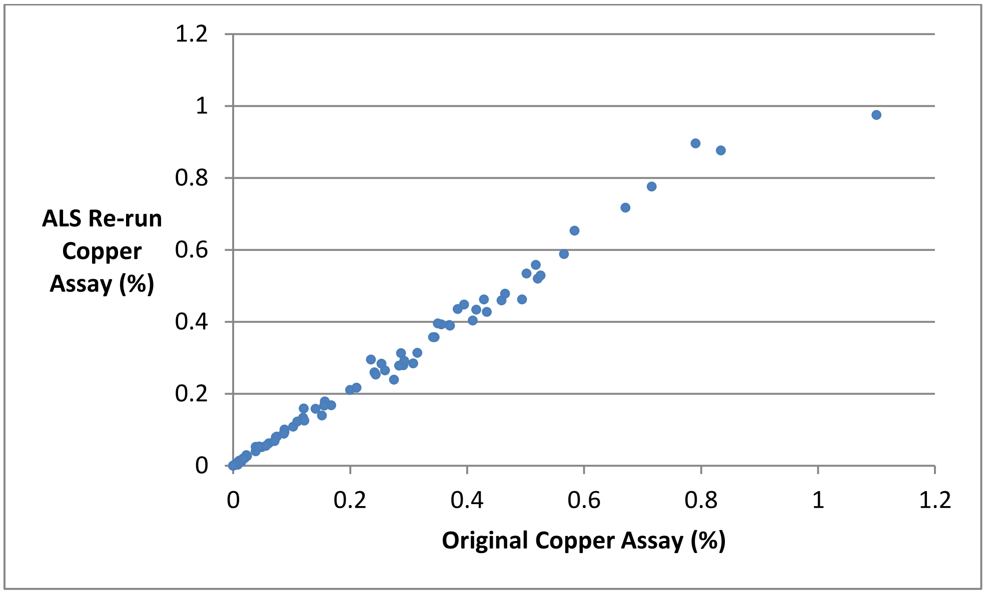


Figure 12.8. Scatter diagram for pulp copper verification assays (Source: Behre Dolbear, 2013)

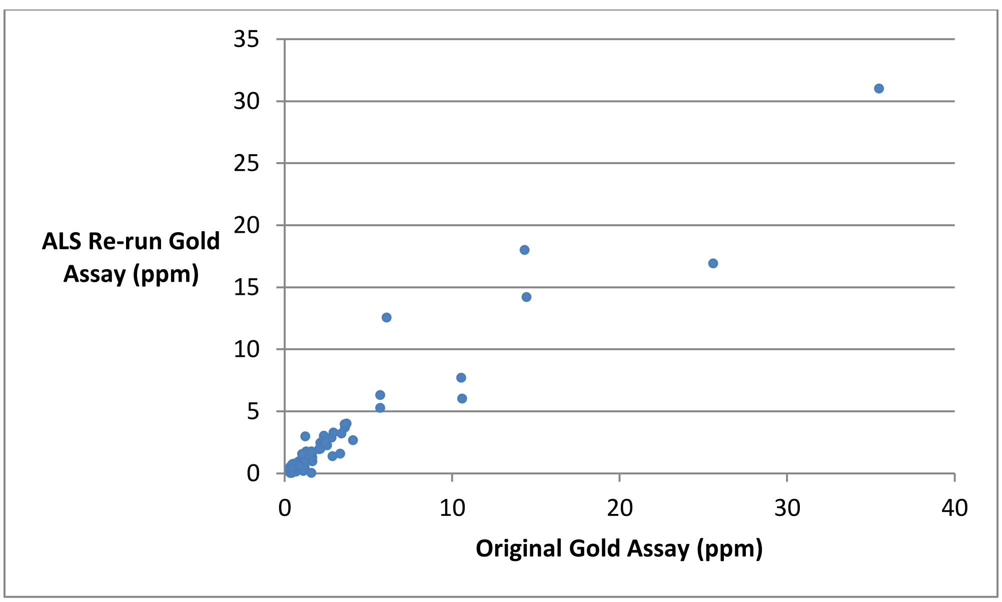


Figure 12.9. Scatter diagram for pulp gold verification assays (Source: Behre Dolbear, 2013)

TABLE 12.2
PULP, DUPLICATE, AND COARSE REJECT VERIFICATION ASSAYS

Original Au (ppm)	ALS 1st Duplicate Au (ppm)	ALS 1st Duplicate (Check Assay) Au (ppm)	ALS 2nd Duplicate Au (ppm)	ALS 2nd Duplicate (Check Assay) Au (ppm)	ALS Coarse Reject Au (ppm)	ALS Coarse Reject (Check) Au (ppm)
0.336	0.07	0.13	<0.05		0.07	
0.685	0.13		0.69	0.65	0.65	
0.336	0.01		0.31	0.25	0.07	
0.336	0.01		<0.05		0.46	0.22
0.441	0.01		<0.05		0.33	
1.199	0.45		0.61		0.68	
0.729	0.45	0.47	0.68		0.67	
0.995	0.39		0.68		0.53	
1.123	0.17		0.42		0.26	
0.910	0.57		0.6		0.5	
1.610	0.01		0.13		1.46	

These results suggest that the variation in gold assay results may be due to a coarse gold (nugget effect) associated with sulfide minerals or improper labeling of pulp bags and in one instance, a reasonable spread of values.

During the 2011, 2012, and 2013 site visits, the authors spent considerable time looking at core from the higher-grade intervals from many drill holes to compare the drill core of higher-grade mineralization to the surrounding lower-grade zones. In nearly every case, the higher-grade mineralization correlated very well with intervals of considerably more disseminated and fracture filling chalcopyrite and/or magnetite; or pyrite-sphalerite ± chalcopyrite veins; and/or minor chalcocite, bornite, or copper oxides.

During the 2013 site visit and data review, the authors spent considerable time reviewing in detail all of the geologic cross sections, which were prepared in two directions and plan geologic maps to insure continuity of geologic contacts, intrusive boundaries, and structure. The interpretations appear correct and the three-dimensional geology was utilized to build a viable resource block model. In previous interpretations, some concerns on fault movement and displacement and continuity of fault strike and dip existed, particularly on the wall rock-intrusive boundary at Cerro Vetas. New interpretations, based upon logging from the in-fill drilling campaign, have alleviated past concerns and simplified the contact that is now considered mostly intrusive rather than faulted. Nonetheless, there are small displacement faults that are not depicted on the present geologic plan and cross sectional maps that need to be better understood for improved geological interpretation, particularly at Chisperos. Additional detailed geological interpretations are necessary to better understand these faults and their relationship to mineralization.

No negative issues were identified during the inspection of diamond drill core, drill hole geology-assay cross sections, or the relationships between geology and the three-dimensional resource model. Issues concerning coarse gold and the nugget effect were discussed and resolved to the authors' satisfaction. The logging database, specifically lithology and alteration, was checked with no major concerns identified. The authors opined several different interpretations concerning the breccia units, simplifying the geology, particularly on the "mylonite breccia," now considered a lahar-type unit.

Because the diamond drill core has been oriented and strikes and dips recorded for the vast majority of veins, continuity of mineralization is reasonably good based upon the drill hole spacing. In addition, the use of three-dimensional downhole photography has enhanced the understanding of joints, faults, and veins.

All technical functions, performed by the Sunward staff, were clearly to industry standards. Assay data was electronically added to the database, eliminating the possibility of translation and typographical errors. Notwithstanding recognition of coarse gold (nugget-effect) issues and some concerns with possible pulp labeling issues and its effect on duplicate assays, with the procedures adopted by Sunward and the authors' 2011, 2012, and 2013 reviews, the authors have verified the adequacy of the data used in the 2013 NI 43-101 Technical Report and for use for this updated 2016 NI 43-101 Technical Report and resource estimation.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 METALLURGICAL TEST WORK

Metallurgical test work progressed satisfactorily through early 2012. No new metallurgical testing has been undertaken since 2012. The following statement is taken directly from the 2013 ITR, was supplied by Sunward (White, 2013) and is a summary of the 2011 and 2012 metallurgical test results.

> *"In 2011, Sunward engaged Tetra Tech Inc. to carry out preliminary metallurgical investigations on mineralized samples from Titiribi. They contracted Resource Development Inc. of Golden, Colorado and for the Phase II programme, four samples of 75 kg were investigated. The principal results were:*
>
> 1) *For all four samples tested, a significant proportion of the gold could be upgraded by gravity.*
> 2) *The samples were all non-refractory and cyanidation of the head samples, or the gravity or flotation concentrates, successfully recovered gold.*
> 3) *Flotation of the Cerro Vetas sample produced a saleable copper concentrate with high gold and copper recoveries.*
>
> *In 2012, TJ Metallurgical Services was asked by Sunward to develop a suitable test work program that would identify an optimized process flow sheet and determine the key metallurgical design parameters. The UK laboratory of Wardell Armstrong International (WAI) was selected and 3 samples weighing 270 kg to 300 kg from Cerro Vetas, NW Breccia, and Chisperos were sent to the Cornwall laboratory. The work carried out covered:*
>
> a) ***Extensive Head Sample Investigations.*** *XRD, ICP, Abrasion Indices and Bond Work Index determinations.*
> b) ***Knelson Gravity Test Work.*** *Three 50kg samples were dispatched to FLSmidth-Knelson for Gravity Recoverable Gold (GRG) testwork and a determination of the gold that could be recovered to a final product.*
> c) ***Gold Deportment Investigations on Gravity and Flotation Concentrates.*** *This included Diagnostic Leach testwork, Qemscan, and SEM investigations to determine the gold association and so plan the subsequent metallurgical test work.*
> d) ***Flotation Testwork.*** *Reagent and flotation optimisation for all three samples tested. Cleaner test work with optimised flotation reagent regime.*
> e) ***Locked Cycle Flotation Testwork.*** *Nine tests were carried out in total with six being carried out on Cerro Vetas to maximise the Au and Cu recovery to a copper flotation concentrate.*
> f) ***Cyanidation Testwork.*** *Pyrite flotation concentrates were produced from all three samples and the Au recovered by cyanidation.*
> g) ***Detailed Cyanidation Testwork.*** *A large bulk pyrite concentrate was produced from NW Breccia and a six-test cyanidation testwork programme carried out.*
> h) ***Environmental Testwork.*** *TCLP leach tests, ABA investigations and NAP/NAG tests were carried out on the flotation tailings. An Inco-type cyanide detox test was also carried on the NW Breccia cyanide leach tailings.*

The metallurgical work was reported by WAI in the report 'Stage III Metallurgical Testing on Samples of Gold and Copper Mineralisation' ZT64-0386, May 2013. The principal results obtained are:

a) ***Gold Deportment.*** *For all the samples around 10-12% was recoverable to a gravity concentrate. The gold was not liberated and was generally locked with sulphides but was amenable to cyanidation. For Cerro Vetas, 57% was recoverable to a copper concentrate and 13% to a pyrite concentrate. For NW Breccia and Chisperos the majority was associated with pyrite and was also amenable to cyanidation.*

b) ***Knelson GRG Tests.*** *Samples of Cerro Vetas and NW Breccia were sent for testwork at FLS-Knelson. FLS reported that for Cerro Vetas and NW Breccia there was a significant GRG (Gravity Recoverable Gold) element in both samples of 39.8% and 64.8% respectively. More importantly they stated that the introduction of a Knelson circuit and a cyanidation circuit would lead to an additional Au recovery of 1.2-1.8% and 4.0-5.6% for Cerro Vetas and NW Breccia respectively. Chisperos was not tested.*

c) ***Locked Cycle Flotation Testwork.*** *These tests replicate plant practice by recirculating intermediate streams and give the best indication of the grades and recoveries that can be achieved in an operating flotation plant. Using the optimized collector MX-5125 with other collectors in combination the following results were obtained for Cerro Vetas.*

TABLE 13.1
CERRO VETAS LOCKED CYCLE FLOTATION TESTS

Test No.	Cu Conc Grades		Cu Conc Rec (%)			Pyrite Conc		
	Cu	Au	Wt%	Cu	Au	Wt%	Au gpt	Au Rec
LCT1	15.7	30.3	1.25	86.9	69.5	0.35	5.5	3.5
LCT2	24.4	50.0	0.76	86.7	76.5	0.70	3.0	4.2
LCT3	18.8	34.4	1.24	90.3	76.7	0.80	5.1	7.3
LCT4	21.7	41.8	1.02	90.1	78.4	0.63	5.5	6.4
LCT1 (blend)	19.5	39.1	0.95	88.6	69.1	0.96	3.8	6.9
LCT2 (blend)	16.7	30.3	1.17	90.2	65.2	1.03	3.9	7.4

LCT3 reported the best results and LCT4 was a repeat with the same conditions. Very similar results were reported. The LC tests indicate that a saleable copper concentrate can be produced with a copper recovery of 90% and a gold recovery of 77%. The flotation of a pyrite concentrate recovers a further 6% gold.

The two Locked Cycle blend tests are on a feed composite of Cerro Vetas and NW Breccia in a blend of 9:1.

Two Locked Cycle tests were carried out on a sample of NW Breccia and one Locked Cycle test on Chisperos.

TABLE 13.2
NW BRECCIA AND CHISPEROS LOCKED CYCLE FLOTATION TESTS

Test No.	Pyrite Conc: Grades		Pyrite Conc: Recoveries		
	%S	Au gpt	Wt%	%S	%Au
NW Breccia:					
LC1	44.5	12.4	3.7	59.9	85.3
LC2	39.8	6.1	6.4	93.2	90.1
Bulk Float	39.1	11.2	6.4	94.5	95.7
Chisperos:					
LCT1	50.3	12.3	5.0	92.6	92.9

The NW Breccia 'Bulk Float' test was a test on a 20-kg feed sample to generate a 1.25-kg pyrite flotation concentrate for a cyanidation testwork program. The results indicate that over 90% of the gold can be recovered to a pyrite flotation concentrate for both NW Breccia and Chisperos.

a) ***Pyrite Concentrate Cyanidation Testwork.*** *The six-test optimization program showed that it was not necessary to regrind the pyrite flotation concentrate to achieve high gold recoveries and an average gold recovery of 91.7% with a cyanide consumption of 5.2 kg/t was achieved.*

b) ***Environmental Testwork.*** *The environmental characterization tests did not report any issues with regard to acid generation.*

The WAI testwork has identified the following process flow route to treat a Cerro Vetas ROM ore or a blend of Cerro Vetas with a minor proportion of NW Breccia;

i) *Comminution circuit to produce a flotation feed with a P_{80} of 90 microns.*
ii) *Knelson circuit within the comminution circuit to recover a gravity concentrate.*
iii) *Copper flotation circuit to produce a copper concentrate as filtercake.*
iv) *Pyrite flotation circuit.*
v) *Small cyanidation circuit to treat the Knelson gravity concentrate and the pyrite flotation concentrate and produce Au/Ag doré.*

From a series of Locked Cycle flotation and detailed cyanidation tests, the WAI testwork program has identified the likely copper and gold recoveries that could be achieved from a standard two-circuit flotation plant with a small cyanidation circuit. It is the opinion of WAI and the consultants involved that sufficient metallurgical data has been produced in the Stage III metallurgical testwork program for an engineering design company to carry out a preliminary process design and costing."

14.0 MINERAL RESOURCE ESTIMATES

The mineral resources at the Project were continually re-estimated and updated by the Sunward staff, as new drilling data and assay results became available, using the Surpac® computer mining software. The Sunward staff generated a block model based on the Titiribi Master Magna drill hole database, as of April 15, 2013 and a new three-dimensional geological interpretation produced by the Sunward geologists was completed in May 2013. These in-house models formed the basis of the three-dimensional geological model that were used with minor modifications by Dr. Robert E. Cameron (one of the authors) of Behre Dolbear to re-estimate the tonnage and grades at the Project for reporting of the 2013 Mineral Resources, as required under NI 43-101. This updated report reflects changes in metal prices and updated resource estimations based upon modified resource parameters.

To determine the mineral resource at Titiribi in 2013, a single block model had been developed to cover the primary drilling areas: Cerro Vetas, NW Breccia, and Chisperos. The resource areas are shown in Figure 14.1 and are referred to as:

1) Cerro Vetas
2) NW Breccia
3) Chisperos

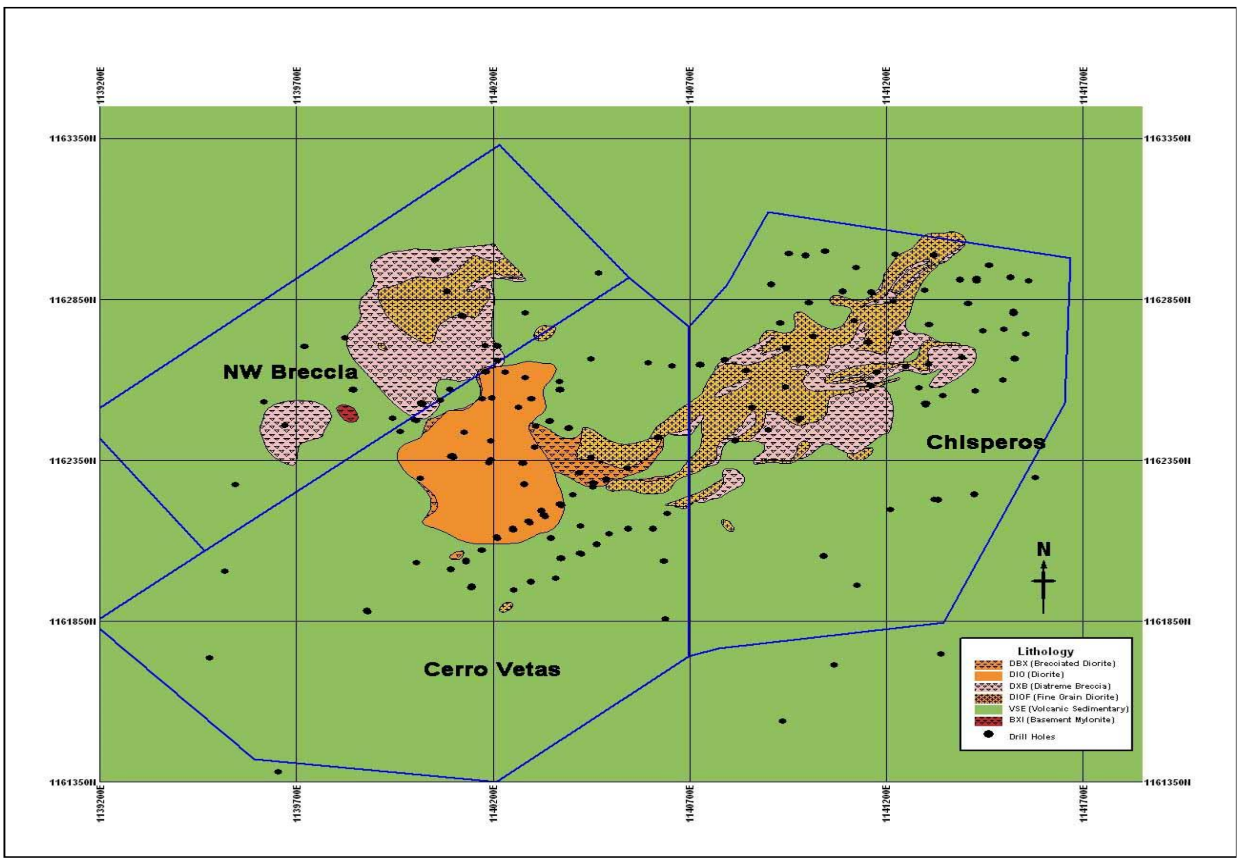


Figure 14.1. Block model areas
(Source: Behre Dolbear, 2013)

For the purposes of this 2016 report, the author reviewed the primary data and work completed by Sunward and used it, in part, as the basis for the current resource estimations. The author is of the opinion that the initial Sunward work and drill hole data was collected and analyzed in a manner that conforms to acceptable industry practices and is acceptable for use to produce Canadian NI 43-101-compliant mineral resource estimates.

14.1 ELECTRONIC DATABASE USED FOR RESOURCE MODELS

The Sunward April 2013 Master Magna drill hole database was used for the current resource estimate. It consists of 254 diamond drill holes with a total drilled length of 141,585.9 meters. Eighty of these holes are outside of the model area and this database does not contain the older 1998 Gold Fields drilling. During 2012, Sunward migrated all of their surveying and collar locations from the Bogota 1975/Colombia West Zone used in previous studies and resources estimates to the Magna-Sirgas/Colombia West zone resulting in use of the term "Magna" in the database name.

The database used for the current Project resource model and estimate is summarized by the drilling campaigns listed in Table 14.1.

TABLE 14.1
SUMMARY OF THE 2013 MASTER MAGNA DRILL HOLE DATABASE

Drilling Campaign	Number	Total Meters
2006 Gold Plata	16	4,658.15
2008 Windy Knob	17	6,180.75
2010 Sunward	36	22,214.46
2011 Sunward	68	41,986.64
2012 Sunward	111	64,703.10
2013 Sunward	6	1,842.80
Total	**254**	**141,585.90**

The electronic database was provided by Sunward in 2013 and contains 95,970 assay intervals plus an additional 13,082 assays used for the QA/QC work (check assays, blanks, and standards). Each assay interval contains grades for gold and copper along with 39 other elements reported in the standard ACME Labs multi-element package, such as Ag, Al, As, B, Bi, Ca, Cd, Co, Fe, and other elements. No updated information since the author's last review in 2013 was supplied for this report.

The electronic database supplied also contains the geologic logging. For each assay interval, a three-letter lithologic code, based on the geologic logging, has been entered. In addition, the detailed lithologic codes have been divided into nine primary lithologic groups that include:

- Volcanics
- Hypabyssal
- Intrusives
- Sedimentary
- Metamorphic
- Breccias
- Plutonic
- Others
- Unconsolidated Sediments

The author spot checked the data entry during previous reviews and found a few typographic errors in the lithology group entries, which were all misspellings. These were corrected in the updated database. Assay entries were also spot checked against original assay certificates and no errors were discovered. No additional drilling or assaying has been undertaken since 2013; thus, the 2013 database is considered current for this 2016 resource estimate.

Topography used for the resource estimation was provided to the author as a standard 1-meter contour interval GIS shape files, DTM and AutoCAD® files. The topography in the modeling area used was current as of approximately June 2012 and was generated from a LIDAR survey. Sunward also provided Behre Dolbear the LIDAR survey of the surrounding region completed in March 2013 but this information was outside of the resource estimate area. All drill hole collar locations were surveyed or re-surveyed by Conditop, S.A.S. and converted to the MAGNA-SIRGAS/Colombia West zone. The 2013 collar locations supplied to Behre Dolbear were checked to ensure conversion accuracy by using a simple computer transformation of the collar locations used in the 2012 work to compare these against the new MAGNA-SIRGAS/Colombia West zone coordinates in the 2013 database.

The 2006 drilling, completed by Gold Plata, was used for geologic interpretation but the assay information was excluded from grade estimation.

14.2 BULK DENSITY MEASUREMENTS

The Project routinely collected and measured the bulk density or specific gravity (SG) of the drill core. As of July 13, 2013, their database consisted of 7,265 measurements divided into 33 lithologic codes. Approximately 6,820 measurements were taken from drilling in the resource area and these were grouped into the primary lithology groups used for the geologic model. Figure 14.2 shows a scatter diagram of all SG measurements by detailed lithology code. Table 14.2 summarizes the SGs, from the modeling area and divided into the major lithology groups, used in the current model.

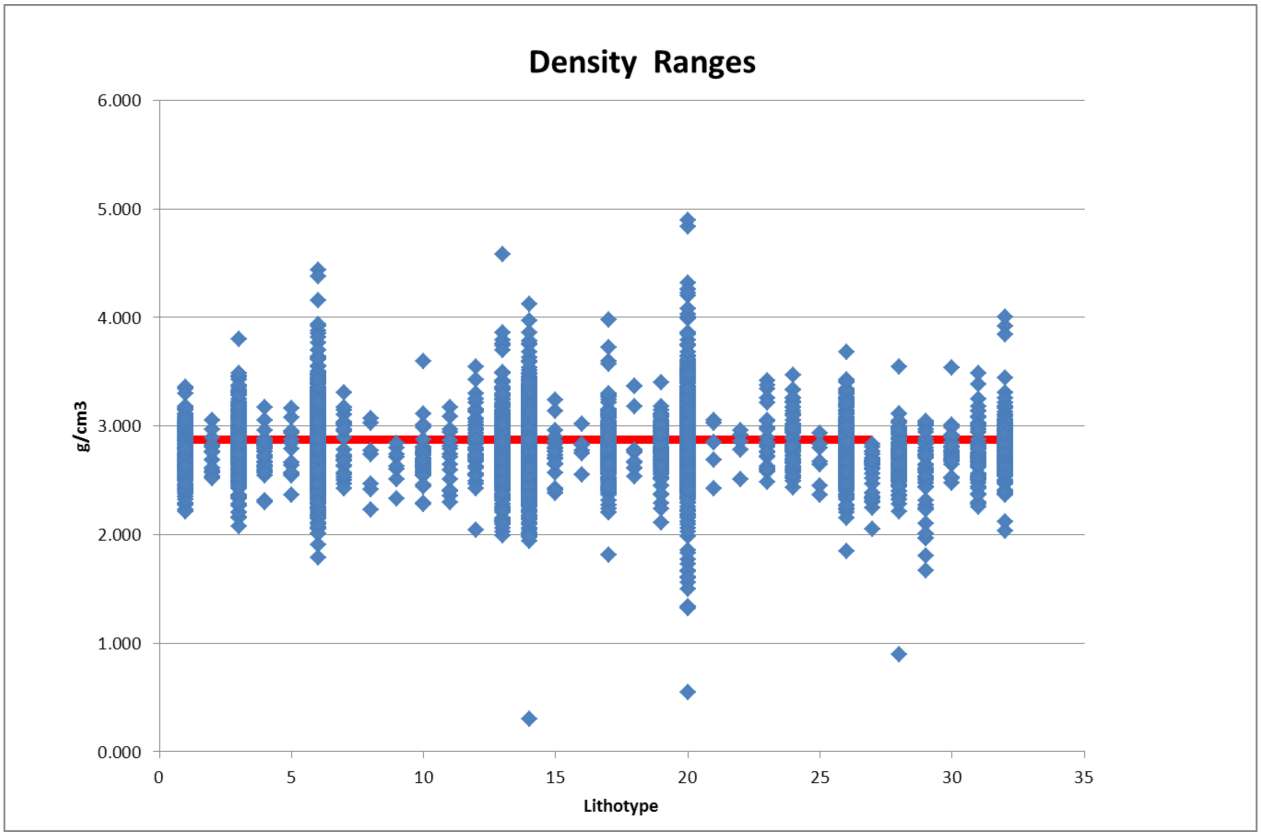


Figure 14.2. Density measurements by lithology code (Source: Sunward, 2013)

TABLE 14.2 BULK DENSITY SUMMARY			
Model Lithology	**Average Density (g/cm^3)**	**Number of Samples**	**Logged Lithology**
Diorite	2.76	2,412	DIO DBX DIOF
Basement Rocks	2.84	1,257	MBA MSG SCH IRU MGW MR MSC
Breccia Basement	2.99	1,543	BXF,BXH,BXI,BXQ,BXX IRU MMY
Diatreme Breccia	2.86	290	BXD
IGD	2.77	193	PHA
Volcanic-Sedimentary	2.81	1,125	XTU,LTU,ANB,AND,ARN BXS CGL CLY MUD QFS QST STO CLS COL SAP SNS SRU GRW

14.3 PROCEDURES AND PARAMETERS USED FOR THE RESOURCE MODELING

In 2013, the 3 block models used in Sunward's 2011 and 2012 resource estimates were merged into a single block model. The area names and designated boundaries were retained for a matter of consistency and comparison with older estimates and the areas are illustrated previously in Figure 14.1. This 2016 resource estimate uses the merged single block model.

The gold and copper mineralization in the Cerro Vetas area is associated with an intrusive event. It is believed that the intrusive event created permeability in surrounding country rocks, which was then susceptible to mineralizing fluids. The core of the intrusion appears to be relatively barren. The Chisperos portion of the deposit is north and east of the Cerro Vetas area (Figure 14.1). It is generally gold-only and consists of parallel to sub-parallel mineralized zones that are both stratigraphically and structurally controlled and hosted in a sedimentary-volcanic sequence. The transition area between the Cerro Vetas and Chisperos mineralization may be a link between the low-temperature epithermal style at Chisperos and the high-temperature porphyry intrusive hosted style at Cerro Vetas. The NW Breccia area is north and west of the Cerro Vetas area (Figure 14.1). The NW Breccia deposit is also generally gold-only and hosted primarily in the diatreme breccia adjacent to the Cerro Vetas intrusion.

The following procedures and parameters were used in the 2013 and current (2016) resource estimation for the mineralization at the Project.

- **Three-dimensional Geologic Model:** Sunward developed a series of very detailed geologic cross sections and plan maps at the project, a representative portion that were shown previously in Figure 7.23 through Figure 7.28. Brazil Resources accepts the interpreted geologic model. These formed the basis of the development of a three-dimensional geologic model consisting of 8 major lithologies or rock types. The 50-meter plan maps were digitized and then extruded to generate the geologic model. Blocks within each rock type were tagged with a block rock type code. The Gold Plata drilling, completed in 2006, was used for the geologic interpretation but was not used for the grade estimation.

  Figure 14.3 illustrates the three-dimensional geologic solid used to delineate the intrusive and surrounding mineralization. This model does not fully encompass the true extent of mineralization around the intrusive at Titiribi and is, therefore, only used as a guide for additional geologic interpretation.

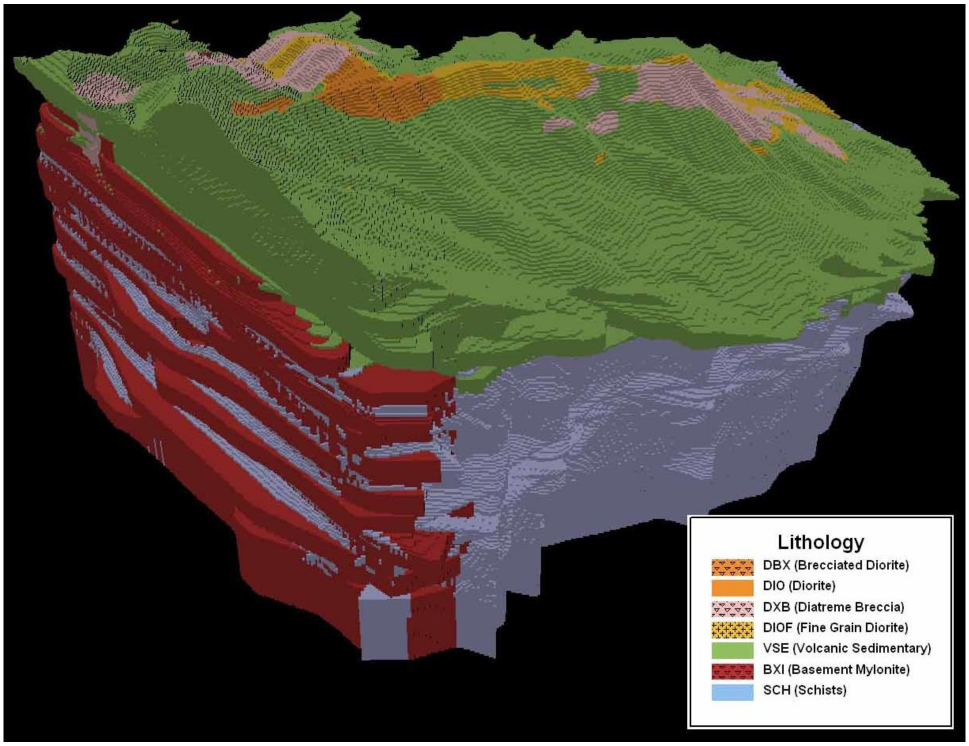
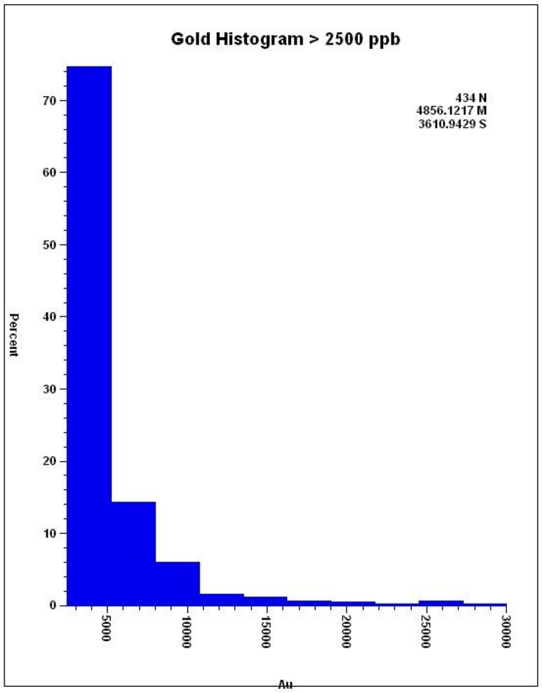


Figure 14.3. Sunward 3-dimensional geologic model (Source: Behre Dolbear, 2013)

- **Grade Capping and Assay Statistics:** Grade capping for the Titiribi block model was based on examination of the distribution of the raw assays and grade probability distributions. Grades were capped to eliminate the effects of high-grade outliers on the resource estimation. Gold was capped at 25,000 ppb of gold per tonne and copper was capped at 20,000 ppm. These values only capped 14 gold and 8 copper assays. Figure 14.4 shows the histograms of the assay distributions for both gold and copper for the high end of the population. Notice that after about 25,000 ppb of gold per tonne for the gold distribution and 20,000 ppm for the copper, the assays are fairly spotty, and therefore, can be considered outliers.



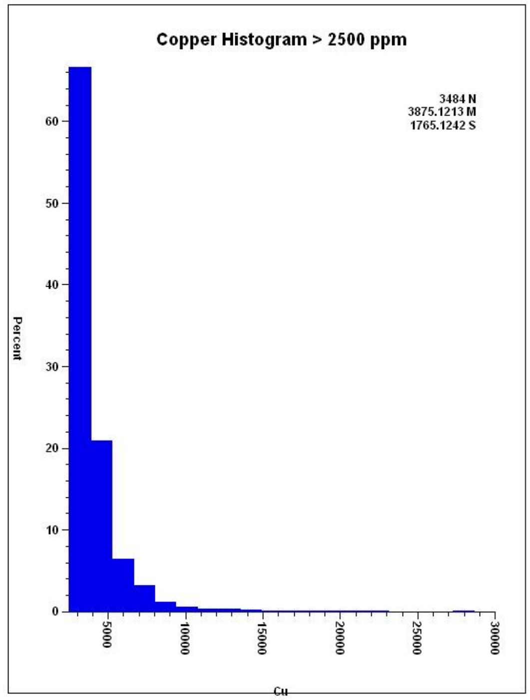


Figure 14.4. Cerro Vetas gold and copper assay histograms (Source: Behre Dolbear, 2013)

Both raw and uncapped assay statistics were computed for the Titiribi model. These are shown in Table 14.3.

TABLE 14.3 ASSAY STATISTICS									
Element	**Number of Assays**	**Raw Assays**				**Capped Assays**			
		Mean	**S.D.**	**Max**	**Min**	**Mean**	**S.D.**	**Max**	**Min**
Au (ppb)	70,923	202.09	692	113,500	0	200.50	536	25,000	0
Cu (ppm)	70,923	616.99	1,098	131,000	0	614.69	965	20,000	0

- **Compositing:** Capped gold and copper assays were composited to 5-meters fixed-length composites. The composite length was chosen to correspond to the block dimensions in the block model. Once the composites were generated, they were assigned the rock type corresponding to the rock type of the geologic model. The author opines that the composite length is appropriate for the modeling work. Table 14.4 shows the composite statistics divided by rock type. A few composites were not assigned rock types as they fell outside of the three-dimensional geologic model. The rock type code used in the modeling work is in parenthesis after the rock type.

TABLE 14.4
FIVE METER COMPOSITE STATISTICS

Rock Type	Element	Number of Composites	Composites			
			Mean	S.D.	Max	Min
All Rock Types	Au (ppb)	21,414	193.7	329	9,753	0.0
	Cu (ppm)	21,414	599.2	823	13,030	0.0
Diorite (1)	Au (ppb)	4,071	375.2	364	4,202	8.1
	Cu (ppm)	4,071	1,426.0	1,066	9,808	30.5
Fine Grain Diorite (2)	Au (ppb)	2,955	144.9	236	3,793	0.0
	Cu (ppm)	2,955	309.8	406	3,806	0.0
Diatreme Breccia (3)	Au (ppb)	1,746	221.2	374	5,047	0.0
	Cu (ppm)	1,746	213.8	215	1,967	0.8
Basement Mylonite (4)	Au (ppb)	4,276	172.6	377	9,753	0.0
	Cu (ppm)	4,276	561.1	748	8,075	3.3
Volcanic Sedimentary (5)	Au (ppb)	4,372	127.0	235	7,806	0.0
	Cu (ppm)	4,372	406.1	624	6,156	0.0
Basalts and Green Rocks (6)	Au (ppb)	3,345	132.5	280	5,305	0.0
	Cu (ppm)	3,345	409.8	664	13,030	6.9
Schists (7)	Au (ppb)	147	184.5	646	7,384	0.0
	Cu (ppm)	147	105.7	94	912	8.5
Granodiorite (8)	Au (ppb)	389	107.8	141	983	0.0
	Cu (ppm)	389	412.9	441	3,207	10.2
Unclassified	Au (ppb)	113	4.6	8	55	0.0
	Cu (ppm)	113	160.5	64	341	31.9

- **Variography:** Variograms models were estimated for both gold and copper using the 5 meter-composites based on each rock type at a variety of orientations and directions.

  The variogram models were developed using four nested variogram structures. The variogram models have typical nugget (or random) components for gold-copper mineralization with the gold nugget being approximately 50% of the total population variance. The copper nugget is also typical of that found in this sort of deposit at less than 30% of the total variance. Rock type 7 had insufficient samples to construct a meaningful variogram; hence, the global variogram was used for estimation. Table 14.5 summarizes the variogram models selected for the Titiribi block model area.

TABLE 14.5
EXPERIMENTAL SEMI-VARIOGRAM MODELS

Rock Type	Variogram Model	Au		Cu	
		Sill	Range	Sill	Range
Global	Nugget	56,000	NA	100,000	NA
	Spherical 1	21,500	40	100,000	40
	Spherical 2	26,000	160	420000	120
	Spherical 3	8000	280	60000	320
1,2,3	Nugget	42,000	NA	180,000	NA
	Spherical 1	22,500	40	360,000	40
	Spherical 2	19,000	160	240,000	240
	Spherical 3	30,000	280	151,000	480
4	Nugget	30,000	NA	50,000	NA
	Spherical 1	9,000	40	120,000	40
	Spherical 2	64,000	160	310,000	160
	Spherical 3	44,000	200	74,000	320
5	Nugget	10,000	NA	80,000	NA
	Spherical 1	3,000	40	12,000	45
	Spherical 2	33,000	160	100,000	90
	Spherical 3	11,700	200	210,000	315
6	Nugget	12,000	NA	50,000	NA
	Spherical 1	25,000	40	60,000	40
	Spherical 2	19,000	160	40,000	240
	Spherical 3	30,000	280	290,000	600
7 (Global)	Nugget	56,000	NA	100,000	NA
	Spherical 1	21,500	40	100,000	40
	Spherical 2	26,000	160	420,000	120
	Spherical 3	8,000	280	60,000	320
8	Nugget	4,000	NA	20,000	NA
	Spherical 1	1,500	40	20,000	40
	Spherical 2	4,000	160	20,000	240
	Spherical 3	11,000	280	134,000	600

Figure 14.5 and Figure 14.6 shows the semi-variograms, produced by the author, for both gold and copper for the Titiribi model. The author opines that the variography work with the extrapolation used is adequate for the current resource model.

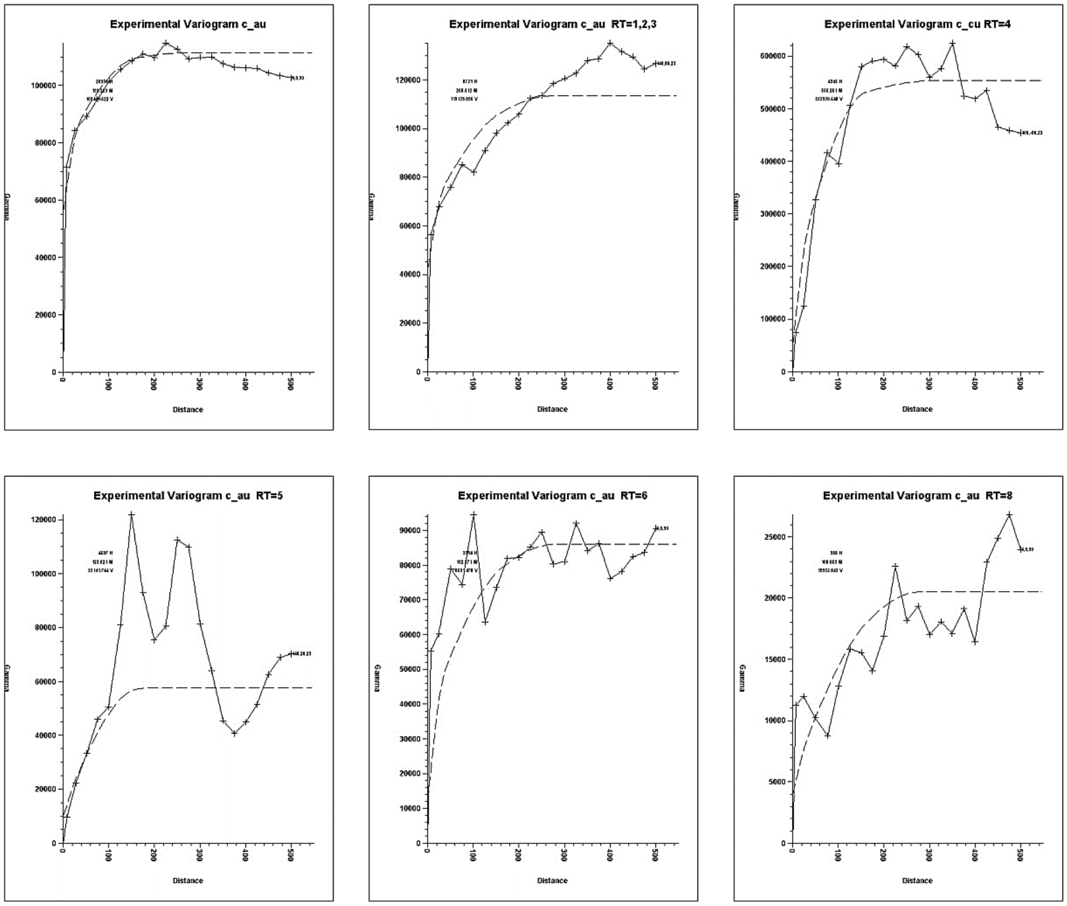


Figure 14.5. Gold experimental semi-variograms (Source: Behre Dolbear, 2013)

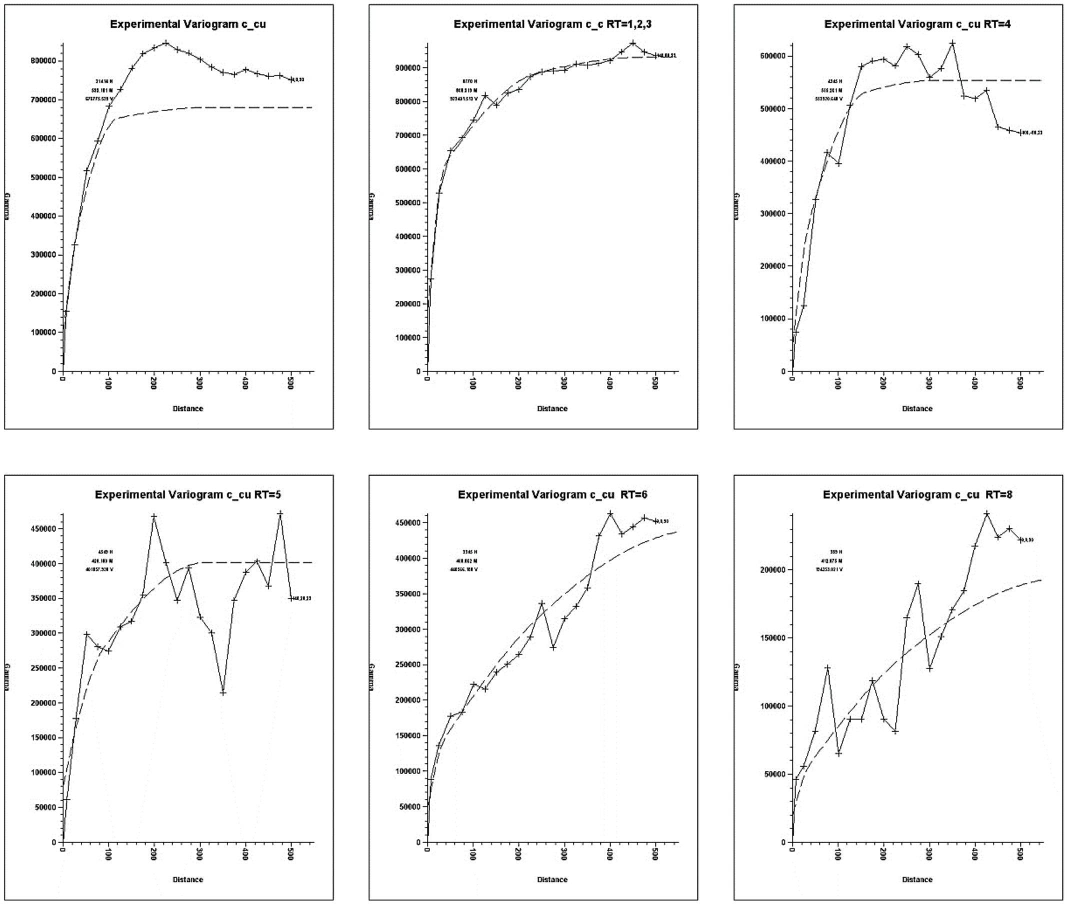


Figure 14.6. Copper experimental semi-variograms (Source: Behre Dolbear, 2013)

- **Block Model Definition:** A three-dimensional block model with a block size of 5 meters × 5 meters × 5 meters was defined for the Titiribi model. The estimation zone or rock type envelopes were coded into the block model using the center of the block, *i.e.*, a block is considered inside the mineralized envelope, if the center of the block is located inside the mineralized envelope. Table 14.6 shows the definitions of the model used for the 2013 Titiribi model. No changes were made to the block model definitions for this 2016 report.

TABLE 14.6
TITIRIBI BLOCK MODEL DEFINITION

Direction	From	To	Length (m)	Block Dimensions (m)	Number of Blocks
East	1,139,203.5	1,141,813.5	2,610	5	522
North	1,161,355	1,163,445	2,090	5	418
Vertical	1,000	2,400	1,400	5	280

- **Grade Estimation:** Block grade estimation for both gold and copper was conducted using a 5-pass ordinary kriging (OK) procedure. The search radii and orientation for all 5 passes are shown in Table 14.7. The variography used for the kriging estimates are the experimental semi-variograms discussed above. This 2016 resource estimate utilizes only the first 3 passes.

TABLE 14.7
SEARCH ELLIPSE ORIENTATION FOR RESOURCE ESTIMATION

Rock Type	Azimuth Major Axis	Dip Major Axis	Rotation Semi-Major Axis
1,2,3	140	80	90
4	100	-80	30
5	140	20	0
6	140	80	0
7	140	80	90
8	140	80	90

The minimum number of 5-meter composites used for each pass varied and ranged from 2 to 6 and a maximum of 10 composites were allowed. A maximum of two composites from any single drill hole requiring composites from multiple drill holes for the first and second passes. Grades for each block were estimated from only composites with the same rock type code. The estimation parameters for composites and the range of the search ellipsoid are shown in Table 14.8.

TABLE 14.8
ESTIMATION PARAMETERS

Pass	Number of Composites			Range of Search Ellipsoid (m)		
	Max	Min	Max from Any Hole	Major	Semi-major	Minor
1	10	6	2	60	50	50
2	10	4	2	120	100	100
3	10	2	2	240	200	200

The author believes the procedures utilized for grade estimation are suitable for the current overall estimate of tonnage, average grade, and metal content.

- **Resource Classification:** Model blocks were classified into Measured, Indicated, and Inferred Mineral Resources using the CIM definitions. Measured blocks were those that were estimated in pass one that required at least two composites from each of a minimum of three different drill holes. Blocks estimated during the second pass were classified as Indicated and required at least two composites from each of a minimum of two different drill holes. Inferred blocks required at least 2 composites from 1 drill hole and are the blocks estimated in pass 3. The author reviewed the classification and adjusted some of the pass 1 tonnage downward to Indicated and Indicated to Inferred where sampling data combined with the detailed geologic sections would warrant the change of categorization.

- **Validation:** Local grade bias was checked by posting the block grades and composite grades on a computer screen on sections and plans. Visual inspection indicated that the block grades estimates are generally similar to the nearby composite grades, with a reasonable amount of smoothing. The author believes that the model grade distribution reasonably corresponds to the drilling data.

14.4 GOLD EQUIVALENCE ESTIMATIONS

Gold equivalent ounces were estimated based on a selling price of $1,300 per troy ounce gold and $2.90 per pound copper. Overall, average recoveries of 83% for gold and 90% for copper were factored into the estimations based on the preliminary metallurgical test work discussed in Section 13.0. No revenue adjustments for transportation or smelter charges were considered for the copper concentrate in the estimation. The equation below shows the detailed conversion from troy ounces of gold and pounds of copper to troy ounces of gold equivalence.

$$Au_{Equivelance\_oz} = Au_{oz} + \frac{(Cu_{price} \times Cu_{Recovery})}{(Au_{price} \times Au_{Recovery})} \times Cu_{lbs}$$

or

$$Au_{Equivelance\_oz} = Au_{oz} + 0.0024189 \times Cu_{lbs}$$

14.4.1 Metals Pricing Used for Gold Equivalence

The average spot gold price during September 2016 was $1,326 per ounce. The average spot copper price during this period was $2.14 per pound. Price Waterhouse Coopers LLP (PWC) completed a survey as of December 2015 of the gold and copper prices used by the industry to determine resources and reserves. Table 14.9 shows the results of the survey for both gold and copper resources. Based on these figures, Behre Dolbear and Brazil Resources selected a gold price of $1,300 per ounce and a copper price of $2.90 per pound to estimate the resources and calculated gold equivalence at the Titiribi Project for this report.

TABLE 14.9
PWC SURVEY OF METALS PRICE USED FOR DETERMINING RESOURCES[1]
(DECEMBER 2015)

Type	Low	Average	High
Gold Resource	$1,100	$1,295	$1,500
Copper Resource	$2.50	$3.08	$3.97

[1]From *Gold and Copper Price Survey December 2015*, Price Waterhouse Coopers LLP.

14.5 BEHRE DOLBEAR'S RESOURCE ESTIMATION RESULTS

The Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standing Committee on Reserve Definitions prepared the CIM Standards on Mineral Resources and Reserves – Definitions and Guidelines, which was adopted by the CIM council on May 10, 2014. This is a resource/reserve classification system that has been widely used and is internationally recognized. The CIM definitions are used by the author to report the Mineral Resources at the Titiribi property in this report. Mineral Resources under the CIM Standards are defined as follows:

> *A '**Mineral Resource'** is a concentration or occurrence of solid material in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other*

geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

*An **'Inferred Mineral Resource'** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence sampling. Geological evidence is sufficient to imply but not verified, geological and grade continuity. An Inferred Mineral Resource is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, trenches, pits, workings and drill holes***.**

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

*A '**Measured Mineral Resource'** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation*.

The author has categorized and summarized the Mineral Resource at the Project using the CIM definitions for Mineral Resources. As only preliminary economic considerations have been developed for the Project, the author has used various cutoff grades ranging from 0.2 grams of gold per tonne to 0.5 grams of gold per tonne to summarize the results of the in situ global resource estimate. Any of the blocks meeting the cutoff criteria and contained within the block model are included in the resource summary. Table 14.10 presents the estimate of the Measured and Indicated Mineral Resource at the Project at various cutoff grades. Table 14.11 shows the estimate of the Inferred Mineral Resource.

14.5.1 Reasonable Prospects of Economic Extraction

The Titiribi project is an early stage project with insufficient design and engineering work to estimate a potential economic cutoff for the property. Open pit gold mines operating in deposits, similar to the Titiribi property, have been shown to average a cutoff grade of 0.25 grams of gold per tonne. The author has, therefore, selected a base case for reporting the Mineral Resource at the Titiribi Project using a cutoff of 0.3 grams of gold per tonne and, is of the opinion that, based on the data from similar properties, the mineralization has reasonable prospects of economic extraction at this cutoff grade. This case has been highlighted in Table 14.10 and Table 14.11.

TABLE 14.10
TITIRIBI MEASURED AND INDICATED MINERAL RESOURCE
(0.3 G/T CUTOFF AS OF 14 SEPTEMBER 2016)

Area	Category	Au Cutoff	Million Tonnes	Average Au (g/t)	Average Cu (%)	Contained Metal				Au Equivalence[1]	
						Au (kg)	Au (million oz)	Cu (tonnes)	Cu (million lbs)	(g/t)	(million oz)
Cerro Vetas	Measured	0.2	75.5	0.415	0.156	31,352	1.01	117,432	258.9	0.67	1.63
		0.3	51.6	0.492	0.172	25,380	0.82	88,486	195.1	0.78	1.29
		0.4	30.9	0.588	0.190	18,196	0.59	58,825	129.7	0.90	0.90
		0.5	17.4	0.698	0.209	12,161	0.39	36,424	80.3	1.04	0.59
	Indicated	0.2	231.8	0.380	0.133	88,178	2.84	307,683	678.3	0.60	4.48
		0.3	132.4	0.483	0.157	63,949	2.06	208,317	459.3	0.74	3.17
		0.4	73.3	0.593	0.176	43,483	1.40	128,952	284.3	0.89	2.09
		0.5	38.0	0.731	0.195	27,744	0.89	73,839	162.8	1.05	1.29
Chisperos	Indicated	0.2	140.3	0.350		49,081	1.58	-		0.35	1.58
		0.3	62.1	0.484		30,077	0.97	-		0.48	0.97
		0.4	32.2	0.616		19,844	0.64	-		0.62	0.64
		0.5	19.3	0.733		14,121	0.45	-		0.73	0.45
NW Breccia	Indicated	0.2	73.2	0.447		32,690	1.05	-		0.45	1.05
		0.3	39.7	0.618		24,541	0.79	-		0.62	0.79
		0.4	24.1	0.796		19,160	0.62	-		0.80	0.62
		0.5	15.2	1.001		15,241	0.49	-		1.00	0.49
Base Case – Measured + Indicated		**0.3**	**285.8**	**0.50**		**143,947**	**4.63**	**296,804**	**654.4**	**0.68**	**6.22**

[1]Gold Equivalence estimated using $1,300 per ounce gold at 83% recovery and $2.90 per pound copper at 90% recovery.

TABLE 14.11
TITIRIBI INFERRED MINERAL RESOURCE
(0.3 G/T CUTOFF AS OF 14 SEPTEMBER 2016)

Area	Category	Au Cutoff	Million Tonnes	Average Au (g/t)	Average Cu (%)	Contained Metal				Au Equivalence[1]	
						Au (kg)	(g/t)	(g/t)	Cu (million lbs)	(g/t)	(million oz)
Cerro Vetas	Inferred	0.2	196.4	0.309	0.051	60,745	1.95	99,729	219.9	0.39	2.48
		0.3	70.8	0.429	0.050	30,326	0.98	35,323	77.9	0.51	1.16
		0.4	30.5	0.542	0.049	16,547	0.53	15,040	33.2	0.61	0.61
		0.5	14.3	0.657	0.049	9,393	0.30	6,999	15.4	0.74	0.34
Chisperos	Inferred	0.2	122.2	0.329		40,279	1.30	-		0.33	1.30
		0.3	51.1	0.452		23,110	0.74	-		0.45	0.74
		0.4	23.4	0.580		13,561	0.44	-		0.58	0.44
		0.5	11.0	0.737		8,087	0.26	-		0.74	0.26
NW Breccia	Inferred	0.2	150.0	0.423		63,513	2.04	-		0.42	2.04
		0.3	86.0	0.555		47,775	1.54	-		0.56	1.54
		0.4	48.0	0.722		34,680	1.12	-		0.72	1.12
		0.5	35.1	0.826		29,020	0.93	-		0.83	0.93
Base Case – Inferred		**0.3**	**207.9**	**0.487**		**101,211**	**3.25**	**35,323**	**77.9**	**0.51**	**3.44**

[1]Gold Equivalence estimated using $1,300 per ounce gold at 83% recovery and $2.90 per pound copper at 90% recovery.

The author would also note that the Inferred resource estimates have a great amount of uncertainty as to their existence and economic and legal feasibility. It cannot be assumed that all or any part of an Inferred mineral resource will ever be upgraded to a higher category. Under Canadian rules, estimates of Inferred mineral resources may not form the basis of feasibility or pre-feasibility studies or economic studies except for a preliminary economic assessment or scoping study, as defined under Canadian NI 43-101. Investors are cautioned not to assume that any or all of the Inferred resources exist or are economically or legally mineable.

14.6 RESOURCE RISK FACTORS

The author opines that the Sunward staff performed good work in determining the in situ mineralized resource at the Project. The author also opines that the Mineral Resource Statements, issued as of 14 September 2016, are appropriate based on our review of the mineralized envelopes and the grade estimation methods. However, there are still a number of risk factors for the resource estimate.

- **The Author Has Not Conducted Independent Drilling:** The author has accepted the drilling data, mine sampling data, and assays, as presented by Sunward, for this report. The author has spot checked the database against the laboratory certificates. The author had a few check samples run using ¼-core of selected intervals and the stored pulps; however, no independent drilling and check work has been completed. ***Low Risk***

- **Resource Categorization:** Model blocks were estimated and classified into Measured, Indicated, and Inferred Mineral Resource under the CIM definitions. The author opines that as additional drill holes are completed in the Chisperos and NW Breccia areas, the variography should be reviewed, in detail, and adjustments made to both the grade estimation parameters and to the methodology for determining Mineral Resource categories. ***Low Risk***

- **Risks to Mine Planning:** The author opines that the overall grade and tonnage estimates are probably reasonable for mine planning based on the assay statistics and variography. The current resource model will smooth out the localized variations in the grade in the Inferred areas, as the drilling density here will miss some of the highly oriented structural controls. This presents a ***Low Risk*** for pre-feasibility or feasibility mine planning work, as no Inferred Resource should be used.

14.7 RESOURCE CONCLUSIONS

The author opines that, based on a cutoff of 0.3 grams of gold per tonne, the mineral deposits covered by this review, hold approximately 51.6 Mt of Measured Mineral Resources averaging 0.49 grams of gold per tonne and 0.17% copper, and Indicated Mineral Resources of 234.2 Mt of which 132.4 Mt averages 0.48 grams of gold per tonne and 0.16% copper, and 101.8 Mt averaging 0.54 grams of gold per tonne with only traces of copper. In addition, the Project has approximately 207.9 Mt of Inferred Mineral Resources of which 70.8 Mt averages 0.43 grams of gold per tonne and 0.05% copper, and 137.1 Mt averaging 0.52 grams of gold per tonne with only minor traces of copper. These Mineral Resources conform to the definitions in the 2014 *CIM Definition Standards – for Mineral Resources and Mineral Reserves*. No reserves conforming to CIM standards have been estimated for this report, as Brazil Resources has not advanced the evaluation work to a point of developing mine plans, production schedules, and economic analysis. Also, no resources have been estimated for the mineralization at Junta, Maria Jo, Candela, and Porvenir, as an estimation would be premature at these early stage exploration projects.

The author opines that the Mineral Resource estimation database, procedures, and parameters applied at the Project to be generally reasonable and appropriate. The geological constraints were adequately considered in the estimation of the resource. The author opines that the data density requirements used for Measured, Indicated, and Inferred Mineral Resource definition are adequate and generally comparable to those used for Mineral Resource estimation for similar deposits.

Future Mineral Resource estimates should include more detailed geologic modeling and interpretation as new infill drilling increases the density of drilling within the NW Breccia and Chisperos areas.

15.0 MINERAL RESERVE ESTIMATES

No reserves conforming to CIM standards have been estimated for this report, as the Project has not advanced exploration and evaluation work to a point of developing mine plans, production schedules, and economic analysis.

16.0 MINING METHODS

As the Project is still in the exploration phase, it is premature to discuss mining methods.

17.0 RECOVERY METHODS

From a series of Locked Cycle flotation, gravity tests, and detailed cyanidation tests, the Wardell Armstrong International (WAI) test work program has identified the likely copper and gold recoveries that could be achieved from a standard two-circuit flotation plant with a small cyanidation circuit. It is the opinion of WAI and the consultants involved that sufficient metallurgical data has been produced in the Stage III metallurgical test work program for an engineering design company to carry out a preliminary process design and costing.

18.0 PROJECT INFRASTRUCTURE

Present infrastructure is suitable for the current exploration stage of the Project. No large-scale mining infrastructure is available in the area. Small-scale and artisanal mining is commonplace in the region and historically well developed at the El Zancudo Mine some 3 km north of Titiribi. Medellin, approximately 70 km northeast, is a city of 3.2 million people and has a well-developed infrastructure, including 2 airports.

A large port (Buenaventura) is located about 500 km to the west. However, based upon discussions during a previous site visit, because of the mountainous terrain to the west, port facilities to the north may be more practical. Hydroelectric power is available via the National Grid (at 500 kV) some 3 km distant from the license boundary. Local electrical infrastructure is restricted to domestic supply from a low-tension grid.

The area is well served by roads.

It is premature to discuss requirements for mine and access roads, rail, port facilities, dumpsites, power, pipelines, or leach pads and tailings facilities.

19.0 MARKET STUDIES AND CONTRACTS

The Project is not at a state where market studies and contracts are relevant.

20.0 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 ENVIRONMENTAL MANAGEMENT

Sunward initiated an active environmental monitoring program for drainage waters, vegetation, drilling fluids, erosion, meteorological data, etc. The authors had been advised that there had been no issues with the monitoring program or results and Brazil Resources is fully expected to continue this monitoring program.

Exploration drilling protocols are very strict. One month prior to the start-up of drilling, water monitoring begins. Drill platforms are to kept clean, fuels are to be properly stored, fences and barriers are to be erected to prevent against spillage, fluids are to be re-circulated, and portable toilets are to be used. Completed drill pads are reclaimed and fenced to avoid deterioration by cattle. Figure 20.1 is a photo of a reclaimed drill pad.

**Figure 20.1. Reclaimed drill site (fenced)
(Source: Behre Dolbear, 2011)**

A Weather Hawk Model 232 was installed in July 2010 and has been recording meteorological data ever since. The data will be useful in establishing baseline conditions for permitting.

There are no inherited environmental liabilities. The current environmental liabilities consist of the need to rehabilitate areas cleared of vegetation created during the construction of access roads, trails, and drill pads. All programs are covered by Environmental Management Plans that are monitored by the Regional Autonomous Environment Corporation (Corantioquia) who carry out regular site inspections. Plans were established for re-vegetation of affected areas, water monitoring, and controls for slope failure and mass movements. Once drilling has been completed at each site, reclamation is initiated, thus, limiting environmental exposure.

Upon completion of the current exploration program and subsequent resource modelling, a determination will be made concerning resource development. Baseline environmental data is required in the pursuit of permits for exploitation of natural resources and are conducted for a period of time necessary to adequately establish baseline conditions for the project area. Baseline monitoring of the environment began in November 2012 following the parameters set by the ministry, which includes the list below.

1) Surface and groundwater quality and quantity. Limited surface water quality and quantity data is being obtained for the exploration drilling project.

2) Continued meteorological monitoring including precipitation events. As previously noted, meteorological monitoring started in 2010.
3) Air quality
4) Geologic activity including seismic monitoring
5) Wildlife
6) Forestry

20.2 PERMITTING

Water concessions and a water discharge permit are needed for exploration drilling. Once a mine and reclamation plan has been established and environmental baseline data has been acquired, environmental permitting for the project can begin. The need to obtain an environmental permit is determined by the activities carried out and the impact of those activities on the environment. The Colombian National Code of Renewable Natural Resources and Protection of the Environment requires that anyone who uses natural resources must obtain a permit. Also, by Colombian decree, mining projects are required to obtain an environmental license. Licenses include permits for exploitation of natural resources, atmospheric emissions permits, forestry permits, water discharge permits, and waste disposal permits. Permits should include items such as:

1) Mining plans
2) Reclamation or closure plans
3) Land and mineral control
4) Geologic setting
5) Surface and groundwater control and protection
6) Mineral and other waste management
7) Forestry preservation
8) Environmental impact study
9) Environmental management plan

20.3 SOCIAL AND COMMUNITY IMPACT

Brazil Resources is continuing Sunward's social, community, and communications programs that are commensurate with what might be expected of a company in the exploration phase of a mining project. Their programs have, to some degree, educated the local community and surrounding areas about the exploration project. These programs have established "lines of communication" with some stakeholders in the area. The Brazil Resources staff will continue to educate the stakeholders on the progress of the exploration project.

A report titled "Evaluation of Community Relations Program" by Akicita S.A. was completed and was issued in January 2012. The report contains recommendations that were reviewed and addressed by Sunward. The recommendations address issues such as:

1) The difference between a community relations program and a donations program.
2) The community relations programs need formalization.
3) The community relations programs cannot be viewed as a charity.
4) No written work plans, documentation, or milestones exist.
5) Training and education needs to be commenced for the staff and stakeholders.
6) Potential non-governmental organizations (NGOs)/project opposition need to be addressed.
7) Governmental responsibilities need to be defined and used.
8) Leadership in community relations needs to be demonstrated by Sunward.
9) There appears to be a lack of demographic information for the towns and area.
10) The local workforce may not possess the skills or provide the numbers needed for a mining project. There will be an influx of people looking for employment when a project is developed.
11) Formal procedures, reporting, and communications systems need to be established.

Based on the Akicita S.A. recommendations, Sunward, and now continued by Brazil Resources, implemented a new approach to sustainable matters. A board level sustainability committee created a formal sustainability department consisting of environment, community relations, and health and safety departments. The community relations plan was adjusted to address recommendations made and to formalize all community relations, environmental, and health and safety issues. Preliminary issues have focused upon:

- A mine and reclamation plan that will fully address and evaluate social, community, and environmental impacts. Mining was a part of Titiribi's history. A smaller scale mining operation should be supported by existing local services, although they appear to be limited. Institutional enhancement will be required in support of any potential large-scale mining operation at Titiribi.

- Some in the community have a misunderstanding of the Project, as they think that gold mining is already occurring. Others are under the impression that the Project will be the same as other mining projects in the area and there will be minimal impact on them and their way of life.

- Other areas that would need to be addressed, if development is proposed, include:
  1) Water supply for the town and surrounding areas
  2) Sewage treatment
  3) Waste disposal
  4) Adequate housing (person-camps)
  5) Hospital and ambulance services
  6) Health issues
  7) Fire protection and rescue
  8) Law enforcement
  9) Roads and transportation
  10) Schools
  11) Manpower and training
  12) Electrical service and distribution
  13) Transient population
  14) Service industry
  15) Government services
  16) Cultural and heritage values
  17) Communications

- Formal programs commensurate with the size of any proposed mining operation will need to be established in the following areas:
  1) Community relations/community impact
  2) Public affairs/communications
  3) Government affairs
  4) Disaster recovery/Emergency response
  5) Land acquisition
  6) Site and community security
  7) Manpower recruiting
  8) Assumed NGO response

21.0 CAPITAL AND OPERATING COSTS

The Project is not at a state where capital and operating costs are determined.

22.0 ECONOMIC ANALYSIS

The Project is now at a point when a preliminary economic analysis would be meaningful. However, Brazil Resources has not, as yet, initiated such a study as they are awaiting the results of the updated resource estimations.

23.0 ADJACENT PROPERTIES

The authors are unaware of any adjacent properties, as defined by the NI 43-101.

24.0 OTHER RELEVANT DATA AND INFORMATION

All relevant data and information regarding the Project was included in other sections of this report. All of the data presented or disclosed in this report are for the properties controlled by Brazil Resources. All information in this section was taken from the 2013 NI 43-101 Technical Report. Some statements may be somewhat outdated.

24.1 COLOMBIA – GENERAL INFORMATION

- Fourth largest economy in Latin America (FMI)
- 11th coal producer world wide. (Enerdata)
- 2014 coal production 88.5 m/tons and 2015 86m/tons (Year book Enerdata)
- 2015 inflation rate of 5% (CIA world fact book)
- Real GDP; 2013 at 4.9%, 2014 at 4.4% and 2015 at 3.1% (CIA world fact book)
- Direct foreign investment; 2014 – US$16.325 billion and 2015 – US$12.108 billion (WB)
- High geological potential
- Highly skilled technical and professional workforce
- Major gold deposits: La Colosa, Marmato, and Buriticá

24.2 DEMOGRAPHIC AND GEOGRAPHIC SETTING

Spain increased taxation on the colonists to fund their home-front war expenses, which led to a revolution in 1819, which saw the defeat of the Spanish, and the independent Republic of Gran Colombia was formed; it included Colombia, Ecuador, Panama, and Venezuela. By the early 20th Century, all of the original partners had withdrawn from the association, and in 1905, Colombia became a sovereign state. In recent history, the country has experienced unrest in the form of political assassinations, internal governmental conflicts, guerrilla activities, and drug wars; however, free elections have been continuously held and smooth transitions to new governing parties are a tradition.

On August 25, 2016, "The Colombian government and the FARC announce that we have reached a final, full and definitive accord… on ending the conflict and building a stable and enduring peace." The two sides said in a joint statement read out in Havana by Cuban diplomat Rodolfo Benitez. Colombian President Juan Manuel Santos stated that the deal would be put to a decisive referendum on October 2, 2016. Colombians rejected the peace deal with FARC by a razor-thin margin of 50.21% to 49.78% in sharp contrast to pre-election polls. Colombian President Juan Manul Santos vowed to press ahead with peace talks with FARC and stated that the ceasefire is expected to remain in place; negotiations are continuing in Havana, Cuba; and his counterpart, FARC leader Rodrigo Londoño Echeverri, agreed that the referendum result would not sway the former rebels from the path of peace.

Colombia has a total area of approximately 1,138,910 km^2 with an estimated population of around 47 million. It is located at the northwestern corner of South America, and bordered by Venezuela, Brazil, Péru, Ecuador, and Panama and has coastline along both the Caribbean Sea and Pacific Ocean.

The geography of Colombia consists of the Caribbean and Pacific lowlands, the eastern Amazon lowlands that extend to its borders with Brazil and Venezuela, and the western third of Colombia that is crossed by 3 rugged and rocky parallel ranges of the Andés Mountains, namely the Eastern, Central, and Western Cordilleras with the highest point some 5,775 meters above sea level. These elevations are the source of the most significant rivers in Colombia, including the Cauca, Magdalena, and Putumayo. The Cauca and Magdalena (which flow northward) separate the 3 principal Andéan Mountain ranges, draining into the Caribbean Sea. The project areas of Titiribi are close to the Cauca River and provide transport possibilities.

24.3 COLOMBIAN PHYSIOGRAPHY

Colombia can be divided into four geographic regions: the Andéan highlands, consisting of the three Andéan ranges and intervening valley lowlands; the Caribbean coastal lowlands; the Pacific coastal lowlands (separated from the Caribbean lowlands by swamps at the base of the Isthmus of Panama); and Eastern Colombia, a great plain that lies to the east of the Andés, including the Amazon portion of the country. The majority of the population is concentrated in the Andéan highlands and valleys. The Andéan region is the center of national political and economic power, with most of the country's population in large cities, including Bogotá, Medellin, and Cali; the three most populous. The Cauca Valley and the Antioquia highlands are perhaps the most dynamic centers of economic activity and growth.

Colombia's climate is tropical but annual precipitation is variable. Climatic differences are related to altitude and the displacement of the inter-tropical convergence zone between the two major air masses from which the northeast and southeast trade winds originate. The climate of the tropical rainforest in the Amazon region, the northern Pacific coast, and the central Magdalena valley, is marked by an annual rainfall of over 2,500 mm and annual average temperatures above 23ºC.

Temperature is directly related to elevation and average temperature decreases uniformly by about 0.6ºC per hundred meters of ascent. Popular terminology recognizes distinct temperature zones, which are sometimes referred to as *tierra caliente* or hot lands up to about 900 meters, *tierra templada* (temperate lands, corresponding to the coffee region) 900 meters to 2,000 meters, and tierra fría (cold lands) 2,000 meters to 3,000 meters above sea level.

The temperate region has moderate rainfall and temperatures between 18ºC and 24ºC. In the highlands, the capital, Bogotá, at 2,640 meters, has an average of 223 days of precipitation, an average rainfall of 1,000 mm, and mean temperature of 14ºC. The climate of the high mountain regions or *páramos*, that range between 3,000 meters and 4,600 meters, is characterized by average temperatures below 10ºC.

24.4 POLITICS AND FINANCIAL STATUS

Colombia was one of the three countries that emerged from the collapse of Gran Colombia in 1830 (the others being Ecuador and Venezuela).

Political and internal unrest has limited the economic and social development of Colombia. It has recently been recovering and is now the fourth largest economy in South America.

Real gross domestic product (GDP) has grown more than 3% per year for the past 3 years, continuing almost a decade of strong performance. Colombia depends heavily on oil exports making it vulnerable to a drop in oil prices. The U.S.-Colombia Free Trade Agreement (FTA) was ratified by the U.S. Congress in 2011 and implemented in 2012. Colombia has signed or is negotiating with FTAs with other countries including Canada, Chile, México, Switzerland, the European Union, Venezuela, South Korea, Turkey, Japan, and Israel. Poverty has been reduced from 56% in 2002 to 37% in 2010.

The government type is that of a democratic republic (executive, legislative, and judicial branches); however, the executive branch dominates government structure. The president and vice president are elected by popular vote. Three branches of power also exist at national, regional, and municipal levels.

The Government of Colombia takes place in a framework established in the Colombian Constitution of 1991 with countrywide elections every 4 years. The Colombian government is divided into 3 branches of power: the executive, legislative, and judicial with special control institutions and electoral institutions. The president of

Colombia is the highest representative of the executive branch of government and is also the head of state with supreme administrative authority. At a provincial level, the executive is managed by department governors and by mayors at the municipal level.

The legislative branch of government in Colombia is represented by the National Congress of Colombia, which is formed by an Upper House, the Senate, and the Chamber of Representatives. Bicameral Congress "*Congreso*" consists of the Senate "*Senado.*" It has 102 seats and members elected by popular vote to serve 4-year terms.

The House of Representatives, "*Camara de Representantes*," holds 166 seats and members are elected by popular vote to serve 4-year terms.

At a provincial level, the legislative branch is represented by department assemblies and at the municipal level with municipal councils. Both the legislative and executive branches share most of the government power while the judicial branch of Colombia functions as an independent body from the other two branches, which are vested with a shared power.

The Judicial branch comprises of four coequal, supreme judicial organs:

- Supreme Court of Justice "*Corte Suprema de Justical*," the highest court of criminal law. Judges are selected from the nominees of the Higher Council of Justice for 8-year terms.
- Council of State, the highest court of administrative law. Judges are selected from the nominees of the Higher Council of Justice for 8-year terms.
- Constitutional Court that guards integrity and supremacy of the constitution, rules on constitutionality of laws, amendments to the constitution, and international treaties.
- Higher Council of Justice administers and disciplines the civilian judiciary; members of the disciplinary chamber resolve jurisdictional conflicts arising between other courts. The members are elected by 3 sister courts and Congress for 8-year terms.

The Colombian legal system is based on Spanish law, with a new criminal code modeled after United States procedures enacted in 1992-1993; judicial review of executive and legislative acts.

Colombia's administrative division is based on a single capital district and 32 departments; each administrative division has a government (*Gobernación*) and the head of the government is the Governor (*Gobernador*). Each department is a compound of Municipalities and these too have their local governments (*Alcaldía*) and their head of the government is the Mayor (*Alcalde*). All of these governments are elected democratically.

This means that although there is a central government with its own national policies, there is a high degree of autonomy in the regional and local governments.

Antioquia is one of Colombia's departments and is one of the few that hold Mining Authority (for applications and registry). Although they report to ANM, the central mining entity, the Gobernación is autonomous in their decisions and procedures.

In the case of gold, the royalties generated from this mining activity are collected by either the refineries or the Central Bank and then transferred to the National General Royalties System, SGR, Sistema General de Regalias, created in 2011. From there, projects, municipalities, and the government can access it as needed for social projects. A small percentage is transferred to producing municipalities.

24.5 MINING LAWS OF COLOMBIA

Mining Code of 2010 (Law 1382) was ruled unconstitutional because it was developed without consultation with indigenous and Afro-Colombian peoples. Thus, mining in Colombia is governed by the Mining Law 685 of 2001 (Appendix 2.0). The mining authorities in Colombia are as follows.

- **Ministry of Mines and Energy (Ministerio de Minas y Energia – MME)**: The highest mining authority in the country. MME (*Ministerio de Minas y Energía*) is the principal mining authority in Colombia and is in charge of managing mining resources and formulating mining polices.

- **Mining National Agency, (Agencia Nacional de Mineria, ANM)**, created in 2012, is charged with promoting the sustainable development of the country's mineral resources, granting mining titles for the exploration and exploitation of such resources and, in coordination with the relevant environmental authorities, ensuring that all mining companies adhere to the terms of such titles and other relevant legal requirements.

- **Departmental Mining Delegations (Gobernaciones Delegadas)**: They administer mining contracts in the Departments with the most mining activity (Antioquia, is the only one that remains active in the country due to its importance).

- **Colombian Geological Service (*Servicio Geologico Colombiano* or "SGC", formerly Ingeominas)**, is responsible for performing scientific research of the sub-soil resources and administering the geological information regarding mineral resources.

- **Mining Energy Planning Unit (Unidad de Planeación Minero Energética – UPME)**: Provides technical advice to the MME regarding planning for the development of the mining and energy sector and maintains the System of Colombian Mining Information (Sistema de Información Minero Colombiano – SIMCO).

All mineral resources belong to the state and can be explored and exploited by means of concession contracts granted by the state. Under the Mining Law of 2001, there is a single type of concession contract covering exploration, construction, and mining, which is valid for 30 years and can be extended for another 20 years.

Concession contract areas are defined on a map with reference to a starting point (punto arcifinio) and distances and bearings or map coordinates.

A surface tax (canon superficial) has to be paid annually, in advance, during the exploration and construction phases of the concession contract. This is defined by the number of hectares in the concession. At Titiribi, there are 3,919 hectares and the tax is set as 0.75 minimum wage per hectare per year for years 1 to 5 (about US$6.72); 1.25 minimum daily wages per hectare per year for years 5 to 7 (about US$11.20); and 1.0 minimum daily wages per hectare per year for year 8 to 11 (about US$17.92). The minimum daily wage in 2010 was COP17,166.67, which, at the then present exchange rate of COP1,915 = US$1.00 (1 April 2010), was about US$8.96. The current conversion is approximately COP2,970 to US$1.00 (September 2, 2016). The minimum daily wage is adjusted annually 2016, COPO$22.982 – daily, hence US7.73.

The application process for a concession contract is as follows.

1) Application submitted. The application form costs COP500,000 (about US$260).

2) Within three days, required documents have to be presented for technical study by the mining authority to determine whether there is any overlap with other contracts or applications and validity of documents. The applicant is notified.

3) The contract made and notified for signature and with it the applicant obtains and present the environment policy and the contract is inscribed in the National Mining Registry (Registro Minero Nacional – RMN).

4) Once that is ready, within a week or so, a liquidation of surface tax is officialized to be paid by the applicant that has to be presented.

The concession contract has three phases.

1) **Exploration Phase**
   - Starts once the contract is registered in the National Mining Registry
   - Valid for 3 years plus up to 4 extensions of 2 years each, for a maximum of 11 years
   - Annual surface tax
   - Requires an annual Environmental Mining Insurance Policy for 5% of the value of the planned exploration expenditure for the year
   - Present a mine plan (PTO) and an Environmental Impact Study (Estudio de Impacto Ambiental or EIA) for the next phase

2) **Construction Phase**
   - Valid for 3 years plus a 1-year extension
   - Annual surface tax payments continue as an Exploration Phase
   - Requires an annual Environmental Mining Insurance Policy for 5% of the value of the planned investment, as defined in the PTO for the year
   - Environmental License issued on approval of the Environmental Impact Study

3) **Exploitation Phase**
   - Valid for 30 years minus the time taken in the exploration and construction phases and is renewable for 30 years
   - Annual Environmental Mining Insurance Policy required
   - No annual surface tax
   - Pay royalty based on regulations at the time of granting of the Contract

Royalties payable to the state are 4% of gross value at the mine mouth for gold and silver and 5% for copper (Law 141 of 1994, modified by Law 756 of 2002). For the purposes of royalties, the gold and silver price is 80% of the average of the London afternoon fix price for the previous month.

The most important changes in the Mining Law, since 2010, are:

- The exploration phase can now be up to 11 years, rather than 5 years.

- The contract length is 60 years (30 years + 30 year extension) and additional preference to the contract for another 60 years.

- The surface tax is the same for all sizes of concession and increases from Year 6.

- The surface tax for Year 1 has to be paid since the day of registration of the contract at the National Mining Registry.

- Once an application or contract is dropped or expires for whatever reason, the area does not become free for taking again for a period of 30 days.

The Mining Law of 2001 allows for mining titles granted under previous laws to continue to be governed by the terms of the previous laws, including Decree-Law 2655 of 1988. In addition, applications made under the 1988 Mining Law can continue the application process under the terms of the old law and be granted a license under the 1988 Law. Under the 1988 Law, an exploration license is issued for 2 years and is renewable for 1 year. This is followed by an exploitation license that is valid for 10 years and may be renewed for another 10 years. A more detailed overview of the Colombian Mining Law was presented in the 2011 and 2012 NI 43-101 Technical Reports.

24.6 ENVIRONMENTAL REGULATIONS AND LIABILITIES

The Mining Law 685 of 2001 requires an Environmental Mining Insurance Policy for each concession contract. In addition, the Law states that an Environmental Impact Study (EIA) has to be presented at the end of the Exploration Phase, if the concession is to proceed to the Construction Phase. The EIA must be approved and an Environmental License issued before the Exploitation Phase can begin, subject to an Environmental Management Plan ("Plan de Manejo Ambiental" or "PMA"). In addition, exploitation requires a Permit for Springs, Forest Use Permit, Certificate of Vehicular Emissions, Emissions Permit, and River Course Occupation Permit.

Exploration activities require an Environmental Management Plan (PMA) and a Surficial Water Concession.

Under Colombian mining and environmental laws, Brazil Resources is responsible for any environmental remediation and any other environmental liabilities, based on actions or omissions occurring from and after the entry into force and effect of the relevant concession contract, exploration license, or mining request, as applicable, even if such actions or omissions occurred at a time when a third party was the owner of the relevant mining title. On the other hand, Brazil Resources is not responsible for any such remediation or liabilities based on actions or omissions occurring before the entry into force and effect of the relevant concession contract, exploration license, or mining request, as applicable, from historical mining by previous owners and operators, or based on the actions or omissions of third parties who carry out activities outside of the mining title (such as illegal miners).

24.7 COLOMBIAN LABOR LEGISLATION – MAIN ASPECTS

The concept of salary in Colombia is quite broad, as the law sets forth a general principle with certain illustrative examples, but the provision is basically a catch-all. Salary is defined as not only the ordinary remuneration, fixed, or variable, but everything the worker receives in money or in kind, as direct compensation for his/her services, regardless of the form or name given to it.

There is no legal provision establishing special salary levels, except for the minimum wage. The current minimum wage for 2016 is COP$689.455 plus a transportation allowance of COP$77.7 (which by law is a constituent part of the salary).

In practice, subject to the minimum wage, salary levels depend on the criteria of the employer, the quality of the employee, and, in general terms, on the specific characteristics of the activity (such as the average salary levels applicable in the region for like services).

The monthly salary normally covers the employee for his services rendered during the ordinary work day. In general, the legal maximum duration of the ordinary work day is 8 hours per day, 48 hours per week. Exceptionally, overtime work is permitted in some instances, but must be paid with a surcharge.

Labor regulation in Colombia is complex and requires a thorough analysis. In summary, the law allows two types of labor contract; direct and indirect contracts.

24.7.1 Direct Contracts

Direct contracts, where the company hires personnel directly, can be for a fixed period, indefinite term, and for the term of a specific task or job. Contracts can be verbal or in writing, but in the case of a definite term contract, it has to be in writing and signed by both parties.

The integral salary is a salary that not only compensates for ordinary services, but also pays in advance all social benefits (including semester bonus, severance pay, and interest on severance pay), allowances, work on Sundays and Holidays, and in general, whatever payment or benefit in money or kind expressly identified in the agreement, as included in the integral salary payment, which the employee would otherwise receive separately. This integral salary is only applicable, if agreed, to persons who have a monthly salary not below 10 times the minimum legal monthly wage.

24.7.2 Indirect Contracts

Indirect contracts are where the company hires personnel through a third party.

Temporary Services/Employment Agencies: Companies can contract temporary services only when exceptional and "temporary" circumstances arise. Outsourcing companies charge a fee on top of the salary and other social payments.

Companies can only hire temporary services in the following cases: occasional, accidental, or transitory laborers for less than 1 month; to replace personnel in holidays, sick, or maternity leave, and, when increases in production, transport, and sales occur (this can last for 6 months and extend for an additional 6 months).

It is important to note that if the company hires personnel outside the specific cases, the company can be liable for fines and lawsuits.

Outsourcing: These companies provide their own personnel to companies that request it, but the outsourcing company is the real employer, they only provide the service of providing personnel.

Independent Contractors: The definition of an independent contractor (and therefore true employers) is when an entity (person or legal) contracts in benefit of a third party, the carrying-out of a task or service, assuming all risks. In order to be qualified as a true independent contractor, this independent contractor should perform in an independent way, with complete technical, management, and financial autonomy to carry out the work with his/her own means.

This type of contract is used due to lower costs but must follow the above criteria in order to avoid the contractor becoming an intermediary and the company becoming legally liable for the employee, as if they were the real employer.

Cooperatives: The associated work cooperative scheme is an autonomous association of people that have been voluntarily united to carry out an activity in a fair and satisfactory manner. Based on these values, they form a company of mutual ownership and democratic principles. Their main characteristics are collective association enterprise of civil rights, non-profitable with social vocation, limited responsibility, and with a variable number of associates.

Associated work cooperatives follow a different labor regime from Colombian standard labor regime. The main difference is that workers are not just workers or affiliates, but also owners of the cooperative and as such, they cannot form Unions; they can stop working in a given post, when required, instead of following Colombian dismissal scheme (times and compensation), and they can have a scheme of basic pay and incentive pay (this latter does not constitute salary).

After analyzing the different contract options, it is believed that the cooperative is the most efficient way to contract mine workers.

24.7.3 Social Benefits

Colombian labor law requires the employer to pay to the employee a number of mandatory benefits, called social benefits, which are the minimum payable to employees. There are some 12 types of social payment.

Severance Pay and Interest (12%) on Severance Pay: This is included in the monthly salary for those employees with an integral salary. In general terms, the severance pay is equivalent to one month of salary for each year of service and proportionally for fractions of a year.

Semester Bonus: This is included in the monthly salary for those employees with an integral salary. This benefit is equivalent to 15 days of salary payable to the employee on the last day of June of each year; and 15 days of salary payable to the employee within the first 20 days of December of each year, both payable in proportion to the time worked during the respective calendar semester.

Protective Clothing Supply: Employees, with a monthly salary that does not exceed the value of two times the monthly minimum wage, are entitled to receive from the employer, every four months, dress and footwear appropriate for their labor.

Vacation: This benefit is equivalent to 15 consecutive work days of paid vacation per each year of service. Upon termination, the employee is entitled to receive compensation for the vacation that the employee may have pending on the basis of 15 work days of salary for each full period of pending vacations and proportionally for fractions of a year.

Transportation Subsidy: For 2013, it is equal to a monthly sum of COP$70,500. Applicable for employees that have a monthly salary that does not exceed the value of two times the legal monthly minimum salary. It constitutes a salary.

Family Subsidy: The employers contribute every month to family subsidy institutions, 9% of their total payroll. These institutions provide several services direct to the employees and their family.

Transfer Expenses: The employer must pay the employee any reasonable re-location expenses, if the employee has to change his/her place of residence in order to take up employment with the employer or, if the contract is terminated by the employer, the employer must pay travel expenses in order for the employee to get back to his/her former living place.

Life Insurance: To be assumed by the employer, while the relevant risk is assumed by the pension entity.

Mandatory Benefits: All employees participate in the Integral Social Security Regime (ISSR) that exists in Colombia. The ISSR includes the mandatory health, professional risks, and pension programs.

Pensions: Currently, the total amount that has to be contributed each month is 16.0% of the employee's salary. Of this 16.0%, 75% is paid directly by the employer and the balance 25% is contributed by the employee.

Health: All employees shall participate with a Health Plan Entity (*Entidad Promotora de Salud* or EPS). EPS provides health coverage to the employees and their families. EPS is either private or State owned (ISS). Employees have the right to choose to which EPS they want to belong. Contributions to the EPS is paid on a monthly basis and is 12.5% of the employee's salary of which 8.5% is paid directly by the employer and 4% is contributed by the employee.

Professional Risks: Companies are obliged to participate with a Professional Liabilities Entity, which guarantees the employee general medical assistance in case of accidents or sickness caused from or derived from labor activities. Contributions to the relevant entity will depend on the risks present in the company.

24.8 MINING IN COLOMBIA

The Colombian mining industry, driven principally by oil and gas, coal, and ferro-nickel, generated some US$42.994 billion of revenue in 2011 compared to US$30.931 billion in 2010. Of this, about US$25.2 billion and US$16.0 billion were attributed to oil and gas revenues in 2011 and 2010, respectively. In 2011, this revenue represented about 13.3% of the Colombian economy, up from 12.2% the previous year. Despite the significance of the earnings potential of the mining sector, somewhat less than 1% of the total work force of the country, is employed in this section.

The Colombian 2015 mining industry, coal and ferro-nickel exports, was COP$9.24 billion reported by the Mining Ministry compared to COP$10.844 billion in 2014. This represents the 6.83% in the GDP for 2015 and 7.32% of GDP in 2014.

Large-scale coal mining is conducted at two sites in the northeast of the country.

- El Cerrejón Mine is operated by a consortium of BHP Billiton, Anglo American, and Xstrata (Glencore). It is the world's largest open pit coal mine. In 2006, it produced 27.5 Mt of coal for export and employs approximately 4,000 people, with an equal number of contractors (BHPB).

- The La Loma Mine is operated by Drummond Coal Company, as well as a port facility, which exported over 24 Mt of coal in 2005 (a 140% increase from 2000) (Drummond).

Cerro Matoso is an open pit, ferro-nickel, nickel mining, and smelting operation, owned by BHP Billiton. It is one of the world's highest-grade lateritic nickel deposits and one of the largest and lowest cost ferro-nickel producers in the world (producing approximately 17% of annual world nickel production, approximately 50,000 tonnes per annum (tpa) of ferro-nickel. The operation employs approximately 900 people and an equal number of contractors (BHPB). The mine is in decline and, having produced 50,000 tonnes in 2013, total production for 2015 is expected to fall to around 37,000 tonnes.

The country also has a large hydrocarbon production industry, including operations run by multi-nationals, such as BP, as well as the state owned Ecopetrol yielding an average of 525,100 barrels per day (bbl/day) of crude oil and 640.0 million cubic feet per day (cfd) of natural gas production.

In addition, Colombia is one of the world's prime sources of high quality emeralds, producing 9.82 million carats in 2007.

Colombia demonstrates, by far, the longest and most productive history of gold exploitation in South America, dating from both the pre-Colombian period and Spanish colonial to recent times. Gold artifacts are found the length of the Andés within Colombia, from the Tumaco and Nariño cultures near the border with Ecuador to the Tairona culture on the Caribbean coast.

Emmons, in "Gold Deposits of the World," published in 1937, estimated that some 49.0 million ounces of gold were produced between 1492 and 1937. Approximately two-thirds of all the gold produced in Colombia, during this time period, came from placer deposits.

Records available through the Colombian Banco de La Republica document production of an additional 30.0 million ounces of gold since Emmon's 1937 publication; thus, a total estimate approaching 80.0 million ounces of gold is observed (the Society of Economic Geologists) estimates it at 125.0 million ounces of gold (total to date).

Since 1985, Colombian gold production has averaged *ca.* 800,000 ounces per annum, and crested in 1986 at *ca.* 1.3 million ounces of gold. Present production generally shows a growth and decline curve that parallels that of fluctuations in the price of gold, and hence, production waned noticeably in 1998, picking up again from 2003 to the present day.

25.0 INTERPRETATION AND CONCLUSIONS

The Cerro Vetas-NW Breccia-Chisperos complex is a bulk tonnage gold and copper porphyry deposit directly related to several interconnected Cerro Vetas diorite porphyry centers but also hosted in the immediate contact aureoles and adjacent breccias. Mineralization hosted in the Cerro Vetas diorite porphyry is disseminated and fracture controlled. The principal metallic minerals are native gold, chalcopyrite, pyrite, and magnetite. Gold values within the Cerro Vetas diorite normally correlate well with copper content and magnetite. The largest diorite intrusive occurs within the Cerro Vetas zone with smaller plugs and dikes found within the NW Breccia and Chisperos zones. The diorite porphyry hosts typical porphyry copper alteration with a barren to weakly mineralized pro-grade potassic core, surrounded by a well-mineralized phyllic zone, and a thinly mineralized retrograde argillic zone. The outermost propyllitic alteration zone is widespread. Interpretation of geophysical and drill hole data suggests that potential higher-grade gold-copper zones exist as a domed contact-related shell in the intrusive where brecciated diorite with xenolithic fragments of sedimentary rocks was intercepted in drilling. This higher-grade domed shell is, at least in part, coincident with the phyllically altered intrusive-sedimentary contact breccia.

A second style of mineralization is gold-only mineralization developed in diatreme breccias in the NW Breccia and at Chisperos. Chisperos hosts gold-copper mineralization in diorite plugs and dikes, gold-only mineralization in diatreme breccia, and also hosts substantial epithermal, lower-temperature generally gold-only mineralization within parallel to sub-parallel mineralized zones that are both stratigraphically and structurally controlled and hosted in a sedimentary-volcanic sequence. The Cerro Vetas, NW Breccia, and Chisperos zones host NI 43-101-guideline-compliant resources. Exploration during 2013 discovered copper-dominant and gold-copper mineralization at the Maria Jo prospect that may be an extension of the Cerro Vetas and Chisperos zones.

Further exploration potential exists to expand the known resources at Cerro Vetas-NW Breccia-Chisperos particularly along the alignment of magnetic highs hosting the Maria Jo and Junta mineralized zones. Drilling at Maria Jo has intersected significant intervals of copper-dominant and gold-copper mineralization related to a diorite intrusive where surface exposures are lacking due to a thin veneer of post-mineral gravel. Junta hosts mineralized stock-like diorite porphyry intrusive, as does Porvenir; Candela hosts thick zones of mineralized hornfels and diorite porphyry. Margarita and Rosa are very early-stage targets.

Coring is logged and well documented. The QA/QC data is extensive; the use of standards and blanks, duplicate and check assays followed industry recognized procedures. There are some minor concerns that relate to a coarse gold-nugget effect and possible mislabeling of pulp sample envelopes.

The property warrants a Preliminary Economic Assessment (PEA) to define the next course of action.

26.0 RECOMMENDATIONS

26.1 GEOLOGIC AND EXPLORATION RECOMMENDATIONS

- The known deposits and early stage exploration projects have focused upon magnetic highs with coincident gold-copper soil anomalies. In 2012, the authors recommended a preliminary drill test at a magnetic high that did not host geochemical anomalies, along the Cerro Vetas-Junta structural zone. This recommendation resulted in the discovery of significant copper-dominant mineralization at Maria Jo. The authors recommend further drilling at Maria Jo, focused along the Cerro Vetas-Junta structural trend and over the magnetic high, which has yet to be drill tested.

- The relationship between magnetic highs, intrusive centers, and mineralization is well established. An unexplored magnetic high occurs about 700 meters southeast of the Junta magnetic high along the trend of the Cerro Vetas-Maria Jo-Junta magnetic highs. This trend suggests a common source along a controlling deep-seated structural weakness. Although there are no geochemical anomalies related to this un-named and unexplored magnetic feature, the analogy with Maria Jo, where the causative intrusive and mineralized contact aureole are covered by post-mineral gravel, is plausible. If additional geologic mapping cannot find the source of the magnetic high, the authors recommend that some initial exploration drill holes be drilled in and peripheral to the magnetic high.

- Future geologic studies focus on a more in-depth study of small-displacement faults that are not depicted on the present geologic plan and cross sectional maps, but appear to be important structural-mineralizing controls, particularly at Chisperos.

- QA/QC procedures are good; however, it is recommended, in the future, that:
  - More diligence be paid to explain outlier results on standards. There are concerns with the assay results on two gold standards. The questionable results appear to be due to the insertion of the wrong standard sample into the sample stream.
  - Outlier results (duplicate or re-assay) should be repeated, as necessary, to determine if the cause is a nugget effect, error in sample identification, etc.

26.2 RESOURCE AND MODELING RECOMMENDATIONS

- If infill drilling is contemplated at the Chisperos and the NW Breccia areas, additional variography work should be completed and the detailed three-dimensional geologic models updated.

26.3 METALLURGICAL RECOMMENDATIONS

- Comprehensive metallurgical testing of mining plan based composites needs to be completed to further develop the milling flow sheet.

- Copper concentrate marketability needs to be investigated to fully understand the effects of identified penalty elements, such as zinc and lead.

- An optimized flow sheet can be developed following the development of a base mining plan with annual head grades and ore production values. More specific costing can then be developed to match the production variables.

26.4 SOCIAL AND CULTURAL RECOMMENDATIONS

- Assuming preliminary economic assessments are positive, Brazil Resources should initiate a formal baseline environmental monitoring program. The next step would be to begin preparation of the necessary permits. A mine and reclamation plan will be needed to evaluate environmental and other impacts. Brazil Resources should seek input from Colombian governmental agencies to make sure they are informed and nothing is missed.

- If a decision is made to move forward with the Project, formalization of sustainable social and community impact programs should be established. The recommendations noted above, along with those contained in the Akicita, S.A. report, will provide a strong base for these programs. The public affairs/communications program noted above should start by bringing local, state, and Colombian officials to the Project site at the earliest time possible to educate them on the Project. Training, communications, and education are the foundation for success.

26.5 BUDGET RECOMMENDATIONS

Sunward Resources, the previous owner, undertook aggressive exploration and development programs from 2010 to 2013 totaling US$56,330,459 (Table 26.1). In the period from 2014 to present, exploration and development activities were curtailed given the commodity and equity markets at the time. In the beginning of 2016, there has been some improvement in the gold price and capital markets; however, the proposed budget for 2017 and 2018 does not include drilling; the current yearly budget totals approximately US$1.88 million per year (Table 26.2). Should there be continued improvement in the commodity and capital markets, the Company may amend this budget to include a drilling component. The focus of the current budget is to evaluate all existing data and move the Project forward in a reasonable and judicious manner. The authors of the report agree with this approach.

TABLE 26.1
2016 TITIRIBI BUDGET EXPENDITURES AND HISTORIC EXPENDITURES
(US$)

2009	2010	2011	2012	2013	2014	2015	2016[1]
1,437,245	8,475,630	16,264,975	16,271,941	15,317,913	3,624,488	1,573,676	890,065

[1]Forecast 2016 Expenditures

TABLE 26.2
TITIRIBI PROPOSED 2017 AND 2018 BUDGETS
(US$)

	2017	**2018**
Vancouver		
G&A	750,000	750,000
Investor Relations	250,000	250,000
Subtotal Vancouver	**1,000,000**	**1,000,000**
Colombia		
Assaying	50,000	50,000
Camp Cost	160,000	160,000
Drilling	-	-
Fuel and Transportation	15,000	15,000
Land Access	-	-
Legal	30,000	30,000
Medellin Cost	100,000	100,000
Consultants	150,000	150,000
Staff Cost	265,000	265,000
Taxes	45,000	45,000
Sustainability	40,000	40,000
Investor Relations	25,000	25,000
Subtotal Colombia	**880,000**	**880,000**
Grand Total	**1,880,000**	**1,880,000**

A brief discussion on key budgetary items follows:

- **Salaries:** Environmental and permitting regulations are manpower intensive operations and require several employees and consultants to be compliant.

- **Taxes:** There are many taxes imposed on roughly the same base, the wage bill or payrolls of firms. These taxes include contributions for social security, an apprenticeship charge (or Learning Quota), and the para-fiscals. The latter are used to finance the Servico Nacional de Aprendizaje (SENA), Instituto Colombiano de Bieneestar Familiar (ICBF), and the Cajas de Compensacion.

- **Consultants:** A number of consultants across a range of aspects including health and security, accounting, legal, public relations, and technical issues are used on an ongoing basis.

The authors agree with and recommend a detailed study of all technical, environmental, and social issues to determine the best course of action in moving the Project forward.

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DATE AND SIGNATURE PAGE

Respectfully submitted, this 28th day of October 2016.

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Joseph A. Kantor, M.Sc., MMSA 01309QP

Robert Cameron

Robert E. Cameron, Ph.D., MMSA 01357QP

CERTIFICATE OF AUTHOR

JOSEPH A. KANTOR, M.Sc., MMSA QP

I, Joseph A. Kantor, M.Sc., MMSA Geology QP #01309, of 6608 Ivy Street, Anacortes, Washington, USA, certify that:

1) I am an independent consulting geologist providing exploration services to the mineral exploration community.
2) I graduated from Michigan Technological University with a B.S. degree in Geology in 1966 and an M.S. degree in 1968.
3) I am a member of the Society for Mining, Metallurgy and Exploration, Inc. and a Qualified Professional (QP) Member of the Mining and Metallurgical Society of America, QP Member #01309 – Geology.
4) I have practiced my profession continuously since 1966 and have been involved in projects and evaluations exploring for precious and base metals in the United States, Canada, China, México, Kazakhstan, Mongolia, Péru, and elsewhere. As a result of my experience and qualifications, I am a Qualified Professional, as defined by the Canadian National Instrument 43-101 *Standards of Disclosure for Mineral Properties* ("NI 43-101") and am a Qualified Person (Professional) for this Instrument.
5) I have read the definition of "qualified person" as set out in the 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 the NI 43-101.
6) I am responsible for the preparation of portions of Section 1.0, Section 2.0 through Section 12.0, portions of Section 13.0 and for Section 16.0 through Section 24.0, portions of Section 25.0, and Section 26.0 through Section 27.0 of the *Technical Report on the Titiribi Project, Department of Antioquia, Colombia* with an effective date of 14 September 2016 (the "Technical Report").
7) I visited the Titiribi Project on July 12 through July 14, 2011, March 12 through March 13, 2012, and April 16 through April 18, 2013.
8) I have had no prior involvement with the property that is the subject of the Summary Technical Report, except for my involvement with the 2011, 2012, and 2013 NI 43-101 Technical Reports.
9) As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, my sections of the Technical Report contains all scientific and technical information that is required to be disclosed to make the report not misleading.
10) I am independent of Brazil Resources Inc., as set out in Section 1.5 of the NI 43-101.
11) I have read the NI 43-101 and the Technical Report has been prepared in compliance with the NI 43-101 and Form 43-101F1.
12) I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 28th day of October 2016.

"Signed and Sealed"

Joseph A. Kantor

Joseph A. Kantor, M.Sc., MMSA Geology 01309QP

CERTIFICATE OF AUTHOR

ROBERT CAMERON, PH.D., MMSA QP

I, Robert E. Cameron, Ph.D., MMSA QP, do hereby certify that:

1) I am a consulting resource and reserve specialist doing business as Robert Cameron Consulting at the address of 200 Dubois Street, Black Hawk Colorado, 80422, USA.
2) I am a Qualified Person – No. 01357QP of the Mining and Metallurgical Society of America.
3) I am a graduate of The University of Utah with a B.S., M.S., and Ph.D. degrees in Mining Engineering.
4) I have practiced my profession since 1977. My relevant experience for the purpose of the Technical Report (as hereinafter defined) is acting as a consulting resource and reserve specialist for 30 years specializing in the due diligence review, computerized mine design, mine optimization, geostatistical review, and resource and reserve audits of a wide variety of minerals.
5) I have read the definition of "Qualified Person" as set out in the Canadian National Instrument 43-101 *Standards of Disclosure for Mineral Properties* ("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.
6) I am responsible for preparation of Section 1.2, Section 14.0, and Section 15.0 and jointly responsible for Sections 1.0 through 28.0 of the *Technical Report on the Titiribi Project, Department of Antioquia, Colombia* with an effective date of 14 September 2016 (the "Technical Report").
7) I have personally visited the Titiribi Project on July 12 through July 14, 2011 and March 12 through March 13, 2012, and April 16 through April 18, 2013.
8) I have had no prior involvement with the properties that are the subject of the Technical Report except for my involvement with the 2011, 2012, and 2013 NI 43-101 Technical Reports.
9) I am independent of Brazil Resources, Inc., as set out in Section 1.5 of the NI 43-101.
10) I have read the NI 43-101 and the Technical Report has been prepared in compliance with the NI 43-101 and Form 43-101F1.
11) 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.
12) I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 28th day of October 2016.

"Signed and Sealed"

Robert Cameron

Robert E Cameron, Ph.D., MMSA 01357QP

APPENDIX 1.0
DRILL HOME SUMMARY – ALL HOLES DRILLED AT THE PROJECT

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
Goldfields							
DDT1	1,141,272.98	1,162,641.07	1,785.82	175	-50	159.50	5/28/1998
DDT2	1,140,855.88	1,162,622.42	1,926.75	175	-50	125.10	6/4/1998
DDT3	1,140,851.02	1,162,822.79	1,865.02	175	-50	160.50	6/8/1998
DDT4	1,140,449.80	1,162,719.99	1,920.68	175	-50	167.00	6/12/1998
DDT5	1,140,300.44	1,162,504.57	1,981.80	360	-90	132.41	6/15/1998
DDT6	1,140,102.86	1,162,352.16	1,934.49	175	-50	160.00	6/18/1998
DDT7	1,140,041.20	1,162,663.62	1,885.62	175	-50	188.00	6/21/1998
DDT8	1,139,679.05	1,162,454.96	1,962.58	175	-50	158.00	6/26/1998
DDT9	1,139,679.05	1,162,454.96	1,962.58	85	-50	149.00	7/10/1998
DDT10	1,139,734.42	1,162,701.54	1,934.54	85	-50	101.00	7/15/1998
DDT11	1,140,104.70	1,162,354.04	1,934.45	52	-50	300.00	7/23/1998
DDT12	1,140,041.26	1,162,663.55	1,885.50	52	-50	149.00	7/27/1998
DDT13	1,140,104.87	1,162,351.14	1,934.52	232	-50	150.00	8/1/1998
DDT14	1,140,455.23	1,162,627.44	1,948.47	232	-50	302.00	8/8/1998
DDT15	1,140,165.68	1,162,304.65	1,959.58	232	-45	250.00	8/19/1998
DDT16	1,140,342.08	1,162,328.77	2,021.27	232	-45	406.00	10/3/1998
Chisperos – GRL and DBGF Joint Venture							
TR1	1,141,534.77	1,162,660.84	1,633.50	270	-70	200.00	12/1/2006
TR2	1,141,536.86	1,162,658.58	1,633.41	320	-55	197.00	12/5/2006
TR3	1,141,535.48	1,162,658.35	1,633.47	230	-55	152.85	12/12/2006
TR4	1,141,533.60	1,162,802.33	1,652.10	270	-60	200.00	1/11/2007
TR5	1,141,531.51	1,162,806.75	1,652.10	315	-60	295.00	2/18/2007
TR6	1,141,438.44	1,162,909.04	1,655.84	263	-60	161.15	2/28/2007
TR7	1,141,438.06	1,162,906.48	1,655.88	360	-70	185.15	3/8/2007
TR8	1,141,437.47	1,162,900.90	1,656.14	90	-80	191.50	3/17/2007
TR9	1,141,440.04	1,162,900.32	1,656.18	180	-60	200.00	3/27/2007
TR10	1,141,307.17	1,162,520.31	1,785.00	360	-60	304.20	4/17/2007

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
TR11	1,141,309.84	1,162,519.43	1,784.84	180	-60	301.45	5/4/2007
TR12	1,141,308.79	1,162,515.75	1,785.07	270	-60	322.10	5/14/2007
TR13	1,141,316.60	1,162,642.18	1,763.52	270	-75	400.40	5/31/2007
Cerro Vetas – GRL and DBGF Joint Venture							
CV001	1,140,153.33	1,161,950.45	2,103.80	360	-60	497.70	7/14/2007
CV002	1,140,154.42	1,161,951.44	2,103.81	245	-60	364.65	8/4/2007
CV003	1,140,153.00	1,161,946.88	2,103.83	45	-50	685.00	9/7/2007
CV004	1,140,106.79	1,162,353.09	1,934.59	232	-70	450.00	5/5/2008
CV005	1,140,106.55	1,162,352.92	1,934.57	232	-50	300.00	5/17/2008
CV006	1,140,134.70	1,162,430.89	1,927.52	232	-70	450.00	5/29/2008
CV007	1,140,134.45	1,162,430.67	1,927.50	232	-50	300.00	5/13/2008
CV008	1,140,400.24	1,162,443.13	2,005.39	232	-70	350.00	7/30/2008
CV009	1,140,399.95	1,162,442.82	2,005.39	232	-50	450.70	8/8/2008
CV010	1,140,104.60	1,162,358.18	1,934.38	52	-77	400.00	8/15/2008
CV011	1,140,101.68	1,162,355.17	1,934.37	232	-85	400.50	8/22/2008
CV012	1,140,181.42	1,162,534.94	1,921.95	232	-50	400.00	8/29/2008
CV013	1,140,457.75	1,162,658.22	1,938.67	232	-60	400.00	9/21/2008
CV014	1,140,462.79	1,162,260.43	2,099.34	232	-50	400.00	10/11/2008
CV015	1,140,426.80	1,162,304.51	2,074.18	232	-50	429.55	9/13/2008
CV016	1,140,355.81	1,162,101.75	2,074.38	60	-50	300.00	10/17/2008
CV017	1,140,350.10	1,162,464.73	2,006.24	232	-50	400.00	9/30/2008
CV017E	1,140,350.10	1,162,464.73	2,006.24	232	-50	995.50	10/10/2010
CV018	1,140,238.85	1,162,617.60	1,963.72	232	-56	1,031.80	6/11/2010
CV019	1,140,290.62	1,162,600.63	1,937.46	232	-60	1,047.35	7/23/2010
CV020	1,140,602.34	1,162,646.68	1,928.56	232	-58	887.20	8/12/2010
CV020A	1,140,602.53	1,162,646.96	1,928.53	232	-58	360.00	8/12/2010
CV021	1,140,188.04	1,162,699.71	1,960.54	232	-60	1,059.70	8/22/2010
CV022	1,140,128.58	1,162,792.20	1,930.20	232	-60	1,073.50	9/7/2010
CV023	1,140,130.93	1,162,792.16	1,930.12	52	-50	500.00	10/3/2010

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
CV024	1,140,628.23	1,162,414.96	2,040.33	232	-60	1,244.26	11/1/2010
CV025	1,140,353.63	1,162,465.91	2,006.21	52	-60	401.00	10/24/2010
CV026	1,140,197.75	1,162,336.31	1,976.51	232	-45	657.00	10/27/2010
CV027	1,140,377.80	1,162,588.17	1,941.26	232	-60	1,025.40	11/22/2010
CV028	1,140,287.49	1,162,269.38	2,041.33	232	-50	922.20	11/23/2010
CV029	1,140,651.18	1,162,177.78	2,003.61	232	-70	369.05	11/19/2010
CV030	1,140,433.40	1,162,052.85	2,037.98	232	-60	1,014.30	27/01/2011
CV031	1,140,090.40	1,162,868.40	1,909.99	232	-60	850.90	16/01/2011
CV032	1,140,642.96	1,162,030.77	1,948.96	232	-65	1,015.00	18/1/2011
CV033	1,140,476.45	1,162,925.22	1,832.97	232	-55	1,045.00	12/2/2011
CV034	1,140,060.92	1,162,966.14	1,873.19	232	-60	941.50	24/02/2011
CV035	1,140,646.62	1,161,851.33	1,931.05	232	-60	808.55	6/2/2011
CV036	1,140,331.11	1,162,186.50	2,112.94	232	-50	828.29	3/3/2011
CV037	1,140,219.38	1,162,653.22	1,963.55	142	-60	700.00	26/03/2011
CV038	1,140,401.75	1,162,444.42	2,005.39	142	-60	692.50	26/03/2011
CV039	1,139,679.01	1,162,452.91	1,962.78	142	-50	950.00	26/05/2011
CV040	1,140,179.88	1,162,064.85	2,134.10	322	-51	873.50	11/6/2011
CV041	1,139,626.18	1,162,525.13	2,019.68	142	-70	357.20	18/06/2011
CV042	1,140,100.63	1,162,005.05	2,134.22	322	-60	783.00	30/06/2011
CV043	1,139,552.00	1,162,278.00	2,085.00	142	-50	492.00	2/7/2011
CV044	1,140,013.00	1,162,023.00	2,117.00	322	-50	600.00	14/07/2011
CV045	1,140,612.00	1,162,139.00	1,988.00	142	-60	324.60	27/07/2011
CV046	1,140,261.00	1,162,144.00	2,110.00	322	-50	816.50	7/8/2011
CV047	1,139,889.00	1,161,880.00	2,142.00	142	-50	710.50	18/08/2011
CV048	1,140,260.00	1,162,134.00	2,110.00	142	-50	300.80	17/08/2011
CV049	1,140,141.00	1,162,038.00	2,117.00	322	-50	670.00	6/9/2011
CV050	1,139,889.00	1,161,880.00	2,142.00	322	-50	506.50	31/08/2011
CV051	1,139,488.00	1,161,735.00	2,106.00	142	-50	462.30	23/09/2011
CV052	1,140,141.00	1,162,038.00	2,117.00	142	-50	500.00	20/09/2011
CV053	1,140,226.00	1,162,116.00	2,107.00	322	-50	731.50	10/10/2011

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
CV054	1,139,731.00	1,162,707.00	1,931.00	142	-50	964.50	25/10/2011
CV055	1,140,222.00	1,162,116.00	2,107.00	142	-55	724.00	27/10/2011
CV056	1,140,294.00	1,162,815.00	1,870.00	142	-50	495.40	9/11/2011
CV057	1,139,830.00	1,162,740.00	1,921.00	142	-50	1,208.50	26/11/2011
CV058	1,140,304.00	1,162,163.00	2,103.00	322	-50	744.70	14/11/2011
CV059	1,140,612.00	1,162,139.00	1,988.00	322	-50	832.30	15/12/2011
CV060	1,140,304.00	1,162,163.00	2,103.00	142	-55	507.50	28/11/2011
CV061	1,139,853.00	1,162,581.00	1,937.00	142	-55	953.00	16/1/2012
CV062	1,140,342.00	1,162,183.00	2,098.00	322	-50	902.00	13/1/2012
CV063	1,140,549.00	1,162,144.00	2,007.00	322	-50	1,022.00	13/2/2012
CV064	1,140,451.00	1,162,362.00	2,047.00	230	-60	1,000.00	11/2/2012
CV065	1,140,342.00	1,162,183.00	2,098.00	142	-55	578.50	26/1/2012
CV066	1,140,460.00	1,162,286.00	2,084.00	322	-50	886.60	21/2/2012
CV067	1,139,848.00	1,162,579.00	1,937.00	230	-85	1,006.80	9/2/2012
CV068	1,140,219.00	1,162,709.00	1,933.00	142	-50	870.30	25/2/2012
CV069	1,140,219.38	1,162,653.22	1,945.00	142	-50	497.00	20/2/2012
CV070	1,140,376.00	1,162,221.00	2,087.00	322	-50	1,245.50	14/2/2012
CV071	1,140,063.00	1,162,535.00	1,938.00	142	-50	904.00	28/2/2012
CV072	1,140,504.00	1,162,127.00	2,018.00	322	-50	1,041.60	10/3/2012
CV073	1,140,378.00	1,162,220.00	2,087.00	142	-55	1,041.20	26/2/2012
CV074	1,140,373.75	1,162,210.61	2,106.00	142	-55	417.00	26/2/2012
CV075	1,140,487.23	1,162,291.08	2,097.00	322	-50	833.30	2/3/2012
CV076	1,140,307.15	1,162,457.54	1,982.00	142	-50	707.15	18/3/2012
CV077	1,140,180.86	1,162,625.73	1,938.00	142	-50	1,000.00	17/3/2012
CV078	1,140,402.62	1,162,243.91	2,100.00	322	-50	990.00	11/3/2012
CV079	1,140,020.28	1,162,526.56	1,966.00	142	-50	60.00	3/3/2012
CV079A	1,140,017.79	1,162,524.68	1,967.00	142	-50	872.00	19/3/2012
CV080	1,140,420.93	1,162,061.91	2,037.00	322	-55	1,021.10	8/4/2012
CV081	1,140,372.32	1,162,045.82	2,054.79	322	-55	508.60	23/3/2012
CV081E	1,140,372.32	1,162,045.82	2,054.79	322	-55	633.90	2/5/2012

Table A1.1
Summary List of All Titiribi Project Drilling Through February 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
CV082	1,140,252.05	1,161,947.91	2,044.00	322	-57	1,038.10	14/04/2012
CV083	1,140,088.98	1,162,570.97	1,916.00	142	-50	878.30	1/4/2012
CV084	1,140,016.77	1,162,528.43	1,968.00	322	-50	666.40	30/3/2012
CV085	1,140,358.54	1,161,984.89	2,012.00	322	-50	1,106.70	16/4/2012
CV086	1,140,000.68	1,162,476.78	1,957.00	142	-50	457.30	18/4/2012
CV087	1,140,295.27	1,161,973.29	2,026.00	322	-55	1,000.35	16/5/2012
CV088	1,140,306.25	1,162,391.53	1,987.00	142	-60	677.65	22/4/2012
CV089	1,140,004.87	1,162,474.50	1,954.00	322	-50	621.00	3/5/20102
CV090	1,140,275.28	1,162,342.07	1,992.00	142	-55	483.80	15/5/2012
CV091	1,140,462.69	1,162,089.42	2,024.00	322	-60	1,049.70	31/5/2012
CV092	1,139,964.06	1,162,439.49	1,970.00	142	-50	803.30	24/5/2012
CV093	1,140,193.22	1,162,352.11	1,974.00	142	-50	515.20	4/6/2012
CV094	1,140,540.23	1,162,325.11	2,096.00	322	-50	919.05	13/6/2012
CV095	1,140,052.15	1,162,973.26	1,872.00	142	-50	801.30	12/6/2012
CV096	1,139,943.22	1,162,482.12	1,997.00	45	-85	1,004.00	12/6/2012
CV097	1,140,015.22	1,162,295.12	1,947.00	142	-60	673.20	22/6/2012
CV098	1,140,197.23	1,162,545.11	1,932.00	142	-80	988.60	8/7/2012
CV099	1,140,264.00	1,162,515.00	1,975.50	142	-60	250.00	26/1/2013
CV100	1,140,297.00	1,162,542.00	1,970.00	142	-55	250.00	1/30/2013
CV101	1,140,370.00	1,162,570.00	1,961.00	142	-65	300.00	2/8/2013
CV102	1,140,193.00	1,162,411.00	1,934.00	142	-55	200.00	2/14/2013
Sunward – Chisperos							
CP001	1,141,531.07	1,162,800.44	1,652.30	205	-50	365.50	3/31/2010
CP002	1,141,570.48	1,162,901.15	1,609.49	205	-50	331.90	4/10/2010
CP003	1,141,416.84	1,162,831.48	1,677.83	205	-50	500.30	4/25/2010
CP004	1,141,470.00	1,162,949.44	1,637.51	205	-50	501.70	5/16/2010
CP005	1,141,306.08	1,162,871.15	1,712.83	205	-50	500.40	5/6/2010
CP006	1,141,329.55	1,162,980.43	1,686.46	205	-50	500.60	6/5/2010
CP007	1,141,230.59	1,162,982.65	1,732.01	205	-50	301.00	6/2/2010
CP008	1,140,915.67	1,162,889.93	1,848.08	205	-50	339.90	6/17/2010

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
CP009	1,141,011.33	1,162,833.45	1,843.66	205	-50	241.56	6/23/2010
CP009B	1,141,010.87	1,162,832.97	1,843.76	205	-50	714.00	9/8/2010
CP010A	1,141,052.65	1,162,993.03	1,795.91	205	-60	271.80	7/1/2010
CP011	1,141,292.16	1,162,569.31	1,779.73	205	-60	317.30	7/10/2010
CP012	1,141,434.69	1,162,558.86	1,698.82	205	-60	245.50	8/10/2010
CP013	1,141,049.14	1,162,045.88	1,846.61	205	-60	563.20	12/3/2010
CP014	1,141,225.00	1,162,847.00	1,738.00	205	-50	545.30	11/11/2011
CP015	1,141,169.00	1,162,880.00	1,782.00	205	-50	612.10	29/11/2011
CP016	1,141,565.00	1,162,750.00	1,632.00	205	-50	208.50	11/12/2011
CP017	1,141,127.00	1,162,956.00	1,777.00	205	-50	668.60	15/12/2011
CP018	1,141,501.00	1,162,596.00	1,652.00	205	-50	190.60	18/1/2012
CP019	1,141,097.00	1,162,881.00	1,802.00	205	-50	677.10	26/1/2012
CP020	1,141,449.00	1,162,756.00	1,672.00	205	-50	273.70	22/1/2012
CP021	1,141,505.00	1,162,763.00	1,647.00	205	-60	214.60	21/2/2012
CP022	1,141,399.00	1,162,915.00	1,662.00	205	-50	509.70	4/2/2012
CP023	1,140,959.00	1,163,001.00	1,823.00	205	-50	682.00	14/2/2012
CP024	1,141,026.00	1,162,742.00	1,890.00	205	-50	635.60	15/2/2012
CP025	1,141,320.00	1,162,771.00	1,724.00	205	-50	662.90	22/2/2012
CP026	1,141,004.00	1,162,988.00	1,807.00	205	-50	737.20	5/3/2012
CP027	1,141,163.00	1,162,717.00	1,812.00	205	-50	664.20	4/3/2012
CP028	1,141,230.25	1,162,745.85	1,771.00	205	-50	736.90	11/3/2012
CP029	1,140,899.64	1,162,444.46	2,030.58	205	-60	497.00	27/3/2012
CP030	1,141,160.67	1,162,583.86	1,842.00	205	-50	617.50	22/3/2012
CP031	1,141,516.32	1,162,918.80	1,618.00	205	-50	301.15	24/3/2012
CP032	1,141,248.87	1,162,640.45	1,791.57	205	-50	317.80	21/3/2012
CP033	1,141,343.68	1,162,552.45	1,756.96	205	-50	734.20	13/4/2012
CP034	1,140,929.80	1,162,776.72	1,873.00	205	-50	709.70	12/4/2012
CP035	1,140,815.75	1,162,412.00	2,043.00	205	-60	664.90	21/4/2012
CP036	1,140,843.02	1,162,628.70	1,926.85	205	-45	516.40	27/4/2012
CP037	1,141,391.99	1,162,669.68	1,706.02	205	-50	638.10	6/5/2012

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
CP038	1,140,942.51	1,162,579.13	1,959.00	205	-60	478.60	15/5/2012
CP039	1,140,726.30	1,162,647.14	1,926.03	205	-65	717.30	20/5/2012
CP040	1,141,222.81	1,162,991.43	1,731.00	142	-70	550.70	18/5/2012
VR001	1,140,954.00	1,162,691.00	1,920.00	205	-50	500.00	7/22/2010
VR002	1,141,184.00	1,162,618.00	1,827.00	205	-60	351.45	7/17/2010
VR003	1,141,127.68	1,162,776.95	1,817.77	205	-50	637.50	8/3/2010
VR004	1,140,797.88	1,162,655.75	1,915.28	205	-50	377.00	7/30/2010
VR005	1,140,664.00	1,162,636.00	1,935.00	205	-60	1,325.69	9/14/2010
VR006	1,140,868.00	1,162,507.00	1,980.00	205	-60	668.40	10/1/2010
VR007	1,140,986.81	1,162,470.73	2,040.21	205	-54	603.80	10/27/2010
VR008	1,140,990.53	1,162,473.46	2,039.86	180	-75	482.00	11/12/2010
Sunward – Candela							
CA001	1,139,974.95	1,160,764.25	1,873.03	60	-50	300.00	11/12/2008
CA002	1,140,440.37	1,161,225.74	2,017.67	258	-50	200.00	11/29/2008
CA003	1,140,440.28	1,161,225.84	2,017.70	258	-70	250.00	12/6/2008
CA004	1,140,591.38	1,161,321.29	1,986.75	205	-50	888.10	22/03/2011
CA005	1,140,162.33	1,161,124.78	2,074.22	322	-50	905.00	29/04/2011
CA006	1,140,165.54	1,161,123.23	2,074.22	25	-50	581.00	12/5/2011
CA007	1,139,874.58	1,161,199.00	2,001.40	142	-50	563.60	1/6/2011
CA008	1,140,033.00	1,160,974.00	1,977.00	142	-50	325.50	11/6/2011
CA009	1,140,043.00	1,160,849.00	1,920.00	142	-45	218.20	18/06/2011
CA010	1,139,884.00	1,161,017.00	1,923.00	322	-45	350.00	21/07/2011
CA011	1,140,224.00	1,161,035.00	2,072.00	322	-50	708.45	10/9/2011
CA012	1,140,078.00	1,161,058.00	2,009.00	322	-50	644.40	17/10/2011
CA013	1,139,841.00	1,161,261.00	1,992.00	52	-78	565.50	25/11/2011
CA014	1,139,666.00	1,161,386.00	2,027.00	142	-55	682.00	22/1/2012
CA015	1,139,801.20	1,160,739.11	1,832.00	232	-50	60.80	15/7/2012
CA016	1,139,804.00	1,160,740.00	1,828.00	290	-50	168.00	6/8/2012
CA017	1,139,973.20	1,160,741.11	1,865.00	232	-55	158.30	15/8/2012
CA018	1,139,417.00	1,160,987.00	1,784.00	110	-50	416.60	13/9/2012

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
CA019	1,139,881.00	1,161,016.00	1,938.00	253	-50	175.40	8/10/2012
CA020	1,140,057.00	1,160,918.00	1,952.00	52	-50	304.10	24/10/2012
CA021	1,140,021.00	1,160,872.00	1,921.00	232	-50	337.30	4/11/2012
Sunward – Juntas							
JT001	1,142,624.51	1,161,198.78	1,649.00	52	-50	616.60	24/08/2011
JT002	1,142,775.01	1,161,275.92	1,658.00	232	-70	513.00	13/09/2011
JT003	1,142,586.14	1,161,396.75	1,635.00	142	-50	700.30	15/09/2011
JT004	1,142,777.39	1,161,278.97	1,658.00	52	-70	595.15	7/10/2011
JT005	1,142,734.69	1,161,504.09	1,607.00	142	-50	182.90	30/09/2011
JT006	1,142,697.64	1,161,389.47	1,607.00	142	-50	615.80	21/10/2011
JT007	1,142,777.69	1,161,276.29	1,655.00	142	-70	774.50	5/11/2011
JT008	1,142,833.38	1,161,108.07	1,710.00	322	-50	595.50	16/11/2011
JT009	1,142,774.51	1,161,278.51	1,655.00	322	-70	786.00	16/01/12
JT010	1,142,897.52	1,161,477.27	1,606.00	232	-50	601.60	9/12/2012
JT011	1,142,901.28	1,161,475.35	1,610.00	142	-50	570.30	23/1/2012
JT012	1,142,659.22	1,161,475.09	1,608.00	205	-75	687.30	10/6/2012
JT013	1,143,110.22	1,161,203.08	1,698.00	205	-75	704.70	17/6/2012
JT014	1,142,608.22	1,161,347.09	1,614.00	205	-75	527.70	26/6/2012
JT015	1,142,899.22	1,161,149.08	1,685.00	205	-75	300.00	2/7/2012
JT016	1,143,057.22	1,161,094.08	1,710.00	205	-75	300.00	15/7/2012
JT017	1,142,541.00	1,161,333.00	1,648.00	52	-70	511.10	20/9/2012
JT018	1,142,495.36	1,161,441.08	1,657.00	52	-60	423.40	21/9/2012
JT019	1,142,500.00	1,161,104.00	1,718.00	52	-70	870.60	10/10/2012
JT020	1,142,465.00	1,161,153.00	1,722.00	52	-70	777.00	12/10/2012
JT021	1,142,381.00	1,161,356.00	1,707.00	52	-70	474.70	25/10/2012
JT022	1,142,419.00	1,161,256.00	1,724.00	52	-70	461.20	27/10/2012
JT023	1,142,519.00	1,161,575.00	1,647.00	52	-70	396.60	5/11/2012
JT024	1,142,580.00	1,161,604.00	1,615.00	52	-60	230.40	8/11/2012
JT025	1,142,678.00	1,161,153.00	1,642.00	52	-60	408.80	14/11/2012

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
Sunward – Porvenir							
PR001	1,140,773.58	1,160,120.92	1,951.21	52	-50	97.40	1/4/2011
PR002	1,141,018.82	1,160,321.61	2,059.88	142	-50	98.55	26/05/2011
PR002A	1,141,018.82	1,160,321.61	2,059.88	142	-50	702.50	27/07/2011
PR003	1,141,216.00	1,160,236.00	2,025.00	232	-50	777.00	5/9/2011
PR004	1,141,151.00	1,160,295.00	2,058.00	232	-50	116.50	14/08/2011
PR004A	1,141,151.00	1,160,295.00	2,058.00	232	-50	404.05	12/9/2011
PR005	1,140,788.00	1,160,023.00	1,925.00	52	-50	644.35	2/10/2011
PR006	1,141,216.00	1,160,236.00	2,025.00	52	-50	612.00	24/09/2011
PR007	1,141,151.00	1,160,295.00	2,058.00	322	-50	657.00	9/10/2011
PR008	1,141,216.00	1,160,236.00	2,025.00	142	-50	171.30	5/10/2011
PR008A	1,141,216.00	1,160,236.00	2,025.00	142	-60	722.30	1/11/2011
PR009	1,141,304.00	1,160,302.00	2,054.00	322	-50	498.60	6/11/2011
PR010	1,141,420.00	1,160,314.00	2,094.00	322	-50	563.15	6/11/2011
PR011	1,141,060.00	1,160,578.00	2,112.00	142	-50	776.10	8/12/2011
PR012	1,140,819.00	1,160,418.00	2,063.00	142	-50	451.60	12/12/2011
PR013	1,141,051.00	1,160,411.00	2,107.00	142	-50	121.45	15/1/2012
PR014	1,141,198.21	1,160,498.10	2,051.00	232	-70	285.30	15/7/2012
PR015	1,141,177.21	1,160,239.10	2,019.00	232	-70	426.80	9/8/2012
PR016	1,141,108.00	1,160,403.00	2,109.00	232	-70	151.10	2/8/2012
PR016A1	1,141,090.00	1,160,409.00	2,110.00	232	-70	278.80	20/9/2012
PR017	1,141,269.21	1,160,315.10	2,061.00	232	-70	389.80	20/8/2012
PR018	1,141,128.21	1,160,346.10	2,076.00	232	-70	150.10	22/8/2012
PR018A	1,141,119.00	1,160,336.00	2,075.00	232	-70	397.90	6/9/2012
PR019	1,141,189.00	1,160,388.00	2,116.00	232	-70	74.60	26/9/2012
PR019A	1,141,184.00	1,160,390.00	2,117.00	232	-70	364.10	7/10/2012
Sunward – Rosa							
RO001	1,144,478.22	1,160,353.07	1,558.00	232	-68	295.50	23/7/2012
RO002	1,144,304.00	1,160,222.00	1,519.00	52	-62	256.60	2/8/2012

TABLE A1.1
SUMMARY LIST OF ALL TITIRIBI PROJECT DRILLING THROUGH FEBRUARY 2013

Hole ID	East UTM Colombia West	North UTM Colombia West	Elevation	Azimuth	Dip	Total Depth (meters)	Date Completed
Sunward – Margarita							
MG001	1,140,552.20	1,159,833.11	1,947.00	52	-73	302.30	14/8/2012
MG002	1,140,503.00	1,160,047.00	1,961.00	52	-72	300.70	27/8/2012
MG003	1,140,872.00	1,159,820.00	1,897.00	232	-82	367.10	3/9/2012
MG004	1,140,616.00	1,159,615.00	1,904.00	52	-50	282.30	5/9/2012
Sunward – Maria Jo							
MJ001	1,141,339.00	1,161,748.00	1,737.00	52	-60	455.4	18/10/2012
MJ002	1,141,578.00	1,162,297.00	1,637.00	205	-50	464.4	27/10/2012
MJ003	1,141,424.00	1,162,245.00	1,706.00	205	-50	505.7	12/11/2012
MJ004	1,141,322.00	1,162,229.00	1,757.00	205	-50	498	25/11/2012
MJ005	1,141,125.00	1,161,962.00	1,819.00	142	-50	437.7	24/11/2012
MJ006	1,141,332.00	1,162,228.00	1,751.00	142	-50	500.2	6/12/2012
MJ007	1,141,210.00	1,162,197.00	1,813.00	142	-50	660	7/12/2012
MJ008	1,141,067.00	1,161,714.00	1,801.00	142	-50	503.8	1/17/2013
MJ009	1,140,936.00	1,161,541.00	1,823.00	142	-50	339	1/20/2013
Total						**144,778.51**	

APPENDIX 2.0
OVERVIEW OF THE COLOMBIAN MINING CODE

4.3 OVERVIEW OF THE COLOMBIAN MINING CODE

4.3.1 Mining Code

The Colombian mining code (Law 685) was re-drafted and replaced on the statute in 2001 on the principal of first in line, first in right and one all-encompassing mining title covering exploration through to exploitation, thus significantly improving the transparency of the process. A recent review introduced certain changes that potentially increase the costs of licensing fees and certain limitations on mining above altitudes of 3,000m.

The code is regulated by the Ministry of Mines and Energy and administered by the Colombian Institute of Geology and Mining (INGEOMINAS) and nine departmental delegations who have been appointed by the Ministry to administer matters in their jurisdictions. A summary is included below.

Under Article 332 of the Colombian Constitution, the subsoil and all non-renewable natural resources are the property of the Nation. Accordingly, Article 5 of the mining

code states that minerals, regardless of their type and location that lie within Colombian soil or subsoil are the exclusive property of the Colombian nation. The property of said minerals is not related to the property of the land or surface rights in which they rest. Consequently, the surface rights may belong to private individuals or entities, communities or groups.

However, some private mines acquired under previous vintage statutes remain and have, de facto, been grandfathered into the new regime.

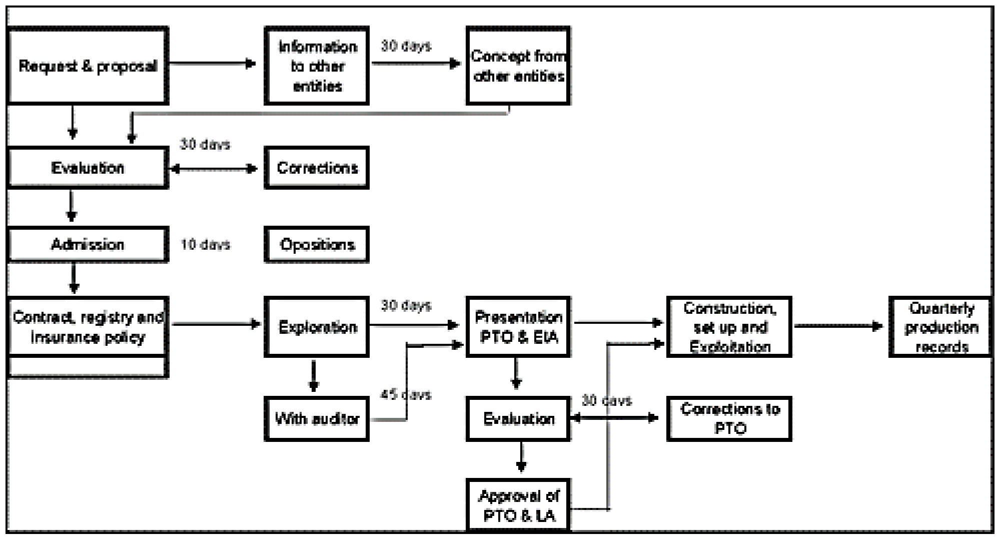
Exploration is conducted under Article 78:

> ***Article 78. Works of Exploration.*** *The studies, works and installations to which the concessionaire is in the obligation during the period of exploration by methods of subsoil, are those necessary in order to establish and determine the existence and location of the mineral or minerals contracted, the geometry of the deposit or deposits within the area of concession, in quantity and quality economically exploitable, the technical feasibility to extract them and the impact it might have on the environmental and the social surroundings that might cause these works and installations.*

When the concessionaire decides that it wishes to move to exploitation Article 94 becomes relevant.

> ***"Article 94. Anticipated Exploitation.*** *If the concessionaire opts for starting an anticipated exploitation using works, installations and provisional equipment, or available parts of works and definite installations, he should present an anticipated plan of work and installations, an abbreviated description of assemblies he will use and give a notice that such exploitation is going to start. All, subject to having the definite works and installations, established on time."* Figure 4.5 illustrates the government process and timelines for anticipated exploitation.

Figure 4.1
Government Process and Timelines for Anticipated Exploitation



4.3.2 Explore and Exploit Mineral Resources via a Mining Concession Agreement

The right to explore and exploit mineral resources is acquired through a Mining Concession Agreement (MCA) that must be registered before the National Mining Registry, which is administered by INGEOMINAS.

A MCA confers the title holder the exclusive right to carry out the studies and efforts necessary to establish the existence, in the designated area, of the minerals to which the agreement refers, and to exploit these minerals according with the principles, rules and criteria of geology and mining engineering (Article 58). Technical exploration, economic exploitation and processing of minerals are conducted at the concessionaires' own risk and expense.

The MCA also grants the concessionaire the right to establish mining easements (rights of way, rights of access) over the designated area as might be necessary for the efficient development of the mining activity. The concessionaire may build and install the equipment, services and works required for the appropriate enjoyment of said easements. Easements are mandatory by law; however the land owner may request compensation for the damages arising from them (Article 166).

The MCA comprises three distinct periods:

- The exploration period, covers the technical exploration of the area and must be performed within a maximum of three years after the registration of the MCA. The exploration term can be extended by a maximum of two years.

- A three-year construction and installation period follows, in which the concessionaire is to build and assemble the infrastructure required for exploitation of the mine. The construction period can be extended by one year.

- Finally, the exploitation period extends to the remainder of the concession term, up to thirty years from the date of registration. The concessionaire may request the extension of the contract for another thirty years.

During the exploration and construction phases an annual surface fee payment or canon must be paid to the Colombian government, based on the annual minimum daily salary (for 2009, this was 16,533 Colombian Pesos (COP)/ha). During the exploitation phase any production of gold and silver is subject to payment to the Colombian government of a 4% gross royalty, based on 80% of the PM fix on the London Bullion Market for an effective rate of 3.2%.

Once a detailed exploration programme, involving drilling or underground development, is defined, it is necessary to apply for certain water use permits. Only at the point of definition of a mining operation is it necessary to apply for a full environmental licence that is subject to the approval and monitoring by the Colombian regional environmental authority, which in this case is CORANTIOQUIA.

A baseline environmental monitoring and reclamation/mitigation programme has been put in place by Sunward including water flow and quality measurement and restitution of all drill platforms and trenches as and when appropriate.

Before obtaining this licence the following documents have to be presented to the Mining Authority: Final Exploration Report (IFE) and Work Plan (PTO). These reports must have the following information:

(a) Delimitation of the required area for the exploitation project with maps.

(b) Location and reserve/resource statement and the characteristics of the deposit.

(c) Description and location of the installations and mining works, processing plant, transport and transformation of the mineral to be processed.

(d) Mine plan and design.

(e) Description of the processing plant to be used, capacity, equipment and tail disposal.

(f) Environmental work to improve the landscape and forest.

(g) Scale and duration of the expected production.

(h) Description and location of required infrastructure regarding land use agreement.

(i) Mine closure plan.

A contractor has been engaged and it is expected the application with the support reports will be presented in six months. After presentation the government notifies receipt of request and plans a site visit to confront the information submitted with the field findings. Approximately three months after the site visit Sunward can obtain the permit. This is a relatively straight forward process providing that the government accepts the final exploration report, if not, this process can take considerably longer.

When the new exploitation licence is granted, it needs to be registered at the mining registry and Sunward will have to present quarterly reports and pay royalties.

To move forward from exploration and evaluation to production is a relatively straightforward procedure and involves the preparation by an independent consultant of the application which must contain certain information as set out in Article 84 of the mining code. However, prior to the preparation of the application Sunward will apply to have the permits integrated under the terms of Article 101 in order to facilitate a single mining licence application.

> ***Article 101. Area's Integration.*** *When the areas corresponding to several titles belonging to one or several beneficiaries for a same mineral were adjacent or close to, they could be included in a sole program of exploring or exploiting in order to carry out their works in those areas, simultaneously or alternatively, with unified objects and goals of production, integrating them into a sole contract. With this purpose, the interested parties should submit before the mining authority the mentioned program for its approval and to which they will be responsible "in solidum".*
>
> *In the neighbouring areas to the new concession contract, where there are applications for concession pending or informal miners for legalization, if there is a general consent, those areas can be integrated to the same concession contract.*
>
> *When in the unique program of exploration and exploitation only remains engaged parts of the areas corresponding to interested parties, it will be optional for them to unify such areas in a sole contract or to keep in effect the original contracts.*

After presentation of the report the government notifies the recipient and plans a site visit. After the site visit issuance of the mining licence can be expected in approximately two months.

> ***Article 84. Schedule of Installations and Works.*** *As a result of the studies and works of exploration, before the overdue date the concessionaire will present for approval of the granting authority or the auditor, the plan of work and installations of exploitation, which should be attached to the contract as part of the obligations. This plan should contain the following elements and documents:*
>
> 1. *Definite delimitation of the area of exploitation.*
> 2. *Topographical map of the mentioned area.*
> 3. *Detailed cartographic information of the area and, when if it deals with marine mining, the bathymetrical specifications.*
> 4. *Location, estimate and characteristics of the reserves that should be exploited in development of the project.*

5. *Description and localization of the installations and mining works, mineral storage, beneficiation and transportation, and if it might be the case, the transformation facilities.*

6. *Mining Plan of exploitation, which will include indication of the technical guides that will be used.*

7. *Work plan for the geomorphological recuperation, landscaping and revegetation of the altered system.*

8. *Scale and duration of the expected production.*

9. *Physical and chemical characteristics of the minerals to be exploited.*

10. *Description and localization of the necessary installations and works for the exercise of the rights corresponding to the mining operations.*

11. *Plan of closure of the exploitation and abandonment of the assemblies and installations and of the infrastructure.*

Before obtaining this licence the company has to present the environmental impact study (EIA) under Article 85, which apart from the information presented for the exploitation licence, it also contains information about the pollutants that will be generated during the exploitation and processing of the mineral, as well as the measures to mitigate the impact. Prior to applying for this licence it is a requisite to have applied for water use and discharge permits. (Current title holders already have some of these permits granted).

> ***Article 85. Study on the Environmental Impact.*** *Simultaneously with the pan of work and installations, a study that demonstrates environmental feasibility of such program should be presented. Without the express approval of this study and the issuing of the corresponding Environmental License, the initiation of the installations of works of the mining exploitation cannot start. The works of geomorphological recuperation, landscaping and revegetation of the altered ecosystem will be executed by experts of each one of these labours. Such license with the restrictions and conditions imposed by the concessionaire will make part of the contractual obligations.*

A contractor has been contacted and it is expected to present the application (EIA) in approximately 6 months. After presentation the government notifies recipient and plans a site visit. After the site visit in approximately six months Sunward could have the permit if the environmental authority is satisfied with the report and the field visit. Normally after the visit, they issue their recommendations and after Sunward incorporates them, the government will approve the licence.

Although the reports are analysed and qualified by different governmental bodies, both are a co-requisite to obtain the exploitation licence that will be granted for a 24 year period.

Additional permits such as air pollution during gold extraction and processing and water use and discharge for gold processing operation and camp use, are requested at a later stages.

The process for the environmental licence is shown in Figure 4.6 which also indicates the timelines, according to those given by the government. However, Sunward has noted that experience has proven that these times are not realistic and the process takes much longer.

Figure 4.2
Colombian Government Process and Timelines for Issuing an Environmental Licence