**Summary Report** 

on the

**INCAMAYO PROPERTY** 

Salta Province

# Argentina

Latitude 24° 42' S, Longitude 66° 22' W

with

**Recommendations** 

**For Further Exploration** 

for

Brigadier Gold Ltd P.O. Box 94540 2900 Steeles Avenue East Thornhill, Ontario L3T 7R5

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#### 1.0 Summary

#### 1.1 Terms of Reference

This report (the "Report") was prepared for Brigadier Gold Corp. ("Brigadier" or "BRG" or the "Company") to document the basis for, and the results of, an exploration program carried out in 2010 and 2011 on the Incamayo Property ("Incamayo" or the "Property"), located in Salta Province, in northwestern Argentina.

# 1.2. Property Location, Description and Ownership

Incamayo is located near the eastern boundary of the Puna physiographic province near the eastern boundary of the Andes in northwestern Argentina (Figures 1 and 2). The Puna is the southern extension of the Bolivian Altiplano averaging 3.7 kilometres in elevation with a maximum elevation of 6.7 kilometres. It is the second largest high-altitude plateau in the world.

Incamayo, (formerly the Cerro Gordo Property) is located in the Province of Salta, on the west flank of Cerro Gordo, in the Sierra de Cachi portion of the Nevados de Palermo Mountain Range. The coordinates for the approximate geographic centre of the Property are 24° 42' south latitude and 66° 22' west longitude.

The Property is located 100 kilometres west of the city of Salta. The Property is road accessible from Salta to San Antonio de los Cobres (160 kilometres) via Highway 51. Just west of San Antonio (3,747 metres elevation) a low-maintenance gravel road leads southwesterly 60 kilometres to the pueblo of Santa Rosa de los Pastos Grandes. From Santa Rosa the road proceeds southerly towards the Sijes Borax Mine. Nineteen kilometres from Santa Rosa, at Puesto Puntas Negras, a spur road leads easterly across the northern part of the Salar de la Laguna Barreal, for approximately 30 kilometres, to the Property.

Although a four-wheel drive vehicle is advisable, the Property is accessible by light duty trucks and can be accessed from Salta in a driving time of 4.5 to 5 hours.

The Property is located between 4,200 and 5,500 metres above sea level.

A permanent adobe storage building, also the site of a temporary drill camp, is located approximately 8 kilometres northwest of the property

## 1.3 Geology

The rock types at Incamayo comprise turbiditic argillite, siltstone, and sandstones of the Proterozoic Puncoviscana Formation. The sequence has been regionally metamorphosed to low-grade greenschist facies. The section is homoclinal, dipping steeply to moderately to the southeast. The exposed thickness is approximately 1300 metres.

These sediments are in unconformable contact with overlying Quaternary continental sediments that outcrop in the northwestern part of the Property. Quaternary sediments overlie the fault contact between Puncoviscana sediments and the Ordovician to Lower Silurian Faja Eruptiva Formation, located to the west of the Incamayo. The Faja Eruptiva is a megacrystic gneissic monzogranite. Approximately 7 kilometres to the east of Incamayo is a Proterozoic granitoid occurring within the Puncoviscana sediments.

The Property is dominated by a northeast striking fault zone that dips moderately to steeply to the southeast and locally steeply to the northwest. The structure extends over 4.5 kilometres in length and is cut by steep east-west and northwest-southeast faults. Field work indicates reverse faulting with southeast side up movement though locally northwest side up movement has been noted. There appears to be a dip-slip component to the faulting with left-lateral movement.

The northeast trending structural zone controls the hydrothermal system that formed the Incamayo deposit. Clay alteration with variable iron oxidation is common along the trend but is stronger in the southwestern portion of the fault zone. Within this argillic alteration sheath are areas of intense iron oxidation, silicification and brecciation with associated jarosite, alunite and kaolinite. Dickite has also been noted. These areas contain the strongest mineralization.

In Brigadier's completed diamond drill program extensive sulphide-healed crackle breccias were noted in all holes. Hornfelsing, indicative of a nearby intrusive event is also widespread, but appears to precede mineralization and is overprinted by clay alteration, silicification, and mineralization. In the northernmost drill holes moderate to strong epidote and chlorite (propylitic) alteration was noted in 2011 drilling and is younger than the observed hornfelsing. This alteration was the first seen in drilling to date. Propylitic alteration is occasionally associated with low-sulphidation epithermal alteration. However, this alteration is also

associated with high-sulphidation epithermal alteration and is proximal to a large untested IP geophysical anomaly that is interpreted to represent porphyry style mineralization.

Previous drilling recorded chalcopyrite, covellite and pyrite, marcasite, arsenopyrite, and enargite. Gold values from the 1997 holes were reported to be associated with goethite. Drilling by Brigadier recorded pyrite, enargite, tetrahedrite, sphalerite, marcasite, chalcopyrite, and bornite. Up to one-metre intervals of massive sulphides within fault zones were noted in holes in the northern part of the Property.

## 1.4 Mineralization

The Property comprises a high-sulphidation epithermal system at the eastern edge of the Argentine Puna. The focus of exploration is principally contained within a  $\pm 1,000$  metre wide and over 5,000 metre long northeast to southwest trending alteration zone that is visible on satellite imagery along the western flanks of Cerro Gordo. This zone of alteration appears to represent a major fault structure that is a splay off the main northerly trending suture zone. Known mineralization appears to be related to second and third order structures that splay off a major terrane bounding fault.

Trench sampling carried out on the property in 1997 by Mansfield Minerals revealed a number of continuously mineralized gold zones including:

- 20 metres of 0.82 grams per tonne (gpt) gold
- 72 metres of 1.40 gpt gold (including 18 metres of 5 gpt gold)
- 50 metres of 0.67 gpt gold
- 10 metres of 1.51 gpt gold
- 16 metres of 0.98 gpt gold and 48 gpt silver

Base metal values in the trenches were low and the property was drilled with widely spaced reverse circulation holes only for its precious metal potential. However, the furthest north drill hole in the alteration zone, RC-7, encountered significant intervals of gold-copper-silver-tellurium-tin mineralization from near surface to the end of the hole at 298 metres.

Mapping and re-sampling of trenches by Brigadier in late 2010 and early 2011 confirmed the above sampling and defined significant gold and silver mineralization in float away from the trenched areas. An IP geophysical survey, also carried out in late 2010 and early 2011, outlined strong, open-ended IP anomalies extending the length of the 4 kilometre long survey area. In

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the northern part of the survey area two large, separate IP anomalies have yet to be tested, one of which portrays aspects of porphyry style mineralization.

In the southern part of the survey area strong silver and zinc mineralization detected by Brigadier's drilling is associated with an induce polarization (IP) anomaly that is plunging to depth to the southwest. This hole represents the largest step-out to date from previous drilling and the better part of the IP anomaly has yet to be tested. The extensive sphalerite mineralization seen in this hole is not likely the source of the IP anomaly as sphalerite does not respond as an IP target.

Brigadier's 2011 nine hole diamond drill program intersected a number of continuously mineralized zones including but not limited to the following:

- 8.2 metres of 2.25 gpt gold and 7.5 gpt silver from surface
- 8.1 metres of 0.6 gpt gold, from surface
- 7.6 metres of 1.14 gpt gold, 14.7 gpt silver and 0.56 % copper
- 3.6 metres of 0.69 gpt gold, 25.4 gpt silver and 1.05 % copper
- 10 metres of 0.8 gpt gold, 7.9 gpt silver and 0.12 % zinc
- 112 metres of 6.6 gpt silver, 0.30 % zinc and 0.08 % lead

The last noted interval cited above represents mineralization that is 350 metres away from any previous drill intersections and is of a mineralizing style that includes matrix supported sulphide breccias, unlike anything seen to date on the Property.

The drilling also intersected tin and tellurium values to 4,300 ppm tin and >1,000 ppm tellurium.

The geometry and controls to the varying styles of mineralization on the Property have yet to be fully determined or understood.

#### 1.5 Exploration Concept and Status

The Property has been described as containing a high sulphidation epithermal system. Fabricáciones Militares, however, had originally explored the Property as a porphyry copper target, based on stream sediment sampling results in the 1970s.

Work carried out by Brigadier in 2010 and 2011 has shown varying styles of mineralization on the Property including auriferous quartz veining, high gold values in bedrock not associated with quartz veining to the north of the northernmost drill hole, widespread silver mineralization over the length of the Property, significant tin and tellurium mineralization, and sulphide supported breccias.

The presence of propylitic alteration in the northernmost drill hole on the Property, combined with the presence nearby of a buried IP anomaly, which has been interpreted as porphyry related, points to the possibility that the Property may contain a telescoped porphyry system, wherein epithermal mineralization is located immediately adjacent to porphyry style mineralization instead of being distal to such deposits. Such systems are known elsewhere in Argentina, one example being the Altar Deposit of Stillwater Mining in San Juan Province.

Such telescoping may be the cause of strong changes in alteration seen in various trenches at Incamayo from one side of the trenches to another. One example of such occurs immediately adjacent to the northern drill holes. Here, native sulphur-bearing, highly argillically altered argillites with no discernible bedding features are separated by a matter of metres along strike from moderately altered rocks with readily apparent bedding.

This zone marks the southern edge of a wide, largely talus covered un-sampled alteration zone. One of two grab samples taken from outcrop in this unmapped and un-sampled zone at the end of the field program assayed 9.7 gpt gold, 255 gpt silver, 635 ppm (parts per million) tellurium and 1,695 ppm tin.

# 1.6 Conclusions

The Property contains an alteration zone, mineralized with Au-Ag-Cu-Zn-Pb-Sn and Te, extending over 4.5 kilometres in length and open to the northeast and the southwest and to depth. The Property hosts varying styles of precious and base metal mineralization and is located at the southeastern end of the Calama - Olacapata - El Toro Lineament, alternately known as the Calama - El Toro Lineament or the Olacapata - El Toro Lineament. At its northwest end, in Chile, the Olacapata - El Toro Lineament hosts the Chuquicamata copper deposit. Despite over 90 years of intensive exploitation Chuquicamata remains one of the world's largest known copper resources. Fifty kilometres northwest of Incamayo, and also on the Olacapata-El Toro Lineament, is located Golden Minerals' El Quevar silver deposit.

Despite being classified as epithermal style, the mineralization and alteration seen in outcrop and in drill core from the recent diamond drill program, and in an IP survey, shows aspects of propylitic alteration usually associated with porphyry style mineralization. The Property contains large untested IP anomalies, one area of which has been interpreted as being related to porphyry style mineralization.

Significant precious and base metal mineralization has been encountered in widely separated drill holes, in outcrop and in float on the Property. Less than one-half of the alteration zone on the Property has been explored. Previous exploration efforts have been focused on trenches excavated on the Property, not all of which reached bedrock. Exploration outside these trenches has not been systematic. For example, no systematic soil sampling has been carried out and limited outcrop mapping and sampling have been carried out over the Property outside the trenched areas, partly due to the recessive nature of the alteration zone.

## 1.7 Recommendations

Based on the results of the 2010 and 2011 geological, geophysical and diamond drilling programs it is recommended to continue the investigation of the development potential of the Property.

An Environmental Impact Declaration (EID) has been filed to allow continued work on the Property and is in the approval process. The EID, as filed, comprises a system of roads and trenches to be constructed in talus-covered, poorly mapped parts of the property to allow the mapping and sampling of bedrock and alteration in poorly mapped, mineralized areas of the property.

Also permitted are a series of drill pads that would allow evaluation of the areas in between previous drill sections, and the drilling of the above mentioned untested IP anomalies.

It is recommended that any drilling be proceeded by the road building, trenching and mapping and sampling program. Any sampling and future exploration should be augmented with the use of a hand-held XRF unit that could also be used to carry out or supplement a soil sampling program in non-talus covered areas. **DISCOVERY** Consultants



**Photo 1**: View of Incamayo from camp area showing access road running diagonally across the west flank of Cerro Gordo from southwest to northeast. The alteration zone (light colour) on the right represents the area of the Gordon Zone and the eastern edge of the M1 Trench. The two adjacent light coloured areas mark the North Zone, with VG Ridge, the site of the north-easternmost drilling, on the left. The alteration zone to the far left is Sinter Hill. The area between VG Ridge and Sinter Hill, some 2 kilometres in length has seen little exploration.

# 2.0 Introduction and Terms of Reference

This Report was prepared for Brigadier Gold Ltd to document work carried out, and the results of, during the course of an exploration program on the Property in 2010 and 2011 by the Company and its Argentine subsidiary, Incahuasi Exploraciones S.A. ("Incahuasi" or "IESA").

The Property is located in Salta Province, Argentina and the Company has the right to acquire a 70% interest in the Property by carrying out certain obligations as outlined in Section 4.10.

The Report is authored by Thomas H. Carpenter, BSc, PGeo, ("Carpenter") of Discovery Consultants ("Discovery") and John R. Breedlove, MSc, CPG, ("Breedlove") of Resource Geological Services, Inc ("Resource"), both of whom have either managed or carried out the various exploration surveys on the Property during the November, 2010 to May, 2011 exploration period.

# 3.0 Reliance on Other Experts

For the Report the authors have relied upon outcrop and trench data generated by: Mansfield Minerals Inc. ("Mansfield") in 1996; the results of a reverse circulation drill program carried out by Argex Minera S.A., a subsidiary of Mansfield, in 1997; a February 1998 report by R. González of Archean Engineering for Argex; an internal geological summary report from 2009 provided by Cascadero Copper Corp ("Cascadero") and Salta Exploraciones S.A. ("SESA"); and discussions with SESA personnel.

The authors have summarized and included material from these sources within the body of the Report but are solely responsible for the conclusions and recommendations of the Report.

# 4.0 Property Location and Description

#### 4.1 Location

The Property is located at the eastern edge of the Puna physiographic province, near the eastern boundary of the Andes in Salta Province, northwestern Argentina (Figure 1). The Puna is the southern extension of the Bolivian Altiplano and averages 3.7 kilometres in elevation, with a maximum elevation of 6.7 kilometres. It is the second largest high-altitude plateau in the world.

The Property is located approximately 100 kilometres due west of the city of Salta, 57 kilometres southsouthwest of the village of San Antonio de los Cobres, and 36 kilometres southeast of the pueblo of Santa Rosa de los Pastos Grandes (Figure 2).

The geographic coordinates of the centre of the property are approximately 24° 42' 57' south latitude, and 66° 26' 02' west longitude, corresponding to UTM coordinates 759565 m E and 7264277 m W (WGS 84, Zone 19 J).

#### 4.2 Overview of Argentina

The Republic of Argentina is located in the southeastern portion of South America. Argentina is bordered to the south and west by Chile and to the north by Bolivia, Paraguay and Brazil. From north to south, the east side of Argentina is bordered by Brazil, Uruguay and the Atlantic Ocean.





Argentina is the second-largest country in South America after Brazil and the eighth largest in the world. The population of the country is about 39.5 million; approximately 16 million live in and adjacent to the capital city, Buenos Aires (CIA, 2007).

#### 4.3 Metal Mining in Argentina

Historically metal mining has not played a dominant role in Argentina's economy, but this situation has changed during the last five years. While industrial minerals and building materials accounted in the past for nearly two thirds of the total mining production, Argentina's gold production increased to 1.1 million ounces of gold in 2003, becoming the 14th-largest world producer (fourth in Latin America, with 7% of the gold output of the region; Torres, 2004).

Argentina is one of three producers of primary aluminum in Latin America, accounting approximately for 12% of production. The country is Latin America's third leading producer of lead (after Peru and Mexico) and steel (after Brazil and Mexico). It is the fourth leading producer of copper (after Chile, Peru, and Mexico) and primary iron and pig iron (after Brazil, Mexico, and Venezuela). Argentina is the fifth leading producer of silver (Torres, 2004).

### 4.4 Mining Industry and Legislation

Information in this section is taken from Garcia (2007) and Torres (2004) and has not been independently verified by the authors.

The *Código Minera de Argentina Decree 456/97* - Argentine Mining Code - ("Code"), which dates back to 1886, is the legislation which deals the rights, obligations and procedures related to mining in Argentina. Although the mining regulations are federal law, the jurisdiction of mining natural resources belongs to the provinces. The Code applies both to the granting of *cateos* and *minas*.

A *cateo* comprises from 1 to 20 basic units of 500 hectares (5 km<sup>2</sup>). A single *cateo* may comprise a maximum size of 10,000 hectares. No person/company/agent may hold in any given province of Argentina more than 20 *cateos* or 200,000 hectares or 400 units.

Before a work program is carried out on a *cateo*, an environmental report *(informe de impacto ambienta*) must be presented to the *juzgado* (judge of the Mining Court) outlining the type of work planned. Preliminary work such as prospecting, mapping, soil and rock sampling, etc., is covered within the initial *cateo* application. For more advanced work such as trenching and drilling, an application containing environmental reports outlining the exploration activities and reclamation procedures to be carried out, must be filed at least 30 working days before the start of the program. The *juzgado* has 60 working days

in which to respond to the application, although normally an approval or request for amendments is issued within 2 to 4 weeks.

An application for water rights must be more detailed and would take longer than the above, as the application would then involve three ministries; i.e., the Mining Court, Mines Branch and the Environmental Branch.

Pursuant to Argentinean legislation, exploration permits (*cateos*) or exploitation titles (*minas*) do not give their holders the ownership or a possession title over the surface land on which it is located. In order to solve potential problems between the land owner and the owner of the mineral title or mine, and to allow the latter to carry out mining activities without interference, the Argentinean Mining Code establishes that *"the exploitation of mines, their exploration, concession and other consequent acts, have the nature of public benefit."* This principle justifies, in cases established in law, the subordination of the superficial property to the mining property subject to prior payment of due compensation or a surety. In the case of a lack of agreement, the compensation and the surety will be fixed by the Mining Judge allowing the owner of a *cateo* to use the superficial property for necessary mining works and to exercise encumbrances, with prior payment of due compensation of the land value to be occupied and the damages caused by this occupation, or prior granting of a surety if the compensation cannot be evaluated or immediately paid, or if the landowner asks for it. In both cases these rights can be exercise even without the agreement of the landowner. In case of lack of agreement, both the compensation and the surety will be fixed by the Mining Judge.

The surface land is subject to the encumbrance of being occupied to the extent required by exploration operations (buildings, camps, deposits, machinery, transportation of water, the encumbrance of use of transit, etc.).

*Minas* (exploitation licences) differ from *cateos* (exploration licences) in that they are real property, governed by the same principles as common property. *Minas* are licensed for an unlimited time period, as long as the owners comply with the administrative rules of maintenance outlined by the Code.

Owners must comply with three conditions: payment of an annual fee, investment of a minimum amount of capital, and the carrying out of a reasonable level of exploitation. Failure to do so could lead to forfeiture of the property back to the State.

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The administrative organization for mining-specific regulation at federal level is the Federal Ministry of Planning, Public Works and Investment, which has a Mining Department headed by the Secretary of Mines.

At the Provincial level, there are mining departments, or mineral courts, depending on the jurisdictions, that deal with the granting of exploration permits, mining concessions and have jurisdiction on mining permitting, in general.

Priority for receiving a *mina* is given to the registered of the exploration concession (*cateo*). A *mina* is composed of one of more units (*pertenencias*). Each *pertenencia* is 6 hectares in area for some types of minerals (mainly, gold, silver, copper, and, generally, hard rock minerals) in common vein-type deposits, and 100 hectares for the aforementioned type of minerals if found in disseminated mineral bodies such as porphyry deposits. The application to the mining authority must include official cartographic coordinates of each *mina* and of the reconnaissance area, and a sample of the mineral discovered. The reconnaissance area, which may be as much as twice the surface area projection of the mine, is intended to allow for the geological extent of the ore body and for site layout and development. Excess area is released once the survey plans are approved by the mining authority

Once the application for a *mina* has been submitted, the applicant may commence work on the reconnaissance area of the application. Any person, or company, opposed to the application for the new mine, whether a holder of an overlapping *cateo*, a mining title holder with conflicting claims, a partner in the discovery that claims to have been neglected, among others, may submit his opposition, following publication of the application in the *Boletín Oficial* (official publication) of the provincial jurisdiction. The person, or company, opposed to the mining concession application must present evidence of his claim to the provincial mining authority. The provincial mining authority resolves on the opposition, and such a resolution can be appealed to the provincial mining law courts. Within 30 days after the term to file certain statutory exploration works on the reconnaissance area of the mining concession application, the applicant must submit a legal survey of the *pertenencias* requested for the new mine, within the maximum property limits allowed by the Code. The request is published in the *Boletín Oficial* and may also be subject to dispute, to be resolved under similar rules as mentioned with regard to opposition to the application for mining concessions. Approval and registration of the legal survey request by the provincial mining property.

#### 4.5 Mineral Tenure

The Code regulates exploitation tenures (*minas*). Priority for receiving a *mina* is given to the registered of the exploration concession (cateo). A mina is composed of one of more units (pertenencias). Each pertenencia is 6 hectares ("ha") in area for some types of minerals (mainly, gold, silver, copper, and, generally, hard rock minerals) in common vein-type deposits, and 100 ha for the aforementioned type of minerals if found in disseminated mineral bodies such as porphyry deposits. The application to the mining authority must include official cartographic coordinates of each mina and of the reconnaissance area, and a sample of the mineral discovered. The reconnaissance area, which may be as much as twice the surface area projection of the mine, is intended to allow for the geological extent of the ore body and for site layout and development. Excess area is released once the survey plans are approved by the mining authority Once the application for a *mina* has been submitted, the applicant may commence work on the reconnaissance area of the application. Any person, or company, opposed to the application for the new mine, whether a holder of an overlapping *cateo*, a mining title holder with conflicting claims, a partner in the discovery that claims to have been neglected, among others, may submit his opposition, following publication of the application in the *Boletin Oficial* (official publication) of the provincial jurisdiction. The person, or company, opposed to the mining concession application must present evidence of his claim to the provincial mining authority. The provincial mining authority resolves on the opposition, and such a resolution can be appealed to the provincial mining law courts. Within 30 days after the term to file certain statutory exploration works on the reconnaissance area of the mining concession application, the applicant must submit a legal survey of the *pertenencias* requested for the new mine, within the maximum property limits allowed by the Code. The request is published in the Boletín Oficial and may also be subject to dispute, to be resolved under similar rules as mentioned with regard to opposition to the application for mining concessions. Approval and registration of the legal survey request by the provincial mining authority constitutes formal title to the mining property.

This Report does not address the granting and maintenance of exploration concessions (cateos).

### 4.6 Royalties and Taxes

Information in this section is taken from Garcia (2007), Beretta and Garcia (2007) and Torres (2004) and has not been independently verified by the authors. The information herein is a summary as a comprehensive review is beyond the scope of this Report.

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A new mining operation is entitled to national, provincial, and municipal tax exemptions for five years. The exemptions commence with the awarding of formal title to the mine. Additional royalty payments to the government are subject to exemptions of three years as described below. Mining royalties in Salta Province are capped at 3% of the mineral's mouth-of-mine value.

Mining royalties are paid to the state (federal or provincial) under which the exploitation concession is registered, and are paid in equal instalments twice yearly. A mining operation that has not paid its royalty within two months of the due date will be served a notice by the mining authority. The exploitation concession under which the mine operates will expire if the overdue royalty has not been paid within 45 days of the notice. The royalty is set by federal law according to the category of the mine. In general, the royalty due per year is \$ARS 80 (about \$C 1.50) per 6 ha *pertenencia* for common ore bodies held by the exploitation concession, or \$ARS 800 (\$C 205) per 100 ha *pertenencia* for disseminated ore bodies. The mine is exempt from royalties for 3 years from the date on which formal title was awarded to the mine.

The holder of the exploitation concession must also commit to investing in the property fixed assets of at least three hundred times the value of the annual mining royalty, over a period of five years. In the first two years, 20% of the total required investment value (i.e., the annual royalty for each year) must be made each year. For the final three years, the remaining 60% of the total required investment may be distributed in another manner. The exploitation concession expires if the minimum required investment schedule is not met.

#### 4.7 Surface and Private Property Rights

Information in this section is taken from Garcia (2007) and Beretta and Garcia (2007) and has not been independently verified by the authors.

Access over surface property rights in Argentina is obtained through the Ministry of Mines, which is required to communicate with the surface owners and ensure that they cooperate with the activities of the exploration/mining companies. Notice can be difficult due to delayed filing of personal property title changes and registry as well as limited staffing and mobility of the relevant authorities.

Private property rights are secure rights in Argentina, and the likelihood of expropriation is considered low. The Argentine legal and constitutional system grants mining properties all the guarantees conferred on property rights, which are absolute, exclusive and perpetual. Mining property may be freely transferred and purchased by foreign companies.

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There are no private property rights in the Property area.

#### 4.8 Environmental Regulations, Permits and Environment Liabilities

A party wishing to commence or modify any mining-related activity as defined by the Code, including prospecting, exploration, exploitation, development, preparation, extraction, and storage of mineral substances, as well as property abandonment or mine closure activity, must prepare and submit to the Provincial Environmental Management Unit ("PEMU") an Informe de Impacto Ambiental or Environmental Impact Assessment ("EIA") prior to commencing the work.

Each EIA must describe the nature of the proposed work, its potential risk to the environment, and the measures that will be taken to mitigate that risk. The PEMU has a sixty-day period to review and either approve or reject the EIA; however, the EIA is not considered to be automatically approved if the PEMU has not responded within that period. If the PEMU deems that the EIA does not have sufficient content or scope, the party submitting the EIA is granted a thirty-day period in which to resubmit the document.

If accepted by the PEMU, the EIA is used as the basis to create a Declaración de Impacto Ambiental or Declaration of Environmental Impact ("DEI" or "EID")) to which the party must agree to uphold during the mining-related activity in question. The DEI must be updated at least once every six months. Sanctions and penalties for non-compliance to the DEI are outlined in the Environmental Protection Mining Code, and may include warnings, fines, suspension of Environmental Quality Certification, restoration of the environment, temporary or permanent closure of activities, and removal of authorization to conduct mining-related activities.

Much of the Property has been disturbed by exploration activities carried out in 1996 and 1997. The 2010 to 2011 program was carried out under an EIA in the name of SESA. An EIA for additional work is currently in the approval process.

#### 4.9 Property Mineral Tenure

The property consists of three tenures comprising two *minas* and one *cateo* covering a total area of 4415.45 hectares (Table 1). The tenures form a contiguous block covering all of the exploration targets in the immediate Incamayo prospect area and all the known mineralized zones that are described in this report (Figure 3).

NUMBER	NAME	STATUS	DATE	HECTARES	OWNER
18110	Incamayo	Mina	Granted 2005	2000.00	SESA
18358	Incamayo Norte	Mina	Granted 2005	1495.46	SESA
20789	Incamayo Sureste	Cateo	Granted 2011	919.99	IESA
				4415.45	

# Table 1: Mineral Title Incamayo Property

Once granted, *minas* and *cateos* are registered in the Juzgado de Minas y en lo Comercial de Registro of Salta Province in the city of Salta.



#### 4.10 Agreements

On August 24, 2008 Brigadier announced the signing of a letter of intent to acquire an option on the Incamayo project consisting of 3,495 hectares located in Salta Province in northwestern Argentina. The option was issued to 1534185 Alberta by Salta Exploraciones SA (SESA) and SESA Holdings LLC and called for the issuance of an additional 400,000 treasury shares of Brigadier and \$900,000 over a 36-month period. The option also called for the expenditure of a total of \$3,300,000 over three years on the property and, upon completion of those requirements, Brigadier would acquire a 70-per-cent interest in the Property.

Brigadier could acquire all the issued and outstanding shares of 1534185 in exchange for the treasury issuance of three million common shares and the payment of \$100,000 cash to the shareholders of the company, subject to regulatory approval and the successful completion of a private placement.

In the event the Option is exercised pursuant to the above conditions SESA may, within 90 days of the exercise, elect to form a joint venture to develop the Property on a 70/30 basis. In the event SESA elects not to form a joint venture it shall convert its 30% undivided interest in the Property to a 2% net smelter return royalty on commercial production of precious and rare metals (including tellurium) from the Property and a 1% net smelter return royalty on commercial production of other than precious and rare metals from the Property. In the event that SESA fails to elect to either form or not form a joint venture on or before the 90 day period referred to above, it shall be deemed to convert its 30% undivided interest in the Property to a the NSR Royalty.

# 5.0 Property Accessibility, Physiography, Climate and Infrastructure

The Property is located 100 kilometres due west of the city of Salta. The Property is road accessible from Salta via San Antonio de los Cobres (160 kilometres) on National Highway 51. Thirteen kilometres west of San Antonio, located at 3,747 metres elevation, a low-maintenance gravel road leads southwesterly 60 kilometres to the pueblo of Santa Rosa de los Pastos Grandes. From Santa Rosa the road proceeds southerly towards the Sijes Borax Mine. Nineteen kilometres from Santa Rosa, at Puesto Puntas Negras, a spur road leads easterly across the northern part of the Salar de la Laguna Barreal, for approximately 30 kilometres, to the Property.

Although a four-wheel drive vehicle is advisable, the Property is accessible by light duty trucks. The Property can be accessed from Salta in a driving time of 4.5 to 5 hours.

#### DISCOVERY

From the camp area, 8 kilometres northwest of the Property, the project area is accessed by four-wheel drive along switchbacks to a contour hugging track running from south to north along the mountain range. This road can also be more directly accessed by a northwest to southeast trending quebrada that bypasses a number of switchbacks at the southwestern part of the Property.

The Property is located between 4,200 and 5,500 metres above sea level on the west side of Cerro Gordo within the Sierra de Cachi mountain range. The access road on the Property achieves a maximum elevation of just over 5,200 metres. Relief is steep with numerous quebradas draining the western slope of Cerro Gordo.

The climate is generally dry, cold, and windy especially during winter and spring. Rain and snow occur during the summer months, feeding springs and quebradas coming off the mountainside. Sufficient water was available from February to May to support the 2011 drilling program. Vegetation is sparse but supports scattered herds of vicuña.

The nearest town with significant services is San Antonio de Los Cobres. Fuel can be obtained from San Antonio de los Cobres but most supplies are trucked in from Salta. The road between San Antonio de los Cobres and the Mina Sijes borate mine is kept open and is continually being maintained.

The village of La Poma and National Highway 40, which runs north-south, lie 22 kilometres east of Incamayo over the Sierra de Cachi mountains. There are no drivable roads through the mountains. Power and gas lines and a rail line run westerly through San Antonio de los Cobres.

Temporary camp facilities consisting of converted metal shipping containers for sleeping, cooking, dining, and shower and toilet facilities were located northwest of the Property. A permanent multi-room adobe building was also used as storage, toilet and bath, and sleeping quarters. Water was obtained directly from a nearby stream. Satellite phone and internet were present and worked well.

The Property has sufficient land for exploration and development services.

## 6.0 Exploration History

The following exploration history of Incamayo is largely summarized from reports by Gonzalez (1998) and the Cascadero/Salta Exploration (2009) summary report on the Property.

1970s: The area was initially explored for porphyry copper deposits by the government controlled Fabricaciones Militares in conjunction with the United Nations. Geological mapping, outcrop sampling and a stream sediment survey were undertaken.

1975: A 100 metre (303') vertical BQ size core hole was drilled by Fabricaciónes Militares. Results included disseminated pyrite over much of its length. Minor concentrations of chalcopyrite and covellite were reported.

1993: The property, then named Cerro Gordo, was acquired by Rio Tinto (RTZ).

1995: Mansfield Minerals signed a joint venture with RTZ naming Mansfield as operator and expanding the size of the property.

1996-1997: Mansfield's Argentine subsidiary, Argex Minera S.A., completed 31 kilometres of road construction to improve access and excavated 21 trenches totalling 5,100 metres. Trenches were oriented roughly east-west across the alteration zone over a strike length of 2 kilometres of the alteration zone. Geological mapping and, sampling of the trenches were carried out, and prospecting surveys were completed along the trend.

1997: Mansfield/Argex completed 9 reverse circulation holes totalling 2,143 metres to test anomalous gold and silver values found in trenches.

2003: Salta Exploraciones S. A. (SESA) acquired Cerro Gordo (Incamayo) by staking. Additional claims were acquired and added to the group in 2005. The two adjoining claim groups contain 35 units (PMDs) totalling 3,495 hectares.

2004: SESA conducted preliminary sampling, confirming earlier assays.

2005: SESA re-examined the 1975 BQ drill core which revealed bleached and pyrite altered sedimentary rocks from surface to the bottom of the hole. The presence of alunite, barite and silica were noted at indeterminate intervals. Chip samples assayed low values of Cu and Zn. No secondary Cu mineralization was noted.

2006: SESA conducted regional prospecting and geochemical program that revealed anomalous coppersilver-gold-tellurium in outcrop in areas within and outside of the identified alteration zone and in areas not subject to drilling.

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2007: SESA conducted a geological mapping program that led to a new structural interpretation and clarification of the possible controls of mineralization.

2010-2011: Brigadier's subsidiary IESA carried out exploration as detailed in Section 10.

# 7.0 Geological Setting

## 7.1 Regional Geology

The following is summarized from Chernicoff et al. (2002), Kay et al. (1999) and various technical reports available on the worldwide web.

The Property is situated at the eastern margin of the Argentine Puna, a region of thickened continental crust bordered on the west by the current magmatic arc of the Cordillera Occidental and to the east by the Oligocene - Miocene Cordillera Orientale Fold and Thrust Belt. Within the Puna, thrust blocks of basement rocks are separated by intermontane basins. These have developed internal drainage systems with the deposition of siliciclastic sediments and evaporites.

Scattered Miocene to Quaternary andesitic to dacitic volcanic centres have generated isolated flows, ignimbrites, and pyroclastic material. Pre-Cenozoic rocks consist of Paleozoic marine sediments, intrusive-metamorphic gneisses, monzogranites, and basement Proterozoic marine sediments and granitoids (Figure 4).

Basement rocks within the Puna are defined by intersecting lineaments. A major north-northeast trending lineament underlies the Puna roughly dividing the basement into east and west. This lineament is considered to be a suture between two Proterozoic cratonic terranes. This structure runs just west of Incamayo. Several northwest and northeast trending transverse Paleozoic lineaments intersect the longitudinal structure. Eocene to Miocene tectonism related to crustal thickening reactivated structures associated with these lineaments. Crustal shortening across the Puna generated north-northeast trending thrust faults which uplifted basement blocks. Reactivated northwest and northeast trending faults acted as transfer structures with sinistral and dextral displacements. During the Pliocene movement along the main north to northeast trending structures became strike-slip with east or northeast directed shortening and north to northwest extension along secondary structures (Figure 4).



#### DISCOVERY

Structural intersections in the northern Puna appear to have focused plutonic, volcanic, and metallogenic activity in the Puna as well as elsewhere in the Central Andes. Mapping and satellite imagery delineate numerous north-south structures paralleling orogenic belts that are intersected by northwest to southeast transverse lineaments. This includes the Calama-Olacapata-El Toro Lineament (also known as the Olacapata-El Toro Lineament and the Calama-El Toro Lineament) which intersects north-south trending structures in the Incamayo area (Figure 5).



### 7.2 Property Geology

Rock types at Incamayo are straightforward. Known mineralization occurs within turbiditic argillite, siltstone, and sandstones of the Proterozoic Puncoviscana Formation. The section comprises a northeast-southwest striking homocline, with the bedding standing nearly on edge or dipping steeply to moderately to the southeast. The exposed thickness is approximately 1300 metres (González, 1998). The sequence has been regionally metamorphosed to low-grade greenschist facies.

These sediments are in unconformable contact with overlying Quaternary continental sediments that outcrop in the northwestern part of the Property. Quaternary sediments overlie the fault contact between Puncoviscana sediments and the Ordovician to Lower Silurian Faja Eruptiva Formation. The Faja Eruptiva is a megacrystic gneissic monzogranite. Approximately 7 kilometres to the east of Incamayo is a Proterozoic granitoid occurring within the Puncoviscana sediments. This granitoid may be the source of hornfels alteration within the Puncoviscana sediments on the Property.

The Property is dominated by a northeast striking fault zone that dips moderately to steeply to the southeast and locally steeply to the northwest. The structure extends over 4 kilometres and is cut by steep east-west and northwest-southeast faults. Field work indicates reverse faulting with southeast side up movement, though locally northwest side up movement has been noted. There appears to be a dip slip component to the faulting with left-lateral movement. González considered faulting to be left-lateral strike-slip. The east-west and northwest-southeast faults appear to have had normal-reverse movement along them dissecting the northeast trending structural zone.

The northeast trending zone controls the hydrothermal system that formed the Incamayo deposit. Clay alteration with variable iron oxidation is common along the trend but is stronger in the southwestern portion of the zone. Within this argillic alteration sheath are areas of intense iron oxidation, silicification and brecciation with associated jarosite, alunite and kaolinite. Dickite was noted by González. These areas contain the strongest mineralization. Within the fault zone mineralized structures commonly dip moderately to the northwest perpendicular to the trend of the fault and also crosscutting the near vertical bedding. These structures are commonly silicified and often contain breccias (Photos 2 and 12). They may be smaller extensional structures within an overall compressional fault zone. Alternatively the mineralized structures may be fracture cleavage associated with large scale folding noted rarely in the field.

Mineralization is considered high-sulphidation epithermal. Figure 5a shows the relationship between high and low-sulphidation systems and their genetic relationship to porphyry systems worldwide.

The southwestern part of the Property contains predominantly silver and zinc mineralization relative to the northeastern area which has stronger gold and copper values (Figures 8 to 11).

Visible gold was identified in two trenches at the centre and the northern extent of the drilling. One sample of visible gold was reported from previous work. The other was in a well silicified structure that dipped moderately to the northwest in the centre of the drilled area.



**Photo 2**: Silver rich siliceous breccia from Trench M2. The M2 Trench area contains intermediate-sulphidation type alteration and mineralization. The above sample is described by LeCouteur (2011).

Previous drilling recorded chalcopyrite and covellite (Fabricaciones Militares, 1975) and pyrite, marcasite, arsenopyrite, and enargite (Mansfield, 1997). Gold values from the 1997 holes appeared to be associated with goethite. Drilling by Brigadier recorded pyrite, enargite, tetrahedrite, sphalerite, marcasite, chalcopyrite, and bornite. Less than one-metre intervals of massive sulphides within fault zones were noted in holes in the northern part of the prospect.

### 8.0 Deposit Model

Epithermal precious metal deposits are commonly described as high-sulphidation and lowsulphidation state end-members in regards to the sulphidation state and redox conditions of the hydrothermal fluids. Alteration mineralogy and form, as well as ore mineralogy, ore gangue, ore textures, and form of mineralization reflect the conditions under which mineralization occurred. A further categorization distinguishes intermediate-sulphidation state mineralization from lowsulphidation state mineralization as defined by their sulphide assemblage (Einaudi, Hedenquist & Inan, 2003). Distinguishing between these types of mineralizing systems is important. Mineralization will be associated with different parts of their respective systems (White & Hedenquist, 1995) and this knowledge should guide exploration.

Epithermal gold-silver deposits usually form within 300 metres of the paleo-surface but can be as deep as 1 to 2 kilometres. Formation temperatures range from <150° C to ~ 300° C (White & Hedenquist, 1995). In high-sulphidation deposits host rocks are leached leaving a residue of vuggy quartz with a halo of quartz, ±alunite, ±dickite, ±pyrophyllite (Einaudi, Hedenquist & Inan, 2003). During deposit formation magmatic volatiles ascend and are mixed with meteoric water. Resulting acidic and oxidized fluids leach rock outward from the fluid conduit and ore minerals may be deposited within the leached rock by later magmatic fluids. Mineralization is disseminated to veined and characterized by the presence of an enargite-pyrite bearing assemblages. Examples of HS deposits are El Indio-Tambo (Chile), Julcani (Peru), and La Mexicana, (Argentina).

In low-sulphidation deposits, alteration consisting of illite or chlorite ± adularia grades out into propyllitic alteration. Boiling fluids rising along structures may deposit ore minerals and eventually discharge silica rich hydrothermal fluids from hot springs. The near neutral pH and reduced fluids form low-sulphidation state sulphide minerals. Mineralization occurs as cavity filling veins with sharp boundaries or small vein stockworks and contains sphalerite-arsenopyrite-pyrite bearing assemblages. Examples are McLaughlin (California), Hishikara (Japan), and El Limon (Nicaragua).

Intermediate-sulphidation systems can be characterized by sulphide content. They share a similar assemblage as high-sulphide systems but lack enargite. The presence of moderate to zinc-rich sphalerite, tennantite-tetrahedrite, high silver-gold ratio, abundant manganese, and a lack of alunite indicate that hydrothermal fluids were at times in an intermediate sulphidation state. Examples of intermediate-sulphidation type deposits are Fresnillo (Mexico) and Creede

(Colorado), and the Victoria deposit at Lepanto in the Phillipines (White-JB personal communication, 2011).

Incamayo is considered an example of a high-sulphidation epithermal gold and silver mineralization with aspects of intermediate-sulphidation systems. The complexity may indicate varying pulses caused by intermittent boiling events, local wall rock alteration, or by introduction of reduced fluids of sedimentary or magmatic origin.

Advanced argillic alteration at Incamayo consists of vuggy silicified structures with halos of kaolinite and alunite grading away from structures into sericite (González, 1998) to variable argillic alteration. Argillic alteration grades out into propyllitic alteration. Much of the chlorite alteration may be associated with older greenschist facies regional metamorphism but epidote has been noted in core associated with clay alteration.

Mineralization is variable along the length of the deposit, with gold and copper predominant to the north and silver and zinc more common at the southern end of the system. The presence of enargite in mineralized areas indicates that the system was probably high-sulphidation (González). However, the amount of sphalerite indicates a lower sulphidation state locally or at different times within the system. (White & Hedenquist, 1995). A low-sulphidation interpretation is also confirmed by a microscopic and mineralogical examination of a mineralized from the southern part of the Incamayo alteration zone by LeCouteur (2011).

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**Figure 5a:** Conceptual model illustrating styles of magmatic arc porphyry copper-gold and epithermal gold-silver mineralization.

High-sulphidation epithermal precious metal deposits occur worldwide. There are a number in the Central Andes often occur within belts associated with deep-seated regional structures (Kay, et.al., 1999). The Maricunga and El Indio Belts in northern Chile contain some of the world's largest high-sulphidation precious metal deposits including La Coipa and El Hueso in the Maricunga gold-copper Belt, and Pascua, and El Indio-Tambo in the El Indio Gold Belt (Jannas et al, 1999).

In northern Argentina high-sulphidation silver-gold epithermal deposits - Silver Standard's Diablillos deposit (estimated 21.6 Mt at 111 gpt silver and 0.92 gpt gold) and Golden Minerals' El Quevar deposit (8.9 million ounces at a grade of 310 gpt silver) - are recent discoveries less than 75 kilometres and 50 kilometres respectively from Incamayo (Figure 5).

Diablillos is located approximately 75 kilometres southwest of the Property, while El Quevar is situated 50 kilometres northwest of Incamayo. Both Incamayo and El Quevar are located on the Calama-El Toro lineament.

# 9.0 Mineralization

The Property comprises a high-sulphidation epithermal system at the eastern edge of the Argentine Puna. The focus of exploration is principally contained within a  $\pm 1,000$  metre wide and over 5,000 metre long northeast to southwest trending alteration zone that is visible on satellite imagery along the western flanks of Cerro Gordo. This zone of alteration appears to represent a major fault structure that is a splay off the main northerly trending suture zone. Known mineralization appears to be related to second and third order structures that splay off a major terrane bounding fault.

Trench sampling carried out on the property in 1997 by Mansfield Minerals revealed a number of continuously mineralized gold zones including:

- 20 metres of 0.82 grams per tonne (gpt) gold
- 72 metres of 1.40 gpt gold (including 18 metres of 5 gpt gold)
- 50 metres of 0.67 gpt gold
- 10 metres of 1.51 gpt gold
- 16 metres of 0.98 gpt gold and 48 gpt silver

Base metal values in the trenches were low and the property was drilled with widely spaced reverse circulation holes only for its precious metal potential. However, the furthest north drill hole in the alteration zone, RC-7, encountered significant intervals of gold-copper-silver-tellurium-tin mineralization from near surface to the end of the hole at 298 metres.

Mapping and re-sampling of trenches by Brigadier in late 2010 and early 2011 confirmed the above sampling and defined significant gold and silver mineralization in float away from the trenched areas (Figures 8, 9, 10 and 11). An IP geophysical survey, also carried out in late 2010 and early 2011, outlined strong, open-ended IP anomalies extending the length of the 4 kilometre long survey area. In the northern part of the survey area two large, separate IP anomalies have yet to be tested (Figure 12), one of which portrays aspects of porphyry style mineralization.

In the southern part of the survey area strong silver and zinc mineralization detected by Brigadier's drilling is associated with an Induced Potential (IP) anomaly that is plunging to depth to the southwest. Brigadier's exploratory hole in this area represents the largest step-out to date from previous drilling and the better part of the IP anomaly has yet to be tested. The
extensive sphalerite mineralization seen in this hole (CG11-07) is not likely the source of the IP anomaly as sphalerite does not respond well as an IP target.

Brigadier's 2011 nine hole diamond drill program intersected a number of continuously mineralized zones including but not limited to the following:

- 8.2 metres of 2.25 gpt gold and 7.5 gpt silver from surface
- 8.1 metres of 0.6 gpt gold, from surface
- 7.6 metres of 1.14 gpt gold, 14.7 gpt silver and 0.56 % copper
- 3.6 metres of 0.69 gpt gold, 25.4 gpt silver and 1.05 % copper
- 10 metres of 0.8 gpt gold, 7.9 gpt silver and 0.12 % zinc
- 112 metres of 6.6 gpt silver, 0.30 % zinc and 0.08 % lead

The last noted interval cited above represents mineralization in CG11-07, which, as mentioned, is 350 metres away from any previous drill intersections and is of a mineralizing style that includes matrix supported sulphide breccias, unlike anything seen to date on the Property.

The drilling also intersected tin and tellurium values of 4,300 ppm tin and >1,000 ppm tellurium.

Complete assay results from the sampling and mapping program are contained in Appendix 1. Selected assay results from the drill program are shown in Tables 2 to 10 and complete results are contained in Appendix 3.

The geometry and controls to the varying styles of mineralization on the Property have yet to be fully determined or understood.

# **10.0 Exploration**

Beginning in October, 2010 and completed in May, 2011 Brigadier carried out exploration that comprised: a mapping and sampling program; a property wide Induced Potential survey; and a nine-hole diamond drill program comprising 1,520 metres. In total, 1489 samples were collected for assay from the diamond drill core.

Mapping, prospecting, and outcrop geochemical sampling continued to the end of the program. During the 2010-2011 field season 175 grab and chip samples were taken and assayed from trenches, outcrop and float.

## 10.1 Mapping and Sampling Program

## **10.1.1 Program Parameters**

Beginning on November 20, 2010 and ending in May, 2011 a three-man geological team mapped and selectively re-sampled trenches created by Mansfield/Argex in 1997. Trenches were in part sloughed in and the floors of the trenches were largely covered, however sufficient outcrop was exposed along the sides of the trenches to allow mapping and sampling. Some 115 samples were collected over the period from late November to mid December and a further 60 samples were collected from mid January to the end of the program in May. These samples comprised grab and chip bedrock samples from trenches, grab samples from outcrop, and grab samples of float material.

Of the 175 samples collected, 56 are anomalous to highly anomalous in gold. Seventeen samples contain from 0.5 to 1 grams per tonne (gpt) gold, 30 contain from 1 gpt to 5 gpt gold, and 9 contain from 5 to 147 gpt gold. The highest gold-bearing sample also contain 411 gpt silver. Complete assays for gold are shown on Figures 8 and 10.

Thirty-five of the 175 samples contained in excess of 40 grams per tonne silver. Twelve samples contain 40 to 70 gpt silver, 7 samples contain 70 to 100 gpt silver, 13 contain 100 to 500 gpt silver and 3 samples contain in excess of 500 gpt silver. The highest silver value (690 gpt) also contains 4.1 gpt gold. This sample was collected from the western end of Trench M2, at the southern end of the alteration zone, immediately west of diamond drill hole CG11-07. Complete silver assays are shown on Figures 9 and 11.





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Photo 3: View of a portion of the Incamayo Property from the northeast looking southwest and showing VG Ridge in the middle distance, North Ridge with North Ridge C and B Trenches running horizontally, and South Ridge in the far distance. The distance from the photo site to VG Ridge is 650 metres, to North Ridge is 1.35 km, and to South Ridge is 2.3 km. Sinter Hill, the northeast end of the alteration zone lies a further 1.4 km to the northeast. The area to the northeast of VG Ridge has seen little alteration, in part due to the talus cover as seen in the foreground. A grab sample from unmapped outcrop on the north side of VG Ridge, within the alteration zone to the left, returned values of 9.7 gpt gold, 255 ppm silver, and 1695 ppm tin.

## 10.1.2 Program Results

The hydrothermal system exposed at Incamayo, and partly shown in the above Photo 3, is hosted by a sequence of siliciclastic turbidite sediments that have been regionally metamorphosed to chlorite-grade greenschist facies. Structural geology is complex consisting of a steeply to moderately southeast dipping northeast striking brittle shear zone which contains associated extensional and compressional structures. The dominant tectonic fabric is a 055° to 070° trending cleavage that dips moderately to sub-vertically to the southeast and is predominantly bedding parallel. Locally, low-angle thrust faults have been identified within the fault zone being either part of the shear structure or overprinted by it. Extensional structures within the fault zone have been utilized by the hydrothermal system which is responsible for

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mineralization at Incamayo. This tectonized zone is cut and offset by northwest to southeast and east to west trending faults. These structures broadly define three to four areas within the mineralized zone that are internally consistent in regards to structure, alteration, mineralization, and styles of mineralization. Geological mapping, geochemistry, an IP geophysical survey, and drilling have been used to define the geology at Incamayo.

For description purposes these areas have been defined, for descriptive purposes, as: the South Block; the Central Block (± the Gordon Zone); and the North Block. The northern end of the North Block is marked by the VG (Visible Gold) Ridge which marks the northern extent of drilling. The alteration zone between VG Ridge and Sinter Hill, which marks the northern extent of alteration, is over 2 kilometres in strike length and is virtually unexplored. This distance is larger than the distance between the northernmost holes on the Property and the southernmost hole, which distance is just over 1.5 kilometres in strike length.



Photo 4: View from atop Cerro Gordo looking southwest. From left to right are shown the South Ridge Trench, the main access road, M2 Trench, M1 Trench, GZ2 Trench, GZ1 Trench, North Ridge D Trench (sinuous), North Ridge Trench, North Ridge A Trench, North Ridge B Trench (curved) and the east end of North Ridge C Trench. The IP chargeability anomaly defined during the present program extends off the geophysical grid under cover to the southwest.



**Photo 5**: View from atop Cerro Gordo looking west showing from left - GZ2 Trench, GZ1 Trench, North Ridge D Trench (sinuous), North Ridge Trench, North Ridge A Trench, North Ridge B and C Trenches (curved), 6018S Trench, 6018W Trench, 6018 Trench, barely visible to right of 6018S Trench, and VG Ridge on the far right. The area between the North Ridges and the VG Ridge Trench is in large part talus covered and poorly explored.

## South Block

The South Block is defined by the headwaters of a large quebrada containing a northwest trending fork and two west-northwest trending forks that encompass the M1 and M@ Trenches. Data from Trenches M1 and M2, DDH CG11-7, and some surface exposures define this area. Mineralization is predominantly silver with lead and zinc and is associated with silicified breccias. Alteration mineralogy consists of predominantly argillic alteration with minor zones of silicification. No alunite was observed.

The western end of trench M2 contains areas of sheeted silicified breccia within argillized and variably oxidized metasediments. These structures are in general less than 5 centimetres in thickness, dip moderately to the northwest and occur over a distance of 80 metres along the trench. Eighteen samples were taken in and around the trench. Five mineralized samples from M2 assayed over 30 gpt silver with four containing over 99 gpt. Four samples assayed from 0.4

to 4 gpt gold. Zinc and lead were more prominent than copper. Northeast striking (reverse?) faulting within the alteration zone dips steeply to moderately to the southeast. Locally, movement appears to be southeast side up.

Trench M1 is located 200 metres to the north of M2 (Figure 6). Bedding and cleavage are steep toward the eastern part of the trench and become increasingly moderate toward the western end. Argillic alteration is strong and predominates within the centre and eastern parts of the trench. Up to 30-metre sections of argillite alternating with sandstone dipping moderately to the southeast are variably altered. Sections consisting predominantly of shales are more argillically altered than sandstones and quartzites. This alteration diminishes at the western end of the trench where argillites and sandstones are weakly altered to unaltered.

M1 and M2 trench extensions east of the north-south access road contain variable to locally strong argillic alteration and iron oxidation. Argillic alteration grades out toward the eastern end of the trenches.

The section of M1 east of the drill road contains scattered intervals of variable silicification and quartz veins and veinlets. Bull quartz veins, containing no mineralization, are sub-vertical to steeply dipping to the southeast, parallel to the tectonic fabric. Silicification is minor within the trenches and is associated with steeply dipping faults within overall argillic alteration. Mineralized float with jarosite and alunite was identified. Nine samples were taken from the eastern part of trench of M1 and surrounding area. Five of these assayed over 100 gpt silver and ran from 0.5 to 2.3 gpt gold. Fifteen samples were taken from M1 west of the road and four were mineralized with from 0.5 to 2.6 gpt gold and from 43 to 80 gpt silver Figures 7 to 11).

Rock geochemistry appears to indicate that silicification and gold mineralization are more prominent in the eastern part of the South Block. Silver occurred across the entire area. (Figures 8 to 11). Silicification was relegated to breccia structures to the west but was more massive to the east. The western part of the south block is 80 metres lower in elevation than the eastern side and the geochemistry may be partly reflecting the level of alteration within the hydrothermal system.

The area between the west ends of trenches M1 and M2, and the area extending downhill to the west into the southernmost quebrada is notable for the amount of ferricrete visible at surface. This ferricrete, comprising brecciated bedrock material cemented by iron oxide, is seen nowhere else at Incamayo.

Hole CG11-07 was drilled near the west end of Trench M2 (Figures 6 and 7). This hole is described in detail in Section 10.3.2.

#### Gordon Zone

Between the South and Central Blocks is the Gordon Zone. This area is defined by two interpreted northwest to southeast trending faults. This area contains trenches GZ1 and GZ 2 (Figure 6). The approximately 90-metre wide structural zone has characteristics similar to both the Central and Southern Blocks.

Near the western extent of Trench GZ 2, 35 metres of variably silicified, oxidized, and locally brecciated meta-sediments form a prominent alteration zone. Translucent to milky quartz veins are common. No alunite was observed. Ten rock samples were collected within and near the trench during the present program. Eight of these were in the highly altered west end of the trench. Though the silica veining and iron oxidation are prominent within the complex structure only two of the nine surface and trench samples contain significant gold, assaying at 0.5 and 3 gpt gold and all samples assayed under 15 gpt silver. All samples were essentially grab samples, mostly collected from the quartz-rich zone (Figures 7-11).

The silicification exposed in GZ 2 extends 30 metres north to immediately south of the GZ 1 trench. The GZ 1 Trench was deep and contained strong argillic alteration and gouge but no quartz veining as in GZ 2. Two samples were taken within the argillic alteration in GZ 1. No anomalous mineralization was defined.

The mineralized zone at the western end of Trench GZ 2 occurs within a network of faults within the overall fault zone. Within this zone a northeast trending thrust fault dipping to the southeast is cut by northwest to southeast trending sub-vertical faults. Both cut the predominant 055° to 070° tectonic fabric. Silicified structures and quartz veining dip moderately to the northwest, cutting the predominant cleavage.

The complex structure of the Gordon Zone, including low angle faults, the amount of massive silicification, and the anomalous gold values being more prevalent than silver, has characteristics similar to the Central Block immediately to the north. The Gordon Zone's elevation, however, and the presence of silicified breccia are similar to aspects of the South Block. It appears that both the South Block and Gordon Zone are down dropped fault blocks with the Gordon zone possibly still retaining elements of the top of a mineralizing hydrothermal system.

DDH holes CG11-6 and CG11-9 were drilled on a 130° azimuth under Trench GZ 2 (Figures 6 and 7). These holes are described in detail in Section 10.3.2.



**Photo 6**: View of the Gordon Zone looking southeast from the North Ridge D Trench. The mineralized alteration zone is the pale brown oxidized area located between the two trenches. Drill holes CG11-06 and 09 were located to intersect this zone but suffered poor recovery within the zone of interest. Prospecting located previously un-sampled high-grade silver (>100 gpt) in outcrop and float to the southeast of the Gordon Zone between the road and the east end of the M1 Trench in the middle distance.

## **Central Block**

The Central Block consists of North Ridge and is 80 metres higher in elevation than the South Block. The area is defined to the north by a northwest striking quebrada that is interpreted as fault. Within the Central Block an extensive envelope of argillic alteration contains discrete zones of silicification,  $\pm$  alunite,  $\pm$  jarosite, and  $\pm$  kaolinite. Gold and copper mineralization predominates and is associated with silicified structures dipping moderately to the northwest.

Five trenches were excavated by Mansfield within the Central Block. These are designated North Ridge and North Ridge A to D. (Figures 6 and 7). These trenches, and outcrop outside the trenches, were mapped during the present program, to define the alteration and structure of the Central Block.

East of the drill road on North Ridge, bedding parallel cleavage in unaltered metasediments dips moderately to the southeast. Immediately west of the drill road in North Ridge Trench A the eastern side of the northeast trending alteration-fault zone is exposed. This part of the fault zone is defined by intensely foliated metasediments with steep to sub-vertical southeast dipping bedding parallel cleavage and strong argillic alteration. Thirty metres to the west structure becomes more complex. Locally tight folds are segmented by a strong foliation that dips steeply to moderately to the northwest alternating with the more common sub-vertical to southeast dip. These reversals of foliation dip are also observed in North Ridge and North Ridge D Trenches. Moderately northwest dipping silicified structures that cut the steep foliation become common toward the middle of the trench and define the topographic high of North Ridge. These structures are up to one metre in thickness and host mineralization at surface. Visible gold has been identified in these rocks in the North Ridge A Trench. The western side of the alterationfault zone is defined by faulting that dips steeply to moderately to the southwest with apparent southeast side up movement. Strong argillic alteration grades out to the west.

Fifty-two samples were assayed from North Ridge trenches and the surrounding outcrop (Figure 7). Five samples assayed greater than 6 gpt gold and two contained over 100 gpt gold. Three assayed from 3 to 6 gpt gold and sixteen from 0.5 to 3 gpt gold (Figures 8 and 11). Eleven samples were anomalous in silver. Three contained over 100 gpt silver, two from 70 to 100 gpt silver and six from 40 to 70 gpt silver (Figures 9 and 11). Four of the five samples with high gold values were from North Ridge A and B Trenches, at and near the topographic high. These samples were variably silicified and oxidized.

The northwest dipping silicified structures can locally be confused with bedding but in actuality crosscut bedding that, property-wide, dips steeply to the southeast. In trenches these structures air out to the south and north. Northwest dipping silicified and mineralized structures appear to lessen in size and frequency in Trenches North Ridge B and C as compared to within the North Ridge Trench.

Southeast dipping low to moderate angle faults occur within the overall alteration fault zone on North Ridge. In the central part of Trench North Ridge B, a low to moderate angle fault dips to the southeast along meta-sandstone/siltstone and argillite bedding. The fault zone is well oxidized. Above the fault, to the west, moderately northwest dipping structures are variably veined, silicified, and mineralized. Smaller low to moderately dipping faults are observed in other areas on the north slope of North Ridge within the alteration-fault zone.

Southeast dipping low-moderate angle faults may be secondary structures associated with overall fault zone. The faults themselves do not appear mineralized but the northwest dipping structures within the host rocks are. There is the possibility of these mineralized fault packages repeating at depth.

DDHs CG11-3, 4, and 5 were drilled on a 130° azimuth section on North Ridge, immediately north of the North Ridge Trench, to test for the down dip extensions of mineralization seen in trenches and outcrop (Figures 6 and 7). These holes are described in detail in Section 10.3.2.



**Photo 7**: View of the Central Block from CG11-01 location looking southwest, showing the North Ridge C and B Trenches. Drill holes CG11-3, 4 and 5 were located at the top of North Ridge to test siliceous mineralized zones (visible as darker brown areas) along the northeast flank of North Ridge. The 650 metres between North Ridge and the CG11-01 location on VG Ridge is untested by drilling.

#### North Block

As with the South and Central Blocks, the North Block is defined by a northwest to southeast trending quebrada that is interpreted as a fault structure. Trenches VG, 6018, 6018S and 6018W were used to define the geology (Figure 6). Thirty-six trench and outcrop samples were collected and assayed. Extensive argillic alteration, of varying intensity, contains discrete zones

of silicification and alunite  $\pm$  kaolinite. Mineralization is primarily gold and copper and occurs within moderately northwest dipping silicified and oxidized structures.

VG trench is approximately 475 metres in length and the most northerly in the North Block. It is also the most northerly trench within the mineralized zone as defined to date. The eastern end of the trench and the eastern extent of the alteration zone begins immediately west of the drill road. East of the access road, unaltered metasediments dip moderately to the southeast. Foliation intensifies and dips steepen west of the road. At the east end of the trench a 1 to 2-metre thick, moderately northwest dipping silicified zone and quartz vein is exposed at intervals over 250 metres along the trench. This vein is locally offset by faulting

Twenty-six samples were collected over the length of the trench. One sample assayed at 4.3 gpt gold and 11 assayed from 0.5 to 6 gpt gold. Six samples collected from a 130 metre silicified and oxidized interval assayed 0.38 to 4.4 gpt gold (Figures 8 and 10).

A smaller 80-metre section at the western end of VG trench contains strong argillic alteration with minimal silicification. Two samples within this section assayed 0.19 and 0.73 gpt gold. Silver values were minimal although one sample assayed at 73 gpt silver at the eastern end of the trench. Three other samples assayed from 42 to 55 gpt silver (Figures 9 and 11).

VG Trench appears to mark a transition in alteration from that further south on the Property. Native sulphur has been discovered in highly argillically altered rocks on the north side of the trench at its eastern end that do not cross the trench to its southern side. As well gold, silver and tin values to 9.7 gpt, 255 gpt and 1695 ppm respectively were discovered at the end of the 2011 program in outcrop immediately north of the trench. These values were found in an alteration zone that is not exposed in the VG Trench and extends northeasterly under talus cover. This mineralization, unlike that seen in the VG Trench, is not associated with quartz veining.

Trench 6018 is approximately 270 metres south of VG trench. The two trenches appear to be off-set by an interpreted east-west fault. Except for the first 10 metres on the eastern end of Trench 6018, the section is almost entirely argillically altered. Silicified and quartz- veined structures dip moderately to the northwest. These are prominent at the centre of the trench. Ten samples were taken from the 6018 trenches. Four assays range from 0.7 to 1 gpt gold at the eastern end of the trench (Figures 8 and 10). Silver content ranged from 0.14 to 18 gpt in

samples from the 6018 area. The western end of the trench contains variable argillic alteration that grades out to the west.

Trench 6018S is at the bottom of the quebrada that defines the southern extent of the North Block (Figure 6). This trench is 370 m south of VG trench and topographically lower than both the 6018 and VG Trenches. The section contained locally strong argillic alteration. Faulting, dipping steeply to the southeast, was present at the eastern end of the trench. One sample within the argillic alteration assayed 0.06 gpt gold and 2.8 gpt silver. This fault zone contained intervals of strong argillic alteration but no silicification. The structure may be a continuation of the faulting in the Central Block.

Holes CG11-1, 2, and 8 were drilled on a 130° azimuth within the main alteration zone beneath and south of the eastern end of the VG Trench (Figures 6 and 7). These holes are described in detail in Section 10.3.2.



**Photo 8**: View of the North Block from the North Ridge area. Rubble in lower right corner is from auriferous silicified zone tested by CG11-3, 4 and 5. Trench 6018S is visible at the bottom of the quebradas. Holes CG11-1, 2 and 8 are located on VG Ridge in the middle distance, 650 metres to the northeast. Note the talus covering the intervening distance.

#### 10.2 IP Survey

From December, 2010 to February, 2011, Argali Geofisica ("Argali") of Antofagasta, Chile, conducted an induced polarization (IP) survey on the Property. The primary objective of the geophysical survey was to help delineate zones of gold, silver and copper mineralization and to help map structures, alteration and lithology. Seventeen lines totalling 47.8 km were surveyed (Figure 12).

#### 10.2.1 Program Parameters

The IP survey, the complete details of which are contained in Appendix 2, was conducted with a pole-dipole array and a dipole spacing of 100 metres expanded through 6 to 8 separations (n=1 to 6-8). The transmitting frequency was a standard time-domain signal with a frequency of 0.125 Hz (2 seconds on – 2 seconds off). The chargeability was measured with "arithmetic" windows, consisting of 20 windows each 80 msec in width following an initial delay of 240 msec. However, to avoid electromagnetic coupling effects, the first two windows were not utilized for the chargeability calculation. The chargeability was calculated as the average of the last 18 windows, representing an integration from 400 to 1840 msec.

Receiver electrodes consisted of a stainless steel electrode embedded in a shallow hole and wetted with approximately 1 litre of fresh water. Current electrodes consisted of several shallow holes lined with aluminum foil and wetted with 10 to 20 litres of water. Additional pits and water were required in some rocky areas with high contact impedances. In general, the transmitted currents were in the range of 1.3 to 3.5 amperes. Lower currents from 0.2 to 1.0 amperes were transmitted in several rocky areas, particularly on the northern lines where resistivities were higher. Contact impedances on the two northern lines were much higher than the rest of the grid.

Noise levels were generally very low where signal strengths were over 10 mV. In those areas with low resistivities, low transmitted currents, and signal strengths less than 6 mV, noise levels were much higher. Although repeatability of the chargeability measurements was generally good, the decay curves exhibit elevated noise levels. The ambient noise level at Incamayo was very high due to frequent thunderstorms associated with the so-called "Bolivian Winter" which peaks from December through March each year. The weather during this year was significantly more severe than in past years. The telluric noise level was noticeably higher-than-usual at Incamayo and also at other projects in northern Chile and Argentina.



#### 10.2.1.1 Inversion

The data were inverted with a 2-D IP and resistivity inversion program called "DCIP2D (version 3.2)" from the University of British Columbia Geophysical Inversion Facility. Results of the inversion are depicted as cross-sections of chargeability and resistivity versus elevation that allow for easier interpretation than pseudosections, particularly when multiple arrays and dipoles are employed on the same line. Most geophysical inversions do not produce a unique solution; that is, there can be a multitude of different models that fit the data equally well. To help reduce the non-uniqueness of the solutions, the data are fit to a specified or calculated error. The error associated with each measurement is not well known and must be estimated. Error estimates for the resistivity (voltage) and chargeability were calculated as follows:

Ev = .00002 (Volts/ampere) + .05Vp, Em = 0.31 (mV/V) + .012 M + .012 SD, where:

Ev is the estimated error of the voltage measurement

Vp is the measured primary voltage (V) normalized by the current (a)

Em is the estimated error of the chargeability,

SD is the standard deviation of the chargeability measurement, and

M is the measured chargeability.

The majority of the voltage error estimates were about 5%, while most of the chargeability error estimates were between 0.3 and 0.5 mV/V. Some of the error estimates were edited manually where an analysis of the data and anomaly pattern suggested that the noise and error estimate should be either higher or lower.

During the inversion, an objective function is minimized so that the solution contains a minimum amount of structure. The mesh for the inversion was designed with 3 cells between each electrode and a sufficient padding of cells on the sides. Because of the elevation variation along the lines, the vertical portion of the mesh was designed with a fine mesh so that the variation is topography could be well accounted for.

Specific inversion parameters that were used include:

- Topography: from GPS

- Mesh: manually designed for each line to optimize results and account for topography
- Chi-factor: 1.0 for resistivity, and 1.0 for chargeability
- Error estimates of voltage and chargeability: supplied (see above)
- Model Objective function: default values (default,1,1), no weighting
- Starting resistivity model: homogeneous half-space
- Starting chargeability model: homogeneous polarization, resistivity from inversion

### 9.2.1.2 IP Data Maps

The IP data were presented as pseudo sections of the raw data and as sections showing the inverted chargeability and resistivity. The inverted sections were also presented as "stacked" sections so that results from all lines may be quickly compared. Plan views of the inverted chargeability and resistivity were presented at selected elevations. The following maps are presented in Appendix B of the attached IP report (Appendix 2):

- Pseudo sections and inverted sections for each line
- Stacked sections of the inverted chargeability and resistivity
- Plan views of the inverted chargeability and resistivity at selected elevations

The inverted sections together with the peudosections of the observed raw data and the calculated data are contained in Argali's IP report in Appendix 2.

#### 9.2.3 Program Results

The IP data from Incamayo outline large anomalous zones with chargeabilities from 20 to 40 mV/V (Figure 12). The anomalous zone measures approximately 4 km long by 1 to 2 km wide. Background chargeabilities on the flanks of the anomaly are generally less than 5 mV/V. The high chargeabilities are mostly interpreted as sulphide (including pyrite) mineralization associated with a large hydrothermal porphyry system. The resistivities at Incamayo are mostly in the range of 50 to 1000 ohm-m. Resistivities less than 100 ohm-m are considered conductive. Most of the chargeability anomalies are located within conductive zones or near resistivity-conductive contacts. Several chargeability anomalies are located within resistive zones, particularly on the northern and western parts of the grid. A large, deep conductive zone is located in the east central portion of the grid and is clearly outlined on the plan views of the inverted resistivity at elevations of 4700 m and below. Chargeabilities within the large deep conductive zone are generally moderately high. Higher chargeabilities are located on the western edge of the deep conductive zone on a contact with a large resistive zone.

The IP and resistivity are clearly mapping a large, complex hydrothermal system. The IP data were interpreted by Frank Fritz of Fritz Geophysics of Fort Collins, Colorado. Results of this interpretation along with an interpretation of a magnetometer survey carried out by SESA in 2006 are shown on Figures 13 and 13a. Cross sections of the IP data, corresponding to drill hole sections are shown on Figures 14 to 18.



## 9.3 Diamond Drilling Program

### 9.3.1 Program Parameters

Drilling on the Property was concentrated in four, widely separated areas, three of which corresponded in large part to areas previously tested by Mansfield in 1997, on VG Ridge, North Ridge and the Gordon Zone immediately south of North Ridge. The fourth area was located almost 400 metres to the southwest of any previous drilling, and over 500 metres to the southwest of the Gordon Zone, at the west end of the M2 Trench (Figure 19).

Drilling was carried out by Falcon Drilling (Barbados) Succursal Argentina of Salta, Argentina and comprised 1520 metres of diamond drill coring in nine holes utilizing NQ coring equipment.

### 9.3.2 Program Results

Drilling on the Property intersected a package of turbiditic argillite, siltstone, and sandstones that have been faulted, variably argillically altered, silicified and mineralized. Variable amounts of gold, silver, copper, zinc, tin and tellurium were encountered in all holes and show evidence of differing styles of mineralization.

### South Block

Drilling in the South Block, comprising one hole, CG11-07, intercepted variably silicified breccias, silica veins, kaolinite alteration, and brittle fault structures. Holes CG11-6, CG11-7, and CG11-9 show alteration and mineralization relationships that are prominent at Incamayo. A sequence of regionally metamorphosed siliciclastic meta-sediments has been faulted, phreatically and tectonically brecciated, hydrothermally altered, and locally silicified and mineralized in structurally prepared sections. Hornfels is common at depth within the holes as are thin, ragged, intrusive dykelets. These are possibly off an intrusive body at depth or are associated with a much older Proterozoic granitoid 9 km to the east. The dominant silver and zinc mineralization over most of the hole indicate intermediate sulphidation affinities. The presence of kaolinite and lack of lead at the top of the hole indicates that a higher sulphidation hydrothermal system was active locally.

Hole CG11-7 (130°, -45°) was drilled furthest to the south. At the top of the hole anomalous silver values are associated with lead relative to silver. Overall however silver values do not show a direct relationship to lead values. They occur within a well tectonized fault zone near



surface. Strong base and precious metals are associated with sphalerite dominated massive sulphides in variably silicified breccias toward the middle of the hole. The lower portion of the hole contains high zinc values relative to lead. Silver and zinc mineralization occur within sulphide ±silica veins and veinlets.

Selected assays are shown in Table 2 below.

			Au		Cu	Pb	
Hole_ID	From	То	ppb	Ag ppb	ppm	ppm	Zn ppm
CG11-07	1.5	11.0		42400			
Incl.	0.0	1.5		2712		309	
ш	1.5	2.5		1664		363	
ш	2.5	4.0		16408		187	
ш	4.0	5.7		6437		154	
ш	5.7	7.0		6029		189	
ш	7.0	8.5		36627		587	
ш	8.5	10.0		167000		959	
ш	10.0	11.0		11325		216	
	21.0	133		6600			3000
Incl.	123.0	124.0	329	79286	1041	5728	56000
ш	124.0	125.0	233	18248	120	1106	8164
ш	125.0	126.0	823	73023	529	6189	9918
ш	142.0	143.0		528	20	62	273
ш	143.0	144.0		2245	36	1128	4202
ш	144.0	145.0		1654	33	1135	2477

Table 2: CG11-7 selected results

An IP section with hole CG11-07 plotted is shown on Figure 14. A plan map of CG11-07 and cross sections showing sample intervals, gold and silver values, and copper and zinc values are shown as Figures 20, 21 and 22.



Photo 9: Close-up of CG11-07 showing sphalerite veinlets crosscutting bedding at 122.9 metres depth.

#### Gordon Zone

Holes CG11-6 (130°, -45°) and CG11-9 (130°, -60°) were drilled on the same section, 480 metres north of CG11-7 (Figure 19). The holes were collared in faulted, structurally complex, hydrothermally altered argillite and sandstones. Silicification and translucent to milky quartz veining were common on surface. The holes were characterized by a large brittle fault zone at the top of the section and scattered smaller faults down hole. Both holes were targeted to intercept the auriferous siliceous zone exposed at surface in Trench GZ1. However, hole CG11-6 recovered from 40% of cored material to as little as 10% to 18.5 metres depth, and hole CG11-9 recovered from 10% to 30% to 9.7 metres depth. Both these holes therefore failed in their intended purpose of adequately testing mineralization at surface.

Mineralization is associated with silicified breccia within the fault zone at the top of the holes and in more discrete faults toward the lower parts of the holes. Faulting, strong argillic alteration and silicification and associated pyritization are focused along more competent siltstone-sandstone horizons. The best mineralization occurs within the fault zone in the upper



portion of the holes. Pyrite and chalcopyrite veining and variably silicified breccia matrix contain the gold and silver mineralization as does more massive pyrite breccia matrix. Copper is relatively more common than zinc and lead. Intervals of gold and zinc at depth occur within discrete brecciated and faulted intervals. Toward the bottom of the holes zinc predominates over lead and silver over gold. Mineralization occurs within sulphide veining and minor brecciated intervals.

Selected assays, minus tin and tellurium values, are shown in Tables 3 and 4 below.

Hole_ID	From	То	Au ppb	Ag ppb	Cu ppm	Pb ppm	Zn ppm
CG11-6	35.9	43.5	1140	1470	5600		
Incl	35.9	36.7	237	28671	2206		151
and	36.7	37.7	153	1217	276		
and	37.7	38.6	472	3768	817		181
and	38.6	39.6	187	1204	194		
and	39.6	40.3	515	5129	619		310
and	40.3	41.0	2276	21356	12700		517
and	41.0	41.8	153	1414	353		128
and	41.8	42.3	10201	100000	52410		346
	42.3	42.9	438	6474	4517		
	42.9	43.5	420	15762	1858		

 Table 3: CG11-6 selected results

Hole_ID	From	То	Au ppb	Ag ppb	Cu ppm	Pb ppm	Zn ppm
CG11-9	0.0	1.5		1815			
	1.5	4.5		1397			
	4.5	7.5		1566			
	7.5	9.7		1467			
	9.7	10.5		1368			
	10.5	11.1		1184			
	11.1	12.0		1369			
	48.5	58.5	800	7900			1200
incl	48.5	49.5	3891	23806	4248		1510
and	49.5	50.5	161	6192			
and	50.5	51.5	372	10465	1962		1729

 Table 4: CG11-9 selected results





Photo 10: Close-up of hole CG11-7 at 108.5 metres showing sulphides and crackle breccia that is typical of brecciation throughout property.



Photo 11: Quartz veining and mineralization at 49.2 metres depth in CG11-9.

An IP section with holes CG11-06 and 09 plotted is shown on Figure 15. A plan map of CG11-06 and 09 and cross sections showing sample intervals, gold, silver, copper and zinc values are shown as Figures 23, 24, 25 and 26.

## Central Block

Mineralization within the Central Block of Incamayo was tested by holes CG11-3 (130°, -60°), CG11-4 (130°, -47°), CG11-5 (Vertical, -90). These holes were collared at the top of North Ridge and were designed to intercept a series of moderately northwest dipping silicified structures exposed on surface and within trenches North Ridge and North Ridge A. All three holes encountered poor recovery in the top several metres of each hole, within the gold zone. Selected assays are shown in Tables 5, 6 and 7 below.

Strong argillic to advanced alteration with spotty alunite and kaolinite is dominant at the top of the holes. Spotty silicification to less than one-meter wide intervals of massive silicification and variably silicified breccia zones and gouge occur intermittently within the clay alteration. Fine

stockwork and fracture bound silica veinlets are common. Iron oxidation is strong and copper oxide was observed locally. This alteration-mineralization and structural section thickens to the southeast. Structure within the core is complex with numerous orientations.

Mineralization is associated with spotty silicification, iron oxidation, and kaolinite at the tops of all three holes. Silver is relatively minor compared to gold and lead more common than zinc and copper. With depth silver increases relative to gold and zinc and copper are almost equivalent and more prevalent than lead. Mineralization occurs in silica veining and masses with scattered sulphide masses and veining. The lower portions of all three holes contain minor gold, and zinc is more prevalent than lead or copper. Disseminated sphalerite and sphalerite + pyrite veins and masses occur with silica veining and discrete mineralization.

			Au	Ag	Cu	Pb	Zn
Hole_ID	From	То	ppb	ppb	ppm	ppm	ppm
CG11-3	0	9.1	590	9800			
	0.0	1.7	1316	12368			
	1.7	2.9	784	6949			
	2.9	4.4	130	2313			
	4.4	5.0	412	3524			
	5.0	6.0	796	14493			
	6.0	7.0	505	25250			
	7.0	8.0	281	11058			
	8.0	9.1	137	3378			
	32.4	40.3	170	11900			
incl	39.2	39.8	1026	81128			
and	39.8	40.3	563	55577			
	69.1	88.7	170	5900			
incl	80.0	81.3	144	4096			
and	81.3	82.5	145	4402			
and	82.5	83.9	493	13404	3653		
	96.6	98.0	133	28972			3545
	106.5	107.0	339	88902	9626		2572

Selected assays are shown in Tables 5, 6 and 7 below.

Table 5: CG11-3 selected results

			Au		Cu	Pb	Zn
HoleID	From	То	ppb	Ag ppb	ppm	ppm	ppm
CG11-4							
	0	8.2	2250	7500			
Incl	0.0	1.2	4639	7802			
and	1.2	2.2	4416	16082			
and	2.2	2.8	7524	6948			
and	2.8	4.0	2409	4939			
and	4.0	4.8	218	3937			
and	4.8	5.4	427	16061			
and	5.4	6.3	273	4647			
and	6.3	7.2	213	6529			
and	7.2	8.2	214	2986			
	8.2	9.3	142	2647			
	9.3	10.2	248	2759			
	10.2	11.6	117	1226			
	17.0	22.9	170	6300			
	41.4	48.6	140	14000			
incl	42.2	43.3	106	8650			
and	43.3	43.8	1115	132000			
	55.0	67.2	130	3800			
	80.0	81.0	240	6315			3002
	81.0	82.2	31	1944			1686
	82.2	83.6	112	2474			4476
	109.1	110.0		523			4714
	110.0	111.2		354			2481
	111.2	112.7		307			1416

 Table 6: CG11-4 selected results

Hole_ID	From	То	Au ppb	Ag ppb	Cu ppm	Pb ppm	Zn ppm
CG11-5	0.0	0.8	48.7	1216			
	0.8	8.9	600				
incl	0.8	2.0	2830	4500			
and	0.8	1.3	3210	5745			
and	1.3	2.0	2564	3593			
	25.6	40.1			2700		4000
incl	26.6	27.4		22729	5020	17361	4202
and	27.4	28.1		37687	21340	1604	36200
and	28.1	28.8		1768	4374		2086
and	28.8	29.8		2978	2521		
and	29.8	30.9		1796	1490		
and	30.9	31.8		2011	2095	983	2252
and	31.8	32.6		961	671		1808
and	32.6	33.4	109	5488	1826	1165	6429
and	33.4	34.8		2841	683	727	1788
and	34.8	35.4		48414	1239	2382	19400

Table 7: CG11- 5 selected results

An IP section with holes CG11-03, 04 and 05 plotted is shown on Figure 16. A plan map of CG11-03, 04 and 05 and cross sections showing sample intervals, gold, silver, copper and zinc values are shown as Figures 27, 28, 29, 30 and 31.

## North Block

The northern part of the Property is defined by drill section CG11-1 (130°, -60°) and CG11-2 (130°, -50°). Hole DDH CG11-8 (130, - 65°) is located 25 metres northeast of the section and is on strike with CG11-01 and 02. The holes were collared at the eastern end of VG Ridge, immediately south of the eastern end of VG Trench.

CG11-1 was intended to twin RCDH CG97-7. CG11-2 was drilled to test for structural and geochemical continuity along section to the SE and hole CG11-8 was to do the same along strike to the northeast.

Alteration within metasediments at the top of the holes consists predominantly of argillic alteration with zones of advanced argillic alteration and silicification. Alunite, kaolinite, and jarosite are not uncommon. Sulphur was observed on surface at the east end of the VG Trench. Scattered milky quartz veins and silicified zones of up to 2 metres thick are present over the upper (eastern) 30 metres. Silicified zones vary from massive to more commonly brecciated

and are oriented both steeply and moderately to the core axis. Iron oxidation is moderate to strong and often spotted the core. Disseminated to patchy pyrite masses increased with depth.

In CG11-1 a brittle fault zone with breccia and gouge occurs from 101.6 to 113.6 metres. This zone has strong clay alteration, is variably silicified and contains five intervals of semi-massive sulphide totalling 1.27 metres. There is no similar zone in CG11-2. However, the fault zone may be expressing itself as a variably silicified and oxidized zone in CG11-2. This zone contains stockwork silica veining but no fault breccia or gouge. Hole CG11-8 contains a mineralized structure with semi-massive to massive sulphides (0.3 metres) within a variably silicified brittle fault zone (107 to 118.4 metres). Below this zone is a well brecciated and gouged fault with no silicification or mineralization (118.4 to 121.8 metres).

Below these structural zones crackle breccias grade in and out of hornfelsed sediments. Intrusive dykelets are intermittent and often associated with the hornfels. Structures are scattered and usually discrete with fault breccia occasional silicification and pyritization. Two larger structures occur at the bottoms of CG11-1 and CG11-8. Vuggy, semi-massive pyrite with silica (0.6 metres) occurs within a brecciated and gouged fault zone from 286.6 to 294 metres in CG11-1.

CG11-8 was lost in a fault and fracture zone in pyritic crackle breccia due to equipment failure.

Selected assays, minus tin and tellurium values, are shown in Tables 8, 9 and 10 below.

Hole_ID	From	То	Au ppb	Ag ppb	Cu ppm	Pb ppm	Zn ppm
CG11-1	104.3	110.2	190		3800		
Incl	105.1	106.1		684	1406		
and	106.6	107.0	2129	57218	31800		
and	107.0	107.9		801	1004		
and	107.9	108.4	107	2025	1140		
and	109.0	109.3	116	907	2132		
	288.4	289.3		12787	1022		1779
	289.3	290.3		2637			2002

**Table 8**: CG11-1 selected results. Results do not show 515 ppm tin and 581 ppm telluriumfrom 106.6 to 107.0 metres.

Hole_ID	From	То	Au ppb	Ag ppb	Cu ppm	Pb ppm	Zn ppm
CG11-2	60.4	70.2			1100		
	81.6	82.3		2947			
	82.3	87.4	170	4200			
incl	82.3	83.2		3577			
and	83.2	84.1	208	3535			
and	84.1	85.3		1766			
and	85.3	86.4		4735			
and	86.4	87.4	460	7678			
	120.0	121.0		2031			
	121.0	121.5		560	812		2080
	121.5	122.0		883	9789		8959
	122.0	123.0		408			1465

Table 9: CG11-2 selected results

			Au		Cu	Pb	Zn
Hole_ID	From	То	ppb	Ag ppb	ppm	ppm	ppm
CG11-8	71.7	72.7		131	3176		315
	72.7	73.5		411	3676		437
	73.5	74.3		714	3323		161
	108.9	112.5	690	25400	10500		
Incl	108.9	109.4	228	129000	13990		4412
and	109.4	110.2		744	433		72
and	110.2	110.8	2217	19457	20430		324
and	110.8	111.3		3812	13440		268
and	111.3	112.0		519	430		
and	112.0	112.5	1946	24633	22390		481

**Table 10**: CG11-8 selected results. Results do not show 269 ppm tin and >1000 ppm tellurium from 110.2 to 110.8 metres, and 541 ppm tin and 159 ppm tellurium from 112.0 to 112.5 metres.

IP sections with holes CG11-01 and 02, and CG11-08 plotted are shown on Figure 17 and 18 respectively. A plan map of CG11-01 and 02, and CG11-08 and cross sections showing sample intervals, gold, silver, copper and zinc values are shown as Figures 32 to 37.

# 10.0 Sampling Method and Approach

Rock samples were collected by and under the direction of co-author Breedlove during the mapping and sampling program, and comprised grab and chip samples of outcrop and grab samples of float material. The samples were placed in individually numbered plastic sample bags and sealed. Samples were maintained in the possession of the co-author until delivered to the analytical lab from Salta by bonded courier.

Drill core was logged in the field in a core logging facility at the exploration camp. Core was split using a mechanical core splitter, one half of the core was placed in individually numbered plastic bags and the other half returned to the core box and retained for reference purposes. Core duplicates, blanks and standards were inserted into the sample stream and the samples shipped, via bonded courier from Salta, to the facilities of Acme Analytical Laboratories in Mendoza, Argentina for preparation.

# 11.0 Sample Preparation, Analyses and Security

Samples were delivered by bonded courier to Acme, which operates a sample preparation laboratory in Mendoza, Argentina, and a full analytical laboratory in Vancouver, British Columbia. The Mendoza facility has ISO 9001:2008 certification and the Vancouver facility has ISO and BSI certification.

Sample preparation involved the crushing of up to 1 kilogram of rock to -10 mesh (2 millimetres particle size), then pulverizing a 250 gram split to -200 mesh (74 microns particle size). A 30.0 gram sub-sample was digested in hot (95°C) aqua regia (HCI-HNO<sub>3</sub>-H<sub>2</sub>O), followed by analysis by inductively-coupled plasma mass spectrometry (ICP-MS) techniques (Acme's Group 1DX). Analysis of 36 elements was made.

Over-limit analyses (Acme's 7AR method) were performed for Au, Ag, Cu, Pb, Zn, Sn and Te. This method involves the analysis of a 0.4 gram sample by ICP-ES techniques for high grade rock samples. Over–limit analyses for gold and silver were done using a 30 gram sub-sample with fire assay techniques and a gravimetric finish (method 6 Ag 30 gram).

Quality control samples from the lab include control blanks, duplicates and standards. One sample blank (BLK), two lab solution blanks (G1) and two standards (STD DS7) were run with the batch analysis; no problems were noted with analytical accuracy or precision.

# **12.0 Interpretations and Conclusions**

Precious and base metal mineralization at Incamayo is the product of an epithermal hydrothermal system with high and intermediate sulphidation characteristics. The mineralization occurs within tectonic, phreatic, and possible hydrothermal breccias and in moderately dipping extensional structures. Alteration consists predominantly of strong and widespread argillic alteration. This alteration envelope contains zones of intense silicification with associated kaolinite, jarosite and alunite alteration.

Visible alteration extends for over 4 kilometres and is up to 500 metres wide. The hydrothermal system and resultant alteration and mineralization is astride a shear zone with associated compressional and extensional structures. This fault system is offset by numerous cross-cutting faults which often express themselves as topographic features.

Mineralization occurs within structures that are continuous within these structural blocks. Mineralization likely occurs as a series of stacked lenses within the alteration zone. The continuous mineralization in CG11-07 for example is not evidenced by exposure at surface.

Mineralization varies within the system. Gold and copper are more dominant near surface and at the northern and central portions of the drilled and trenched area. Mineralization becomes more silver rich to the south. With depth zinc, lead and silver are generally more predominant over the entire drilled area though gold can be strong locally in structures. Tin and tellurium values are also enriched, particularly at the north end of the area.

Regional greenschist facies metamorphism produced well indurated Proterozoic siliciclastic metasediments which host the deposit. Unless structurally modified, permeability within these rocks is very low. Fortunately a complex fault/shear structure has brecciated the metasediments and provided pathways for fluid transport and mineral deposition.

The fault/shear zone has had a complex history and not all structurally attractive areas are mineralized. However, there are numerous hydrothermal conduit centres defined by the presence of silica-alunite-jarosite-kaolinite that have been noted at the surface and also semimassive to massive sulphides at depth within fault structures identifying the conduit at depth. These structures and associated high temperature possible metal bearing alteration must be mapped out and tested at depth.



The area outside the 1997 trenches has not been adequately tested. One result of the Brigadier exploration program has been to confirm that gold and silver mineralized zones exist outside the trenched areas. The presence of 9.7 gpt gold in outcrop immediately north of the east end of the VG Trench is but one example. Significant silver values were found in outcrop and float during the present program immediately south of the VG Trench and also immediately north of the east end of the M1 Trench, due south of the Gordon Zone. None of these zones had been previously identified or sampled.

To date drill testing of the large mineralized alteration zone has been limited to relatively shallow slices through the alteration zone at widely spaced intervals. The alteration zone is open to the southwest where it continues under cover and may continue to the northeast into the flank of Cerro Gordo.

The structural attitude of the massive sulphide mineralization seen in holes CF11-1 and 8 is unknown. This mineralization should be amenable to detection and tracing by an electromagnetic survey.

## **13.0 Recommendations**

Continued drilling in each of the four structural zones is recommended (North, Central, Gordon Zone, and South Block). The overall fault/shear zone extends across interpreted structural block boundaries. However, care should be taken when extending smaller structures or mineralized zones across these fault-bounded structural blocks. More knowledge about the internal structure of each of these areas should be a priority.

Continued surface sampling and more trenching in the south area both west and east of the drill road will fill in a large area between the Gordon Zone trenches and the M1 and M2 trenches. A drill road cut into this area, as proposed in the filed EID, with possible drill hole locations in mind would be an efficient use of road building. Other trenches could be placed strategically, relative to road building and observed alteration and mineralization.

Anomalous gold and silver samples were noted east of the drill road and to the north of VG Ridge. Mapping and more prospecting in these areas would assist in locating further mineralization. An emphasis should be placed

The IP geophysical survey on the Property has generated a large amount of data and these data have received only a brief interpretation. It has been noted in core that both mineralized and non-mineralized intervals in core have been pyritized. Base and precious metal mineralization have almost always been observed in association with silicification though it has been noted to occur with kaolinite. The IP survey results should be re-examined using the results of the drilling program in order to refine the interpretation

Golden Minerals' personnel (personal communication) have reported that the highest silver values at El Quevar always occur as dustings within kaolinite rich zones. These zones, where observed in trenches, have usually been well silicified. However, high-grade silver and gold values discovered in surface sampling north of the east end of M1 Trench, and north of the east end of VG Trench, have not been particularly siliceous. Interpreting high resistivity targets at depth could lead to generating some prospective silicified zones below surface mineralization. There is an abundance of low resistivity targets within and outside the alteration zone; however these zones may be reflecting remnant hornfels alteration with the argillically altered zones.

Further drilling will depend on more geochemical sampling, mapping, and on geophysical interpretation. But even without this work the results of the 2011 drilling suggest numerous sites that can be drilled. In the South Block adding one or two drill holes to the CG11-7 section



and possibly drilling a vertical or northwest dipping hole further to the east within or near the section would generate structural and, hopefully, mineralization data.

Because of the poor recovery at the top of many of the holes drilled in the areas of near surface mineralization care should be taken to maximize sample recovery. This may entail the use of reverse circulation drilling within these areas.

It is imperative that a hand-held XRF unit be employed in any future surface work. Such a unit would quickly identify the type and tenor of mineralization and would allow the identification of mineralized zones or pathfinders to mineralization in areas of limited outcrop.

Any future drilling should be of sufficient amount to allow the proper testing of the two large IP anomalies north and northwest of VG Ridge.

It should also be noted that sphalerite will not produce an IP response. The considerable quantities of sphalerite seen in hole CG11-07 will not therefore have produced the IP anomaly in the area, unless accompanied by pyrite, and a review of Figure 14 will show that the drill hole is not located in the most chargeable part of the IP anomaly on this section.

The area downhill from the M2 Trench, northwest of hole CG11-7, and along slope to the north toward the M1 Trench, contains considerable quantities of ferricrete, talus material cemented by iron oxide, which emphasizes the mineral potential of this area.

Any future work should include a detailed structural study of the Property as an aid in determining the likely structural history of the area and defining extensions to mineralization.

Respectfully submitted:

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